ENERGY CHARTER SECRETARIAT

REVIEW OF THE NATIONAL POLICY OF THE REPUBLIC OF KAZAKHSTAN IN THE AREA OF ENERGY SAVING AND ENERGY EFFICIENCY

KAZENERGY ASSOCIATION

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INTRODUCTION

The Republic of Kazakhstan is making good progress towards the formation of a sustainable model for economic development. The Decree of the Head of State Nursultan Nazarbayev approved the Concept for the transition of the Republic of Kazakhstan to a "green" economy. In addition, the Green Bridge Partnership Program was launched to promote sustainable development in Central Asia and other parts of the world.

It is impossible to form a sustainable model for economic development in Kazakhstan without solving the issues of energy efficiency and conservation. It is the government's understanding that the policy of efficient and balanced energy consumption will restrain consumption growth and substantially reduce the environmental impact. Any efforts in this area will contribute to the modernization of the production sector, electric power industry, housing and utilities sector, and transport sector by encouraging the implementation of new technology and innovations. In this regard, the government of Kazakhstan has chosen energy saving and energy efficiency as top priorities of the national energy policy, despite the fact that the country has considerable energy resources and a well-developed energy infrastructure. The government has set a goal to reduce GDP energy intensity by at least 40% by 2020[1].

To provide legislative support for energy saving and energy efficiency efforts, the Law on Energy saving and Energy efficiency and the Law on Amendments to Certain Legislative Acts of the Republic of Kazakhstan Related to Energy saving and Energy efficiency, as well as a number of bylaws to these Laws were passed in 2012. In addition, the Comprehensive Plan for Energy efficiency in the Republic of Kazakhstan for 2012-2015 and the Program for Modernization of the Housing and Utilities Sector for 2011-2020 were also approved. In August 2013, the government of Kazakhstan approved the Republican Program "Energy saving 2020".

However, despite a number of legislative initiatives and measures, the general energy efficiency policy of the Republic of Kazakhstan needs to be further improved in line with the best international practices.

All over the world, industrial nations started implementing a vigorous energy efficiency policy during the 1970s energy crisis, as a response to the soaring prices across global energy markets. Since then, good progress has been made in this area dampening the growth of global energy consumption. In this respect, the Republic of Kazakhstan lags far behind the member countries of the Organization for Economic Cooperation and Development (OECD): the country's energy intensity level exceeds their levels several times over, which restricts the competitive ability of industrial products and makes the complicated environmental situation even worse.

This review studies the policy of the Republic of Kazakhstan in the area of energy saving and energy efficiency; it has been conducted by the Energy Charter Secretariat and Association KAZENERGY with the support of the Energy Centre of JSC Kazakh Institute of Oil and Gas and JSC KEGOC. The main purpose of the review is to make an independent and objective assessment of the current situation, provide recommendations, strengthen international cooperation, and share the country's best practices with the other treaty countries.

The main objectives of this paper are as follows:

1. Review, to the fullest extent possible, the current situation in the energy efficiency policy of the Republic of Kazakhstan.
2. Analyse key challenges and barriers, including by economy sectors, which may hinder successful implementation of the energy efficiency policy.
3. Review the best energy efficiency practices of developed nations and provide recommendations to improve government control mechanisms.

1 from the 2008 level

ҚЫСҚАША БАЯНДАУ

Қазақстанның «Қазақстан Стратегиясы 2050» және «Жасыл» экономикаға көшу тұжырымдамасын қабылдауына орай, елімізде қоғамның мүлде жаңа даму жолы қалыптасты. Тұжырымдамаға сай, қоршаған ортаға әсер ету деңгейін төмендету, ресурстарды үнемдеу және халықтың тұрмысын жақсартуға бағытталған шаралар мемлекеттік саясатты қалыптастыру саласында басты рөл атқарады.

Жасыл экономикаға кезең-кезеңмен көшудің басты негізі энергия тиімділігі болып табылады. Қазіргі уақытта ЖІӨ-нің энергия сыйымдылығы көрсеткіші бойынша Қазақстан ЖІӨ мәні жоғары елдердің қатарында болып саналады. Хартия сарапшыларының пікірінше, Қазақстанда өнеркәсіптің, энергетиканың, ТКШ және көліктің энергия тиімділігін арттыруға елеулі мүмкіндіктер бар.

2012 жылдан бастап Қазақстанда энергия тиімділігі саласындағы негізгі талаптарды белгілейтін бірқатар заңнамалық актілер қабылданды, қазіргі уақытта «Энергия үнемдеу және энергия тиімділігін арттыру туралы» заңы қолданылады. Қазақстан Республикасының Үкіметі ЖІӨ-нің энергия сыйымдылығын 2020 жылға қарай 2008 жылғы деңгейден кемінде 40% азайту жөнінде мақсат қойып отыр.

Қазақстандағы арзан отынның қол жетімділігін және электр энергиясы мен отын тарифтерінің төмен деңгейін ескерсек, энергия үнемдеу бойынша шаралар мол инвестицияны талап етеді және өтімділік мерзімі де ұзақ. ЖІӨ-нің энергия сыйымдылығын төмендету арқылы қойылған мақсаттарға қол жеткізудегі мемлекеттің басты міндеті энергияны көп тұтынатын экономика салаларындағы энергия тиімділігін арттыру мақсатында тиімді жұмыс істейтін заңнамалық база қалыптастыру болып табылады.

Жалпы тұтынылатын бастапқы энергетикалық ресурстардың шамамен 47% энергетикаға жұмсалады. Осы орайда, еліміздегі энергетика саласында қуат өндіретін және электр жүйесі жабдықтарының тозығы жеткен, мұның өзі электр энергиясын өндірудің тиімділігін төмендетеді және электр жүйелеріндегі электр шығынын салыстырмалы түрде жоғарылатады.

Өндірістік секторда, жоғары энергия тұтыну деңгейі, бірінші кезекте, энергияны көп тұтынатын мұнай-газ, металлургия және тау-кен сияқты экономика салаларында көрініс тапқан. Осы орайда, жабдықтардың техникалық жай-күйі және кәсіпорындардың жүктемесін азайту мәселесі өнеркәсіптің тиімділігіне елеулі әсер етеді. Энергия тұтыну бөлігіндегі бірқатар заңнамалық шектеулер әлі оң нәтиже берген жоқ. Өнеркәсіп саласындағы бекітілген энергия тұтыну нормаларының талдамасы оны кәсіпорындардың жұмыс жағдайына, әсіресе тау-кен-металлургия кешені және көмір өндіру кәсіпорындарына қолдануға болмайтынын көрсетті.

Қазіргі тұрғынжайлардың көпшілігі қазандық немесе ЖЭО негізінде орталықтандырылған жылумен жылытылатын көппәтерлі үйлерден тұрады. Қазіргі инфрақұрылымның орталықтандырылған жылу беру тораптарының тиімділігі төмен және жылу шығыны көп. Орта есеппен алғанда, Қазақстандағы тұрғын үйлер Солтүстік Еуропамен салыстырғанда алаңның бір бірлігіне шаққанда үш есе көп энергия тұтынады. Жылу шығынының жоғары деңгейі негізінен жабдықтардың тозуына, қажетті жөндеудің болмауына байланысты.

Көлік секторында жалпы тұтынылатын бастапқы энергетикалық ресурстардың шамамен 17% жұмсалады, осыған сәйкес, автокөлік құралдары паркінің техникалық жай-күйі мен пайдаланылатын отынның сапасы меншікті отын тұтынуға және зиянды заттардың шығарындыларына елеулі әсер етеді. Отын сапасының жаңа сатндартарына көшу, заманауи навигациялық-ақпараттық жүйелерді енгізу көлік секторының энергия тиімдлігін арттыруға мүмкіндік береді.

Энергетикалық Хартия және KAZENERGY қауымдастығының сарапшылары Қазақстан экономикасының энергия тұтынатын негізгі салаларында энергия тиімділігін арттыру бойынша ұсыныстар 1 әзірледі:

Энергетикалық секторға төмендегілер ұсынылады:

- электр шығындарын азайту мақсатында электр энергиясын өндіру, беру және тарату секторларындағы ескірген инфрақұрылымға инвестиция тарту тәжірибесін дамыту;
- электр өндіруші компаниялардың, сол сияқты электр энергиясының ірі тұтынушыларының электр энергиясының сапасы бойынша талаптардың сақталуына жауаптылық деңгейін арттыруды көздейтін энергия үнемдеу сенімділігі мен сапасын қамтамасыз ету бөлігінде Заңнамаға түзетулер енгізу. Сонымен бірге электр энергиясын сертификаттау мәселелерін пысықтау да ұсынылады;
- талап етілетін инвестицияларды және олардың көздерін белгілеп, электр желілік компанияларды дамыту (ЭКД) жаңарту және дамыту жөнінде саланың негізгі проблемалары ескерілетін мемлекеттік бағдарлама әзірлеу және қабылдау; шығындарды азайту, электрмен жабдықтау сапасы мен сенімділігін арттыру, тарифтерге тиісті өзгерістерді енгізіп, мерзімдері бойынша ЭКД меншік иелеріне қойылатын талаптарды белгілеу;
- электр энергиясының ірі тұтынушыларына реактивтік қуаттылық үшін ақы төлеу механизмдерін енгізу және реактивтік қуаттылықтың орнын өтеу бойынша шараларға ынталандыру үшін және электр желілеріндегі электр энергиясы шығынын азайту үшін шығынды азайтатын электр желілік компанияларға преференция беру мүмкіндігін қарастыру;
- тарифтерді құру ережесі мен тәртібіне өзгерістер енгізу арқылы энергия үнемдеуді ынталандыру механизмдерін әзірлеу.

Өндірістік секторға төмендегілер ұсынылады:

- орындалған энергетикалық аудит нәтижелері бойынша құрылған энергия үнемдеу бойынша жоспарлардың іске асырылуына мемлекеттік бақылауды күшейту және мониторинг ұйымдастыру;
- ISO50001 стандартының орындалуына жағдай жасау – энергетикалық аудитті жүргізу барысындағы стандартталған тәсілдерді қоса алғанда, ірі өнеркәсіптік кәсіпорындардың энергетикалық менеджменті;
- өнеркәсіптік кәсіпорындарға қолдануға жарамсыздығына байланысты, энергия тұтыну бойынша бекітілген нормаларды қайта қарау немесе алып тастау;
- энергия тиімділігі саласындағы озық технологиялық шешімдердің қолданылуын дамыту мақсатында, соның ішінде жаңа өнеркәсіптік нысандарды жаңарту және салу барысында өнеркәсіптік жабдықтарға қатысты қолданыстағы стандарттарды қайта қарау;
- аудит нәтижелері бойынша ұсынылған шаралардың іске асырылуына қолдау білдіру мақсатында өнеркәсіптік кәсіпорындар үшін әртүрлі мемлекеттік ынталандыру механизмдерін (ерікті бағдарламалар, субсидиялар, жеңілдікті несиелер, салықтық жеңілдіктер) әзірлеу және енгізу;
- салалық институттарда және ЖОО-да энергия үнемдеу және энергия тиімділігін арттыру саласындағы кафедралар базасында кадрларды даярлау және қайта даярлау, кәсіби тренингтер, сонымен қатар біліктілік және қайта біліктілік беру бойынша бағдарлармалар өткізу.

ТКШ (с.і. жарықтандыру) секторында төмендегілер ұсынылады:

- энергия тиімділігіне қойылатын жаңа және қолданыстағы білім талаптарын күшейту және заңнама талаптарының, құрылыс нормалары мен ережелерінің сақталуын мониторингілеу үшін жеткілікті ресурс бөлу;
- ғимараттар мен құрылыстардың құрылысын авторлық және техникалық қадағалау рөлдерін күшейту;

- соңғы тұтынушыларды өздерінің жылу тұтыну деңгейін реттеуге ынталандыру үшін жаңа ғимараттарда әр пәтер бойынша жылу тұтынуды есепке алу жүйесін енгізу; қазіргі көппәтерлі ғимараттарда тұтынылған жылуды автоматты бақылау жүйесін және жылу есептегіштерді орнату ісін жалғастыру;
- аудит нәтижелері бойынша талаптарды орындау үшін және мемлекеттік сатып алу рәсімдерін жүргізу кезінде энергия тиімділігі бойынша арнайы критерийлерді енгізу үшін өңірлік және жергілікті билік органдарын барлық қоғамдық ғимараттарда энергетикалық аудит жүргізуге және энергия тиімділігін арттыру жөнінде мақсатты бағдарлама әзірлеуге ынталандыру;
- энергия тиімділігін арттыру үшін қолданыстағы ғимараттарды жаңартуға инвестиция тартуға ынталандыратын соңғы тұтынушыларға арналған қаржы механизмдерін әзірлеу және енгізу;
- жылу энергиясы мен газ өндіру және тарату секторында энергия тиімділігін арттыру және жаңартуды инвестициялауды көздейтін экономикалық негізделген деңгейде ұзақ мерзімді тарифтерді белгілеу;
- еуропалық экономикалық одақ шеңберіндегі энергия тұтынатын өнімге қатысты жалпы ең төменгі стандарттарды әзірлеу және қабылдау процесін жандандыру;
- өңірлік/жергілікті билік органдарына қалалық/көшелік тиімділігі жоғары жарықтандыруға қатысты жобаларды әзірлеу және жүзеге асыру мәселелерінде қолдау көрсету үшін қажетті жағдай жасау; еліміздің барлық аумағында энергиялық тиімді көше жарықтандыруын жылдам енгізуге арналған гранттар мен субсидиялар нысанында ынталандырма енгізу.

Көліктік салаға төмендегілер ұсынылады:

- қалаларды, көлік инфрақұрылымы элементтерін жоспарлау және қозғалысты ұйымдастыру сапасына бағалау жүргізу. Ұлттық және өңірлік деңгейде көлік секторының энергия тиімділігінің индикаторлары жүйесін құру қажет;
- нарыққа жеткізілетін мотор отынының сапасына мемлекеттік бақылауды күшейту;
- көлік құралдары паркін жеделдетіп жаңарту ісін реттейтін және ынталандыратын шаралар кешенін енгізу;
- Энергиялық тиімді автокөліктерді және көлік құралдарын пайдалануға қолдау білдіру үшін салықтық және қаржылық жеңілдіктер енгізу;
- қала аудандарындағы жекеменшік көлікке балама ұсыну мақсатында қолданылып жүрген қоғамдық көлік жүйесінің қызмет ету сапасын, тиімділігін, қол жетімділігін және жайлылығын арттыру бойынша тиісті мемлекеттік органдар мен ведомстволарға қойылатын талаптарды жоғарылату;
- көліктік логистика секторын оңтайландыру және жүк көліктері (сонымен бірге темір жолдың да) қозғалысының энергия тиімділігін арттыру мақсатында навигациялық-уақыттық жүйені енгізу.

КРАТКОЕ ИЗЛОЖЕНИЕ

С принятием Казахстаном «Стратегии «Казахстан 2050» и Концепции перехода к «зеленой» экономике, страной был выбран принципиально новый путь развития общества. Согласно Концепции, ключевую роль будет играть направленность государственной политики на снижение воздействия на окружающую среду, ресурсосбережение и достижение высокого уровня качества жизни населения.

Одним из центральных моментов в последовательном переходе к зеленой экономике является энергоэффективность. В настоящее время по показателю энергоемкости ВВП Казахстан находится в числе стран с наиболее высокими значениями. По мнению экспертов Хартии, в Казахстане сосредоточены значительные возможности повышения энергоэффективности в промышленности, энергетике, ЖКХ и транспорте.

С 2012 года в Казахстане был принят ряд законодательных актов, определяющих основные требования в области энергоэффективности, в качестве основного документа в настоящее время выступает закон «Об энергосбережении и повышении энергоэффективности». Правительством Республики Казахстан также поставлена цель по снижению энергоемкости ВВП не менее чем на 40 % к 2020 году от уровня 2008 года.

Учитывая условия доступности дешевого топлива и поддержания на низком уровне тарифов на электроэнергию и тепло в Казахстане, мероприятия по энергосбережению требуют существенных инвестиций и имеют сравнительно длительные сроки окупаемости. Главной задачей государства в достижении поставленных целей по снижению энергоемкости ВВП является формирование эффективно работающей законодательной базы с целью стимулирования повышения энергоэффективности в энергоемких секторах экономики.

На энергетику приходится около 47% от общего потребления первичных энергетических ресурсов. При этом в сфере энергетики наблюдается высокая доля износа генерирующего и электросетевого оборудования, что в результате приводит к низкой эффективности генерации электроэнергии и сравнительно высокой величине потерь в электрических сетях.

В промышленном секторе, высокий уровень энергопотребления обусловлен, в первую очередь, деятельностью таких энергоемких отраслей экономики, как нефтегазовая, металлургическая и горнорудная. При этом существенно влияет на эффективность промышленности техническое состояние оборудования и проблема снижения загрузки предприятий. Ряд законодательных ограничений, принятых в части энергопотребления в промышленности, пока не дал положительных результатов. Анализ утвержденных норм энергопотребления в промышленности показал их неприменимость к условиям работы части предприятий, особенно в горно-металлургической и угледобывающей отраслях.

В части жилищно-коммунального хозяйства, большинство существующего жилого фонда состоит из многоквартирных домов с центральным отоплением на основе котельных или ТЭЦ. Для сетей центрального отопления при текущем состоянии инфраструктуры характерна низкая эффективность и значительные потери тепла. В среднем, жилые дома в Казахстане потребляют в три раза больше энергии на единицу площади, чем в странах Северной Европы. Высокий уровень тепло потерь в основном связан с устаревшим оборудованием, а также с отсутствием должного ремонта.

На транспортный сектор приходится до 17% от общего потребления первичных энергетических ресурсов страны, при этом техническое состояние части парка автотранспортных средств и качество используемого топлива, оказывают существенное влияние на удельное потребление топлива и выбросы вредных веществ. Переход на новые стандарты качества топлива, внедрение современных навигационно-информационных систем позволят повысить энергоэффективность транспортного сектора и увеличить пропускную способность транспортной системы.

Эксперты Энергетической Хартии и Ассоциации KAZENERGY подготовили рекомендации[2] по повышению энергоэффективности в основных энергопотребляющих отраслях экономики Казахстана:

В энергетическом секторе рекомендуется:

- развитие опыта привлечения инвестиций в модернизацию устаревшей инфраструктуры в секторах производства, передачи и распределения электроэнергии в целях минимизации потерь;
- внесение поправок в законодательство в части обеспечения надежности и качества электроснабжения, предусматривающих увеличение степени ответственности за несоблюдение требований по качеству электроэнергии, как электропроизводящими и электросетевыми компаниями, так и крупными потребителями электроэнергии. Также рекомендуется проработка вопросов сертификации электроэнергии;
- разработка и принятие государственной программы модернизации и развития электросетевых компаний (РЭК) с определением требуемых инвестиций и их источников, учитывающих основные задачи отрасли: снижение потерь, повышение надежности и качества электроснабжения, установление требований к собственникам РЭК по срокам их достижения с внесением соответствующих изменений в тарифы;
- рассмотрение возможности введения механизмов платы за реактивную мощность крупными потребителями электроэнергии и предоставление преференций электросетевым компаниям снижающим потери, для стимулирования мероприятий по компенсации реактивной мощности, и снижение потерь электроэнергии в электрических сетях;
- разработка механизмов стимулирования энергосбережения путем внесения изменений в правила и порядок формирования тарифов.

В промышленном секторе рекомендуется:

- усиление государственного контроля и организация мониторинга за ходом реализации планов по энергосбережению, составленных по результатам выполненных энергетических аудитов;
- содействие соблюдению стандарта ISO50001 – Энергетический менеджмент крупными промышленными предприятиями;
- пересмотр либо отмена утвержденных норм по энергопотреблению, ввиду их неприменимости для части промышленных предприятий;
- пересмотр существующих стандартов в отношении промышленного оборудования в целях продвижения применения наилучших технологических решений в области энергоэффективности, в том числе при модернизации и строительстве новых промышленных объектов;
- разработка и внедрение различных механизмов государственного стимулирования (добровольные программы, субсидии, льготные кредиты, налоговые льготы) для промышленных предприятий в целях поддержки мероприятий по энергосбережению и повышению энергоэффективности;
- подготовка и переподготовка кадров на базе кафедр профильных институтов и ВУЗов в области энергосбережения и энергоэффективности, проведение профессиональных тренингов, а также программ по квалификации и переквалификации.

В секторе ЖКХ (в т.ч. в освещении) рекомендуется:

- ужесточение требований к энергоэффективности новых и существующих зданий и выделения достаточных ресурсов для мониторинга за соблюдением требований законодательства, а также строительных норм и правил;
- усиление роли авторского и технического надзора за ходом строительства зданий и сооружений;

2 Полный список рекомендации обзора по секторам см гл 3 "Оценка потенциала энергоэффективности по секторам экономики"

- внедрение системы поквартирного учета потребления тепла в новых зданиях для стимулирования конечных потребителей к регулированию их уровня теплопотребления; продолжение установки автоматических систем контроля теплопотребления и домовых теплосчетчиков в существующих многоквартирных зданиях;
- стимулирование региональных и местных органов власти к разработке целевых программ повышения энергоэффективности для выполнения требований по результатам аудитов и для внедрения специальных критериев по энергоэффективности при проведении процедур государственных закупок;
- разработка и внедрение финансовых механизмов для конечных потребителей, стимулирующих привлечение инвестиций в модернизацию существующих зданий для повышения их энергоэффективности;
- в секторе распределения тепловой энергии и газа необходимо установление долгосрочных тарифов на экономически обоснованном уровне, предусматривающем инвестиционную составляющую в модернизацию и повышение энергоэффективности;
- активизация процесса разработки и принятия общих минимальных стандартов энергоэффективности в отношении энергопотребляющей продукции в рамках Евразийского экономического союза;
- создание необходимых условий для поддержки региональных/местных органов власти по вопросам разработки и осуществления проектов в отношении высокоэффективного уличного/городского освещения; внедрения стимулов в форме грантов или субсидий для содействия быстрому внедрению энергоэффективного уличного освещения на всей территории страны.

В сфере транспорта рекомендуется:

- выполнение оценки качества планирования городов, элементов транспортной инфраструктуры и организации движения. Необходимо на национальном и региональном уровнях создать систему индикаторов энергоэффективности транспортного сектора;
- усиление государственного контроля в части качества поставляемого на рынок моторного топлива;
- внедрение комплекса мер, регулирующих и стимулирующих ускоренное обновление парка транспортных средств;
- внедрение налоговых и финансовых льгот для поддержки использования энергоэффективных автомобилей и транспортных средств;
- повышение требований для соответствующих государственных органов и ведомств по повышению качества услуг, эффективности, доступности и комфорта существующих систем общественного транспорта с целью создания альтернатив использованию частных автомобилей в городских районах;
- внедрение навигационно-временных систем в целях оптимизации сектора транспортной логистики и повышения энергоэффективности движения грузового транспорта (в том числе железнодорожного).

EXECUTIVE SUMMARY

With the adoption of the Concept of Kazakhstan on transition to green economy and "Strategy 2050", the country has chosen a principally new way of economic and social development. A key aspect in the gradual transition to a green economy is energy efficiency. Currently, Kazakhstan is among the countries with the highest energy intensity and there is a considerable potential for improving energy efficiency in industrial, energy, housing and transport sectors.

Since 2012, a number of legislative acts, defining the basic requirements in the field of energy efficiency were adopted in the country. Important documents include the Law on energy saving and energy efficiency and the Program "Energy Efficiency 2020", setting at least 40% energy intensity reduction target until 2020. The main Government's task in order to reduce the energy intensity is the successful implementation and enforcement of the existing legislative framework, thus improving the energy efficiency in most energy intensive sectors.

Given the availability of inexpensive energy resources, low electricity and heat tariffs in Kazakhstan as well as deteriorated infrastructure, energy saving measures require substantial investments and have a relatively long payback period. As a result, there is an increased need in incentive mechanisms, which would allow to improve the investment attractiveness of energy efficiency projects.

Kazakhstan's power sector (generation, transmission and distribution) consumes around 47% of the total primary energy resources and is characterised by relatively low efficiency of generating plants, high losses in the electricity and heat distribution networks and use of outdated equipment and technology.

High level of energy consumption in the industrial sector is related mainly to the energy intensive industries such as oil and gas, iron and steel industry and mining. The old and depreciated equipment together with reduced production load considerably affects the efficiency of industrial enterprises. A number of normative restrictions on energy consumption in the industry has not given positive results. Analysis of approved energy consuming norms in industry shows thay they are not always appropriate to the working conditions of the enterprises, especially in the mining and metallurgical sectors.

Most of the existing housing stock consists of apartment buildings with central heating based on the boiler-houses or heat stations. District heating networks are characterised by low efficiency and significant heat loss. At the average, residential buildings in Kazakhstan consume three times more energy per unit area than in Northern European countries. When analysing the situation in the housing sector, it is necessary to outline several key problems and barriers to investments in energy efficiency - the existing low tariffs, the lack of heat metering devices, the lack of regulatory requirements for municipal authorities to develop and implement municipal energy saving plans, as well as to invest in energy efficiency measures in public buildings, as well as low general awareness and understanding with respect to affordable and cost effective technologies and energy efficiency measures.

The transport sector energy use accounts for 17% of the total consumption of primary energy resources in the country, with the technical condition of the vehicle fleet and the low fuel quality having considerable effect on efficiency of transport fleet. Transition to the new fuel quality standards and the introduction of modern navigation and information systems will improve the efficiency of the transport sector and increase the transport system capacity.

Experts of the Energy Charter and KAZENERGY Association have prepared the following recommendations[3] by sectors:

To improve the efficiency of generation, transmission and distribution of electricity and heat resources it is recommended to:

- promote investments into the modernisation of deteriorated infrastructure of electricity production; transmission and distribution and thus further minimise losses;
- consider amending the existing regulations, related to ensuring reliability and quality of electricity supply, as well as major electricity consumers for non-compliance with power quality standards. Introducing electricity certificates should also be analysed;
- develop and adopt a state Programme for the modernisation and development of the regional electricity companies, specifying required investments and financing sources taking into account key challenges of the sector: high losses and the necessity to increase reliability and quality of electricity supply. Relevant implementation timeframes and tariff adjustment are also to be discussed with electricity companies;
- introducing energy saving incentives through the adjustment rules and procedures for tariff formation and consideration of the possibility to grant preferences to those companies that reduce losses;

In order to utilise the significant energy efficiency potential of industry it is recommended to:

- increase state control and establish monitoring of the implementation of energy efficiency measures prescribed by energy audits;
- actively promote the adoption of ISO 50 001 standards to large industrial enterprises incorporating a standardised approach to energy auditing and encourage further industrial enterprises to implement actions to deliver cost-effective energy savings;
- revise existing industrial equipment standards and minimum performance standards to allow for best available technology applications solutions, include new energy efficient technologies into the standards applicable to new industrial facilities. Revise existing energy consuming norms and standards;
- develop and introduce various incentive schemes (voluntary programmes, subsidies, fiscal incentives) for industrial enterprises that undertake energy audits in order to support the implementation of the recommended measures;
- train and upgrade personnel at relevant research and academic institutions engaging energy savings and energy efficiency departments, hold professional training sessions, as well as qualification and retraining programmes.

The government of Kazakhstan can succeed in eliminating the obstacles to increasing energy efficiency in the residential and public sectors and uncover considerable energy savings potential in these sectors by:

- strengthening the energy performance requirements for new and existing buildings and allocating sufficient resources for monitoring compliance, and proper enforcement of the legislation and building codes. In addition standards need to be developed and enforced regarding the performance of various building components – windows, heating, ventilation and cooling systems, etc.;
- introducing individual apartment heat metering for new buildings to create incentive for final consumers to regulate their heat use. Continue installing automatic systems of heat consumption control and building heat meters for existing multi apartment blocks;
- stimulating regional and local authorities to undertake energy audits of all public buildings and develop dedicated Programmes for improving the energy performance of public buildings to implement the requirements of the audits. Require that they also introduce energy efficiency criteria in procurement procedures for public expenditures on goods and services;
- consider developing financial incentive schemes for final consumers, stimulating investments in energy efficient retrofit of existing buildings;
- in sector of heat production and distribution consider the adoption of long-term cost reflective tariffs, providing an investment component for network modernization and reduction of losses;
- accelerating the process of development and adoption of common minimum energy performance standards for energy using products within the Eurasian Union. Authorities need to allocate sufficient resources for compliance, monitoring and verifying claimed performance for different appliance groups, regardless on whether they are imported or locally manufactured;
- creating the necessary conditions to support regional/local authorities to develop and implement projects for high-efficiency street and public lighting. Introduce incentives in forms of grants or

3 For the full list of recommendations of the Review by sectors see chapter 3 "Assessment of energy efficiency potential."

subsidies to facilitate the fast deployment of energy efficiency street lighting throughout the country.

To reduce the energy consumption and level of associated emissions in transport sector it is recommended to:

- introduce policy packages (regulatory and incentives) that encourage more rapid turnover of the old vehicle fleet. Such measures could be in a form of a ban of importing old vehicles, incentives encouraging quick fleet renewal by owners, vehicle fuel economy labels, tax and fiscal measures stimulating purchase of more efficient vehicles;
- enhance state control for fuel quality, available at the market;
- transport infrastructure elements and traffic management should consider introducing at national and regional levels a system of transport sector energy efficiency indicators;
- introduce financial incentives that support the use of energy-efficient vehicles and mode of transport;
- introduce navigation systems to improve the transport sector logistics and increase efficiency of cargo and railroad transport;
- introduce requirements to relevant state and local authorities for improving the quality of service, efficiency, accessibility and comfort of existing public transport systems in order to create an alternative to private vehicle use in urban areas.

BACKGROUND

COUNTRY OVERVIEW

The Republic of Kazakhstan is a unitary state with the presidential form of government. The President of the Republic is the head of the state, the highest official who determines the focal points of the country's domestic and foreign policy and represents Kazakhstan both at home and on the international stage. Kazakhstan declared independence on 16 December 1991. The capital of the country is the city of Astana. The state language is Kazakh. Russian has the status of the language for interethnic communication. The currency is the tenge (KZT).

Geography

The Republic of Kazakhstan is located in the center of the Eurasian continent, at an equal distance from the Atlantic Ocean and the Pacific Ocean. With its territory of 2,724,900 km2 it is the ninth largest country among the states in the world and the fourth largest one among the countries in Eurasia. In the west and north, Kazakhstan borders Russia; in the east, China; in the south, the Central Asian countries – Uzbekistan, Kyrgyzstan, and Turkmenistan. The total length of the country's borders is 12.2 thousand km, including 600 km of borders in the Caspian Sea waters.

Figure 1: Map of the Republic of Kazakhstan

Source: The World Fact Book, CIA, https://www.cia.gov/library/publications/the-world-factbook/geos/kz.html

Kazakhstan has a distinct landscape diversity - 44% of the territory is covered with deserts and 14% with semi-deserts. Steppes and forests occupy 26% and 6% of the territory, respectively. The rest of the country (10%) is dominated by mountains. In addition, the country is bounded by two landlocked seas, the Caspian Sea and the Aral Sea. Kazakhstan is the world's largest country in the world that does not have access to the world's oceans.

Climate

Since the country is located away from any oceans, the climate here is sharply continental. The average temperature in January varies from –19oC in the north to –5 °C in the south; the average temperature in July, from +19 °C in the north to +28 °C in the south. Summers in Kazakhstan are hot and dry. The temperature in some regions may reach +50 °C. In winter, the temperature in the northern regions of the country may drop to -58 °C.

Households

BAccording to the Committee on Statistics of the RK Ministry of National Economy, the country's population as of 1 March 2014 is 17.207 million people. Given the country's vast area, the population density in Kazakhstan is low: a little bit more than 6 people per square kilometer on average. Major cities are usually located at a considerable distance from each other.

More than half of the country's population lives in cities. See Fig. 2 for the urban/rural population ratio by regions. 2.

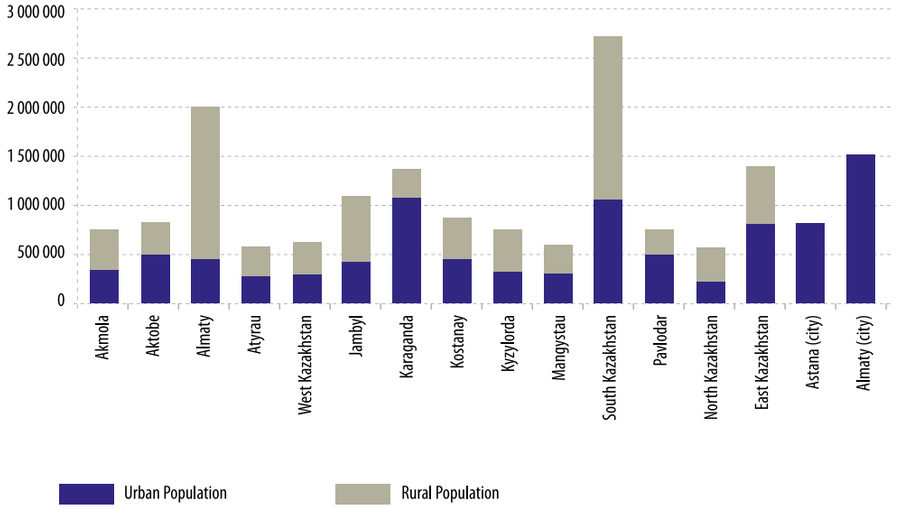


Figure 2: Population of the Republic of Kazakhstan by regions as of 1 March 2014

Source: Committee on Statistics, RK Ministry of National Economy, http://www.stat.gov.kz

In percentage terms, the urban population accounts for 56% of the total population. Eighty-six settlements in Kazakhstan have the status of a city. Major cities include: Astana, Almaty, Karaganda, Kyzylorda, Kokshetau, Kostanay, Pavlodar, Petropavlovsk, Taraz, Ust-Kamenogorsk, Uralsk, and Shymkent.

The large area of the country, considerable distances between major cities, and harsh weather conditions are the main reasons for substantial losses of energy resources. These specific features should be taken into account in the analysis of the current consumption of energy resources in different sectors of the country's economy.

Economy

According to the estimates of the International Monetary Fund, the Republic of Kazakhstan is one of the top ten fastest growing economies in the world.[4] According to the Committee on Statistics of the RK Ministry of National Economy, the growth of the country's Gross Domestic Product reached 6% as of the end of 2013, with per capita GDP of nearly USD 12,933. 933. The growth rate of the national economy in Kazakhstan is comparable with that of the fast developing economies in the Asia-Pacific region.

During the global economic recession, the country's economy slowed down substantially. GDP growth was 3.3% in 2008 and a mere 1.2% in 2009. However, the government of Kazakhstan took prompt action and the country recovered quickly, with GDP growth reaching 7.3% in 2010.

4 Kazakhstan overview, World Bank, http://www.worldbank.org/ru/country/kazakhstan/overview

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
GDP, USD billion	43	57	81	104	133	115	148	188	204	224
Annual GDP growth (%)	10	10	11	9	3	1	7	8	5	6

Table 1: GDP growth rates in 2004-2013

Source: World Bank, World Development Indicators, http://databank.worldbank.org/data/views/reports/tableview.aspx

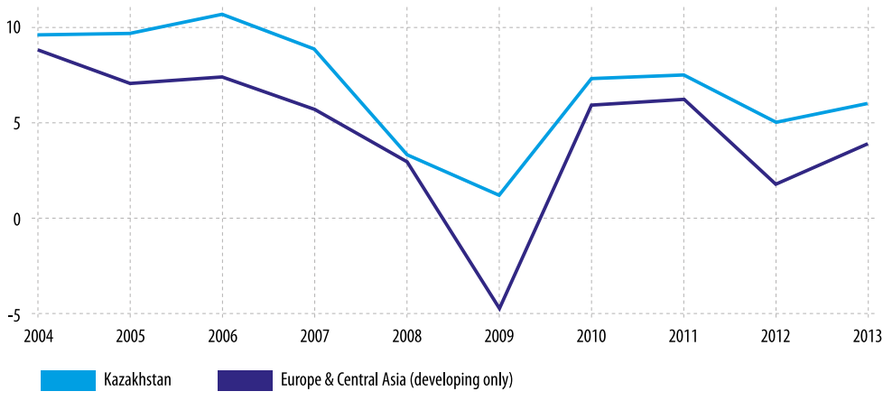


Figure 3: Annual GDP growth indicators compared to the developing countries in Europe and Central Asia (%)

Source: World Bank, http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG/countries/kz-7E?display=graph

Since Kazakhstan gained independence, the country has raised USD 150 billion of foreign investments, which is almost 70% of the total investments in Central Asia. According to the United Nations Conference on Trade and Development (UNCTAD), Kazakhstan ranks No. 19 among the top 20 leading countries in terms of foreign direct investments.

The country's total international reserves, including gold and foreign currency reserves of the National Bank and foreign currency assets of the National Fund (according to preliminary data, USD 70.5 billion), increased by 10.5% to USD 95.2 billion in 2013.

Kazakhstan ranks No. 50 in the Doing Business 2014 ranking by the World Bank. The country was also No. 34 in the World Competitiveness Ranking by the International institute for Management Development (IMD) in 2013. Kazakhstan ranks No. 50 among 148 countries worldwide in the Global Competitiveness Index of the World Economic Forum (WEF).

Global Competitiveness Index

GCI 2013–2014	**50**	**4.4**
GCI 2012–2013 (out of 144)	51	4.4
GCI 2011–2012 (out of 142)	72	4.2
Basic requirements (37.8%)	**48**	**4.9**
Institutions	55	4.1
Infrastructure	62	4.2
Macroeconomic environment	23	5.9
Health and primary education	97	5.3
Efficiency enhancers (50.0%)	**53**	**4.3**
Higher education and training	54	4.5
Goods market efficiency	56	4.3
Labor market efficiency	15	5.0
Financial market development	103	3.7
Technological readiness	57	4.1
Market size	54	4.2
Innovation and sophistication factors (12.2%)	**87**	**3.4**
Business sophistication	94	3.7
Innovation	84	3.1

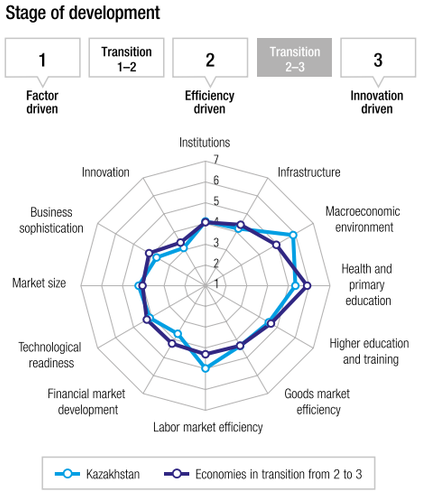


Figure 4: Global Competitiveness Index of the Republic of Kazakhstan

Source: The Global Competitiveness Report 2013-2014, World Economic Forum

The Republic of Kazakhstan is an industrial country where mineral production is one of the key drivers of economic growth. The country's mineral portfolio consists of over 5 thousand fields estimated at dozens of trillions of US dollars. The country has the largest proved reserves of zinc, tungsten and barite worldwide; it ranks No. 2 in silver, lead and chromite reserves, No. 3 in copper and fluorite reserves, No. 4 in molybdenum reserves, and No. 6 in gold reserves. With regard to energy resources, according to the BP Statistical Review of World Energy 2014, Kazakhstan ranks No. 12 in proved oil reserves and No. 21 in proved gas reserves worldwide. In addition, the republic is No. 8 in coal reserves and No. 2 in uranium reserves[5].

Казахстан также имеет значительные запасы нефти и газа, которые сосредоточены в западных областях страны. Сегодня Казахстан относится к разряду ведущих нефтедобывающих государств мира, с годовым уровнем добычи более 80 млн. тонн нефти и газового конденсата, при этом планируется увеличить ежегодную добычу нефти до 120 млн. тонн к 2020 году.

Помимо промышленности, в Казахстане традиционно большое внимание уделяется развитию сельского хозяйства. Казахстан входит в десятку ведущих мировых экспортеров зерна и является одним из лидеров по экспорту муки. До 70% пахотных земель на севере страны занято зерновыми и техническими культурами – пшеницей, ячменем, просом. На юге страны выращивают рис, хлопчатник, табак.

Kazakhstan also has considerable oil and gas reserves concentrated in the western regions of the country. Today Kazakhstan is a world leading oil producer, which produces over 80 million tons of oil and gas condensate annually. By 2020, annual oil output is expected to rise to 120 million tons.

Agricultural development has historically been on top of the national agenda, in addition to the production sector. Kazakhstan ranks among the world's top ten grain exporters and is one of the leading flour exporters. Grain and industrial crops such as wheat, barley, and millet occupy up to 70% of farm lands in the north of the country. Rice, cotton, and tobacco are grown in the south of the country.

In terms of economic geography, Kazakhstan is divided into five major economic regions:

5 BP Statistical Review of World Energy 2014, p. 6, 20, 30.

- Northern Kazakhstan, where grain farming, iron ore and coal mining, mechanical engineering, production of petroleum products and ferroalloys, and power engineering are developed;
- Eastern Kazakhstan, with nonferrous metal industry, power engineering, mechanical engineering, and forestry;
- Western Kazakhstan, the largest oil and gas producing region;
- Central Kazakhstan, with ferrous and nonferrous metal industry, mechanical engineering, and livestock farming;
- Southern Kazakhstan, with nonferrous metal industry, tool engineering, consumer goods manufacturing, food processing, fishing, and forestry. The agricultural sector produces cotton, rice, wool, grain, fruits and vegetables.

In 2013, the country's foreign trade turnover exceeded USD 131 billion.[6] Products of the mining, iron and steel, chemical, and grain industries and the fuel and energy sector are the main export commodities. The CIS countries and the Baltic states are key trade partners. Russia is the largest trade partner. Kazakhstan is successfully developing trade relations with a number of non-CIS countries, including Germany, Turkey, Switzerland, the Czech Republic, Italy, China, United States, Great Britain, South Korea, and others.

Despite considerable natural resources, the Republic of Kazakhstan strives to develop non-energy export-oriented sectors and ultimately switch to the output of high-tech products. For this purpose, the country launched the State Program of Accelerated Innovation and Industry Development for the Republic of Kazakhstan (SPAIID) in 2010.

However, the efforts made by the country have yet to change the structure of the national economy in a dramatic way. Most non-energy sectors are still poorly productive and poorly competitive. The country remains sensitive to fluctuating commodity prices. In this respect, the government is planning to take more aggressive steps to carry out the second five-year industrial plan (SPAIID-2) in 2015-2019.

The Republic of Kazakhstan is taking an active part in regional integration processes to foster the economic development of the country, gain access to international markets for Kazakhstani products, and encourage free movement of goods, capital, and labour resources throughout Eurasia. In 2010, Kazakhstan joined the Customs Union. On 29 May 2014, Russia, Kazakhstan, and Belarus signed a treaty in Astana forming the Eurasian Economic Union (EEU). Kazakhstan is currently at the closing stage of negotiations to accede to the World Trade Organization.

At present, the country is embarking on a new development strategy called Kazakhstan-2050. The main objective of the strategy is for Kazakhstan to rank among the top 30 developed countries by 2050. The new course of development should create a competitive and science-based model of the national economy in Kazakhstan.

PRODUCTION OF PRIMARY ENERGY RESOURCES

In addition to considerable coal, uranium, oil, and natural gas resources, Kazakhstan has good prospects in the hydraulic power industry and the use of other renewable energy sources.

The total amount of recoverable fuel resources in Kazakhstan, such as oil, gas, coal, and uranium, is approximately 34.9 billion tons of oil equivalent (toe).

6 Source: Committee on Statistics, RK Ministry of National Economy.

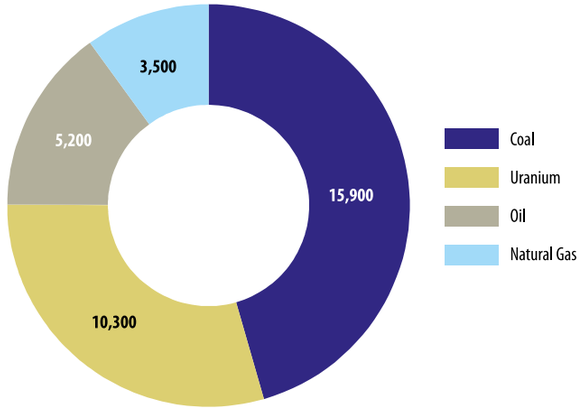


Figure 5: Proved energy resources in the Republic of Kazakhstan, toe

Source: RK Geology and Subsoil Use Committee, RK Ministry of Investment and Development, JSC KING

Coal and uranium reserves account for the bulk of recoverable natural energy resources in Kazakhstan (46% and 30%, respectively) whereas the share of oil and gas does not exceed 25%.

The fact that the country has considerable fossil fuel reserves makes Kazakhstan one of the top twenty global producers of primary energy resources according to the World Bank, with a total annual output of approximately 157 million toe.[7]

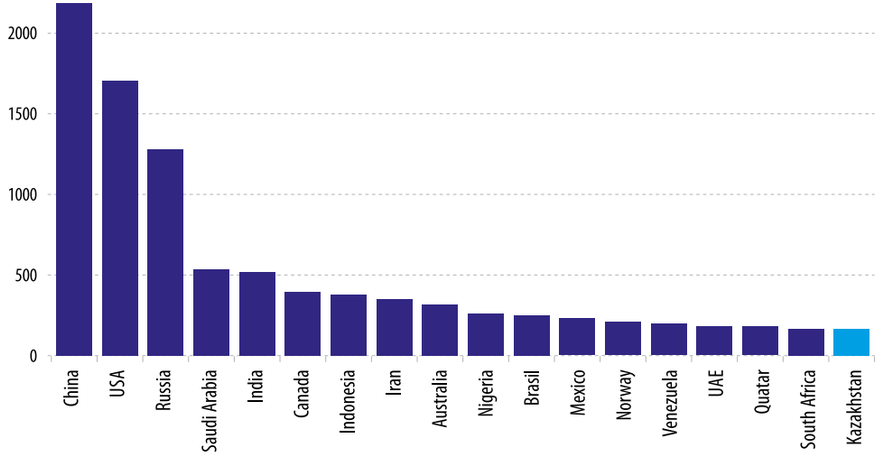


Figure 6: Production of primary energy resources by country, million toe

Source: The World Bank Data Catalog, World Bank

7 As of 2010.

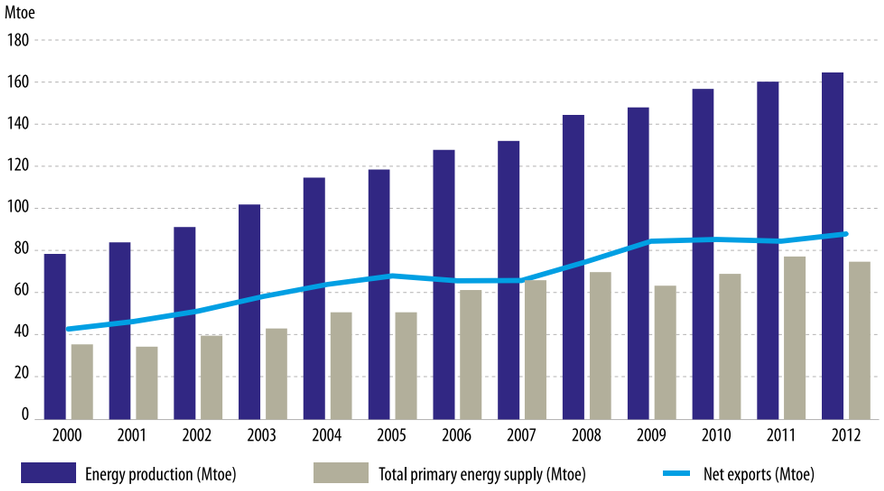


Figure 7: Production, export and import of primary energy resources in Kazakhstan

Source: Statistics database, International Energy Agency (IEA)

As can be seen in Fig. 8, the Republic of Kazakhstan is a major exporter of energy resources (more than 83.5 million toe).

At the same time, according to the estimate of the KAZENERGY Association, the total amount of primary energy production in Kazakhstan amounted to 415 millions toe in 2012. This figure includes the uranium production, which made up about 256 millions toe. [8]

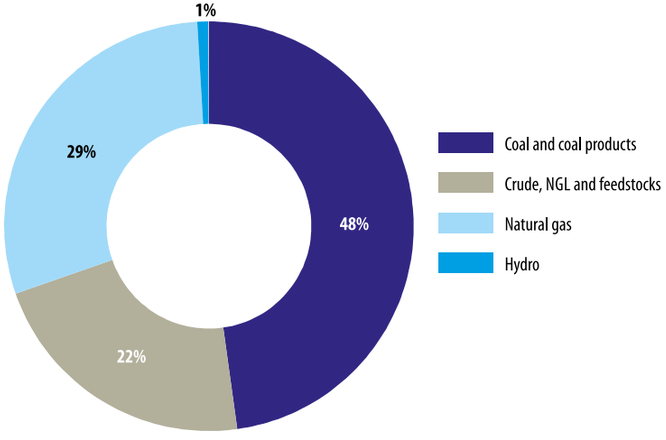


Figure 8: Total production from primary energy sources in 2012

Source: Statistics database 2014, International Energy Agency (IEA)

8 The calculations are based on average enrichment and burn-up values.

The considerable difference between Kazakhstani and international estimates of mineral reserves is mostly due to the use of different methods. Like some other CIS counties, Kazakhstan uses a classification system for reserves and resources which dates back to Soviet times and is based on categories and criteria for balance, off-balance, and potential reserves. Other countries classify their reserves and resources based on the probabilistic approach to the accuracy of reserve and resource estimates and take into account various economic and technical aspects affecting production.

According to the International Energy Agency (IEA) and the World Bank, Kazakhstan ranks No. 28 in consumption of primary energy resources: the country's consumption was at 74.9 million toe in 2012, or 0.6% of the global consumption of primary energy resources. At the same time, BP estimates the domestic consumption in Kazakhstan at 58.1 million toe in 2012, which makes the country No. 34 in the global ranking. These estimates are quite close to the estimates made by the Association KAZENERGY: according to the Association, the domestic consumption of primary energy resources was at 62.6 million toe in 2012.[9]

ENERGY CONSUMPTION

Since 2000, total final energy consumption has more than doubled reaching 42 million toe in 2012.

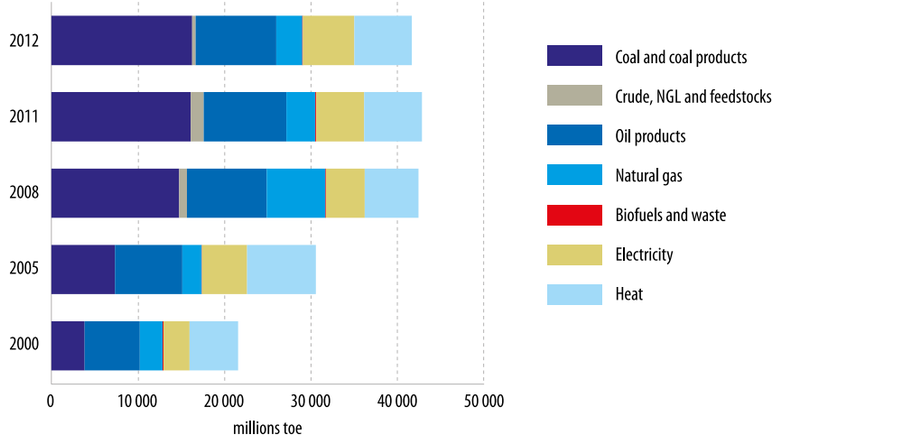


Figure 9: Trends in total final consumption

Source: IEA statistics database

Coal consumption jumped from 17% in 2000 to 39% in 2012. Oil and natural gas consumption also grew, albeit at a more moderate rate. The share of electric power and heating in final energy consumption remained constant.

9 The estimated consumption of primary energy resources and their equivalents does not include biomass consumption but includes net imports of electric power and petroleum products.

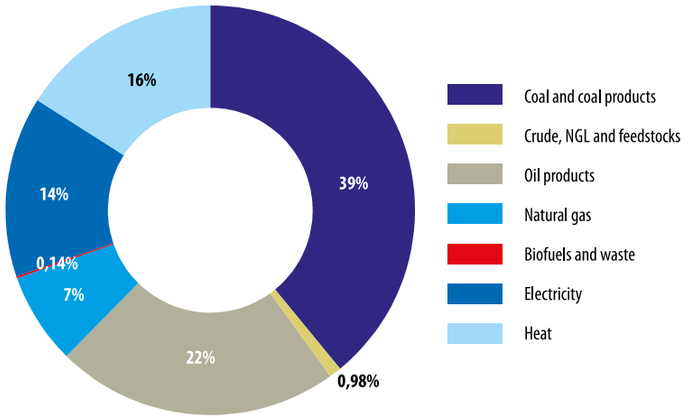


Figure 10: Final energy consumption in 2012

Source: National Energy Report by Association KAZENERGY

Figure 10 shows the final energy consumption by energy sources. The share of coal is 30% of the total consumption, followed by oil 22% and heat (16%) and electricity (14%).

According to IEA, energy consumption by the industrial sector as of the end of 2012 made up more than half of the total final energy consumption in the Republic of Kazakhstan (58%, or 22.8 million toe). The housing sector of the economy accounted for 18% of total consumption; the transport sector, for a little over 13%.

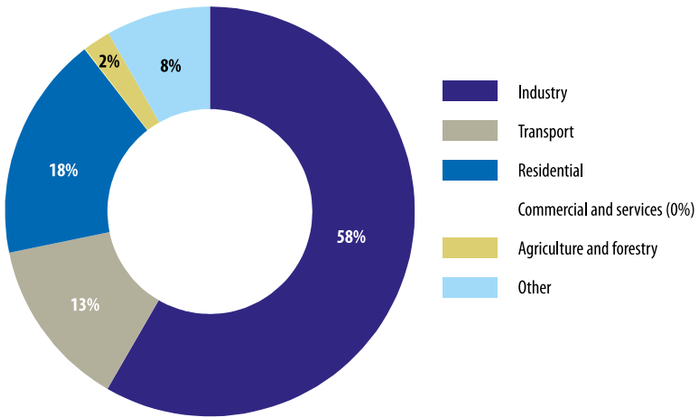


Figure 11: Final energy consumption by sector, 2011

Source: IEA statistics database, 2014

ENERGY SAVING AND ENERGY EFFICIENCY POLICY

ENERGY INTENSITY OF THE ECONOMY

GDP energy intensity is the most common indicator of economic energy efficiency. It is calculated as the ratio of primary energy consumption (coal, oil, gas, and other energy resources) to the nation's real GDP.

In this regard, Kazakhstan is among the top ten countries with the highest energy intensity[10]. However, the country's GDP energy intensity is showing a downward trend in general, even though per capita energy consumption is growing. High GDP energy intensity in Kazakhstan is partially due to a number of natural reasons:

- Severe sharply continental climate, long and cold winters
- Prevalence of energy intensive sectors of the economy in the GDP structure
- A vast, sparsely populated area
- A considerable length of transportation infrastructure (oil and gas pipelines, power lines, water lines).

It is important to understand that GDP energy intensity has a number of limitations; if used directly, this indicator may lead to incorrect conclusions. Comparison of different countries based on their energy intensity may be of no use if the GDP structure of these countries or their climatic characteristics are disregarded. Therefore, to compare the level of energy intensity of different economies, countries with similar economic structures and comparable natural, climatic, and geographical conditions should be considered.

That is why the following countries were selected for comparative analysis with regard to the Republic of Kazakhstan:

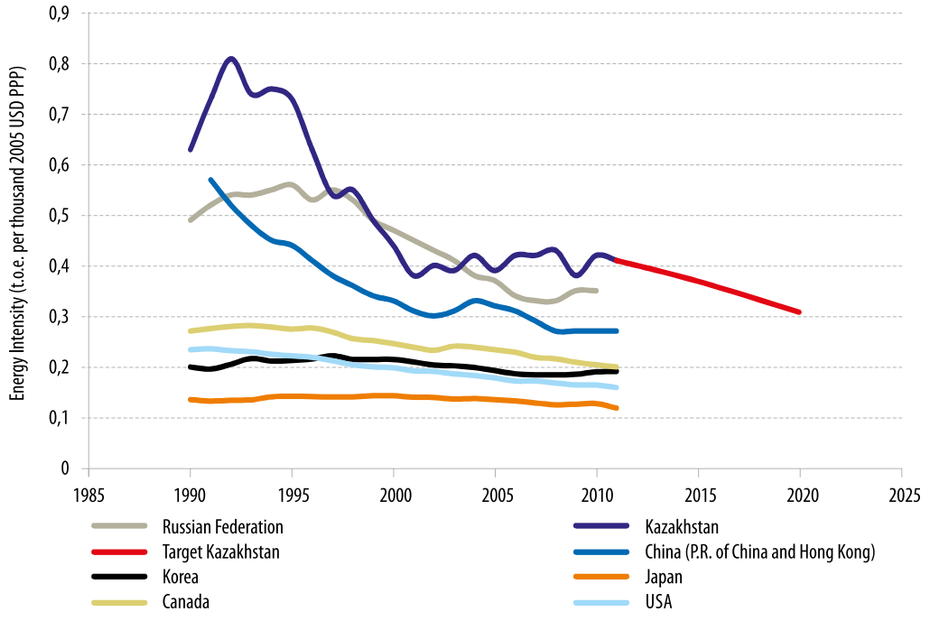
Canada: harsh climatic conditions, vast area, low population density (3.5 people/km^2), energy intensive oil production from bituminous sands.

Russia: harsh climatic conditions, vast area, low population density (8.39 people/km^2), energy intensive oil production in the northern regions of the country, similar type of transition economy.

The Republic of Korea: similar GDP structure, examples of the best energy efficiency practices.

The People's Republic of China: similar GDP structure, the fastest developing major economy worldwide.

The United States and Japan: example of developed post-industrial economies, examples of the best energy efficiency practices.



Note: The GDP structure of the United States and Japan includes social and other services; transport and commerce.

Figure 12: GDP structure and comparison of Kazakhstan and other countries by energy intensity

Source: Statistical book "Russia and Countries of the World" (2012), Federal State Statistics Service of the Russian Federation; IEA statistics database, 2014

Energy intensity indicators are the basis for the quantitative objectives related to energy efficiency and conservation that are set by the government of Kazakhstan. For example, according to the Program "Energy saving 2020", the objective is to lower GDP energy intensity by 30% by 2015 and by at least 40% by 2020 from the 2008 level.
It is important to understand that these objectives were based on the statistical data for a relatively short period of time, which means that annual errors in the data on reduced power consumption cannot be evaluated. The year 2008 selected as the reference period was a year of recession and therefore it is unrepresentative of Kazakhstan's economy. In this respect, an interim analysis of the Program results may be necessary in order to review the objectives when appropriate.

10 Based on energy intensity calculated from real GDP but excluding purchasing power parity.

Energy intensity and per capita GDP (as of 2012)					
Country	Population (million people)	Per capita GDP (PPP) (billion 2005 USD/per capita)	Primary energy consumption (toe per capita)	Energy intensity	
				toe/th 2005 USD, PPP	toe/th 2005 USD
Kazakhstan	16.79	19 171	4.46	0.23	0.86
China	1 357.87	9 787	2.14	0.22	0.61
Russia	143.53	15 177	5.27	0.35	0.77
Japan	127.55	31312	3.55	0.11	0.10
Korea	50.00	27 993	5.27	0.19	0.24
Canada	34.88	37 016	7.20	0.19	0.19
USA	314.28	45 283	6.81	0.15	0.15
OECD	1 254.26	31 255	4.19	0.13	0.13

Table 2: Comparison of Kazakhstan and other countries by energy intensity

Source: IEA World Energy Statistics, 2014

If we look at Kazakhstan's GDP energy intensity calculated from GDP (PPP) data, the difference from the countries under comparison is not so considerable. For example, the difference between GDP (PPP) energy intensity levels in Canada and Kazakhstan is about 17%; of all OECD countries, Canada is closest to Kazakhstan in terms of climatic conditions, area, population density, and GDP structure.

NATIONAL ENERGY SAVING AND ENERGY EFFICIENCY POLICY

Over the last few years, energy efficiency and energy saving have been high on the country's agenda. A regulatory framework is currently in place and the country's government authorities are making good progress in creating a fully operational energy efficiency system, including efforts to modernize various sectors of the national economy, introduce technical regulation and energy accounting systems for businesses, improve management quality and upgrade operating personnel skills, raise energy efficiency awareness among local communities, and increase the appeal of investing in energy efficiency projects.

In this context, the address of the President of the Republic of Kazakhstan to the people of Kazakhstan "New Decade – New Upturn in the Economy – New Opportunities for Kazakhstan" on 29 January 2010 and the State Program of Accelerated Innovation and Industry Development for the Republic of Kazakhstan for 2010-2014 set an objective to lower GDP energy intensity by at least 10% by 2015 and by 25% by 2020. However, the Republican Program "Energy saving 2020" sets even more ambitious goals for the country: to decrease GDP energy intensity by 40% by 2020.

In addition, the country is implementing a number of comprehensive, regional, and industry-specific plans to raise energy efficiency. The Technical Committee for standardization was established in this area.

The Law of the Republic of Kazakhstan on Energy saving and Energy efficiency and the Law on Amendments to Certain Legislative Acts of the Republic of Kazakhstan Related to Energy saving and Energy efficiency passed in January 2012 were important milestones in the development of national policy in this area.

Twenty-two regulatory legal acts have been passed under these laws to:

1. introduce a gradual ban on the use of incandescent light bulbs;
2. introduce energy consumption standards for all types of industrial products and services. All industrial enterprises must adhere to these standards;
3. introduce mandatory energy efficiency requirements for all types of transport, electric motors, buildings, facilities, structures, and their design documentation;

4. introduce energy efficiency classes for buildings, facilities, and structures, as well as classification and reclassification rules;
5. adopt rules for energy audits in industrial enterprises and buildings;
6. introduce requirements to implement energy management systems for enterprises consuming more than 1,500 tons of coal equivalent (tce) (1,050 toe) per year;
7. approve a standard voluntary agreement for energy saving and energy efficiency to be concluded trilaterally between a competent authority for energy saving and energy efficiency, a regional akimat (government), and a major industrial consumer of energy resources. Local representative authorities will not have the right to raise emission fees for parties to these agreements;
8. put in place certain tools to evaluate the performance of local executive agencies with regard to energy saving and energy efficiency;
9. approve rules for training centres engaged in refresher and advanced training of individuals and legal entities responsible for energy audits and/or energy saving analysis, as well as creation, implementation, and organization of energy management systems.

One of the main drivers of the new regulatory framework is the National Energy Register, which incorporates individual entrepreneurs and legal entities consuming 1 500 tce (1 050 toe) or more per year, as well as state-run institutions and companies with a government stake. Except for state institutions, all entities included in the Register must have an energy audit at least once every five years. In addition, all entities included in the Register must implement and maintain an energy management system.

For this reason, the Technical Regulation and Metrology Committee of the Ministry of Investment and Development of Kazakhstan adopted the ST RK ISO standard 50001-2012 "Energy Management Systems. Requirements and Guidance for Use", and developed the methodology of energy audit in buildings.

In August 2013, the Government of Kazakhstan approved the Republican Program "Energy saving 2020" ("the Program") as the key energy efficiency document which contains an analysis of current developments in certain sectors of the economy and defines the objectives and actions required to attain these objectives.

The Program sets the following tasks:

- Modernization and energy efficiency of the production sector
- Reduced losses in power and heat supply networks
- A large scale campaign to raise public awareness of energy saving
- Development and introduction of incentives to promote energy saving and improve energy efficiency
- Development of incentives for energy service companies
- Personnel training in energy saving and energy efficiency
- Reduced fuel consumption in the transport sector
- Lower specific costs per 1 kWh of electric power/1 Gcal of heat.

The Program defines the following objectives to decrease GDP energy intensity from the 2008 level.

Description	2013	2014	2015	2016	2017	2018	2019	2020
Decrease in GDP energy intensity in relation to 2008 level	10	20	30	32	35	36	38	40

Table 3: Program targets

Source: Program "Energy saving 2020"

Note that the energy efficiency targets in the Concept for the Development of the Fuel and Energy Industry of the Republic of Kazakhstan until 2030 and those in the Concept of the Republic of Kazakh-

stan for the Transition to a Green Economy are markedly different from those specified in the Program "Energy saving 2020".

Therefore, it is necessary to harmonize the energy efficiency targets in the country's regulatory framework, subject to their feasibility.

Despite the considerable accomplishments made by Kazakhstan in shaping the appropriate regulatory framework, any meaningful progress in energy saving and energy efficiency cannot be expected until 2015, when energy audit-based initiatives will be put into practice. However, these plans may be pushed forward considerably by improving the current legislation and taking organizational and information measures. Some of the challenges related to the regulatory framework and potential ways of dealing with them are described below.

1. Targets

In our opinion, targets set by the Program "Energy saving 2020" are somewhat overstated and therefore difficult to achieve. Therefore, in order to enhance the performance under the Program, it might be advisable to revise the targets taking into account their actual achievability; moreover, a progress monitoring procedure for the Program should be developed and approved.

2. National Energy Register (NER)

As was mentioned earlier, the National Energy Register is a database that contains information about enterprises consuming 1 500 tce (1 050 toe) or more per year, as well as state-run institutions and companies where the government is a shareholder.

As of today, the Register includes more than 11 thousand enterprises and state-run institutions. Note that not all enterprises are included in the Register. In the first place, this is due to the fact that the metering and control system for consumption of energy resources such as electric power, natural gas, heat, and fuel is not perfect; in the second place, energy consumption is not monitored on a timely basis.

For example, it is difficult to calculate heat consumption for enterprises connected to heat networks because they have no heat meters, which affects the further analysis of potential energy efficiency measures.

With this in mind, the NER operator shall:

- Carry out internal analysis of the National Energy Register to see whether all enterprises consuming one thousand five hundred tons of coal equivalent per year are included in the Register.
- Develop and approve a single NER procedure for the calculation of GCP (gross commodity product) energy intensity, energy saving potential, and total energy consumption metering for enterprises, as well as monitoring and reporting forms and periods.
- Carry out internal analysis following energy audits at the enterprises included in the Register and identify the most energy efficient investment projects to be included in the Kazakhstan Register of Investment Projects.

3. Energy Audit

The procedure for organizing and carrying out energy audits is governed by the Energy Audit Rules (RK Government Decree No. 1115 of 31 August 2012); however, there is no single energy audit procedure (the "procedure") for industrial enterprises. The Energy Audit Rules do not specify the required scope of measurements at an enterprise, survey depth, etc.

In fact, accredited energy audit companies have to determine the required scope of instrumental surveys and depth of analysis at their discretion, and they generally try to reduce the scope of surveys in order to minimize costs. The Russian experience has shown that many energy audits were conducted formally, failing to reach the appropriate scope of instrumental surveys and depth of analysis.

The action plan based on the energy audit findings may not be approved by regulatory authorities and may be a formal list of insignificant and low-cost actions.

That is why it is important that a single energy audit procedure should be approved for industrial enterprises. This procedure should include action items concerning the estimation of energy audit costs and provide for public hearings following energy audits in major energy consumers in Kazakhstan to discuss the feasibility and specific implementation periods for the proposed actions.

4. Energy Management

The energy management system must be implemented by entities included in the National Energy Register, if they consume more than 1 500 tce (1 050 toe). For this purpose, ISO 50001 was selected as the main energy management standard and a relevant state standard was adopted and approved.

It is essential to note that in addition to a substantial increase in the volume of documentation, some producing companies may face difficulties related to certification when implementing ISO 50001. The key certification requirement is the annual decrease in energy consumption from the so-called "baseline", i.e. base energy consumption trend. However, production of energy resources, especially oil, involves a gradual increase in energy consumption; that is why producing companies wishing to introduce energy management systems should determine the baseline very accurately, preferably from energy audit data. As a result, energy management systems should preferably be introduced following energy audits.

5. Energy saving Analysis of Design Documentation

According to the RK Law on Energy saving and Energy efficiency, preliminary design and/or design (design and estimate) documentation for the construction of new buildings, facilities, and structures or expansion (major repairs, reconstruction) of existing buildings, facilities, and structures consuming more than 500 tce (350 toe) of energy resources during one calendar year shall be subject to mandatory energy saving and energy efficiency analysis.

The analysis shall be carried out by an independent organization not connected with the project developer and accredited in this particular area for all buildings, facilities, and structures consuming more than 500 tce (350 toe) of energy resources per year.

Design documentation shall contain a section on energy saving and energy efficiency, an energy certificate for the designed building (with the energy efficiency class specified), and other information about any energy saving technology or heat insulation used.

The result of the analysis shall be a conclusion which contains information about the energy efficiency class. Buildings with an energy efficiency class lower than C shall not be constructed.

№ No.	Class symbol	Energy efficiency class	Deviation of the calculated (actual) energy efficiency index for heating and ventilation in a building from the standard value, %
Design and operation of new buildings and buildings under reconstruction			
1	A++	Very high	less than -60
	A+		from -50 to -60
	A		from -40 to -50
2	B+	High	from -30 to -40
	B		from -15 to -30
3	C+	Normal	from -5 to -15
	C		from +5 to -5
	C-		from +15 to +5
Operation of existing buildings			
4	D	Lower	from +15.1 to +50
5	E	Low	more than +50

Table 4: Energy efficiency classes for buildings

Source: RK Government Decree of 31 August 2012 No. 1117 "Rules for Energy Efficiency Classification and Reclassification for Buildings, Facilities, and Structures"

If this mechanism is put in place, it may be quite efficient; however, consideration must be given to a substantial volume of design documentation subject to analysis. Therefore, a greater emphasis should be put on training experts in energy saving and energy efficiency analysis of design documentation and tightening control over the centres where such experts are trained.

6. Amendments to the Code of Administrative Violations of the Republic of Kazakhstan ("CoAV" or "the Code")

During the implementation of energy saving and energy efficiency laws of the Republic of Kazakhstan, a number of amendments were made to RK CoAV imposing penal sanctions for failure to comply with legal requirements. However, some CoAV articles require further revision.

For example, the Code imposes penal sanctions for failure to maintain standard power factors in electrical networks or stay within energy consumption limits (Art. 219-1). 219-1).

At the same time, it should be noted that the applicable energy consumption limits[11] do not take into account specific process features or operating procedures in certain enterprises. According to our analysis, many enterprises go far over the energy consumption limits and sometimes it is not possible to determine the best energy consumption level, which depends on each particular enterprise, its specific process features, etc.

Penal sanctions for failure to maintain standard power factors in electrical networks may produce a beneficial effect only if major consumers have an automated energy metering system or a power factor monitoring system.

So, in order for this article to be more effective, the applicable energy consumption limits and the procedure for their definition should be revised and differentiated penal sanctions should be introduced for failure to maintain standard power factors, subject to the amount of electric power consumed.

Art. 219-2 that covers the operation of malfunctioning equipment requires additional clarification as to what exactly "the operation of malfunctioning equipment" means and how one can determine whether equipment is functioning properly or not.

11 Decree of the Government of the Republic of Kazakhstan No. 1346 of 24 October 2012

Furthermore, the Code states that specific consumption of energy resources and water shall be based on the values determined from energy audits

(Art.219-4). 219-4). However, it should be pointed out that not all enterprises can reduce specific energy consumption. For example, production of resources typically involves a general increase in specific energy consumption. Energy audits must define the attainable level of slowdown in energy consumption growth. In addition, a procedure for examining

Following the incandescent lamps ban. the country is seeing a much wider application of mercury-vapour (fluorescent) lamps. However, the issue of their safe disposal still remains unresolved, which poses a real threat to public health and may have negative environmental implications. In this regard, it is essential to introduce a country-wide system for gathering, storage, and disposal of mercury-containing lamps.

In general, following the analysis of the RK laws in the area of energy saving and energy efficiency, it may be noted that prohibitory and controlling mechanisms prevail considerably whereas investments or incentives are virtually non-existent. Therefore, the following can be recommended:

- To implement energy service contracts
- To reduce the tax burden for enterprises which manage to improve their energy efficiency dramatically
- To offer credit preferences for energy saving projects.

Incentives are necessary, first of all, because of a relatively low cost of energy resources in Kazakhstan, which affects the investment appeal of energy saving and energy efficiency projects.

PRICING POLICY IN THE ENERGY INDUSTRY

Government regulation of prices provides the basis for the pricing policy across energy markets.

According to the RK Law on Natural Monopolies and Regulated Markets, tariffs and their maximum level in relation to the regulated services offered by natural monopolies shall not be lower than the cost of regulated services and shall result in profits from effective performance of a natural monopoly.

The following services are provided by natural monopolies in Kazakhstan:

- transportation of crude oil/petroleum products via main pipelines;
- storage and transportation of sales gas via connecting gas lines, main gas lines and/or gas distribution systems; operation of group tank facilities; transportation of raw gas via connecting gas lines;
- power transmission and distribution;
- heat generation, transmission, distribution, and supply;
- technical dispatch control over grid output and electric power consumption;
- electric power generation and consumption balancing.

According to the RK laws, natural monopolies are controlled by the Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy (CRNM&CP or "the Committee").

All services related to power supply to households are provided on the basis of standard contracts and at standard rates (tariffs) established by the Committee. The Committee also approves tariff calculation procedures for services (goods, works) provided by natural monopolies.

In addition, maximum power tariffs were introduced for the electric power generation sector in 2009 by a Decree of the RK government; these tariffs will be in effect for 7 years and will apply to 13 groups of energy producing companies.

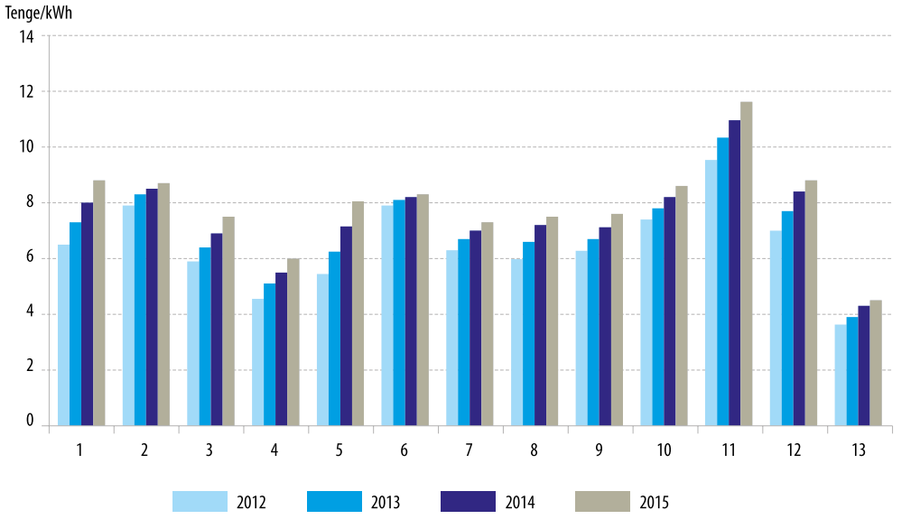


Figure 13: Maximum tariffs for electric power generation by groups of energy producing companies

Source: RK Government Decree of 25 March 2009 No. 392 "On Approval of Maximum Tariffs"

Electric Power

The cost of electric power generated by power plants is determined by the market but cannot exceed the specified maximum tariffs. Approximately 95% of generated power is purchased on the wholesale electricity market, with the remaining 5% purchased on the retail market. Tenders are held by the market operator JSC KOREM. Major consumers may conclude power purchase agreements directly with energy producers or following the tenders.

Electricity tariffs differ from region to region. Differentiated tariffs apply to all consumers in each region, subject to power consumption levels. In addition, if differential (daytime/night-time) meters are installed, electricity tariffs will depend on the time of day. The highest tariffs apply to peak load periods.

City	Tariffs, KZT/kWh, excl. VAT					
	Level 1 from 0 to _kWh		Level 2 From level 1 up to ___kWh		Level 3 More than___kWh	
	With el. cooker	No el. cooker	With el. cooker	No el. cooker	With el. cooker	No el. cooker
Astana	90	70	180	140	180	140
	7.57	7.63	12.58		15,86	
Almaty	115	90	190	160	190	160
	12.82		17.36		21.71	
Aktau	90	70	180	150	180	150
	2.45	4.27	5.75		7.21	
Atyrau	110	90	190	170	190	170
	5.08	4.97	6.37		7.97	
Aktobe	90	70	140	120	140	120
	8.1	8.18	10.38		12.98	
Karaganda	100	80	180	160	180	160
	6.89	6.91	8.62		10.77	
Kostanay	130	100	190	150	190	150
	13.37	13.03	16.47		20.58	
Kyzylorda	70		150		150	
	11.03		16.09		20.11	
Uralsk	90	70	140	120	140	120
	6.89	6.91	8.62		10.77	
Ust-Kamenogorsk	90	85	190	170	190	170
	7.47		10.25		12.81	
Pavlodar	110	90	180	150	180	150
	8.25	8.27	10.61		13.26	
Petropavlovsk	90	70	170	150	170	150
	9.30	9.44	12.13		15.16	
Taraz	100	80	180	150	180	150
	12.21	12.67	15.78		19.7	
Shymkent	110	70	170	140	170	140
	11.26		14.18		17.7	

Table 5: Electricity tariffs differentiated by power consumption levels (for consumers without electric cooking appliances)

Source: Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy

Note: consumption limits (kWh per month) differ from region to region and depend on household subsidies.

City		Tariffs, KZT/kWh, incl. VAT				
		Individuals		Companies		
		night 23.00-07.00	day 07.00-23.00	night 23.00-07.00	day 07.00-23.00	evening [12] 19.00-23.00
Astana		3.01	13.58	3.69	13.64	28.64
Almaty		4.08	18.55	4.08	14.47	30.31
Aktau		1.38	6.17	4.25	13.52	30.48
Atyrau		1.60	6.91	5.40	17.93	37.73
Aktobe		2.82	11.47	6.58	17.26	37.14
Karaganda	<750 kW[12]			4.91	18.19	45.96
	>750 kW	1.54	9.24	6.55	15.62	42.60
Kostanay		4.01	17.73	5.08	17.33	45.96
Kyzylorda		3.64	17.05	4.41	13.41	29.51
Uralsk		1.37	9.06	4.47	14.56	31.91
Ust-Kamenogorsk		3.86	15.17	6.06	17.81	45.58
Pavlodar		2.40	11.24	3.51	12.95	27.23
Petropavlovsk		4.44	12.98	3.61	10.60	26.47
Taraz		3.70	16.83	4.81	17.08	33.56
Shymkent		3.74	15.55	5.53	17.42	40.20

Table 6: Differentiated tariffs by time zones for individuals (ind) and companies (c)

Source: Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy

As required by the Law of Energy saving and Energy efficiency, all buildings put into operation must have electric power meters with differentiated time-of-day metering.

The table below shows tariffs for power transmission, distribution, and dispatch services offered by JSC KEGOC:

Description	Regulated activity	Tariff, KZT/kWh, excl. VAT	
		From 01/11/2013	From 01/11/2014
JSC Kazakhstan Electricity Grid Operating Company (KEGOC)	Power transmission	1.305	1.954
	Technical dispatch control over grid output and electric power consumption	0.134	0.182
	Electric power generation and consumption balancing	0.060	0.083

Table 7: Tariffs for natural monopoly services (JSC KEGOC)

Source: Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy[14]

In March 2010, the RK Law on Natural Monopolies and Regulated Markets was amended to allow regional grid management companies to set tariffs based on benchmarking (comparative analysis).

Since 2013, tariffs for power distribution services offered by regional grid companies have been approved by the Committee for the Regulation of Natural Monopolies and Competition Protection using the benchmarking method[15], for a period of 3 years. Under this method, performance of a regional

12 Peak consumption time
13 For companies with set power capacity
14 Note: 17 September 2013. The Agency for the Regulation of Natural Monopolies approved the Order on Maximum Tariffs and Tariff Estimates of JSC KEGOC for Regulated Services for the mid-term period from 1 November 2013 till 31 October 2015.
15 Before that, tariffs were set on a cost estimate basis (cost plus method).

grid company is compared with that of peer regional grid companies from the same group. Tariffs are approved for each regional grid company under this method for three years, subject to the company's performance. Financial and operational indicators are used for RGC performance benchmarking. Each regional grid company is then assigned a task to improve its performance by including investment project costs into the company's tariffs.

The tariff policy of the combined heat and power plants (CHPP) currently in operation remains a major challenge for the Kazakhstani power industry. These plants account for almost 35% of the electric power generated in the country. If the cost of electric power generated by a CHPP is in fact dictated by the market, the cost of heat energy is controlled by the Committee for the Regulation of Natural Monopolies and Competition Protection and depends on the total costs, depreciation, and profitability limit. Heat is a by-product of power generation by CHPP; therefore, it is difficult to distinguish between power costs and heat costs. According to the procedure for sharing costs, revenues, and assets used for combined heat and power generation approved by the Committee, there are two methods to determine the share of heat generation costs: the physical method and the exergy method. If the physical method allocates most of the costs to heat energy, the exergy method results in the bulk of costs being allocated to power generation, subject to the plant's operating conditions.

It is essential to note that CHPP performance depends on the plant's operating conditions. For example, if the thermal load is not sufficient, CHPP will have to switch to the condensing mode with very low efficiency compared to conventional condensation plants. Moreover, CHPP efficiency is always lower than that of condensation plants in terms of electric power generation; as a result, CHPP will often be behind condensation plants when it comes to the cost of electric power, despite the fact that the cogeneration cycle is quite efficient. This is the reason why the exergy method for cost sharing that relies on the plants' operating conditions should be followed when heat tariffs are approved for CHPP.

In addition, the government of the Republic of Kazakhstan approved "green" tariffs for electric power generated by renewable energy sources (RES). These tariffs apply to all power plants generating electric power from renewable energy sources, for a period of 15 years; it is guaranteed that all generated power will be purchased using these tariffs (adjusted for inflation on a yearly basis). The Unified Financial Settlement Centre of JSC KEGOC, the system operator of the Unified Electric Power System of the Republic of Kazakhstan, is responsible for purchasing electric power from RES power plants. The Centre then sells the power to conventional power plants, which use it for their own needs.

A reactive power payment scheme for major power consumers could substantially contribute to reducing electric power losses in grids. Increased reactive power consumption is typical of many industrial enterprises in Kazakhstan. Therefore, reactive power compensation is an important issue, because the reactive component is responsible for some grid losses. For example, lower reactive power in 6-10 kV distribution networks significantly reduces power losses, increases network transmission capacity, and stabilizes voltage fluctuations.

At present, consumers pay for active power only, but it is the reactive component that leads to partial grid losses. This payment scheme will encourage consumers to find ways to compensate for reactive power, which will result in lower total power losses, voltage stabilization, and higher transmission capacity of RGC networks. However, if the reactive power payment scheme is introduced, the issue of double payments has to be considered, because the electricity tariff includes payment for losses resulting, in particular, from reactive power[16]. So, with regard to the pricing policy, it would be advisable to consider a more detailed differentiation structure for electricity tariffs, develop priority mechanisms for purchasing electric power from CHPP, and introduce reactive power payment schemes.

Heat Supply

At present, heat supply companies set tariffs based on the volume of heat per 1 m² for households and supply of 1 Gcal of heat. Tariffs for heat generation and supply are approved by the Committee for the Regulation of Natural Monopolies and Competition Protection.

16 The reactive power payment scheme was used in Kazakhstan before but was canceled due to the double payment issue.

№	Regions and cities	Heating tariffs, KZT/m² per month, excl. VAT	Heat energy tariffs, KZT/Gcal (excl. VAT)			
		Average tariff for the last heating season for heating of buildings, KZT/m² (per month)	Households		Other consumers (incl. companies)	
			with HM [17]	without HM	with HM	without HM
1	Astana	80.79	1 855.28	2 513.08	2 445.36	3 873.59
2	Almaty	130.03	3 891.80	5 099.38	3 891.80	6 374.22
3	Almaty region (Tadykorgan)	68.9	214.42	2 414.58	3 087.90	6 797.20
4	Kokshetau	81.25	1 394.00	2 825.11	3 131.77	5 633.66
5	Aktobe region	62.04		1 803.61		2 399.26
6	Atyrau region	90.10	1 877.16	4 098.26	4 776.15	12 827.97
7	East-Kamenogorsk region	71.83		2 388.76		4 098.84
8	Zhambyl region	70.14		2 669.91		10 970.62
9	West Kazakhstan region	95.42		3 118.16		3 355.58
10	Karaganda region	75.72		2 498.98		5 334.17
11	Kostanay region	127.96		3 998.47		6 615.74
12	Kyzylorda region	75.98		2 638.34		2 948.10
13	Mangistau region	43.97		1 799.00		2 085.70
14	Pavlodar region	2206.93	936.79	1 917.55	2 340.49	3 491.45
15	North Kazakhstan region	78.045		2593.50		3 691.67
16	South Kazakhstan region	77.63	2 078.66	4 172.08	6 350.42 – state-funded 4 899.87 – others	18 414.83 – state-funded 11 674.97 – others

Table 8: Heat energy tariffs

Source: Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy.

Heat energy tariffs are set and approved by the Committee for the Regulation of Natural Monopolies and Competition Protection under the costs + depreciation + profit scheme; however, this approach does not take into account investments required for modernization.

The pricing policy for heat supply should be aimed at providing incentives for the modernization of heat sources by offering long-term tariffs (for at least 5 years) at an economically feasible level, with the investment component included. At the same time, companies should be able to redistribute funds among different tariff items, as well as retain and reinvest any costs saved.

Another disadvantage of the pricing policy is that the cost of heat energy generated by vapour is not differentiated either by the amount of energy (Gcal) or by vapour pressure.

Natural Gas

Gas tariffs for households differ from one region where gas is consumed to another. Gas prices vary in a very wide range, from KZT 4 631 per one thousand cubic meters (approximately EUR 18.5) to KZT 22 295 (approximately EUR 90).

Tariffs shown below include wholesale cost of gas and cost of gas distribution services approved by the Committee for the Regulation of Natural Monopolies and Competition Protection. In general, natural gas pricing in Kazakhstan is set up as follows:

17 heat meters

JSC KazTransGaz, the national operator, exercises its right[18] to purchase processed associated gas at fields[19] at a price based on the cost of production and the rate of return (no more than 10%).

Regions	Wholesale price, KZT/th m3	Tariff, KZT/th m3			
		Households	Companies	Heat generation for:	
				households	companies
Almaty		24 800	27 226.01	21 212.17	22 059.77
South Kazakhstan	15 132.89	22 295.35	17 110.77	15 132.89	18 159.47
West Kazakhstan	11 638.3	14 827.95	16 199.12	16 199.12	16 199.12
East Kazakhstan	N/A	10021	w/d [20]	w/d	w/d
Zhambyl	18 008.14	15 274.13	21 245.38	15 274.13	16 190.58
Kyzylorda		11 329.85	w/d	w/d	w/d
Aktobe		5 187.86	9 805.26	w/d	w/d
Kostanay	19 412.84	17 603.33	20 856.89	15 781.85	19 587.34
Atyrau		4 631.86	16 905.96	5 546.36	5 546.36
Mangystau	14 776.92	7 027.00	5 742.88	w/d	w/d

Table 9: Wholesale and retail prices for natural gas

Source: Prices effective from 1 July 2014 (data provided by JSC KazTransGaz, the national operator).

When selling gas to gas distributors and industrial consumers, the national operator relies on the marginal wholesale price approved every six months by the government of Kazakhstan. As a result, the national operator's[21] margin is equal to the wholesale cost of gas less the cost of purchasing gas at fields and the gas transportation tariff (approved by the Committee for the Regulation of Natural Monopolies and Competition Protection). The disadvantage of this scheme is that the national operator may increase its rate of return considerably if the wholesale price for gas goes up, without any actual obligations to modernize the gas transportation infrastructure.

As to gas prices, there is no cost differentiation in Kazakhstan by consumer type. Therefore, it seems appropriate to consider differentiating the cost of gas by consumer type (housing and utilities sector, households, industry, generation) and consumption season. In addition, gas transportation and distribution pricing should allow for costs for long-term modernization and energy efficiency programs. In order to promote energy efficient generation, discounts should be considered on the wholesale price for natural gas for combined cycle plants as the most effective way of power generation.

Petroleum Products

Under the law of Kazakhstan on the government control of petroleum products trade, the Committee for the Regulation of Natural Monopolies and Competition Protection sets marginal retail prices for fuel and lubricants subject to government control (diesel fuel, AI-92/93 and AI-80 gasoline) as agreed upon with the Ministry of Oil and Gas and the Ministry of Economy and Budget Planning.

Moreover, the RK Ministry of Energy submits, on a monthly basis, information about global oil prices for the period from the 15th of the previous calendar month to the 14th of the current calendar month to the Committee.

18 Under the Law of the Republic of Kazakhstan on Gas and Gas Supply, the national operator has the preemptive right and takes precedence over any other persons with regard to purchasing raw gas sold by subsoil users and sales gas produced by subsoil users in the course of raw gas processing.

19 Associated petroleum gas amounts to 90% of the total gas production in Kazakhstan.

20 Without differentiation

21 At present, the margin component is at the lowest possible level.

AI-92/93 gasoline	≤ 128.0 KZT/l
AI-80 gasoline	≤ 89.0 KZT/l
Diesel fuel	≤ 115.0 KZT/l

Table 10: Retail prices for petroleum products as of August 2014

Source: Committee for the Regulation of Natural Monopolies and Competition Protection

THE CONCEPT FOR THE TRANSITION OF THE REPUBLIC OF KAZAKHSTAN TO A "GREEN" ECONOMY

In his message to the people of Kazakhstan on December 14, 2012 «Strategy «Kazakhstan-2050»: new political course of the succeeding state» the President of the country specified transition to the new course of the sustainable and balanced development having determined the following aims:

1. To raise the share of alternative[22] and renewable energy in the country's total energy mix to 50% by 2050.
2. To decrease GDP energy intensity by 10% by 2015 and by 25% to 2020 from the 2008 baseline level.
3. To provide drinking water to all households by 2020 and meet the demand for water for irrigation farming by 2040.
4. To increase productivity of agricultural lands by a factor of 1.5 by 2020, etc.

Furthermore, the President announced a nationwide mission to become one of the top 30 developed countries of the world. To add momentum to the country's transition to a "green" path of development, the International Specialized Exposition EXPO 2017 "Future Energy" will be held in Astana.

In this connection and for the purpose of attaining these objectives, the Decree of the Head of State Nursultan Nazarbayev approved the Concept for the Transition of the Republic of Kazakhstan to a "Green" Economy (the "Concept") in May 2013.

The green economy is defined by the Concept as "an economy with a high quality of life and sound and sustainable use of natural resources in the interests of current and future generations".[23] As such, this document should play a key role in shaping the national policy in the area of energy saving and energy efficiency, because it sets out basic principles and approaches to the use of natural resources, modernization of the economy, and further sustainable economic growth with minimum environmental impact. The main objectives of the Concept are expected to be attained, in the first place, by taking a number of steps towards cost-effective use of resources, energy efficiency, and adoption of new technology.

In general, the adoption of the Concept has added value to the strategic development goals for the key sectors of the economy and society stated in the Kazakhstan-2050 Strategy and industry policy documents.

According to the Concept, GDP energy intensity will decrease by 25 percent by 2020, 30 percent by 2030, and 50 percent by 2050 from the 2008 level.

The following targets will be achieved in the electric power industry:

1. The share of solar and wind power plants will reach 3 percent by 2017. The total share of alternative energy, including renewable energy sources and nuclear and hydroelectric power plants, will grow to 30 percent by 2030 and 50 percent by 2050.
2. The share of gas-fired power plants that are to replace coal-fired CHPPs in major cities will amount to 20 percent in 2020 and will gradually increase to 30 percent by 2050.
3. By 2030, gas supply will be provided for the northern and eastern regions of the country.

22 Nuclear Power Plants included

23 The Concept for the Transition of the Republic of Kazakhstan to a Green Economy, page 3. 3.

4. CO2 emissions will be reduced by 15 percent by 2030 and 40 percent by 2050 from the 2012 level.

Key priorities during the country's transition to a "green" economy are:

1) More efficient use and management of resources, including water, land, biological resources, etc.

2) Modernization of existing infrastructure and construction of new infrastructure

3) Improved human well-being and environmental quality through cost-effective methods to decrease the load on the environment.

4) Improved national security, including water security.

The Concept will be implemented in three stages:

2013-2020

During this period, the key priority for the government will be optimization of resource consumption, adoption and improvement of environmental practices, and creation of "green" infrastructure.

2020-2030

The national economy will be transformed on the basis of existing "green" infrastructure, with a focus on the sound use of water resources, promotion and encouragement of development, wider application of renewable energy technology, and construction of buildings in line with high energy efficiency standards.

2030-2050

The national economy will complete the transition to the principles of the so-called "third industrial revolution" that require natural resources to be used on a renewable and sustainable basis.

According to the Concept, the transition to a "green" economy will involve the following:

- Sustainable use of water resources
- Sustainable agricultural development
- Energy saving and energy efficiency
- Development of the electric power industry
- Development of the waste management system
- Reduced pollutant emissions
- Conservation and efficient management of ecosystems.

The transition to the "green" economy is expected to increase GDP by 3%, create more than 500 thousand jobs, and give rise to new sectors of industry and services to ensure universally high standards of living for society.

Despite the fact that Kazakhstan has considerable energy resources, the government of the country has made a strategic choice for the transition to a "green economy", which is a major achievement in the area of sustainable development making Kazakhstan a leader among other countries in the region.

In order to attain these objectives, it may be advisable for Kazakhstan to implement a monitoring system to track performance under the Concept, including through the use of systems of sustainable development indicators.

At present, the leaders of Kazakhstan have set ambitious goals to decrease GDP energy intensity and improve environmental conditions and the quality of life in the country. To achieve these goals, a new regulatory framework for energy efficiency has been put in place, which can be further developed through:

- Harmonization of targets set forth in the national strategies and government programs for energy efficiency and conservation, with a single baseline year introduced for such targets
- Adoption of a system of sustainable development indicators to monitor the transition to a "green" economy
- Inclusion of costs for modernization and energy saving in tariffs for the activities regulated by the government

- A more detailed differentiation of the pricing policy
- Introduction of reactive power payment schemes for major power consumers.

EVALUATION OF ENERGY EFFICIENCY POTENTIAL BY ECONOMY SECTORS

ELECTRIC POWER INDUSTRY

General

The Unified Electric Power System (UEPS) of the Republic of Kazakhstan is a system of power plants and grids operating under standardized conditions, with a single centralized dispatch and emergency control to ensure reliable and efficient power supply.

The UEPS of Kazakhstan consists of:

1. The National Power Grid, which is a combination of substations, distribution equipment, interregional and interstate power lines, and power lines for power output from electric power plants with voltage of 220 kV or more.
2. Regional grid companies (RGC), which have on their balance sheet and operate regional power networks and grids (220-110 kV or less) and also perform power distribution functions. In total, there are 20 regional grid companies with different forms of incorporation in Kazakhstan.
3. The electric power generation sector of Kazakhstan, which includes power plants.

UEPS of Kazakhstan works in parallel with UES of Russia and the unified energy system of Central Asia. At the regional level, there are 3 energy zones in Kazakhstan:

- Northern Zone, including East Kazakhstan, Pavlodar, Akmola, Karaganda, North Kazakhstan, Kostanay, and Aktobe Regions, as well as the capital of the country – the city of Astana.

The Northern Zone is the centre where the UEPS of Kazakhstan is based. This is where most of the generating assets (72.5%) and well-developed power grids (220-500-1,150 kV) connecting the UEPS of Kazakhstan with the UES of Russia are located. This zone generates excessive power. Power generated by power plants in this zone is used to make up the deficit of power in the southern region of the country and transmit power to Russia.

- Southern Zone, including Almaty, Zhambyl, Kyzylorda, and South Kazakhstan Regions, the city of Almaty, and the Baikonur area.

Due to the lack of available primary fuel and energy resources and therefore generating assets in the area, there is a deficit in the power balance of the Southern Zone. The deficit is covered by power transmitted via the Kazakhstan North – South transit system or imported from the unified energy system of Central Asia.

- Western Zone, including Atyrau, West Kazakhstan, and Mangystau Regions. This energy zone has no electrical connections with the UEPS of Kazakhstan that pass through the country.

According to their functions, UEPS grids in Kazakhstan are divided into main grids, backbone grids, and distribution grids connected by the same process flow.

If you look at the structure of the country's electric power industry, you will see that assets are mostly concentrated in the generation segment where JSC Samruk-Energo is the key player. This company accounts for about 39% of the market, including output by Ekibastuz GRES-1 and the cascade of Irtysh power plants currently under concession.

Power transmission via main grids is almost completely controlled by JSC KEGOC, the system operator of RK UEPS.

Generating Assets

The electric power potential of the Republic of Kazakhstan is represented by 76 power plants with an installed capacity of 20 591.5 MW as of 1 January 2014, including:

- Thermal power plants: 18 002.4 MW
- Hydroelectric power plants: 2 583 MW
- Wind power plants: 5.6 MW
- Solar power plants: 0.5 MW.[24]

24 Concept for the Development of the Fuel and Energy Industry of the Republic of Kazakhstan until 2030 approved by RK Government Decree of 28 June 2014 No. 724.

The available capacity of power plants was 17,108 MW in wintertime and 15,320 MW in summertime; annual peak electrical demand in 2013 was 13,099 MW.

As to energy sources by fuel type, the country's power generation mix is as follows:

- Coal: 73.2%
- Gas: 18.4%
- Hydroelectric power plants (excluding small hydro power plants): 8.1%
- RES (including small hydro power plants): 0.3%.[25]

In accordance with the Concept for the Development of the Fuel and Energy Complex of the RK, in 2013 electricity production in Kazakhstan accounted for 91 972.7 mln. kWh (a 1.9% growth compared with 2012) and electricity consumption fell by 2% standing at 89.6 TWh. It should be noted that electricity production growth rate fell by 1.4% in 2013 compared to 3.7% in 2012, electricity consumption slowed down by 2% compared to a 4.6% growth in 2012. The decline in power consumption partly resulted from the implementation of energy saving measures.

Power Transmission

The National Power Grid serves as a backbone grid in the UEPS of Kazakhstan. The total length of 110 kV power lines in the Republic of Kazakhstan is approximately 44 thousand km; 220 kV power lines, 20.2 thousand km; 500 kV and 1,150 kV power lines, about 6.9 thousand km.

Substations, distribution equipment, and interstate, interregional and transit power lines (220 kV or more) for electric power output from plants that form part of the National Power Grid are on the balance sheet of JSC KEGOC.

Regional power networks and grids (110 kV or less) are widely used for power output from plants, supply to major load centres and individual consumers, provision of electrical connections within regions, districts, and cities, and power transmission to retail consumers. As many as 20 regional grid companies (RGC) transmit electric power via regional power networks.

In addition to JSC KEGOC and regional grid companies, there are also a number of other companies involved in power transmission on a contractual basis via their own or used power networks in the wholesale and retail markets and energy providers (EP, approximately 150 providers), including such major companies as JSC KazTransOil, JSC Kazakhstan Temir Zholy, Corporation Kazakhmys LLP, JSC Kazzinc, etc.

Power losses in KEGOC grids in 2013, including transits from neighbour states, were 2 607.1 million kWh (against 2 827.9 million kWh in 2012) or 5.46% (against 5.68% in 2012) of the net grid output.

It should be noted that power losses in the National Power Grid are higher than those in developed countries, which is due to the following:

- A considerable length of power lines between main consumption and generation centres (500 km to 1,500 km) compared to the Western countries where power transmission distances are much shorter.
- Sharply continental climate which has an adverse impact on corona power losses in power networks 220 kV or more (these losses account for 20-30% of the total losses).
- Wear and tear of main electrical equipment used for power transmission and generation is 50% to 60%, which has an adverse impact on the level of constant and variable losses.
- Transit and interregional power networks utilize the radial type of power supply (power source is at the beginning of a section).

Electricity Market

The existing model of the wholesale electricity market is based on a system of interrelated and coordinated markets for decentralized and centralized trading of electric power, a market for system and ancillary services, and a real-time balancing market[26]

25 Ibid.

26 A balancing market is a market where deviations from contractual volumes of power supply and consumption are sold and

The pricing policy is the key driver for encouraging the industry to save energy and improve energy efficiency. Tariff regulation mechanisms should allow for return on investments in energy saving through tariff adjustments (see the Pricing Policy in the Energy Industry section).

Analysis of current developments, major challenges and barriers:

At present, the electric power generation sector faces the following challenges:

- Power interruptions and limitations at existing power plants amount to almost 4 GW (approximately 205 of total installed capacity).
- The fleet life of generating equipment is nearing its end (up to 75% for thermal power plants).
- Power plant efficiency is low (33-34% for condensing power plants).
- The coal-fired power industry has a considerable environmental impact.

Moreover, the following is true for the generation sector:

- A lag in technology compared with the best global practices
- A low level of ash collection at coal-fired power plants, which results in considerable adverse environmental impact
- Lack of standby and peak carrying capacities
- Not enough thermal load on some CHPP sections and their operation in condensing mode
- Not enough gas for Zhambyl GRES (in fact, the power plant incurs losses at current gas prices and the applicable maximum tariff).

High specific fuel consumption typical of most Kazakhstani combined heat and power plants is also a major problem. Most of these plants have to operate in the costly condensing mode because there is not enough thermal load. It is important to understand that these plants were designed and built during the Soviet times for certain thermal loads, but after the economic recession in the 1990s most major industrial heat consumers were gone.

Challenges in the power transmission sector are related to transit via main grids between the energy zones within the country. For example, when electric power is transmitted from the sources in the north and east of Kazakhstan to energy-deficient regions in the Southern energy zone, limited transmission capacity due to steady-state stability requirements is one of the key challenges. As a result, in order to maintain reliable and fast-acting emergency control systems, power flows in weak sections are limited to 20% reserve of the maximum allowable value, which also contributes to underutilization of 500-220 kV transit lines. The fact that there is no single accident recording and intelligent control system to handle extreme power transmission conditions also affects the performance of the main power grids.

The level of losses in the country's distribution grids is quite high (almost 13%). Distribution grids with the lowest voltage (0.4 kV and 6-10 kV) account for most of the losses in RGC, which translate into approximately 70% of total power losses in the RGC.

purchased.

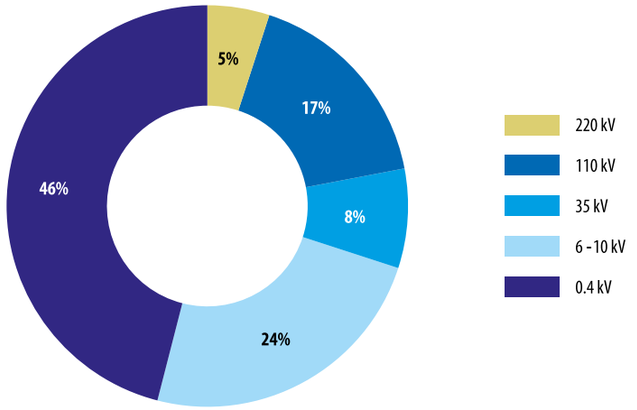


Figure 14: Structure of power losses by voltage levels in RGC

Source: Data provided by Non-profit JSC Almaty University of Energy and Communications[27]

Many high voltage power lines operated by RGC were built 40-50 years ago; their length exceeds the design length to a great degree. However, power transmitted via these lines is far less than the design values. Operation of transformer capacities by RGC is not always efficient: even in wintertime, transformer load for some transformers in many companies does not exceed 15-20%. It must also be noted that energy companies in Kazakhstan do not make enough effort to reduce power losses (reactive power compensation, operation optimization, etc.) and introduce advanced software systems for power loss calculation.

With the advent of semiconductor technology, the load structure for both the industrial sector and the household sector has changed dramatically over the last twenty years. As a result, we see lower power quality and higher reactive power consumption, which eventually affects power losses, performance and service life of power consuming equipment.

Today's challenges faced by the distribution sector are due to the absence of a single technical policy for RGC development, no transparent ownership structure, a great number of RGC owners, and lack of interest from some RGC owners in capital renewals. Therefore, action should be taken to enhance RGC transparency and approve common investment programs for their development.

As regards energy efficiency law, a document called Energy Consumption Standards was approved in 2012, where, among other things, averaged power losses are specified for different voltage ratings (under optimum grid operation conditions).

Voltage, kV	1150—500	220	110	35	10—6	0,4
Losses, %[28]	1.0—2.0	2.5—3.5	3.0—5.0	2.0—5.0	5.0—7.0	6.0—7.0

Table 11: Average power losses in grids with different voltage rating

Source: Decree of the Government of the Republic of Kazakhstan of 24 October 2012 No. 1346 "Energy Consumption Standards"

27 Implementation of Investment Programs for Reduction of Electricity Losses in Local Energy Companies, International Conference, Pavlodar State University, K. K. Tokhtibakiyev, Candidate of Science, Associate Professor at the Department for Electrical Stations, Networks, and Systems, and A. A. Saukhimov, engineer at Almaty Institute of Energy and Communications, FESTI, 2010.

28 As percentage of transmitted electric power by voltage rating (under optimum grid operation conditions).

In reality, these regulations are almost never used because power grids are seldom operated under optimum conditions. These standards have to be revised with regard to power losses in grids. Extensive research is required to determine the economically feasible level of technical power losses in grids; however, if such research is conducted, it will result in recommendations for loss reduction, which may be implemented in future investment programs for RGC modernization.

Proper reliability and quality of electric power supply is a key issue related to consumer supply. Despite the fact that there are relevant regulations[29] in effect in the Republic of Kazakhstan, there are no viable mechanisms for monitoring and assignment of responsibility for non-compliance with power quality standards. Enforcement of power quality standards and assignment of responsibility may be performed through a power quality monitoring system to be implemented at the level of major power consumers, producers, and transport energy companies.

Challenges faced by the electricity market in Kazakhstan may be summarized as follows:

- The balancing market is now functioning only in imitation mode.
- Automated power metering systems are not implemented by electricity market players to an adequate degree.
- Maximum tariffs and uncertainty in relation to such tariffs after 2015 affect the investment appeal of power plant construction and expansion projects.
- Tariff regulation does not fully account for investments in long-term modernization and energy saving programs.

Environmental Impact

A considerable environmental impact from coal-fired power plants, the main source of pollutant emissions in Kazakhstan, is a serious problem for the country's energy industry.

Sector	Total	Solids	SO_2	NO_x
Electric power industry and centralized heat supply	845.9	320.7	339.4	128.6
Processing industry	718.4	139.7	275.5	41.1
Mining industry	340.8	80.1	87.7	30.2
Subtotal for industrial sectors	1926.0	540.5	702.7	200.0
Transport	118.3	7.1	1.6	4.8
Total for Kazakhstan	2 226.5	639.3	723.6	215.6

Table 12: Pollutant emissions in Kazakhstan by main sectors of the economy in 2010, thousand tons

Source: Concept for the Transition of the Republic of Kazakhstan to a "Green" Economy

At the same time, pollutant emission volumes from most Kazakhstani power plants comply with the standards in force in the country. Consequently, the country needs a gradual transition to new environmental standards to reduce the environmental pressure from coal-fired power plants.

Type of emissions	Kazakhstan [30]	Interim standards	European Union
Solids (ash)	1200-1600	300-600	50-100
Sulfur dioxide (SO2)	2000-3000	1000-1500	400
Nitrogen oxides (NOX)	600	650	500

Table 13: Current standards for air pollutant emissions applicable in Kazakhstan[31] as compared with EU standards for existing power plants, mg/m3.

Source: Concept for the Transition of the Republic of Kazakhstan to a "Green" Economy

29 Power quality limits in public electrical systems.
30 Standards applicable in Kazakhstan are technical regulations for boilers with capacity of 420 t/h or more.
31 Standard Specifications of Kazakhstan, Directive 2001/80/EC

The transition to new environmental standards should be made on a step-by-step basis, with implementation milestones specified. It is also important that new power plants should be designed in line with the proposed environmental standards (e.g. Balkhash thermal power plant) and as close to the European standards as possible.

The fact that environmental standards for the generation sector are being raised gradually and consistently will enhance the investment appeal of the campaign for energy efficiency. This will become possible because lower specific fuel consumption at power plants will reduce specific pollutant emissions.

Moreover, in 2013 Kazakhstan introduced a system of government control over greenhouse gas emissions, according to which industrial enterprises and power plants are granted certain carbon dioxide emission allowances (carbon credits). If they exceed these allowances, they have to compensate for this by buying extra allowances on the domestic carbon market. In this case, the so-called internal carbon reduction project mechanism is put in place, which essentially makes it possible to convert outputs of Energy saving and energy efficiency projects into carbon credits that may be traded on the domestic carbon market.

As a result, government control over greenhouse gas emissions may promote state-of-the-art energy efficient technology and Energy saving. The environmental law in this area requires further improvement and development of mechanisms to carry out internal carbon reduction projects, including for energy efficiency purposes.

Energy saving Potential

With regard to the generation sector, it should be noted that specific fuel consumption for electricity and heat generation in Kazakhstan is, on average, higher than that in developed countries. In the first place, this is due to equipment wear and tear, low efficiency and operating conditions at power plants, and pent-up thermal capacity of combined heat and power plants.

According to expert estimates, low-cost measures taken at power plants to optimize operating conditions of power generation facilities and the number of boiler start-ups and shutdowns, subject to projected thermal loads, reduce fuel consumption by as much as 10%.

On average, power losses in distribution grids may be reduced by 4-5% (as low as reasonably practicable), depending on grid configuration.

The National Power Grid is currently being modernized, which will reduce the level of losses by 1% at the most. Any further reduction will require substantial capital investments and will have a limited effect.

The lack of generating capacity in the Southern energy zone first and foremost results from underutilization of the Zhambyl GRES, which has the highest cost of electricity in Kazakhstan due to high gas price and lack of gas supplies, especially in wintertime. This explains the plant's low ability to compete. Out of six plant units, only five remain functional; out of these five, only two are in operation at a relatively low utilization rate. As a result, the lack of capacity in the Southern energy zone is covered by power flows from the north of the country and Central Asia while the plants in the zone are underutilized. This increases power losses in the process of power transmission via the long-distance North – South transit lines.

The following should be taken into account when planning national energy saving programs:

- Substantial load reduction and surplus coal-fired generation capacity may adversely affect both the economic performance of coal-fired power plants and specific fuel consumption, because lower load will affect plant efficiency.
- Lower load in an energy-deficient zone has a multiplier effect because it reduces power transmission losses.

Therefore, when taking steps to improve the national policy in the area of energy saving, the structure of national power consumption should be taken into account. The Southern energy zone should have

top priority with regard to implementing and encouraging energy saving. Moreover, power reduction should be given the highest priority.

Recommendations:

- Promote further investments into the modernisation of deteriorated infrastructure of electricity production; transmission and distribution and thus further minimise losses
- Consider amending the existing regulations, related to ensuring reliability and quality of electricity supply, as well as major electricity consumers for non-compliance with power quality standards. Introducing electricity certificates should also be analysed.
- Develop and adopt a state Programme for the modernisation and development of the regional electricity companies, specifying required investments and financing sources taking into account key challenges of the sector: high losses and the necessity to increase reliability and quality of electricity supply. Relevant implementation timeframes and tariff adjustment are also to be discussed with electricity companies.
- Consider introducing energy saving incentives through the adjustment rules and procedures for tariff formation and consideration of the possibility to grant preferences to those companies that reduce losses.
- Introduce gradual transition to new regulatory requirements for hazardous emissions from coal-fired power plants. Refocusing of the regulatory frameworks of greenhouse gas emissions towards promoting projects aimed at improving energy saving and energy efficiency.
- Further develop relevant regulatory framework for calculating and setting the standards of electric power losses, implementation of measures to reduce power losses and to set the limits of maximum allowed transit and NPG cross-section power flows.
- The energy audits done for REC need to define the economically viable potential for energy savings and losses reductions in the distribution networks.
- A new, up to date regulatory framework should be developed for power loss calculation and standardization to reduce power losses and determine maximum allowable power flows via NPG transit systems and sections.
- The economically viable potential for energy saving and reduction in distribution losses should be determined as part of RGC energy audits.
- Cost estimates of government agencies and state-owned companies should be revised with regard to energy saving, given that energy saving is top priority for the Southern energy zone.

INDUSTRIAL SECTOR

General

The nation's industry is in the process of dynamic development. Almost every sector shows production growth, which, as a whole, results in annual GDP growth in the country. At the same time, the industrial sector accounts for less than 40% in the GDP structure.[32] The export-oriented natural resources sectors form the basis for Kazakhstani industry. Primary resources prevail in the export mix:

- Oil and petroleum products[33] - 35%;
- Nonferrous metals – 17%
- Ferrous metals – 16%
- Other ores – 12%
- Crops – 9%.

The Kazakhstan industry is represented by the following basic sectors: energy, oil and gas and mining and smelting. Chemical, machine-building sectors and production of construction materials are also developed.

32 Committee on Statistics, RK Ministry of National Economy.

33 Among petroleum products, mainly fuel oil is exported; at the same time, up to 33.2% of gasoline and 10% of diesel fuel are imported.

Because of the access to cheap energy resources, the great number of mineral deposits yet to be developed, and political stability, the Kazakhstani market is quite attractive. On the other hand, the geographical position of this landlocked country that has no direct access to sea substantially affects its export potential.

The most energy-intensive sectors of the Kazakhstani industry are discussed below.

Oil and Gas Industry

The oil and gas industry is the driving force of the national economy, which attracts the largest inflow of investments and technology into Kazakhstan and allows the country to accumulate financial reserves for the development of the non-oil and gas sectors of the economy.

The oil and gas sector accounts for almost 14% of Kazakhstan's GDP; moreover, the share of oil in total export revenues exceeds 64%[34]. Hydrocarbons are produced in six regions: Atyrau, Mangystau, West Kazakhstan, Aktobe, Karaganda, and Kyzylorda Regions.

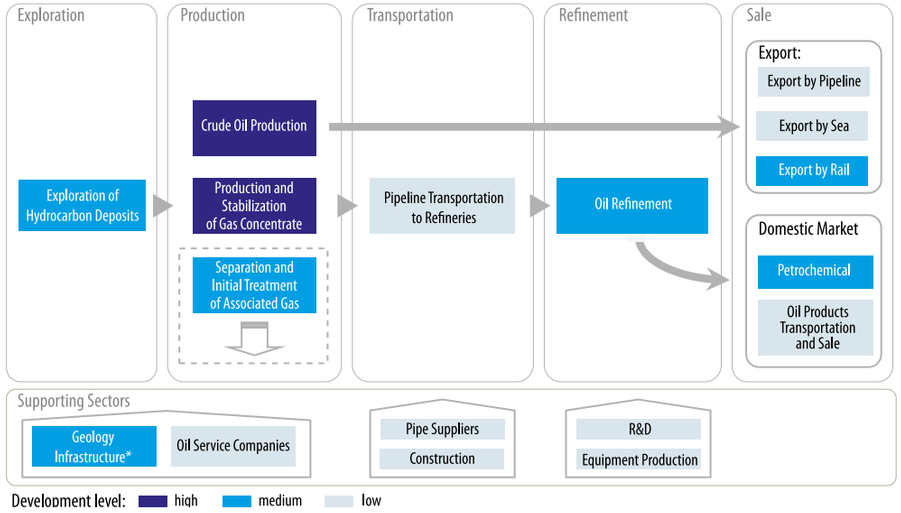


Figure 15: Structure of the oil and gas industry in Kazakhstan

Source: National Energy Report, Association KAZENERGY

All segments of the oil industry are more or less present in Kazakhstan but production remains the most developed sector. More than 81% of added value is created at the production stage.

It is important to note that most of the oil and gas fields in Kazakhstan have low recovery rates and are classified as depleted, marginal or high-viscosity. As a result, specific energy consumption for oil production in the country is relatively high. Some crude oil produced in Kazakhstan has high paraffin content, which increases energy consumption during both production and transportation. For example, in order to transport crude oil by main oil pipelines in the west of the country, a temperature of 40-50oC has to be maintained; at the same time, inadequate heat insulation of oil tanks at oil pump stations results in high energy losses.

The future potential for crude oil production in Kazakhstan is related, among other things, to transport infrastructure capabilities. Since Kazakhstan has no direct access to the global ocean, the bulk of oil is transported by main oil pipelines with a total length of approximately 7,000 km, operated by JSC KazTransOil, the national company.

34 National Energy Report, Association KAZENERGY.

In 2013, Kazakhstan exported 68 158 million tons of crude oil and gas condensate (0.1% up from 2012)[35], with only 10% of this volume shipped by sea or rail. In addition to crude oil exports, Kazakhstan imports up to 6.2 million tons of oil by main oil pipelines from Russia for Kazakhstani refineries (Pavlodar Oil Chemistry Refinery and PetroKazakhstan Oil Products (PKOP)).

Figure 16: Map of main oil pipelines in the Republic of Kazakhstan and major oil export destinations

Source: National Energy Report, Association KAZENERGY

The refining infrastructure in Kazakhstan is much less developed than the crude production and transportation sector, which is primarily due to the low capacity of the domestic market. Kazakhstan is far behind most other oil producing countries in terms of domestic consumption of crude oil.

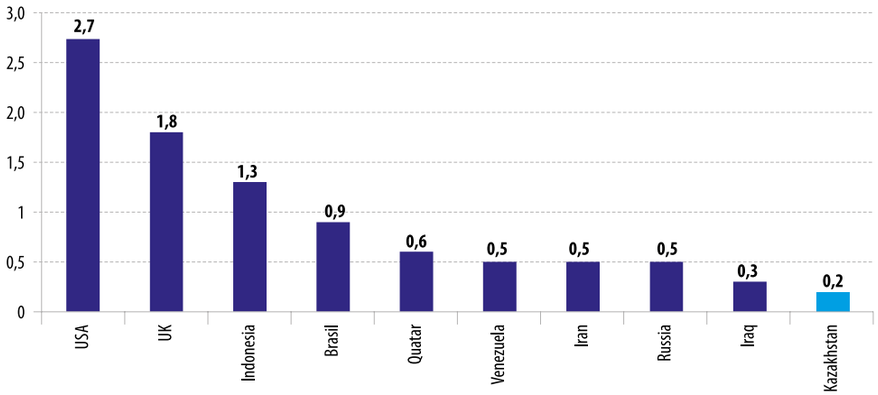


Figure 17: Refining throughput vs. production, units

Source: BP Statistical Review of World Energy 2013

35 Based on data provided by the Committee on Statistics, RK Ministry of National Economy.

At present, the major oil consumers in the country include three large refineries: the oldest Atyrau Refinery (ANPZ) commissioned in 1945, Pavlodar Refinery (PNHZ), and Shymkent Refinery (PKOP). A total of 14.3 million tons of crude oil was processed by the three refineries in 2013. In addition, there are about 32 mini-refineries in Kazakhstan, which processed 0.88 million tons of oil by year-end 2012[36]. These refineries generally produce semi-finished products, which are then exported for further processing.

Kazakhstani refineries are major electricity consumers. For example, the Atyrau Refinery consumes more than 700 million kWh of electricity per year. This refinery has more energy-intensive refining processes than all other refineries. At the same time, it has the lowest oil conversion ratio (54-57%). This is primarily due to the refining technology and the long service life of the main equipment. The PKOP (Shymkent Refinery) built in 1985 is the newest domestic refinery with the lowest specific energy consumption.

At present, the country's refining industry is undergoing extensive modernization, which is expected to raise the oil conversion ratio substantially. As a result of the modernization, the total annual refining throughput in the country will increase to 18.5 million tons of oil (by 27%) and the refineries will start to produce engine fuels in line with Euro 4 and Euro 5 emission standards (from 2016 onwards) as required by the Technical Regulations of the Customs Union (TR TS) 013/2011 "On the Requirements for Motor and Aviation Gasoline, Diesel and Marine Fuel, Jet Fuel, and Fuel Oil".

Furthermore, the modernization of the domestic refineries has another purpose: to meet the demand of the domestic market for petroleum products, which currently relies on imports. Since domestic consumption continues to grow, Kazakhstan is now considering an option to construct a new refinery with an oil conversion ratio of more than 90% and a capacity of 5 million tons of oil per year at the first stage (may be expanded to 10 million tons of oil per year).

The modernization of the refineries will have a multiplier effect. First of all, the energy efficiency of the refining sector will improve. Secondly, the significantly better quality of produced fuels will improve the energy efficiency of vehicles.

Associated gas accounts for more than 90% of all gas produced in the country. At the same time, approximately 47% of gas produced in Kazakhstan is used for reinjection to maintain reservoir pressure, consumed by subsoil users for their own needs, or flared. The remaining volume is sent to processing to produce approximately 21 billion m3 of sales gas. According to Kazakhstani law (Law on Subsoil and Subsoil Use), associated gas shall not be flared unless required so by the process; in addition, the law imposes heavy penalties for illegal flaring of associated gas.

According to the RK Ministry of Energy (based on information from subsoil users), gas flaring in Kazakhstan decreased from 3.3 billion m3 in 2006 to about 1 billion m3 in 2012. Moreover, Kazakhstan was planning to stop flaring almost all associated gas in 2013, except when it is inevitable due to process requirements. However, according to the World Bank's space monitoring data (Global Gas Flaring Reduction), actual volumes of flared gas are considerably higher than the official data. So, it is fair to assume that some companies in Kazakhstan do not disclose information about gas flaring.

As to cost-effective use of resources, the most important goals for the oil and gas industry in the Republic of Kazakhstan are:

- To put in place procedures to discover non-disclosed volumes of illegally flared gas
- To develop mechanisms to encourage the efficient utilization of associated gas[37].

In addition to its own gas reserves, Kazakhstan is an important link in gas transit from Central Asia to Europe and China. The total length of main gas lines in Kazakhstan exceeds 16 thousand km.

At the same time, the bulk of energy resources is consumed for gas transport by the main gas line system of JSC Intergas Central Asia, built and commissioned more than 30 years ago. The main process

36 Based on the data provided by the RK Ministry of Energy.
37 Electric power generation, power output to grids, production of sales gas.

equipment for gas lines in the system includes compressor units[38] with very low efficiency: in fact, their actual efficiency is 5% to 10% less than that of any modern versions.

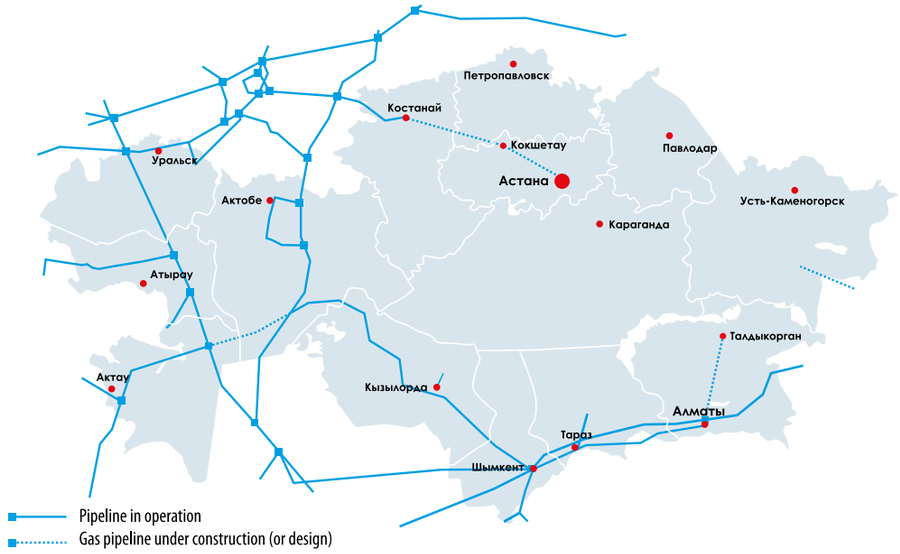


Figure 18: Map of main gas lines in the Republic of Kazakhstan

Source: National Energy Report, Association KAZENERGY

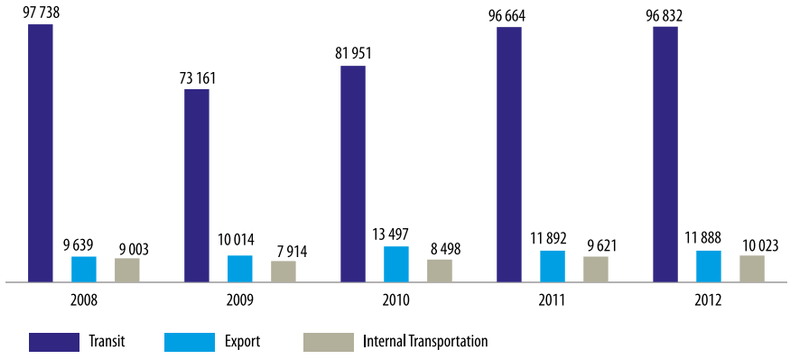


Figure 19: Transit, export, and domestic consumption in 2008-2012

Source: National Energy Report, Association KAZENERGY

The lower throughput of gas transported from Central Asia to Russia[39] also affects the energy efficiency of compressor stations on some main gas lines, because the efficiency of gas turbine power units depends on their load.

38 Gas turbine centrifugal compressors are most common.

39 The lower volumes of natural gas pumped from Central Asia to Russia (a decrease by a factor of 2.6 since 2008) were in part compensated by growing throughput of transit gas from Turkmenistan to China via Kazakhstan, which was due to redirecting Turkmenistani exports to the east.

As to the structure of natural gas consumption, energy producers account for 39%; industrial enterprises, 29%; households, about 24%; utilities companies, 8%[40]. At present, gas is supplied only to 38% of households in Kazakhstan; however, according to the approved General Gas Supply Scheme for Kazakhstan, this figure will grow to 56% by 2030. Losses[41] and internal gas consumption in gas distribution networks vary from 0.5 to 5.5% depending on the region. The average figure is approximately 2.5% while the total length of gas distribution networks is about 24 thousand km.

Mining and Metals Sector

The mining and metals industry in Kazakhstan is the second most competitive industry on the international market next to oil. The country's mining and metals sector includes more than 70 enterprises and organizations. Major mining and metals companies in Kazakhstan are: Eurasian Industrial Association, MittalSteel Temirtau (Ispat-Karmet), JSC Corporation Kazakhmys, and JSC Kazzinc. They are holdings with common production and commercial facilities, which comprise mining, concentration, and metallurgical processing plants, energy and heat generation companies, and well-developed infrastructure to perform financial, marketing, sales, international business, and research activities.

Rolled steel is the core product with a high degree of processing and high added value. In 2013, steel export reached 1.755 million tons totalling USD 1.166 billion.[42]

The advantage of Kazakhstan's metals industry is that the country has its own mineral resources. Ores found in Kazakhstan contain nonferrous metals, are multimetal, have complex structure and mineralogy, and include a wide variety of rare and rare-earth elements. At the same time, the structure, physical, chemical, and other characteristics of Kazakhstani ores during mining, concentration, and metallurgical processing require custom-tailored technology for almost every ore deposit.

Kazakhstan has unique mineral resources. The country has 30% of world chromium ore reserves, 25% of manganese ore reserves, and 10% of iron ore reserves. Kazakhstan is ranked No. 13 in total solid mineral production in the world. However, despite considerable reserves, some balance reserves are not competitive at current prices because of the low content of target metal, the refractory nature of ores, and a number of territorial, transportation, and other limitations.

High wear and tear of equipment is typical for businesses in this industry; as to energy efficiency of concentration processes, it is substantially affected by underutilization of concentrating plants, with significant deviations from projected volumes.

Analysis of current developments, major challenges and barriers

The industrial sector (here and elsewhere, the energy industry is not included in the industrial sector) accounts for almost 20% of consumption of primary energy resources and approximately 70% of total energy consumption. At the same time, the share of electric power consumption by the industrial sector in the European Union averages 24%. In Kazakhstan, high energy consumption in the industrial sector is first and foremost due to operations in energy-intensive industries such as oil and gas, metals, and ore mining.

Vertically integrated companies (VIC) account for a large share of electricity consumed in the industry. These are major industrial groups and associations which, in addition to energy-intensive operations, also have their own fuel resources, energy sources, and distribution (and sometimes transmission) power grids (ENRC Kazakhstan LLP, JSC ArcelorMittal Temirtau, Corporation Kazakhmys LLP, JSC Kazzinc, JSC NAK Kazatomprom, and Tengizchevroil LLP).

40 Based on data from JSC KazTransGaz.

41 Net of commercial losses.

42 Committee on Statistics, RK Ministry of National Economy.

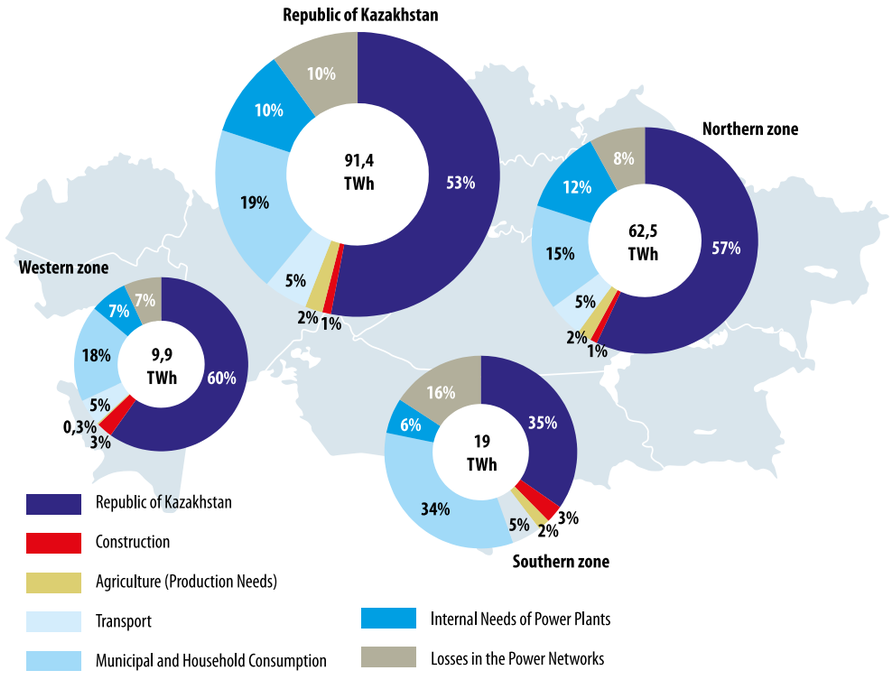


Figure 20: Structure of electric power consumption by economy sectors

Source: National Energy Report, Association KAZENERGY

The largest power consumers are companies from the mining and metals industry.

Company	Electrical energy consumption million kWh, 2012
Aksu Ferroalloys Plant (Branch of JSC TNK KazChrome)	5 763.8
JSC ArcelorMittal Temirtau	4 125.6
JSC Kazakhstan Electrolysis Plant (KEP)	3 637.7
JSC Kazakhstan Temir Zholy	3 516.9
JSC Kazzinc	2 885.7
Sokolovsko-Sarbayskoye Mining and Processing Production Enterprise (JSC SSGPO)	2 517.3
PO Zhezkazgantsvetmet	1 860.6
Novodzhambul Phosphorus Plant (NDFZ)	1 643.1
Aktobe Ferroalloys Plant (Branch of JSC TNK KazChrome)	1 461.1
JSC Aluminium of Kazakhstan	1 045.7

Table 14: Ten largest power consumers

Source: JSC KEGOC data for 2012

In general, the level of energy consumption in the ore mining industry and the oil industry is higher than the reasonably practicable level; some producers also exceed energy consumption limits.

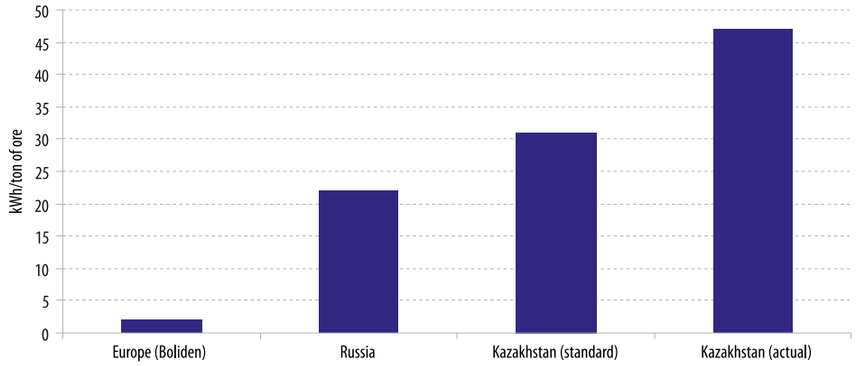


Figure 21: Specific energy consumption per one ton of produced lead-zinc ore

Source: Program "Energy saving 2020"

It is important to note that the accepted energy consumption standards are difficult to apply. For example, specific energy costs in ore mining are variable and may deviate considerably within the range of 5-50%. Each mine/deposit has its own specific process features; its energy consumption depends on ore output in its own way. According to some experts, it is often misleading to compare energy consumption at ore mines against common energy consumption standards because too much depends on mining geology and technology.

Coal producers also exceed energy consumption limits.

Producing companies	Energy consumption standards	Actual value (2013)	Exceedance, %
Coal (open-pit method)	7-8 kWh/t	8.53	6.6%
		12.9	61%
Oil (for comparison)	70-120 kWh/t	140	16.6%

Table 15: Examples of companies exceeding the approved consumption standards

Source: Data provided by Association KAZENERGY

The oil production sector also exceeds energy consumption standards. In this case, deviations from consumption standards vary from several to hundreds of percent points. It is important to understand that specific electric power consumption in the oil production sector is growing constantly and unavoidably; for some companies, growth is 2-3% per year. At the same time, requirements for specific electric power consumption in oil and gas production are also governed by energy consumption standards, which, as in the ore mining industry, are difficult to apply if special aspects of oil and gas fields are ignored. Some oil and gas producers already exceed existing standards. This is first of all true for companies that develop fields with hard-to-recover reserves or operate marginal wells and wells with a high water cut.

As a result, it is obvious that energy consumption standards in use are not working for the industry. Therefore, individual consumption standards developed for each company on the basis of energy audits and specific operation features may produce more tangible results in terms of energy efficiency.

Oil and gas production. Several major fields in Kazakhstan, such as the Tengiz, Kumkol, Akshabulak, Karachaganak, etc., were brought on stream over the last 20 years, so they are operated using relatively modern equipment and relatively efficient process workflows.

On the contrary, fields that have been in operation for more than 30 or 40 years are facing a lot of problems with regard to production processes, power supply, and performance of auxiliary equipment.

Below is an example of a major field which shows that low-cost and organizational measures may substantially reduce specific electric power consumption for oil production.

As can be seen in Figure 24, a substantial reduction in specific electric power consumption for oil production was achieved at the field during 2006-2008, without any dramatic changes to oil output.

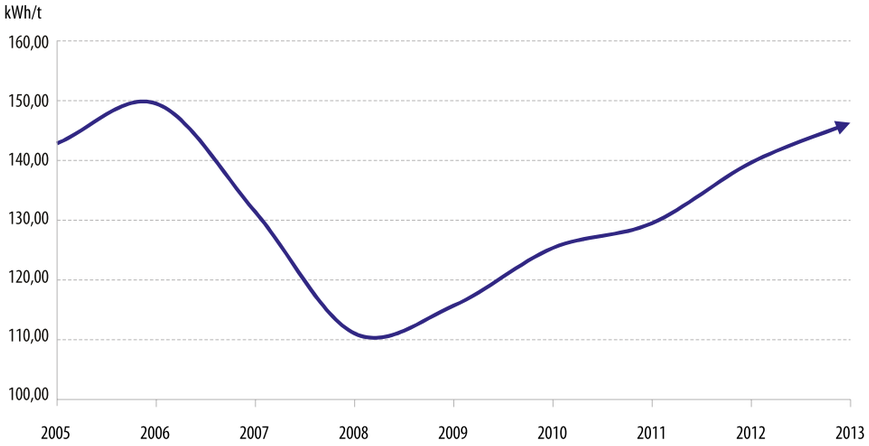


Figure 22: Specific electric power consumption per one ton of oil produced at the field during 2005-2013, kWh/t

Source: Energy Centre, JSC KING

It is telling that such a great reduction in specific electric power consumption was achieved at the field mostly through organizational (unused load is cut off) and relatively low-cost measures (pumps are replaced with less powerful ones).

So, with regard to mature oil and gas fields, the efforts to improve energy efficiency should focus on low-cost measures, optimization of production processes, and reliability of electric power supply.

The oil and gas industry is an illustrative example of emergency power cut-offs. Downtime due to emergency power cut-offs may reach 1% of the total field operation time at some fields. As a result, oil production losses due to emergency power cut-offs in Kazakhstan exceed 100 thousand tons of oil per year.

Emergency power cut-offs at fields reduce the daily flow rate and above all lead to equipment failures (in particular, subsurface equipment). It may take from one day to one month to bring the field back to the same average daily production level after emergency power cut-offs.

Wear and tear of power grid equipment and improper maintenance by electric power providers (regional and/or own providers) are the key reasons for emergency power cut-offs at fields. Besides, power is often cut off due to insulation failure, overlapping wires, and other problems that can be solved technically. Outstanding issues related to power supply reliability have a considerable impact on oil output and the operation of the main field equipment.

Oil transportation. Due to high paraffin content and low power point of crude oil produced at some Kazakhstani fields, transportation of such oil requires unique engineering solutions, with oil heating

being one of them. Kazakhstan operates the world's only "hot"[43] main oil pipeline Uzen-Atyrau-Samara, which is over 1,380 km long (including 1,232 km on Kazakhstan's territory). However, this method of transportation involves high energy costs. The Uzen-Atyrau-Samara oil pipeline was designed and built during the Soviet eta, under completely different technical and economic conditions, when energy saving was not as high on the agenda. At today's technology level and fuel costs, fuel consumption for oil heating may be greatly reduced, e.g. by using new heat insulation materials at "hot" pipeline facilities.

Oil refining. Refineries in Kazakhstan were designed during Soviet times, in an entirely different technical and economic environment, when energy resources were easily accessible and did not cost as much. At present, the country's refining industry has good potential for energy efficiency improvement. For example, in addition to electric power, refineries consume a lot of heat energy (steam) supplied from their own sources (combined heat and power plants, steam boilers) or external sources (e.g. Pavlodar Refinery). Heat consumption amounts to 35-60% of the total energy consumption, depending on the specific refinery.

The use of new composite materials for heat insulation of steam lines at refineries and higher heat recovery volumes require investments, which will increase refinery modernization costs. However, the measures to reduce heat losses and utilize waste heat may pay themselves back within 5 years, which is an acceptable payback period.

Gas transportation system. By the amount of gas consumption for fuel and loss during transportation and distribution, the gas transportation system in Kazakhstan is at a level comparable with other CIS countries.

	Main gas lines	Gas transportation and distribution system
Armenia	3.5%	2.0%
Moldova	0.2%	4.9%
Uzbekistan	2.1%	2.4%
Kazakhstan	1.0%	2.3%

Table 16: Gas consumption for fuel and loss in CIS countries

Source: INOGATE Technical Secretariat (ITS) and the Integrated Program in Support of the Baku Initiative and the Eastern Partnership Energy Objectives.

However, the amount of gas consumption for fuel and loss is not always indicative for comparing gas transportation systems because losses depend on many factors: pipeline length, number of locking and regulating nodes, pipeline pressure, number and capacity of gas distribution stations, gas regulation stations, etc. The system of trunk pipelines, excluding the Kazakhstan–Chine gas pipeline launched in the recent years, is characterized by wear-out of equipment (compression units), which results in low efficiency and high specific gas consumption.

There is no gas temperature measurement at most gas meters, which is also a serious problem; consequently, the volumes of consumed gas are underestimated and even the use of adjustment coefficients still leads to poor accuracy of gas metering. Underestimated gas volumes due to the fact that there is no gas temperature measurement may exceed 10% of the total gas consumption for fuel and loss in gas distribution networks.

Ore mining industry. Ore mining is divided into two main stages: production and concentration, which should be considered both individually and as a whole.

The standards for specific energy consumption applicable to producing companies in the Republic of Kazakhstan do not take into account the physical and chemical properties of produced ore (composition, density, grade, etc.), which affect process energy intensity to a great degree. Furthermore, these

43 The heated oil temperature is approximately 36-41°C.

standards ignore ore haulage methods that determine what energy resources will be used: electric power or vehicle fuel. In case of underground mines, mining depth also has a considerable impact on specific energy consumption.

Interestingly, the specific electric power consumption by copper mines located in the East Kazakhstan Region is much higher than that for Zhezkazgan area. For this reason, one may come to an "erroneous" conclusion that Zhezkazgan mines are more efficient. However, it should be borne in mind that copper content at East Kazakhstan mines is substantially higher and the efficiency of these mines is also higher (if converted to pure copper).

Therefore, energy consumption standards should be established with due regard to specific operation features and the actual performance of the existing mines, with requirements to minimize energy consumption reductions on a regular basis, and subject to design (estimated) parameters for newly commissioned facilities. It is essential that the country should abandon the concept of energy consumption control using an averaged limit (standard) for all companies.

Standards applicable to concentration plants in Kazakhstan have even less bearing on reality: they depend on the daily output of these plants. In fact, the specific power consumption at some concentration plants that handle polymetallic ores exceeds the existing standards by more than double due to high ore density, although it is in line with the design values. This means that actual design values are much higher than the approved standard values. In addition, there is a wide gap in the approved standards between the figures for concentration plants with a daily output of up to 10,000 tons and those with a daily output of 20,000 tons or more.

The lack of qualified experts who could monitor energy efficiency progress at industrial enterprises is one of the major obstacles in the implementation of the national policy for energy saving in the industrial sector. The approach to state monitoring of energy usage at industrial enterprises is also unclear.

Energy and resource saving potential

The program "Energy Saving - 2020", taking into account the increase of specific energy consumption per unit of production by Kazakh metallurgy compared to the technically achievable level (the level of developed countries and established norms), assessed the comparative technical energy saving potential in the industry (except electric power) at a level of about 30%.

This assessment illustrates the technically achievable decrease in energy consumption, but the economically feasible potential taking into account the country's conditions, according to expert appraisals, does not exceed 19% of the total level of energy consumption in the industrial sector. A more precise assessment of the energy saving potential can be obtained in 2015 based on the results of completed energy audits of large industrial companies.

In general for energy intensive industry branches the energy saving potential can be assessed as follows:

Oil and gas production. Some of the major deposits in Kazakhstan have been commissioned over the last 20 years and energy saving potential at them should not exceed 10% due to operation of new equipment and the effective organization of technical processes. The greatest potential energy saving is observed at deposits that have been in operation for over 40 years, where energy saving potential may exceed 20% according to expert appraisals.

Oil transportation. Energy saving potential in the main pipeline system can be assessed for two main areas: reduction of gas consumption for oil preheating and reduction of electric power consumption. If in regard to power consumption the potential does not exceed 5-7%, then gas consumption can be reduced to 20% by applying new heat insulation materials and modernizing the oil preheater .

Oil refining. Considerable potential for increasing the energy efficiency of oil processing plants is concentrated in the recuperation of heat (flue gases, heat from cooled petroleum products, etc.) and return of steam condensate. According to expert appraisals, saving more than 10% of consumed energy

can be achieved at oil processing plants due to activities with payback periods that are not longer than 5 years.

Transport and distribution of gas. Despite the comparatively acceptable level of gas consumption for fuel and loss at main gas pipelines and gas distribution systems, the technically and economically achievable level of gas loss share decrease can be assessed at 10% of the current level for main gas pipelines (except ones that have been commissioned in recent years) and 10-15% for gas distribution systems.

Ore mining industry. The technically achievable potential increase in the energy efficiency of ore production at various enterprises differs depending on individual features and extraction conditions, and ranges from 5% to 20%.

For example, the Abyz mine utilizes open development, and hauling is carried out using motor transport, in connection with which consumption of the main energy resource (diesel fuel) directly depends on output volumes. In addition, the considerable use of diesel fuel continues during the period of overburden removal at the mine, while ore extraction stops. In such conditions, regardless of the considerable potential efficiency increase of electric power consumption for needs of lighting and heating of production premises amounting to about 15-20% – this has almost no impact on the total energy efficiency of the mine in general, as the main energy resource is diesel fuel, which has an energy efficiency increase potential not more than 3-5%.

At the same time, for mines where underground development is carried out, the technical potential energy efficiency increase is much higher and amounts to approximately 15-20%, but the economically advantageous potential is considerably lower. The thing is that the potential for increasing energy efficiency at mines with this development method can be implemented mostly by installation of frequency control on the main electric power consumers (ore hoisting, cage, pump and ventilation equipment). This will require considerable investments, the payback period of which is more than 10-15 year in conditions of relatively small tariffs for electric power and, quite often, exceeds the warranty period for equipment.

A similar picture can be observed also at the stage of subsequent ore concentration. Thus, the density and content of ore arriving for concentration has a considerable effect on the energy efficiency of operation of concentration plants.

The main potential for increasing energy efficiency for concentration plants is connected with their considerable under-utilization. A similar situation can be observed at many plants commissioned more than 30-50 years ago and in general all around Kazakhstan. The further loading of concentration plants to design values can increase the energy efficiency of their operation by 15-50%. In conditions when it is impossible to reach the full capacity of an enterprise, the only way out would only be the complete replacement of the process line designed to ensure effective operation with this volume of processing, but such costs are not expedient and will never pay back.

The economically feasible potential energy efficiency increase of concentration plants is approximately 5-10% and much lower than the technical potential, which is as high as 20-25%.

Metallurgy. Ferrous and non-ferrous metallurgy enterprises are the most energy intensive industries of Kazakhstan's economy. The main share of energy consumption (above 90%) is connected directly to the technical process. In this regard, the main potential energy saving in this segment of the economy can be achieved by full modernization or replacement of technical equipment, which, due to considerable capital intensity, cannot be implemented without substantial subsidies from the state. Therefore, by the specialists' reckoning, the actually achievable level of energy consumption at enterprises of this branch does not exceed 3-5 %. Many projects allowing a high level of energy saving at enterprises of the industry have long terms until payback and are quite capital intensive.

In general for Kazakhstan's industry, it is necessary also to note considerable opportunities for using secondary energy resources (SER).

Secondary energy resources include: waste heat of exhaust gases; chemical energy of process gases (blast furnace gas, mine methane, etc.); waste heat of industrial water and steam; energy of excessive gas, water or steam pressure

Flue gas The introduction of exhaust gas energy disposal systems by increasing aerodynamic resistance to a stream of flue gases can cause a partial reduction in the efficiency ratio of energy plants. Burning gas at boiler facilities without providing them with a waste heat steam boiler for power generation is forbidden by law in the EU and USA. The possibility of introducing such a prohibition is currently under consideration in Kazakhstan.

Reduction of steam losses and condensate return. Considerable potential energy saving lies in the steam and condensate systems of industrial enterprises. For example, the average amount of potential energy saving at oil processing plants obtainable through the optimization of steam and condensate systems may be approximately 30%.

Process gas is production waste, which can be disposed of immediately as fuel. This includes process gases of iron and non-ferrous metallurgy, gaseous, liquid and solid wastes of the chemical, oil and gas processing industry.

For the oil and gas branch, the main source of gaseous renewable energy sources, not counting associated gas, is petroleum refinery gas, which is used at oil refinery plants to receive steam, preheating oil and oil products, and also in the production of liquefied hydrocarbon gases. In this case, petroleum refinery gas and its derivatives products are valuable raw materials. The performance of activities aimed at reduction of consumption of petroleum refinery gas by increasing the efficiency ratio of furnaces and boilers of oiler refining plants, and reduction of losses of generated heat is almost always economically justified.

Combustion gases of the metallurgical branch include blast furnace and coke gases. They also manifest as high potential heat emissions with a temperature of 300 to 1,600°C, and blast furnace gas also has excessive pressure. Blast furnace gas has the highest energy potential, its combustion can cover up to 35-40% of need for heat of metallurgical enterprises.

In the energy balance of industrial enterprises of the RK, combustion RESs have applications but it is necessary to consider the possibility of introducing new, more efficient technologies of their utilization.

Utilization of the energy of excessive pressure. Reduction of gas pressure at gas distributing stations (GDS) is normally performed in throttling devices, where excessive gas pressure is used for overcoming hydraulic resistance, which leads to direct loss of this energy. In many countries having extensive systems of main gas pipelines, including the CIS countries Russia, Uzbekistan and Ukraine, energy of excessive gas pressure is used for production of electric power at turbo expanding assemblies. The process of pressure reduction in these facilities allows the maximal value of mechanical energy to be obtained with a process efficiency ratio of 80% and more.

There are over 33 GDSs for which the option of introducing disposal turbo expanding assemblies can be considered. The economic potential of using excessive pressure potential at large GDSs is equal to 22.1 MW, and the annual generation of electric energy can be over 180 million kWh (as estimated by the Energy Centre AO "KING").

Kazakhstan's involvement of RES into the fuel and energy balance of industrial enterprises is one of the key possibilities for increasing energy efficiency in the industry.

In view of the considerable potential of using secondary energy resources, the development of measures for involvement of SER in the energy balance of the industry is required for Kazakhstan. In the law On energy saving No.210-I of December 25, 1997, using secondary energy resources was one of the priority directions of reducing the energy intensity of Kazakhstan's economy, however in the new law No.541-IV 3PK of January 13, 2012 on Energy Saving and Increasing Energy Efficiency this direction is absent. Therefore, in spite of the considerable potential of using secondary energy resources in the industry, not only stimulating mechanisms but also the very notion is actually missing in the current law.

For the purpose of solving the issues of associated gas disposal, the RK law of January 9, 2013 On gas and gas supply provides for a mechanism of public - private partnership, under which associated gas can be transferred by subsurface users to the state for subsequent transfer to a private investor. In addition, implementation of this mechanism is hindered by the following circumstances:

a) In case the subsurface user transfers gas in favour of the state, there is a considerable risk of receiving a fine for illegal combustion in the past.

б) The subsurface user will have to continue gas combustion for the period between the conclusion of a public-private partnership contract and construction of refining capacities by the investor. In this case, according to environmental legislation, it will have to pay for burnt volumes despite transferring gas to the state's ownership.

A separate issue is the problem of electric power quality on the part of industrial consumers. A number of factors have an effect on the quality of electrical energy: Abruptly variable load and using various inversion devices, etc. Especially big deviations of electric energy quality can occur at enterprises where the main energy consuming equipment is pump and compressor units, for example oil and gas deposits, oil pumping stations, water pump stations and oil refining plants. Low quality of electric power has a great impact on the efficiency of electrical equipment's operation, service life, and dependability of power supply. It is necessary to note the difficulty of quantitative assessment of the influence of deviations in electric power quality indicators on end consumption of electric power and as a consequence the low investment attractiveness of power quality increase projects.

To determine the necessary steps for power quality increase, it is necessary to perform actual measurements at enterprises, so the organization of state regulation is recommended in regards of quality of electric power, with the organization of relevant monitoring systems.

As for Kazakhstan, it is in the industry exactly where the highest potential energy savings are concentrated. In this connection, the state needs to develop stimulating mechanisms for industrial enterprises more vigorously by reviewing the fiscal policy of the state, provision of taxation preferences to cover a part of costs for performance of activities on energy saving and increasing energy efficiency and also preferential credit lines for investing in energy saving projects.

The introduction of stimulating mechanisms can be recommended at the level of industrial enterprises themselves. For example, a number of Kazakhstani companies[44] successfully introduced staff encouragement systems for technical improvement suggestions. Staff of the companies are paid a monetary reward for implemented technical improvement suggestions, including a percentage of the achieved economic effect. The experience of introducing such encouragement systems has shown their efficiency, including in the reduction of energy resource consumption. Quite often qualified employees of the enterprises, based on their own experience at work, can point to the most expedient ways to decrease consumption of energy resources.

Recommendations.

Government authorities can achieve considerable reduction of energy consumption in the industrial sector by compliance with the following recommendations:

- Develop and introduce systems for monitoring energy efficiency measures implementation, according to the results of completed energy audits.
- Consider revising the normative energy consumption set for different industries taking into account the specifics of the mining sectors.
- Develop measures to encourage the use of associated gas for production of electricity or commercial gas
- Incorporate advanced energy savings technologies in the design regulations and norms for industrial facilities.

44 AO "KEGOC", "Pavlodar Oil Chemistry Refinary" LLC, "ANPZ" JSC, "Volkovgeologia" JSC, and others.

- Introduce requirements to the installed commercial gas metering devices as regards mandatory automatic temperature metering (temperature offset). This requirement can be expanded in relation to the installed commercial gas metering devices of business entities.
- Develop incentives for using secondary energy resources and include them in the fuel structure of enterprises.
- Increase the responsibility of companies for compliance with declared energy consumption volumes.
- Provide regular training at relevant research and academic institutions engaging energy savings and energy efficiency departments, hold professional training sessions, as well as qualification and retraining programmes (See case studies 4, 7, 8, 9, 10).
- Actively promote the adoption of ISO 50 001 standards to large industrial enterprises incorporating a standardized approach to energy auditing and encourage further industrial enterprises to implement actions to deliver cost-effective energy savings. (see case studies 7-10)
- Develop and introduce various incentive schemes (voluntary programmes, subsidies, fiscal incentives) for industrial enterprises that undertake energy audits in order to support the implementation of the recommended measures. (see case studies 1, 2, 4 and 5).
- Revise existing industrial equipment standards and minimum performance standards to allow for best available technology applications solutions, include new energy efficient technologies into the standards applicable to new industrial facilities (see case study 11)
- Train and upgrade personnel at relevant research and academic institutions engaging energy savings and energy efficiency departments, hold professional training sessions, as well as qualification and retraining programmes.
- Providing legislative requirements for most large enterprises - entities ERT Systems Implementation encourage innovations employees in terms of energy and energy efficiency;
- Encourage establishment of networks of large industries to in order to establish platform for information sharing as well as conduct a comparative analysis of industrial processes in accordance with best international; practices in the field of energy savings and energy efficiency (see case studies 3,4).
- Revise existing industrial equipment standards and minimum performance standards to allow for best available technology applications solutions, include new energy efficient technologies into the standards applicable to new industrial facilities (see case study 11)
- Encourage industrial energy efficiency applications by providing innovative financial mechanisms and creating attractive conditions for application of energy performance contracting and ESCOs (see case studies 2, 6, 12, 13, 14)
- Encourage the use of highly efficient cogenerating solutions in the industry with high heat consumption (see case study 3).

HOUSING AND UTILITIES SECTOR

General

The domain is represented by the housing sector, including apartment blocks and individual house buildings, being the main consumers of communal services, and also the communal sector including networks and structures (systems) that provide:

- power, gas and heat supply;
- water supply and sewage;
- collection and processing of garbage;
- regular and capital repair of buildings and facilities.
- lighting.

The Committee for Construction, Public Utilities and Land Resource Office of the Ministry of National Economics of the RK carries out state oversight and control of public utilities in Kazakhstan.

The housing sector consumes about 11-13% of electric power and 40% of generated heat. энергии.[45] By experts' estimates, thermal and technical characteristics of 70% of buildings (especially ones built in 1950-1980) do not meet modern requirements, which is why 30% and more of the heat they consume goes out of these buildings through the fencing structures.

The total area of housing stock of the Republic of Kazakhstan is above 270.9 million m2, out of which 50.1 million m2 or 32% of the housing stock are pertaining to apartment blocks in need of various kinds of repair works (repair of facades, roofs, tightening joints of wall panels, etc.), and 3.8 million m2 or 2% of the housing stock are in an emergency state and require demolition as unsuitable for further use[46].

The heating season in various regions lasts from 3,500 to 5,000 hours per year. Out of the total consumption of heat in the volume of 175.2 million Gcal, about 74.8 million Gcal fall on heating and hot water supply of the housing stock[47]. In 2012 final energy consumption in the housing sector was 9.96 million tons of oil equivalent or 18 %[48] of the total consumption of initial energy resources and their equivalents.

A country-wide tendency of heat consumption growth is observed in the Republic.

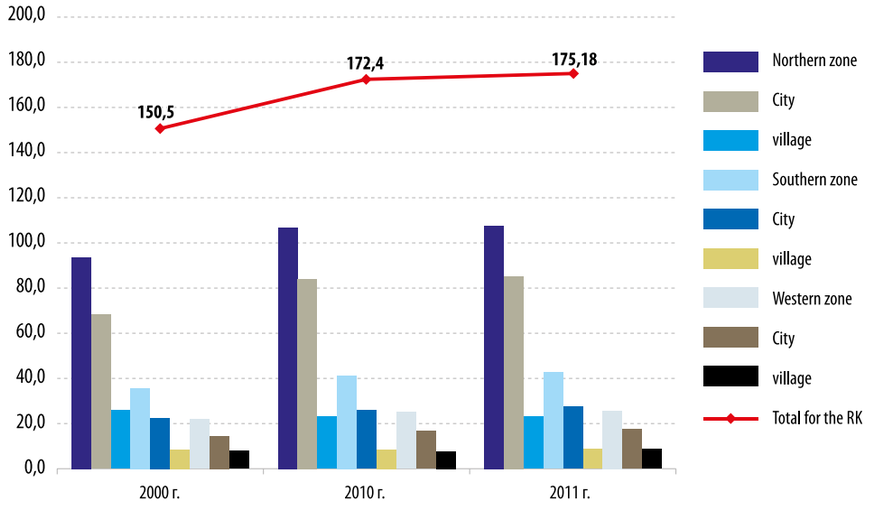


Figure 23: Heat consumption of cities and villages of the RK by zones, million. Gcal

Source: Committee on Statistics, RK Ministry of National Economy.

45 Removal of barriers on the path to energy efficiency of municipal heating and hot water supply systems, United Nations Development Programme, final publication concerning the project.
46 Program of modernization of the utilities service of the Republic of Kazakhstan as of 2011 - 2020 authorized by Order of the Government of the RK No. 473 of April 30, 2011.
47 Removal of barriers on the path to energy efficiency of municipal heating and hot water supply systems, United Nations Development Programme, final publication concerning the project.
48 IEA energy statistics 2014

As of 2012[49], 42 networks of central heating function in 30 Kazakhstan cities, which use:

- 40 CHPP with a total capacity of 35 000 MW.
- about 30 big boiler houses with a total capacity of 5 800 MW.

According to data as of late 2011, 2 330 boiler rooms functioned in the country. Installed capacity of registered boiler houses is about 19 thousand Gcal/hour, and heat generation reaches 24.62 million Gcal per year.

About 50% of boiler houses use coal, about 30% work on natural gas, and the remaining 20% use liquid fuel. Studies carried out in recent years show that only 5 cities (Astana, Almaty, Semipalatinsk, Shymkent and Pavlodar) account for 1 485 local boiler houses (except for large district boiler houses of the central heating system). The average efficiency of the boiler houses in Kazakhstan is very low. For example, in Southern Kazakhstan region it is 48.9%, in the Atyrau region – 52.8%, in Astana – 64%. This leads to excessive use of fuel (excess consumption is 645 300 toe per year[50]) and, correspondingly, to the additional emissions of hazardous substances into the environment.

State policy

On April 30, 2011 the Government of the Republic of Kazakhstan approved a Program of modernization of the utilities service of the Republic of Kazakhstan for 2011-2020. The Programme includes bases for development and implementation of activities aimed at modernization of the communal infrastructure, development of an optimal model for relations in the housing sector, and improvement of utilities services quality for the population, which will allow repair of property of public condominiums, including its modernization on the basis of development of separate funding mechanisms.

In addition, from January 1, 2015 the Program for development of regions till 2020 will enter into force, developed within the implementation of the Message of the President of the Republic of Kazakhstan to the people of Kazakhstan "Strategy Kazakhstan – 2050: new political course of the established state". This program was created on the basis of a combination of five acting governmental programs including the above-mentioned Program for modernization of Utilities Service of the RK for 2011-2020, and aimed at implementation of the unified state policy regarding improvement of the population's quality of life through development of life sustaining infrastructure and development of the economic potential of the regions (urban agglomerations) based on "green economy" principles, including provision of power and resource saving in the communal housing stock that is being built as well as existing communal housing stock and development of "green belts" and park areas using environmentally friendly transport, waste handling systems, etc.

In addition, the government approved various solutions regarding rules of determining standards of consumption, maximal tariffs, level of emissions during combustion of various types of fuel in boiler houses of CHPPs, etc.

The government has currently developed the following guidelines and regulations for the heating sector:

- Guidelines on environmental monitoring and knowledge audit.
- Recommendations for individual houses' fuel consumption standards.
- Procedures for identifying heat loss
- Procedures for reduction of emissions in the utilities services.

Mandatory norms of thermal efficiency of buildings were introduced in Kazakhstan in 2004 (SNiP 2.04-21-2004 Energy consumption and thermal protection of civil buildings); before then construction codes were unnecessary. The norms of 2004 pertain to regulation of energy consumption when heating spaces in new and repaired buildings.

The new standards introduced in 2004 also contain a requirement for installation of thermostatic control valves on batteries in new buildings. According to estimates of the government, national coverage of heat meter installation reached 38% in 2011, whereas in 2010 it had been 29%, and in 2009 – 25%.

49 Removal of barriers on the path to energy efficiency of municipal heating and hot water supply systems, United Nations Development Programme, final publication concerning the project.

50 Same place

Pilot projects were carried out in Astana and Almaty in Kazakhstan for installation of metering points and heat supply control. As a result it was determined that the potential energy saving for each project may be up to 25-30%[51].

In 2011 SN RK 2.04-04-2011 "Thermal protection of buildings" was developed and approved by order of the Agency on Construction and Municipal and Housing Economy of the Republic of Kazakhstan No. 540 of 29.12.2011.

The requirements of SN RK 2.04-04-2011 "Thermal protection of buildings" completely meet the requirements of the Government's order No. 1117 of August 31, 2012 On approval of rules to determine and revise energy efficiency classes of buildings, structures and facilities, but still have not been put into effect. At the present time, to design thermal protection of buildings designers use only SN RK 2.04-21-2004* "Energy consumption and thermal protection of buildings", where requirements for the rated (baseline) specific characteristic of heat consumption for heating and ventilation of residential and public buildings is 10-15 % below that in the above-mentioned Governmental Order.

In the course of designing construction facilities, energy certificates are filled (in accordance with SN RK 2.04-21-2004*) with a specified class of energy efficiency and attached to the main design and cost estimate documentation. With acceptance of the law On energy saving and increasing energy efficiency, the mandatory expert appraisal of design and cost-estimate documentation for energy saving and increasing energy efficiency for buildings with ready annual consumption above 500 tons of reference fuel (350 tons of oil equivalent) per year was introduced into the practice of design and construction of buildings[52].

However after erection of a facility, conformity with the class of energy efficiency specified in the design and estimate documentation is neither actually checked or confirmed, which is one of the key barriers on the path to energy-efficient construction.

For fullness of carrying out this type of expert appraisal Kazakhstan needs to accept changes to norms for designing new energy efficient materials (guarding structures, heat insulation) and technologies (LED lighting).

In addition to expert appraisal of design documentation, it is the most important to follow design solutions at the stage of construction of buildings and structures. Therefore legislative enhancement of designer and technical supervision is required, and consequently establishing control of using modern materials provided by the project (buildings and facilities), and not low quality substitutes.

Analysis of the current situation, key problems and barriers.

Housing stock

In general residential houses in Kazakhstan consume three times more energy per unit of area than in countries of Northern Europe. Most of the existing housing stock consists of apartment blocks with central heating based on boiler houses or CHPPs. More than 80% of the central heating facilities in Kazakhstan function on coal, 13% on gas and about 7% on furnace fuel oil.

An energy audit of the buildings carried out under the project of the United Nations Development Programme[53] showed that consumption of heat by residential buildings in Kazakhstan generally equals 273 kWh per m2every year, which exceeds the level of consumption in developed countries of the world many times over.

51 Demonstration zone of energy saving: Pilot projects for increase of energy efficiency of the heat consumption system of residential apartment blocks in Almaty and Astana, United Nations Development Programme in the RK, Global Environment Fund,

52 500 tons of reference fuel per year is consumption that is characteristic for a residential house with approximately 45-60 apartments.

53 Project of the United Nations Development Programme "Energy efficient design and construction of new buildings"

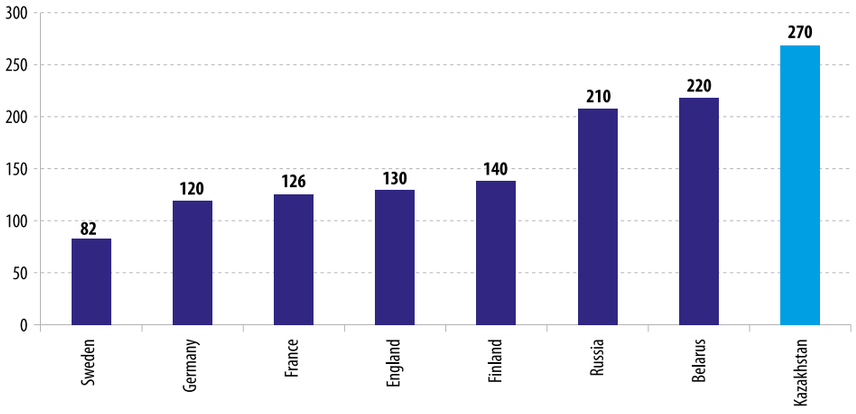


Figure 24: Comparison of separate consumption of heat by buildings, kWh/m2 per year

Source: Project of the United Nations Development Programme "Energy efficient design and construction of new buildings"

However it is necessary to note the considerable differences in the climate of Kazakhstan and European countries. For example, the average temperature in January in Germany is +1º C, and in Kazakhstan it is -15º C, so a much larger amount of energy resources is required for heating buildings in Kazakhstan than in most countries in Europe.

Regarding the housing stock, the main problem that considerably affects the high heat consumption of buildings is the dilapidation of housing stock. Owners of apartments do not save money for capital repair of houses and therefore operating organizations are able to at best only maintain the current condition of housing. There is a need for steps aimed at provision of state guarantees during repair of the residential stock, as well as the introduction of a mechanism for return on investment for owners of apartments.

Considerable problems are characteristic also for the infrastructure of heat, power and gas supply of the residential stock. Thus, the share of heat supply networks and facilities that require repair is 63%, in power supply - 73%, and in gas supply - 54%[54].

In this sector one can observe serious accidents, breaks of networks and cutting off consumers, which causes not only losses in engineering networks and undersupply of resources to consumers, but also contamination of the environment and violation of the sanitary welfare of the population.

Central heating and heat supply.

Over 50% of demand for heating in cities of the republic is provided by central heating. Most of CHPPs are coal fired, and boiler houses mostly use fuel oil. As you can see from Fig. 27, the service life of 41% of CHPP operating capacity is at least 30 years old, and 35% has been operating for 20-30 years.

54 Program of modernization of the utilities service of the Republic of Kazakhstan as of 2011 - 2020 authorized by Order of the Government of the RK No. 473 of April 30, 2011.

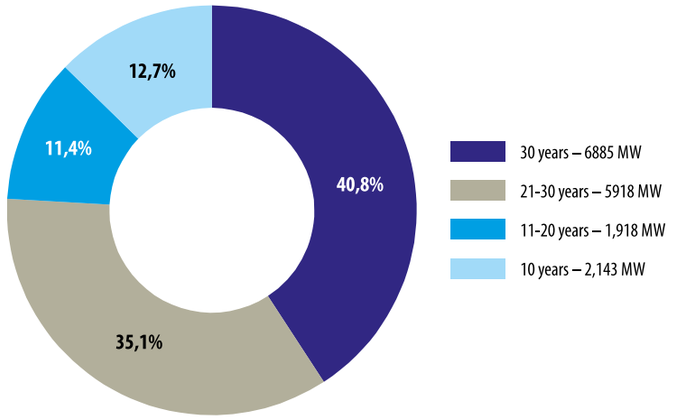


Figure 25: Duration of CHPP operation

Source: Removal of barriers on the path to energy efficiency of municipal heating and hot water supply systems, United Nations Development Programme

The high share of CHPPs in the heating system of urban buildings is the main advantage of Kazakhstan's thermal power sector. However, construction and maintenance of extended heating networks is a "bottle neck" of using cogeneration which gives a negative effect in case of inappropriate control of the infrastructure's condition. Every year a considerable part of heating network pipelines is repaired and replaced in the central heat supply systems, however these costly and labour intensive activities do not ensure full renovation of heating networks.

In general low efficiency and considerable losses of heat are characteristic of central heating networks with the current technical condition of operation. A high level of heat losses is generally connected with obsolete equipment, and also lack of adequate repair. The age of about 70% of the whole length of heating pipelines is more than 20 years with a standard life cycle of 25 years. The overwhelming majority of central heating networks are distinguished by bad insulation and considerable leakages through worn out valves and shutters. According to experts' estimates, about 20% of all losses occur in the main transmission networks, and about 80% in the distribution networks.

In terms of operation of boiler houses, the main problems are:

- Serious wear on the majority of equipment, the actual operation period exceeds the time prescribed in technical documentation.
- The quality of instrumentation, meters of generated and sold energy, automatics (including fuel supply equipment) and equipment for control of technical processes and heat supply modes are insufficient.
- High level of coal under burning in some coal fired boiler houses.
- Absence of automatic fuel feed to parts of boiler houses and therefore considerable influence of the human factor on the reliability of heat generation.
- Using substandard fuel (sludge, mix of various coal ranks, etc.).
- Unavailability of necessary quantity of measurement and control devices and meters at a part of boilers[55].

In addition, the low qualification of operating personnel results in inefficiency when using even new equipment in good technical condition.

55 An example is the accident at a boiler house in Priozyorsk in 2011: according to the inspection report, the boiler house totally lacks instrumentation and control devices.

As noted before, the highest energy losses of the utilities services can be observed in heating networks. Real losses in heating networks are unknown due to the incomplete availability of instrumentation. According to experts' estimates, losses can range from 18% to 42%, which considerably exceeds allowable values.

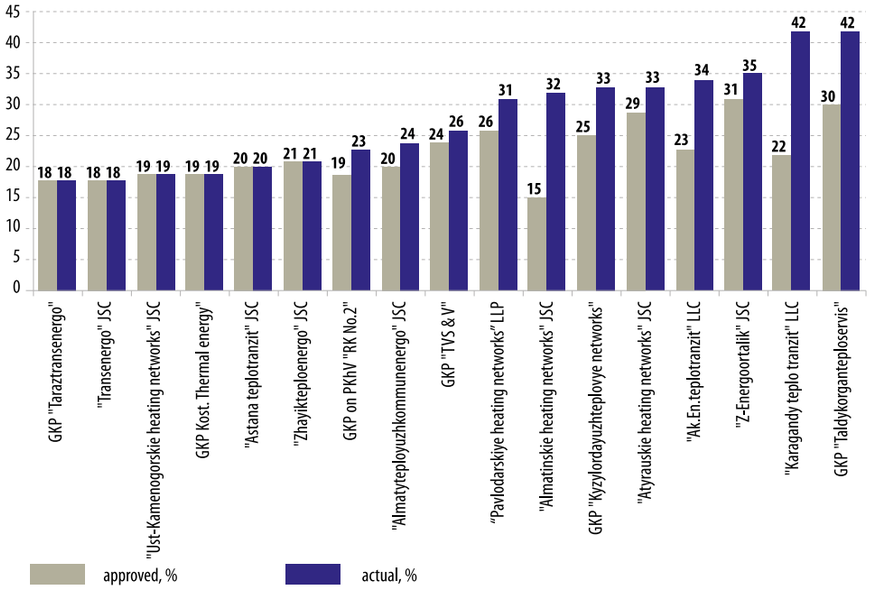


Figure26 :Actual and allowable heat losses, %

Source: General plan for development of the electric energy industry in the Republic of Kazakhstan till 2030.

The heat supply system is characterized by an extremely low level of provision of metering devices. According to experts' estimates, total need for them is 45.8 thousand units, while the number installed is 23.3 thousand. Due to the absence of proper metering, it is impossible to determined the level of actual use and consumption of heat, and therefore the actual level of losses[56].

Main problems of heating networks:

- Low quality of repair of heating networks, quite often it is done by unqualified organizations without proper supervision by developers.
- Absence of a system of administrative and state quality control of the laying and operation of heating networks.
- Absence of owners interested in reduction and removal of excessive losses.
- Considerable number of heat losses, also because of leaky insulation valves.
- Lack of a unified approach to funding the heating networks' modernization programs.

In order to slow down the process of heating network wear and to maintain the existing level of their average age, it is necessary to re-lay about 4% of pipelines every year, which amounts to 460 km of 2-pipe networks. In turn, to maintain the transportation system, there is a need for capital repair or full replacement of 7,000 to 8,000 km of heating mains. Payback of these measures requires long-term investments, which should be included in the tariff for transfer of heat.

In Kazakhstan's conditions it is necessary to determine the optimal level of heat loss for central heat supply systems, which should consider the need for maintaining thermal loss of CHPPs.

56 Program of modernization of the utilities service of the Republic of Kazakhstan as of 2011 - 2020 authorized by Order of the Government of the RK No. 473 of April 30, 2011.

The existing imbalance between the design and actual heat load of CHPPs as it continues to reduce may result in an even worse reduction of CHPP operation efficiency due to a forced increase of the number of operation hours in condensing mode. Thereby, a considerable reduction of losses in heating networks and heating of buildings may have a reverse effect.

This is why optimal thermal load should be calculated for every area of CHPP installation and its growth should be forecast. Heat losses in heating networks should be determined taking into account this optimal level, based on which the scope of works and investments into reduction of heat loss has been defined.

Existing systems of heat consumption of residential and public buildings having the biggest potential energy saving need a package of measures to be developed for the stimulation of activities for reduction of heat consumption:

- heating buildings with old designs
- modernization of domestic heating systems with transition to a double pipe heat supply system
- Modernization of apartment heating systems with installation of controllers and heat consumption metering devices on radiators.
- Introduction of heat consumption automatic control systems.

Power supply Concerning power supply, note that the structure of the selector load has changed considerably. It should be noted that small motor consumers (air conditioners, washing machines, etc.) prevail, and also there is a great share of semi-conductor devices (computers), etc. As a result, we can see an increase of reactive capacity consumption and a deterioration of electric power quality in low voltage networks, which substantially increases load losses in distribution networks.

In-house networks are in a critical state. There is no legislative provision of responsibility for use and maintenance of this class of electrical networks. Wear of in-house networks does not allow the quick transmission of information about required volume from the devices, which greatly hinders development of the Smart Grid system - an automatic system for commercial metering of power consumption.

Transfer of 0.4 kV in-house networks to the balance of regional power companies[57] will allow them to begin solving the above-stated problems of in-house networks, however this will provoke growth of tariffs of regional electricity companies by increasing the depreciation fund, maintenance, repair, and account of losses in this category of electric networks. Therefore the state needs to foresee compensation or subsidies for regional electricity companies, as well as stimulation mechanisms (by partial compensation of expenses) for introduction of automatic system for commercial metering of power consumption.

So, when analysing the situation in the public utilities sphere one can point out a few key problems:

- Shortage of funds for modernization and development of the public utilities sphere.
- Poor technical equipment, using outdated equipment with a very low efficiency factor.
- Absence of state fund expenditure control.
- Imperfection of energy resource consumption accounting and control system (especially heat).
- Lack of mechanisms for financial stimulation of rational usage of energy by tariff regulation taking into account expenditures in the field of power and heat supply including costs of coal and local emissions.
- Absence of a unified policy for construction of new or modernization of existing engineering communications during construction of new housing stock.

It is these problems that predetermine the necessity of adopting legislative acts aimed at increasing investment attractiveness of activities on modernization and energy saving in the public utilities sphere.

Barriers to DH companies

- The existing low heat tariffs are not encouraging DH companies to invest in improved energy efficiency of the heating systems;

57 To date according to electrical network rules, the commercial delimitation between regional electricity companies and domestic consumers is on the landing of the residential house.

- Outdated technical standards and regulations are preventing the use of new, more efficient equipment and installation techniques;
- Lack of experience of the financial sector coupled with a high level of perceived investment risks of energy efficiency projects in Kazakhstan, lead to high expected rates of return, high interest rates, and short payback periods of available commercial or semi-commercial financing sources;
- Difficulties for private or semi-private DH companies in obtaining government or municipal guarantees, required by most international loan providers;

Barriers to residential consumers

- Ineffective legal and regulatory provisions governing the operation of an Association of Apartment Owners (AAO), for example, in case of contracting heat and hot water service providers or applying for a loan;
- Lack of metering equipment and low heat tariffs are not stimulating for apartment owners to invest in energy conservation measures
- Lack of capacity and knowledge among apartment owners in managing heat and hot water supply services, as well as other building related tasks and services (including investments into energy efficiency, when economically feasible) at the building level; and
- Low level of awareness and experience in implementation of energy saving measures

Barriers to municipalities (as consumer in public building)

- No regulatory requirements exist for Municipalities to develop and implement Municipal energy saving plans and to invest in energy efficiency measures in public buildings (administrative buildings, schools, kindergartens)
- The current municipal budget regulations does not allow for municipality to keep the savings, resulted from energy efficiency improvements, thus creating serious barrier to the use of new institutional and financial mechanisms and structures (e.g. Energy Service Companies (ESCOs), private-public partnerships, etc.) for developing, financing and implementing energy efficiency investments in the municipality.
- Lack of local capacity to formulate and implement "bankable" energy efficiency project proposals;
- Lack of general awareness and information of different stakeholder groups on available, cost-effective energy saving technologies and measures.

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- Lack of local capacity to formulate and implement "bankable" energy efficiency project proposals;
- Lack of general awareness and information of different stakeholder groups on available, cost-effective energy saving technologies and measures.

Implementation of energy saving measures requires a considerable amount of investments and considering the beneficiary nature of the public utilities sphere it is necessary to introduce new financing mechanisms.

One of the possible funding schemes may be introduction of energy service contracts, the essence of which consists in the performance of energy saving activities at the Customer's facilities at the expense of energy service companies in the RK. In this case the energy service company gets its investments paid back from funds received as a result of energy saving during the term of the energy service contract.

Despite the obvious advantages of the energy service scheme there are factors limiting its spreading in Kazakhstan:

- Absence of a regulatory and legal framework.
- Absence of effective service contract insurance schemes with a high risk level.
- Relatively low prices for energy resources and, consequently, long payback periods.
- High interest rates on loans.

Energy saving Potential

The energy saving potential in the public utilities sphere can be valued as follows:

- Reduction of losses on heat sources up to 10%.
- 10% reduction of losses during transportation of heat in the heat supply sector.
- Thermal modernization of the housing stock will allow a reduction of up to 20% of consumed heat.
- a 3-4% reduction of energy consumption can be achieved in the electric energy supply sector by reconstruction of 0.4-0.22 kV distribution networks and equalization of load.
- Introduction of energy efficient lighting in the public utilities can reduce consumption of electric energy for lighting by up to 30%.
- It is economically and technically possible to achieve a reduction of gas losses of up to 10% in the gas distribution sector.

Recommendations:

The Government of Kazakhstan can succeed in eliminating existing obstacles on the path to the increase of energy efficiency in the public utilities sector by:

- Strengthening the energy performance requirements for new and existing buildings and allocating sufficient resources for monitoring compliance, and proper enforcement of the legislation and building codes. In addition standards need to be developed and applied regarding the performance of various building components – windows, heating, ventilation and cooling systems, etc. (see case studies 16 and 17).
- Introducing individual apartment heat metering for new buildings to create incentive for final consumers to regulate their heat use. Continue installing automatic systems of heat consumption control \and building heat meters for existing multi apartment blocks.

- Adoption of the necessary legislation regulating activity of the Housing owners associations in the field of energy saving and energy efficiency, as well as providing a guarantees or other incentives in case of granting or loan application is submitted for implementation of energy efficiency renovation of the building (see case study 19);
- Stimulate regional and local authorities to undertake energy audits of all public buildings and develop dedicated Programmes for improving the energy performance of public buildings to implement the requirements of the audits. Require that they also Introduce special energy efficiency criteria in procurement procedures for public expenditures on goods and services.(see case study 20)
- Introduce the necessary changes in budget regulations to allow regional/local authorities to keep the savings, resulted from energy efficiency improvements in public buildings, thus stimulating local authorities to implement energy efficiency projects via Energy Service Companies (ESCOs), private-public partnerships, etc.)
- Consider developing financial incentive schemes for final consumers, stimulating investments in energy efficient retrofit of existing buildings. (see case studies 22-24)
- Consider introducing policies stimulating local manufacturers of high-efficiency building components (e.g. fiscal incentives) and/or customs duty exemptions for imported high-efficiency building components.
- In sector of heat production and distribution consider the adoption of long-term tariffs, providing an investment for network modernization and losses reduction.
- establishment of the necessary legal and regulatory framework, as well as the introduction of various incentive mechanisms to ensure the investment of energy companies in the modernization of existing district heating networks including in improving their efficiency (see. case study 26).

ENERGY EFFICIENT LIGHTING

General

The share of lighting in the total consumption of electric power in Kazakhstan is about 13%[58], however the share of electric power used for lighting in the residential sector in this case is higher – 39%, and in commercial and state sectors it is about 19%.

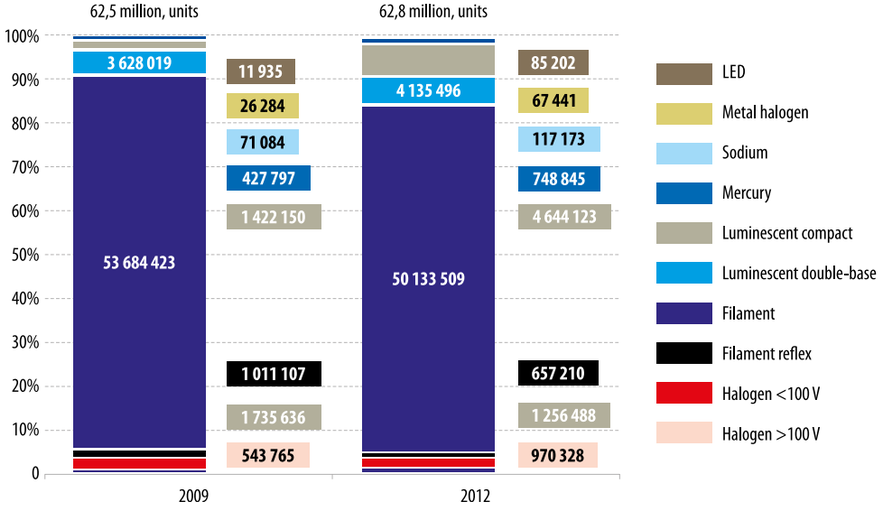

Figure 27: Sources of lighting used in Kazakhstan

Source: United Nations Development Programme, Kazakhstan.

58 Encouragement of energy efficient lighting in Kazakhstan, design document, United Nations Development Programme

Analysis of current developments, major challenges and barriers

There is actually no domestic production of lighting fixtures in Kazakhstan, almost all lamps in the Kazakhstan market are imported. The total number of imported lamps in 2012 was 62.8 million, which represents growth by 28% compared to 2008[59]. The main countries, from which Kazakhstan imports lamps, are Kyrgyzstan (52%), the Russian Federation (27%) and China (10%).

Among imported lamps, 80% are ineffective filament lamps (FL). Even despite the 5% reduction of their quantity compared to 2009, FL still holds a leading position in the Kazakhstan market. Fluorescent tube lamps make up about 6.6% of the total importation of lamps. At the present time the supply of compact fluorescent lamps in the Kazakhstan market is quite low – only 7% of the market. At the same time demand for energy efficient lighting devices is growing - over the period from 2009 to 2012 the growth of imports of these lamps was more than three times as high.

Stepwise prohibition of selling and production of electric filament lamps (more than 100 W – from July 1, 2012, more than 75 W – from January 1, 2013, more than 25 W – from January 1, 2014) was introduced by the law of the Republic of Kazakhstan "On energy saving and increasing energy efficiency" in 2012.

A positive result that has been achieved for the two years of the prohibition is full replacement of filament lamps by numerous major industrial companies and state enterprises.

The "Energy Saving - 2020" state program, which is implemented in five main directions with "energy efficient lighting" being among them, was accepted in support of development of the Energy Saving Law. This direction envisages a step-by-step transition to LEDs, modernization of street lighting in cities and communities, 60% reduction of electricity consumption by the lighting sector in the whole country.

Construction codes, standards and technical regulations

Requirements connected with lighting in residential and especially with state buildings in Kazakhstan are defined in the collection of construction codes SNiP RK 2.04-05-2002 "Natural and artificial lighting". There is a note in the collection that "the most economic gas discharge lamps with luminous efficiency not less than 55 lm/W should be used for general artificial lighting of internal spaces". Using filament lamps is allowed for general lighting only to meet architectural and artistic requirements and in spaces with explosion risks.

SNiP RK 4.04-18-2003 "Instructions for design of outdoor lighting of cities, settlements and rural communities" with references to SNiP RK 2.04-05-2002. These codes contain quite general requirements that design of lighting should ensure "economy, rational use of electric energy, and energy saving".

Draft construction code SN RK 2.04-XX-2011 developed by JSC KAZNIISA and corrected taking into account changes entailed by enforcement of a full ban on filament lamps with output more than 25 W should be introduced as a base for creation a lighting SNiP instead of SNiP 2.04-05-2002 acting since 2002, which does not meet the current requirements of energy efficiency and energy supply. It should be complemented with requirements for the minimal luminous capacity of lighting sources up to 70-80 lm/W regardless of the source type.

RGP "Kazakhstan Institute for Standardization and Certification" together with the United Nations Development Programme carry out development of a number of standards on LED lighting in order to introduce high efficiency lighting sources. The year the standards will be into effect is 2015.

Minimum energy efficiency standards are being developed now for various categories of electrical appliances (Draft EAEU regulations). They are expected to be accepted by all EAEU member countries in the near future.

59 Study of the Kazakhstan market of lighting devices, 2012, United Nations Development Programme

Recommendations

Kazakhstani government authorities may achieve a considerable reduction of energy consumption by modernization of the lighting sector and using more effective energy consuming items. To this end, it is advisable to:

- Accelerate the process of development and adoption of common Minimum energy performance standards for energy using products within the Eurasian Union. Authorities need to allocate sufficient resources for compliance, monitoring and verifying claimed performance for different appliance groups, regardless on whether they are imported or locally manufactured.(see case study 27-29);
- Adopting regional test standards and measurement protocols as well as establishing ate regional level the necessary product testing infrastructure for lighting and energy using products. (see case study 30);
- Create the necessary conditions to support regional/local authorities to develop and implement projects for high-efficiency street and public lighting. Introduce incentives in forms of grants or subsidies to facilitate the fast deployment of energy efficiency street lighting among the country. (see case studies 31-33);
- Work together with utility companies and retail shops to promote and provide information to final consumers on the benefits from using high efficient lighting and appliances;
- Consider introducing bonuses for purchase of high efficiency equipment. (see case study 34).
- Introduce national system for collection, storage and disposal of mercury lamps.

TRANSPORT SECTOR

General

The transport sector is one of the most energy intensive branches of the RK economy. Moreover, specifics of energy consumption on transport are such that the majority of demands of the branch are satisfied from non-renewable resources, first of all petroleum products. In much smaller degree the needs of the branch are covered by means of gas and only a negligible share of vehicles uses electric power.

Since 2000 the share of the transport sector in the total amount of energy consumption in Kazakhstan has been ranging between 10% to 18%. In 2012 the transport sector which shared 18% of consumption of initial energy resources was third according to this indicator after the industrial and the housing sector.

Analysis of general cargo traffic by various types of transport over the last ten years allows for an unequivocal conclusion about the dominating role of automobile transport compared to other types. A similar distribution with an emphasis on automobile, mostly bus, transport is observed in the area of passenger transportation.

Therefore the biggest comprehensive effect from the introduction of energy saving technologies can be achieved just in this segment of the branch.

These conclusions are generally characteristic of other countries of the world, which is confirmed by the results of research of the international energy agency:

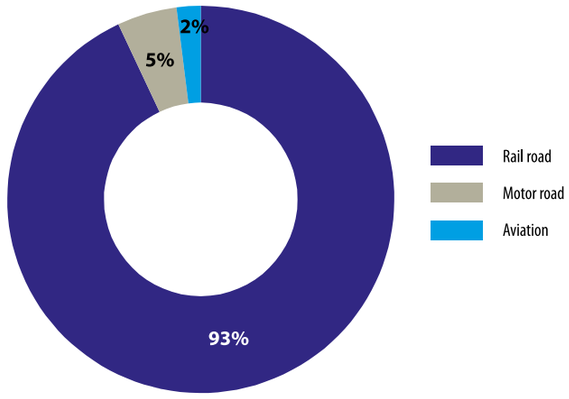

Figure 28: Energy consumption in the transport sector, 2011, IEA

Source: energy online statistics of IEA, 2013

Growth of number of vehicles is indicative of the considerable increase of energy resource consumption in this branch. According to data of the International Energy Agency, consumption of energy in the transport sector of the Republic of Kazakhstan increased suddenly during the period from 2003 through 2008. After a certain reduction caused by the financial recession in 2009, growth of energy consumption continued in 2010-2012 and reached 5,277 kilotons of oil equivalent (Fig. 31). The biggest volume of consumption is in petroleum products – about 90%.

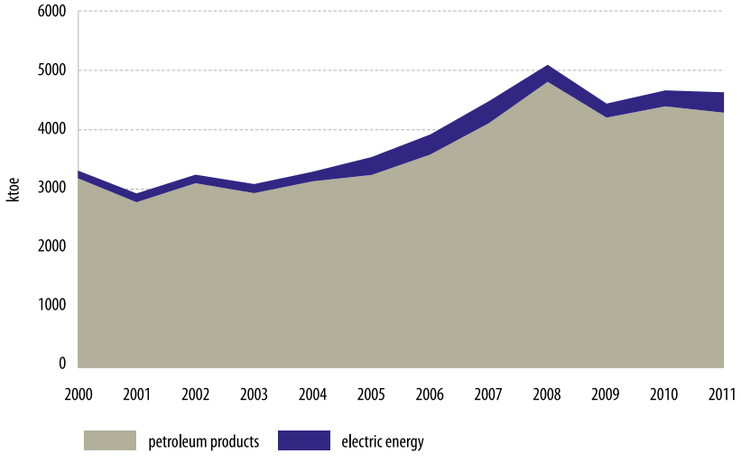

Figure 29: Energy consumption in the transport sector

Source: energy online statistics of IEA, 2013

Analysis of current developments, major challenges and barriers

The energy efficiency of motor vehicles directly depends on two main factors:

- Technical condition and type of internal combustion engine.
- Quality of fuel used.

The effectiveness of an engine is evaluated by its efficiency coefficient, which depends on the ICE type. Thus, average indicators for internal combustion engines are:

- gasoline Efficiency ratio – 25-30%
- diesel efficiency ratio – 40-50%
- gas Efficiency ratio up to 40%.

The technical condition of an engine usually depends on its service life and mileage directly influencing the wear of ICE.

According to data of the study carried out by United Nations Development Programme Kazakhstan, the majority of the car fleet consists of ineffective second-hand vehicles from Europe and Asia. Information provided by the Scientific Research Institute for Transport and Communications of the RK testify to the fact that the share of cars amounts only to 86% of the entire automobile fleet of the Republic. However vehicles with the gasoline engine have a share of 94 %, while the majority consists of vehicles with a service life of 10 years or more (see Fig. 32).

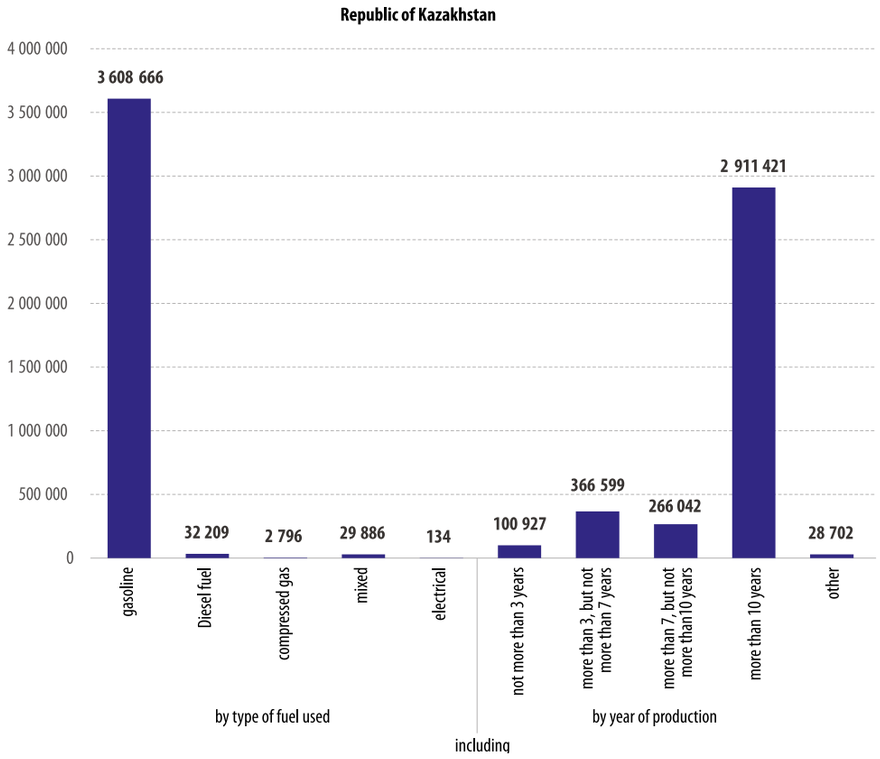

Figure 32: The ratio of cars by type of fuel used and year of production.

Source: Scientific research institute for transport and communications.

A critical problem for Kazakhstan is the problem of quality of fuel produced in the Republic. The current large oil refining plants of the Republic were designed for production of old fuel grades (for example, gasoline grades A-72, A-76). Since commissioning of the oil refining plants, modernization has been performed only now. As a result, a considerable quantity of additives[60] influencing the quality of the fuel and ultimately the effectiveness of its combustion in engines of automotive transport are used during production. Using fuel that does not meet the requirements of internal combustion engines leads to a reduction in the efficiency factor of the engine and under burning of the fuel.

Today there are a few prospective directions for increasing transport energy efficiency in the Republic of Kazakhstan, including:

- State protection for electric and hybrid motor transport, and also stimulation of a wide usage of gas motor fuel.
- Transition to new automotive fuel quality standards (EURO-5, EURO-6).
- Development of a high speed public transport system.
- Efficiency increase of road freight transportation.

Taking into account Kazakhstani conditions, these directions have the following advantages and disadvantages.

Electric and hybrid motor transport Heavy growth of such an innovative direction as self-contained electric and hybrid transport speaks to a serious energy saving potential in the transport sector. A considerable breakthrough in this direction that has been observed in recent years in developed countries of the world is connected with perfection of battery production technologies, including lithium-ion batteries that increase mileage "on one charge" to 150-200 km, and in some cases even to 300 km. In this case, the considerable problems that the impede full-scale development of this type of transport are its high price, absence of a network of charging stations with a capacity of 50 kW for a car, and also the severe weather conditions of Kazakhstan (especially in the winter) that affect battery operation efficiency. In addition, separately a question of maintenance and disposal of waste accumulators comes up, which in turn requires creating the appropriate infrastructure and training the appropriate staff.

Gas motor fuel. The experience of using gas motor fuel has quite a long history. In this case, among the positive moments one can distinguish:

- reduction of costs for combustible and lubrication materials
- Increase of engine resources by 35% on average.
- Reduction of emissions of harmful substances.

The factors interfering with large-scale introduction of gas motor fuel include:

- Imperfection of corresponding infrastructure: fuel stations, maintenance stations, certification of high pressure vessels, etc.;
- need for additional equipping of vehicles, which causes their cost to rise.

Reduction of such technical and economic indicators of rolling stock as load carrying capacity, mileage on one charge, etc.

Transition to new standards (EURO-5, EURO-6) will help to achieve the best environmental indicators, including by the effective application of systems to reduce hazardous substances on vehicles. In addition, better fuel will enhance the efficiency of internal combustion engines (for new cars up to 15.3 %) and help achieve the highest indicators of efficiency. However, note that a part of energy efficiency achieved due to using new standards of fuel is partially leveled out by costs for ensuring the operation of the hazardous emission reduction systems.

The development of a system of high speed public transport is oriented to the reduction of traffic in cities using private cars and increasing the competitiveness of city public transportation. The optimal option to increase competitiveness is development of a high speed transport system having advantages in speed of motion compared to individual motor vehicles.

Optimization of transport logistics. Increasing the energy efficiency of cargo transport (including railway transport) by optimization of the transport logistics sector through introduction of navigation and timing systems with precise timing will allow for considerable reduction in non-productive consumption of

60 According to information of the Balkhash-Alakosky department of ecology, testing the quality of fuel revealed that 40% of the liquid fuel samples do not meet the standards.

fuel, coordination of time underway, and more productive distribution of load on road systems. In this case, this project appears to be least expensive in terms of financial investments.

Introduction of such systems on railway transport is advised, primarily to improve the efficiency of railway transportation and increase the throughput of railway lines and transport nodes.

In general, the development of each of the listed directions seems to be most prospective in terms of reducing energy intensity and increasing the efficiency factor of the transport branch. In this regard state stimulus is necessary for the sustainable development of these directions, including stimulus enshrined in legislation.

Thus, activities to reduce or completely waive payment of the transport tax for hybrid cars, provided that the corresponding infrastructure is formed, can raise the interest of the population to this kind of vehicle. Using state subsidy mechanisms for the population to purchase new energy efficient and more environmentally friendly automobiles or to introduce a system of differentiated tax levies for motor vehicles depending on the level of harmful substance emissions, the year of production of a vehicle or level of fuel consumption could considerably speed up the process of updating the transport fleet of the Republic of Kazakhstan.

One of the most important points of enhancing environmental friendliness and energy efficiency of transportation is vehicle driving style. Abrupt starting and sudden stopping, and also driving at high speeds increases fuel consumption and consequently the amount of hazardous substances emitted into the atmosphere. Besides, this impairs the technical condition of the vehicle by imposing high loads on all assemblies of the vehicle and poses threats to road safety.

For the purpose of increasing the safety of transport, and also reducing the amounts of road fuel consumption and exhaust gas emissions, it seems to be reasonable to implement a monitoring system for public traffic, passenger transport, and also transport used for carrying hazardous freights, also including the possibility of vehicle navigation installed in accordance with the regulations of the customs union. It is also necessary to develop and implement a package of measures that promote environmentally friendly driving and raise drivers' awareness of benefits they gain, as well as the relation between driving style and fuel consumption (see case study No.36).

State policy regarding increasing the energy efficiency of transport

In order to provide the appropriate legal framework in the sphere of energy saving and increasing the energy efficiency of transport, the government of the Republic of Kazakhstan enacted the law of the Republic of Kazakhstan "On energy saving and increasing energy efficiency" and "On introduction of amendments and additions in some regulatory acts of the Republic of Kazakhstan regarding energy saving and increasing energy efficiency in January 2012.

Government orders on establishing obligatory requirements for the energy efficiency of transport and electric motors, and also fuel consumption decrease in the transport sector were accepted in the framework of the mentioned laws.

Item No.	*Name of vehicle type*	*Energy efficiency in %*
1	Automobile: engine running on natural gas diesel engine gasoline engine hybrid car (gasoline/electricity) electric engine	 66 55 60 75.7 52.5
2	Aircraft engines	40
3	Railway locomotive electric locomotive	41 82
4	Sea transport	60
5	Inland water transport	60
6	City electrical transport, including metro	75

Table 17: Indicators of transport energy efficiency

Source: Order of the Government of the RK No.1048 of August 15, 2012 "On establishment of requirements for energy efficiency of transport".

In addition, the Plan of the Ministry of Transport and Communications of the Republic of Kazakhstan for increasing energy efficiency in 2012 – 2016 provides for a package of measures in railway, water and motor transport, civil aviation, and development of motor roads, information technologies and telecommunications.

In the framework of the National program "Energy Efficiency 2020" adopted in August, 2013, goals were set to reduce fuel consumption in the transport sector by 30% and renovate the country's automobile fleet by 50%.

The plan of activities for implementation of this program provides for implementation of a set of activities on:

1. Introduction of Euro (3, 4, 5, 6) standards for motor transport.
2. Development of energy efficient transport infrastructure.
3. Development of solar powered city passenger buses.
4. Marking energy efficiency of tires.
5. Encouragement to buy economical cars.
6. Elimination of customs duties for cars with hybrid, gas and electric engines.
7. Replacement of obsolete aircrafts.
8. Using new passenger locomotives and electric locomotives.
9. Using energy efficient tires on government motor transport.
10. Installation of energy saving lighting equipment on airports and aero navigation facilities.

Besides, the plan of measures to implement the Concept for transition of the Republic of Kazakhstan to a "green" economy provides for initiatives on forming the optimal structure of the motor transport fleet in 2014-2015 taking into account the regional specifics, availability of types of motor fuel and possibilities of using prospective types of energy.

There is also a plan to develop a Program for disposal of vehicles for encouragement of automobile fleet renovation and increase energy efficiency in the transport sector.

Sustainable transport in Almaty

The main tasks of the project "Sustainable transport of Almaty" is reduction of emissions connected with transport in Almaty. The project is carried out by the local office of the United Nations Devel-

opment program with financial support from the Global Environment Fund and European Bank for Reconstruction and Development. As estimated by the authors of the project, considering the forecast growth of number of vehicles in Almaty, without any plans to expand the city road network the intensity of traffic in Almaty will grow by 7% a year on average. Regardless of big investments in the transport infrastructure in some recent years, the city transport of Almaty is far from sustainable. The number of traffic jams and amount of hazardous emissions is growing, cars take a dominant position in the city streets leaving little room for pedestrians. It is expected that unless changes are made to the current strategy of the city development, the emissions and greenhouse gases in the Almaty road network will grow by 75% over 10 years.

The project assists Almaty city authorities in the development of a system of sustainable city public transport and the introduction of a comprehensive system for road traffic control. In recent years a decrease in the usage of public transport has been observed. Today it accounts for less than 30% of all trips made in Almaty, whereas in other large cities this amount is typically 60%. Despite considerable investments in the development of public transport over recent years, the need to improve its quality and provide an attractive alternative to the private car remains.

The greatest achievement of this project is acceptance of a Strategy of Sustainable Transport in Almaty till 2023 by the Akimat (local government body) of Almaty. The strategy sets goals for the reduction of emissions of pollutants and greenhouse gases by 32% of the current level[61], expansion of the market share of sustainable types of transport (public transport, walking and bicycle transport) up to 55% and reduction of the number of traffic jams in the city centre by 30%.

According to the strategy, more than 55% of all traffic in the city will be using sustainable types of transport by 2023: in general this is MHSTS (mass high-speed transit system – metro, tram) (over 20%), buses (16%), walking (12%) and bicycle transport (5-6%). Therefore, the daily number of rides by car will decrease almost by a half million, from 1.75 million to 1.22 million.

The following table shows the expected quantitative results of implementing the sustainable city transport strategy compared to the scenario when the city would continue developing in accordance with current trends.

Indicator	Today	Current scenario as of 2023	Sustainable transport as of 2023
Average vehicle traffic speed (km/h), (morning rush hour)	19.1	15.0	18.3
Average public transport traffic speed (km/h), (morning rush hour)	15.5	11.8	19.2
Emissions of greenhouse gases connected with transport, Mt CO2eq	2 650 000	4 990 000	3 420 000
People living 500 m2 from the metro station	8 %	18%	51%
Share of bicycle transport in total traffic	Less than 0.5%	1.5%	6%
Traffic using sustainable transport (walking, by bicycle, by public transport)	42%	35%	55%
Quantity of car traffic	1 130 000	1 850 000	1 370 000
Total distance of car traffic, million km.	10.34	20.04	14.1

Table 18: Results of the sustainable city transport strategy

Source: Sustainable transport strategy of Almaty

Recommendations:

For the purpose of reducing energy consumption the level of associated emissions of transport, the government of the Republic of Kazakhstan is advised to:

61 Strategy for development of Sustainable transport in Almaty, 2013

- To assess the quality of urban planning, transport infrastructure elements and traffic management it is required to set up at national and regional levels a system of transport sector energy efficiency indicators;
- To ensure a large-scale use of pressurized (compressed) gas as motor fuel it is recommended, with direct participation of corresponding profile ministries and agencies, to:
  - Develop a set of measures aimed at creating conditions for large-scale use of gas as motor fuel on public transport and transport of road and community service authorities;
  - Develop a set of measures aimed at enhancing the use of gas as motor fuel for agricultural equipment;
  - Consider the possibility to reduce (zero out) the rate of entry customs duties on components necessary for the manufacture of transport vehicles that use gas as motor fuel;
  - Consider the possibility to reduce (zero out) the rate of transport fee for transport vehicles that use gas as motor fuel;
  - Introduce the system of privileged subsidies to transfer transport vehicles to the use of gas as motor fuel for the purposes of renovation of bus fleet, road and community services and agricultural equipment.
  - Set up meteorological and certification services (bodies) to accompany gas-fuel equipment and transport navigation systems.
- Introduce time navigation systems to improve the sector of transport logistics and increase energy efficiency of cargo transport movement, including railway road transport.
- Introduce fuel-efficiency and vehicle-efficiency standards for road vehicles. The implementation of these standards can be combined with other policies, such as tax and fiscal incentives, information campaigns to raise consumer awareness, etc. (see case study 40)
- Introduce policy packages (regulatory and incentives) that encourage more rapid turnover of the old vehicle fleet. Such measures could be in a form of a ban of importing old vehicles, incentives encouraging quick fleet renewal by owners, vehicle fuel economy labels, tax and fiscal measures stimulating purchase of more efficient vehicles. (see case studies 34-41)
- Introduce financial incentives that support the use of energy-efficient vehicles and mode of transport (see case studies 35, 37,38)
- demand form relevant authorities that they improve the quality of service, efficiency, accessibility and comfort of existing public transport systems in order to create alternative to private vehicle use in urban areas (see case studies 42-45)
- Introduce a set of measures regulating and encouraging the accelerated renovation of transport vehicle fleet. Such measures could include a ban or increase of customs duties on import of old cars;
- Enhance state control form the point of view of quality of the motor fuel supplied to the market;
- Introduce navigation systems on railway road transport to optimize the time of its movements and increase the traffic capacity of railway roads and transportation centres.
- Promote Eco driving among the population (see case study 41)

ANALYSIS OF BEST PRACTICES IN ENERGY EFFICIENCY

The main features of the energy sector of Kazakhstan are the following:

- Energy efficiency is still emerging as a policy option. The government is still developing its own policy capabilities, however energy use statistical data is limited, and a base of experience and learning is still being established. Experience with regulatory policies, coordination or evaluation and compliance management is yet to be developed to the level of other countries with already established energy efficiency programmes.
- Weather extremes may mean that several energy efficiency options that work in less demanding conditions are not going to work well in Kazakhstan. For example, providing reliable heat is a necessity, not an option, therefore reliability in home heating is a priority.
- The economy is changing rapidly, both supply and demand side activities and energy use patterns are dynamic and growing. As a growing energy exporter Kazakhstan can make trade offs by either exporting energy at world prices or consuming it domestically. This means that wasted demand side energy represents a lost opportunity to the energy exporting sector.
- Kazakhstan is changing from a time when energy processes were centrally planned to one where it must consider the distortions made by energy price subsidies on the market. The impact of energy price subsidies on imports, exports, the demand for energy efficiency and renewable energy should not be neglected.
- Old and obsolete energy infrastructure remain from previous administrations, strong efforts on refurbishing the not in good condition equipment is underway but still to be further developed.
- The private sector doesn't yet have all the skills and institutional conditions to be able to deliver energy efficiency. There is no doubt about the technical capabilities of engineers and scientists, but translating this expertise into practical implementation is still lagging behind. Moreover, the commercial experience of ESCOs in creating and delivering commercial projects is also yet to be developed.
- Energy efficiency financing is developing. Good co-operation between local banks and development banks like the EBRD, with risk sharing and a network of intermediaries that increasingly understand energy efficiency finance, funds are progressively available.
- It may not be obvious how Kazakhstan can adopt international standards used by other countries for appliance efficiency. Local industry has yet to develop locally designed energy efficiency products, and testing of appliances and equipment may be more economically carried out in accredited labs in other countries due to a lack of local test facilities.

Under these conditions many policies that make sense and are working well in other countries may not work well in Kazakhstan. All policies should make economic sense, use available technologies and skills well, and offer productivity and social outcomes for the country.

Which policies might work well in Kazakhstan?

1. Polices that help the government to learn about the potential for energy efficiency and the best ways to adopt it at institutional level.
2. Polices that develop local skills and capabilities, to create conditions for the private sector, local markets and industries for energy efficiency to progress.
3. Polices that deliver energy efficiency solutions for the local climate conditions and social and economic priorities.

This section of the report surveys a wide range of polices from around the world that have already been evaluated and reported. By drawing from these reviewed polices we can have some confidence that these measures do work. Single page policy summaries are provided for each of the identified policies, with references to the details of the policies and their evaluations.

INDUSTRY AND POWER SECTOR

Case studies Industry

Case study 1: Energy Audit Programme in Industry (EAP), Finland

Target Area:

Buildings, industry, services, commercial.

Policy type:

Voluntary agreements, administrative, economic, incentives and subsidies.

Organisations:

Ministry of Employment and the Economy. Motiva Oy.

Ministry of the Environment.

Summary:

The EAP is a voluntary programme, promoted by a 40% subsidy for industry participants. It consists of the following elements: programme administration, detailed guidelines, auditor training and authorisation, as well as a monitoring system and promotion activities.

Cost:

€72 million.

Years observed:

1992-2011.

Total energy saved:

11 TWh.

Scale:

8300 audits in 19 years.

Implementation:

Nine audit models have been developed for different type of buildings and sectors. All have 3 basic elements: evaluation of energy consumption, identification of energy saving possibilities and reporting.

The Energy Audit Models:

- Industrial Energy Audit: A 'light' audit for facilities with low energy intensity.
- Industrial Energy Analysis: A 'heavier' model for facilities with medium energy intensity.
- Process Industry Energy Analysis: A two-step Energy Audit model for energy intensive process industry, including a scanning phase and a detailed energy Audit.
- Energy Inspection: for very small buildings in the commercial and industrial sectors.
- Building Energy Audit: The basic model for commercial buildings.
- Post–acceptance Energy Audit (PEA): for new and renovated buildings designed to optimise energy use after construction.
- Follow-up Energy Audit (FEA): A model to update previous energy audits.
- Power Plant Energy Analysis: for electric power plants for communities or for industry.
- District Heating Analysis: A model for heating plants and distribution networks.

All industry is eligible for the audit subsidy, and the same company/site can reapply for the subsidy three years after the previous audit.

Auditing is carried out by private consulting companies in order to establish a local industry. Motiva Oy controls the quality of the first audits undertaken by newly certified auditors and monitors audits.

A revised software tool for energy auditors, Motiwatti 2.0, was published in 2000. This software standardises and simplifies calculations to estimate the savings in the energy audit report.

Relevance to Kazakhstan:

This policy develops new local skills, is cost effective, and provides industry and government with much needed quality information for better business investments. The programme covers audit models for many different energy use scenarios, all of which could be implemented in Kazakhstan. The software analysis ensures consistency and quality with the audits, and provides a good template for Kazakhstan.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/FIN3.PDF

http://ec.europa.eu/energy/demand/legislation/doc/neeap/finland_en.pdf

http://www.motiva.fi/en/areas_of_operation/energy_auditing/overview_of_energy_auditing_in_finland

http://motiva.fi/files/5366/Energiatehokkuussopimukset_tuloksia_2008-2010.pdf

Case study 2: Energy Conservation and Environmental Consultancy Subsidy Scheme (EMA), The Netherlands

Target Area:

Industry, SMEs, commercial.

Policy type:

Audits, subsidies, information.

Organisations:

NOVEM.

Summary:

Under the Energy Conservation and Environment Consultancy Scheme, companies can obtain subsidies to help them employ an external consultant to draw up an energy plan or give environmental advice. The scheme is intended mainly for small and medium-sized enterprises in both the industrial and commercial sectors.

Cost:

€13.2 million in 1990-2000.

Years observed:

1990-2000.

Total energy saved:

27 Mt GHG emissions reduction in 2000.

Scale:

Unknown.

Implementation:

Subsidies are provided for companies to use consultants to undertake audits for energy efficiency and the environment. The maximum subsidy is 40% of the cost of an audit.

Relevance to Kazakhstan:

This scheme develops new local skills in auditing and offering advice. The subsidies allow a company to more easily engage with its energy use and determine areas for improvement. The subsidies also support the consultants with specific audit skills by encouraging companies to engage with them.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/NLD12.PDF

http://www.osti.gov/scitech/servlets/purl/840327

Case study 3: Large Industry Energy Network (LIEN), Ireland

Target Area:

SMEs, large enterprises.

Policy type:

Informative, education, training, voluntary network.

Organisations:

SEAI.

Summary:

The Large Industry Energy Network (LIEN) is voluntary network initiative for the largest industrial energy consumers in Ireland, i.e. those with an annual energy spend over €1m.

The LIEN is developing a set of role-model companies who recognise the benefits of better energy management. This voluntary approach has been effective in enabling members to choose profitable energy saving projects and actions.

Members of the Network employ a wide variety of technologies and management approaches. These include investments in technologies such as compressed air, refrigeration, energy efficient lighting, motive power, building management systems and combined heat & power (CHP). Other approaches include Monitoring & Targeting, staff awareness campaigns and energy management teams.

Cost:

Combined annual energy expenditure of the programme is around €300mill.

Years observed:

1995- Ongoing.

Energy saved:

1,595 GWh in 2010.

Scale:

160 members. Collectively €60 million in energy costs were avoided in 2008 alone.

Implementation:

SEAI publishes an annual report which shows the performance of every company over recent years and at the same time highlights achievements, case studies and trends. Workshops and seminars are organised throughout the year for LIEN members, providing them with a forum to learn from energy experts and other specialists, as well as from other energy managers. By learning from experts and sharing knowledge and experiences, members save valuable research time, invest wisely and maximise returns.

Each of the 135 member companies submits an annual statement of energy accounts to SEAI. These accounts are then collated, analysed and the energy savings are reported on in the LIEN annual report each year.

Relevance to Kazakhstan:

The network provides a platform for information sharing so that poor decision making is reduced and mistakes are not repeated. This measure is suitable for Kazakhstan's largest industrial users as improvements with these consumers ensure a high return on energy savings. By working on a voluntary basis, the consumers who become involved will actively seek results and engage in the network to reap maximum benefits.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/IRL2.PDF

http://www.seai.ie/Your_Business/Large_Energy_Users/LIEN/

http://www.seai.ie/Your_Business/Large_Energy_Users/LIEN/LIEN_Reports/LIEN-Annual-Report-2011.pdf

Energy efficiency in industry, a holistic and integrated strategy from policy to results by John O'Sullivan

Case study 4: Voluntary Energy Conservation Agreement in Industry, Finland

Target Area:

Industry, large enterprises, SMEs

Policy type:

Voluntary agreement, co-operative measures

Organisations:

Ministry of Employment

and the Economy. Association of Finnish Energy Industries

Summary:

The aim of this voluntary agreement is to reduce the specific consumption of energy and to develop and introduce action models that would allow energy efficiency to become integral to the companies' operations. Principal measures according to the agreement are:

- energy auditing and analysis and
- carrying out of conservation measures based on the findings.

The agreement itself does not include mandatory or indicative targets for the companies. Instead, each company sets specific energy conservation targets for themselves when they draw up their individual energy conservation plans.

Investments:

Totaled €295 million in 1998-2006

Years observed:

1997-2007

Energy savings:

By the end of 2006: 5,240 GWh/a of heat and fuels, 999 GWh/a of electricity

Scale:

By the end of 2006, 189 companies operating in 327 industrial sites had joined the agreement

Implementation:

When first joining the agreement, the company is required to name the date by which it intends to draw up a report on its energy use. The report must indicate the products made by the company, amount of electricity and heat/fuels consumed for their manufacturing each year and the level of energy costs. The report must include a plan for the carrying out of the energy audits and analyses.

To ensure sufficient expertise in conducting the process industry analysis Motiva organises special training sessions for industrial companies own personnel. This way industrial companies can have authorised auditors from their own personnel to conduct the industrial process analysis. State aid for audit activities can be given only if the company's audit operations conform to Motiva's instructions.

For the monitoring of the agreement the company must annually report details of its energy consumption and the various factors that have affected it. Summary reports prepared yearly by Motiva, the Confederation and the Ministry provide feedback on the situation of the entire sector.

Relevance to Kazakhstan:

This initiative provides incentive to the industrial companies to develop on-the-job training, improving skills of the already existing industry staff. There is also an incentive to the industrial company to set their own targets and follow up according to specific Monitoring & Targeting techniques. It is a methodology very much process oriented and could be implemented at the desired pace of each company.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/FIN8.PDF

http://www.motiva.fi/en/areas_of_operation/energy_efficiency_agreements/energy_conservation_agreements_1997-2007

Case study 5: Industrial companies with individual targets for energy savings, Bulgaria

Target Area:

Industry, SMEs.

Policy type:

Legislative, mandatory audits.

Organisations:

Energy Efficiency Agency.

Summary:

Every industrial system whose annual energy consumption is above 3000 MWh is subject to obligatory audits of energy efficiency, which is carried out at least once every three years. The methods for proving the achieved energy savings are energy audits or specialized methods.

The measures implemented in 2012 were mainly replacement of technical equipment, in contrast to previous years when the majority of the measures were insulation improvements.

Cost:

In 2012 the companies used 90% own funding.

Years observed:

2009- Ongoing.

Total energy saved:

186.1 GWh/year from 2008-2012.

Scale:

297 obliged industrial companies.

Implementation:

The audits of industrial systems for energy efficiency aims at determining the specific possibilities for decreasing the energy consumption in the industrial systems and to recommend measures for promotion the energy efficiency.

The owners of industrial systems shall be obliged to start implementing the measures, prescribed by the audits of energy efficiency within 2 year term, starting from the date of receiving the results of the audits.

The audits shall be conducted by persons who:

1. are traders under the Law on the Commerce or the legislation of an EU Member State, or another state under the EEA Agreement;
2. have the needed technical equipment;
3. have the needed staff .

The audits shall be finalised by a report.

Relevance to Kazakhstan:

This measure ensures regular information collection and monitoring, and develops local auditing skills and systems. The audits determine areas for improvement, and more importantly offers suggestions for methods to carry out these improvements. Strict monitoring ensures these are implemented.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/BG5.PDF

http://www.seea.government.bg/documents/eng/LEE-2008.pdf

Case study 6: Polish Sustainable Energy Financing Facility

Target Area:

SMEs, large enterprises

Policy type:

Investment, grants, subsidies

Organisations:

EBRD, Millennium

Bank, Bank BGŻ, BNP Paribas Bank Polska SA, BZ WBK.

Summary:

PolSEFF is a €190 million credit line to help small and medium sized businesses in Poland invest in new, sustainable energy technologies. PolSEFF credit lines of up to € 1 million are available through partner banks and leasing companies.

PolSEFF is available for three major types of investment:

- Simple investments based on list of eligible materials and equipment (LEME)
- Large scale energy efficiency, renewable energy and building sector projects
- Investments of Suppliers

PolSEFF offers not only financing for technologies that significantly reduce energy consumption; it is also designed to provide free of charge professional support of engineers and financial experts specialised in sustainable energy solutions.

Cost:

€170 million by end of 2013

Years observed:

2011-ongoing

Annual energy saving:

318,071 MWh/year

Scale:

1870 projects implemented by end 2013

Implementation:

Following projects are eligible for the PolSEFF program:

- Energy efficiency projects using LEME technologies; it refers to projects of financing value not exceeding 250.000 EURO.
- Complex projects improving energy efficiency based on individual solutions achieving minimum 20% of energy saving, financing can not exceed 1 million EURO.
- Investments in commercial buildings achieving min. 30% of energy saving.
- Renewable energy projects generating annually minimum 3kWh per 1 EUR invested.

Relevance to Kazakhstan:

The EBRD is considering the establishment of a USD 75 million framework facility in the form of dedicated credit lines to local financial institutions for on-lending to private sector companies to finance investments in sustainable energy. Eligible investments will include energy efficiency in the industrial sector and small renewable energy projects.

The Project will generate transition impact by demonstrating the benefits of energy conservation and promoting the expansion of energy efficiency lending in the energy inefficient Kazakh economy. It will have positive demonstration effects particularly with respect to utilizing financial intermediaries for investments resulting in rational energy utilization; something that has not yet been widely utilized. The Project will demonstrate the effects of rational energy utilization for improving industrial competitiveness in light of the rising energy costs in the region.

The Project is also expected to transfer and build expertise, among both banks and companies, related to energy efficiency. The banks will build expertise in assessing the risk and creditworthiness of clients for energy efficiency loans, while the enterprises are expected to become more familiar with banks requirements for providing energy efficiency loans. The Project is expected to contribute to lowering the transaction costs for financing energy efficiency and the Project's success would lead to sustainable lending by local banks. This decision was approved by the EBRD Board on 10 December 2008. (extracted from EBRD website on 17 July 2014)

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/PL12.PDF

http://www.polseff.org/en/

http://www.ebrd.com/pages/project/psd/2008/38538.shtml

Case study 7: The improvement of energy efficiency in industrial operators through the management of demand for energy and the drawing up of energy balance sheets, Romania

Target Area:

Energy management, industry.

Policy type:

Information and legislative measures, energy balance sheets.

Organisations:

Ministry of Finance.

ARCE.

Summary:

This policy aims to encourage energy consumers to possess their own system for the measuring and monitoring of energy consumption in accordance with Law No 199/2000. It introduces modern systems of measurement and inspection, including computer-assisted systems, for the monitoring and continued evaluation of energy efficiency.

Energy balance sheets allow for detailed studies of production processes and of the equipment responsible for energy consumption. These balance sheets include recommendations for measures to be applied in order to reduce energy consumption. Energy efficiency measures recommended by the energy balance sheet are included in energy efficiency programmes, which must include the following:

a) Short term programmes involving little or no cost and which do not involve major investment.

b) Long-term programmes of 3-6 years involving investments for which feasibility studies will be carried out.

Cost:

Unknown.

Years observed:

2007- ongoing.

Energy saved:

705186 tep/year.

Scale:

81 energy balances finalised in 3 years.

Implementation:

Energy balance sheets are drawn up as follows:

- Consumers using between 200 and 1,000 toe must obtain an energy balance sheet every two years, to be drawn up by persons authorised by ARCE.
- Consumers using greater than 1,000 toe of energy per year must obtain an energy balance sheet on a yearly basis, to be drawn up by persons authorised by ARCE.

In the 2008-2010 period, co-financing from the national budget of up to 50% of the costs of drawing up energy balance sheets was approved. This applies to industrial operators, SMEs using between 200 and 1,000 toe worth of energy, and to public buildings with a surface area greater than 1000 m2. This funding is dependent on the implementation of measures resulting from the energy balance sheet.

Information campaigns are carried out to encourage the application of energy efficiency legislation. ARCE designate personnel responsible for the management of energy in companies with energy consumption exceeding 1,000 toe per year. Inspections are carried out by ARCE personnel on industrial operators in order to ensure the application of energy efficiency legislation.

Relevance to Kazakhstan:

This policy develops new local skills, is cost effective, and provides industry and government with much needed quality information. The energy balance sheets ensure consistency and quality with the audits, and provides a good template for Kazakhstan. This programme covers both large and small energy users.

Links:

http://ec.europa.eu/energy/demand/legislation/doc/neeap/romania_en.pdf

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/RO3.PDF

Case study 8: Support for the Introduction of Energy Management in Industry, Norway

Target Area:

Energy management, industry.

Policy type:

Economic instruments, direct investment.

Organisations:

Enova. Ministry of Petroleum and Energy.

Summary:

This Enova programme aims at supporting industries and equipment producers that establish energy management with both analysis and the identification of measures.

There are two levels for this programme:

1. "Energy management simplified" requires the establishment of an energy management system that builds up on parts of the standard ISO 50 001. Companies should have a total energy use between 1 and 10 GWh. The maximum funding is of 200,000 NOK and is provided for feasibility studies.
2. "Energy management ambitious" requires the establishment of an energy management system according to ISO 50 001 (no requirement for certification). Companies with a total energy use of 10 GWh or more can apply. The maximum funding is of 1,000,000 NOK and is provided for feasibility studies.

Maximum funding:

1,000,000 NOK

Years observed:

2012- ongoing

Total energy saved:

Unknown

Scale:

Unknown

Implementation:

The following companies can apply to the programme, as long as their activity is localized in Norway:

- Industrial companies or businesses.
- Companies producing equipment which fall outside the target group for Enova's programme "Support to energy measures in equipment".
- Companies with a total energy consumption equal or higher than 1 GWh per year.

Projects under the program:

- Projects including the introduction of measuring equipment and tools necessary for the creation of lists of measures and a systematic follow-up of corporate energy use.
- Projects with businesses with energy equal to or greater than 1 GWh/year.
- Projects with contracts for an energy saving of at least 10% related to specific energy consumption.

Relevance to Kazakhstan:

This policy encourages energy management as a means to develop measures and to monitor energy use through financial support. The Energy Fund is financed by means of a levy on the electricity grid tariff, as well as through allocations from the state budget. It is used for funding programmes and policies such as this one, and a similar mechanism could be put in place in Kazakhstan to fund its own energy policies.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/NOR19.PDF

http://www.enova.no/finansiering/naring/programtekster/program-introduksjon-til-energiledelse-i-industrien/245/937/

http://www.iea.org/policiesandmeasures/pams/norway/name,24957,en.php

Case study 9: Energy Manager, Italy

Target Area:

Industry, public administrations, transport, services

Policy type:

Legislative, informative, mandatory energy manager

Organisations:

FIRE. ENEA. Ministry of Productive Works

Summary:

This measure establishes the obligation of local authorities and energy-intensive companies to designate a responsible Energy Manager in charge of:

- recording an energy balance split into final energy uses.
- determining actions and measures to promote the rational use of energy for the company/institution.

Parties involved are:

1. Companies in the industrial sector with energy consumption more than 10,000 toe per year.
2. Companies in the service sector and local/regional authorities with energy consumption over 1,000 toe per year.

Cost:

Self-financing, with expenses of €125,000/year.

Years observed:

1991- ongoing

Effectiveness:

65% of questioned energy managers implemented measures in the past 3 years.

Scale:

Remains at approximately 2500 appointed energy managers.

Implementation:

Companies appoint an expert who deals with the analysis of energy flows, promotes energy efficiency measures and support the top management and the policymakers to pursue a sustainable development. This Energy Manager can be an employee of the company, and does not require particular qualifications or experience, or participation in particular courses, although it is suggested. Every year the companies have to communicate the name of the designated engineer to the Ministry of the Industry by April the 30th. The FIRE has initiated a process of voluntary certification of energy managers, with a goal to create a list of certified and qualified individuals.

Relevance to Kazakhstan:

This action allows the development of competences of the newly appointed energy managers which take charge of the detailed analysis of the energy consumption in the different phases of the industrial processes. Skilling and reskilling of labour force is achieved and could create ways to definition of internal targets for energy savings.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/ITA2.PDF

http://em.fire-italia.org/

http://www.fire-italia.it/adempimenti/EnergyManagerProgramme.pdf

Case study 10: Training Courses of Energy Managers in Industry, Lithuania

Target Area:

Industry, SMEs

Policy type:

Informative, training courses, education, energy management

Organisations:

State Company Energy Agency

Summary:

The training courses were started with the aim of enhancing energy efficiency activities in the industrial sector in Lithuania. A training program and manual for energy managers in industry have been prepared. The main focus of training courses is linked to organization, planning and work procedures that are necessary for conducting energy management in industry.

Cost:

Unknown

Years observed:

2004 - ongoing

Total energy saved:

Unknown

Scale:

6 training courses in the three last years.

Implementation:

The participants attended the courses to increase their own qualification and awareness of energy efficiency activities in industry. During the courses the main issues of energy efficiency in industry are discussed as follows:

- Purpose and structure of energy management.
- Energy policy, energy objective and targets.
- Responsibilities and organisational plan.
- Energy control, maintenance of energy consuming equipment.
- Energy conscious purchase, energy conscious design, information and motivation, evaluation.
- Revision of energy mapping.
- Elaboration and updating energy action plans, energy objectives and targets.
- Energy analysis.
- Calculation of project economy.
- Advice on technical matters.

Relevance to Kazakhstan:

This vocational education and training initiative provides training for professionals wanting to upskill, retrain or gain new qualifications through a nationally consistent training programme. The introduction of specialised professional development programs brings new tools to managers on energy efficiency across the range of targeted industries in a uniform way, reducing the industry cost of developing materials and also creates a common language for training across the country.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/LT1.PDF

Case study 11: MotorChallenge Programme, European Union

Target Area:

Industry, SMEs, large enterprises

Policy type:

Information, education, training

Organisations:

European Commission

Summary:

The Motor Challenge Programme is a voluntary programme to aid companies in improving the energy efficiency of their electric motor driven systems. The program is aimed at all users and engine manufacturers and designers of systems which are operated by electric motor.

The core of the programme is an Action Plan by which a Partner commits to take particular measures to reduce energy consumption. The Partner company itself determines which production facilities and type of systems are covered by the commitment. Motor challenge Partners will receive financial aid, advice and technical assistance to execute their Action plans.

Cost:

Unknown

Years observed:

2003- ongoing

Total energy saved:

185,104 MWh by 2009 in EU 27

Scale:

93 partners by end 2009.

70 endorsers in 2013

Implementation:

The 5 steps to participate in the Motor Challenge program:

- Inventory and assessment of the company's motor-driven systems.
- Define an action plan, the scope and nature of the commitment of the company.
- Approval of the Action Plan by the European Commission.
- Execution of the action plan and annual reports to the European Commission.
- Renewal of partner status by the European Commission, after examining the annual report.

Companies that use motor driven systems can request "Partner" status. Organisations (in particular companies that supply motor driven systems and components) wishing to aid the commission and member states in carrying out the motor challenge programme may become "Endorsers".

Partners can receive:

- aid in defining and carrying out an Action Plan, to reduce energy related operating expenses, while maintaining or improving reliability and quality of service;
- public recognition for their contribution to achieving the objectives of the European Union's energy and environmental policies: minimizing environmental impact and particular reducing CO2 emissions; improving competitiveness of European industry; reducing dependence on imported energy sources

The Endorsers get public acknowledgment for their efforts to support the Programme. They may participate by assisting Partners in defining and carrying out their Action Plan.

Relevance to Kazakhstan:

This programs efforts are concentrated completely on electric motor systems, which ensures a high level of engagement with this one component. At the same time the program achieves high energy savings due to the number of electric motor systems that exist in industry.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/EU1.PDF

http://iet.jrc.ec.europa.eu/sites/default/files/documents/scientific_publications/2010/the_european_motor_challenge_programme_evaluation_2003-2009.pdf

http://okolje.arso.gov.si/ippc/uploads/File/5_MCP_en.pdf

http://re.jrc.ec.europa.eu/energyefficiency/motorchallenge/index.htm

Case study 12: Market incentives: the white certificates system, Italy

Target Area:

Cross-sectoral. Distributors, ESCOs

Policy type:

Financial

Organisations:

Energy Services Manager, GSE, ENEA, RSE

Summary:

White Certificates are securities that certify the achievement of energy savings in end-use of energy through actions and projects to increase energy efficiency, and provides that distributors of electricity and natural gas annually reach specific quantitative goals of primary energy savings, expressed in tone of equivalent oil saved (toe). The distribution companies, of electricity and gas can fulfil their obligation to realizing energy efficiency projects entitling white certificates or by buying them from other players in the market for Energy Efficiency Credits organised by GME (Electricity Market Operator).

Cost:

Unknown

Years observed:

2004-2016

Total energy saved:

Unknown

Scale:

Each electricity distributor must implement 5.23million white certificates in 2016.

Each natural gas distributor must implement 4.28million white certificates in 2016.

Implementation:

The "parties obligated" to fulfil the obligations of quantitative national annual increase in energy efficiency are distributors of electricity or natural gas that, at the date of December 31 of the two years preceding each year of obligation, have more than 50,000 end customers connected to their distribution network.

The obligated parties may satisfy the requirements, achieving energy efficiency projects, with the consequent emission of white certificates, or by purchasing white certificates from other parties.

The following "voluntary subjects" can access the white certificates mechanism and present energy efficiency projects:

- Energy Service Company (ESCO)
- Company with the obligation to appoint energy manager (SEM)
- Companies controlled by the distributors obligated
- Distributors of electricity or gas not subject to the obligation
- Companies operating in the industrial, residential, commercial, agricultural, transport and public services.

Three types of white certificates can be produced and traded: Type I certificates are for savings achieved in the electricity sector, Type II certificates for those achieved in the gas sector, and Type III for those in neither sector (from other fuels). The certificate has a five years value except from those produced for high cogeneration projects and interventions related to the building shell.

Relevance to Kazakhstan:

White certificate schemes mandate energy companies to promote energy efficiency with flexibility mechanisms adaptable to monopoly situations or to fully liberalised energy markets. Besides the reduction in energy consumption the main factor targets reduced energy bills and CO2 emissions saved. Experience in Europe show that they can deliver energy savings in a cost effective way, however price signals and the model of governance are key. Lessons learned from the European experience should be regarded carefully.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/general/ITA2.PDF

http://www.gse.it/it/CertificatiBianchi/Decreto%2028_dicembre_2012/Pagine/default.aspx

Case study 13: The ESCO Concept, Finland

Target Area:

Cross-sectoral

Policy type:

Financing

Organisations:

Motiva Oy

Summary:

In the ESCO Concept developed by Motiva, the results of energy audits, i.e. proposed energy saving measures with estimated economical evaluations are the first step to an ESCO contract. From the client point of view an ESCO is a good alternative when the client does not wish to or cannot use its own financing or personnel. The client pays the investment to ESCO by savings resulting from the decrease in energy consumption. An ESCO agreement is usually concluded for 3-8 years.

Cost:

Unknown

Years observed:

2000-Ongoing

Energy savings:

260 GWh of heat and fuel savings and 13 GWh of electricity savings by the end of 2005.

Scale:

7 ESCOs operate in Finland, and have implemented 44 projects.

Implementation:

The Motiva ESCO Concept is intended to follow an implemented energy audit. Based on the audit report the client normally implements the most cost-effective measures. Those with a longer pay-back time can be implemented by an ESCO which is responsible for the financing of the project as well as for the implementation of the project and for all required guarantees and collateral if a loan is needed.

The Motiva ESCO Concept is divided into three parts:

- Project plan: The ESCO develops, based on the energy audit report, a conceptual plan for the chosen measure, which aims to confirm the profitability as well as the technical applicability of the measure.
- Implementation: The ESCO and the client sign an agreement on the implementation of the measure, verified potential in the Project plan. ESCO takes then the overall responsibility on for designing, implementing and commissioning of the project – a turn key principle.
- Follow-up: The energy savings created by the measure are verified and monitored. The client pays the ESCO either the total amount of savings or a share of it until the total project cost has been paid of.

Motiva operates and updates an ESCO register. It includes information on the individual projects implemented by ESCOs. Information collected includes, for example, the target project, the way the project has been implemented, net energy savings and type of energy saved.

Relevance to Kazakhstan:

Underinvestment in energy efficiency in Kazakhstan offer significant potential with progressive attractive payback periods. However, public authorities often lack budgetary funds, do not have resources and knowledge for designing and planning efficiency investments. Therefore, ESCOs could provide a solution by financing on a commercial basis, using adequate expertise to design and implement investments.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/general/FIN7.PDF

Case study 14: The ESCO Concept, Korea

Target Area:

Cross-sectoral

Policy type:

Financial

Organisations:

MKE, KEMCO, KAESCO

Summary:

The ESCO market has been growing promptly in Korea over the past two decades, with a great increase in the number of registered ESCOs that have been undertaking energy efficiency projects. Despite great efforts from the Korean government to promote energy efficiency, with the support and continuous developments in efficiency made by companies, there is still a struggle of the increased domestic electricity consumption to the point where supply is not being able to match the demand of electricity, resulting in power shortages.

The Korean government have plans to promote new systems to achieve further energy savings with the cooperation of the industrial sectors.

Cost:

Unknown

Years observed:

2007-2011

Total energy saved:

3 358 000 toe between 2007-2011.

Scale:

235 ESCOs were registered in Korea for this time period where 78 projects were energy efficiency projects.

Implementation:

The main focus of the ESCO market in Korea is through the Korean Energy Management Corporation (KEMCO) concept to follow the government initiatives and programmes by implementing and facilitating different alternatives. To enhance the performance of the ESCO market the KEMCO have allocated a substantial amount of preferential loans, voluntary agreement (VA) and energy audit to energy saving programmes that use the guaranteed saving model.

The KEMCO's main activities are:

To conduct two different types of audit free and in-depth ones, where the free audits are usually made for medium-sized enterprises (SME) and the in-depth audit are conducted by request of the user. The VA and the preferential loans are a cooperative programme between the government and industries to be able to develop and enhance their work in for example in energy conservation and GHG reduction.

The Korean government offers a rather mature service market, there are however no local funding that finance the ESCO markets. For this reason the KEMCO have started education programmes to raise awareness of the ESCO financing risks and opportunities.

Links:

IEA Energy Efficiency "Market Report-Market Trends and Medium-Term Prospects", 2013.

http://www.wec-policies.enerdata.eu/Documents/cases-studies/KR_smart_meters.pdf

Bertoldi. P, Hansen, J.S, Langlois, P. 2009.Around the World: Lessons Learned in 49 Countries.

Case study 15: Example Charges for reactive energy in EU countries

Area:

Power sector

Type of policy measure:

Tariff policy

Organizations:

Electric energy consumers depending on the load

Brief description:

Charges for reactive energy are collected in 18 EU countries and currently two charging schemes for reactive energy exist:

- Reactive Tariff - for each MVar of energy produced and/or consumed a regular tariff rate is applied;
- Penalty: reactive energy produced and/or consumed is charged only if some pre-conditions are met.

Applied policy of charges for reactive energy is aimed at encouraging electric energy consumers to install equipment for reactive energy compensation. Requirements and procedures of setting tariffs or penalties differ by EU countries. For example, since 1997 Poland has applied a mechanism of charges for energy taken-off and reactive energy fed into the transmission network (hereinafter, RE) in excess of industry norms. Polish energy suppliers establish the phase factor (tg ϕ) in the range from 0 to 0.4, and a consumer is exempt from RE charges if these limits are met. However, any deviation from this range, especially towards RE feeding into the transmission network implies additional charges for electric energy.

Since 2011, in Spain a charge for each MVar*h has been applied to the reactive energy consumption exceeding the 33% of active energy consumption. Applicable to consumers connected above 1 kV.

Cost:

N/a

Project period:

1997- present

Saved energy:

N/a

Scope:

All industrial enterprises of Poland

Implementation:

Poland. The penalty is calculated for each MVar*h of passive energy taken-off the HV and EHV network when phase factor tgφ is above 0.4, and for each MVar*h of passive energy fed into the transmission network regardless of the value of phase factor.

Spain. A charge for each MVar*h is applied according to approved tariffs:

cos φ	€/MVar*h
0.80<cos φ<0.95	0.041554
cos φ<0.80	0.062332

Impact of the charge for Kazakhstan:

Introduction of a charge for consuming and feeding reactive energy into the grid will allow encouraging industrial enterprises and grid companies to install equipment for reactive energy compensation. This will eventually result in a reduction of energy losses in grids, reduction in energy consumption, and will improve throughput capacity of electric energy infrastructure.

Reference:

ENTSO-E Overview of transmission tariffs in Europe: Synthesis 2014. June 2014.

https://www.entsoe.eu

BUILDING SECTOR

Case study 16: National standard criteria for passive houses and low energy houses, Norway

Target Area:

Residential buildings

Policy type:

National standard

Organisations:

Unknown

Summary:

The standard applies to new residential buildings and rehabilitation of existing residential buildings to low energy or passive house standard.

The standard can be used to

- Consider whether the building meets the requirements for passive houses and low energy houses.
- Make requirements on products and building elements used in passive houses and low energy houses.
- Make requirements on the technical work on passive houses and low energy houses.

Cost:

Unknown

Years observed:

2010-Ongoing.

Total energy saved:

Unknown

Scale:

Unknown

Implementation:

The standard specifies three levels of energy efficient residential buildings:

- Passive house
- Low energy house class 1
- Low energy house class 2

The standard includes definitions, requirements regarding heat loss, heating needs and energy supply and minimum requirements for building components and leakage figures. It gives further requirements to test procedures, measurement methods and reporting of energy performance on completion for residential buildings that can be defined as passive house and low-energy houses in the Norwegian climate.

The standard covers buildings for residential purposes such as detached houses, duplex/quadruplex houses, terrace houses and residential blocks. The requirements apply to buildings, but the criteria can also be used on parts of buildings, such as a single apartment, part of a dwelling or a single terrace house.

The standard may also form the basis for regulatory requirements and energy and environmental labelling schemes.

The standard is based on energy computations from NS 3031.

Relevance to Kazakhstan:

The climate or geographical region is not a barrier to passive house development. Passive houses stay at a comfortable temperature year round with minimal energy inputs. Such buildings are high quality insulated and are heated using the sun, internal heat sources and heat recovery systems so that conventional heating systems become unnecessary - even in winter. During warmer season, these buildings make use of passive cooling techniques.

Passive house standard is a quality standard, therefore may not impose specific methods of construction and can be used in retrofitting applications as well.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/NOR31.PDF

http://www.standard.no/en/nettbutikk/produktkatalogen/Produktpresentasjon/?ProductID=507701

Case study 17: Minimal energy efficiency requirement for Multi-dwelling buildings, Latvia

Target Area:

Residential buildings, multi-dwelling buildings, heating.

Policy type:

Legislation, MEPS.

Organisations:

The Parliament of the Republic of Latvia.

Summary:

New governmental regulations were adopted in September 2011. These regulations include the new chapter "Requirements to provide energy efficiency of multi-dwelling buildings". The main provisions are the following:

- energy efficiency measures are obliged in the cases when the average annual heat consumption, calculated during previous three calendar years, exceeds 230 kWh/m2 annually.
- manager of multi-dwelling building shall install heat consumption metering in case the heat energy supplier of the particular building is not licensed energy supply utility.
- when planning energy efficiency measures, the manager of building shall implement the measures which provide the highest heat energy savings rated to investments.
- in case heat losses are identified, the manager of building shall (at least) provide
  - outer doors with shutting device,
  - insulation of the heat supply and hot water pipes which are placed in non-heated premises of the building,
  - packaging insulation of windows and outer doors.
- the manager of the building shall regulate heat supply regime depending on the season (winter/summer) and day time (day/night).

Cost:

Unknown

Years observed:

2012-Ongoing

Total energy saved:

Unknown

Scale:

Unknown

Implementation:

In January 2014 new amendments to the noted governmental regulations have come into force which strengthened the minimum requirements. Namely, energy efficiency measures are obliged in case the average annual heat consumption, calculated during previous three calendar years, exceeds:

(i) 200 kWh/m2 annually for heat and hot water, or

(ii) 150 kWh/m2 annually for heat only.

The new amendments had shortened the normative lifetime for building elements such as windows frames, doors, etc. The manager of the building shall implement energy efficiency measures to reach the noted threshold values. The costs of the energy efficiency measures are included in the total management costs, however it is expected that it will not create burden due to the costs related to energy consumption. Simultaneously, the flats owners' association may decide to implement the project of full renovation of the building, however such full renovation cannot be obliged.

Relevance to Kazakhstan:

Such approaches help to plan and deploy basic sustainable energy investments in buildings as well as represents an opportunity for multi-family blocks to reduce their long-term energy costs, support investments in innovative technologies, create jobs, and help shape healthier communities and neighborhoods. This regulatory approach may provide also a basis for benchmarking at country level for existing and new buildings.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/LV35.PDF

http://www.vvc.gov.lv/export/sites/default/docs/LRTA/Likumi/Law_On_Administration_of_Res idential_Houses.doc

Case study 18: Energy Audits, Czech Republic

Target Area:

Buildings, facilities.

Policy type:

Legislative, informative.

Organisations:

Czech Republic Parliament.

Summary:

The Energy Management Act also required energy facilities or buildings to undergo an energy audit if a state subsidy within the National Programme is obtained.

Cost:

Unknown.

Years observed:

2001-2005.

Total energy saved:

Unknown.

Scale:

Unknown.

Implementation:

Energy audits were obligatory under the Act if the facilities were owned by the state, regions or municipalities, or owned by natural or legal persons with total consumption higher than that stated in the relevant legal regulations. In the public sector, audits were obligatory if energy consumption was above 1,500 GJ per year. For private facilities, audits were mandatory if energy consumption is above 35,000 GJ per year.

Relevance to Kazakhstan:

Public buildings owners often lack the technical ability to monitor and manage energy consumption and adopt energy efficiency measures. It is important to show technically that there are proven technologies that could bring substantial energy consumption reductions. Such programmes help to create the technical basis, develop the legal framework, define the institutional challenge and support the organisation of the financial principles for promoting energy efficiency in public buildings.

Links:

English version of Act No. 406/2000 Coll. (393/2007 Coll.) :

http://download.mpo.cz/get/34362/38515/440014/priloha001.zip

Case study 19: Union of Homeowners' Associations (CAC), Bulgaria

Target Area:

Apartment buildings.

Policy type:

Information, training.

Organisations:

The Union of Homeowners Associations in Bulgaria (CAC).

Summary:

The Union of Homeowners Associations in Bulgaria (CAC) is an independent non-profit organisation that has been created to unite homeowners and homeowners associations in condominium apartment buildings.

Activity Plan of the Union of Homeowners' Associations CAC in 2009:

1. Information & presentation campaign to support the dissemination and implementation of the newly adopted Condominium Law and related regulatory provisions.
2. Representation of HOAs in the overall housing reform in Bulgaria.
3. Training and consultancy for homeowners' associations in the framework of the new housing legislation and related regulations.
4. Institutional development and elaboration of housing platform.

Cost:

Unknown.

Years observed:

2007-Ongoing.

Total energy saved:

Unknown.

Scale:

Unknown.

Implementation:

CAC does not receive any public financial support. Also, at the moment, no significant contribution can be expected from membership fees. In its early years, therefore, the implementation of CAC program will depend on support from donors and partnerships.

- Program for improvement of housing maintenance and management of existing condominium stock;
  - Updating and edition of CAC handbook according to the newly adopted legal framework for housing.
  - Provision of practical advisory and models for establishment of homeowners' associations according to the provisions of the newly adopted Condominium Law.
  - Consultancy services & training programs on the dissemination of the new Condominium Law and related regulatory provisions.
- Program for community development and urban regeneration;
  - 'My clean neighbourhood' – municipal event in cooperation with Oborishte District for cleaning the neighbourhood by the citizens. Targeted CAC information campaign for creating of initiative groups for homeowners.

– 'Together with our friends' – annual national event of CAC with the participation of HAL Habitat from Romania.

Relevance to Kazakhstan:

Promotion of housing associations and professional housing management, combined with recommendations for energy efficiency and financing mechanisms, facilitates the process of improving energy efficiency of multiapartment residential buildings, which represent a large

share of the existing building stock in Kazakhstan. Introducing the concept of housing associations has will be an important step in improving facility management and energy efficiency of housing stock as well as will ease the access to available financial funds (e.g. bank loans)

Links:

http://www.cac-bg.org/scrivo/asset.php?id=360766

Case study 20: Mandatory procurement procedures (for energy efficient technologies and renewable energy technologies – green public procurement) in public buildings, Greece

Target Area:

Goods and services, public buildings

Policy type:

Co-operative measures, information

Organisations:

Ministry of Environment, Energy and Climate Change. The Green Office. Interministerial Committee for Green Public Procurement.

Summary:

Public expenditure on goods, services and works, at pan-European level, account for about 17% of the European GDP every year. They involve, among others, the procurement of electronic and electrical equipment, devices, computer hardware, construction, textile, food, energy, paper, furniture, transport and cleaning. Green Public Procurement (GPP) is a tool that provides the necessary incentives to significantly reduce negative environmental impacts from these goods, services and works.

Cost:

Unknown

Years observed:

2008-Ongoing

Total energy saved:

Unknown

Scale:

Unknown

Implementation:

Article 7 of Ministerial Decision D6/B/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and broader public sector" stipulates that energy labelling and certified energy efficiency indication of appliances supplied by the State is mandatory.

Article 8(1) of Law 3855/2010 "Measures to improve energy efficiency in end use, energy services and other provisions" lays down the minimum energy efficiency requirements for procurement by bodies of the public and the wider public sector.

As part of implementing the above provisions, the Green Office was created and an Interministerial Committee for Green Public Procurement was established, which will:

- support the timely information of suppliers of the public sector and the market in general,
- create a framework for cooperation,
- set up working groups,
- coordinate the necessary actions for the drafting of environmental criteria,
- coordinate the selection of product and service categories that will be applied to environmental criteria.
- plan the national policy and to draft the National Action Plan for promoting Green Procurement.

A survey of products and services with environmental features was carried out in the Greek market with a view to assessing the readiness of the Greek market to accept the introduction of 'green' stan-

dards upon public procurement. Its results helped in creating an Index and in preparing the National Action Plan for the Promotion of Green Public Procurement.

Relevance to Kazakhstan:

Public authorities are generally major consumers and their purchasing power could be used to choose more efficient goods and services. Introducing energy efficiency criteria in a voluntary instrument may provide financial savings, be a major driver for innovation and reduce the environmental impact of the public purchases. Setting minimum energy efficiency standards could be applied to e.g. office equipment, road transport vehicles, buildings, etc.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/tertiary/GRE15.PDF

2nd National Energy Efficiency Action Plan 2008-2016

Case study 21: Programme for the renovation/upgrading of multi-apartment buildings, Lithuania

Target Area:

Apartment buildings, renovation.

Policy type:

Financial.

Organisations:

Ministry of Finance. Ministry of Social Security and Labour. Ministry of Energy. Housing and Urban Development Agency. Ministry of the Environment.

Summary:

Under the programme, the State provides support to both energy efficiency improvement measures and other building renovation/upgrading measures:

- major repairs or reconstruction of the heating systems and hot and cold water supply systems;
- replacement of windows and exterior doors;
- roof thermal insulation, including installation of new sloping roofs (excluding construction of attic premises);
- glassing of balconies (loggia) under a unified project;
- thermal insulation of exterior walls;
- thermal insulation of cellar ceilings;
- thermal insulation of walls;
- installation of the equipment for alternative energy sources (sun, wind etc);
- major repairs and replacement of elevators;
- replacement or reorganisation of the communal services of buildings (wastewater systems, electrical and fire prevention installations, drinking water pipes and installations)

Cost:

Unknown.

Years observed:

2005-2020.

Projected energy saving:

250 GWh up to 2016.

Scale:

From 2005 to 2011, 357 multi-apartment buildings were renovated.

Implementation:

This programme is implemented using the funds of the owners of the apartments in multi-apartment buildings, State and municipal budgets, EU Structural Funds, the Ignalina Programme for 2007–2013 and other resources. Specific budgets are approved every year.

Relevance to Kazakhstan:

Such approaches help to plan and deploy basic sustainable energy investments in buildings as well as represents an opportunity for multi-family blocks to reduce their long-term energy costs, support investments in innovative technologies, create jobs, and help shape healthier communities and neighbourhoods. This regulatory approach may provide also a basis for benchmarking at country level for existing and new buildings.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/LT8.PDF

Second Energy Efficiency Action Plan, 2011

Case study 22: Support for energy efficient renovation of apartment buildings, 2010, Estonia

Target Area:

Apartment buildings, renovation of main structures.

Policy type:

Financial.

Organisations:

KredEx.

Summary:

Since 2003 the State has supported repair work related to the reconstruction and restoration of the main structures (load-bearing and enveloping structures) of pre-1990 apartment buildings.

In September 2010 state owned foundation KredEx started to issue renovation grants in the amount of 15-35% of the total cost of renovation project.

Cost:

Since 2010 €1.50 million of support has been paid out.

Years observed:

2010-Ongoing.

Estimated energy saving:

33%

Scale:

Since October 2010, KredEx has allocated renovation support to 80 housing associations, with 81 multi-apartment houses.

Implementation:

The grant is financed from the sales of unused assigned amount units to Luxembourg in frames of the green investment system (GIS). The grant limits are 15%, 25% and 35% of the total project cost depending on the level of integration in reconstruction of apartment buildings. To obtain a grant of 15%, an apartment building shall achieve energy saving of at least 20% in an apartment building with closed net area of 2000 m2, at least 30% in an apartment building with closed net area of over 2000 m2, fulfil recommendations provided in energy audit and requirements of programme

- By performing reconstruction work, the accordance of indoor climate to requirements shall be ensured, and the apartment building shall achieve at least energy label class E (i.e. annual specific energy consumption in range of 201-250 kWh/m2).
- To obtain a grant of 25%, in addition to the fulfilment of the above terms, an apartment building shall reconstruct the heating system so that it is locally adjustable, and mount devices that make it possible to divide and measure heating costs individually by apartments, partly or fully insulate and reconstruct the façade, replace all windows with energy-saving ones, insulate or/and reconstruct the roof, achieving energy saving of at least 40%, resulting in being eligible for receiving energy label class D (151-200 kWh/m2a).
- To obtain a grant of 35%, in addition to the fulfilment of all above terms, the applicant for the grant shall install a ventilation system with heat return, achieving at least 50% of energy saving from consumption of heating energy, and energy label class C (121-150 kWh/m2a) for the building.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/EST19.PDF

Second National Energy Efficiency Action Plan, 2007-2013

National Development Plan for Housing Sector, 2008–2013

Grants for preparing construction project and for supervision of energy efficient renovation, Estonia

Target Area:

Apartment buildings, energy efficient renovation, construction plans.

Policy type:

Financial, legislative.

Organisations:

KredEx.

Summary:

The grant is aimed at supporting preparation of construction plans leading to complete solutions of energy efficient renovation of apartment buildings as well as at rendering services for owner's supervision of the construction process to guarantee that the renovation is completed according to the plan.

Cost:

Unknown.

Years observed:

2008-Ongoing.

Total energy saved:

Unknown.

Scale:

KredEx has received 124 applications for this type of support, 23 renovation projects are in progress.

Implementation:

A successful complete solution means that:

- the internal climate of the apartments is of good quality (in compliance with the limits of category II provided by the standard EVS-EN 15251:2007) and a major part of the heat escaping due to air ventilation is returned into the apartment building;
- the heating system is optimal and can be regulated;
- the exterior enclosures have sufficient thermal insulation so that the calculated total energy demand of the apartment building after carrying out the complete solution would not exceed an annual 150 kWh per square meter of the area to be heated.

The grant covers 90% of the costs of preparing a project and the costs related to owner supervision services for a specific applicant (modelling and designing a complete solution, plus the services of owner supervision), while cost-sharing is only 10%.

KredEx gives the applicant a preliminary estimate on the possibilities and cost of an apartment building's complete solution. Before the design is prepared, a decision by the general assembly of the apartment association has to be made, stating that the complete solution will be carried out according to the project ordered by KredEx, and that the construction works according to the construction project will begin at the latest 9 months after the construction project has been completed.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/EST18.PDF

Second National Energy Efficiency Action Plan, 2007-2013

National Development Plan for Housing Sector, 2008–2013

Case study 23: Energy Efficiency Programs targeted to low-income households within the UK Fuel Poverty Strategy, United Kingdom The Warm Front Scheme

Target Area:

Low-income households.

Policy type:

Financial.

Organisations:

The Department of Energy and Climate Change (DECC). Eaga.

Summary:

In 2001 the UK Government launched its UK Fuel Poverty Strategy with the overall aim of the eradication of fuel poverty in the UK by 2016. The Warm Front scheme is a programme providing grants targeted to the private housing sector to help low income households improving their dwelling's energy efficiency.

Estimated budget:

Around £1.6 billion for the period 2000-2008.

Years observed:

2000-Ongoing.

Potential energy saving:

Almost 13 GJ per household annually.

Scale:

Over 2 million households assisted since its inception in June 2000.

Implementation:

The Scheme provides a grant of up to £2,700, or £4,000 if an oil central heating system is required, to pay the installation cost of heating and insulation measures in vulnerable private sector households. Vulnerable households are those with low incomes containing older people, families with children, or those who are disabled or have a long-term illness.

How it works:

1. Qualification. Identifying those most in need through the regionally based Partnership Development Officers (PDOs) is a key part of the work. Benefit Entitlement Check (BEC) team verify the effective qualification of the identified potential beneficiaries.
2. Assessment. One of Eaga's Technical Surveyors/Assessors visit home and suggest improvements which should be made under the Scheme.
3. Installation. Eaga team of trained installers will make the required improvements to the home.
4. Quality Check. Eaga regularly check their installers' work so beneficiary can be confident in the quality of the service

When the grant does not cover the costs of work and alternative sources of funding, such as assistance from local authorities, cannot be found, applicants are required to pay the difference.

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/GB_low_income.pdf

http://www.wec-policies.enerdata.eu/Documents/cases-studies/GB_Financing.pdf

http://www.warmfront.co.uk

Energy Efficiency Programs targeted to low-income households within the UK Fuel Poverty Strategy – additional supports

Target Area:

Low-income households.

Policy type:

Financial.

Organisations:

The Department of Energy and Climate Change (DECC).

Summary:

In 2001 the UK Government launched its UK Fuel Poverty Strategy with the overall aim of the eradication of fuel poverty in the UK by 2016. This strategy also includes The Warm Front scheme,

The Carbon Emission Reduction Target (CERT), and The Decent Homes and other Standards, for which individual summaries are also included in this report.

Cost:

The Government has spent more than £20 billion on measures to reduce fuel poverty from 2000-2008.

Years observed:

2001-Ongoing.

Total energy saved:

Unknown.

Scale:

These measures were responsible for taking around 200,000 households out of fuel poverty in the UK as a whole in 2007.

Implementation:

The issue of low income and vulnerable situations is first tackled as a general poverty issue, through diverse social measures like Pension Credit for the older people, or the Disability and Carers Service. Then three additional supports are provided to specifically tackle energy poverty:

- the Winter Fuel Payments: tax free lump sum payments, with all households with people aged 60-79 receiving £250, and those with pensioners aged 80 and over receiving £400. £2.7 billion of payments were made in 2008/09, and this represents over 12.3 million beneficiaries;
- the Cold weather payments: these are payable by the Government to poorer pensioner and other eligible households in weeks of extremely cold weather. For the 5 years up to 2007/08 the number of annual payments made averaged around £500,000 and the payment was £8.50;
- Benefit entitlement checks: the Department for Work and Pensions has calculated, for example, that at least a third of people eligible for pension credit did not claim it in 2006-07. The Warm Front Scheme has tried to account for this effect through offering a benefit entitlement check to all applicants, to determine whether they are eligible for additional benefits they are not currently claiming, which may make them eligible for the Scheme.

This is complemented by area based programmes (Community Energy Saving Programme in Great Britain, Community Energy Efficiency Fund in England, Low Carbon Buildings Programme in England and Wales, Warm Zones in England). Moreover, these activities are reinforced by information campaigns (e.g., "Keep Warm Keep Well") and stakeholders actions (e.g., "Energy Efficiency Partnership for Homes").

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/GB_low_income.pdf

The Decent Homes Standard

Target Area:

Low-income households.

Policy type:

Financial.

Organisations:

The Department of Energy and Climate Change (DECC).

Summary:

In 2001 the UK Government launched its UK Fuel Poverty Strategy with the overall aim of the eradication of fuel poverty in the UK by 2016. The Decent Homes Standard (England, from 2001 on), the Scottish Housing Quality Standard (from 2004 on) and the Welsh Housing Quality Standard (from 2002 on) sets requirements on minimum energy performance (among others) for social housing.

Expenditure:

£2.2 billion over 2008-2011.

£4 billion over 2000-2008.

Years observed:

2000-Ongoing.

Total energy saved:

Scale:

Since 2001 there has been a 36 reduction in the number of social sector homes failing on the thermal comfort criterion.

Implementation:

The Standard has a thermal comfort element that requires the presence of efficient heating and effective insulation in homes. Similar standards also apply in Wales (WHQS, Welsh Housing Quality Standard, from 2002) and Scotland (SHQS, Scottish Housing Quality Standard, from 2004), while the Decent Homes Standard is also used in Northern Ireland. These standards are often based on existing rating systems for housing performance like the HHSRS (Housing Health and Safety Rating System) or the SAP (Standard Assessment Procedure, related to energy performance).

In the 2009 Budget the Government allocated £84 million to help social landlords in England to insulate hard to treat cavity walls that would not otherwise be filled under the Decent Homes Programme. The Social Housing Energy Saving Programme will fund the insulation of up to 130,000 wall cavities in social rented homes;

In the local authority sector landlords report that between 2000-2008 over 1 million council houses have had new doubled glazed windows, at a cost of over £2.5 billion; over 1 million have had new central heating at a cost of over £2.7 billion and over 820,000 have had improvements to their insulation at cost of almost £375 million.

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/GB_low_income.pdf

The Carbon Emissions Reduction Target

Target Area:

Low-income households.

Policy type:

Financial.

Organisations:

The Department of Energy and Climate Change (DECC). Eaga.

Summary:

In 2001 the UK Government launched its UK Fuel Poverty Strategy with the overall aim of the eradication of fuel poverty in the UK by 2016. The Carbon Emission Reduction Target (CERT) (Great Britain, from 2002 on) sets obligations on energy suppliers to achieve energy savings and reductions of carbon emissions in the domestic sector.

Total support:

£3.2 billion from 2008-2011.

Years observed:

2002-Ongoing.

Total energy saved:

82 TWh were saved among the Priority Group from 2005-2008.

Scale:

Around 6 million households have benefited from subsidised or free insulation since 2002.

Implementation:

In April 2008, the CERT replaced the Energy Efficiency Commitment which was started in 2002. This scheme has set obligations on energy suppliers in Great Britain, based on three-year cycles. While its primary focus is on reducing carbon emissions in the domestic sector, it also has a social dimension, as 40% of the corresponding energy reduction target has to be met among a priority group, which includes low income and elderly (70 and over) households.

Most of the energy suppliers developed partnerships or other forms of collaboration with local authorities and social housing associations in order to be more efficient in their Priority Group actions.

Eaga, the Warm Front contractor, has delivered cost savings to the Scheme, and approximately £45 million of income through the Carbon Emissions Reductions Target (CERT), whereby utility companies pay Eaga to install insulation measures on their behalf.

Relevance to Kazakhstan:

Introducing various financial instruments and incentives are prerequisite for overcoming the financial barrier to the extent that they directly fill an immediate financial gap and allow at least a temporary shift in the market. By specifically targeting a given gap in the market, grants have the advantage of sending a clear message to actors in the market. Such programmes will prove particularly efficient in dealing with short term financing needs. However, unless coupled with adequate training and awareness programmes, they will not usually have a lasting impact on the market, nor will they be able to adapt to changing needs of the market.

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/GB_low_income.pdf

Case study 24: Warm Up New Zealand: Heat Smart, New Zealand

Target Area:

Residential buildings.

Policy type:

Financial.

Organisations:

The Energy Efficiency and Conservation Authority (EECA).

Summary:

Warm Up New Zealand: Heat Smart is a soft loan scheme with grants, promoting insulation and clean heating for homeowners and landlords. The scheme aims to overcome the barrier of the up-front cost of insulation and heating measures. It aims to make repayment simple, gradual, appropriate and non-intimidating by offering repayment options through council rates and banks. It also aims to reach "hard to reach" and vulnerable groups, including in the rental sector.

Cost:

The state funding is NZD 350 million from 2009-2013.

Years observed:

2009-2013.

Expected energy saving:

4% of average annual total metered energy.

Scale:

It is estimated that 230,000 houses will have had insulation installed by 2013.

Implementation:

The funding can be used to install: ceiling and under-floor insulation, installed by an EECA approved Service Provider; a hot water cylinder wrap, pipe lagging, draught-stopping, and a ground moisture barrier, where necessary.

Homeowners with a house built before 2000 can get 33% (up to NZD 1,300) off the cost of installing ceiling and under-floor insulation and NZD 500 for efficient heating systems. Low income households get a grant of 60% for insulation and NZD 1,200 towards efficient heating systems. Landlords with low income tenants also qualify for the higher insulation grant. The retrofits are audited by the Service Providers and EECA initially audited 10% of these (now 5%) to ensure quality and compliance. All products used in the retrofits must be on the EECA approved list.

Warm Up New Zealand offers two routes for financing: loan from the local council to be paid back through an additional charge on the council tax or a commercial loan from a high street bank. The banks enable their customers to add to their mortgages to cover the cost of the retrofit with no charges. Councils provide access to funding which is fiscally neutral to them.

Employment creation was estimated to be between 130-800 jobs per annum. 84% of customers surveyed felt they had a warmer home after the insulation was installed and 42% had improved health. The principle unintended consequence of the programme was the high level of health benefits. While EECA expected a significant benefit for health, the actual level (99% of benefits) was unexpected.

Marketing of the scheme has been a significant strength; as well as television and print media and the EECA Website, materials have been made available to Citizens Advice Bureaux, doctors' surgeries, Service Providers and installers and retail outlets.

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/NZ_Financing_energy_efficiency_buildings.pdf

Case study 25: Information system for monitoring energy efficiency and achieved energy savings, Greece

Target Area:

Cross-sectoral.

Policy type:

Information, monitoring.

Organisations:

Ministry of Environment, Energy and Climate Change, (CRES).

Summary:

The objective of this measure is the development of an information system, which will be used for the operation of all necessary services for digital energy modelling and statistical databases, to support the national policy for improving energy efficiency in final use.

By implementing the information system all the necessary tools for the quantitative monitoring of national targets, according to be designed and planned the Energy Efficiency Action Plans will be provided, while using the evaluated retrospectively the degree of implementation of measures and the achievement of national energy savings targets contained therein.

The information system will be outgoing and will represent a key supporting tool for operators of the energy market, as companies providing energy services and energy efficient equipment, end users, energy auditors, energy decision makers etc.

Budget:

€2.78 million.

Years observed:

2009-Ongoing.

Total energy saving:

Unknown.

Scale:

Unknown.

Implementation:

Specifically, the Information System that has been developed takes into account the following objectives:

- Analysis of energy consumption in all sectors of final use, through the collection and statistical analysis of energy data, by conducting market surveys, where appropriate.
- The recording, mapping and updating the necessary statistical data of energy consumption and their energy indicators.
- The development of all relevant Records and databases, that are predicted for the support of national goal for energy savings supervision (Record building auditing, record of energy auditors, record of ESCOs, Record of Energy Services Performance Contracts, concentrated statistical data from key actors of energy consumption market).
- The energy programming for Energy Savings and CHP
- The supervision, by using digital energy models, of NEEAP programing and implementation
- Support the development of Energy Service Market as well as the introduction of energy efficient equipment in the market.
- The information of energy distributors, actors in the field of energy efficiency improvement and final consumers, concerning the ways and actions for energy saving, as well as the support for best energy efficient decisions, through legislations and best practices.
- Market surveys, for energy efficiency evaluation in all sector of final consumption, as well as for the development of suitable indicators for achieving the national energy goal for 2016. In parallel, the development of structures (databases, records) and a concentrated information system for collection of primary data, is predicted.

Relevance to Kazakhstan:

Engaging in detailed energy statistical data collection and analysis contribute to the good development of energy efficiency policies and strategies. The lack of proper knowledge of the current reality of energy consumption prevents the development of energy efficiency opportunities, technologies, across all sectors of end uses and technologies.

Referencing to international standards, timely and reliable data collection can provide a much clearer view on the energy strategies to adopt.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/general/GRE13.PDF

2nd National Energy Efficiency Action Plan 2008-2016

Case study 26: Grants to renewable heat production and distribution – district heating and local heating plants, Norway

Target Area:

Heating plants, renewable energy.

Policy type:

Grants.

Organisations:

The Norwegian Water Resources and Energy Directorate (NVE). Enova SF.

Summary:

This scheme replaces the former scheme "Grants to heating plants" together with two other new schemes for district heating. The objective of the scheme for grants to local heating plants is to increase the use of renewable energy with the available technology, in a most cost-effective way. The supported projects have to result in a lasting heat utilisation based on renewable energy.

The intention is to support cost-effective projects that would not be carried through without the grant.

Cost of grants:

2489 million NOK during 2002-2010.

Years observed:

2008-Ongoing.

Contracted savings:

4579 GWh from 2002-2010.

Scale:

District heating has been established in 60 of Norway's 100 cities.

Implementation:

As from 2008 the scheme is divided in three different schemes:

- Scheme for support to local energy heating plants based on renewable energy
- Scheme for support to new district heating plants
- Scheme for support to district heat distribution

Enova launched more targeted support programmes in 2008, focusing on lacking infrastructure for, and inside, buildings as vital barriers. There is a significant potential for conversion to small heating plants outside typical district heating areas.

Installation of flexible heating systems in buildings was identified as an important part of the solution to the challenges associated with temperature-dependent consumption.

Increasing the percentage of renewables receives greater attention as district heating is developed. A large-scale solar collector power plant is an example of new technology that has been demonstrated in connection with district heating.

Relevance to Kazakhstan:

District heating is a good collective heating solution in densely populated areas, areas with a high heating need and with access to reasonable energy sources. In Kazakhstan, the focus should be on improvement and maintenance of district heating technology. A policy such as this one should be teamed with insulation programs, heating control systems, and metering.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/NOR16.PDF

http://www.enova.no/upload_images/3188E398DBD34B2B9C9E692C74A2D5FC.pdf

Grants to heating plants

Target Area:

Heating plants, renewable energy, district heating.

Policy type:

Grants.

Organisations:

The Norwegian Water Resources and Energy Directorate (NVE). Enova SF.

Summary:

The objective of the scheme for grants to heating plants was to increase the use of renewable energy with the available technology, in a most cost-effective way. The supported projects had to result in a lasting heat utilisation based on renewable energy, as e.g. bio energy, geothermal energy, sea/river water, solar energy, waste heat or production of processed bio energy. The scheme also included heat distribution based on renewable energy.

The intention was to support cost-effective projects that would not be carried through without the grant. The grant did normally not exceed 30% of the costs of the project.

Cost of grants:

425 million NOK from 1997-2001.

Years observed:

1997-2007.

Energy return:

2.0 TWh of district heating delivered in 2002.

Scale:

District heating has been established in 60 of Norway's 100 cities.

Implementation:

36% of the projects were based on utilisation of waste. 26% were based on bio energy and 23% on utilization of waste heat. The remaining 8% were projects with heat pumps and miscellaneous other projects.

Relevance to Kazakhstan:

This policy summary provides insight into the background of the current "Grants to renewable heat production and distribution" policy in Norway.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/NOR12.PDF

http://www.enova.no/upload_images/3188E398DBD34B2B9C9E692C74A2D5FC.pdf

LIGHTING AND ENERGY USING PRODUCTS

Case study 27: Product Standards and Labels, Australia

Target Area:

Appliances

Policy type:

MEPS, labelling, voluntary standards

Organisations:

Department of Environment, Water, Heritage and the Arts. Equipment Energy Efficiency Programme (E3).

Summary:

Australia has made extensive use of product standards and labels, being one of the earliest to adopt these measures (1986), and has helped develop product policy internationally. These programmes have delivered significant energy savings from improved efficiency.

Cost:

Unknown

Years observed:

1986-Ongoing

Annual energy saving:

750 GWh, as in 2005

Scale:

Unknown

Implementation:

It is currently mandatory for all of the following electrical products offered for sale in Australia to carry an approved energy rating label:

- Refrigerators and freezers
- Clothes washers
- Clothes dryers
- Dishwashers
- Air conditioners (single phase mandatory, three phase voluntary)

In addition to mandatory energy labelling, products are also regulated on the basis of Minimum Energy Performance Standards (MEPS).

In addition, the Australia Energy Star provides a voluntary international standard for energy efficient office equipment, including computers, printers and photocopiers, and home electronics such as TVs, audio products and DVD players.

The E3 Committee conducts a national “check testing” programme to provide the quality assurance that ensures that the labelling and MEPS scheme maintains high levels of credibility both with consumers and manufacturers. Appliances are purchased from retail outlets or obtained anonymously for testing.

In addition to mandatory energy labels and Energy Star, information to consumers is provided through a product database (on website). In addition, there has been the Top Energy Saver Award Winner (TESAW), which highlights the most efficient product in a class.

The E3 programme has been tracking trends in the efficiency of appliances on the market since 1993 in order to help in the evaluation of the impact of the energy labelling programme. Each year a report is prepared detailing these trends; the latest report is titled "Greening Whitegoods 2005" which includes data up to 2005. These reports are all available from the E3 Energy Rating website.

Relevance to Kazakhstan:

The energy efficiency requirements imposed to energy using products on its design phase, associated with labelling are measures that have proven track record on reducing energy consumption. The first aims at improving the energy and environmental performance of the products whereas the second to provide information to the consumer about the products performance. Therefore, there is a greater focus on the lifetime energy use and on the environmental impacts of using such products. These directives and guidelines are able to set the framework for performance criteria, which manufacturers should meet in order to be able to place their products in the market. Standards and labels allow consumers to make choices between products based on their energy and environmental performance.

Links:

http://www.encharter.org/fileadmin/user_upload/document/EE_Standards_and_Labels_2009_ENG.pdf

http://www.energystar.gov.au/

Case study 28: Label and minimum energy efficiency standards, China

Target Area:

Appliances, MEPS, labelling

Policy type:

Auditing, voluntary endorsement label, mandatory comparative label

Organisations:

Standardisation Administration of China (SAC). China National Institute of Standardisation (CNIS)

Summary:

China first adopted minimum energy performance standards (MEPS) in 1989. A voluntary endorsement label was then introduced in 1998. There are currently MEPS for 22 appliances with 50 products using the voluntary endorsement label that is based on US Energy Star.

For the labelling programme, manufacturers are required to submit to an on-site audit of production facilities and undertake third-party testing in certified laboratories. Audits are carried out annually.

In 2005, China launched a mandatory comparative label, similar to the one used in Europe. It covers refrigerators, washing machines, air conditioners and unitary air conditioners. Manufacturers self report energy consumption of each product.

Total budget:

USD 72,000 per annum for product testing

Years observed:

2005-2010

Energy saved:

282 GWh in 2010 for replacing low efficiency air conditioners with MEPS equipment

Scale:

In 2007 the overall compliance for all products reached 96 percent.

Implementation:

In 2005, China launched an energy efficiency labelling program which classified air conditioners in 5 performance grades in order to inform consumers and foster appliance makers to improve their products. With the introduction of MEPS, the share of less efficient models of air conditioners decrease from 70% to about 40% in just four years. Since 2009, only the two higher efficiency classes (1 and 2 out of 5) of AC equipment are allowed to be traded within China.

The Chinese program combines MEPS and two kinds of efficiency label:

- the Energy Information Label, a classification label with five performance categories, and
- the Energy Conservation Label, an endorsement voluntary label administrated by the China Standard Certification Center (CSC).

The Standardisation Law and its Implementation Regulation have guidelines for penalties for non compliance for mandatory standards.

Relevance to Kazakhstan:

The energy efficiency requirements imposed to energy using products on its design phase, associated with labelling are measures that have proven track record on reducing energy consumption. The first aims at improving the energy and environmental performance of the products whereas the second to provide information to the consumer about the products performance. Therefore, there is a greater

focus on the lifetime energy use and on the environmental impacts of using such products. These directives and guidelines are able to set the framework for performance criteria, which manufacturers should meet in order to be able to place their products in the market. Standards and labels allow consumers to make choices between products based on their energy and environmental performance.

Links:

http://www.wec-policies.enerdata.eu/Documents/cases-studies/CN_compliance.pdf

http://www.wec-policies.enerdata.eu/Documents/cases-studies/CN_Measures_to_promote_efficient_air_conditioning.pdf

Case study 29: Top runner programme, Japan

Target Area:

Product development, equipment, appliances, lighting, passenger vehicles

Policy type:

MEPS

Organisations:

The Ministry of Economy, Trade and Industry (METI)

Summary:

In 1998, Japan initiated a unique program to improve energy efficiency of end-use products and to develop "the worlds best energy-efficient products". As part of the Energy Conservation Law, the program set mandatory energy efficiency standards, based on the most efficient ("Top Runner") products on the market, for a variety of appliances, equipment , and automobiles. By 2009, the program had achieved mandatory energy efficiency standards for 21 products.

The scope of the Top Runner Program is based on three criteria:

- Products involving large domestic equipments;
- Products that consume a substantial amount of energy in the use phase;
- Products with considerable room to improve energy efficiency.

Cost:

Unknown

Years observed:

1998-Ongoing

Energy saved:

Unknown

Scale:

The energy consumed by the Top Runner target products amounts to more than 70% of residential electricity consumption

Implementation:

The major characteristics of the Top Runner Approach can be summarised as follows:

- The Top Runners set the standard, taking into consideration technological potential.
- Differentiated standards are set based on various parameters.
- Compliance with the standard is evaluated by corporate average.

As the name suggests, the most energy efficient product on the market during the standard-setting process sets the Top Runner Standards. However, it also takes into account technological analysis, and considers technological potential for efficiency improvement in the future.

In order to comply with the Top Runner Standards, producers must ensure that the weighted average energy efficiency of the products sold in the target year achieves the requisite standards. Therefore, not all of a manufacturers products have to meet the target, but on average, they must achieve the standards. This flexibility enables producers to provide a wide range of models to meet the market demand while guiding the overall market to higher energy efficiency.

In the target year, the METI requires the producers to submit a report on their sales and the energy efficiency of their products, and then evaluates their compliance. In case of noncompliance, the Top Runner Program takes a "name and shame" approach.

Relevance to Kazakhstan:

This approach is done by assessing the energy consumption of the available products on the market and then valuing the most efficient, this product then sets the standard that all manufacturers have to meet at a target year. It is a dynamic and market driven process, the assessment is done based on the products available on the market, sets a positive connotation to the "top runner" product and it has proven effective over time.

Links:

http://www.denken.or.jp/en/serc/research_re/download/09035dp.pdf

Case study 30: Tests and Trials of Domestic Appliances, Sweden

Target Area:

Appliances, household.

Policy type:

Regulatory instruments, codes and standards, monitoring.

Organisations:

Swedish Energy Agency. Testlab.

Summary:

The Swedish Energy Agency runs the Testlab laboratory that carries out tests and trials on domestic appliances, including: refrigerators, freezers, stoves, dish washers, washing machines, tumblers, lamps, home electronics, and vacuum cleaners. The test results are used to guide buyers towards better and more energy-efficient appliances and to encourage manufacturers to produce such appliances. Certain tests are carried out on behalf of companies and are financed by them.

Testlab also carries out trials to check that products are labelled in accordance with the energy labelling system that is mandatory in the EU. A large part of the work at Testlab focuses on developing new methods and drawing up new laws and regulations for labelling and standardisation.

Cost:

Unknown.

Years observed:

1995-Ongoing.

Total energy saved:

Unknown.

Scale:

Field measurements have been performed in 200 houses and 190 apartments.

Implementation:

Field measurements in 389 households were conducted by the Swedish Energy Agency to evaluating the importance of the energy label for household energy consumption. The appliances selected were fridges, freezers, fridge/freezers, washing machines and dishwashers.

In order to make the measurements cost-effective only 40 sets measurements were carried out for a whole year, 20 per year. The rest were measured for a month, 20 each month. With the aid of the one year measurements, a seasonality correction factor was calculated in order to transform the one month measurements to annual consumption of the cold appliances.

Measurements were performed in the following the concept used in the EURECO-study:

- As much as possible was measured in the switchboard by means of special wattmeters, namely the total consumption, stove and oven, freezer, fridge etc.
- The other appliances (TV, PC, etc.) were measured by serial meters placed between the socket outlet and the appliance.
- Light sources were measured in an indirect way: light sensors measured when the lamps were on and off; together with information of the nominal power it was then possible to calculate the energy consumption (energy = power* time).
- Estimations were used for loads that could not be measured directly (apart from light sources), e.g. when there was a mix of free and fixed installations fed from the same fuse.
- The indoor and outdoor temperatures were measured.

Relevance to Kazakhstan:

This measure would allow understanding of the current situation in Kazakhstan, and thus understanding of the potential for energy savings to be driven by the local market and new appropriate standards.

Links:

IEA Policies and Measures Database. "Tests and Trials of Domestic Appliances - Testlab"

E. Öfverholm, P. Bennich, I. Norstedt. "The EU labelling system for household appliances and the reality. Comparisons with field measurements in 389 Swedish households". EGEEE 2011 Summer Study

Case study 31: Investments in Public Territories' Lighting Infrastructure, Latvia

Target Area:

Local authorities, public lighting.

Policy type:

Grants, subsidies.

Organisations:

The Ministry of Environmental Protection and Regional Development (MEPRD). CCFI.

Summary:

This measure is noted in the Tertiary sector of Latvia's 2nd NEEAP, and falls under the "Latvian Environmental Investment Fund" (LEIF). The particular measure is implemented by the 3 open tenders.

The project's financing by is based on the principle of additionally, namely, to implement the project the beneficiary had not received or does not intend to receive a co-financing within the framework of other financing programmes (including the programmes financed by the national operational programme "Infrastructure and services"), from other financial instruments, European Union or foreign financial assistance resources for the eligible costs financed by the CCFI. Projects' applicants may be municipalities, municipal institutions and business entities having on their balance sheet the lighting infrastructure in municipal public territories. The beneficiary ensures that the given lighting infrastructure will be used for the purposes stated in the application at least 5 years after the completion of the project.

Cost:

the total costs of approved projects ~ 12.5 mill EUR.

Years observed:

2011-2014.

Total energy saved:

6.5 GWh/year.

Scale:

Unknown.

Implementation:

The eligible activities within the project includes:

1. dismantling, replacing or reconstruction of existing lamps to provide the switch to energy efficient lighting (new energy efficient lamps shall be installed or the parts of existing ones shall be changed/renovated)
2. installation of new energy efficient lamps
3. installation of automatic equipment regulating and protecting lighting regimes
4. installation of connecting cables between the regulating equipment and new installed lamps, not longer than 15 meters
5. change or reconstruction of existing support elements of lighting system (physical support constructions and fastening wires, distribution panels, cables and air wires).

A beneficiary is responsible for achievement of results specified in the project application and project contract. The monitoring shall be performed up to 3 years after completion the project.

Relevance to Kazakhstan:

This policy is effective at replacing old inefficient lighting technology in municipalities that have not received any other financial support, and who without this policy may not have been able to carry out these renovations. In Kazakhstan this policy would mean a more even spread of financial support amongst municipalities, and a large number of old lighting systems could be replaced.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/tertiary/LV11.PDF

http://ec.europa.eu/energy/efficiency/end-use_en.htm

Case study 32: Subsidies for the refurbishment of public lighting in small municipalities, France

Target Area:

Local authorities, public lighting

Policy type:

Subsidies, refurbishment.

Organisations:

ADEME.

Summary:

ADEME financially supports small municipalities (under 2 000 inhabitants) in refurbishing their public lighting installations.

The subsidies were calculated based on the number of street light unit refurbished and subsidy rates varied depending on the energy savings targeted:

- Operations Factor 2: For refurbishment targeting at least a 50% decrease in the corresponding energy consumption, a subsidy of €360 (before tax) is granted per street light unit refurbished;
- Operations Factor 3: For refurbishment targeting at least a 66% decrease in the corresponding energy consumption, a subsidy of €1,600 (before tax) is granted per street light unit refurbished;
- Operations Factor 4: For refurbishment targeting at least a 75% decrease in the corresponding energy consumption, a subsidy of €3,000 (before tax) is granted per street light unit refurbished.

Cost:

Scheme available until €20 million of funds used up.

Years observed:

2013.

Energy savings:

205 GWh/year.

Scale:

65,200 street light units in 2,082 municipalities have been refurbished.

Implementation:

Municipalities can apply for these subsidies by submitting a project to their regional direction of ADEME. A diagnostic of the municipality public lighting will have to be done before this application following the technical specifications defined by ADEME. This diagnostic will fix the perimeter and the savings targeted by the refurbishment project. Priority operations must target spherical luminaire with mercury vapour lamps. Each municipality selected can receive a subsidy for up to 50 street light units, projects based on a large number of units being preferred.

Relevance to Kazakhstan:

This policy is effective at replacing old inefficient lighting technology in many small municipalities, which without this financial support may not have been able to carry out these renovations. In Kazakhstan this policy would mean that the areas outside of large cities would receive support, and a large number of old lighting systems could be replaced.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/tertiary/FRA23.PDF

Case study 33: Action Plan 2011-2020: Improvement of energy efficiency of the indoor lighting installations in existing buildings, Spain

Target Area:

Local authorities, public buildings, lighting.

Policy type:

Grants, subsidies, education, training, legislation.

Organisations:

Ministry of Industry, Tourism and Trade/IDAE.

Summary:

The aim of this measure is to reduce the energy consumption of existing indoor lighting installations so that the minimum energy requirements established by the Technical Building Code can be met. This measure builds on previous Action Plans in Spain.

Cost:

Previously €22.5 million in public aid from 2005-2010.

Years observed:

2011-2020.

Expected energy saving:

842 ktoe/year by 2020.

Scale:

Involves acting on 200 million m2 of floor space.

Implementation:

The following actions will be carried out with a view to promoting the renewal measure of indoor lighting installations in buildings:

- Minimum energy efficiency requirements will be established by the Technical Building Code, and are to be met by new and existing lighting installations.
- An economic support line will be created on an annual basis, with the aim of linking economic incentives with energy rating levels, especially when dealing with comprehensive rehabilitations.
- Campaigns for the domestic sector are also taken into account here, similar to the ones carried out for the promotion of low-energy or LED-technology bulbs for households.
- Training activities will be devised and implemented as a supplement to this measure.
- Information on the most efficient equipment and systems are available on IDAE's Website.

Actions on technical installations may include the following:

- Lighting fixtures, bulbs and equipment: replacement of the whole by another set of higher performance lighting fixtures, more efficient bulbs and adjustable electronic ballasts.
- Switch start control gear and lighting level adjustment: they shall include presence sensing devices and lighting level adjustment according to daylight contribution.
- Change in the lighting system: relocation of light fittings using the former technologies so as to reduce electrical consumption in relation to the current lighting system.
- Monitoring systems to evaluate the comfort conditions and the adequacy of the actions carried out in order to improve the energy efficiency.

Relevance to Kazakhstan:

This measure includes many steps in improving indoor lighting that are applicable to Kazakhstan. Building codes are key for ensuring efficient lighting is being installed, and financial support offers additional incentive to perform above the standard. Information campaigns, training and information sharing mean that information is more readily available, and allows consumers to make an informed choice.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/tertiary/SPA37.PDF

http://www.idae.es/uploads/documentos/documentos_11905_PAEE_2011_2020._Executive_Summary_AP._A2011_2a1f1f92.pdf

Case study 34: Fiscal incentives for energy savings in the household sector: Ecobonus 2014 and tax deduction for renovations and appliances, Italy

Target Area:

Appliances, lighting.

Policy type:

Financial, fiscal, tariffs.

Organisations:

Ministry of

Economic Development.

Summary:

By the Legal Decree n. 63 of 6 June 2013, converted into Law no. 90 of 4 August 2013, have been introduced a series of tax benefits for taxpayers who have ongoing construction projects. The decree introduces changes to tax deductions for upgrading of existing buildings, and a new tax bonus of 50% for the purchase of furniture and appliances.

Tax bonus:

Up to €10,000 for appliances.

Years observed:

2008-2015.

Total energy saved:

Unknown.

Scale:

Unknown.

Implementation:

The tax bonus for appliances and furniture can only be applied to purchases for residential properties subject to deduction of 50% required for construction projects, with a maximum cost of €10,000 which is in addition to the 96,000 expected for these. The list of appliances eligible for deduction includes: refrigerators, freezers, washers, dryers, dishwashers, cooking appliances, electric stoves, electric hot plates, microwave ovens, electric heating, electric radiators, electric fans, air conditioning machines.

Previous laws:

The Budget law 2007 and 2008 had established a tax incentives for the purchase of high efficient electrical appliances. The incentives have been applied during the years 2007-2010 but have not been included in the Budget Law 2011.

The 2007 Budget Law contained the following measures:

- The tax incentive of 36% for any energy saving lighting systems installed by 2009 in non -residential buildings;
- The tax incentive of up to €200 for any A+ refrigerator and freezer purchased by 31.12.2007;
- Tax incentive of up to €30,000 to replace the existing boilers with condensing boilers,

The Budget Law 2008 had recalled the articles regarding the thermal plant and the heating systems extending the deadline for the tax incentives until the 31/12/2010, establishing a fund of €2 million. The same law had created a 'Fund for energy and efficiency savings' with €1 million of budget to support:

- Awareness raising on electrical appliances labelling and for turning off appliances equipped with function stand-by when not in use.
- The gradual and total replacement of incandescent light bulbs with those of low consumption,
- Measures to improve energy efficiency of public lighting.

Relevance to Kazakhstan:

As a rapidly developing country, Kazakhstan must ensure that new constructions, and the components within, are energy efficient. This policy encourages and supports the installation and purchase of high efficiency electrical appliances in such new constructions.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/household/ITA30.PDF

http://www.nextville.it/normativa/2105/

TRANSPORT

Case studies

Case study 35: Grants for Electric Vehicles, France

Target Area:

Transport, new vehicles, electric vehicles.

Policy type:

Financial, subsidies.

Organisations:

ADEME.

Summary:

Between 2003 and 2006, ADEME supported the purchase of many kinds of electric vehicles. The target for 2006 was to support 900 private electric vehicles, 100 commercial electric vehicles, 80 electric buses and 100 urban electric trucks.

Cost:

Unknown.

Years observed:

1999- Ongoing.

Energy saved:

12.6 TJ in 2004

8.4 TJ in 2005

7.14 TJ in 2006.

Scale:

ADEME supported 1700 electric vehicles between 2000 and 2003.

Implementation:

Up to December 2008, ADEME supported 3 kinds of electrics vehicles:

- €400 for electric mopeds
- €3200 for commercial electric vehicles
- for 3 or 4 wheels specific vehicle electric light vehicles : €2000 (load < 500 kg) or €3000 (load > 500 kg). This grant will continue up to December 2014.

Financial support by ADEME is €3050 for the purchase of an electric car (€3810, if the owner scraps their old car, bought before January 1993).

Relevance to Kazakhstan:

This policy would help to increase the percentage of electric vehicles in Kazakhstan, and help to reduce emissions from vehicles. Supporting public infrastructure such as charging stations and additional electric load should be considered when implementing electric vehicles.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/FRA14.PDF

Case study 36: ecoENERGY Efficiency for Vehicles, Canada

Target Area:

Transport, ecodriving.

Policy type:

Education, training, information.

Organisations:

Natural Resources Canada.

Summary:

The ecoENERGY Efficiency for Vehicles program aims to reduce energy use and emissions from transportation in Canada. The program offers fuel efficient driver training, provides energy information to vehicle consumers, and encourages freight companies to make their operations as energy efficient as possible.

Cost benefit:

$19,000 in fuel savings/year for an entire city department. Years observed:

2008-Ongoing.

Total energy saved:

Unknown.

Scale:

Most drivers can save 10-15% with simple changes to their driving habits.

Implementation:

Helping Canadians understand the links between their driving behaviour and fuel consumption through training and other tools is a key pillar of ecoENERGY Efficiency for Vehicles:

- Auto$mart targets novice light-duty vehicle drivers;
- SmartDriver targets drivers in the commercial and institutional fleet sector;
- Commercial and institutional fleets will have access to practical advice, tools, and strategies offered through FleetSmart.

ecoENERGY Efficiency for Vehicles also focuses on providing consumers with the information they need to make energy efficient vehicle and equipment purchasing decisions. The program will:

- Produce the Fuel Consumption Guide and provide on-line consumer fuel efficiency information;
- Introduce updated energy efficiency labels for light-duty on-road vehicles;
- Develop a new consumer awareness initiative that recognizes fuel efficient tires for light-duty vehicles.

ecoENERGY Efficiency for Vehicles will also introduce a Canadian version of the SMARTWAY Transport Partnership, a successful program launched by the U.S. Environmental Protection Agency in 2004:

- SMARTWAY connects freight shippers with an interest in greening their operations to a list of endorsed energy efficient freight carriers.
- Participants are benchmarked against each other using data they submit describing their energy use and emissions.

From 2008 to 2011 Green Communities Canada developed and delivered an extensive EcoDriver program based on the principles of community-based social marketing.

- 88% reported reduced idling, with annual fuel savings projected at $199,500
- 71% reported slower speeds on the highway, with annual fuel savings projected at $159,000

- 52% reported now checking their tire pressure monthly, with annual fuel savings projected at $105,000.

Relevance to Kazakhstan:

This measure introduces new skills, and is a cost effective way to see positive changes in fuel consumption, costs, road safety and local and global environment. Eco-driving can lead to fuel consumption reduction up to 15-20%. More readily available information allows consumers to make an informed choice about purchasing new vehicles and their future consumption rates.

Links:

http://greencommunitiescanada.org/programs/ecodriver/

http://www.nrcan.gc.ca/energy/offices-labs/transportation/cars-light-trucks/5703

Case study 37: Increasing the energy efficiency of road vehicles, Slovenia

Target Area:

Transport, road vehicles.

Policy type:

Legislative, informative, grants, subsidies, taxation, education, training.

Organisations:

Ministry for Infrastructure and Spatial Planning - Energy Directorate.

Summary:

The activities under this measure are based essentially on raising awareness and on the use of fiscal measures to stimulate the purchasing of environmentally more friendly and more energy-efficient road motor vehicles, and also on the introduction of new regulations to reduce CO2 emissions in exhaust gases and to raise vehicle efficiency.

The measure includes the following activities:

- energy labelling of private vehicles,
- proportionate taxation of road motor vehicles in relation to the ecological standard and the energy efficiency of the vehicle,
- green public procurement for the purchase of energy-efficient vehicles,
- promotional and education activities (safe-driving schools, etc.).

Cost:

€6 million of public funding, 2008-2016

Years observed:

2008- ongoing.

Expected energy saving:

198 GWh/year.

Scale:

Unknown.

Implementation:

The Decree on Consumer Information on Fuel Economy and CO2 Emissions in Respect of New Passenger Cars was adopted in 2010. In line with the Decree, suppliers are bound to make up a standard manual on fuel economy and CO2 emissions, where consumers can find a list of all private vehicles on the market in Slovenia together with data on fuel consumption and CO2 emissions.

In the area of fiscal measures, with the aim of promoting the purchase of environmentally more acceptable private vehicles, a differentiation in the tax on private vehicles has been devised in respect of CO2 emissions. The Act Amending the Motor Vehicles Tax Act (ZDMV-C) thus defines the tax bracket for motor vehicles depending on emissions of CO2 for combined travel and on the type of fuel.

Another fiscal measure envisages the level of vehicle road tax depending on CO2 emissions and the engine emissions class for private vehicles. The year 2008 saw the issuing of the Annual Fee on the Use of Motor Vehicles Act and the Decree on the Dealings and Amount of Annual Fee on the Use of Motor Vehicles. For goods vehicles and buses the Decree also sets the annual taxes depending on the emission class of the engine, which does not in fact take account of CO2 emissions.

Relevance to Kazakhstan:

Taxation of road motor vehicles offers a method to raise revenue and incentivize public purchase of vehicles with better fuel economy. In Kazakhstan, any revenue from this scheme could be used as a means to finance the maintenance and improvement of the road system. This measure also introduces new skills, and is a cost effective way to see positive changes in fuel consumption through training and education. More readily available information on vehicle performance allows consumers to make an informed choice.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/SLO5.PDF

http://ec.europa.eu/energy/demand/legislation/doc/neeap/slovenia_en.pdf

Second National Energy Efficiency Plan, Slovenia 2011-2016

Case study 38: Green OwnerFee, Denmark

Target Area:

Transport, passenger cars.

Policy type:

Taxation, incentive.

Organisations:

The Central Customs and Tax Administration, The Ministry of Taxation, The Department of Customs and Excise.

Summary:

The taxes on motor vehicles comprises of a registration tax paid when the vehicle is purchased (heavy trucks are excluded) and an annual tax based on the fuel economy of the vehicle. A lower registration fee is charged for freight transportation and this tax is based on the weight of the vehicle.

The main and original purpose of the registration tax and the annual vehicle tax is to raise revenue. It is to ensure vehicle owners bear some of the costs of road maintenance and construction. The registration tax also aims to reduce the number of vehicles in Denmark and to provide an incentive to use smaller vehicles with better fuel economy.

Tax Revenue:

18 billion DKK projected for 2005.

Years observed:

1997- ongoing.

Total energy saved:

Unknown.

Scale:

Unknown.

Implementation:

In 2005, the Danish registration amounts to 105% of the value of a new passenger car that is valued below DKK 62,700 and 180% for those valued above. In 2005, non-passenger vehicles weighing below two tonnes are charged with a 95% duty for those valued above 15,100DKK, while those valued below 15,100 DKK are free of charge. Trucks weighing above two tonnes are charged 60% for those valued above 12,100 DKK while those valued below 12,100 DKK are free of charge.

Before 1997, the annual vehicle tax was based on the weight of the car. All vehicles sold before 1997 are liable to the annual weight based tax, where lighter vehicles paid a lower duty than heavy vehicles. For vehicles registered after 1997, a tax known as "the owners green tax", is paid based on the fuel economy rather than the weight of the car.

As part of the government's green energy agreement in 2008, it was decided that electric vehicles would not be subject to normal vehicle registration tax of 180 percent until 2012. In 2009 it was announced that the exemption may be extended by the government until 2015.

There has been much debate over the high registration tax on passenger cars in Denmark. The higher tax payment acts as a deterrent for buyers, and therefore politically the registration tax system is seen as non-environmentally-friendly and not supporting the "greening" of the Danish car fleet. Even with this drawback, the tax revenue for the government implies reluctance to change the system.

Relevance to Kazakhstan:

The Green Owner Fee offers a method to raise revenue and incentivise public purchase of vehicles with better fuel economy. In Kazakhstan, any revenue from this scheme could be used as a means to finance the maintenance and improvement of the road system.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/DK7.PDF

http://www.economicinstruments.com/index.php/air-quality/article/87-

Case study 39: Subsidy for clean car purchase, Sweden

Target Area:

Transport, fleet owners.

Policy type:

Financial, subsidies.

Organisations:

National Road Administration. The Swedish Transport Agency.

Summary:

In April 2007, a purchasing rebate for new cars classified as environmentally beneficial was introduced and was supposed to be in place until the end of 2009. The support period has shortened because of the great impact the subsidy scheme has had on the share of cars purchased that are beneficial for the environment. The rebate is only directed to cars of private use. The car has to fulfil the criteria for being environmentally beneficial according to the definition stated by the National Road Administration.

Cost:

A total of SEK 815 million during the support period.

Years observed:

2007-2009.

Total energy saved:

Unknown.

Scale:

The share of environmentally beneficial cars in total sales increased from 17.6% in 2007 to 33.3% in 2008.

Implementation:

A conventional diesel or gasoline driven car is allowed to emit at the maximum 120g CO2/km. A car can also be driven by bio fuels, be a hybrid or be driven by electricity in order to classify. The emission limits are 0,92 litres/10 km of gasoline in a car driven by ethanol and 0,93 m3 of gas/10 km. For electric cars, the emissions are not allowed to exceed 37 kWh/10 km, but these vehicles are currently not in the market. Each consumer gets a rebate of SEK 10000 6 months after the car has been bought.

Relevance to Kazakhstan:

This policy would help to increase the percentage of environmentally-friendly vehicles in Kazakhstan. Assessing cars against a criteria for environmental friendliness provides information to all consumers which allows them to make an informed choice when purchasing a new vehicle. This criteria could consider the climate and terrain in Kazakhstan, as well as emissions and efficiency.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/SWE16.PDF

Case study 40: Energy labelling of vehicles, Portugal

Target Area:

Transport, passenger vehicles.

Policy type:

Legislative, informative.

Organisations:

DGV, ACAP, ADENE, IDAD.

Summary:

The Decree-Law nº 304/2001, of November 26th, creates an information system for consumers of new passenger vehicles in order to allow an informed choice on the consumption of fuel and carbon dioxide emissions. All the promotional literature on new passenger vehicles must include information about the fuel consumption and CO2 emissions.

Cost:

Unknown.

Years observed:

2001- ongoing.

Total energy saved:

Unknown.

Scale:

865 site visits in 2003.

Implementation:

An Internet guide on fuel economy and CO2 emissions is available in the following Internet site:

http://www.moonlight.pt/acapco2/

The label on fuel economy and CO2 emissions will also be available in the internet site mentioned and can be viewed and printed by the main actors involved.

The "Fuel Economy Guide" is provided by Directorate-General for Traffic (DGV) on an annual basis, with data on official fuel consumption and the specific CO2 emissions for every model of new passenger car available on the market.

Environmentally sustainable consumption has been addressed in several training initiatives at schools that are members of RedeEC (Consumer Education Network).

Relevance to Kazakhstan:

This policy would help to increase the percentage of environmentally-friendly vehicles in Kazakhstan by providing information to all consumers which allows them to make an informed choice when purchasing a new vehicle.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/POR1.PDF

http://www.apambiente.pt/index.php

1st National Report to the Aarhus Convention, PORTUGAL, January 2005

Case study 41: Eco Drive Campaign and Competition, Austria

Target Area:

Transport, ecodriving.

Policy type:

Education, training.

Organisations:

Mobility Department of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management. Austrian Energy Agency. Federal Branch Association of Driving Schools.

Summary:

Ecodriving was established in Austria in summer 2004. The initiative aims to establish a fuel-saving and smart driving style to enhance fuel economy, by certification of driver trainers, the training of drivers, Ecodriving competitions as well as awareness raising among the public. The initiative offers subsidies for commercial fleets and arranges Ecodriving trainings which are offered by its cooperating partners since 2005. In 2007 the programme was enhanced for drivers of trucks and buses, and in 2009 for drivers of tractors.

Cost:

Unknown.

Years observed:

2004-Ongoing.

Energy saving:

55,000 tons CO2/year.

Scale:

18,500 fleet drivers have participated in a training. 90,000 novice drivers per year are educated in Ecodriving skills.

Implementation:

The train-the-trainer seminars take two days for passenger cars and one day for the additional education for truck and/or buses trainers. As of 2012, 500 trainers for passenger cars, 260 trainers for trucks & buses and 80 trainers for tractors have been certified as Ecodriving-trainers. The content and schedule of the trainings is defined in Ecodriving handbooks in order to guarantee a quality standard.

Trainings are mainly offered in form of a full-day training. General contents of the activity are:

- Intelligent use of cars;
- Make your car fit;
- How to use a cars technique;
- Driving style: economical, safe and relaxed.

Since 2012, one-hour trainings are offered for drivers of passenger cars as well. This includes a practical lesson only, with one trainer per driver in each car.

In 2008, Ecodriving has become a mandatory part when obtaining a driving licence.

Ecodriving competitions were launched since the very beginning of the Ecodriving initiative in Austria.

Relevance to Kazakhstan:

This measure introduces new skills, and is a cost effective way to see positive changes in fuel consumption, costs, road safety and local and global environment. Eco-driving can lead to fuel consumption reduction up to 15-20%.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/AU14.PDF; www.ecodrive.org

Case study 42: Public transport packages, Norway

Target Area:

Public transport, facility improvements, accessibility.

Policy type:

Financial, policy packages.

Organisations:

The Ministry of Transport and Communications.

Summary:

After a pilot project in 1991, the Ministry of Transport and Communications to changed its policy from dealing with individual measures to financing packages of measures, from 1996 to 2000. As a result, the various schemes for cities and districts were not individual measures, but a combination of different measures appropriate for achieving targets with increasing the proportion of public transport, more effective traffic flow and improved public transport.

The Ministry of Transport and Communications invited county councils to apply for funds for long-term projects based on politically adopted plans. A minimum of 50% local finance was required to obtain financial support.

Cost:

In the period 1996-1997, a total of NOK 32.2 million was allocated.

Years observed:

1996-2000.

Total energy saved:

Unknown.

Scale:

21 per cent of public transport users say that they now travel more often by bus as a result of the packages of measures.

Implementation:

Four examples of packages are:

1. Hundvåg scheme: Comprehensive reorganisation and upgrading of public transport routes. The frequencies have been increased, supplemented by feeder buses. Bus stops have been upgraded, accessibility measures have been implemented and there have been heavy emphasis on information and marketing.
2. Continued emphasis on the development of resource- and environmentally-friendly transport in the Tønsberg area: Improvements to facilities for the combination of bicycles and public transport, inter-changes between train and bus, expanding routes, refurbishing bus stops and attitude-awareness work.
3. New deal for public transport in the Drammen region: Contains various individual measures spread across four areas: products development, information/marketing, accessibility and bus stops.
4. Package of measures for Nedre Glomma: Emphasises information, accessibility, the standard of bus stops, fares/ticketing systems and an improved adaptation of available routs according to the market.

Relevance to Kazakhstan:

Implementing policies that work well together deliver results faster than if they had been implemented individually, and ensures the success of the project. Kazakhstan could implement such a measure to supports councils carrying out improvements to public transport in their local area.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/NOR7.PDF; https://www.toi.no/getfile.php/Publikasjoner/T%C3%98I%20rapporter/2000/497-2000/Sum-497-00.pdf; K. N. Kjorstad and A. Ruud. "Benchmarking Public Transport Experiments

Case study 43: Energy Conservation Programme for Public Transport 2005-2010, Finland

Target Area:

Public transport, vehicle fleets.

Policy type:

Co-operative measures, monitoring, training, audits, management systems.

Organisations:

The Ministry of Transport and Communications. The Finnish Public Transport Association. The Finnish Bus and Coach Association Motiva Oy.

Summary:

The objective of the programme is to reduce energy consumption in public transport, and that all participants implement environmental management systems equivalent to or based on ISO 14001 by the end of 2010. The programme covers buses and coaches, trams and local train transport.

When acceding to the agreement the company agreed:

- to build a plan for energy conservation (as a part of ISO 14001)
- to make energy audits
- to monitor its energy consumption
- to inform and train its personnel
- to report annually to the Finnish Bus and Coach Association confidentially
- to pay attention for energy efficiency when planning purchases

Cost:

Unknown

Years observed:

2005-2008.

Total energy saved:

The savings would be approximately 0.08% of the sectoral total.

Scale:

The members cover about 80% of Finland's busses and coaches.

Implementation:

Tools for carrying out the procedure in the companies were:

- Environmental audit in every second year
- Energy audits of real estates
- Energy conservation investments of real estates
- Databank of the Finnish Bus and Coach Association, including comparable (anonymous) energy consumption data of all reporting companies.

A steering group, with members from the agreement parties and Motiva Oy (the Information Centre for Energy Efficiency and Renewable Energy Sources), has been established to guide, monitor and further develop the programme.

By the end of 2006, ten bus companies had certified quality and environmental management system, one had a BAK-environmental management system and one had implemented only a quality management system. One rail company had ISO 14001 -certified quality and environmental management sys-

tem. By the end of 2006, only two companies had conducted energy audits in their buildings making use of the energy audit subsidies provided by the Ministry of Employment and the Economy.

Relevance to Kazakhstan:

This policy develops new local skills and provides government with much needed quality information for public transport system improvements and investments.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/FIN16.PDF

www.motiva.fi

Case study 44: Development of Intelligent Transportation Systems, Poland

Target Area:

Local government, traffic management, infrastructure.

Policy type:

Financial.

Organisations:

General Directorate for Roads and Motorways.

Summary:

The main aim of these measures is improve traffic management through financial support of the implementation of Intelligent Transport Systems in Polish transport, as in Action 8.3, Development of Intelligent Transport Systems in the framework of POIiŚ. The Intelligent Transport System (ITS) stands for systems, which encompass vast collection of various technologies (telecommunications, informatics, sensor and control technologies) and management techniques applied to transportation to make lives safer, increase road capacity and reduce environmental impacts of transportation.

The benefits resulting from use of Intelligent Transportation Systems will include:

- increased road capacity (20–25%);
- reduction the number of crashes (40–80%);
- travel time savings and energy saving (45–70%);
- reduced fuel consumption and pollutant emission (30–50%);
- better comfort, saving on operating maintenance costs.

Funding:

56,286,661 PLN for the project in the City of Bydgoszcz.

Years observed:

2007-2013.

Total energy saved:

Unknown.

Scale:

Unknown.

Implementation:

The Project of Intelligent Transport Systems will be implemented in Bydgoszcz with multiple segments. The most important segment is responsible for controlling inflow of vehicles into the central area of the city. Others include providing priority to passage of public transport vehicles, perform complementary part of the total traffic management. Administration of the flow of vehicles through the control of ITS will be based on data received from the ARCP cameras. The traffic light control algorithm is based on a SCATS system, which was implemented in Sydney, Dublin or Singapore.

The maximum share of funding in eligible expenditure at project level:

- General Directorate for Roads and Motorways - 100 per cent;
- municipalities and cities, local government units - 85 percent.

Relevance to Kazakhstan:

Road and other transport systems in Kazakhstan could be updated to include intelligent transport systems, to improve road capacity, safety, travel time and fuel consumption.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/PL13.PDF

The Second Polish National Energy Efficiency Action Plan (EEAP)

http://www.kszr.gddkia.gov.pl/index.php/en/about-kszr

http://www.itspolska.pl/admin/pliki/ATST%201_2013.pdf

http://www.funduszeeuropejskie.gov.pl/PoradnikBeneficjenta/Polis/Strony/8.3-Rozwoj-inteligentnych-systemow-transportowych.aspx

Case study 45: Improvements in efficiency and attractiveness of public transport, Austria

Target Area:

Transport, public transport.

Policy type:

Infrastructure, management.

Organisations:

Austrian Energy Agency.

Summary:

The Viennese Public Transport Company (Wiener Linien) is widely recognised as among the best in the world. Vienna has successfully implemented many public transport priority measures throughout the city as part of its effort to improve public transport.

Cost:

Unknown.

Years observed:

1960-Ongoing.

Total energy saved:

Unknown.

Scale:

The Wiener Linien carries approximately 812 million passengers annually.

Implementation:

Energy-saving speed control of the subway in Vienna:

As a result of introducing an energy saving speed controlled driving mode (using the central timetable computer), savings of 7% in traction electricity were realised. The idea was to optimise and control the speed of the subway, depending on time of departure and time of arrival in the next station. This technology has also been adapted for the Ultra Low Floor tramway (ULF), which is used since 1998.

LPG bus fleet:

Wiener Linien introduced LPG-buses in the 1960s. Since 1975 all new buses were equipped with LPG engines and since 2000 the complete bus fleet is driven with LPG, making Vienna the city with the biggest LPG-bus fleet in the world. Since 2005 all new buses undercut the emission standard EEV (Enhanced Environmentally Friendly Vehicle) by 50%.

Other measures to improve the attractiveness of public transport (selection):

- Speeding up public transport with traffic lights that are influenced by trams and buses (green wave). Roughly 50% of traffic lights (out of 1,300 passed by public transport) can be controlled in this way.
- Low-floor buses and ultra-low-floor tramway (trams still in test period)
- 55,5 km of separate bus lanes (taxis and cyclists are also allowed to use these lanes)
- Separate lanes for tramway (about 50% of all tramway rails)
- Night buses and night subway covering most of the city's area (1/4 - 1/2 h interval)
- As of 2010, 500 passenger information systems showing the arrival time of the next vehicle to arrive were installed at subway, tramway and bus stops.

Relevance to Kazakhstan:

Public transport systems have the ability to reduce the general public's dependence on personal vehicles, thus minimising emissions and reducing congestion on the road network. Managing these systems maximises these benefits with technical improvements, and also makes the systems more attractive to the public. The use of cleaner fuels in public transportation also brings improved local environmental quality. Kazakhstan cities could also consider other options such as hybrid buses, natural gas driven buses or electric buses.

Links:

http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/AU33.PDF

http://www.wienerlinien.at

http://improve-public-transport.wikispaces.com/city_vienna

ANNEXES

ANNEX I: OVERALL ECONOMIC AND ENERGY DATA[62]

Table 19: Energy balance, thous.toe

Indicators	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Total manufacture of crude energy	63850	78575	91204	114623	127793	148050	156875	160267	164638	144457
Imports	11345	8185	12772	16556	19926	10236	11486	10459	13155	11675
Exports	22688	-51038	-64096	-80604	-85613	-94873	-96918	-94971	-101179	-86526
Total crude energy consumption	52243	35679	39679	50717	61504	63475	69121	77336	74853	69862
Total energy consumption (TEC)	40334	21607	20328	25699	30842	35377	38782	42901	41727	42492

Table 20: Structure of total primary energy supply (TPES), thous. toe.

Energy Products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Carbon and carbon products	28921	19764	21781	27848	30541	34761	32014	34515	37770	37856
Crude oil and raw materials	12014	6943	10816	13843	17471	14728	15179	17102	18631	17333
Oil products	-231	1419	-725	-1235	-2199	-1584	-4487	-5646	-4307	-4476
Natural gas	10108	6572	6986	9734	14982	21341	20110	22309	24416	23309
Atomic energy	0	0	0	0	0	0	0	0	0	0
Hydropower	716	648	765	693	668	642	592	690	678	657
Geothermal	0	0	0	0	0	0	0	0	0	0
Sun/wind/other	0	0	0	0	0	0	0	0	0	0
Combustible RES and wastes	79	73	23	21	20	70	67	50	79	59
Electric energy	636	259	34	-187	19	25	-57	100	68	113
Other	0	0	0	0	0	0	0	0	0	0
TPES	52243	35679	39679	50717	61504	69983	63417	69120	77336	74853

Table 21: Total final energy consumption (TEC), ktoe

Energy Products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Carbon and carbon products	11681	3850	3496	6142	4437	14804	13739	14980	16134	16304
Crude oil and raw materials	0	0	0	0	0	873	341	357	1514	409
Oil products	8732	6380	6338	7258	8557	9260	8255	8760	9547	9321
Natural gas	7117	2674	171	933	4883	6771	2609	3316	3355	3018
Atomic energy	0	0	0	0	0	0	0	0	0	0
Hydropower	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0
Sun/wind/other	79	73	23	21	20	70	67	50	79	59
Combustible RES and wastes	4438	3026	3395	3720	5610	4469	4462	4936	5569	5951
Electric energy	8286	5603	6905	7625	7335	6241	5903	6382	6702	6665
Other	0	0	0	0	0	0	0	0	0	0
TPES	40334	21607	20328	25699	30842	42491	35377	38782	42900	41727

62 IEA 2014 Statistics Database

Table 22: Energy indicators

Indicator	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Population (mn)	15.82	14.88	14.86	15.01	15.31	15.67	16.09	16.32	16.56	16.79
GDP (US$ bn 2005)	30.85	34.88	43.47	52.07	63.24	71.14	71.99	77.25	83.04	87.19
GDP (US$ bn 2005, PES)	113.9	128.8	160.5	192.2	233.4	262.6	265.8	285.2	306.6	321.9
Energy consumption(toe./US$ thous. 2005)	1.69	1.02	0.91	0.97	0.97	0.98	0.88	0.96	0.94	0.86
Energy consumption (toe./US$ thous. 2005, PES)	0.46	0.28	0.25	0.26	0.26	0.27	0.24	0.24	0.25	0.23
TPES per capita (toe per capita)	3.30	2.40	2.67	3.38	4.02	4.46	3.94	4.23	4.67	4.46
Electricity consumption/GDP(kWh/US$2005))	2.07	1.35	1.22	1.11	1.03	1.03	0.99	0.99	0.98	0.98
Electricity consumption per capita (kWh per capita)	4.07	3.17	3.56	3.86	4.26	4.69	3.94	4.73	4.89	5.08
C02 emissions (mn t)	169.52	113.00	119.65	145.65	173.72	228.19	199.35	233.70	234.18	

Table 23: Electrical energy production, GWh

Products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Carbon and carbon products	48016	35645	40151	50558	49313	61581	58090	66657	70220	69421
Oil products	4860	2668	3071	1181	6573	3080	884	620	543	735
Natural gas	5454	5480	6230	7149	8003	8206	12857	7347	7940	13411
Hydro	8331	7531	8890	8057	7768	7460	6879	8022	7883	7637
Total electrical energy production	66661	51324	58342	66945	71657	80327	78710	82646	86586	91207

Table 24: Heat production, TJ

Products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Carbon and carbon products	307653	264965	310278	358345	330880	377152	384672	397921	401495	9874
Oil products	39336	19032	21984	8400	18192	19152	6312	4464	3912	111
Natural gas	0	0	0	0	0	0	0	0	0	0
Total heat production	346989	283997	332262	366745	349072	396304	390984	402385	405407	9986

ANNEX II: DATA ON FINAL CONSUMPTION

Table 25: Sector-based total final consumption, thous. toe

Sectors	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Industrial sector	17483	9445	10123	13907	14152	22538	18789	20907	23857	22888
Transport sector	3439	3321	3250	3299	3924	4993	4475	4751	4933	5277
Residential sector	583	1993	2374	2590	2712	5415	5949	6237	7543	6960
Commercial and governmental services	95	137	139	132	172	5999	2900	3399	3776	2527

Table 26: Final energy consumption – residential sector, thous. toe

Energy products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Carbon and carbon products	0	5	1	1	49	1085	1107	1191	2276	1563
Oil products	0	217	236	233	181	373	846	740	1119	1455
Natural gas	0	0	0	0	0	1007	901	1166	1108	838
Combustible RES and wastes	0	0	0	0	0	42	62	42	60	48
Electrical energy	583	410	459	503	699	716	734	764	810	872
Heat	0	1362	1678	1853	1782	2192	2298	2335	2177	2184
Other	0	0	0	0	0	0	0	0	0	0
Total residential sector	583	1993	2374	2590	2712	5415	5949	6238	7549	6960

Table 27: Final energy consumption – service sector, ths toe.

Carbon and carbon products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Oil products	0	0	0	0	0	755	702	760	788	678
Natural gas	95	137	139	132	172	1420	758	820	969	82
Combustible RES and wastes	0	0	0	0	0	2490	301	541	540	418
Electrical energy	0	0	0	0	0	329	364	400	551	465
Heat	0	0	0	0	0	1475	898	879	926	884
Other	0	0	0	0	0	0	0	0	0	0
Total services sector	95	137	139	132	172	6469	3023	3429	3838	2527

Table 28: Final energy consumption – industrial sector, thous. toe

Carbon and carbon products	1995	2000	2002	2004	2006	2008	2009	2010	2011	2012
Oil products	11681	3169	3021	5766	3768	12785	9956	10889	12894	12539
Natural gas	0	0	0	0	0	873	341	357	1514	398
Combustible RES and wastes	3795	1715	1682	2173	2777	2232	1677	1815	1737	1726
Electrical energy	0	0	0	0	0	1351	1294	1456	1531	1563
Heat	0	0	0	0	0	0	0	0	0	0
Other	2007	1821	2044	2240	4019	3072	3091	3450	3816	4287
Carbon and carbon products	0	2740	3377	3729	3587	2225	2429	2955	2372	2375
Total industrial sector	17483	9445	10123	13907	14152	22538	18789	26294	23864	22888

ANNEX III: LIST OF SOURCES

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ANNEX IV: ABBREVIATIONS

AEPMS	Automated Electric Power Metering System
GDP	Gross Domestic Product
VIC	Vertically Integrated Company
RES	Renewable Energy Sources
WEF	World Economic Forum
SER	Secondary Energy Resources
GOST	State Standard
SPAIID	State Program of Accelerated Innovation and Industry Development for the Republic of Kazakhstan
GDS	Gas Distribution Station
GRES (CPP)	Condensing Power Plant
NER	National Energy Register
EEU	Eurasian Economic Union
EBRD	European Bank for Reconstruction and Development
EU	European Union
UEPS	Unified Electric Power System
EEA	European Economic Area
H&U	Housing and Utilities
IDAE	Institute for Diversification and Saving of Energy
ISO	International Organization for Standardization
KEGOC	Kazakhstan Electricity Grid Operating Company
KING	Kazakh Institute of Oil and Gas
PF	Performance factor
CoAV	Code of Administrative Violations of the Republic of Kazakhstan
CRNM&CP	Committee for the Regulation of Natural Monopolies and Competition Protection of the RK Ministry of National Economy
KEP	Kazakhstan Electrolysis Plant
ILB	Incandescent Light Bulb
AB	Apartment Building
MNE	Ministry of National Economy
MHSTS	Mass High-Speed Transit System
IEA	International Energy Agency
VAT	Value Added Tax
NDFZ	Novodzhambul Phosphorus Plant
NPG	National Power Grid
TNEC	Total Net Energy Consumption
TPES	Total Primary Energy Supply
OECD	Organization for Economic Cooperation and Development
PPP	Purchasing Power Parity
UNDP	United Nations Development Program
PUE	Electrical Installations Code
EAP	Energy Audit Program
RGC	Regional Grid Companies
GIS	Green Investment Schemes
F&L	Fuel and loss/consumption and loss
SN	Construction Norms
CIS	Commonwealth of Independent States
SSGPO	Sokolovsko-Sarbayskoye Mining and Processing Production Enterprise
ESCOC	Energy Service Company Concept
EESS	Energy Efficiency and Saving Service
TPP	Thermal Power Plants
CHPP	Combined Heat and Power Plant
FICC	Financial Instrument for Climate Change
EDC	Emergency Distress Call
ESCO	Energy Service Companies
ESC	Energy Service Contracts
PGMIE	Power Grid of Major Industrial Enterprises
EP	Energy Providers

ANNEX V: LETTERS

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ИНВЕСТИЦИЯЛАР ЖӘНЕ ДАМУ
МИНИСТРЛІГІ

МИНИСТЕРСТВО
ПО ИНВЕСТИЦИЯМ И РАЗВИТИЮ
РЕСПУБЛИКИ КАЗАХСТАН

15.09.14г. № 05-30/973

Қазақстан мұнай-газ және энергетика кешені
ұйымдарының қауымдастығы «Kazenergy»

2014 жылғы 5 қыркүйектегі
№ 07-03/1969 хатқа

Қазақстан Республикасы Инвестициялар және даму министрлігі ұсынылған Қазақстан Республикасы энергия үнемдеу және энергия тиімділігі саласындағы мемлекеттік саясатына шолу жобасын қарастырып, өз құзыреті шегінде ұсыныстар мен ескертулердің жоқ екенін хабарлайды.

Вице-министр А. Рау

Орын. А.Б. Жаңылқасов
Тел. 24-21-07

0002412

Unofficial translation

Union of Legal Entities
"KAZENERGY"

Your Ref. № 07-03/1969
dated September 5, 2014

Having considered the Draft Review of State Policy of the Republic of Kazakhstan in the field of energy saving and energy efficiency, the Ministry of Investment and Development of the Republic of Kazakhstan hereby informs that it has no comments or suggestions on this matter.

Vice Minister **A. Rau**

КАЗАКСТАН РЕСПУБЛИКАСЫНЫҢ
ИНДУСТРИЯ ЖӘНЕ ЖАҢА
ТЕХНОЛОГИЯЛАР МИНИСТРЛІГІ

МЕМЛЕКЕТТІК ЭНЕРГЕТИКАЛЫҚ
ҚАДАҒАЛАУ ЖӘНЕ БАҚЫЛАУ
КОМИТЕТІ

МИНИСТЕРСТВО ИНДУСТРИИ
И НОВЫХ ТЕХНОЛОГИЙ
РЕСПУБЛИКИ КАЗАХСТАН

КОМИТЕТ ГОСУДАРСТВЕННОГО
ЭНЕРГЕТИЧЕСКОГО НАДЗОРА
И КОНТРОЛЯ

2014. 09.09. 18-01-18-08/1226-КГЭН

Объединение юридических лиц
«Казахстанская ассоциация
организаций нефтегазового и
энергетического комплекса
«KAZENERGY»

На исх. № 07-03/1969 от 03.09.2014г.

Комитет атомного и энергетического надзора и контроля Министерства энергетики Республики Казахстан, рассмотрев в пределах своей компетенции обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности, замечаний и предложений не имеет.

Председатель С. Есимханов

001757

Unofficial translation

From: Ministry of Industry and Innovative Technologies
of the Republic of Kazakhstan
Committee for State Power Supervision and Control

To: Association of legal entities
“Kazakhstan Association of Oil-Gas and Energy Complex
“KAZENERGY”

№ 18-01-18-08/1226-КГЭН from 2014.09.09

The Committee of Nuclear and Energy Supervision and Control of the Ministry of Energy of the Republic of Kazakhstan has examined within its competences the Review of the State Policy of the Republic of Kazakhstan in Energy Saving and Energy Efficiency Development. The Committee does not have any comments or suggestions concerning the review.

Chairman **S. Yesimhanov**

«ҚАЗАҚСТАНДЫҚ ЭНЕРГОАУДИТОРЛАР ҚАУЫМДАСТЫҒЫ» ЗАҢДЫ ТҰЛҒАЛАР БІРЛЕСТІГІ

ОБЪЕДИНЕНИЕ ЮРИДИЧЕСКИХ ЛИЦ «КАЗАХСТАНСКАЯ АССОЦИАЦИЯ ЭНЕРГОАУДИТОРОВ»

Исх.№ 1-30/10 от 30 октября 2014г.

Генеральному директору
Ассоциации «Kazenergy»
г-ну А.Магауову

В ответ на ваше письмо № 07-03/2709 от 27 октября 2014 года.

ОЮЛ «Казахстанская Ассоциация Энергоаудиторов» рассмотрев обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности подготовленного совместно с Секретариатом Энергетической Хартии сообщает, что члены Ассоциации не имеют замечаний и дополнений.

С уважением,

Президент Д.Г. Токбаев

КАЭ

Unofficial translation

Union of Legal Entities
"Kazakhstan Association of Energy Auditors"

Ref. no. 1-30/10 dated October 30, 2014

Mr. A. Magauov
General Director
KAZENERGY Association

Your ref. no. 07-03/2709 dated October 27, 2014

Having reviewed the Overview of State Policies of the Republic of Kazakhstan on Energy Saving and Energy Efficiency, which was prepared jointly with the Energy Charter Secretariat, the Union of Legal Entities "Kazakhstan Association of Energy Auditors" hereby informs that the Association members have no comments or additions to it.

Best regards,
D.G. Tokbayev
President

"Энергия" Казахстандық
отын-энергетика кәсіпорын құрылымдарын
жаңғырту және жобалау-іздестіру
институты акционерлік қоғамы
("Энергия" ҚазОЭЖҒЗЖИ АҚ)

ABB

Акционерное Общество
Казахстанский Научно-Исследовательский
и Проектно-Изыскательский Институт
Топливно-Энергетических систем "Энергия"
(АО КазНИПИИТЭС "Энергия")

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050004, Республика Казахстан, г. Алматы, пр. Абылай хана, 58
www.energia.kz

17.09.2014 № 7400/2072
на № 07-03/1969 от 05.09.2014

Генеральному директору
Ассоциации «KAZENERGY»
г-ну А. Магауову
факс: +7(7172) 97 93 91
тел: +7(7172) 79 01 75
kense@kazenergy.com

Вопросы энергосбережения и повышения энергоэффективности являются наиболее актуальными в настоящее время, нерешенность которых препятствует вхождению Казахстана в число 30-ти самых развитых государств мира к 2050 году.

Рассмотрев предоставленный обзор, касающейся исследования политики Республики Казахстан в области энергосбережения и повышения энергоэффективности, сообщаем, что АО КазНИПИИТЭС «Энергия» поддерживает данную работу и в целом согласно с приведенными в работе выводами и предложениями и готов к дальнейшему сотрудничеству по данной тематике.

Замечания по тексту направлены по электронной почте на адрес O.Arkhipkin@king.kz.

С уважением,
Президент А. Черняевски

Исп. Р. Лысенко
Тел. 258-18-88, вн.181

Unofficial translation

From: The Kazakhstan Scientific Research Design
and Survey Institute of Fuel and Energy systems
"Energy" JSC

To: Magauov A.M.
Director General
KAZENERGY Association

№ 7400/2072 from 17.09.2014

Nowadays, questions of energy saving and energy efficiency improvement are the most relevant, and these unresolved questions prevent Kazakhstan from joining the list of the most developed 30 countries in the world by 2050.

After examining the review on the State Policy of the Republic of Kazakhstan in Energy Saving and Energy Efficiency Development, we would like to inform, that the JSC "Energy" in general supports the research and, according to the conclusions and recommendations of the abovementioned review, is ready for further cooperation on this topic.

Comments on the text were sent to the following email address O.Arkhipkin@king.kz.

Yours sincerely,
Cherneevski A.
President

Ref.: No: UN/020140CT0007004

United Nations Development Programme

Empowered lives.
Resilient nations.

02 октября 2014 г.

Уважаемый Асет Маратович,

Настоящим письмом Программа развития Организации Объединенных Наций (ПРООН) выражает признательность за возможность ознакомиться с публикацией «Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности», подготовленной Ассоциацией «Казэнерджи» и Секретариатом Энергетической Хартии.

Внимательно ознакомившись с данной публикацией, ПРООН сообщает следующее.

Публикация «Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности» представляет собой результаты исследования политики Республики Казахстан в области энергосбережения и повышения энергоэффективности. Данная работа базируется на качественном экспертном материале, в том числе и результатах выполненных и текущих проектов ПРООН/ГЭФ и Правительства Республики Казахстан, и дает полную картину о реализуемой политике в области энергоэффективности, ключевых уроках и выводах.

В частности, ПРООН считает целесообразным отметить, что обзор позволяет сформировать независимую и объективную оценку текущей ситуации и выработать конкретные рекомендации по решению наиболее проблемных вопросов в области энергоэффективности. В этой связи, обзор будет интересен широкому кругу лиц, включая экспертные круги, государственные органы и бизнес-сообщество.

Замечания некритичного характера были направлены в рабочем порядке.

С уважением,

Мунхтуя Алтангерил
Заместитель Постоянного Представителя

Г-ну Магауов А.М.
Генеральный директор KAZENERGY

Исп. Расул Рахимов Тел: 698550

UNDP in the Republic of Kazakhstan
[illegible] Astana, 010000, Republic of Kazakhstan

Unofficial translation

From: United Nations Development Programme (UNDP)

To: Magauov A.M.
Director General
KAZENERGY Association

2 October, 2014

Dear Aset Maratovich,

Hereby, the United Nations Development Programme (UNDP) expresses its appreciation for the possibility to examine the publication of the "Review of the State Policy of the Republic of Kazakhstan in Energy Saving and Energy Efficiency Development", which has been prepared by the KAZENERGY Association and the Energy Charter Secretariat.

After careful examination of the publication, the UNDP would like to report the following.

The "Review of the State Policy of the Republic of Kazakhstan in Energy Saving and Energy Efficiency Development" contains results of the research about policy of the Republic of Kazakhstan in the field of energy saving and energy efficiency. The report is based on the qualitative expert material, including results of completed and on-going projects of the UNDP/GEF and the Government if the Republic of Kazakhstan, and gives a complete picture of the implemented energy efficiency policy, lessons learned and conclusions.

In particular, the UNDP considers appropriate noting that the review allows to create an independent and objective assessment of the current situation and to develop specific recommendations to address the most problematic issues in the energy efficiency. Therefore, the review will be of an interest to a wide range of people, including experts, state authorities and business community.

Minor comments were sent on a routine basis.

Yours sincerely,

Munhtuya Altangerel

Deputy Permanent Representative

"ТАУ-КЕН ӨНДІРУШІ ЖӘНЕ ТАУ-КЕН МЕТАЛЛУРГИЯЛЫҚ КӘСІПОРЫНДАРЫНЫҢ РЕСПУБЛИКАЛЫҚ ҚАУЫМДАСТЫРЫ"

Заңды тұлғалар бірлестігі

Объединение юридических лиц

"РЕСПУБЛИКАНСКАЯ АССОЦИАЦИЯ ГОРНОДОБЫВАЮЩИХ И ГОРНО-МЕТАЛЛУРГИЧЕСКИХ ПРЕДПРИЯТИЙ"

03 11 2014 г. № 1581

Казахстанская ассоциация организаций нефтегазового и энергетического комплекса

На № 07-03/2709 от 27. 10. 2014г.

ЭКСПЕРТНОЕ ЗАКЛЮЧЕНИЕ
на проект «Обзора государственной политики Республики Казахстан в области энергосбережения и повышении энергоэффективности»
(далее – проект обзора)

Представленные материалы для заключения:
1. Проект обзора.

Заключение:

Республиканская ассоциация горнодобывающих и горно-металлургических предприятий (АГМП), рассмотрев представленный проект обзора, согласовывает его без замечаний и предложений.

Исполнительный директор **Н. Радостовец**

Карымбаев Б. М.
689 612

Unofficial translation

Union of Legal Entities
"Republican Association of Mining and Metallurgical Enterprises"

Ref. no. 1581 dated November 3, 2014

To: Kazakhstan Association of Oil, Gas and Energy Sector Organizations "KAZENERGY"

Your ref. no. 07-03/2709 dated October 27, 2014

EXPERT OPINION
on the draft "Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency"
(hereinafter – the Draft Overview)

The materials submitted for expert examination:
1. Draft Overview

Opinion:

Having examined the presented Draft Overview, the Republican Association of Mining and Metallurgical Enterprises (AGMP) concludes that it has no comments or suggestions.

N. Radostovets
Executive Director

«ЭЛЕКТР ЖЕЛІЛЕРІН БАСҚАРУ ЖӨНІНДЕГІ ҚАЗАҚСТАН КОМПАНИЯСЫ» «KEGOC» (KAZAKHSTAN ELECTRICITY GRID OPERATING COMPANY) АҚ

010010 Қазақстан Республикасы, Астана қ., Алматы ауданы, Тәуелсіздік даңғылы, 59 ғимарат
Тел. (7172) 693-824, 690-203
Факс (7172) 690-455
E-mail: kegoc@kegoc.kz

KEGOC

АО «КАЗАХСТАНСКАЯ КОМПАНИЯ ПО УПРАВЛЕНИЮ ЭЛЕКТРИЧЕСКИМИ СЕТЯМИ» (KAZAKHSTAN ELECTRICITY GRID OPERATING COMPANY) «KEGOC»

010010 Республика Казахстан, г. Астана, район Алматы, проспект Тәуелсіздік, здание 59
Тел. (7172) 693-824, 690-203
Факс (7172) 690-455
E-mail: kegoc@kegoc.kz

03.11.2014 № 24-01-22/7125

Ассоциация «KAZENERGY»

На № 07-03/2409 от 27.10.2014г.

Настоящим АО «KEGOC» повторно рассмотрев представленный "Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности", подготовленный Ассоциацией "Kazenergy" совместно с Секретариатом Энергетической Хартии, сообщает об отсутствии замечаний и предложений к указанным материалам.

Управляющий директор по развитию НЭС и системным услугам **А. Куанышбаев**

Исп. Абушахманов Е., тел (7172) 690 177

015137

Unofficial translation

Kazakhstan Electricity Grid Operating Company
KEGOK JSC

Ref. no. 24-01-22/7125 dated November 3, 2014

To: KAZENERGY Association

Your Ref. no. 07-03/2409 dated October 27, 2014

Having re-examined "The Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency", prepared by the KAZENERGY Association jointly with the Energy Charter Secretariat, KEGOK JSC hereby informs that it has no comments or suggestions to the above said materials.

A. Kuanyshbayev
Managing Director
NPG Development and System Services

«ҚАЗАТОМӨНЕРКӘСІП» ҰЛТТЫҚ АТОМ КОМПАНИЯСЫ» АҚ

KAZATOMPROM

АО «НАЦИОНАЛЬНАЯ АТОМНАЯ КОМПАНИЯ «КАЗАТОМПРОМ»

05.11.2014 № 04-18/04322

Генеральному директору
Казахстанской ассоциации
организаций нефтегазового
и энергетического комплекса
«KAZENERGY»
Магауову А.М.

Уважаемый Асет Маратович!

В ответ на исх.№07-03/2409 от 27.10.2014г. АО «НАК «Казатомпром» выражает свою признательность за внесенные нами предложения в предетавленный Вами ранее Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности. Рассмотрев повторно направленный Обзор, считаем, что в заключительном варианте проекта отражены решения насущных проблем энергетики.

И.о. Председателя Правления А.Арифханов

Исп. Ахметов К.М.
ПД (8-7172) 551424
kakhmetov@kazatomprom.kz

007044

Unofficial translation

National Atomic Company
"KAZATOMPROM" JSC

Ref. no. 04-18/04322 dated November 3, 2014

Mr. A.M. Magauov
General Director
Kazakhstan Association of Oil, Gas
and Energy Sector Organizations
"KAZENERGY"

Dear Mr. Magauov,

With reference to your letter with ref. no. 07-03/2409 dated October 27, 2014, the NAC "Kazatomprom" JSC expresses its appreciation for including our suggestions in the Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency, previously presented by your organization.

Having re-examined this Overview, we came to the conclusion that the final draft contains the solutions to topical energy issues.

A. Arifkhanov
Acting Chairman of the Board

КазМұнайГаз

«КазМұнайГаз-өңдеу және маркетинг» АҚ
Қазақстан Республикасы,
010000, Астана қ., Тұран д-лы, 1
тел.: +7 (7172) 979 700
факс: +7 (7172) 979 740
email: ...@kmgrm.kz

АО «КазМұнайГаз-переработка и маркетинг»
Республика Казахстан,
010000, г. Астана, пр. Туран, 1
тел.: +7 (7172) 979 700
факс: +7 (7172) 979 740
email: ...@kmgrm.kz

«KazMunayGaz-refinery and marketing» JSC
1, Turan Ave., Astana, 010000,
Republic of Kazakhstan
tel.: + 7 (7172) 979 700
fax: + 7 (7172) 979 740
e-mail: ...@kmgrm.kz

«12» 09 2014 ж.
№ 13-10/2928

ОЮЛ «Казахстанская ассоциация организаций нефтегазового и энергетического комплекса «KAZENERGY»

На №07-03/1969 от 05.09.2014г.,

Акционерным обществом «КазМунайГаз – переработка и маркетинг» (*далее – Общество*) в соответствии с Вашим письмом рассмотрен обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности, подготовленную совместно с Секретариатом Энергетической Хартии.

По результатам рассмотрения сообщаем, что в рамках деятельности Общества замечаний и предложений не имеется.

Управляющий директор
по правовому обеспечению **А. Кабдушев**

Исп. Мадыбаев Е.М.
Тел.: 979680

004924

Unofficial translation

From: "KazMunayGaz-refinery and marketing" JSC

To: "Kazakhstan Association of Oil-Gas and Energy Complex "KAZENERGY"

№ 13-10/2928 from 12.09.2014

In accordance with your letter, the JSC "KazMunayGaz-refinery and marketing" has examined the review on the State Policy of the Republic of Kazakhstan in Energy Saving and Energy Efficiency Development, prepared jointly with the Energy Charter Secretariat.

Upon results of the examination we would like to inform, that in the framework of its activities, the JSC "KazMunayGaz-refinery and marketing" does not have any comments or proposals with regard to the review.

Kabdushev A.
Managing Director for Legal Affairs

"ҚазМұнайГаз Өнімдері"
жауапкершілігі
шектеулі серіктестігі

ҚазМұнайГаз
ӨНІМДЕРІ

Товарищество с ограниченной
ответственностью
"КазМұнайГаз Өнімдері"

010000, Казахстан Республикасы, Астана қаласы
заңды мекенжайы: Кабанбай батыр даңғылы, 17
почты мекенжайы: Кабанбай батыр даңғылы, 17
тел.: +7 (7172) 97 44 24, факс: +7 (7172) 97 44 88

010000, Республика Казахстан, город Астана
юридический адрес: пр. Кабанбай батыра, 17
фактический адрес: пр. Кабанбай батыра, 17
тел.: +7 (7172) 97 44 24, факс: +7 (7172) 97 44 88

11.10.2014 № 25-11/3690

«KAZENERGY»
қауымдастығының
Бас директоры
Ә.М. Магауовқа

2014 жылғы 27 қазандағы № 07-03/2409 хатына

Құрметті Әсет Маратұлы!

«ҚазМұнайГаз Өнімдері» жауапкершілігі шектеулі серіктестігі Сізбен ұсынылған «Қазақстан Республикасының энергияны үнемдеу және энергия тиімділігін арттыру саласында мемлекеттік саясаттың шолуы» қайтадан қарады.

Мәселе бойынша ескертулер мен ұсыныстар жоқ екендігін хабарлаймыз.

Бас директордың
(Басқарма төрағасының)
міндетін атқарушы **Г. Қошанов**

Орынд. В. Меркушев
тел. 8(7172)974236

0004210

Unofficial translation

KazMunayGas Onimderi
Limited Liability Partnership

Ref. no. 25-11/3690 dated October 31, 2014

Mr. A. Magauov
General Director
KAZENERGY Association

Your ref. no. 07-03/2409 dated October 27, 2014

Dear Mr. Magauov,

The Limited Liability Partnership "KazMunayGas Onimderi" has re-examined the draft "Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency", presented by your organization.

With regard to this issue, please be informed that we have no comments or suggestions.

G. Koshanov
Acting General Director
(Chairman of the Board)

NCOC
NORTH CASPIAN OPERATING COMPANY
ncoc@ncoc.kz www.ncoc.kz
АСТАНА
АТЫРАУ

Исх.№: NC-0-1409125
Дата: 29/09/2014

Генеральному директору
Ассоциации «Kazenergy»
г-ну А. Магауову

Касательно Вашего письма № 07-03/1969 от 05.09.2014

Уважаемый господин Магауов!

Благодарим Вас за письмо № 07-03/1969 от 5 сентября с.г., в котором запрашивается предоставление замечаний и предложений в отношении обзора государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности.

В обзоре, подготовленном Ассоциацией «Kazenergy» и Секретариатом Энергетической Хартии, приводится анализ состояния дел, касающихся вопросов энергоэффективности и описывается наилучшая зарубежная практика, которая может принести возможности по улучшению для Республики. Вопросы энергоэффективности также актуальны в Северо-Каспийском проекте и такой подход учтен при проектировании наших производственных объектов. После возобновления добычи мы ожидаем внести дальнейший вклад в экономическое развитие страны. В долгосрочной перспективе мы видим нашу общую цель как оказание поддержки устойчивому развитию в целом. Я также высоко ценю усилия Ассоциации «Kazenergy» в продвижении данного комплекса вопросов. Северо-Каспийский Консорциум готов и дальше оказывать поддержку и участвовать в обсуждениях по вопросам энергосбережения и повышения энергоэффективности.

С искренними пожеланиями,

Стефан де Майё
Управляющий директор
Норт Каспиан Оперейтинг Компани Б.В.

NCOC
NORTH CASPIAN OPERATING COMPANY
ncoc@ncoc.kz www.ncoc.kz
ASTANA
Republic of Kazakhstan
ATYRAU
Republic of Kazakhstan

Our Ref.: NC-0-1409125
Date: 29/09/2014

To: **Mr. A. Magauov**
General Director
ALE "KAZENERGY"

Dear Mr. Magauov,

Re: Your letter (Ref.: 07-03/1969) dated 05.09.2014

I refer to your letter dated 5 September 2014 (Ref.: 07-03/1969) which requested comments and suggestions to the review of RoK state policy in energy saving and increase of energy efficiency.

The study prepared by KAZENERGY Association and the Energy Charter Secretariat explores the status of the energy efficiency issues in Kazakhstan and describes international best practices that can offer opportunities for the country to improve. Energy efficiency is also important to the North Caspian Project operations as embedded in the design of our facilities and, once production is restarted, we shall further contribute to the economic development of the country. As a long-term investment, it is in our common interest to support sustainable development in general and I appreciate the efforts of KAZENERGY in promoting this agenda. The North Caspian Venture would be eager to further support and participate in discussions on the issues of energy conservation and efficiency.

Yours sincerely,

Stephane de Mahieu
Managing Director
North Caspian Operating Company B.V.

Legal Address:
North Caspian Operating Company B.V.
The Hague
The Netherlands

ТЕНГИЗШЕВРОЙЛ
Товарищество с ограниченной ответственностью
060011, Республика Казахстан
Атырау
ул. Сатпаева 3
Головной офис ТШО
Телефон: (7) 712-302-6000
Факс: (7) 712-302-6752

TENGIZCHEVROIL
A Limited Liability Partnership
060011, Republic of Kazakhstan
Atyrau
Satpayev Street,3
TCO Headquarters
Telephone: (7) 712 302 6000
Facsimile: (7) 712 302-6752

г. Атырау, Казахстан
31 Октября 2014 года
Исх. № 1410-327

Генеральному Директору
Ассоциации «KAZENERGY»
Господину Магауову А.

Кас: Ответ на письмо исх. № 07-03/2409 от 27.10.2014 г.

Уважаемый Асет Маратович,

ТОО «Тенгизшевройл», повторно рассмотрев проект «Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности» сообщает, что дополнительных предложений и комментарий не имеет.

С уважением,

Садирбаев А.Г.
Заместитель генерального менеджера департамента
оптимизации производства, техники безопасности и охраны окружающей среды

Unofficial translation

TENGIZCHEVROIL LLP

Atyrau, Kazakhstan
Ref. no. 1410-327 dated October 31, 2014

Mr. A. Magauov
General Director
KAZENERGY Association

Re: Your ref. no. 07-03/2409 dated October 27, 2014

Dear Mr. Magauov,

Tengizchevroil LLP has re-examined the draft "Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency", and hereby informs that it has no additional comments or suggestions.

Best regards,
A. Sadirbayev
Deputy General Manager
Department of Production Optimization,
Safety Engineering and Environmental Protection

СТРАТЕГИЯ

Исх. №12-68

07 ноября 2014 г.

Генеральному Директору
Ассоциации KAZENERGY
Господину Магауову А. М.

Уважаемый Асет Маратович!

ТОО «Центр исследований и консалтинга «Стратегия», рассмотрев проект документа «Обзор государственной политики Республики Казахстан в области энергосбережения и повышения энергоэффективности», подготовленный Ассоциацией KAZENERGY совместно с Секретариатом Энергетической Хартии, сообщает, что в обзоре выполнен качественный анализ законодательной базы, а разработанные рекомендации и представленный международный опыт имеют значительный интерес для дальнейшего совершенствования законодательной базы в области энергоэффективности..

В целом поддерживаем изложенные в документе предложения, а также считаем данные инициативы Ассоциации актуальными. Выражаем заинтересованность в дальнейшем сотрудничестве по данному направлению.

Генеральный директор **А. Буранбаев**

Республика Казахстан, 010000, г. Астана, пр. Кабанбай батыра, д. 19, тел. 7172 670880

Unofficial translation

From: Center for Research and Consulting "STRATEGY"

Ref. no. 12-68 dated November 7, 2014

To: Mr. A. Magauov
General Director
KAZENERGY Association

Dear Mr. Magauov,

Having reviewed the draft "Overview of State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency" prepared by the KAZENERGY Association jointly with the Energy Charter Secretariat, the Center for Research and Consulting "Strategy" hereby informs that this document contains a qualitative analysis of the legal framework, and the recommendations and international experience presented therein are of considerable interest for further improvement of the legal framework in the field of energy efficiency.

Generally, we support the proposals outlined in the document and deem these initiatives of the Association relevant. We express our interest in further cooperation in this matter.

A. Buranbayev
General Director

«Сәкірім-Қазына» ұлттық ғылыми қоры Акционерлік қоғамының «Академик Ш.Ш.Шокин атындағы ҚазГЭ институты» акционерлік қоғамы

АО «Фонд Национального благосостояния «Самрук-Казына»
Акционерное общество «КазНИИ энергетики им. академика Ш.Ч.Чокина»

050012 г. Алматы, ул. Байтурсын-улы, 85 Тел. 292-08-60 Факс 292-24-54
050012 Алматы қ., Байтұрсын-ұлы, 85 үй Тел. 292-08-60 Факс 292-24-54

Исх. № 461
от «11» ноября 2014 г.

Генеральному директору
Ассоциации «KAZENERGY»
Г-ну Магауову А.М.

АО «КазНИИ энергетики имени академика Ш.Ч. Чокина», получило для ознакомления документ «Обзор Государственной Политики Республики Казахстан в области энергосбережения и повышения энергоэффективности».

В документе приведено краткое описание предпринимаемых мер и достижений в области энергосбережения и повышения энергоэффективности РК, отмечены все основные барьеры, препятствующие эффективной политике энергосбережения, и даны рекомендации по их устранению и предупреждению.

АО «КазНИИ энергетики имени академика Ш.Ч. Чокина» не имеет дополнений и замечаний к представленному документу.

Председатель Правления Абдуллаев К.А.

Исп.: Джилкибаев Ж.
Тел.: 8(727) 292 88 90

000461

Unofficial translation

THE SH. CHOKIN KAZAKH RESEARCH INSTITUTE OF ENERGY

Ref. no. 461 dated November 11, 2014

Mr. A.M. Magauov
General Director
KAZENERGY Association

The Chokin Kazakh Research Institute of Energy JSC hereby informs that it received the "Overview of the State Policy of the Republic of Kazakhstan on Energy Saving and Energy Efficiency" for review and comments.

The document contains a brief description of the developments and measures taken in the field of energy saving and energy efficiency in the Republic of Kazakhstan, a description of all main barriers impeding effective energy policy, and recommendations to remove and prevent them.

Please be informed that the Chokin Kazakh Research Institute of Energy JSC has no additions or comments to the above mentioned document.

K.A. Abdullayev
Chairman of the Board

Prepared by Zh.Dzhilkibayev
Tel.: 8(727) 292 88 90