Delivering win-win solutions to industry:

A 'tour du monde' of industrial energy efficiency policies

December 5, 2013

Julia Reinaud

IIP at a glance

MISSION

Improve energy efficiency in industry, enhance productivity, and reduce GHG emissions by providing the private sector and the Government agencies access to best practice information, technologies, tools and financial solutions.

WHAT WE DO

- Sharing best practices
- Policy assistance
- Financial expertise
- Technical support

WHO WE ARE: an NGO with offices in Beijing, New Delhi, Paris, and Washington DC

Institute for Industrial Productivity

IIP's Strategic Focus

3 X 3: We position ourselves where we can make the most impact:

Institute for Industrial Productivity

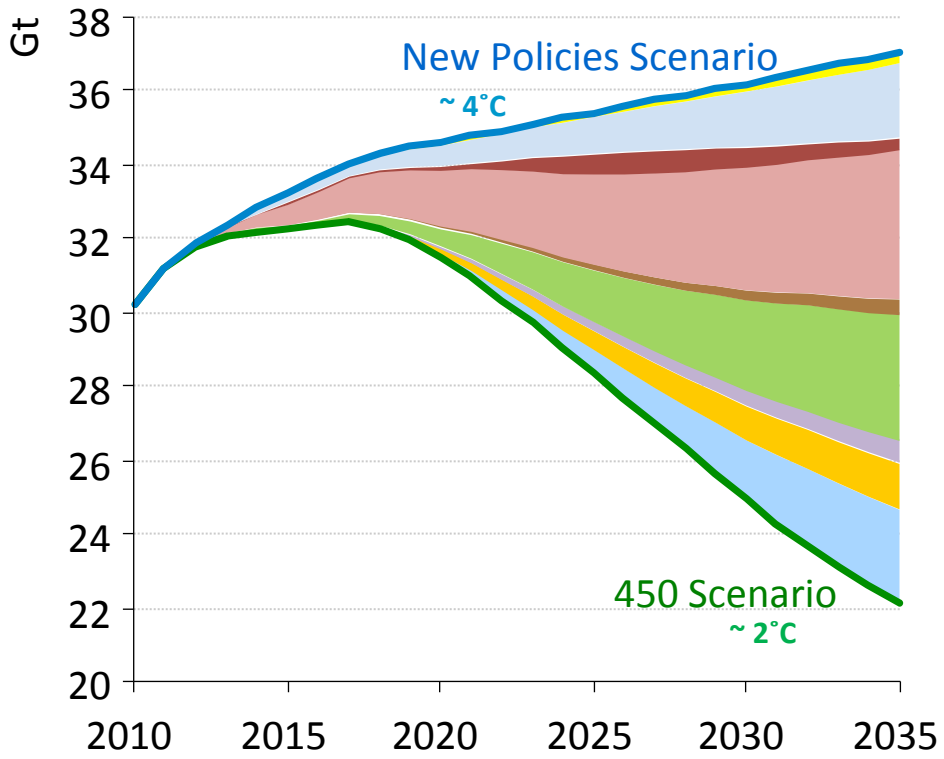
Presentation Outline

1. Untapped energy efficiency potentials in industry
2. Energy efficiency – a win-win situation
3. Drivers and barriers to industrial energy efficiency
4. Policy approaches from around the world: Findings from our “Tour du Monde”
    - *Deep dive into China, the U.S. and Denmark*
5. Food for thought

EE – a key element for CC Mitigation

WORLD ENERGY OUTLOOK 2012

Energy-related CO_2 emission abatement in the 450 Scenario

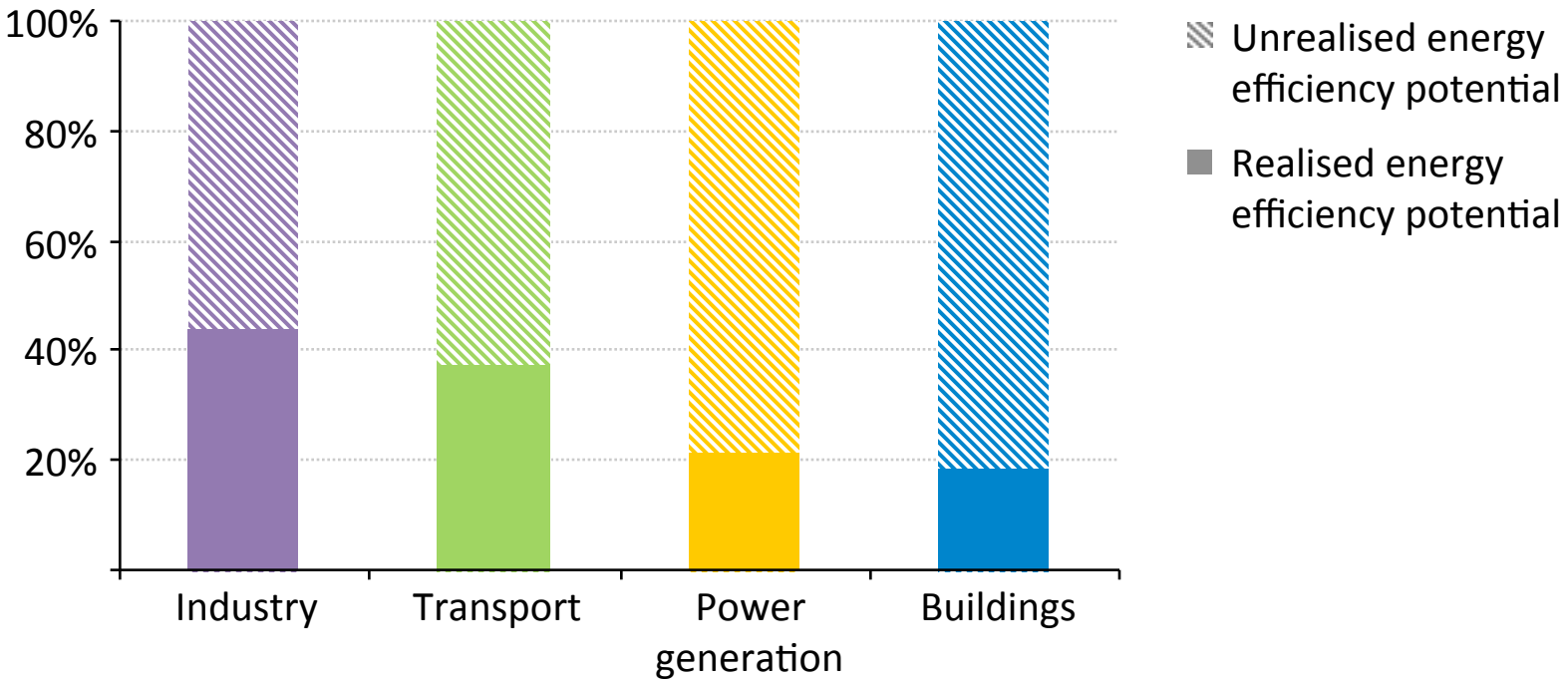


CO_2 abatement	2020	2035
Activity	2%	2%
End-use efficiency	18%	13%
Power plant efficiency	3%	2%
Electricity savings	50%	27%
Fuel and technology switching in end-uses	2%	3%
Renewables	15%	23%
Biofuels	2%	4%
Nuclear	5%	8%
CCS	4%	17%
Total (Gt CO_2)	**3.1**	**15.0**

Energy efficiency: a huge opportunity going unrealised

WORLD ENERGY OUTLOOK 2012

Energy efficiency potential used by sector in the New Policies Scenario



Two-thirds of the economic potential to improve energy efficiency remains untapped in the period to 2035

The No or Low cost of Energy Efficiency Improvements

Examples of technology improvements (Sample savings identified by US IAC's)

Description	Savings (US$)	Cost (US$)	Payback (yrs)
Recycling casting sand	$437,377	$71,170	0.2
Turning off equipment when not in use	$108,914	$25,000	0.2
Using adjustable frequency drive to replace motor-generator set	$103,515	$150,000	1.4
Reducing the pressure of compressed air to the minimum required	$173,190	$46,250	0.3
Using waste heat from hot flue gases to preheat combustion air	$225,013	$57,159	0.2

Energy Management System (EnMS) implementation

By adopting EnMS, ArcelorMittal in South Africa saved roughly *US$9 million* in 2011 with a capital investment that they offset *in less than four* production days

Drivers Stimulating Investment Decisions

Chief Technology Officer
"Do we know what energy efficiency practices and technologies are available?"
Driver: knowledge

Financial Director
"Do we have the money to invest and are we willing to spend it on EE?"
Driver: Financials

CEO
"Are we committed to prioritize EE above other investments?"
Driver: Commitment

Marketing Director
"Do the public and market demand us taking EE measures?"
Driver: Public and market demand

Regulatory Affairs Officer
"Does this government policy require us to take EE measures?"
Driver: Policy obligation

Policies must stimulate the drivers of investment decisions

Source: Ecofys 2011

Drivers, Barriers: Two Main Policy Responses

1. Enabling identification of energy efficiency opportunities

2. Enabling implementation of identified solutions

Key Findings from Our "Tour du Monde"

1. All countries have a policy package to deliver energy savings in industry
2. There is no "1 size fits all"
3. … but adoption of energy management by companies is key
4. Policies targeting the industry sector tend to be flexible to allow companies to remain competitive internationally
5. There is a growing market, led by government, for financial mechanisms dedicated to energy efficiency projects
6. Alternate and complementary channels are increasingly playing a role in delivering energy efficiency
7. … and there is a significant opportunity to scale public-private collaboration: the "more the merrier"

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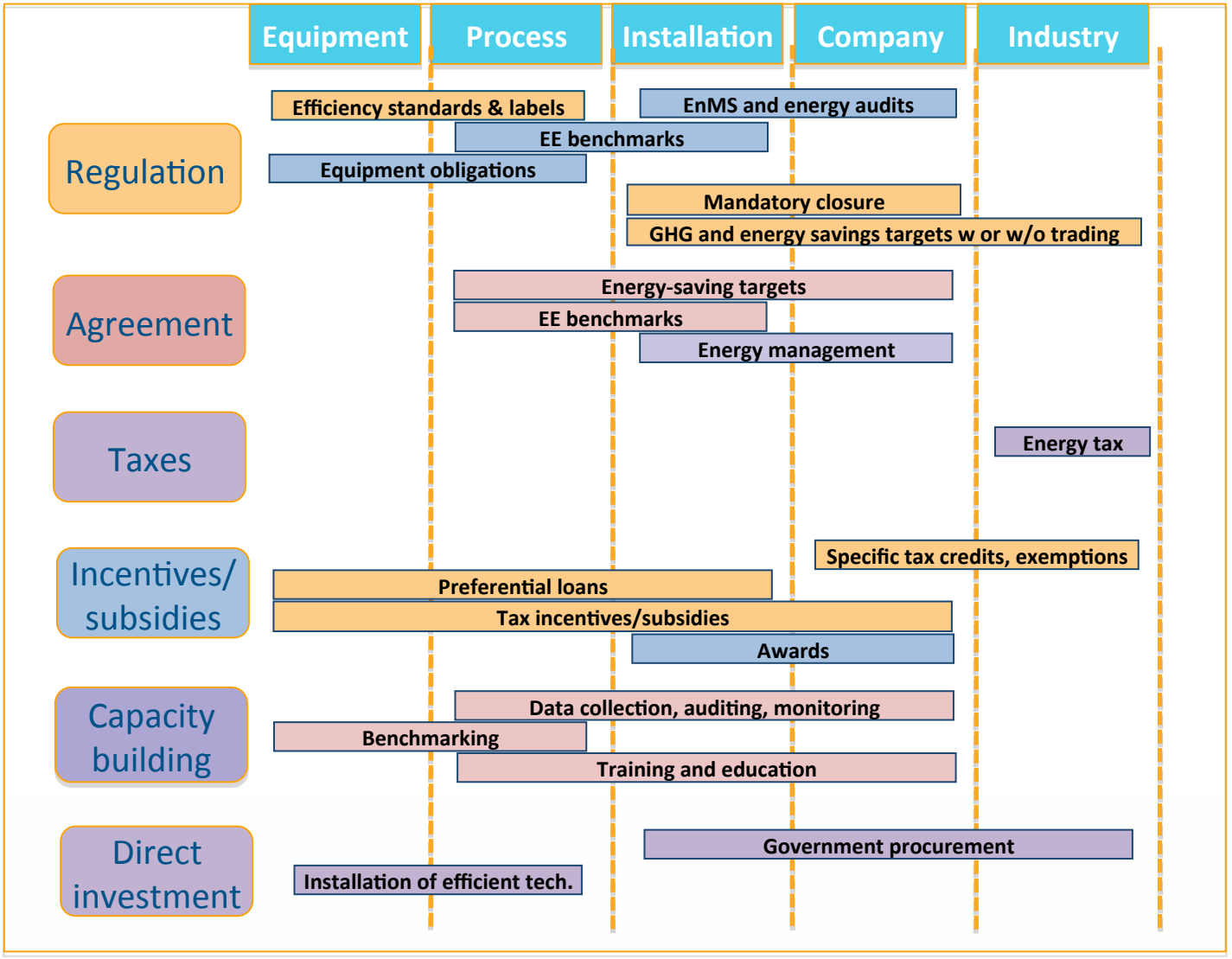
Countries introduce policy packages – not policies in isolation



Reinaud and MacNulty, 2013

IIP's Policy Pyramid

Effort-defining Policies
Interventions that motivate and drive energy efficiency, energy savings or GHG emissions reduction.

Supporting Measures
Carrot-and-stick policies that encourage action and address or alleviate barriers.

Implementation Toolbox
Guidelines, tools, templates etc. that support the above policies.

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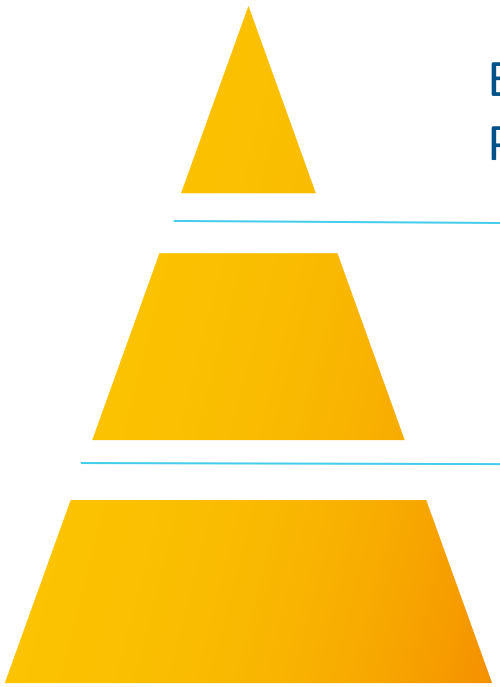
China: simplified



Effort-defining Policies

Energy conservation targets *Top-10,000 enterprise program*

Mandatory appraisals of projects & closures

Product Performance Standards

Supporting Measures

Mandatory energy management

Financial subsidies – 2 conditions

Policies targeting other actors (Escos,FIs)

Some are also by Provinces

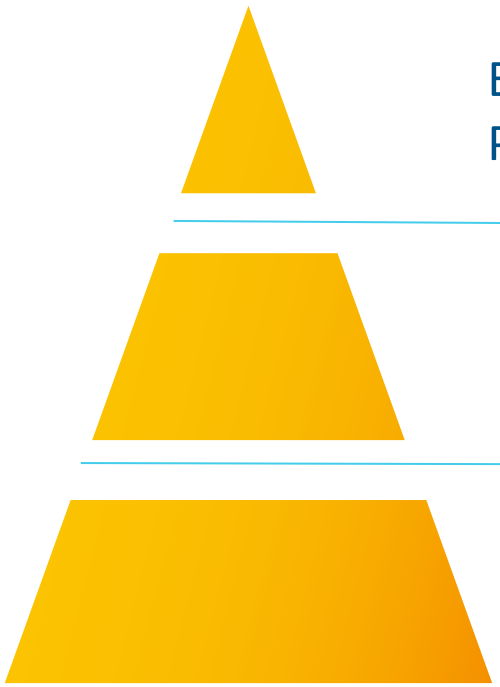
Implementation Toolbox

Technology catalogues, guidelines from Beijing

Technical support often provided at the **provincial level**

Moved away from technology push to performance standards, energy management and systems optimisation as well as green crediting policies

United States (Federal): simplified



Mandatory standards on equipment

Voluntary programs, including the Superior Energy Performance Program

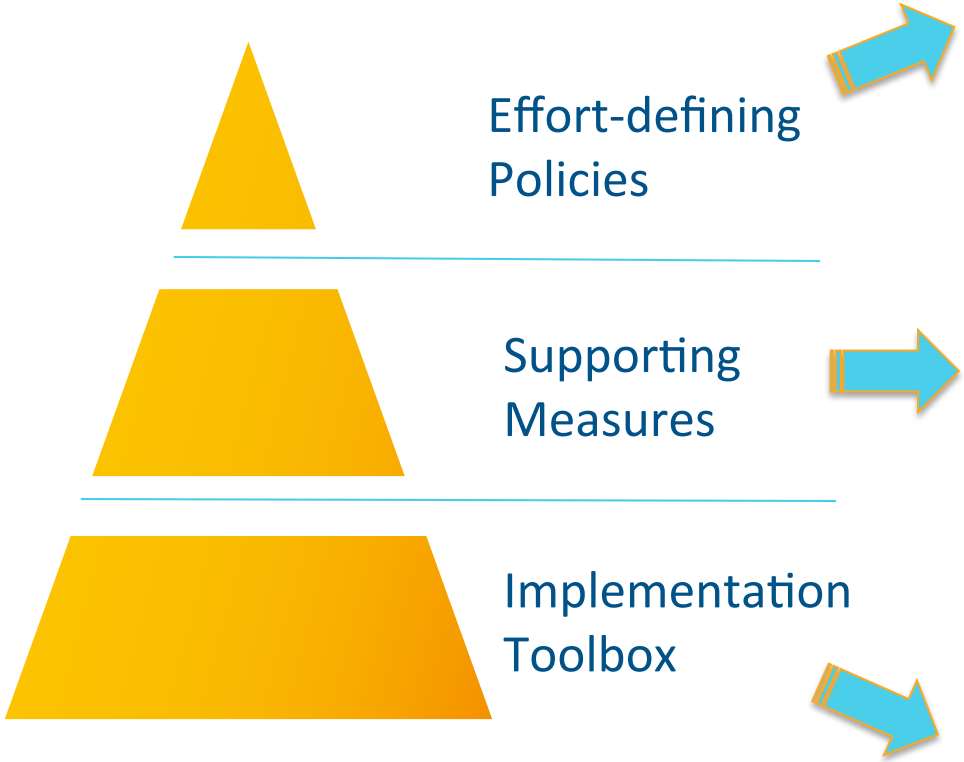
Voluntary ISO 50001 and awards

Many measures developed at the State level, with some exceptions at the Federal level

Very detailed implementation toolbox and tools to help companies identify their energy conservation potentials

ex. Software tools (e.g. Quick PEP)

Denmark's Policy Pyramid



European **Emissions Trading Scheme**
Voluntary agreement with constraints

- mandatory ISO 50001 certification,
- implementation of EE opportunities with payback <4y &
- penalty in case of non compliance

Special investigations and technical assistance
Utility obligation with financing of IEE from utility bills

In-depth technical assistance
Ex. "The Toolbox" (ex. Guidelines on EnMS, EnPIs); Information sharing and center for SMEs

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Examples of Government Programmes that Promote Energy Management

Country	Program Name	EnMS type	Voluntary Mandatory	Certification	Drivers
Australia	Energy Efficiency Opportunities	EEO Assessment Framework	M	No	Public reporting of EE opportunities
China	Top 10,000 Enterprise Program	GB 23331	M	Voluntary	Mandatory
Denmark	Agreement on Industrial Energy Efficiency (DAIEE)	ISO 50001	V	Yes	Tax rebate Mandatory investments <4y payback
Ireland	Energy Agreements Program	ISO 50001	V	Yes	Extensive technical support
South Korea	GHG and Energy Target Management scheme	ISO 50001	M	Yes	Mandatory
Sweden	Energy Efficiency in Energy Intensive Industries (PFE)	ISO 50001	V	Yes	Tax rebate
USA	Superior Energy Performance	ISO 50001	V	Voluntary	Awards, possible tax rebate

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Policies Targeting Industry

Flexible policy types:

- Voluntary agreements with companies and/or sectors (ex. GY, DK, IR, SW, US)
- Trading of energy savings or GHG emissions (ex. EU, IN)
- Maximum amount of energy per tonne of industrial product (ex. CH)
- Benchmarking targets (ex. JP)
- Rewards and incentives for overall improvement (ex. US, CH)
- Financial incentives and fiscal incentives

Often come with ties…

- Adoption of energy management systems (certified or not)
- Minimum energy performance improvements
- Penalties for non-compliance

Requirements and regulation are generally aimed towards

- EE identification (energy audits, EnMS)
- Specific equipment types (motors)
- Closure of inefficient plants (ex. CH)

Policies targeting SMEs tend to also be adapted to companies' capacity to dedicate resources to EE.

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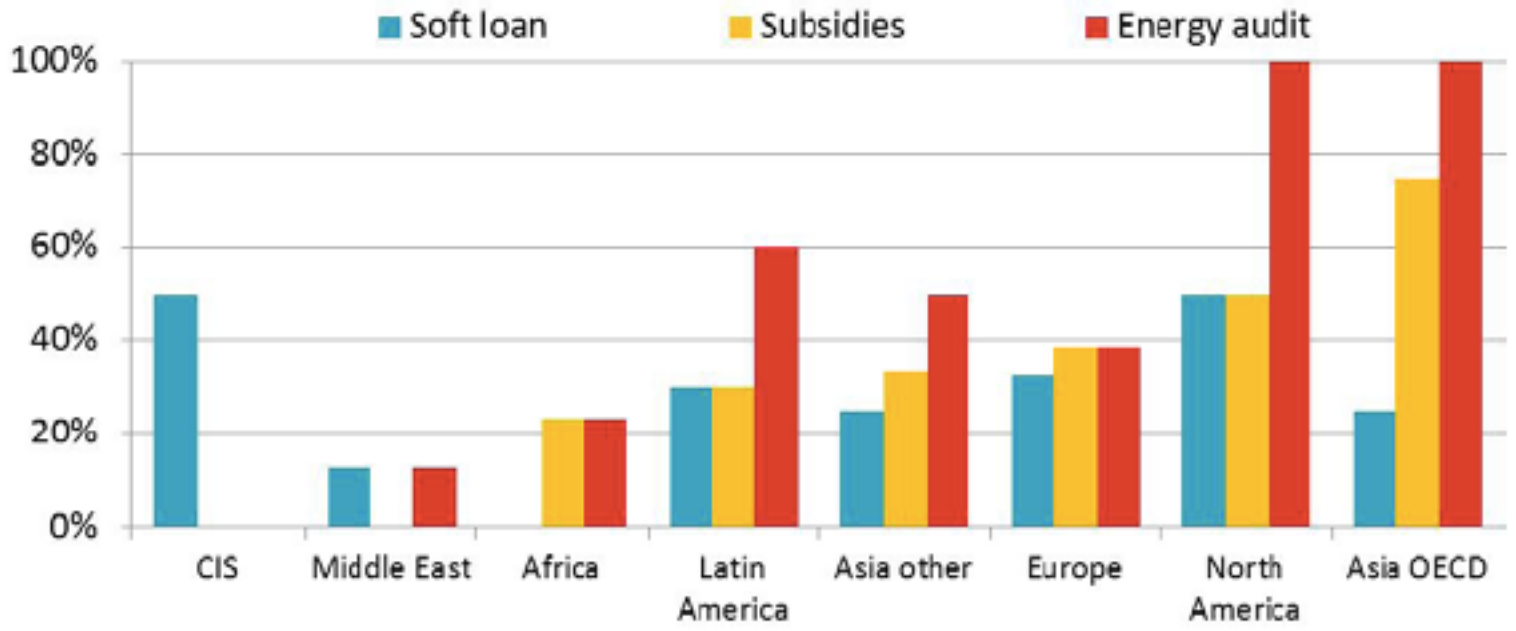
Financial Mechanisms for Industrial EE

- Direct grants that defray costs of EE projects
  - (e.g. grants to support energy audits and the technical development of EE projects)
- Subsidies and rebates
  - (e.g. direct subsidies for energy efficiency equipment)
- Tax incentives such as credits, exemptions or improved depreciation conditions
- Reduced or low-interest rate loans
- Loan guarantee schemes or similar risk-sharing schemes

Distribution of Financial Measures by Type



Ademe- WEC survey (2013)

Example of Industrial Energy Efficiency Programs Identified

Program	Country	Financial Mechanism
China Utility-Based Energy Efficiency Finance Program	China	• Risk-sharing • Leveraging commercial financing • Guarantee • Knowledge dissemination
EE Revolving Fund	Thailand	• Leveraging commercial financing • Credit line • Fund
Energy Efficiency and Renewable Source Fund	Bulgaria	• Fund • Guarantees • Credit lines
EE Vermont	US	• Utility scheme

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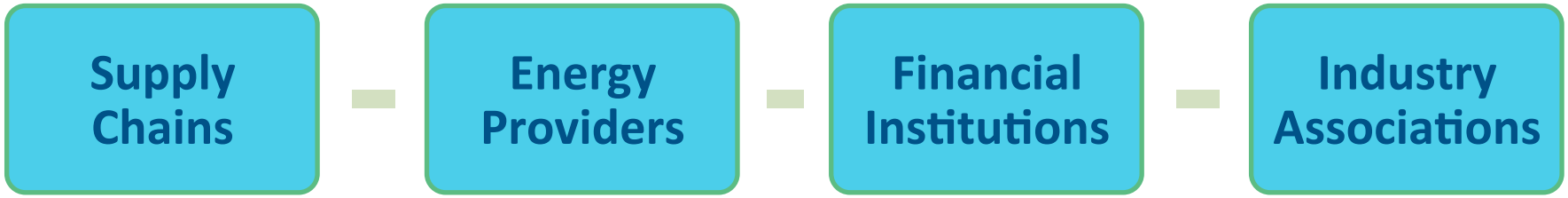
Alternate and Complementary Channels to Deliver Energy Efficiency



- Energy providers, multinational companies and multilateral and commercial banks around the world have started to initiate large-scale energy efficiency programmes that have energy management at their heart.

Alternate Delivery Channels for Industrial Energy Efficiency

Delivery Models	Drivers for Players	Drivers for Companies
Supply Chains (large corporations)	• Enhance company's reputation • EnMS can be used by all industrial players, large and small • Government support: allowing companies to meet their EE obligations by engaging their value chain	• Buying power of the large company • Cost savings • Possible implementation support
Utilities/Energy Providers (utility or third parties)	• Improve the utility's customer relations • Strategy to improve reliability and availability of power supply at a lower cost than supply resources • Regulatory requirements for energy efficiency	• Sustainable source of financing • Technical assistance
Financial Institutions	• Increase number of deals and project finance • Help assess the risks and returns of EE projects • Reduce investment risk • Improve and enhance customer relations	• Lower loan transaction costs • Blending technical assistance with financial products
Industry associations	• Provide valuable service to member companies	• Sharing of information • Implementation support

Initiatives in the Supply Chain

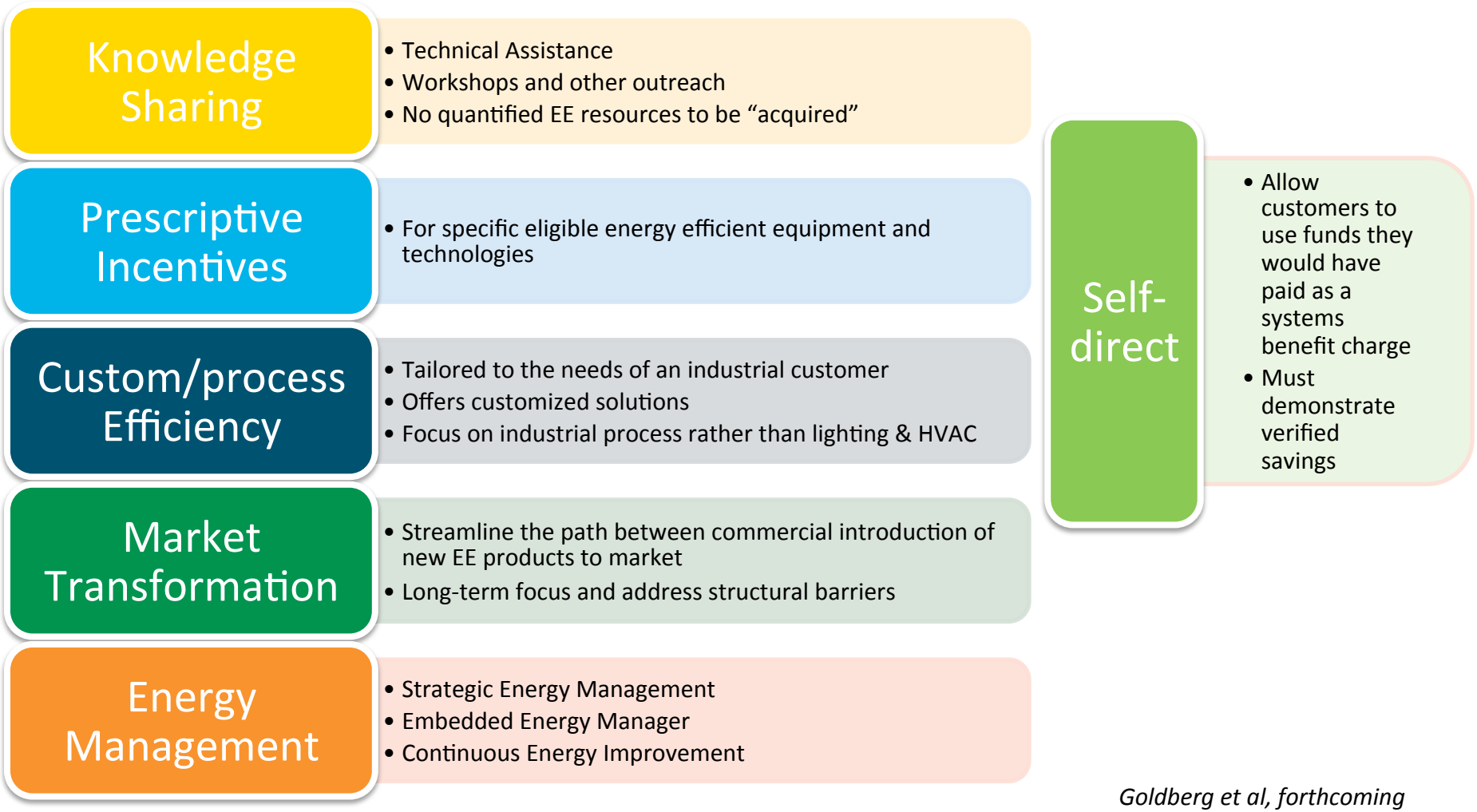
Examples

- SKF requires all its energy intensive suppliers have ISO 50001 by 2016.
- HP is requiring suppliers in China and Taiwan to implement energy management.
- Governments (Japan, Netherlands) allow larger companies to count action in the supply chain toward their energy targets/obligations.
- Financial institutions, like IFC, now offer specialised financial services for energy efficiency projects in suppliers of large brands.
- Recognition of action such as US. Save Energy Now Leader

➔ More can be done, especially to increase public-private partnership

Utility Schemes and Industrial Program Offerings

Continuum of State IEE Program Approaches in the US and Canada



Goldberg et al, forthcoming

Utility Programme Example in the US: Incentives based on EnMS performance

Milestones Achieved	Certification Path Incentives (required for enterprises >2,000 MWh/yr)
Energy Action Plan approved	$7,500
Certification readiness Report issued	$7,500
ISO 50001 certification received	$7,500
Superior Energy Performance certification	$7,500

EnMS and Industry Associations

- Introduce voluntary energy saving programs with their members.
- Coordinate network of companies to share best practices.

Food processing industry – U.S. Pacific Northwest

- The Northwest Food Processors Association (NWFPA), government and Northwest Energy Efficiency Alliance (NEEA) built a partnership to leverage enterprise participation in a voluntary EnMS program.
- The partnership set a voluntary 25% energy intensity reduction target for their sector.
- NWFPA serves as the intermediary between companies and government and coordinates sharing of best practices and information on benchmarks.
- Energy management implementation is linked with utility incentives.
- Third parties help implement EnMS in companies and provide training.

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Food for Thought

- Effort-defining policies are the most important driver that governments can provide - coherence is key
- The success of energy/GHG goals relies on the ability of companies to implement EE actions and on good government-industry consultation
- Challenge and necessity to monitor and evaluate policies implemented in order to adapt to industry needs
- Looking at investments only from the perspective of energy savings will provide a distorted RoI – Importance of Co-benefits
- Important to recognize the difference between incremental improvements and breakthrough technologies and practices

Thank you!

Julia.Reinaud@iipnetwork.org

www.iipnetwork.org

IIP Database and Resource links

iipnetwork.org/databases/policy

iipnetwork.org/databases/technology

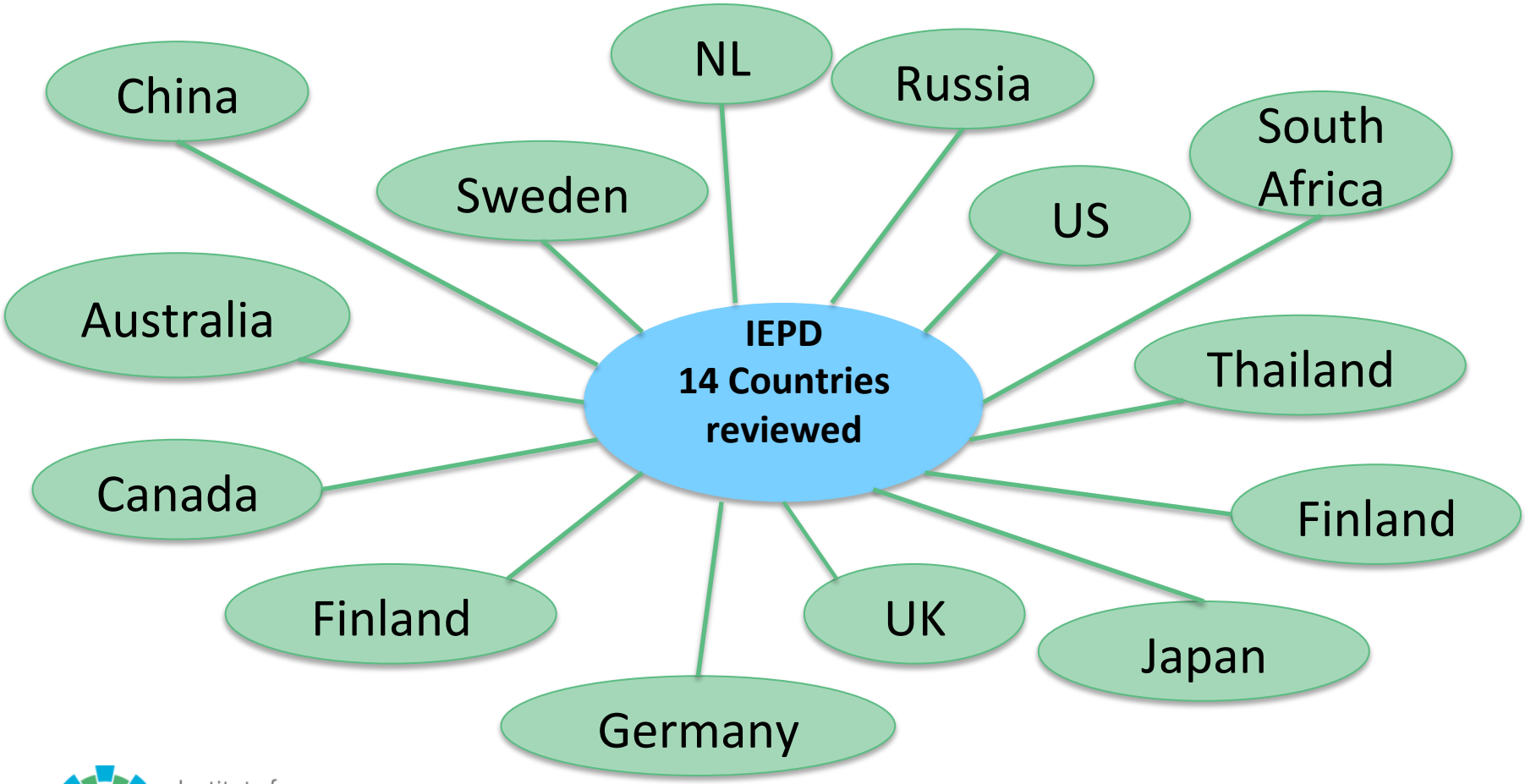
iipnetwork.org/databases/supply-chain

iipnetwork.org/databases/finance

iipnetwork.org/databases/programs

iipnetwork.org/resources

IIP Industrial Efficiency Policy Database (IEPD)



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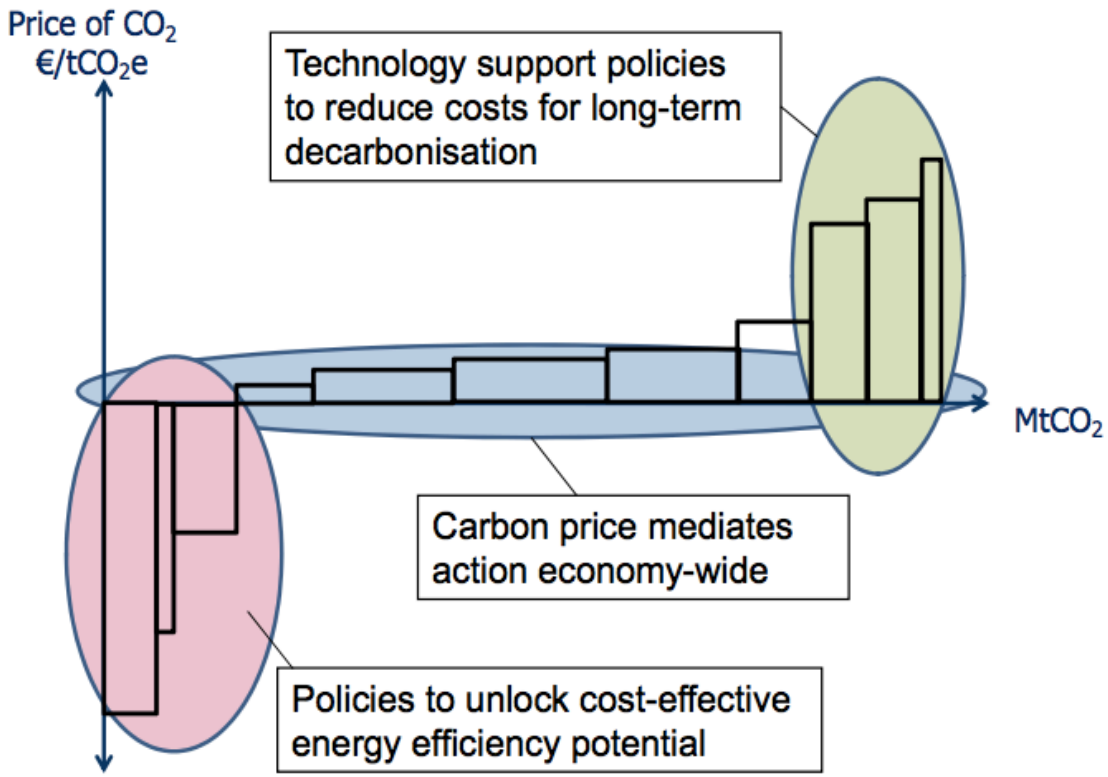
Policy Database online – www.iepd.iipnetwork.org

Achieving EE potential with an Integrated Policy Mix

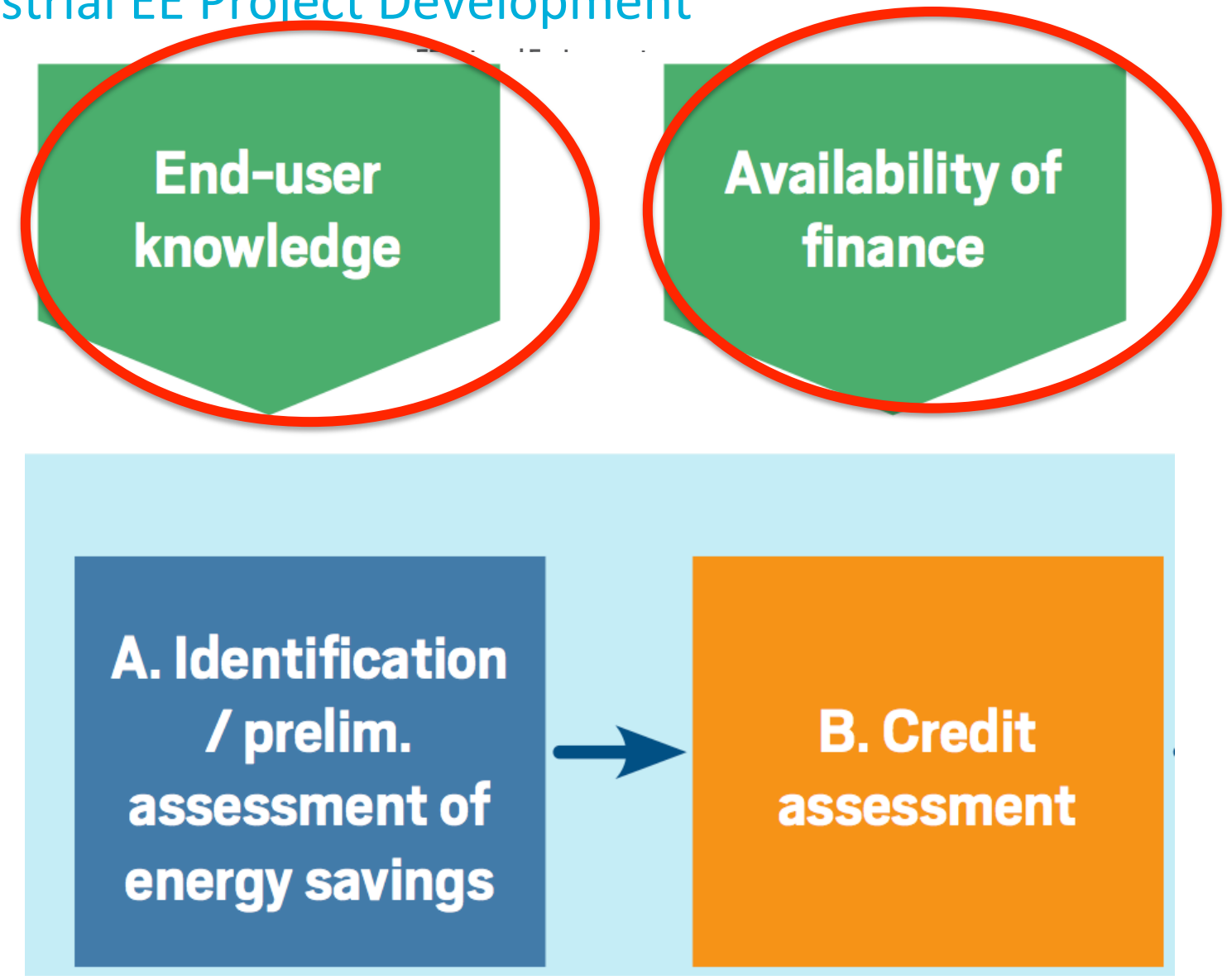
The core policy mix: a carbon price, energy efficiency and technology policies



Institute for Industrial Productivity

Source: IEA, Summing Up The Parts (November 2011)

Industrial EE Project Development



Source: Delivery mechanisms for Financing of Industrial Energy Efficiency, IIP 2012

EnMS and Financial Institutions

- Financial institutions are initiating models that blend financing with technical assistance and EnMS capacity building.

- For example, EBRD has developed internal technical capacity to promote and provide assistance on EnMS to its customers, and make EE assessments as part of its standard loan evaluation process.

GEF-funded Program: EE Market Transformation in Russia 2010-15

- EBRD and UNIDO joint program builds capacity of the government to develop effective industrial energy efficiency policies, and of industry to engage in energy management and identify energy efficiency projects.

- EBRD provides technical assistance and capacity building to industry CFOs to develop bankable EE projects according to EnMS.

Institute for

- EBRD builds capacity of local lenders, including financial intermediaries, ESCOs, to access risks and returns of EE projects.

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