

Applying Behavioural Insights for Cost-effective Energy Efficiency Interventions

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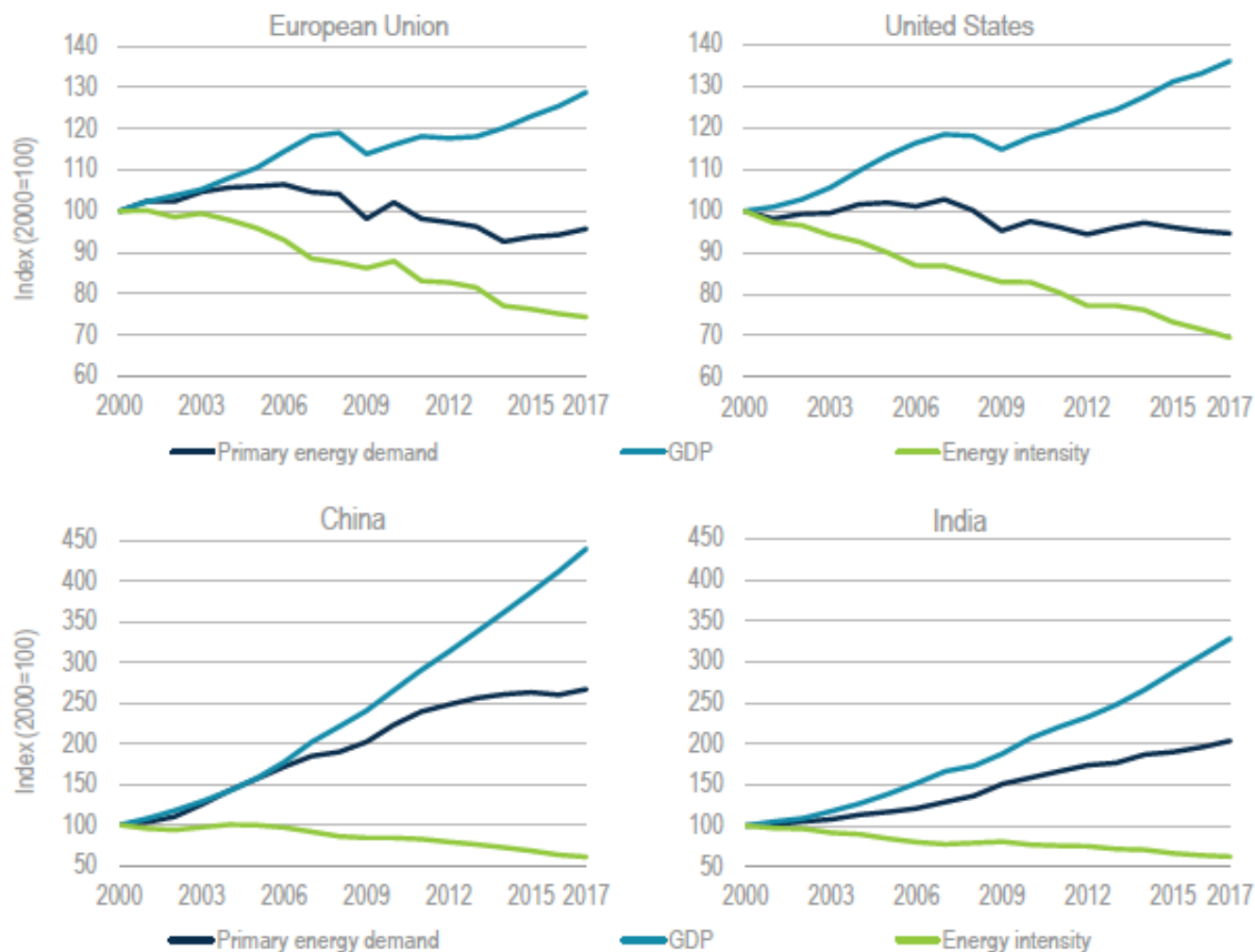
Outline

- The multiple benefits of energy efficiency (EE) and the EE Gap
- Integrating behavioural insights in EE interventions
- BEHAVE 2020 - the 6th European Conference on Behaviour and Energy Efficiency

The multiple benefits of energy efficiency

- Energy efficiency means using less energy to perform the same task or using the same energy to get more energy services.
- Energy efficiency brings a variety of benefits: reducing greenhouse gas emissions and pollution, reducing demand for energy imports, and saving our costs at household and economy level.
- Energy efficiency is often the cheapest and cleanest way to meet our energy demand while reducing the use of fossil fuels, also referred to as "the first fuel".

Energy intensity changes in different regions



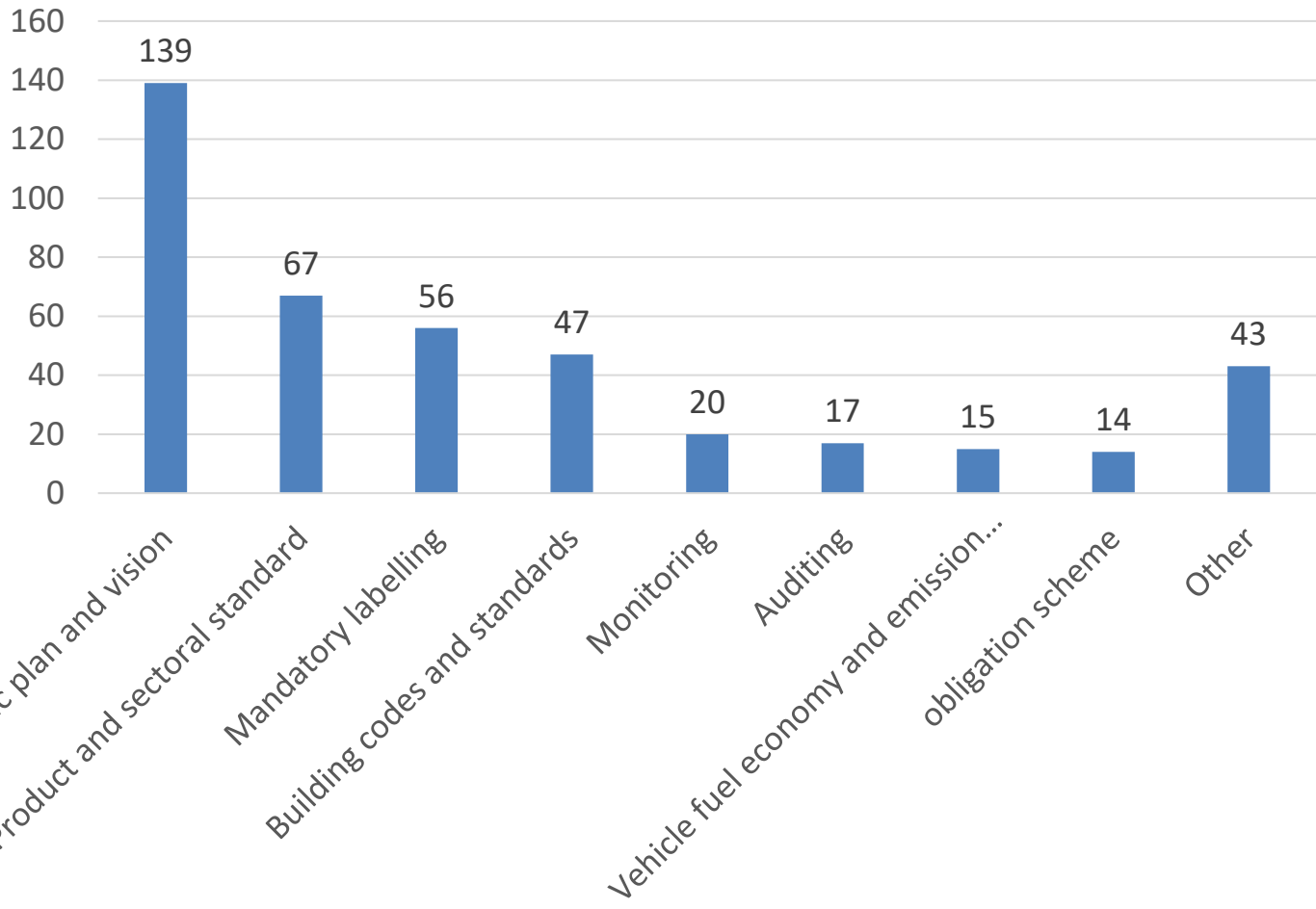
Source:
Energy
Efficiency
Report 2018,
IEA

Note: For the European Union and the United States, the left axis ranges from 60 to 140; For China and India, the left axis ranges from 50 to 450. Primary energy intensity is calculated as primary energy demand per USD 1 000 of GDP in 2017 prices at purchasing power parity.

Sources: Adapted from IEA (forthcoming), *World Energy Outlook 2018*; IEA (2018c) *World Energy Balances 2018* (database).

Types of energy efficiency policies found in 106 developing countries (as of end 2015)

Number of policies



Policy approach used in different domains to influence residential energy use

Perspective	Basic Explanation	Objective	Policy Strategy
Technology	Characteristics of buildings and technology determine energy use	Understand and increase device and thermal efficiency	Promote technological innovation and dissemination via regulation or appeals to market
Economics	Consumer as price influenced utility maximizer	Understand and use price signals to influence consumer action	Change or communicate prices of energy or energy using goods
Psychology	Individual expression through choices: mental processes affect conservation behaviour	Understand /influence individual perceptions about and actions related to energy use	Convince people that they will be better off using less energy or more efficient products
Sociology	Socially negotiated patterns of consumption: focus on groups, cultures, and larger social systems	Understand variability and patterns of consumption and the social origins of these patterns	Target people's life circumstances, identify winners and losers, look for sources of constraint and outside influences

The existence of the EE Gap and Behavioural Insights

- The untapped potential for zero and low- cost EE improvement is also known as the EE gap. Although EE improvement can bring about multiple benefits, continuing the existing policies, 2/3 of the potential EE will remain untapped.
- Behavioural economics is the study of psychology as it relates to the **economic** decision-making processes of individuals and institutions. They find some biases in human decision-making and offer some solutions for closing the energy efficiency gap.

Behavioural insights

- Main findings: two model of thought: "System 1" is fast, instinctive, and emotional; "System 2" is slower, more deliberative and more logical.

Two cognitive modes of thinking

System 1 - automatic thinking	System 2 - reflective thinking
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self-aware
Skilled	Rule following

Source: Daniel Kahneman, *Thinking, Fast and Slow*, 2011.

Behavioural biases affect EE policy effects

Bounded rationality -**Bounded rationality** reflects the limited cognitive abilities that constrain human problem solving.

- **Framing effect:** the way an option is presented (or framed) affects individual choice among alternatives.
- **Loss aversion** arises when the cost associated with giving up something is perceived as greater than the benefit that would accrue to the acquisition of the same thing.
 - Endowment effect
 - Status-quo bias

Bounded willpower captures the fact that people sometimes make choices that are not in their long-run interest.”

- **Inconsistencies** *between individual beliefs and behaviours can be denoted as cognitive dissonances.*
- **Myopia in intertemporal choices:** *individuals tend to show time-inconsistent preferences when considering decisions characterised by time-varying discount rates.*

Bounded self-interest incorporates the comforting fact that humans are often willing to sacrifice their own interests to help others.”

- Individuals are not motivated exclusively by their own utility: **altruism, fairness and social norms** also affect individual decision-making.

Source: OECD, 2017. *Tackling Environmental Problems with the Help of Behavioural Insights.*

The application of behavioural insights in policymaking

- **A nudge** is any aspect of the choice architecture that alters people's behaviour in a predictable way, without forbidding any options or significantly changing their economic incentives.
- The first 'nudging unit' in government was set up in 2009 when the US government recruited Cass Sunstein to head the Office of Information and Regulatory Affairs (OIRA) to streamline regulations.
- In 2010, the United Kingdom (UK) established its Behavioural Insight Unit (BIT) under the Cabinet Office. This approach has expanded rapidly to include Australia, Canada, Colombia, Denmark, Germany, Israel, Netherlands, New Zealand, Norway, Singapore, South Africa, Turkey and the EU.
- An OECD map in 2018 identified 202 institutions around the world applying BIs units to public policy. Some of these BI units focus on energy. One example is the Behavioural Economics Unit set up in the Sustainable Energy Authority of Ireland in 2017.

Application of BI by international organizations

- International institutions such as the World Bank, United Nations agencies, OECD and the EU have special teams to promote BI application.
- The World Bank has a behavioural science unit, eMBeD, to support governments across the globe in the implementation of behaviourally informed policies. The 2015 version of the World Bank flagship report, *World Development Report: Mind, Society, and Behaviour*, focused on explaining behavioural economics and its applications for more effective development support.
- The OECD has published multiple publications to assess the applications of BIs in policymaking.

Existing cases of nudging for EE

Case	Title	Topic	Description
1	The smart design of energy bills	Feedback/energy behaviour	Consumers were sent frequent, well-designed energy bills, which includes average energy consumption of similar households in their neighbourhood to motivate for more energy savings
2	Smart electricity meters and energy behaviours	Feedback/energy behaviour	Smart electricity meters, combined with smart feedback on consumption can reduce rush peak hour consumption
3	Improve energy behaviours through direct feedback	Feedback/energy behaviour	A luminous button gives a strong signal when the electricity price is extraordinarily high
4	Subsidy for private roof insulation	Energy renovation in buildings	Grant scheme aimed at roof insulation achieved significantly greater participation when it integration measures to address a bias related to tidy-up the attic
6	Better energy labelling of household appliances	Information/energy labelling	A new energy label highlights operating cost saving and thus draws attention away from the initial cost
7	Environmental labelling of cars	Information/energy labelling	Labelling scheme there helps to value other features of the car than just the purchase value, e.g. ongoing fuel costs and climate impact
8	Openness about consumption data and market-driven nudging	Nudging infrastructure/energy behaviour	Provides customers and potential market players access to detailed information on their energy consumption, which can produce a variety of products to improve energy behaviour
9	Including annual estimate energy cost in energy efficiency labels of refrigerators and bulbs, rather than in physical units	Information/energy labelling	Energy efficiency labels with grades in stars or letters cannot provide simple clues for consumers' quick calculation of the economic benefits of buying efficient product, to overcome this, annual operating costs should be included in the labels

Main approaches for using Behavioural insights for energy efficiency and conservation

Nudging Mechanism used	Applications to residential energy efficiency
Simplification and framing of information	Feedback on energy consumption: informative energy bills, metering and displays
	Energy labelling of appliances and buildings
Changes to the physical environment	Design for sustainable behaviour, design with intent (of homes and appliances)
	Prompts as reminders of appropriate behaviour
Changes to the default	Opt- out green electricity offers
	Opt-out from smart grid trial (technology installed to control consumption)
Use of descriptive social norms	Social comparison billing feedback

Various trials have been conducted on integrating of BI into EE intervention's, showing different degree of effectiveness.

How to design and implement the right behavioural insight interventions?

- Based on its extensive experiences, the Behavioural Insights Team has provided four principles of EAST (Easy, Attractive, Social, and Timely) for the successful application of behavioural insights.
- **Principle 1: Make it Easy.** 1) *Harness the power of default.* 2) *Reduce the 'hassle factor' of taking up a service.* 3) *Simplify messages.*
- **Principle 2: Make it Attractive.** 1) *Attract attention through effective communication;* 2) *Design rewards and sanctions for maximum effect.* Financial incentives can be effective; lotteries are a worthwhile alternative as they are also effective and tend to cost less.
- **Principle 3: Make it Social.** Social norms and peer pressure are an important influencing factor to human behaviours and choice. 1) *Show that most people perform the desired behaviour.* 2) *Use the power of networks.* 3) *Encourage people to make a commitment to others.*
- **Principle 4: Make it Timely.** 1) *Prompt people when they are likely to be most receptive.* 2) *Consider the immediate costs and benefits.* 3) *Help people plan their response to events.*

Existing tools and guidance

Guidance and Tools	Scope	Organisations	Source
Integrating BI for better public policies, the BASIC Toolkit	Case studies and lessons	OECD	OECD website
Behaviourally informed policies	<ul style="list-style-type: none"> Project support on policy designing; capacity building, focusing on development policies 	World Bank	The Mind, Behaviour, and Development Unit (eMBed) of the World Bank
Nudging in Public Policy: Application, Opportunities and Challenges	BI and their application at EU Commission and among EU member countries	EU	Research and training at the Joint Research Centre (JRC) to support EU policy-making
Applying behavioural insights in policy making to encourage sustainable lifestyles	Energy and other resource efficiency	UNEP	10YFP Sustainable Lifestyles and Education Programme
BI for the realisations of the SDGs	Sustainable Development Goals	UN	UNDP website
Many publications and projects, targeting at academic, policy makers, and practitioners	Cover many areas, one of them is environmental sustainability, including energy conservation	ideas42	https://www.ideas42.org/ (NGO, originally based in Harvard University)
Applying BI for energy efficiency improvement	Focusing on energy efficiency	ACEEE	www.aceee.org
Toolkit for the transport sector	This is a toolkit developed by the UK Department of Transport, in 2011.		

From changes specific behaviours to change habits and lifestyles

Frequency of Action\ Cost	Infrequent	Frequent
Low-cost or No cost	<ul style="list-style-type: none"> • Energy Stocktaking • Behaviour and Lifestyle Choices • Install CFLs • Pull fridge away from wall • Install weather stripping to doors & windows • Choose a Smaller Living Space 	<ul style="list-style-type: none"> • Habitual Behaviours and Lifestyle Choices • Wash in Cold Water • Take Shorter Showers • Air Dry Laundry • Turn off TV, Computer & other Devices after use
Higher cost /Investment	<ul style="list-style-type: none"> • Consumer Behaviour & Technology Choices • New EE Windows • New EE Appliances • Additional Insulation • New EE AC or Furnace 	

UNEP believes **Attitude, Facilitator, and Infrastructure** are key determinants of people's lifestyles and highlights the social factors like attitudes, knowledge, and value orientation are important shaping factors to sustainable lifestyles. These are also the application areas of behavioural insights.

Conclusions

- Behavioural economics provide some useful tools for energy efficiency policy and intervention designing.
- The application of behavioural insights has spreading among governments, enterprises, and companies
- So far their application is mainly under specific contexts, and no breakthrough on changing the macro-level modelling.

BEHAVE 2020 - 6th EU International Conference on Behavioural Economics

- Co-organized by the Copenhagen Centre on Energy Efficiency and EnR (European Network of Energy Regulators)
- Original date: Oct 2020, postponed to 21-23 April 2021, hopefully in-person in Copenhagen, otherwise moved on-line.
- Deadline for submitting long-abstract (up to 1000 words), deadline 31 Oct 2020;
- Deadline for Full paper submission: 28 Feb, 2021
- Proceedings of abstracts and selected papers will be released during the conference
- Special issue in two journals
- Very low-registration fee: 50 Euro per person
- More info available at: <https://c2e2.unepdtu.org/behave2020/>



Thank you very much

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