Ministerio de Energía
Presidencia de la Nación

Behaviour Change for Energy Efficiency: Opportunities for International Cooperation in the G20 and beyond

SCOPING WORKSHOP

Hosted by the Argentinian Ministry of Energy (MEN), the International Partnership for Energy Efficiency Cooperation (IPEEC) and the International Energy Agency (IEA)
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Background Note

The relationship between behaviour and energy efficiency

Technology and innovation, while important, cannot deliver the full energy efficiency potential required to achieve the world's energy and environmental goals. Changes in the way societies and individuals operate on a daily basis are required to ensure the long-term sustainability of current life styles. To achieve this, a better understanding of the way we produce, transport and use the energy necessary to achieve better services and material conditions is required. The human dimension and drivers behind economic development, consumption habits, and social norms are important and a better comprehension of these can help define policies that can improve countries' respective energy efficiency.

Said otherwise, energy users' behaviour is an important determinant in how they respond to energy efficiency policies and whether they choose (or not) to adopt energy efficient technologies and services. Therefore, incorporating an understanding of energy users' behaviour into the design of policies, business models and technologies is crucial for realising energy efficiency goals.

Most energy efficiency policies and programmes intend to achieve a change in behaviour, during either the purchase or use of energy-using goods and services. For example, vehicle fuel-economy labels aim to change consumers' behaviour when they *purchase* a vehicle. Government websites offering energy conservation "hints and tips" attempt to induce a change in individuals' behaviour when *using* energy. However, whether these policies and programmes succeed in inducing changes in behaviour varies, depending on the extent to which they consider how people and organisations actually make decisions.

This workshop seeks to explore how policy-makers can draw on behavioural science to harness insights on human behaviour, and improve the design, implementation and evaluation of energy efficiency policies. This will include examining the different institutional models used to incorporate behavioural science into policymaking processes.

> We can't solve problems by using the same kind of thinking we used when we created them.
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> Albert Einstein 1879-1955

The role of behavioural sciences for energy efficiency policy

Given the importance of human behaviour to the success or failure of energy efficiency interventions, there is a logical role for behavioural scientists (e.g., sociologists, anthropologists, psychologists and behavioural economists) in designing and implementing policies. However, government agencies responsible for energy efficiency have tended to rely on a narrow set of expertise, drawn from the fields of public policy, economics and engineering – among others.

Increasingly, governments are looking to behavioural science to improve energy efficiency policy design. In some cases, relatively inexpensive interventions can result in large-scale changes in energy users' behaviour. In other cases, behavioural insights have revealed a need to change existing policies dramatically to improve their efficacy. **Table 1** provides an example of how behavioural science might be used to increase the efficacy of existing energy efficiency policies.

Table 1 Examples of how behavioural sciences could improve energy efficiency policy

Efficiency policy	Examples of how behavioural science can help improve policy (non-exhaustive)
Financial incentives such as subsidies	• At the policy design stage, understanding the socio-economic and cultural backgrounds of different energy users can help determine which would respond positively to financial assistance for the purchase of energy efficient equipment, allowing for more targeted policy interventions. This saves governments from spending on population segments that do not need incentives. • At the policy implementation stage, information campaigns on incentive schemes can be informed and designed with insights from behavioural science on how target groups obtain and assimilate information. This in turn can help ensure that there is a high uptake of the incentives for energy efficient behaviours amongst target groups.
Awareness-raising and education programmes	• Behavioural science can help policy-makers understand how different energy users obtain information, which sources of information are used and deemed trustworthy, and how they can then design campaigns that target users in tailored ways for higher impact.
Labelling schemes	• Behavioural insights can help inform the design of labels that convey information that energy users care about in an easy-to understand manner by considering the way users respond to visual signals. • Behavioural insights can help to determine where to place the labels to make their use more effective by taking into account the way users absorb information and make purchase decisions.
Energy price mechanisms	• Behavioural science can also help in the design of energy tariff (in particular electricity tariff) structures to ensure that these take into account the point at which users respond to price signals, and to develop the supporting communications materials that are tailored to users.

This background note provides examples of behaviour-related challenges to improving energy efficiency in three sectors: building and appliances, transport, and industry. For each challenge, examples are provided of policies commonly used to overcome them.

1. Behaviour change in the buildings and appliances sectors

In the buildings sector, efficiency improvements could be realised through changes to energy users' behaviour in relation to, amongst other things:

1) **Purchasing and investment decisions** (e.g. buying more energy efficient appliances, investing in building retrofits)
2) **Appliances, equipment and devices' use** (e.g. setting equipment optimally); and
3) **Tariff choices** (e.g. switching to off-peak electricity tariffs to curb peak demand)

This table presents examples of behavioural challenges commonly observed in the sector, possible reasons for such behaviours, and policies and programmes commonly applied to overcome them.

Behaviour	Possible reasons for the observed behaviour	Common policy approaches in response
Building technologies and appliances are not used in a way that optimises energy use.	• Energy users lack information on how to use appliances and equipment efficiently. • The design of equipment is not user friendly. • Occupants are not aware of the benefits of more efficient behaviours. • Cultural norms or personal preferences prevent an efficient use of devices.	• Deliver information on optimal equipment use through trusted communication channels, with messengers trained in how to frame messages appropriately. • Deploy smart devices[1] to reduce the chance of sub-optimal appliance use (e.g. smart thermostats) and design policies that reward the installation of smart devices (e.g. incentives or utility obligations).
Residential users do not switch to cost-effective off-peak electricity tariffs.	• There are insufficient incentives to switch tariffs or providers, compared to the administrative efforts involved. • Lack of information on the potential savings that would arise from switching tariffs.	• Use incentives, utility obligation schemes, and other means to promote devices (e.g. smart meters) that motivate users to switch tariffs by providing near-real-time feedback on home energy use and costs. • Tailored media campaigns to promote benefits of tariff switching.
Appliances and lighting: consumers continue to purchase inefficient products, over efficient, cost-competitive alternatives.	• Retailers fail to provide information on the energy efficiency performance of the appliance/lighting at the time of purchase. • There is a lack of simple and credible labelling and rating schemes that would help consumers and business make good purchasing decisions. • More purchases are being made online, rather than in person – which leads to energy efficiency being ignored.	• Design labelling and rating schemes by drawing on principles that help maximise consumers' engagement. • Design choice engine[2] to nudge purchasing decisions through visible and actionable efficiency information. • Train retailers in how to sell efficient appliances. • Encourage online retailers to display efficiency information prominently during purchase decisions.

2. Behaviour change in transport sector

In the transport sector, efficiency improvements could be achieved through changes in users' behaviours in relation to, amongst other things:

1) Vehicle purchasing decisions (e.g. buying more efficient vehicles such as electric vehicles)
2) Vehicle use (e.g. driving less or driving more efficiently through "eco-driving" techniques); and
3) Modal choices (e.g. choosing the most efficient mode of transport to get from A to B)

This table presents examples of behavioural challenges commonly observed in the sector, possible reasons for such behaviours, and policies and programmes commonly applied to overcome them.

Behaviour	Possible reasons for the observed behaviour	Common policy approaches in response
Commuters do not purchase efficient vehicles (e.g. electric vehicles)	• Perceptions that efficient vehicles especially electric vehicles have limitations, including short driving ranges, long charging times, as well as a lack of supporting infrastructure. • Perception that efficient vehicles are more expensive than conventional vehicles. • Information on fuel savings and safety driving is not visible enough.	• Design policies that encourage the uptake of efficient vehicles, including vehicle fuel economy labels, "smart" subsidies (e.g. France's Feebate system[3]) but also dynamic pricing for parking based on vehicle types, among other things. • Build the necessary supporting infrastructure (e.g. charging points). • Carry out communication campaigns (e.g. Go Ultra Low communication campaign. This campaign motivates users to use electric vehicles through an online platform with a car selector, a charging point map, a tax and a savings calculator.)
The driving styles of passenger, and freight vehicle users do not maximise efficiency	• Commuters and commercial vehicle users lack information on efficient driving styles and optimal fleet management practices that can improve efficiency. • Fuel subsidies and inexpensive fuel create disincentives for efficiencies. • Perception amongst certain vehicle users that eco-driving can reduce enjoyment of driving.	• Provide eco-driving programmes, (e.g. during driver training), and encourage effective fleet management practices (e.g. measuring fuel and activity, managing and developing feedback tools). • Provide credible tools and information to measure and benchmark the energy consumed (e.g. The U.S. EPA SmartWay programme helps companies and organisations improve transport sustainability through better measurements and benchmarking of the energy consumed).
Commuters opt for driving rather than taking public or active transport[4]	• Public transport is perceived to be inconvenient, time consuming, and/or expensive. • Urban planning and road designs do not support active transport. • Lack of transport sharing platforms (e.g. for shared cars and bikes).	• Develop trip planning tools (e.g. phone apps) to give real time transport information and transport sharing availability to change consumers' preferences, and reduce vehicle travel demand. • Information campaigns on trip planning tools and public transport upgrades.

3. Behaviour change in industry sector

Industrial energy efficiency could be improved through changes to behaviour in relation to, amongst other things:

1) Investment decisions (e.g. organisations invest in cost-effective energy efficiency technologies and energy management systems);
2) Organisational culture (e.g. integrating energy efficiency into corporate strategies).

This table presents examples of behavioural challenges commonly observed in the sector, possible reasons for such behaviours, and policies and programmes commonly applied to overcome them.

Behaviour	Possible reasons for the observed behaviour	Common policy approaches in response
Energy efficiency is often overlooked by company procurement managers	• Energy is not a major cost to the company's production. • Poor communication between procurement managers and energy managers. • Lack of awareness of the company's energy consumption, and the potential energy savings that are available. • No energy efficiency culture within the company. • Companies do not face reputational risks for poor energy efficiency performance.	• Support the creation of industry networks to improve data availability on performance management and benchmarking to raise awareness of efficiency opportunities (especially at the board level). • Promote innovative energy monitoring systems that can enable users to discover, analyse, and share data about how energy is consumed, and the potential to become more efficient. • Promote energy management standards (e.g. ISO 50001[5]) that help to integrate energy efficiency into broader organisational practices. • Organise awareness raising programmes at company level. • Design policies that increase reputational risks and financial costs for poor performers and reward top performers (e.g. public energy/carbon emissions reporting, penalties, etc.).
High aversion to risk associated with adopting new technologies and practices in certain industries	• Organisations and individuals lack the knowledge and capacity to adopt best available technologies and practices. • Organisations and individuals lack incentives to follow best practices. (e.g. no specific obligatory standards)	• Enhance capacity building and knowledge sharing (e.g. sharing best practices on energy savings through digitalised platforms) • Training and technical support (for upper management and process engineers for example). • Design policies that reduce cost risks of adopting energy efficient equipment (e.g. low interest loans).

4. How can behavioural science contribute to policy design?

BUILDINGS AND APPLIANCES

- Governments can help households set realistic energy saving goals, and evidence suggests that encouraging them to publicly commit to electricity reduction goals can help drive further energy efficiency gains.[6]
- People often stay with the default settings of the appliances they use, due to a bias towards the status quo (this is called 'status quo bias')[7] Setting the correct default settings on energy-intensive appliances can lead to greater efficiencies and could make major differences to overall energy consumption (e.g. Increase the temperature setting of cooling appliances in India will result in big electricity savings[8]).
- Recent evidence suggests that customers will respond to peak vs. off-peak tariffs, but once they have switched to these, increasing peak tariffs do not seem to lead to additional savings.[9] In fact, policies establishing peak tariffs are more effective when combined with information feedback, such as well-designed energy-use statements and in-home displays.

TRANSPORT

- Well-designed in-car feedback systems are crucial for drivers to respond to the impacts of eco-driving and prevent them from reverting to past behaviours[10].
- Providing visible vehicle fuel economy labels at point of sale, and also at where vehicle purchases are researched, can direct consumers towards buying more efficient vehicles[11]
- "Relativity bias", (how people respond to the order in which choices are presented), may have implications for the design of trip planning tools, etc.: transport options presented first may enjoy greater take-up.

INDUSTRY

- Companies' aversion to energy efficiency investments may be explained by individuals' aversion to uncertainty and ambiguity and "present bias" whereby people weigh present rewards more heavily than future rewards. This suggests policies should include a combination of information to remove uncertainty, and mechanisms to help companies realise the paybacks of efficiency up-front.
- Campaigns aimed at motivating employees through competitions, comparisons and financial rewards tend to be more successful than those with more general 'using less energy' slogans.[12]
- For energy efficiency industrial policies to be successful, it is crucial to secure commitments by senior management to energy efficiency as cultural change starts at the top in many organisations. Therefore, integrating behavioural insights in engaging board level should be further explored. (e.g. Netherland government conduct field research to investigate the effectiveness of different metrics in motivating board level engagement on energy efficiency in companies.[13])
- Certain companies may respond to financial penalties or increased reputational risks as key drivers for energy efficiency investments while others may respond better to rewards for good performance (e.g. risks and rewards associated with public carbon emissions reporting).[14]

5. Examples of international actors and actions

Actors	Actions
OECD	The OECD aims to find new ways to improve government policies and practices through behavioural insights. Some key upcoming projects include: A framework and policymaking toolkit to help governments develop and use behavioural insights Understand organisational behaviour to create a culture of safety in the hydrocarbon sector Understand consumers' needs to identify trade-offs and long-term impacts of infrastructure and pricing decisions.
IEA	IEA-Demand Side Management Technical Collaboration Programme (DSM TCP) • Task 24 uses a collective impact approach methodology and storytelling as the overarching language and brings 'Behaviour Changers' from all sectors (industry, government, research, middle actors and the third sector) together with the end users. • Task 25 will focus on identifying and creating effective business models that lead to the growth of the demand market for energy efficiency. In addition, this Task will focus on identifying and supporting the creation of energy 'ecosystems' in which these business models can succeed. • Some other IEA initiatives also involve behaviour change components, including the community scale methods of the Energy in Buildings and Communities (EBC), the Smart Homes studies of the Energy Efficient End-Use Equipment (4E) and, behaviour change workshops by the Experts' Group on R&D Priority Setting and Evaluation (EGRD).
World Bank	The World Bank helps countries conduct energy efficiency and conservation campaigns in support of energy sector and subsidy reform through its Energy Subsidy Reform and Delivery Technical Assistance Facility housed within the Energy Sector Management Assistance Program (ESMAP). The World Bank Behavioural Science for Development also conducts projects informed by behavioural sciences.

6. Examples of upcoming Behaviour Change Events

Event	Objective
5th European Conference on Behaviour Change and Energy Efficiency 5th-7th September 2018, Zurich, Switzerland	The BEHAVE 2018 conference aims to facilitate the exchange of knowledge, sharing multi-disciplinary research on new technological developments and best practices on sustainable energy behaviour in transport, buildings and consumption of goods as well as the individual and social acceptance of sustainable technologies (e.g. renewables). Resources and reference materials from past conferences held in Europe can be found on the individual conference websites Coimbra, Portugal - 2016, Oxford, UK – 2014, and Helsinki, Finland – 2012).
WCG-OECD Behavioural Insights Conference 27th-28th September, Cape Town, South Africa	This conference aims to foster global partnerships on promoting sustainable social outcomes and better service delivery. The development of a behavioural insights policy-making toolkit and ethical frameworks will be discussed.
The Behaviour, Energy & Climate Change Conference (BECC) 7th-10th October 2018, Washington, DC, U.S.	The BECC conference focuses on understanding human behaviour and decision-making and using that knowledge to accelerate the transition to a low-carbon future. Currently in its 12th year, BECC is associated with a growing set of allied conferences in Europe and Asia. Resources and reference materials from the prior conferences can be found in the archives section on the conference website).
2019 Summer Study of the European Council for an Energy Efficient Economy (eceee 2019) June 2019, Hyeres, France	The next eceee Summer Study will pick-up on a ten-year old eceee report entitled ”Is efficient sufficient?”, we continue to challenge today’s prevailing concepts in energy efficiency policies. The summer study moves the frontiers of energy policy and established practices, and looks at what is really needed to break the curves of increasing energy demand and rising temperatures. It will also focus on energy sufficiency, and the outcomes of the big on-going project of eceee on energy sufficiency will be presented at this event.

Endnotes

[1] Smart devices are able to “learn” user preferences and adjust equipment accordingly while also boosting efficiency.

[2] An example of choice engine is Enervee’s PG&E Marketplace. The appliance choice provided Energy Score, integrated rebate sign-up functionality and personalised energy bill savings and ClearCost (cost to buy and operate model) to help facilitate customers’ shopping experience and nudge purchasing decisions without eliminating consumers’ choices nor providing any further financial incentives.

[3] Under the CO2-based bonus-malus system of France, the car buyer would either pay a fee (malus) for vehicle CO2 emissions above certain levels (as officially determined by the EU vehicle type approval procedure), or receive a rebate (bonus) if the vehicle's CO2 emissions were below certain limits. This system is regarded as a zero cost “smart” policy for the government.

[4] Active transport refers to any form of human-powered transportation – e.g. walking, cycling, and using a wheelchair, in-line skating or skateboarding.

[5] ISO 50001 is based on the management system model of continual improvement. This makes it easier for organisations to integrate energy management into their overall efforts to improve quality and environmental management.

[6] Changing energy behaviour – what works?, Sustainable Energy Authority of Ireland (SEAI), expected public release August 2018.

[7] Status quo bias is an emotional bias that the current state of affairs is the preference. The current status quo is regarded as a reference point, and any change from that baseline is perceived as a loss.

[8] *Why power ministry wants to set your AC temperature at 24 degree Celsius,* By Nishtha Saluja, ET Bureau, 23 June.

[9] Ibid.

[10] *Reviewing In-vehicle Systems to Improve Fuel Efficiency and Road Safety,* By Atiyeh Vaezipour et al., Mar. 2015.

[11] *Review and evaluation of vehicle fuel efficiency labelling and consumer information programs* , by By Zifei Yang et al., consulting report of The International Council on Clean Transportation (ICCT), January 2016.

[12] *Understanding the Behavioural Drivers of Organisational Decision-Making Rapid Evidence Assessment ,* pp. 82, By the Institute for Employment Studies (IES) of UK Government, Mar. 2016

[13] *Increasing energy efficiency in the Netherlands by behavioural insights & RCT* by Eva van den Broek, PhD, Behavioural Insights Team (BIT EZ) of government of Netherlands , Nov. 2015 at IEA’s workshop - Influencing Business Behaviour and Decision Making to Improve Energy Efficiency.

[14] *Driving energy efficiency in the UK’s large energy users: Findings from the evaluation of the CRC Energy Efficiency Scheme,* By Laura Edwards, Nov. 2015 at IEA’s workshop - Influencing Business Behaviour and Decision Making to Improve Energy Efficiency.