The Economist Intelligence Unit

A report by The Economist Intelligence Unit

DRIVING ENERGY EFFICIENCY:
A comparison of five mature markets

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CONTENTS

EXECUTIVE SUMMARY

As governments work to meet the carbon emissions targets agreed at the United Nations climate conference in Paris in December 2015, improving energy efficiency has emerged as a critical part of the effort. Those efforts have focused on all areas of energy consumption, including industrial, commercial and residential uses. This report focuses on innovative strategies for conserving energy in the residential and commercial sectors, and compares initiatives in five countries: the US, Canada, the UK, France and Germany.

These initiatives can be grouped into three broad categories: raising awareness of the need to conserve energy; tightening technical standards for buildings and energy-using products and establishing building codes and more stringent building related regulations; and offering financial incentives for energy conservation in the form of grants, tax breaks and low-interest loans.

The specific strategies for encouraging conservation differ depending on the ownership of buildings. For owner-occupied accommodations, investments in insulation, low-energy appliances and efficient heating and cooling equipment offer direct payback in terms of lower energy bills. In rented accommodations and in workplaces, the incentives are more complex, due to the different interests of owners, on the one hand, and tenants, on the other. In this sector, the energy-savings technologies must be joined to gains-sharing schemes that incentivise both tenants and owners to conserve energy.

This study reaches the following main conclusions:

- Energy efficiency initiatives require careful planning based on an understanding of the messages that will motivate different audiences. Some consumers and businesses respond well to appeals based on environmental considerations, while others focus more on financial incentives.
- The success of energy savings initiatives depends on the degree of trust that audiences place in the organisation delivering the message. In the US, where utilities have long been regulated by public service commissions that set the price of power, consumers tend to respond well to utility-led conservation initiatives. In contrast, in the UK, where energy companies were privatised in the 1990s, consumers tend to mistrust messages from privately-owned power providers.
- Product-labelling schemes and systems that rate the efficiency of buildings or homes have proven effective tools for encouraging purchasing of energy-efficient products and investing in low-energy buildings.
- While lower energy bills encourage investment in efficient homes and appliances, governments should guard against the "rebound effect", in which the benefits of energy-efficient appliances and homes are wiped out by purchase of new appliances and devices, and higher overall energy use.

ABOUT THIS REPORT

Driving energy efficiency: A comparison of five mature markets is an Economist Intelligence Unit (EIU) report, commissioned by Rexel, an electrical and low-energy equipment distributor and service provider. The report looks at the key role the public sector plays in promoting energy efficiency in both homes and workplaces. The focus is on how five industrialised countries—the UK, the US, Canada, Germany and France—are trying to inform and incentivise energy efficiency in homes and workplaces.

This report is based on desk research and in-depth interviews with 10 experts in energy efficiency, conducted in June and July 2016. The EIU would like to thank the following individuals (listed alphabetically) for sharing their insights and experience:

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- Jon Creyts, managing director, Rocky Mountain Institute
- Mindy Lubber, president, Ceres
- Brian Motherway, head of energy efficiency, International Energy Agency
- Michal Nachmany, lead, Global Climate Legislation Study, Grantham Research Institute on Climate Change and the Environment, London School of Economics
- Matthew Savage, director, Oxford Consulting Partners
- Carine Sebi, PhD, project manager and energy efficiency expert, Enerdata
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1. INTRODUCTION: THE ENERGY CONSERVATION GOAL

It is often said that the cleanest unit of energy is the one that is not used. This is because lowering energy consumption helps prevent greenhouse gas emissions—both from reduced direct consumer demand for fossil fuels and from lower electricity demand, which reduces emissions from power generation. Although investment in renewable energy has dominated the climate change mitigation debate in many countries, energy efficiency is actually a more effective means of achieving a low-carbon economy. The International Energy Agency (IEA) has found that in 2030, energy efficiency will account for 49%—the biggest proportion—of global greenhouse gas reduction.[1]

"People think about renewables and the supply side but the more mundane business of saving energy actually makes a bigger contribution," says Brian Motherway, head of energy efficiency at the IEA. "The biggest source of clean energy in the world today is energy efficiency, because it allows you to do more without having to supply more energy."

It comes as no surprise, then, that energy efficiency is enjoying renewed attention in the wake of the global agreement on lower carbon emissions targets reached at the United Nations climate conference in Paris in December 2015. Some of the more advanced energy savings initiatives are being implemented in the world's advanced economies.

Germany, which until recently focused on renewable energy as its main climate-change solution, recently launched a large-scale programme called "Effizienzoffensive", or "efficiency offensive". This programme dedicates substantial funds for energy-saving measures, including a national campaign to promote awareness of energy efficiency.

Such initiatives can yield significant energy savings. The McKinsey Global Institute, a think tank, says that energy efficiency investments of $170 billion could cut global growth in energy demand by at least half by 2020. That is equivalent to a reduction in energy demand of about one and a half times today's energy consumption in the US.[2] Some of the biggest targets for reduced energy consumption are buildings—both homes and workplaces—since these account for more than one-third of all final energy use worldwide, and half of global electricity use, according to the IEA.[3]

Mature economies, in particular, offer rich opportunities for conserving energy in buildings. In such economies, much of the building stock is old and inefficient in retaining heat. In apartment buildings alone, comprehensive upgrades can boost energy efficiency by 15% to 30%, according to the American Council for an Energy-Efficient Economy (ACEEE), a non-profit organisation that promotes energy efficiency.

[1] International Energy Agency, "Energy and Climate Change: World Energy Outlook Special Report", 2015; https://www.iea.org/publications/freepublications/publication/WEO2015SpecialReportonEnergyandClimateChange.pdf

[2] McKinsey Global Institute, "The case for investing in energy productivity", February 2008; http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/the-case-for-investing-in-energy-productivity http://bit.ly/29B2cu2

[3] International Energy Agency, "Transition to Sustainable Buildings: Strategies and Opportunities to 2050", 2013; https://www.iea.org/publications/freepublications/publication/Building2013_free.pdf

Offices buildings, too, offer big opportunities for energy savings, through measures such as improved ventilation and insulation, upgrades to heating and air-conditioning, and use of more energy efficient computers and printers. One telling example: using optimisation software in elevators—which account for 5% of US office-building energy use—could cut energy use in elevators by 30% to 40%, says the ACEEE.[4]

Given the potential savings, the question for governments is how to encourage reduced energy use. They have a wide range of measures from which to choose. These include increasing access to information—whether on how to access incentives programmes or on measures to take to conserve energy—and developing awareness campaigns that highlight the role of energy efficiency in mitigating climate change. Other measures include encouraging or providing labelling and ratings systems based on the energy efficiency of products and homes, and providing financial incentives to save energy. This report examines the use of such approaches in five mature markets, to gain an understanding of what measures work best in homes and workplaces.

[4] http://aceee.org/topics/elevators

2. RAISING AWARENESS

In the absence of clear, easy-to-understand information about the effect of simple steps—such as powering down computers at night and adjusting the air-conditioning on cooler days—it is not easy to persuade people to focus on conserving energy. Yet the cumulative effect of simple steps can be dramatic savings in energy bills and reduced emissions. Governments around the world are focusing on this basic premise to make energy conservation easy to understand and easy to carry out.

To do so, governments have an array of awareness raising tools at their disposal, including official websites, leaflets sent with household energy bills, television advertisements, workshops for building owners and educational programmes in schools. These tools and others are being deployed by governments at national and local levels. In addition, utilities supplying power to homes and workplaces are raising awareness. And a wide range of innovative apps are informing consumers how they can gain more control over their own energy consumption.

As with any message, some audiences are more receptive than others. Employers tend to understand the energy saving message promptly, for example. "Commercial operations tend to have more awareness of the potential savings, partially because increasingly you have people dedicated to internal energy management," says Mark Winfield, associate professor and co-chair of sustainable energy initiative at Canada's York University. "There, it's more a struggle over return on investment, with the energy manager making the case internally that spending the money upfront will pay back over time."

Consumers, on the other hand, tend to require a more individualised approach. "Some people will respond to a sustainability or 'green' message, while others are all about the hard cash," says the IEA's Mr Motherway. He adds that awareness-boosting campaigns should be based on careful market research and tailored accordingly.

Moreover, awareness campaigns should be designed to minimise the so-called "rebound effect", in which increased efficiency of appliances encourages consumers to buy more appliances and use them more intensively. This can result in more overall energy use, the opposite of the intended result. "While the individual [products and equipment] are getting more efficient, there's little reduction in energy consumption, and that's a challenge," says Matthew Savage, director of Oxford Consulting Partners, which advises on climate change issues.

National, local and corporate outreach campaigns

Some governments take these complexities into account and devise energy-efficiency programmes at a national level. For Germany, as it embarks on its comprehensive new energy efficiency initiative, an important element is an awareness campaign using the slogan "Deutschland macht's effizient" (Germany makes it efficiently).

The campaign's message is that, rather than diminishing people's quality of life, energy efficiency can add to it while also saving money. The initiative encourages a wide range of organisations—from states and municipalities to large corporations and local businesses—to participate by using the campaign logo in their publicity materials and by giving them flyers, posters and other campaign items to distribute. The idea is to give participating organisations a way to show that they support energy conservation.

Other governments, in contrast, take a more targeted approach. In 2013, France's Agence Nationale de l'habitat (Anah), the country's national housing agency, recruited 1,000 energy renovation "ambassadors" and tasked them with approaching disadvantaged households with an offer to conduct energy efficiency upgrades. The 'ambassadors' raised the target audiences' awareness of the potential savings in energy conservation, and helped them access financial aid for these upgrades.[5]

In other countries, energy utilities rather than governments connect with consumers. Utilities may act on their own, or in partnership with government-led campaigns. In the US in particular, many states require regulated utilities to implement efficiency programmes. These initiatives may involve providing information on efficiency measures, and/or offering incentives to encourage reduced energy use by individuals and companies. "To a large extent, we rely on incentive programmes by utilities overseen by state-level public service commissioners. Across the board, they have been successful in reducing electricity demand cost effectively," says Mindy Lubber, president of Ceres, a US-based non-profit group that mobilises investor and company leadership on global sustainability challenges.

Such approaches, however, depend heavily on the degree of trust that customers place in their energy providers. This has proved a problem in the UK. "One of the major problems is that the information [on energy efficiency] has been communicated through energy suppliers and there's a huge crisis of trust in the UK energy sector," says Jimmy Aldridge associate director of the UK's Institute for Public Policy Research (IPPR). "When the energy companies come knocking on the door with a package of measures, a lot of homeowners don't trust that."

He believes that it would be more effective if information and incentives were to be better communicated by local authorities, arguing that they know more about the housing stock and income levels. That approach would also allow officials to target programmes more effectively, for example, by prioritising low-income households, he says.

The high tech boost: leveraging communications technology

Regardless of who is originating the conservation message—national or local governments, utilities or other organisations—new communication technologies can help to spread the word. Online discussion forums and interactive web sites can engage citizens in energy efficiency efforts far more easily and compellingly than

[5] Directorate General for Energy and Climate, Climate and Energy Efficiency Service, "Energy efficiency action plan for France – 2014", p28; https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_en_france.pdf

flyers included in energy bills, television advertisements and street posters. Moreover, cutting-edge smart-grid technologies—particularly smart meters in homes and offices that provide real-time information on energy use—are important means of managing energy consumption.

Beyond that, dedicated websites can provide engaging visuals and interactive tools. In the UK, for example, a Department of Energy and Climate Change website offers a "2050 Calculator" that allows users to consider the choices and trade-offs the country face in moving towards a low-energy economy.

Personal devices play a role, too. For example, smartphone apps can help people calculate their daily energy use and determine which appliances in their homes are consuming most energy. "Information technology is making material inroads into how energy is being managed," says Jon Creyts, managing director of the Rocky Mountain Institute, a US-based non-profit research and educational foundation.

"There's huge potential in social media," adds IPPR's Mr Aldridge. However, he also stresses that face-to-face communications will remain part of outreach efforts in the UK, particularly when promoting energy efficiency as a means of helping low-income households. "On-the-ground, locally organised roll-out schemes are going to remain hugely important," he says.

From preaching to practice

Awareness campaigns are an important starting point, but in themselves are not sufficient to change behaviour in fundamental ways. Practical educational programmes offering advice on retrofits and appliances are needed as well. In New York City, the New York State Energy Research and Development Authority (NYSERDA) offers programmes through which residents can learn how to conduct a home energy assessment and receive a detailed list of recommended improvements.

In Germany, the process starts in the school system. A forward-looking programme called "fifty/fifty", which runs in more than 3,500 schools, aims to educate children and create incentives for energy conservation. Participating schools make climate and energy the focus of lessons, designate energy-conservation project days, organise study groups and conduct field trips—as well as focusing on the schools' own energy use. The schools receive 50% of the money they save through such measures, while the other half goes to the school district to fund environmental initiatives.

Similarly, since 2008 the Germany city of Tübingen has been running a campaign called *Tübingen macht blau* (Tübingen goes blue), to encourage residents to take personal actions to reduce their impact on the climate. Boris Palmer, the city's mayor is well known locally for the bright blue "efficiency" suit he wears to promote the campaign. "It's the municipality that does the hard work but the general awareness raised [by the

campaign] is a critical part of it," says Stefan Büttner, director for international affairs and strategy at the University of Stuttgart's Institute for Energy Efficiency in Production.

In France, where one of the biggest challenges is the age of the housing stock, efforts to raise awareness have been combined with information and support to help homeowners retrofit their homes. Launched in 2013 as part of France's Sustainable Housing Plan, the "Point Renovation Info Service" is a "one-stop-shop" that aims to boost refurbishments from 150,000 a year in 2012 to 500,000 in 2017. An information campaign called "J'eco-rénove, j'économise" (I eco-renovate, I save) promotes the service.

The idea is to give owners a single contact point in the form of a website and national phone number, explains Carine Sebi, a project manager and energy efficiency expert at Enerdata, an independent research and consulting firm. The website directs users to one of 450 centres across the country. "You can be called back within five minutes and if you need detailed information, they offer you a free meeting, by phone or on-site, with a technical advisor," says Ms Sebi. These advisors, she adds, can explain the energy performance of different materials and the subsidies for which homeowners are eligible. The French approach is different from the German one, in which the federal government has traditionally been able to work closely with end users. "But with this initiative, France is showing that it is feasible and powerful to implement measures at a central level as well," she says. To date, however, the results of the campaign have been disappointing, as the process of reaching and persuading homeowners has been slow.

Whether information and advice are delivered online, by telephone or in person, and whatever organisation is responsible for the message, a single rule applies: the message must be tailored to the recipient. Messages should take into account whether the recipient cares more about the environment or cost savings, and his/her level of trust in the 'messenger'—whether government or energy utility. Moreover, the recipients should be warned against the "rebound effect", to avoid having the benefits of energy-efficient appliances and homes vanish due to greater overall energy use.

Crafting awareness and education campaigns that meet all these requirements is a tall order. Not many governments, utilities or schools can claim to have mastered this task.

3. SETTING STANDARDS AND APPLYING LABELS

Energy-efficiency labelling programmes, which provide information on how much energy an appliance uses, have proven helpful to consumers and businesses wishing to save energy. Such labels give consumers important signals to guide their purchasing decisions. And while most product-labelling schemes are voluntary, several countries now require companies to display the energy efficiency of their buildings and for homeowners to inform potential buyers of home energy ratings assessments.

Such requirements are not universal, however. "There's a big role for national government to play in creating rating systems that allow people to understand the relative energy efficiency of appliances or building performance," says Mr Creyts of the Rocky Mountain Institute.

Some innovative national labelling schemes provide successful models. In the US, the Energy Star programme—launched by the Environmental Protection Agency (EPA) 20 years ago, initially to rate the energy efficiency of computers—now rates products in more than 60 categories. US consumers now buy an estimated 300 million qualified products a year.

Together, the products carrying the 'Energy Star' label have saved enough energy to avoid more than 150 million metric tons of greenhouse gas emissions per year, says a 2012 EPA estimate. Those savings, the EPA calculated, amount to 15% of the country's residential electricity use, offsetting the need for more than 185 additional power plants. "This has been a tremendously powerful approach," says Mr Creyts. "Both globally and in the US, the Energy Star programme has raised performance standards. Many other countries have modelled their approaches on Energy Star."

Canada has taken a similar approach. It uses the US's Energy Star labelling programme as its primary energy efficiency information tool for consumers, and is an international partner of the EPA's programme.

Standards, ratings and labelling programmes can also encourage manufacturers to produce energy-efficient appliances and machines, says Professor Winfield of York University in Toronto. "You're in a continuous improvement mode. Less efficient products are pushed out of the market place because manufacturers know [standards for energy efficient products] will continue to ratchet up over time."

The labelling and standard-setting approach is not limited to home appliances such as kettles and irons. In Germany, labelling is used for home heating and cooling equipment, to encourage homeowners to upgrade to energy-saving equipment. While these labels have so far applied to new equipment, the federal government is extending them to existing machinery, says Mr Büttner. The programme requires colour-coded labels indicating energy performance levels to be put on domestic heating systems that are

more than 15 years old. "This is in order to raise awareness among owners of how much they could save by putting in new heating," says Mr Büttner.

As further incentives, the government is also offering help identifying consulting and support programmes as well as information about funding schemes. The government expects the programme will boost the annual replacement rate for boilers by about 20%.[6]

From products to buildings

In several countries, entire homes are subject to energy ratings programmes. Canada's EnerGuide home energy rating system, which allows consumers to compare different models and houses, is now used in more than 50 provincial, territorial, municipal and utility programmes. Meanwhile, its R-2000 label denotes energy-efficient homes with strong wall insulation, high-efficiency windows and doors, high-efficiency heating, mechanical ventilation, and testing to ensure minimal air leakage.

In the European Union, buildings must participate in energy ratings schemes. The German, French and British initiatives on energy efficiency labelling for buildings are rooted in the European Energy Performance of Buildings directive. The directive requires energy performance certificates to be included in all advertisements for the sale or rental of buildings. EU countries must also set minimum energy performance requirements for new buildings, set standards to encourage extensive renovations of older buildings, and promote replacement or upgrading of elements such as heating and cooling systems.[7]

France was ahead of many countries in implementing this scheme, requiring as early as November 2006 that certificates be made available to buyers of any home or building. This requirement was extended to rental agreements in 2007. In France, a home listed for sale must provide potential buyers with a "Diagnostic de Performance Energétique" (DPE). This gives a detailed and independent evaluation of a home's energy efficiency, the energy costs associated the home, and the work needed to improve its efficiency.

The requirements governing energy efficiency of office buildings benefit from a commercial incentive for compliance: the wish of companies to show their environmental credentials to employees and consumers. "Companies are keen for their corporate social reporting to have building stock that meets certain requirements," says Mr Savage of Oxford Consulting Partners. "They play heavily on the green standard." He adds that requiring building owners to display energy ratings close to the entrance aids energy efficiency efforts: "That sort of thing works well from a name-and-shame perspective."

Whether labelling programmes are voluntary, as in the case of most product labelling schemes, or mandatory, as with certificates rating the efficiency of buildings or homes, they serve a similar purpose: by measuring relative energy efficiency, they offer consumers and companies an easy-to-understand benchmark of the energy performance of the products they buy or the buildings in which they live and work.

[6] http://www.bmwi.de/EN/Press/press-releases,did=722842.html

[7] European Commission: https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings

4. OFFERING GRANTS, TAX BREAKS AND OTHER INCENTIVES

Even if governments succeed in promoting awareness of the need for energy efficiency and spreading expertise in exactly how to boost efficiency, homeowners and companies often balk at the upfront cost involved. The policy response in many cases is to provide financial incentives to install and use energy efficient products and building upgrades.

"The conundrum with energy efficiency is that on paper it makes sense—if you think about insulating your home, it pays back over time—but you might not have the cash," says Mr Motherway. "So in practice there are lots of valid reasons why it's complicated."

Some argue that the simplest way to cut energy use is to apply a carbon tax. But the IEA contends that while a carbon tax could play a role by making energy more expensive, thereby encouraging conservation, other policy incentives remain critical.[8]

To help consumers manage the upfront investments of energy efficiency upgrades, governments offer grants, tax breaks, and support (in the form of tax breaks) for low-interest loans. In France, tax credits or reduced VAT (value-added tax) are available for home upgrades such as insulation, thermal and hot water equipment.[9]

Governments also encourage replacement of inefficient equipment by offering cash incentives. In Canada, Ontario's Independent Electricity System Operator, a Crown corporation responsible for operating the electricity market and directing the operation of the bulk electrical system, has implemented novel lighting retrofit programmes. In IESO's Small Business Lighting programme, participating businesses receive a free onsite lighting assessment of their facility, up to C$2,000 towards eligible energy efficient lighting upgrades, and a lighting installation service.[10]

Professor Winfield of York University cites refrigerator buy-back programmes, in which some Canadian provinces have offered pay-outs for recycling old, inefficient equipment to encourage consumers to buy more efficient appliances. "These have been quite successful," he says. Since 2007, for example, a buy-back programme run by the British Columbia Hydro and Power Authority has offered consumers C$30 for their old, inefficient refrigerators. BC Hydro has so far collected and recycled more than 250,000 units, saving customers more than C$23 million in electricity costs.

In France, another type of financial incentive designed to encourage businesses to save energy takes the form of Certificats d'Economie d'Energie (Energy Saving Certificates). Using the same principles as the European Union's Emissions Trading Scheme, France-based businesses that can prove energy savings receive certificates, which they then can sell to other businesses that need them to meet mandatory energy reduction targets.

[8] International Energy Agency, "Energy efficiency policy and carbon pricing", 2011: https://www.iea.org/publications/freepublications/publication/EE_Carbon_Pricing.pdf

[9] Switzerland Global Investment, "Energy efficiency in France," 2014, p21: http://www.s-ge.com/sites/default/files/BBK_France_Energy_Efficiency_Sep-2014_1.pdf

[10] IESO: https://www.saveonenergy.ca/Business/Program-Overviews/Small-Business-Lighting-and-AC.aspx

Facilitating access to capital

Meanwhile, governments are also trying to ensure access to financing for efficiency upgrades. One such attempt was launched in the UK in 2013. The Department of Energy and Climate Change's 'Green Deal' was intended to incentivise homeowners to invest in their own properties and realise savings over time. The scheme facilitated access to loans for home energy efficient improvements, with the loans repaid together with energy bills.

In Germany, similar principles underlie the financing packages offered by KfW, the government-owned development bank: energy-efficiency building upgrades qualify owners for low-interest loans. "The general concept is the more efficiently you plan to do something, the more you qualify for cheap loans," says Mr Büttner.

However, not all incentive plans have succeeded. The UK's Green Deal was shut down in 2015, two years after it was launched. The UK National Audit Office concluded that the scheme, which cost taxpayers £240 million including grants to stimulate demand, had not generated additional energy savings. It had failed to persuade householders that energy-efficiency measures represented good value for money. "When Green Deal was nine months old, about 800 [loan packages] had been sold and it was hoped that 130,000 would be sold within a year," says IPPR's Mr Aldridge.

The problem was a failure to understand homeowners' resistance to disruption, explains Mr Savage of Oxford Consulting Partners. "There's a huge amount of inertia in getting people to invest in capital improvements in their homes, which requires quite a lot of disruption. So the barriers are quite high. [The programme] assumed that the main barrier was the lack of access to capital, and that if you told people they'd save more than they invested, they would do it—but they didn't."

When it comes to retrofitting offices, the barriers are different. Among the main obstacles is the split incentive in rented properties, in which the landlord pays for the investment in efficiency upgrades but the tenant benefits from lower energy bills. Governments and industry organisations should do more to align the incentives with the investments.

For both homeowners and building owners, access to the right information at the right time is as important as access to cash for upfront investments, says Patricia Fuller, director general of the Office of Energy Efficiency at Natural Resources Canada. "Many consumers and businesses are interested in reducing their energy use, but low awareness of options available to them slows down adoption of energy efficiency solutions more broadly," she says.

Among the important initiatives in energy conservation is aligning incentives for building owners and tenants. For example, so-called "green leases" for space in office buildings are becoming more popular. Unlike traditional leases, which tend to base energy charges on a flat calculation per square meter—green leases base tenants'

energy charges on actual energy used, and may also pass some of the costs of energy upgrades on to tenants. Green leases typically provide for sub-metering of individual offices so that tenants have a clear view of where energy use is highest and can take effective steps to conserve.

New York's Empire State Building provides an example of successful owner-tenant cooperation to boost efficiency. As part of an ambitious 2009 energy retrofit, the owners provided a web-based system allowing tenants to measure energy use within each of their offices. The owners also provided information about energy efficiency standards, to help tenants benchmark their energy use. According to the Empire State Building Company, the project cut $7.5 million in energy costs over the past three years, and is projected to save 38% of the building's energy and $4.4 million annually.[11]

[11] http://www.esbnyc.com/esb-sustainability

5. CONCLUSION: PART OF A BIGGER PICTURE

Achieving energy efficiency requires an array of initiatives by a range of players. The first step for governments is to set energy efficiency targets that help to meet broader national carbon reduction goals. "They have to take the targets that have been set on an international level and transform those into law," says Michal Nachmany, leader of the Global Climate Legislation Study at London School of Economics' Grantham Research Institute on Climate Change and the Environment. "It's clear that there's a three-way relationship between government and citizens and the business sector."

Persuading energy users to invest time and money upfront will not be easy, particularly in an era of low energy costs. Nonetheless, as this report shows, a variety of measures can help to persuade energy users to make such investments. The prerequisite for making this happen is awareness of potential savings, which can be promoted through a variety of outreach campaigns. The most effective campaigns, such as France's housing agency's 2013 outreach to low-income households, rely on targeted approaches to specific demographic groups, delivered through a trusted source. In the case of the French programme, the trusted source was a group of 1,000 energy renovation "ambassadors" offering to conduct efficiency upgrades and explaining where funding is available. Somewhat less successful was a UK conservation initiative launched by energy providers, whose message was resisted by an untrusting public.

Beyond awareness raising, successful programmes offer appropriate incentives for making the upfront investments in energy efficiency. Here, the cost savings from reduced energy use should be explained clearly, and where possible should benefit those who make the investments. Where incentives of investors and energy users are not well aligned—such as, for example, among tenants of office building who pay a flat fee for energy use based on square footage rather than on their actual consumption—incentives can be re-aligned through agreements for beneficiaries to share the up-front investments and for owners to ensure that tenants have the information needed to track energy use.

Setting energy-use standards for products, and labelling products regarding their energy use, have also proved useful ways to save energy. The US "Energy Star" programme, which rates the energy efficiency of products in more than 60 categories—is a leading example of a successful programme, having produced savings estimated at 15% of residential electricity use. Germany's initiative to label energy efficiency of home heating and cooling equipment also offers a leading example of conservation on a large scale.

An over-arching requirement of successful conservation programmes is providing consumers and companies the information they need to track their energy use. Moreover, incentives in the form of tax breaks to reduce the burden of upfront

investments, and programmes to encourage trade-in or scrapping of energy-guzzling equipment, also play an important role. A Province of Ontario, Canada programme providing businesses with cash grants toward lighting upgrades, plus a lighting installation service, points the way to a successful approach toward incentivising change.

Over the next years, as governments try to meet their carbon-reduction targets and ensure their energy futures, conservation-oriented initiatives and provision of individual energy-use tracking capabilities will become more important. Governments as well as power utilities and other companies will all play a part, as will individual consumers. For governments, in particular, the way in which the conservation message is formulated—to suit different audiences with different interests and needs—is of prime importance. "We're talking about people being warm in their homes and saving money," says the IPPR's Mr Aldridge. "That is something that should be very sellable."

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