ENERGY PRODUCTIVITY PLAYBOOK

Roadmaps for an Energy Productive Future

GLOBAL ALLIANCE FOR ENERGY PRODUCTIVITY

ALLIANCE TO SAVE ENERGY

*Using less. **Doing more.***

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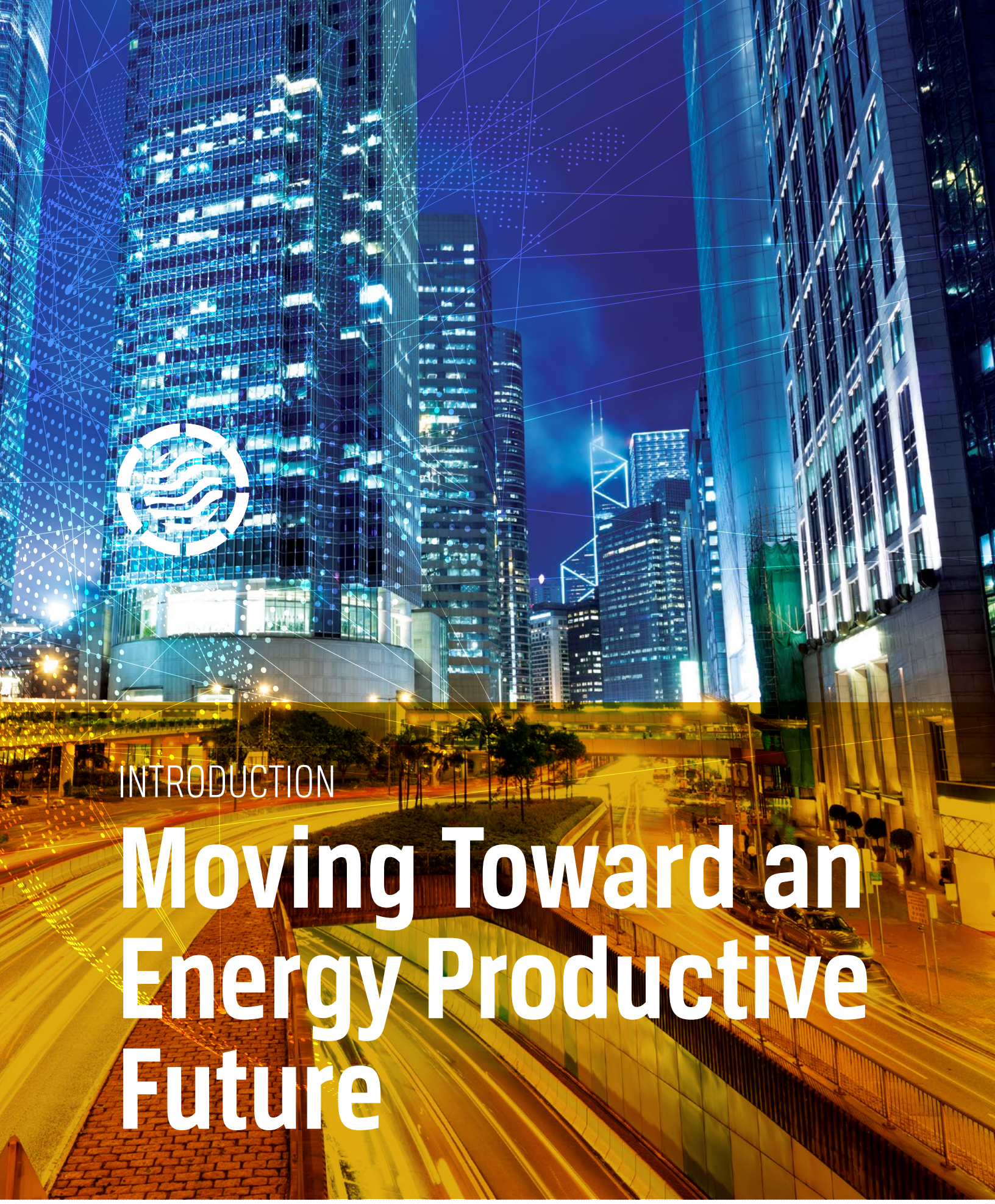


INTRODUCTION

Moving Toward an Energy Productive Future

Clean energy markets around the world are undergoing a revolution as countries, companies and citizens seek paths to a prosperous economic future that also protect the environment. The December 2015 United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Paris added urgency to the call for global leaders to find real solutions to the challenges posed by climate change. Achieving the needed reductions in greenhouse gas (GHG) emissions to achieve the goals set by the negotiators at the 21st Conference of Parties (COP21) will require public and private sector leaders to reexamine every aspect of global energy use—from how we produce energy to how we manage its consumption.

Low- or no-emission energy sources are a part of this equation, but are an incomplete solution. Energy productivity is a fundamental counterpart to the use of clean energy sources for any emissions reduction strategy. Improving energy productivity (increasing the amount of economic output per unit of energy consumed) not only helps to manage energy demand and GHG emissions, but also can ensure that prosperity and development needs are met—boosting GDP, generating jobs, and saving money for consumers.

In May of 2015, the Alliance to Save Energy and ClimateWorks Foundation launched the Global Alliance for Energy Productivity (the Global Alliance) to work with government and corporate leaders to maximize the economic outcomes of energy use around the world, drive innovation, and improve energy system reliability. **The ultimate goal of the Global Alliance is to double energy productivity world-wide.** In order to accomplish this goal, governments at every level and private sector leaders will need to formulate and implement strategic policies and plans that ensure the widespread adoption of energy efficient technologies and practices.

In the United States, the Alliance to Save Energy convened The Alliance Commission on National Energy Efficiency Policy (the Commission), which called for boosting U.S. economic growth through investments, modernization and innovation in efficient energy generation, distribution and use. The Commission recommendations targeted all of the key energy use sectors in the United States, including buildings, transportation, manufacturing and energy infrastructure. In 2013, the recommendations of the Commission inspired the U.S. government to adopt the goal of doubling national energy productivity by 2030, from a baseline of 2010. In September 2015, the U.S. Department of Energy (DOE) joined with the Alliance and the Council on Competitiveness to release "Accelerate Energy Productivity 2030: A Strategic Roadmap for American Energy Innovation, Economic Growth, and Competitiveness", building on the work of the Commission and using innovative macroeconomic modeling to offer new insights into the positive impact of energy productivity on economic growth. The resulting collaboration between the U.S. government, the private sector, and non-governmental organizations (NGOs), focused on a wide array of policies that support the deployment of efficient technologies, continues to drive the U.S. toward the goal of doubling energy productivity.

ENERGY PRODUCTIVITY

ENERGY PRODUCTIVITY is a measure of the economic benefit we receive from each unit of energy we use. It is calculated by dividing **TOTAL ECONOMIC OUTPUT** (e.g., GDP or revenue) by the **AMOUNT OF ENERGY CONSUMED** (e.g., barrels of oil equivalent, or kilowatt hours of electricity).

This simple metric does a powerful thing: It measures the economic outcomes of energy efficiency investments. **By measuring energy productivity over time, we can determine how effectively any entity—whether a company or a nation—is using the energy it pays for.** Targeting energy productivity improvements enables decision makers worldwide to set actionable agendas based on the direct and quantifiable benefits of investing in energy efficient technologies and practices.

A similar process was initiated in Australia: The Australian Alliance to Save Energy convened a Commission of leaders from business, government and academia. Split into nine working groups, the Commission engaged in preparing sectoral roadmaps to achieve a doubling of energy productivity in Australia. These efforts contributed to a pledge by the Australian government to improve energy productivity by 40 percent in 2030 from a 2015 baseline.

Energy productivity is a metric that puts a priority on job creation and economic growth. By setting high-level and ambitious energy productivity targets, policymakers and private sector leaders can help promote a better understanding of the importance of efficient and productive energy use. Framing efficiency goals in terms of energy productivity promotes a better understanding of how efficient energy use helps meet the pressing needs of our time:

- Improved economic performance and growth;
- Universal access to energy services;
- Reduced greenhouse gas emissions;
- Increased reliability and security of energy systems; and
- Technological innovation.

This document is a tool designed to help organizations and policymakers around the world craft their own Roadmaps—published documents that detail the economic, jobs, environmental and security benefits of doubling energy productivity—that clearly articulate a target date for doubling energy productivity and detail achievable policy recommendations necessary to achieving the goal.

Doubling global energy productivity will stimulate economic growth, create jobs and help the environment.

MEASURING THE BENEFITS

An independent study estimated that doubling U.S. energy productivity could[1]:

Decrease U.S. CO_2 emissions by one third BELOW 2005 levels.

Cut average household energy costs by **more than $1,000 per year**.

SAVE **$327 BILLION** ANNUALLY

ADD **1.3 MILLION** JOBS

1 The Rhodium Group, "American Energy Productivity: The Economic, Environmental and Security Benefits of Unlocking Energy Efficiency," February 2013, http://www.energy2030.org/wp-content/uploads/rhg_americanenergyproductivity_0.pdf.

The Energy Productivity Playbook

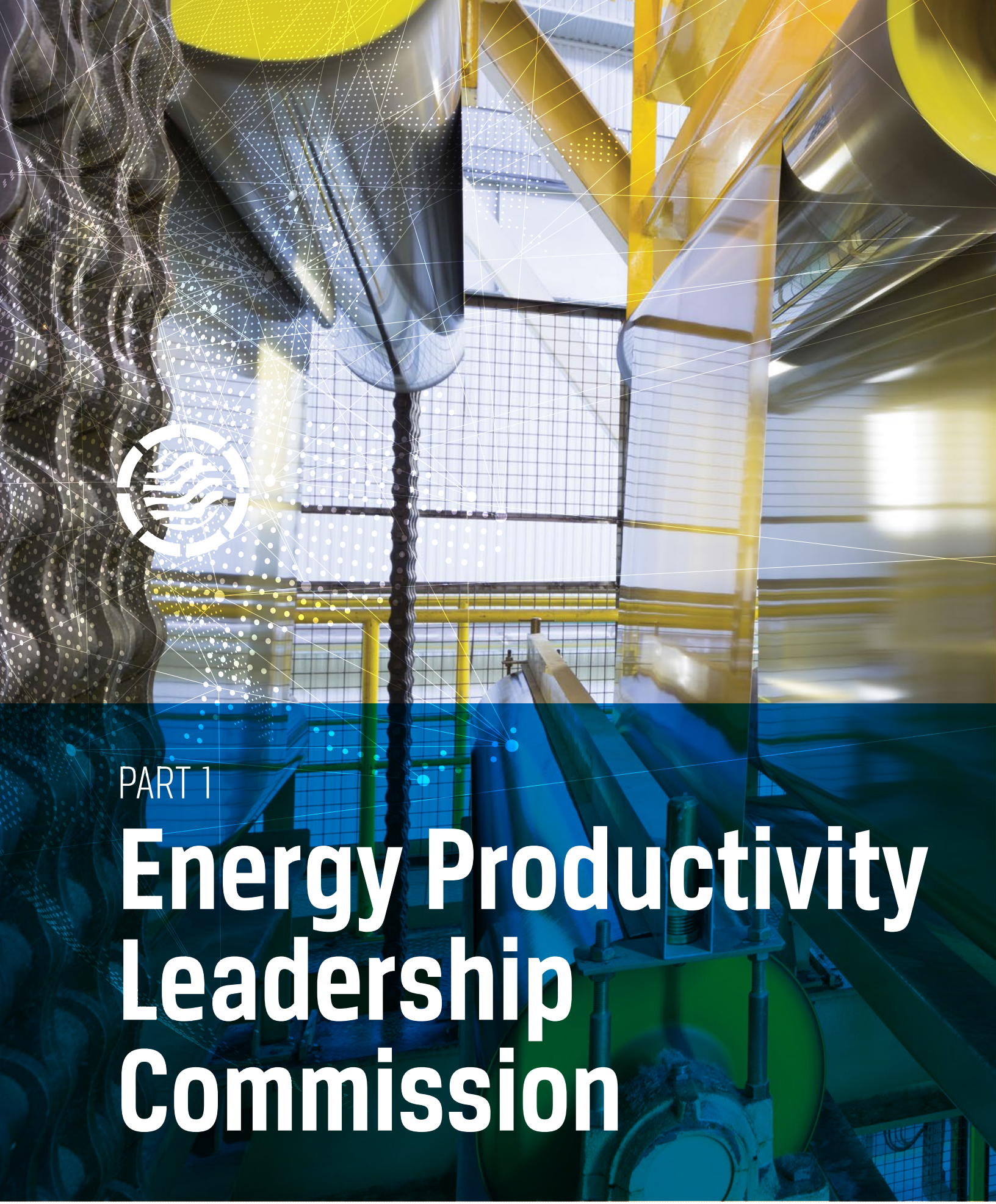
This Playbook provides a set of guidelines for driving energy productivity improvements globally by developing ***Energy Productivity Policy Roadmaps***, which are strategic plans for doubling energy productivity. Roadmaps detail the economy-wide policy and market shifts needed to improve energy productivity across every sector. This is a model that can drive change at both the subnational and national levels. The Playbook describes key steps for developing national Roadmaps, drawing primarily on the U.S. and Australian experiences.

Part 1
Energy Productivity Leadership Commission
Convening a high-level Commission of public and private sector thought leaders is an important way to engage necessary expertise and gain widespread political support for the goal of doubling energy productivity.

Part 2
Modeling the Benefits
Economic modeling helps identify how soon national or state energy productivity can be doubled and estimate the economic benefits of accomplishing the goal.

Part 3
Core Policy Considerations
A successful road-mapping process that offers effective policy recommendations will carefully consider global best practices in key policy areas that affect energy productivity, including energy demand management, supply-side efficiency and consumer education.

Part 4
Communicating the Benefits
When the Commission completes the economic modeling and core policy recommendations and is ready to support an ambitious, high-level energy productivity doubling target, the final step is to disseminate the results to the public and key policymakers through a comprehensive communications plan.



PART 1

Energy Productivity Leadership Commission

Convening a **leadership Commission** is an important tool for developing the consensus necessary to spur political action that supports improving energy productivity, whether at the national or sub-national level. By bringing together diverse thought leadership and expertise—including the business community, government representatives, academics and energy and environmental advocates—an organization seeking to generate political momentum can secure credibility for key recommendations. The Commission members' consensus and support for the recommendations will help steer governments and businesses toward a path to investing in the energy efficient technologies and practices that can help double energy productivity.

The guidance outlined below draws on the lessons learned from experience with two energy productivity Commissions: *The Alliance to Save Energy Commission on National Energy Efficiency Policy* in the United States, and the *2XEP Steering Committee* led by the Australian Alliance to Save Energy. These leadership bodies were able to effectively mobilize diverse stakeholders around a common goal of advancing national energy productivity.

TWO COMMISSIONS, ONE ENERGY PRODUCTIVITY GOAL

Alliance to Save Energy Commission

The Alliance Commission on National Energy Efficiency Policy convened leaders in energy and environmental policy from the business, government, academic and non-profit sectors, to identify and reach consensus on a set of public policies that, when enacted at the U.S. federal level, would have the potential to make the United States one of the world's most energy efficient economies by doubling energy productivity. Participants were selected to mirror the country's wide range of political, social and business philosophies.

Australian Alliance Commission

The Australian Alliance Commission on the National Energy Productivity Plan was formed to work with a range of stakeholders in the business, government, non-profit, and academic sectors to create a Roadmap that aligns public policy with the national goal of doubling energy productivity by 2030. The national policies recommended by the Commission to achieve this goal are designed to increase the global competitiveness of Australian businesses and national GDP while decreasing carbon emissions and oil imports.

Key Deliverables

Although the outcomes of a Commission process will vary by country or state/province, the following key activities should be priorities for any energy productivity leadership Commission:

- Set an ambitious, overarching target for energy productivity (e.g., doubling national energy productivity by a certain date);
- Detail the economic, environmental and security benefits that would result from achieving the goal;
- Examine the challenges facing different sectors and identify the opportunities that exist to improve energy productivity within them; and
- Reach consensus on a set of achievable policy recommendations.

To support these core deliverables, the Commission can form advisory bodies to explore best practices at the local, state/provincial, national and international levels in different sectors. Beginning with an assessment of the current status of energy productivity in the various economic sectors, the reports also should incorporate economic modeling to help determine the achievability and potential impacts of doubling energy productivity. These reports then can be examined in aggregate to identify connection points among the sectors to inform the Commission's development of recommendations for increasing the country's energy productivity.

Once the core recommendations have been developed, they can be used to conduct external outreach. Wide dissemination of the Commission's findings among government and industry stakeholders is critical for gaining industry support and mobilizing individuals to enact and support policy change.

In the U.S., the Alliance's Commission on National Energy Efficiency Policy followed this process over the course of 18 months, resulting in the development and launch of a national energy productivity goal and strategy in February, 2013. The Alliance's Commission prioritized specific sector-based analyses and produced seven reports that informed the Commission's decision to define a national goal of doubling U.S. energy productivity and its recommendations for achieving that goal. An external research institution, The Rhodium Group, then modeled the potential economic outcomes of doubling U.S. national energy productivity.

The Alliance Commission's report, "Recommendations to Double Energy Productivity by 2030," provided 54 recommendations for local, state and national governments as well as the private sector, outlining how ambitious policy action could help double U.S. energy productivity. The Alliance grouped these recommendations into three broad categories: Invest, Modernize and Educate.

STRATEGIES FOR DOUBLING U.S. ENERGY PRODUCTIVITY

INVEST in energy productivity throughout the economy.

Enhance availability of financing for energy efficiency projects, advance energy productivity through tax reform, and increase federal investment in energy productivity research and development.

MODERNIZE regulations and infrastructure to improve energy productivity.

Incentivize innovation and adoption of best practices by state and local governments and strengthen building, equipment, and vehicle efficiency standards.

EDUCATE and engage consumers, workers, business executives, and government leaders on ways to drive energy productivity gains.

Provide improved information on building energy use, improve corporate energy management and transparency, and enhance university curricula and training programs on energy use and productivity.

Commission Structure and Membership

To convene the leadership Commission and maximize its effectiveness, a **Secretariat** should lead the search for **commissioners** and oversee the governance of the Commission. The Secretariat role can be served by a range of organization types, including government agencies, intergovernmental bodies (e.g., United Nations agencies), international or national non-governmental entities, or academic institutions. The key characteristics of a successful Secretariat include credibility in the field of energy productivity, a reputation for an unbiased approach and an established reputation among the sectors that will be convened for the Commission.

The commissioners should include leaders from diverse backgrounds and economic sectors to ensure that the national policy, program and investment recommendations are fully vetted and unbiased, in order to have maximum credibility among the key audiences.

Three types of diversity are important for an effective Commission:

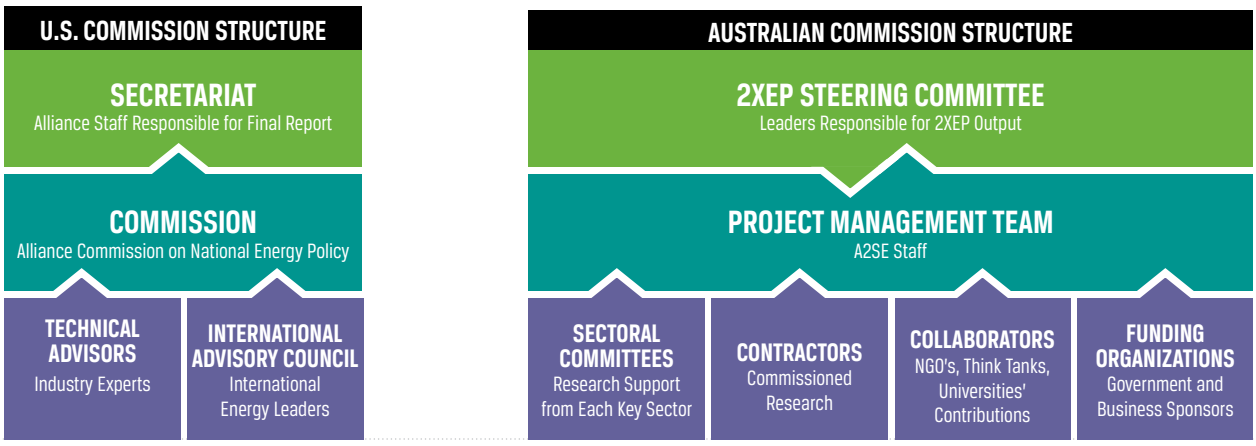
- **Demographic:** Regional (local, state and national), ethnicity and gender
- **Political:** Non-partisan (representation from major political parties)
- **Sectoral:** representatives from government, academia, utilities, industry, the finance sector, and the agriculture, buildings, and transportation sectors.

Within the Commission structure, **subgroups** or **technical advisory groups** with specific areas of focus and expertise are useful for ensuring the Commission receives targeted counsel on the challenges and opportunities presented in the different economic and industry sectors. These advisory groups can be comprised of Commission members, as well as other subject matter experts and external stakeholders who can provide input on new technologies, market trends and key challenges facing different sectors of the economy.

The Alliance to Save Energy Commission created two advisory groups, international and technical, to provide information on best practices and policies that could be adapted at the national level and maximize energy productivity across economic sectors. The international group was comprised of energy efficiency leaders from Germany, Japan and the United Kingdom. The technical advisors informed the Commission on technological questions and U.S. market conditions. Similarly, the Australian Alliance to Save Energy created sectoral committees within their Commission structure to delegate research on manufacturing, agriculture, the built environment, mining, freight and passenger transport, finance, and technology and research.

The inclusion of input from these advisory bodies enabled both Commissions to effectively integrate sector-specific considerations into their national-level recommendations. By providing a Commission with detailed analysis on the energy, economic and environmental barriers and opportunities present in various sectors, these bodies can facilitate the development of energy productivity recommendations that are both aggressive and achievable within that sector.

To facilitate the collaborative Commission process, the secretariat must actively share information among the various committees. Both the Alliance and Australian Alliance found this structure to be effective in ensuring that their Commissions and the resulting recommendations included input from relevant stakeholder groups.



PART 2

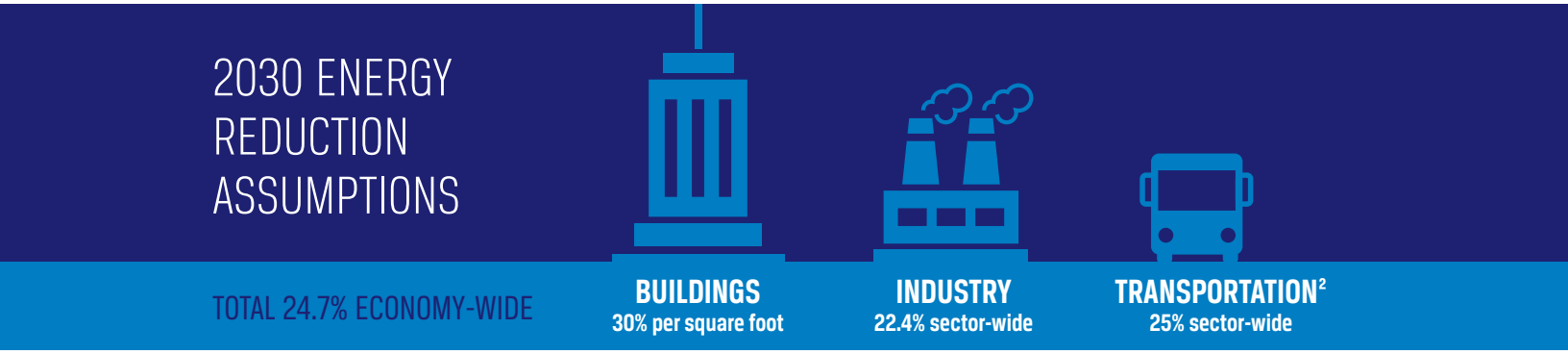
Modeling the Benefits

An important activity to complement the efforts of the Commission and ensure broader support for the road-mapping process is to carry out economic modeling exercises to quantify the outcomes of the policies under consideration. Projecting the quantitative benefits of doubling energy productivity—in terms of jobs created, GDP growth, economy-wide and household energy and cost savings, and CO_2 emissions and other environmental benefits—can generate political buy-in and help persuade a range of audiences that the efforts are truly worth the investment.

The two reports summarized below were undertaken in support of energy productivity promotion programs in the United States. Both modeling efforts built on existing studies of the impact of implementing efficiency policies and technologies in different sectors to draw conclusions about the overarching impact of an economy-wide doubling of energy productivity. The two different approaches illustrate two types of modeling exercises that can be helpful for furthering the conversation about the benefits of doubling energy productivity.

Impact Modeling

The Alliance to Save Energy contracted with The Rhodium Group to analyze the goal of doubling U.S. energy productivity by 2030. The resulting report, *American Energy Productivity – The Economic, Environmental and Security Benefits of Unlocking Energy Efficiency* (Rhodium report), was published in February 2013. The goal of the analysis was to identify efficiency improvements that are a) cost-effective, b) achievable with existing technology, and c) capable of achieving the Commission's energy productivity goal when combined. The report analyzed potential energy reduction in three sectors—buildings, industry, and transportation—and modeled the resulting changes on the U.S. economy.



The Rhodium Group relied on primary source material from several institutions, including the National Academy of Sciences and the Urban Land Institute. These institutions had modeled the impact of measures such as increased vehicle mileage, building shell improvements, more efficient appliances, intelligent control systems, and urban planning to establish potential reductions in each major economic sector.

The Rhodium Group combined the results of these modeling exercises in its proprietary modeling software to produce a forecast out to 2030. The Rhodium report compares the results to the U.S. Energy Information Administration's Annual Energy Outlook (AEO) 2012 baseline. At a high level, the report finds that doubling U.S. energy productivity is possible through the combination of energy use

2 *The Rhodium Group report does not separately list transportation energy reductions, but does include an energy expenditure reduction of 25 percent. While energy expenditure reductions are a good proxy for actual energy reductions, they likely overstate primary energy reductions due to price suppression effects.*

reductions across the three key sectors. This is the result of a projected 24.7 percent decrease in primary energy use (compared to the 2030 business as usual (BAU) scenario), combined with a 64.5 percent projected increase in real GDP between 2010 and 2030. In addition to verifying the feasibility of doubling U.S. energy productivity, the Rhodium report quantified a number of potential economic benefits of meeting this goal. By 2030, the analysis projected that annual net savings to consumers would be $327 billion (in $2010), net employment would increase by 1.3 million jobs, and net energy imports would fall from 19 percent to 7 percent of overall U.S. energy consumption.

The Rhodium report is an economic potential report that demonstrates that existing cost-effective technologies could theoretically lead to the doubling of energy productivity by 2030.

Modeling GDP Impacts

The "Accelerate Energy Productivity 2030: A Strategic Roadmap for American Energy Innovation, Economic Growth, and Competitiveness" (AEP) report released in September 2015 by DOE in partnership with the Alliance and the Council on Competitiveness modeled the impact on GDP of doubling energy productivity. The underlying analysis for this report was based on a different set of source documents and assumptions from the Rhodium report, and focuses on the following six "energy productivity wedges":

- Smart Energy Systems
- Technologies for Building Energy Productivity
- Buildings Energy Productivity Financing
- Smart Manufacturing
- Transportation
- Water Infrastructure

DOE's model applied savings from primary source material that analyzed potential energy reductions in each wedge. These analyses drew on research from the Electric Power Research Institute (EPRI) and on the National Renewable Energy Laboratory (NREL)/Argonne National Laboratory's Transportation Energy Futures project, along with contributions from the American Council for an Energy-Efficient Economy (ACEEE), the Rockefeller Institute, and others. The projected aggregated energy savings resulting from doubling U.S. energy productivity by 2030 are shown in the chart on the next page.

DOE's analysis indicated that a doubling of energy productivity was possible through the combination of energy efficiency improvements in the various sectors. The modeling exercise projected energy savings in 2030 of 24 percent, combined with **GDP growth of 3.6 percen**t relative to the BAU forecast. As with the Rhodium report, the AEP methodology was based on aggressive assumptions about energy saving policies, and so the result represents theoretical economic potential.


2030 SECTOR SAVINGS (QUADS)
5.4 Technologies for Building Energy Productivity
16.0 Transportation
3.0 Buildings Energy Productivity Financing
2.0 Smart Manufacturing
1.0 Smart Energy Systems
0.14 Water Infrastructure

PART 3

Core Policy Considerations

A successful road-mapping process that offers effective policy recommendations for doubling energy productivity should consider and build on global best practices in key policy areas that impact energy productivity. These include energy demand-side management, supply-side efficiency and consumer education.

The legislation, policies, and programs put in place by national, state and local policymakers are extremely important for creating the conditions necessary to improve energy productivity—including infrastructure, expectations, incentives, and support for energy efficiency markets. From national-level target-setting to local regulations, governments have an enormous role to play in improving energy productivity.

This section describes some of the key policies for consideration in improving system-wide energy productivity. Because every country faces different opportunities and challenges, and new technologies and management practices are pioneered every year, these specific policy considerations should be considered a starting point, not a complete list.

Codes, Standards and National Leadership Strategies

Building Energy Codes

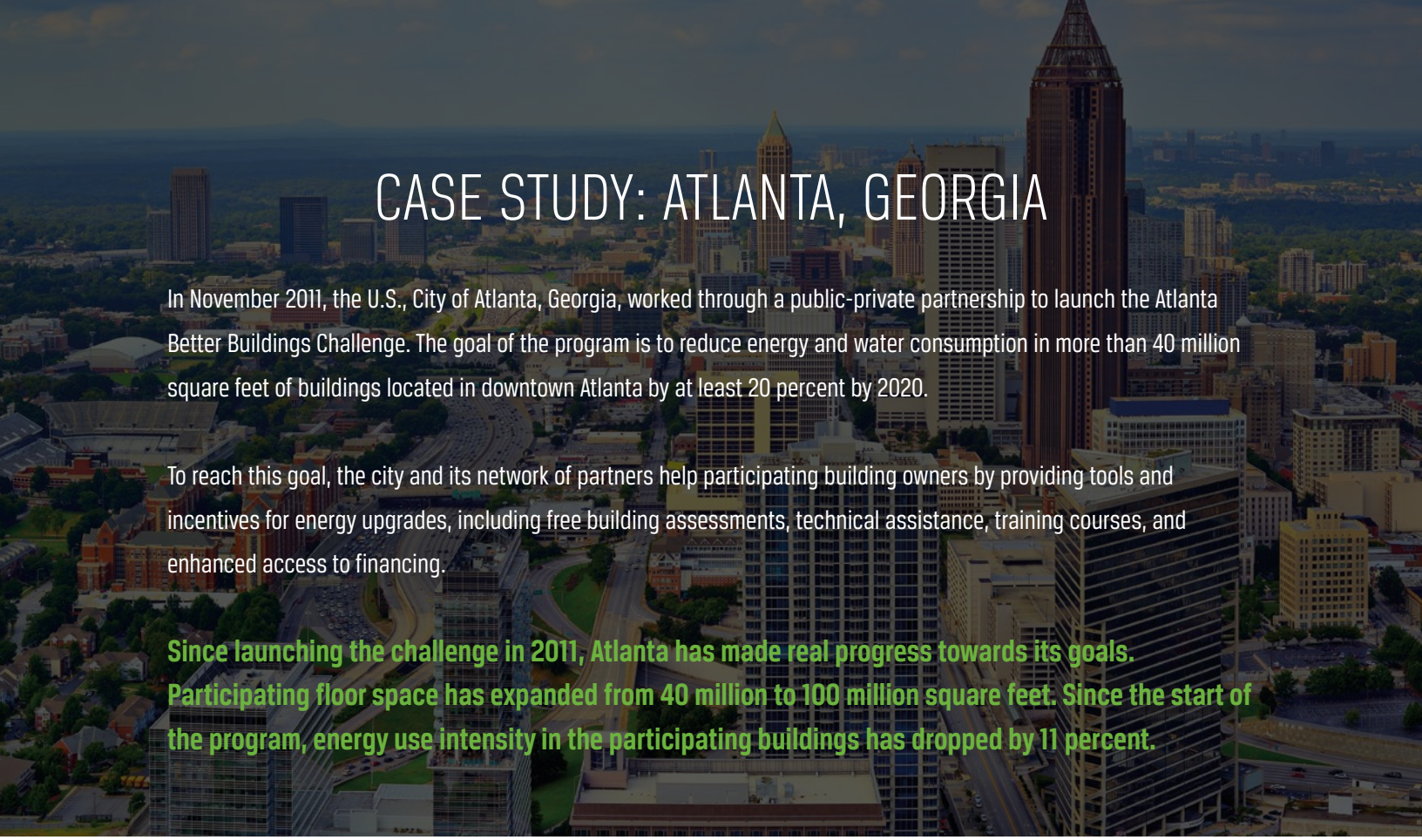
Worldwide, buildings are responsible for consuming about 40 percent of total primary energy, and account for about one third of total GHG emissions.[3] The built environment accounts for the largest portion of overall energy consumption in most countries, and also offers some of the best and most cost-effective energy savings opportunities. Building codes are a key policy tool for ensuring that buildings are designed, constructed, and operated efficiently.

Different types of building codes regulate various aspects of building design, construction, alteration and maintenance. They specify the minimum requirements to adequately safeguard the health and safety of building occupants, and to ensure effective building operation. **Building energy codes, in particular, are important for managing energy demand and minimizing emissions.** Well-designed codes can ensure that new buildings are designed and built using energy efficient equipment, and that they incorporate efficient features such as proper site selection, orientation, envelope design and daylighting. By setting the minimum level of efficiency for new (and in some cases renovated) buildings, codes can lock in energy savings in the built environment for as long as buildings last (up to 100 years).

Because weather patterns and environmental conditions differ for every country or region, **building codes should be tailored to local climate conditions.** The core requirements for efficient energy use in buildings differ depending on specific variances in local climate. Not only do varying temperatures result in different heating and cooling loads for interior climate control, but daylight hours and angles mean that daylighting techniques vary from region to region as well.

Code development also should reflect the availability of efficient products needed to comply with the code. In order for the implementation of a code to be feasible across an economy, the equipment and materials specified in the code need to be available at economical prices; these include insulation, roofing, heating and cooling units, efficient windows, lights, and water heaters and pumps. Domestic industry may need support to adapt to the new requirements for building components. Likewise, investment and trade policies may need to be modified to ensure that adequate supplies of the required products are available. Over time, the adoption and enforcement of energy efficiency codes and standards can support the expansion of product availability as well as the development of improved design and construction practices and services.

3 United Nations Environment Programme, "Sustainable Buildings and Climate Initiative," http://www.unep.org/sbci/AboutSBCI/Background.asp.



CASE STUDY: ATLANTA, GEORGIA

In November 2011, the U.S., City of Atlanta, Georgia, worked through a public-private partnership to launch the Atlanta Better Buildings Challenge. The goal of the program is to reduce energy and water consumption in more than 40 million square feet of buildings located in downtown Atlanta by at least 20 percent by 2020.

To reach this goal, the city and its network of partners help participating building owners by providing tools and incentives for energy upgrades, including free building assessments, technical assistance, training courses, and enhanced access to financing.

Since launching the challenge in 2011, Atlanta has made real progress towards its goals. Participating floor space has expanded from 40 million to 100 million square feet. Since the start of the program, energy use intensity in the participating buildings has dropped by 11 percent.

Building code development also should take into account conditions in the local labor market: **new training and certification programs may be required** to provide the needed skills to support the code's application. It is important to ensure that builders, contractors, equipment and window installers, and specialty trades (e.g., control system companies) have the capacity and certification to properly follow the building code requirements.

Most economies find that mandatory building energy codes are needed to turn today's best-practice into tomorrow's standard practice; however, **voluntary high-performance building programs** can complement mandatory codes by providing market-leading examples. For instance, the U.S. DOE Better Buildings Initiative partners building managers with DOE experts to achieve voluntary energy savings. The Leadership in Energy and Environmental Design (LEED) program is an international, high-profile voluntary certification program for high performance green buildings. Managed by the U.S. Green Building Council, LEED offers buildings third-party certification of efficient resource (including energy) use. These kinds of voluntary programs can help to set the standard for exemplary and innovative building efficiency projects. When operated in a coordinated fashion, codes and voluntary programs can reinforce each other to advance building design and construction practices toward long-term energy efficiency goals.

Appliance and Equipment Standards

Energy efficiency standards are extremely effective policy tools for increasing the efficiency of appliances, lighting and equipment. Standards "push" the market by setting a minimum level of efficiency for newly produced products, eliminating production of the least efficient models. Often most effective when complemented by energy efficiency labels—which "pull" the market by providing consumers with the information they need to select the most efficient available models (see the section on Supporting a Strong Market below)—these policy tools can significantly expedite the penetration of energy efficiency technologies in the market.

U.S. CASE STUDY

U.S. MEPS have been set for nearly 60 product categories that cover 90 percent of residential, 60 percent of commercial, and 30 percent of industrial end use. The U.S. DOE establishes appliance standards through a regulatory process that includes substantial input from industry and energy efficiency advocates. Standards are required by law to be cost effective and not be unduly burdensome on industry to implement. Draft regulations are publically posted, and members of the public are invited to comment. DOE often incorporates feedback from these public comments into its final rule.

Standards adopted to date saved U.S. consumers $63 billion on their utility bills in 2015 and enough electricity to meet the needs of 43 million homes. Since the 1970s, the standards have helped to avoid 2.6 billion tons of CO_2 emissions, cumulatively. DOE estimates that the total utility bill savings as a result of these standards will be over $1.7 trillion by 2030.

Energy efficiency standards—often called **minimum energy performance standards**, or MEPS—have evolved since the 1970s to become one of the most powerful energy-saving policies deployed around the world. By establishing a process for analyzing, implementing, and updating minimum energy efficiency levels for common appliances and equipment, policymakers ensure that residential, commercial and industrial customers automatically realize energy savings when they purchase most new appliances and equipment. This is critical to raising the overall efficiency of the appliance and equipment stock over time, locking in savings as innovative technology becomes more mainstream.

Leadership Strategies

From national-level target-setting, to local building regulations, governments have an enormous role to play in improving energy productivity.

Many national governments have set **high-level energy targets**, including the Obama administration's 2013 goal to double U.S. energy productivity by 2030. China's 13th five-year plan sets a target of reducing energy intensity by 15 percent, and Australia's government has committed to improving energy productivity by 40 percent by 2030.

Subnational governments also can set targets related to energy productivity outcomes. These include **energy efficiency resource standards (EERS)**, which are also known as energy efficiency portfolio standards, or EEPS. EERS are binding energy savings targets for utilities set over an annual or multi-year time period. In the U.S., about half of the states have EERS, either enacting them through legislation, setting targets through utility commissions, or including energy efficiency as a resource in renewable portfolio standards (RPS). EERS programs also exist in a number of Australian states and European Union countries, and are becoming more common in other parts of the world.

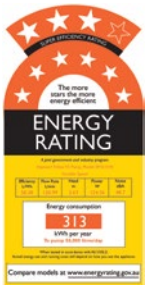
These kinds of high-level targets at national and subnational levels can help create a strategic basis around which national or subnational policies affecting different sectors can be constructed.

Supporting a Strong Market

Labeling Programs

As noted above, labeling programs are an important complement to MEPS. **Labels that identify the energy performance of appliances and equipment** allow consumers to make informed choices when purchasing these products, and help create demand for appliances that are more efficient than the MEPS require. There are two main types of labels:

Energy Star Logo



Energy Rating Label

COMPARATIVE LABELS (such as the Australian Energy Rating label) provide data about the energy use of a product and facilitate comparisons among different brands and models. Comparative labels are frequently regulated by governments, and are most effective when they are mandatory, standardized, and easy for consumers to understand.

ENDORSEMENT LABELS (such as the U.S. Energy Star and the Brazilian Procel and Conpet labels) signify that a product meets or exceeds a certain efficiency level. Endorsement labeling programs are frequently voluntary and help create brand recognition for energy efficient products by identifying top performing appliance and equipment models.

Selo CONPET

Selo PROCEL

Fostering Affordability

Initial capital costs are a barrier to energy efficiency investments for homes and businesses. More efficient equipment has greater lifetime savings potential, but usually costs more. Another common barrier is that the interests of tenants and owners are often misaligned: Building owners who are positioned to invest in efficiency upgrades do not receive the benefits of more efficient energy use, because tenants are responsible for day-to-day energy costs. Government programs as well as financing tools can help overcome these obstacles and enable more customers to deploy solutions that save money in the long term.

High initial capital costs can be addressed a number of ways. In the "MUSH" market (i.e., municipal buildings, universities, other schools, and nonprofit hospitals), national governments can help local governments gain access to capital markets by giving preferential tax treatment to lenders that provide low-cost, long-term capital by purchasing municipal leases or bonds.

Energy Savings Performance Contracts (ESPCs) are another important market tool for enabling efficiency investments. ESPCs are generally a partnership between a customer and an **energy service company (ESCO)**, where the ESCO pays the upfront costs of efficiency improvements, frequently by contracting with a third party lender. The property owner enjoys the benefits of a more efficient building, while the ESCO is repaid from the energy savings.

Residential and commercial energy efficiency investments often present timing mismatches, when payback periods exceed the average length of time that an individual or a company owns a piece of property. For example, if a homeowner installs high efficiency air conditioners with a 15-year lifespan, but then sells the property after 5 years, he or she is missing out on two-thirds of the benefits of the efficient equipment despite having paid the full cost up front. **Property-Assessed Clean Energy (PACE)** programs can address this problem by securing the debt with a lien on the property, with repayment through a line-item on the property tax bill. This structure allows the financing arrangement to be passed on to the new owners who will accrue the benefits of energy savings from the high-efficiency air conditioners.

REBATE PROGRAMS

Energy efficiency rebate programs (often offered by utilities) can incentivize energy consumers to purchase energy efficient products.

By providing discounts or cash back to consumers who purchase high-efficiency equipment, these programs defray the up-front incremental cost of the equipment.

The cost-effectiveness of rebate programs can be assessed by comparing the cost of achieving energy savings above code and standard levels to the resulting program benefits (i.e., energy cost savings, peak energy savings).

In most U.S. programs, the cost of savings is well below the avoided cost of supply, making consumer-facing energy efficiency programs an excellent investment.

For residential efficiency improvements, programs such as o**n-bill repayment (OBR)** allow customers to pay back the upfront costs in multiple installments on their monthly natural gas or electricity bills. OBR also is effective at overcoming the timing mismatch. With repayment tied to the meter, longer payback periods are possible, enabling more extensive upgrades that still yield positive cash flow impacts; the possibility of utility disconnection may reduce default rates.

Demand-side efficiency programs, including **point-of-sale rebates** (in which part of the cost of the equipment is paid back at the time of purchase), are often led by utilities and can complement appliance standards and labeling programs to help incentivize consumers to invest in deeper energy savings. In some utility-managed programs, rebates are provided to consumers who purchase high-efficiency equipment, thus defraying the incremental cost and encouraging the penetration of efficient products (see the box above). Other programs offer whole-house energy audits for free or at a discounted price for commercial, industrial and residential consumers to identify cost-effective energy savings opportunities.

Finally, utilities can be made more supportive of energy efficiency investments in consumer markets through different **electricity rate structures**. Decoupling energy use from utility revenues—i.e., providing a utility its regulated revenue requirement independent of the amount of electricity they sell—has been one such policy tool for rate design that encourages energy efficiency. Another approach might include basing a rate of return on key performance targets, such as the quantity of energy savings or peak demand reduction. By incentivizing a reward to meet or exceed expectations on energy efficiency, both utilities and consumers win.

Consumer Education

OVER FIVE YEARS
511 SCHOOLS
SAVED 38,000+MWH
SAVED $5,471,000
AND INVOLVED OVER
8,000+ STUDENT LEADERS

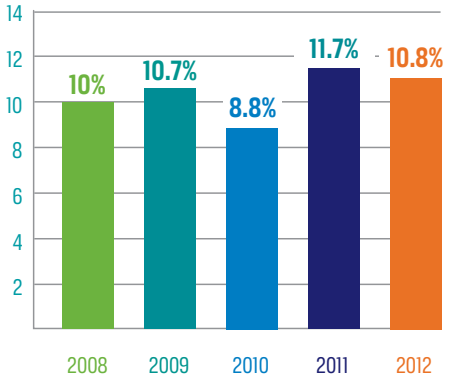
Fostering a knowledgeable consumer base starts with early education. Consumers make decisions that impact national energy productivity every day, and providing them with information about energy use and energy efficiency can help them make decisions that benefit themselves and the nation at the same time. Teaching students the central role of energy in modern life and encouraging them to take action to minimize the amount of energy they consume can positively influence entire communities. Exposing students to energy efficient technologies and practices encourages new generations to identify opportunities for energy savings at school and at home.

POWERSAVE SCHOOLS | AN ALLIANCE TO SAVE ENERGY PROGRAM

In the United States, the Alliance to Save Energy's primary, secondary, and university education programs have contributed to achieving U.S. national energy productivity goals. The PowerSave Schools program combined energy education with actions to achieve measurable energy savings in primary and secondary schools. PowerSave provided schools with a curriculum that integrated science, technology, engineering, and mathematics to allow students to find solutions to energy efficiency problems. Between 2008 and 2015, more than 500 schools participated in the PowerSave Schools program and saved approximately 49 million kWh and $7.4 million. Average electricity savings ranged from 5 to 15 percent of the schools' energy use, as a direct result of no-cost behavior changes within the schools. Annual savings in participating schools averaged more than 66,000 kWh and $10,000 per school, and much of the avoided-energy cost savings were returned to the schools.

In the European Union, the Persuasive Force of Children Through Education (FEEDU) program was deployed in 154 schools in Belgium, France, Greece, Italy, Portugal, Sweden and the UK. FEEDU was designed to raise awareness of the importance of renewable energy and energy efficiency in children aged 10–14. Teachers received energy education training and educational tools, and students carried out projects—including energy audits in their schools and homes—to engage the community and foster broad awareness of energy saving opportunities. [4]

MEASURABLE ENERGY SAVINGS THROUGH NO-COST BEHAVIOR CHANGES



Other Sector-Specific Policy Opportunities

Transportation

Improving efficiency in transportation is most effective using a holistic approach that simultaneously helps to meet rising demand while also mitigating energy use. Municipal governments worldwide have adopted the concept of "Avoid-Shift-Improve" to accomplish a range of transportation-related goals, including reducing energy use, reducing construction costs of vehicle-related infrastructure, mitigating traffic congestion, and improving air quality and safety.

4 European Commission, "Persuasive Force of Children through Education," last modified May 9, 2016, https://ec.europa.eu/energy/intelligent/projects/en/projects/feedu.

"Avoid" refers to finding alternatives to motorized transportation. This can involve encouraging teleworking to reduce the number of people commuting to work, and designing cities so that people can safely walk and bicycle where they need to go.

Governments also can encourage people to **"shift"** away from private motorized travel by providing safe and affordable options for public transportation (e.g., light rail, bus rapid transit), as well as for walking and biking (e.g., dedicated bicycle lanes). Bicycle and car share programs also are encouraging commuters in cities around the world to consider alternatives to using personal motorized vehicles.

Finally, where motorized vehicle travel is necessary, government actions can help **"improve"** the efficiency of those motors. Many countries, for example, have adopted fuel efficiency or GHG emissions standards for passenger vehicles and light-commercial vehicles. By 2016, these countries included Brazil, Canada, China, the European Union, India, Japan, Mexico, South Korea and the United States.[5] Fuel efficiency regulations work like appliance MEPS to set the minimum standard of performance for vehicles manufactured or sold. To be effective, these regulations must be complemented by clear testing and labeling practices to ensure that all vehicles on the road meet the standard and that consumers can make informed decisions.

Energy-Water Nexus

Water supply and wastewater treatment facilities use a tremendous amount of energy: Every liter of water that passes through a system represents a significant energy cost. Globally, energy is often one of the top two expenses for water utilities, leading the field in developing countries and coming in second only to labor in industrialized countries. Whenever water is lost to leaks, also lost are the energy and cost of energy embedded in that water, including pumping, treating and conveying the water. In developing countries, often one-third to one-half of the volume of water produced is lost to leaks and system inefficiencies; and many U.S. cities lose 10 percent to 20 percent of their water before it reaches end-users.[6] By using efficient water pumping systems and reducing water waste and leakage, municipalities and other water managers can simultaneously reduce losses of energy and water.

Pumping water requires a substantial amount of electricity, and as with many industrial processes, efficiency levels can vary dramatically based on the equipment and control processes used. Proper sizing of pumps in relation to total system design is critical, as oversized pumps are inherently less efficient. Technologies such as high-efficiency variable speed motors can increase efficiency, but **properly designing the motor/pump system** as a whole can result in deeper energy savings.

In addition to using more efficient and better controlled pumps to deliver water, municipal governments can achieve significant energy savings in the water sector simply by **improving managerial and operational procedures**—e.g., pressure management—at water utilities. Water conservation programs that educate consumers and help provide access to water-saving devices also can achieve savings by encouraging water conservation. Simple mechanisms such as faucet aerators and low-flow shower heads not only reduce household water use, but also can reduce energy needed to heat water.

Industry

Industrial energy efficiency opportunities differ by type of industry. However, several common strategies can be applied to save energy in facilities as disparate as steel mills, chemical factories, and food processing facilities.

Industrial operations frequently generate their own electricity and thermal energy. Using **Combined Heat and Power (CHP)**, whereby heat that might otherwise have been wasted is captured and used, can result in significant energy savings in many types of industries.

5 The International Council on Clean Transportation, "Global Passenger Vehicle Standards," January 2015, http://www.theicct.org/info-tools/global-passenger-vehicle-standards.

6 U.S. Environmental Protection Agency, "Water Audits and Water Loss Control for Public Water Systems," April 2015, https://www.epa.gov/sites/production/files/2015-04/documents/epa816f13002.pdf.

Industrial operations frequently rely less on electricity than do the residential and commercial sectors. Electricity use tends to be highest in the steel and aluminum manufacturing industries, and lower in industries such as textiles and machinery manufacturing. A common factor, however, is electric motor drives which use a high percentage of the electricity in most types of industrial operations. By investing in **high-efficiency electric motors**, industrial facilities can make immediate gains in productivity.

Best practices in building efficiency are also relevant to industrial operations. Most industrial facilities include office and administrative spaces; these types of spaces account for 20 percent of energy use at U.S. manufacturing facilities.[7] **Building codes, appliance standards, and energy management systems can therefore all be applied in the industrial context** to the benefit of energy productivity in this sector.

In addition to investing in efficient equipment and technologies, strategies for managing industrial facilities can have a huge impact on energy productivity outcomes. The International Organization for Standardization's ***"ISO 50001" specification for energy management systems*** can be particularly useful, and has been adopted by businesses in a wide range of countries. ISO 50001 is a framework for managing energy use that helps managers identify and implement new processes to save energy, check that they are working, and make revisions as needed. These processes be implemented without hampering output, and instilling management practices that focus on eliminating waste in all areas of the business can lead to savings without substantial investments in capital equipment. In fact, a 2013 study by Lawrence Berkeley National Laboratory demonstrated that the cost of implementing ISO 50001 can be paid back in energy savings within two years.[8]

Supply-side Efficiency

Before any kWh of electricity is used by a consumer, a large proportion of the usable energy from the source fuel—e.g., nearly two thirds in the United States and even more in some countries—has been lost due to inefficient power generators, high on-site electricity use, and line losses during transmission and distribution. While certain physical limits cannot be overcome when converting fuels such as natural gas and coal to electricity, improvements can be made in the generation process to maximize the percentage of that energy that reaches consumers.

Technological advancements have made power plant generators more efficient over time. Newer models, particularly ***natural gas powered combined-cycle generators,*** take advantage of heat energy that was previously wasted. By capturing and using this heat for direct use or to produce more electricity, today's best-in-class generators can exceed thermodynamic efficiencies of 60 percent. As old power plants reach the end of their useful lives, decision-makers should consider high-efficiency replacement options.

Many industrial best practices also can be applied in power plants. Well-designed ***control systems*** are crucial to eliminate wasted electricity and heat. ***Efficient lighting and tight building shells*** help reduce electricity and thermal loads. ***High efficiency motors and pumps*** reduce energy needed to move fuel to the generators. All together, these changes can significantly reduce the total energy use needed to produce electricity.

After the electricity has left the power plant and entered the power grid, additional losses are inevitable. However, processes such as conservation voltage reduction (CVR), voltage optimization (VO), and high-efficiency distribution transformers can minimize these losses. CVR reduces the starting voltage needed by a distribution feeder to ensure the last customer on the line is provided with high quality power. VO manages over-voltage at a facility to reduce the amount of power that motors and pumps consume. High efficiency transformers help step down voltage with lower losses. Each of these steps increases the efficiency of the pathway from the power plant to homes and businesses and will help reduce the quantity of fuel consumed by the electric power sector.

7 *American Council for an Energy Efficient Economy, "Intelligent Efficiency: Opportunities, Barriers, and Solutions," October 24, 2013, http://aceee.org/research-report/e13j.*

8 *Ernest Orlando Lawrence Berkeley National Lab, "Assessing the Costs and Benefits of the Superior Energy Performance Program," July 2013, http://www.cleanenergyministerial.org/Portals/2/pdfs/GSEP_Assessing%20Costs%20and%20Benefits%20of%20GSEP_LBNL-6349E.pdf.*

PART 4

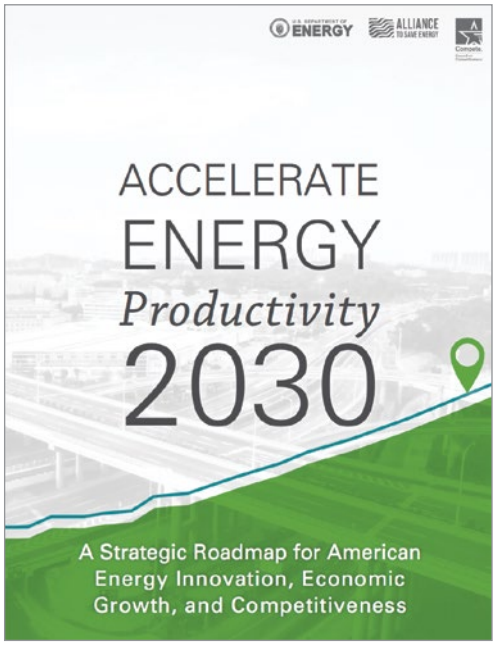
Communicating the Benefits

Once the Commission has completed its review of national sectoral priorities, analyzed the modeling results, and agreed on a core set of recommendations, the next phase of the road-mapping process is to disseminate the Roadmap conclusions to a range of audiences. A strong communications plan is important to ensure that the Roadmap has the intended effect of raising awareness and spurring action toward improving energy productivity.

The objective of the communications plan is to convey the importance of improved energy productivity and provide information about the policies and actions necessary to double national (or city- or state-level) energy productivity. This is a multi-step process:

STEP 1 » Publish the Roadmap

The important analyses and policy recommendations in the Roadmap can be published in the form of a "White Paper," similar to a government or academic report; however, the Roadmap will have greater impact if it is presented more formally. A professional publishing service can help lay out the document in a way that is attractive and accessible, with supporting graphics and data that can be used to help promote the policy recommendations of the Commission.



Throughout this process, continue to engage the Commission members, government agencies, NGOs and other organizations that will serve as key partners in amplifying and implementing the Roadmap recommendations. Take this opportunity to brief key policymakers to both build support for the Roadmap recommendations and collect feedback that can be incorporated into the final document.

STEP 2 » Prepare Key Talking Points and Promotional Materials

In addition to providing the details of the policy recommendations, it is important that the Roadmap also contain concise summaries explaining the recommendations and the expected benefits of implementing them. These talking points should avoid jargon or complex terminology in order to have meaning for diverse audiences.

Talking points can be used to craft a range of materials for engaging with the public and with media. These include PowerPoint slides that Commission members can use to discuss the Roadmap's conclusions in professional settings as well as in press releases, interviews and social media. Example materials such as tweets and blog posts can be sent to partner organizations to help amplify the message. Brochures and posters also can help reinforce messaging at a range of events.

STEP 3 » Identify and Reach the Core Audience

Once the messaging has been developed, the next step is to identify the important audiences and develop a strategy for reaching them. Key audiences include policymakers, business professionals and consumers; each requires a different strategy. Approaches to consider for targeting each audience include:

Direct Engagement

Direct engagement strategies include emailing, calling, or meeting directly with key stakeholders. Although this is frequently the most effective way to influence opinion, it is both time and resource consuming. Thus, direct engagement is most useful for reaching out to policymakers or business leaders who have decision-making ability.

Events

Events that convene decision makers as well as advocates of energy productivity are an important way to build broad support for the policy recommendations. Event planning and management takes time and financial resources, but provides an opportunity to directly influence a wide range of people.

Traditional media

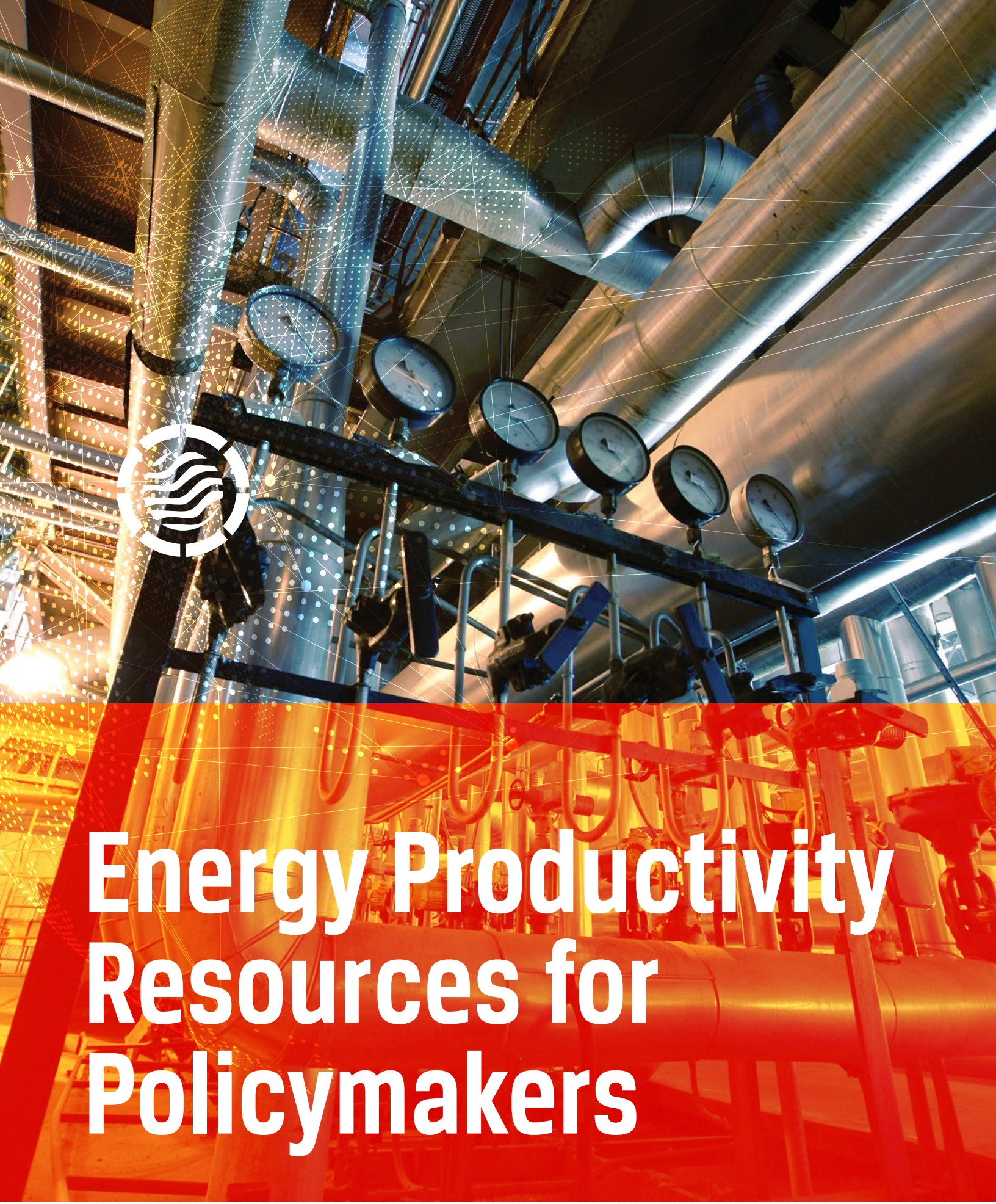
To garner press attention for the Roadmap or related events, talking points and press releases should be clear, concise and compelling. Highlighting the benefits of energy productivity along with the engagement of high-level stakeholders in the Commission process will help engage regional, national and trade press. It is important to ensure that all experts or Commission leaders engaging the press are provided with the core talking points. Practice interviews can be very helpful for preparing for television, print and radio interviews.

Social Media

Social media is an important tool for staying involved in public discourse as well as industry discussions. Engaging through blogs, Facebook, WeChat, Twitter, LinkedIn, WhatsApp and other new media avenues can help reach new and broader audiences to highlight the core recommendations from the Roadmap.

STEP 4 » Continue the Narrative

After the launch of the Roadmap, it is important to keep stakeholders and the public up to date on progress toward doubling energy productivity. The momentum generated by the Roadmap can be sustained by chronicling the policies, investments and actions that help deploy energy efficient technologies and practices toward doubling energy productivity.



Energy Productivity Resources for Policymakers

Energy Efficiency Policy: Best Practices (national level)

SE4All Global Energy Efficiency Accelerator Platform

Sustainable Energy for All

» Six sector-specific policy and finance roadmaps prepared with public and private sector partners.
» Case studies, global partner organization contacts, and policy recommendations for national governments.

www.se4all.org/energyefficiencyplatform

Energy Efficiency Governance Handbook

International Energy Agency

Information on enabling frameworks, institutional arrangements and coordination mechanisms of energy-efficient governance.

www.iea.org/publications/freepublications/publication/gov_handbook.pdf

25 Energy Efficiency Policy Recommendations

International Energy Agency

25 policy recommendations for establishing market signals, accelerating the introduction of new technologies, and strengthening energy efficiency standards and codes.

www.energyefficiencycentre.org/-/media/Sites/energyefficiencycentre/Publications/C2E2%20Publications/ECE_Best_Practices_in_EE_publication.ashx?la=da

Energy Efficiency Policy: Best Practices (sub-national level)

Tool for Rapid Assessment of City Energy (TRACE)

World Bank/ Energy Sector Management Assistance Program (ESMAP)

» Energy benchmarking module comparing key performance indicators (KPIs) among peer cities.
» Sector prioritization module that identifies sectors with the greatest potential for energy-cost savings.
» Intervention selection module to help select locally appropriate energy efficiency interventions.

www.esmap.org/TRACE

Compendium of Best Practices

Renewable Energy & Energy Efficiency Partnership (REEEP)
Alliance to Save Energy, American Council on Renewable Energy

» Case studies of energy efficiency and renewable energy best practices at the state and local level.
» Lessons learned and factors of program success in the United States.

www.acore.org/wp-content/uploads/2011/02/Compendium_of_Best_Practices_-_Final.pdf

Sustainable Design and Green Building Toolkit for Local Governments

U.S. Environmental Protection Agency

» Local codes and ordinances that affect the design, construction, renovation, and operation and maintenance of a building.
» Assessment tool, resource guide, and guide to developing an implementation action plan energy efficiency standards and codes.

https://www.epa.gov/smartgrowth/sustainable-design-and-green-building-toolkit-local-governments

Transport Efficiency

Global Fuel Economy Initiative (GFEI) Autotool

Global Fuel Economy Initiative

» Information on fuel economy policies.
» Guidelines for creating a national fuel economy baseline.
» Case studies of fuel economy policy development and implementation projects.

www.unep.org/transport/GFEI/autotool/index.asp

Survey of Policies and Programs that Promote Fuel-Efficient Transport in APEC Economies

Asia-Pacific Economic Cooperation, Alliance to Save Energy

Descriptions of policies and programs to maximize the efficiency of the transportation sector.

www.ase.org/resources/survey-policies-and-programs-promote-fuel-efficient-transport-apec-economies

Policy Pathways: A Tale of Renewed Cities

International Energy Agency

Lessons learned and examples of good practice for implementing measures to improve energy efficiency in urban transport systems.

www.iea.org/publications/freepublications/publication/policy-pathways-energy-efficiency-in-urban-transport-systems.html

Policy Pathways: Improving the Fuel Economy of Road Vehicles – A Policy Package

International Energy Agency

Lessons learned and examples of good practices for implementing fuel economy policies for vehicles.

https://www.iea.org/publications/freepublications/publication/policy-pathways-improving-the-fuel-economy-of-road-vehicles---a-policy-package.html

Buildings Sector Efficiency

Excellence in Design for Greater Efficiencies (EDGE)

International Finance Corporation

» Software system: Calculates utility savings and reduced carbon footprint of energy-efficient building retrofits against a base case.
» Certification program: Educational program for developers to learn strategies to reduce energy and water use in buildings.

www.edgebuildings.com

Driving Transformation to Energy Efficient Buildings

Institute for Building Efficiency

» Government policy options to accelerate building energy efficiency improvements.
» Building efficiency policy assessment tool.

www.buildingefficiencyinitiative.org/articles/driving-transformation-energy-efficient-buildings-policies-and-actions-2nd-edition

ENERGY STAR Portfolio Manager®

Environmental Protection Agency

» Tool to measure and track energy and water consumption, and greenhouse gas emissions.
» Tool to benchmark the performance of a building or a portfolio of buildings.

https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

Policy Pathways: Modernising Building Energy Codes

International Energy Agency, UN Development Programme (UNDP)

Best practices for implementing building energy codes in four phases: plan, implement, monitor and evaluate.

https://www.iea.org/publications/freepublications/publication/policy-pathways-modernising-building-energy-codes.html

Policy Pathways: Energy Performance Certification of Buildings

International Energy Agency

» "How-to" guide for implementing building energy performance certification programs.
» Case studies from around the world.

https://www.iea.org/publications/freepublications/publication/policy-pathways--energy-performance-certification-of-buildings.html

Appliances, Lighting and Equipment Efficiency

Energy Policy Toolkit for Energy Efficiency in Appliances, Lighting, and Equipment

Collaborative Labeling and Appliance Standards Program (CLASP)

» Examples of policies that have been implemented successfully with minimal costs.
» Suggestions for leveraging financial and intellectual resources.

www.clasp.ngo/Resources/Resources/PublicationLibrary/2013/Energy-Policy-Toolkit-for-Energy-Efficiency-in-Appliances

en.lighten Efficient Lighting Toolkit

Global Environment Facility and UN Environment Programme (UNEP)

» Best practices in policy development, regulations and standards for energy efficient lighting.
» Guidance on financing, communication, and market transformation.

www.enlighten-initiative.org/ResourcesTools/EfficientLightingToolkit.aspx

Policy Analysis Modeling System (PAMS)

Lawrence Berkeley National Laboratory

Software tool to assess the benefits of standards and labeling programs and identify the most attractive targets for appliance efficiency levels.

https://ies.lbl.gov/project/policy-analysis-modeling-system

Bottom Up Energy Analysis System (BUENAS)

Lawrence Berkeley National Laboratory

Estimates global energy efficiency potential for residential, commercial and industrial equipment.

https://eaei.lbl.gov/tool/bottom-energy-analysis-system

Monitoring and Verification

Policy Pathways: Monitoring, Verification and Enforcement

International Energy Agency

Guidance on best practice compliance—through monitoring, verification, and enforcement—in end-use appliance and equipment standards and labeling programs.

https://www.iea.org/publications/freepublications/publication/policy-pathways-monitoring-verification--and-enforcement.html

International Performance Measurement and Verification Protocol (IPMVP)

Efficiency Valuation Organization

» IPMVP Core Concepts documents are available free of charge.
» Detailed protocol documents are available for a fee.

www.evo-world.org/en

Industrial Efficiency

LEAN Manufacturing
U.S. Environmental Protection Agency
Operational toolkits to help Lean, environmental, and other specialists identify and eliminate waste.
https://www.epa.gov/lean/lean-manufacturing-resources

MASTER: Manufacturing Structure and Energy Research
Lawrence Berkeley National Laboratory
Tool to help understand how different factors (production growth, industry structural change, and energy intensity change) influence industrial energy use trends over time.
https://eaei.lbl.gov/tool/manufacturing-structure-and-energy-research

Policy Pathways: Accelerating Energy Efficiency in Small and Medium-sized Enterprises
International Energy Agency
Ten steps for governments and other stakeholders to design and implement energy efficiency programs that deliver cost-effective savings to SMEs.
https://www.iea.org/publications/freepublications/publication/policy-pathways--accelerating-energy-efficiency-in-small-and-medium-sized-enterprises--.html

Best Practices and Case Studies for Industrial Energy Efficiency Improvement
Copenhagen Centre on Energy Efficiency
Shares international experience in industrial energy efficiency policy making and explains preconditions for successful implementation.
www.energyefficiencycentre.org/-/media/Sites/energyefficiencycentre/Publications/C2E2%20Publications/Best-Practises-for-Industrial-EE_web.ashx?la=da

Policy Pathways: Energy Management Programmes for Industry - Gaining through saving
International Energy Agency and Institute for Industrial Productivity
Actionable guidance on how to plan and design, implement, evaluate and monitor energy management programs for industry.
https://www.iea.org/publications/freepublications/publication/policy-pathways-energy-management-programmes-for-industry.html

Energy Efficiency Data and Indicators

ClearPath™
ICLEI: Local Governments for Sustainability
Online software platform for completing greenhouse gas inventories, forecasts, climate action plans, and monitoring at the community-wide or government operations scale.
www.icleiusa.org/clearpath

Energy Efficiency Financing

Policy Pathways: Joint Public-Private Approaches for Energy-Efficiency Finance
International Energy Agency
» Examples and lessons learned about the critical elements of public-private partnerships to finance energy efficiency.
» Focus on dedicated credit lines, risk guarantees, and energy performance service contracts.
https://www.iea.org/publications/freepublications/publication/policy-pathways-joint-public-private-approaches-for-energy-efficiency-finance.html

Guidelines for Financing Municipal Energy Efficiency Projects in the Commonwealth of Independent States
Alliance to Save Energy, Renewable Energy & Energy Efficiency Partnership
» Overview of available financing mechanisms for energy efficient projects.
» List of other financing toolkit sources.
pdf.usaid.gov/pdf_docs/Pnadx837.pdf

Manual for Development of Municipal Energy Efficiency Projects (India)
Alliance to Save Energy, International Finance Corporation, Bureau of Energy Efficiency (India)
» Step-by-step methodology for developing and packaging a municipal efficiency project for performance contracting.
» Procurement and contracting template documents.
www.ase.org/resources/manual-development-municipal-energy-efficiency-projects

Emissions Management

Energy Efficiency Indicators: Fundamentals on Statistics
International Energy Agency
» General principles related to collection of data for energy efficiency indicators.
» Overview of common sectoral indicators and examples of worldwide practices for collecting data to build indicators.
https://www.iea.org/publications/freepublications/publication/energy-efficiency-indicators-fundamentals-on-statistics---.html

Energy Efficiency Indicators: Essentials for Policy Making
International Energy Agency
Tools for policy makers and energy analysts to determine priority areas for the development of energy efficiency indicators, and to select and develop the data and indicators that will best support energy efficiency policy making.
www.iea.org/publications/freepublications/publication/energy-efficiency-indicators-essentials-for-policy-making.html

ALLIANCE TO SAVE ENERGY

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