

# **From Good To Great:** The Next Step in Chilean Energy Efficiency

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## **ACKNOWLEDGMENTS**

A panel of energy, electricity and regulatory Chilean and international experts provided critical insight and made valuable contributions to this policy proposal. The authors of this study would like to extend our sincere gratitude to Javier Bustos, Juan Pablo Carvallo, Brian Castelli, Philip Coleman, Rafael Friedman, Jorge Moreno, Matias Negrete Pincetic, Bernardo Reyes, and Ignacio Santelices for their input, guidance and review. In addition, the authors would like to thank the numerous individuals, companies, institutions, associations, and others with whom we met in Santiago and whose comments and suggestions helped to shape these policies.

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## ABBREVIATIONS AND ACRONYMS

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AChEE	Agencia Chilena de Eficiencia Energética / Chilean Energy Efficiency Agency
BEC	Building energy code
CADE	Comisión Asesora para el Desarrollo Eléctrico / Advisory Committee for Electricity Development
CCTP	Comisión Ciudadana Técnico-Parlamentaria / Citizen Parliamentary Technical Commission
CNE	Comisión Nacional de Energía / National Energy Commission
CO <sub>2</sub>	Carbon dioxide
CORFO	Corporación de Fomento de la Producción / Chilean Development Corporation
DSM	Demand-side management
ECLAC	United Nations Economic Commission for Latin American and the Caribbean
EE	Energy efficiency
EEl	Energy efficiency indicator
EM&V	Evaluation, Measurement and Verification
EMC	Energy Management Commitment
FPP	Formal Participatory Process
IEA	International Energy Agency
MEPS	Minimum Energy Performance Standards
MOE	Ministry of Energy
MOH	Ministry of Housing
MW	Megawatt
NRDC	Natural Resources Defense Council
OECD	Organisation for Economic Co-Operation and Development
PEEEP	Programa de Eficiencia Energética en Edificios Públicos / Program for Energy Efficiency in Public Buildings
PNAEE	Plan Nacional de Acción de Eficiencia Energética 2010-2020 / National Energy Efficiency Action Plan 2010-2020
PPEE	Programa País de Eficiencia Energética / National Energy Efficiency Program
SEC	Superintendencia de Electricidad y Combustibles / Electricity and Fuels Bureau
UN	United Nations

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# INTRODUCTION AND FOUNDATION FOR THE PROPOSED RECOMMENDATIONS

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## A. THE IMPORTANCE OF ENERGY EFFICIENCY GLOBALLY AND IN CHILE

Energy efficiency is important to Chile; indeed, it is the *first pillar* of the 2012 – 2030 National Energy Strategy,<sup>1</sup> which adopts a goal of reducing Chile's 2020 projected energy consumption by 12%. Chile's efforts to improve the efficiency with which its people and organizations use energy began in 2005 and, today, various activities by the Ministry of Energy, the Chilean Agency for Energy Efficiency (Agencia Chilena de Eficiencia Energética or AChEE) and others touch most segments of energy users in the country.<sup>2</sup> Moreover, both the Advisory Committee for Electricity Development (Comisión Asesora para el Desarrollo Eléctrico or CADE) and the Citizen Parliamentary Technical Commission (Comisión Ciudadana Técnico-Parlamentaria or CCTP) agreed on the “need to promote energy efficiency” in addressing Chile's energy future.<sup>3</sup> The previous two administrations—from different sides of the political spectrum— as well as many stakeholders agree that energy efficiency should be a priority in any long-term energy policy.

The broader international community also acknowledges the high importance of energy efficiency. In the International Energy Agency (IEA) 2012 Annual Energy Outlook, the executive summary explains that “[e]nergy efficiency is widely recognized as a key option in the hands of policy makers . . . In the last year, major energy-consuming countries have announced new measures: China is targeting a 16% reduction in energy intensity by 2015; the United States has adopted new fuel economy standards; the European Union has committed to a cut of 20% in its 2020 energy demand; and Japan aims to cut 10% from electricity consumption by 2030.”<sup>4</sup>

The reasons for energy efficiency's prominence as a policy option are well-known. By definition, cost-effective energy efficiency savings produce positive economic value over the life of the action taken to improve efficiency. Almost always, this economic benefit is matched by a proportionate reduction in carbon dioxide (CO<sub>2</sub>) and other emissions because the energy being saved would otherwise come from fossil fuels, directly or through conversion to electricity. To the extent that energy efficiency improvements postpone or eliminate the need for new energy development, conversion and delivery investments, they also postpone or eliminate the environmental effects of these actions and free the capital that would have been required for investment in other priorities.

Increases in energy efficiency also improve the competitiveness of a country's exports in the global economy, securing jobs and providing needed revenues to government. The inter-related domestic economy will benefit from this improvement in international competitiveness. The national economy further benefits from increasing energy efficiency

in its own operations by experiencing greater profitability and larger potential markets from consumers who, having improved their energy efficiency, now have more money or resources to spend on non-energy goods and services. In addition, energy efficiency can help reduce government and private debt and restrain inflation, which is often driven by fuel price escalation.

Beyond the economic and the environmental advantages, increasing energy efficiency simply contributes to a higher quality of life, allowing for greater comfort and safety, better health, and other outcomes entwined with how people live and work. Countries that emphasize energy efficiency experience innovation in products and services, which can improve these products and services far beyond the energy saved.

The potential for these benefits from energy efficiency improvement are significant in Chile. Energy demand projections show significant increases over the next ten to 15 years. The National Energy Strategy posits an additional 8,000 MW of electricity generating capacity—almost half the current installed base—will be needed to meet demand by 2020.<sup>5</sup> The November 2012 study on the Chilean National Situation completed as part of the Partnership for Market Readiness between Chile and the World Bank noted projections of total energy demand growth totaling almost 58% between 2010 and 2020 and electricity demand growth of 118% between 2012 and 2030.<sup>6</sup>

In addition, during the last ten years, Chile has several times faced energy shortages as natural and political conditions threatened supplies. Increased energy efficiency can relieve the pressure if such situations arise again. No matter what combination of technologies Chile might use to meet this future energy demand growth, the direct and indirect costs will be high and, consequently, the value of energy efficiency gains will also be very high.

**The long-term benefits of energy efficiency strategies far outweigh the short term costs of implementing them.** The 2010 Baseline Study for the Elaboration of a National Energy Efficiency Action Plan 2010-2020<sup>7</sup> commissioned by the National Energy Commission (Comisión Nacional de Energía or CNE) estimated direct and indirect economic benefits of potential energy efficiency improvement at between 12 billion and 23 billion (USD).<sup>8</sup> The projected costs of pursuing everything in this plan totaled just over \$904 million (USD).<sup>9</sup> Even under the most pessimistic scenario for Chile's adoption of the identified energy efficiency measures, the costs were just seven percent of the potential economic benefits.<sup>10</sup>

Moreover, Chile's potential for energy efficiency improvement is high. Drawing from several sources, Table 1 (below) shows the share of current and potential energy use attributable to the four major energy end-use sectors in Chile and the potential annual energy efficiency savings that have

**Table 1. Current energy use and energy efficiency potential in Chile, by sector**

Sector (from the 4 major energy end-use sectors in Chile)	Current Energy Use (2010) (as % of Total TCal) <sup>11</sup>	Forecasted Energy Use (2020) (as % of Total TCal) <sup>12</sup>	Average Annual Growth in Energy Use (as %, actual 1990–2010/ projected 2010–2020) <sup>13</sup>	Energy Efficiency Potential (Annual savings as % of 2020 TCal) <sup>14</sup>
Industry and Mining	38	36	4.6/5	7.5
Commercial, Residential and Public	26	17.5	3.2/1.6	Not Available
Transportation	33	43	4.2/6	1.7
Energy	3	3.5	5.4/4	Not Available

been estimated for some of the sectors. Even though we could not find recent detailed potential estimates for two of the four sectors—a fact which underscores the need for a government entity devoted specifically to gathering, analyzing and publishing energy information (see sec. I.C.1)—the size of the potential is still evident. Experience around the world has shown that realized savings often exceed the expected savings identified in such studies.

Despite the high potential, vast benefits and often net lifetime economic savings of energy efficiency improvements, they often remain difficult to attain. Analysts have identified some possible explanations in numerous studies, papers and presentations; these include:<sup>15</sup>

- Lack of information among decision makers and energy end-users about energy efficiency opportunities.
- High initial cost, with benefits/savings appearing over time.
- Inability to finance the initial cost or the high cost of that financing.
- Split incentives or responsibilities, such as in building developer/building owner or landlord/tenant situations.
- Energy user inertia: competing priorities for time and attention.
- Poor price signals because of subsidies or other practices that depress the cost of conventional energy sources and un-priced external costs of these sources.
- Lack of trust in the technologies, installers, or both; inability to “see” the savings.

**To date, most global experiences show that the market—unassisted—has failed to overcome these barriers.** Many countries, in all parts of the world, have concluded that government intervention is necessary to advance the classic public good of energy efficiency. The answer to the question “How?” has been as diverse as the governments addressing it, and the time at which they address it.

## **B. ENERGY EFFICIENCY IN CHILE NOW: “GOOD,” BUT NOT GREAT**

Chile has made efforts to tackle those barriers and improve energy efficiency (see Annex I), which are *good*. For several reasons, however, they are not *GREAT* and are unlikely to support Chile’s achievement of its energy efficiency potential. Although various government and non-government organizations and associations are working to support energy efficiency improvements, the following problems exist.

The national government:

- Lacks good information about the current state of energy efficiency in the country, including the two high energy intensity sectors of industry and mining, whose projected energy demand drives much of the expected growth in Chile’s need for energy infrastructure.
- Did not use a transparent process to set its national energy efficiency goal in which all stakeholders had the opportunity to participate.
- Does not have expectations or timelines for the strategies it is pursuing, such as building energy codes (BECs) and Minimum Energy Performance Standards (MEPS) for

equipment and appliances. MEPS are being pursued slowly; for some building types, energy codes were done but have not been revisited for years notwithstanding the growing importance to Chile of increasing energy efficiency and for others, no energy code exists.

- Has provided uneven and uncertain funding for its energy efficiency efforts and has not made possible adequate funding to provide the type and level of energy efficiency services that Chileans need to pursue energy efficiency's long-term benefits.

The associations and government divisions who are responsible for various energy efficiency strategies:

- Do not always involve all critical stakeholders in their planning, implementation and evaluation processes.
- Do not publish their expectations of the energy efficiency improvement that their activities will produce; the means by which they will measure and verify that the improvement occurred; or the results they achieved.

The existing 12% by 2020 national energy efficiency goal:

- Is not verifiable. If energy use in 2020 is 12% less than what was forecast in 2010, will that be because of energy efficiency or because the forecast was wrong? Most forecasts are wrong with respect to at least some assumptions; many are wrong on major assumptions.
- Is based on a relatively old study that likely uses even older data.
- Does not explain how the Ministry of Energy determined the 12% number, or present any of the component parts, such as sector or geographic goals, which comprise it.
- Does not identify processes by which sectors will report on their energy efficiency progress or will learn from differences that may arise between expected and actual conditions.

In this report, we recommend that the national government address these problems by transparently building a strong framework for Chile's long-term sustained success in improving energy efficiency and adopting effective, proven strategies for increasing energy efficiency within that framework.

## C. STRUCTURE OF THIS REPORT AND OVERVIEW OF PROPOSED POLICIES

Based on international best practices and examples, our proposals to transform Chile's efforts from *good* to *GREAT* align the size of the effort with the potential benefit. Doing so requires a systemic framework: a set of interacting policies, approaches and components from which the outcome—long-term, aggressive growth for all stakeholders in Chile's energy efficiency—will emerge.

The first section of this report describes our proposal for the Goal-Setting and Review Framework, which is the umbrella under which all of the other proposed policies operate. This framework includes a ten-year cycle during which the government will establish the framework, create new sector-specific goals, run the energy efficiency strategies designed to meet those goals, evaluate each sector's progress, and adjust for the next ten-year cycle depending on key lessons. We place heavy emphasis throughout on transparency and accountability, as well as on evaluation, monitoring and verification.

We collectively call the next three sections the Accelerated and Added Energy Efficiency Strategies, and they will operate inside the ten-year cycle established by the Goal-Setting and Review Framework. In identifying strategies to accelerate and add to Chile's present energy efficiency efforts, we considered three distinct types of energy end-users:

- Chile's energy end-users who are acquiring a new buildings (sec. II), whether for residential, commercial or public sector purposes or acquiring new equipment or appliances.
- Chile's largest energy end-users, most of which are in the mining and industrial sectors (sec. III) and whose energy use is a significant driver of forecasted energy use in Chile over the next couple of decades.
- The rest of Chile's energy end-users in households and the commercial and public sectors (sec. IV), as well as a portion of the industrial sector.

Each has distinguishing characteristics that warrant a separate strategy.

We designed these strategies to reach broadly throughout all of Chile's social and economic sectors for a couple of reasons. First, of course, the potential for economic and non-economic benefit associated with energy efficiency improvement runs throughout all. Second, we believe there is valuable synergy in a widespread, coordinated effort to increase energy efficiency. People work in the commercial,

public, industrial and mining sectors. They should see their efforts to increase efficiency at home mirrored in the efforts of the organizations for which they work. The organizations for which they work should be able to leverage their employees' awareness of the importance of energy efficiency to secure their help in identifying, implementing and maintaining the measures and actions that will enable long-term, sustained energy savings. It is critical to consider all of the policies together in calculating cost-effective potential and designing strategies to achieve it.

In the fourth section, which details the strategies for the residential, commercial, public and small industrial sectors, our proposals call for the creation of an Energy Efficiency Administrator, who will manage the specific strategies among those end-users.

The fifth section identifies the Funding Mechanisms we propose to pay for these strategies, and the sixth section discusses some Implementation topics, such as the need for an energy efficiency law and the potential for decoupling for distribution companies.

The report next includes a Timeline and Initial Cycle section to provide a visual aid for the myriad strategies happening at the same time during the first ten-year cycle of the framework, before finishing up with final thoughts in the Conclusions.

It is important to note that all of these ideas build on what Chile is already doing, as summarized in Annex I. Table 2 below shows the accumulation of good efforts we recommend Chile continue (blue column), plus the efforts we propose Chile accelerate (orange column) and the policies and programs we propose Chile add (green column).

<b>Table 2. Recommended energy efficiency efforts</b>		
<b>Good to great: building on Chile's current energy efficiency efforts</b>		
<b>CONTINUE WITH</b>	<b>+ ACCELERATE</b>	<b>+ ADD</b>
Building, Equipment and Appliance Labeling Program Energy Efficiency Education Energy Efficiency Training Energy Efficiency-Related Research (specific to Chile) Energy Efficiency Capability Building Transportation-Related Energy Efficiency Programs (including vehicle efficiency, transportation efficiency, and transportation infrastructure and pricing)	A Full Set of Minimum Energy Performance Standards (MEPS) for Equipment and Appliances (sec. II.A)  Stricter Building Energy Codes (BECs) for Housing (sec. II.B)	Inclusive and Thorough Goal-Setting Process (sec. I.A) Processes and Requirements for Accountability and Transparency (sec. I.B) Commercial and Public Sector BECs (sec. II.B) Scheduled BECs and MEPS Updates (sec. II.A and II.B) Energy Intensity Management Commitment for the Largest Energy End-Users (sec. III) An Energy Efficiency Administrator to manage Energy Efficiency Strategies for the Residential, Commercial and Public Sectors (sec. IV.B) Dedicated Energy Efficiency Services Fund for Comprehensive Incentive-Based Energy Efficiency Services for All (except the largest) Energy End-Users (sec. V.A) An Independent, Well-Staffed and Funded government division for developing and maintaining Energy Information and EE Indicators (sec. I.C) Decoupling (Business Model Change) for Electric Distribution Companies (sec. VI.B)

Implementing these recommended proposals would accomplish the following important goals:

- Establish an understood and trusted goal for Chile's energy efficiency achievements and processes by which all stakeholders can know on a regular basis the progress that has been made toward that goal.
- Provide commitment to and stable funding for a well-staffed governmental department to develop and maintain the energy efficiency indicators and the information they produce.
- Ensure Chile receives the energy efficiency benefit of adopted, enforced, regularly updated Minimum Energy Performance Standards (MEPS) for equipment and appliances and aggressive Building Energy Codes (BECs).
- Focus Chile's largest energy end-users—mines and industries—on improving their competitiveness and lessening their adverse impact on Chile's need for new energy supplies and infrastructure and on its environment by requiring that they make energy management commitments.
- Offer all of Chile's energy end-users, from households through industries a comprehensive set of Energy Efficiency Services—designed to help them increase their energy efficiency through such assistance as information, financial incentives, technical help, and installation—and create a fund for these services collected through electricity tariffs.

Finally, we tried to make the following recommendations as inclusive as possible, so that all of Chile's economic sectors and energy users can enjoy the benefits of achieving greater energy efficiency. A more complete analysis of all actors and sectors, including transportation, financing and energy generation was beyond the scope of this project. To the best of our ability, we will indicate in the following sections where energy efficiency strategies for those sectors and actors should appear. However, all are essential components to this effort and should be included in the processes we will lay out. Fortunately, the Goal-Setting and Review Framework (in sec. I) provides opportunity for all stakeholders—such as those in the transportation, financing and energy generation sectors—to participate.

## **D. CHILE SHOULD PURSUE ALL COST EFFECTIVE ENERGY EFFICIENCY**

**When designing its energy efficiency goals, Chile should pursue ALL cost-effective energy efficiency measures possible.** Some countries and states that have adopted energy efficiency goals have debated about whether to pursue only some of the potential energy efficiency improvements, with proponents of “some” raising concerns about costs or feasibility. We believe that costs and feasibility are issues appropriate to questions of timing and strategy, not to the goals. Accordingly, we recommend that the level of energy efficiency expressed in these goals represent all cost-effective energy efficiency improvements identified over the period through 2027.

Once the national energy efficiency goals are set (described in Section II), the timing and the means by which Chile pursues all cost-effective energy efficiency can be determined in a context that includes considerations of expense and feasibility. Often countries or states within the United States have followed a phase-in process with respect to adopting and pursuing significant energy efficiency goals.<sup>16</sup> With a phase-in, the goals of early years are set to permit time to build capability and gain the benefit of learning the costs involved in gaining the various kinds of energy efficiency improvements throughout the sectors. Once capability and learning have occurred, goals can increase to produce the desired results by the end of a target period.

Chile should demand no less than all. The processes of developing primary energy, converting it to usable forms and delivering it to where people need the energy to do work will not get less costly nor have fewer consequences over the next decades. Intuitively and as reinforced in study after study, **the most valuable thing a country can do to support the role energy plays in its future economic and social vitality is use energy more efficiently.**

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# EXECUTIVE SUMMARY: THE PROPOSED RECOMMENDATIONS

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As we have seen in the introduction, both the international community and Chile's government recognize the importance of energy efficiency. It is also clear from experiences around the world that energy efficiency measures are economically beneficial investments in the long term. Chile can make great energy efficiency gains across a range of sectors—mining, industry, residential, commercial, and more—which would significantly help to meet the country's future energy consumption projections. In order to make those potential gains a reality, the government needs to enhance and strengthen the existing separate energy efficiency projects under one coordinated, strategic policy. Energy efficiency cannot be a narrow afterthought or mere add-on; it must be a policy priority, with broad participation and long-term commitment.

Below we briefly summarize the main policy proposals that we describe in detail in this report which Chile can undertake to raise its energy efficiency efforts from good to great, ensuring that this important sector helps the country meet its future energy needs.

## I. THE GOAL-SETTING AND REVIEW FRAMEWORK

We propose that the Chilean government adopt and adhere to a new framework that will coordinate, discipline and drive the sector-specific strategies we describe below. To ensure that the government has the stable funding, authority, and motivation necessary to carry out these strategies, **we recommend Chile pass an Energy Efficiency Law** mandating the Ministry of Energy to implement a goal setting and program cycle to be repeated once every ten years.

Before the first ten-year cycle (2017-2027) begins, we suggest a one-time, three-year preparatory period (2014-2016) when the government will lay all the groundwork for this framework: establish the processes, identify the actors, and pass the regulations and the energy efficiency law necessary for the ten-year cycles. It is crucial for the success of this policy for most of the preparatory work, as well as the beginning of its implementation, to occur within the same administration. Completing development and starting implementation within a four-year government cycle will ensure stable leadership throughout the process and continuity and coherence between the crucial phases of design and implementation. This time frame will also avoid unnecessary delays, such as can occur if leadership changes with a new administration. The specific activities to be accomplished in the three year preparatory period and the ten-year cycle are summarized in Figure 1 at the end of this Executive Summary and detailed in the "Timeline" section (sec. V).

A key building block of the framework is the use of **Formal Participatory Processes (FPPs)** which let stakeholders know when important decisions will be made and who is making them, and offer them an opportunity to influence those decisions. These processes help ensure transparency and accountability on the part of the decision-makers, and buy-in and commitment from stakeholders. Formal participatory processes require the decision-maker to publically articulate the decision it will make and invite input from those likely to be directly impacted by the decision as well as those likely to be indirectly impacted. The decision-maker does not have to agree with every participant's comments, but it must explain its choices in a written, public decision. When managed well, a formal participatory process requires only a bit more time than internal decision-making and ends in a widely understood decision.

The first component of the framework is a **formal participatory process to design a new energy efficiency potential study**. The new potential study will generate updated information about 1) the current level of energy efficiency in Chile based on specific indicators and 2) where in the economy or among households is the greatest potential to improve on that level of energy efficiency. It will serve as the foundation for the first ten-year cycle of this Goal Setting and Review Framework proposal. Therefore, this first formal participatory process will design the scope of the energy efficiency potential study and will identify the best energy efficiency indicators to determine each sector's potential. **We recommend that the Ministry of Energy be in charge of the potential study formal participatory process. We also recommend that a division within the government—likely but not necessarily within the Ministry of Energy—be designated (or created) to be responsible for collecting, analyzing and publishing this critically important energy efficiency indicator data.**

Once the energy efficiency indicators are selected and the potential study is designed and carried out, **we recommend the Ministry of Energy convene a second formal participatory process to establish the national and sector-specific strategy goals for the country's energy efficiency effort**. In this Goal Setting process, the Ministry of Energy, with input from other participants, will identify the set of goals that each sector will aim to reach by the end of the ten-year cycle, the strategies they will use to meet those goals, how and when each sector will report its progress and evaluate its efforts, and how these sector-specific goals fit into the national goal.

Within the framework, we recommend different strategies be used for three different types of energy consumers to help accelerate and add to Chile's energy efficiency efforts. Some of these strategies build on work that is already occurring; others are entirely new.

## II. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY EFFICIENCY FOR NEW BUILDINGS AND APPLIANCES

Chile's Ministry of Housing is currently responsible for the adoption of housing building codes, including **Building Energy Codes (BECs)**, but the law does not expressly require this Ministry to issue BECs for commercial and public sector buildings. **We recommend the new energy efficiency law do so**, as the potential for savings is so great. We also suggest the law direct the Ministry of Housing to participate in the potential study and goal setting formal participatory processes; design and enforce measurement and verification protocols for BECs; and arrange for the collection of data on new buildings to support the energy efficiency indicators and the division responsible for those indicators. The law should establish that the Ministry of Energy will support the Ministry of Housing as needed.

Pursuant to the potential study and goal setting formal participatory processes, **the Ministry of Energy should set a schedule for the issuance of Minimum Energy Performance Standards (MEPS)** for appliances from the year 2017 until 2027, prioritized according to benefit. This Ministry should also make known the timing and means by which it will report on units of equipment and appliances sold once a MEPS is issued, and the schedule by which it will engage independent contractors to perform impact evaluations of each MEPS.

**We recommend, in accordance with international best practice, that both BECs and MEPS are updated every three to five years, to ensure continual energy efficiency improvement.**

## III. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY MANAGEMENT COMMITMENT FOR LARGE INDUSTRY AND MINING

Chile expects industrial energy use to drive the overall growth in energy need for decades, mostly among the largest industrial and mining companies. Fortunately, the return on improving energy efficiency in these industries is often considerable, so we propose an **Energy Management Commitment (EMC)** as the energy efficiency strategy designed specifically for them. We recommend that the Ministry of Energy work with these companies to determine which ones fit into this group of large-scale energy users (others will fall into our third category of energy users, below)

and how each company will set, meet and report on its own goals, which will contribute to the national goal established in the goal setting formal participatory process.

**Each company participating in the energy management commitment will determine its own energy management plan, including efficiency indicators and goals for 2017-2027.** The companies will discuss their indicators and goals with the Ministry of Energy, and will report to the Ministry on their progress annually. These annual reports will include information about the impact their energy efficiency efforts had in the previous year, an analysis of the reasons for any difference between targeted and achieved efficiency levels, and planned actions for the following year. This energy management plan system is similar to ISO 50001, recommended by the Ministry of Energy in its most recent Energy Efficiency Action Plan.

Although the energy efficiency activities and goals are designed by the companies, we propose that their participation in this commitment be mandatory. Companies will not face a fine or other punishment for not meeting their goals, but they *will* if they do not participate, that is, submit data and annual reports to the Ministry of Energy. Their participation is critical in generating updated, good energy efficiency data and in building capacity within the Ministry of Energy to work specifically with their industries.

## IV. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY EFFICIENCY SERVICES STRATEGY FOR RESIDENTIAL, COMMERCIAL AND PUBLIC SECTORS

For all energy end-users not covered by the energy management commitment, **we propose the government make available funded and targeted Energy Efficiency Services through an Energy Efficiency Administrator.** These services may combine some or all of the following: energy efficiency information; financial incentives to help pay for the cost of energy efficient initiatives; technical help, for example regarding the selection of equipment, design, training, etc.; or physical help, such as equipment installation. Such services will be designed to encourage energy end-users to replace the less efficient—appliance, building design, building material, industrial process, etc.—with the *more* efficient, and to do so faster than would otherwise occur.

**We recommend the government create an Energy Efficiency Administrator**, who will be responsible for strategically planning where and how it will focus energy efficiency efforts for the ten-year cycle, based on the potential

and energy efficiency indicators identified in the potential study formal participatory process and on the national goals set in the goal setting formal participatory process. The administrator will design and carry out a set of energy efficiency services to meet the goals, all planned annually and within its budget. The administrator will present to the Ministry of Energy an annual report on its activities during the previous year, including data on the savings its services achieved, its expenditures, an analysis of the reasons for any differences in savings and costs, and a description of how it encouraged stakeholder input in its activities.

In other countries, governmental agencies, not-for-profit organizations, and for-profit companies, all play the role of administrator. Given the particulars of the Chilean electricity market, we recommend that the Ministry of Energy select a not-for-profit organization or agency to be the Energy Efficiency Administrator. We also recommend that distribution companies and others play key roles in delivering the energy efficiency services that the administrator will design.

## V. FUNDING MECHANISMS

For each of the proposed policies, we have identified a **clear source of funding to provide stable and regular resources for Chile's energy efficiency improvements**. We have commissioned a legal report analyzing the constitutionality of the new options, and find no legal problems with them.

**We propose that the new energy efficiency law include a specific section providing stable and committed funding from the national budget for the energy efficiency activities** that the various government bodies will carry out to contribute to the national and sectoral goals determined during the goal setting formal participatory process. This includes all the activities that these bodies undertake inside their own scope of work that improve Chile's energy efficiency as well as the activities that these bodies may undertake to establish and/or implement the entire energy efficiency framework.

The funding for each of the three specific strategies mentioned above (BECs and MEPS, the Energy Management Commitment for large industry, and Energy Efficiency Services) will come from different stakeholders. First, the Ministries of Housing and Energy will use their own budgets for their work on BECs and MEPS.

Chile's largest energy consumers will each pay for their own activities within their energy management plans, as required by the Energy Management Commitment. Based on international experience, for example among companies

following energy management plans similar to ISO 50001, large industrial companies often see positive returns on their energy efficiency investments.

Third, the Energy Efficiency Services strategy, including the Energy Efficiency Administrator, will receive funding from a new Energy Efficiency Services Fund. The fund will collect revenues for the energy efficiency services from those who will have access to those services: all energy end-users taking electricity at the distribution or sub-transmission levels of the electricity system. The collections will be designed as a certain number of pesos per kWh of energy used and/or kW of demand. Given the National Energy Commission's (CNE) role in setting and designing the distribution and sub-transmission tolls and tariffs, we recommend that CNE also be responsible for designing the size of the Energy Efficiency Services Fund. We also suggest that the owners of the distribution or sub-transmission facilities be responsible for collecting the fund's payments when they collect their tolls and tariff revenue, and then separate and transmit the payments for the Energy Efficiency Services Fund to the administrator, for use in fulfilling its duties. The Ministry of Energy will maintain oversight of the collection, transfer and expenditures of the fund.

## VI. TIMELINE AND INITIAL CYCLE

A detailed timeline for all of these policies is in Section VI.

## VII. FINAL THOUGHTS

Throughout the proposal, we emphasize transparency and accountability, the importance of information, stakeholder participation, and the idea of evaluating and updating energy efficiency policies. These elements are critical to ensuring that Chile's energy efficiency efforts are coordinated, useful, trusted—and great. Implementing these proposals will not be easy; it will require much work, resources, leadership and commitment. We hope these ideas contribute to the discussions about Chile's energy future and the policies needed to lead the country into a more sustainable future.

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# I. THE GOAL-SETTING AND REVIEW FRAMEWORK

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To date, Chile has devoted most of its governmental energy efficiency strategies and tactics to help improve energy efficiency in a given sector, for a given end-use, or even for a specific piece of equipment or appliance. As noted earlier, these efforts are *good*, but to be *great* the government must adopt a **framework** to coordinate, discipline and drive these various strategies and tactics. This is the purpose of the Goal-Setting and Review Framework policy.

Government performs one of its most valuable roles when it sets a policy framework within which its citizens can make informed decisions and take effective action to change current conditions to more desirable conditions, such as the level of energy efficiency. The energy efficiency framework we propose will serve as the foundation on which the Chilean people can secure the energy needs for a sustainable, resilient quality of life. It will give the government the ability and tools to regularly look at, assess and coordinate *all* of the actions that different companies, associations, institutions, and individuals are taking to improve their energy efficiency. Without regularly assembling these pieces, no one can be certain what has happened, what is happening, or what is planned to happen. In short, one cannot lead or manage the outcomes.

An energy efficiency policy framework can serve its purpose only if it is *stable*. To be stable, the framework must embody:

- **Commitment and Flexibility:** The effective pursuit of energy efficiency requires a considerable initial investment of time and resources to support effective action. Effective action becomes visible and measurable only after a period of stable and steady implementation. Everyone who must make this investment needs assurance that change, such as in government administrations or in fossil fuel prices, will not disrupt the policy or randomly affect the strategies in place. Simultaneously, the framework must prevent strategies and tactics from becoming static and based on old information. ***To assure Chileans of the government's enduring commitment beyond a single administration, we propose that a law mandate the Ministry of Energy to carry out these goal-setting and review processes and that the initial commitment to the framework span thirteen years: through 2027. Our proposed framework includes a commitment to measurement and verification of results, as well as to regularly-scheduled processes for reviewing those results and the broader situation, so that the specific strategies can change and, if necessary, the mix of broader strategies can be adjusted.***<sup>17</sup>

- **Accountability and Transparency:** The framework must assure accountability and transparency through strong, inclusive processes and requirements by which those stakeholders that drive Chile's energy efficiency improvement take responsibility for strategies, decisions and actions, report on progress, and learn from differences between expectations and results. ***We purposefully designed this framework and the energy efficiency strategies we propose to assure accountability and transparency.***
- **Information:** Trustworthy, understandable information on the current reality and future potential of energy efficiency in Chile is essential for any effort to manage energy efficiency. ***We propose that a governmental division, likely within the Ministry of Energy, take responsibility for collecting, processing and presenting energy and energy efficiency indicator information. We also propose processes through which Chile can build a strong base of energy efficiency information and begin to reap the benefits of information-driven decisions and actions. Initially, the government and stakeholders will need up-to-date information on the potential for energy efficiency improvement throughout Chile's economic and social sectors.***
- **Support:** Financial and other government support of effective governmental and private decision-making and actions to increase energy efficiency are critical components to the long-term success of this framework. ***The framework provides the basis on which the government can commit to adequate, stable funding of its direct strategies and create the environment within which energy end-users can fund the energy efficiency services they need.***

## A. COMMITMENT, FLEXIBILITY AND THE TEN-YEAR CYCLE

**Building a system for sustained improvement in energy efficiency takes time and stability, just as developing power plants or road networks do.** Establishing a policy framework within which decision-makers and actors can develop quality interaction to ensure the best use of information takes time: time to engage in inclusive processes, and time to make and write thoughtful decisions. Certain energy efficiency strategies we propose, such as the Energy Management Commitment (sec. III) and Energy Efficiency Services Strategies (sec. IV), require lead time to design and

assemble the various types of expertise needed to deliver on the commitments and services. The results of energy efficiency strategies like the ones we propose take time to appear, both because of delay in collecting and processing the measurements and data as well as because of the many non-controllable factors that affect energy use.

However, global experience shows that the short-term investment in building this kind of system and these strategies to improve energy efficiency always results in net long-term economic benefits.

**For these and other reasons, as mentioned above, we recommend that the government make an initial thirteen-year commitment to the energy efficiency Goal-Setting and Review Framework.** This comprises two key periods. The first three years—2014 through 2016—are the “start-up” phase of the policy framework. We believe that it will require focused work over these three years to put the framework and initial strategies in place, including the new ten-year energy efficiency goals.

The ten years from 2017 to 2027 provide the time necessary to:

- Develop the overall goal setting, reporting and review processes within each strategy.
- Develop the range of new energy efficiency strategies. As will become apparent in the rest of this report, all of the Accelerated and Added Energy Efficiency Strategies we propose will require significant development of service provider resources, capacity-building, and processes for evaluation, measurement and verification of results.
- Complete a full set of Minimum Energy Performance Standards and building energy codes, build and use processes for measurement and verification, and record results from these strategies.
- Commit to the next ten-year cycle and prepare to begin again.

Figure 1 in Section VII, “Timeline and Initial Cycle,” illustrates these processes and how they would overlap.

As evident in the discussion below, this framework invites and requires regular assessment of strategies, ensuring that Chile retains the flexibility to adjust its pursuit of greater energy efficiency if needed due to changes in the economy, environment, or society.

## **B. FORMAL PARTICIPATORY PROCESSES—THE KEY TO TRANSPARENCY AND ACCOUNTABILITY**

Transparency and accountability require processes. Stakeholders need to know when important decisions will be made and who is making them and have an opportunity to contribute to those decisions. Government divisions or public sector associations who will be responsible for implementing strategies need an opportunity to participate in setting the expectation for the energy efficiency improvement the strategies will support. Formal participatory processes are extremely common throughout energy efficiency-related policy-making in the U.S.<sup>18</sup> **When managed well, a formal participatory process requires only a bit more time than internal decision-making and ends in a widely understood decision, more likely to support the expected results.**

This report proposes that the government use two formal participatory processes, as we define them below, for this Goal-Setting and Review Framework: one to design a new potential study and the other to set new national and sectoral goals. We also propose using these processes within several of the specific strategies later in this report because they are an effective tool for establishing accountability and transparency within Chile’s current governmental structures; they will be described in their respective sections.

A Formal Participatory Process has four key requirements:

1. A decision-maker and a decision. The governmental division responsible for a given decision is also responsible for the process, and begins by clearly articulating the decision or decisions it must make. The process does not change either the decision-maker’s authority over or responsibility for the decision. At times, the decision-maker may want to seek input on the content and scope of those decisions. The decision-maker will set a schedule for events related to the process’s different elements.
2. Participation: By receiving input from a range of stakeholders, the decision-maker will be able to make a better-informed decision, will have better stakeholder buy-in for that decision, and will be more accountable for the results of the decision. This does not mean that the decision-maker is required to agree to and incorporate every participant’s comments into the decision. It *does* mean that the decision-maker is required to notify stakeholders of the decision, make the source material available for the stakeholders to read, receive the stakeholders’ feedback, and consider that feedback when

## INFORMATION-BASED, DISCIPLINED PROCESSES DONE IN THE OPEN



making the final decision. For the purposes of Chile's energy efficiency sector, we divide stakeholders into two different groups:

*Direct Participants* are those associations, companies, and/or persons directly affected by the decision. These are the people who will be accountable for implementing parts of the decision. For example, the Ministry of Environment would be a Direct Participant of the Potential Study Design process to ensure that it includes the energy effects of its emissions reduction efforts. Similarly, the Ministry of Transportation would be a Direct Participant in the Goal-Setting Process because of its knowledge of and accountability for energy efficiency strategies in the transportation sector.<sup>19</sup> The decision-maker has the responsibility and authority to identify and support participation by those directly affected. The decision-maker should consider all of the Direct Participants' information and comments when making its decision. However, it does not have to agree with all of the comments, only describe how they were considered.

*Interested Persons* are those who may be indirectly affected by the decision and/or who have a strong interest in it, such as individuals, civil society groups, or academics. The decision-maker need not seek out the specific groups in this category, as it must do with Direct Participants, but it must provide a structure for Interested Persons to submit comments on the decision at hand. The decision-maker should consider the input from the Interested Persons, but does not have to respond to them explicitly in its decision.

3. A written decision. The decision-maker states the decision in a written, publicly-available document that addresses the basis for the decision and the comments and concerns of Direct Participants. The decision-maker does not need to agree with all or any of the Direct Participants. The decision may also acknowledge and respond to the comments of Interested Persons.
4. An available record. The decision and the information relied upon in its making are publicly available for as long as relevant.

It bears repeating that if a decision-maker manages a formal participatory process well, the process does not require much more time than internal decision-making, and the result is a widely understood decision, more likely to support the expected results. This is why it is standard practice for some of the world's most energy efficient countries and states, such as the state of California.

## C. ENERGY INFORMATION AND ENERGY EFFICIENCY INDICATORS

Information is critical to the effective use of the framework. Without access to up-to-date, specific and trustworthy data, one cannot make any reliable assessment of past and current energy use and energy efficiency efforts, or make realistic projections and plans for the future. It performs a particularly important role with respect to goal-setting. The IEA's Energy Efficiency Governance Handbook tells readers "*to be useful in measuring progress, targets need to be accompanied by a strong analytic capacity, high-quality data and a transparent measurement process.*"<sup>20</sup> To fully support the Goal-Setting and Review Framework, Chile must establish, authorize, and fully fund a division within the government to collect data on energy use, energy efficiency measures, and generate energy efficiency indicators.<sup>21</sup>

### 1. Energy Information Responsibility

To begin, Chile must select the group within the government that will take the lead in building the capability to collect, assess, analyze, and present energy efficiency information. Various existing agencies have relevant expertise, including the Superintendencia de Electricidad y Combustibles (SEC) and other departments within the Ministry of Energy. This gives Chile the opportunity to consider consolidating energy information reporting, as well as accountability for energy efficiency, into the same division in the Ministry of Energy.<sup>22</sup> For the purposes of this document, we call this entity the "Information Division."

The Information Division, which would be responsible for gathering data on, assessing, preparing and presenting energy information and energy efficiency indicators, should be as neutral as possible. Its success should be judged solely on how well it performs its information duties. Ideally, this division:

- Is independent from any market participant (producer, consumer, intermediary).
- Has sufficient authority to obtain all needed data and information.
- Has expertise in managing large amounts of data, and in assessing the validity of data collected.
- Is adequately funded to gather,<sup>23</sup> process, and present the information and educate and train as necessary to ensure the information is useful to all, including other governmental organizations, business and institutional organizations, and individuals and households.

To ensure that the energy efficiency indicators and other information are useful to those who rely upon it for effective decision-making and action, the Information Division should provide users the opportunity to know:

- Where any data came from, and what processes were followed to check the data for quality and verify it.
- What assumptions were made and the bases of those assumptions.
- What processes were used to transform the data into information, such as models or calculations.
- The meaning interpreted from the data and information.
- Where to access all of this easily, either on the internet or at a physical, public location.

Achieving these goals will no doubt require people and money, as a recent World Bank report states.<sup>24</sup> Chile should explore and make the greatest possible use of all of international resources available as it establishes this important division.

## 2. Energy Efficiency Indicators

Among energy information in general, energy efficiency indicators serve two important purposes. First, these indicators help us see how energy efficient something—a country, an economy, an industry—is, based on the totality of the decisions being made and actions being taken (or

not taken). Using the most recently available data and information, these “top-down” energy efficiency indicators allow us to set high-level expectations for energy efficiency based on what we think are its major drivers. Then, year-by-year, we can explore why the actual energy efficiency, as seen through the specific indicators, is different, hypothesize reasons why this may have occurred, and devise ways to test those hypotheses.

Second, energy efficiency indicators are necessary to establish accountability for the results of each of the specific energy efficiency improvement strategies and those who direct them. Depending on the strategy, one or more types of indicators can help both the organization accountable for the strategy and all of the strategy’s stakeholders determine how effective the current tactics are and engage in learning from the results.

There are a handful of major types of energy efficiency indicators in use around the world.<sup>25</sup> A recent IEA study regarding the Development of Energy Efficiency Indicators in Russia contains useful charts summarizing energy and energy efficiency indicators.<sup>26</sup> The World Energy Council has resources that particularly identify targets and laws in South America.<sup>27</sup> It is important to note that Chile is currently participating in an effort led by the United Nations Economic Commission for Latin American and the Caribbean (ECLAC) directed at identifying and designing energy efficiency indicators.<sup>28</sup>

For the purpose of seeing Chile’s overall energy efficiency for any given period, we recommend that Chile use energy intensity as its primary energy efficiency indicator. This is the energy required for one unit of output, such as a ton of steel or agricultural product. The outcomes can be as broad as the entire economy or all households or as narrow as a liter of water maintained at an average of 40 Celsius for a 24-hour period. Over the last decade or so, a number of countries have worked to build the data required to enable ongoing measurement of energy intensity, which allows for easier cross-country comparisons.<sup>29</sup> As of 2008, eight countries were expressing their targets in terms of energy intensity reduction, including China, Russia and Indonesia.<sup>30</sup>

For the purpose of seeing the specific energy efficiency improvement strategies that the national government is pursuing or monitoring from time to time, the best indicator(s) to enable accountability and support learning will vary and depend on the strategy. For example, “**defined improvement**” indicators can be calculated in two ways: using a historical baseline period of energy use or using a projection of energy use at a future time. These are easy to use for a one-time verification of the impact of energy efficiency improvements to buildings or industrial processes, which often have measurements of energy

inputs in the forms of electricity, natural gas and other fuels. “**Transactional**” indicators report on actions taken (e.g., houses weatherized, efficient refrigerators purchased), and actions yet to be taken (houses yet to be weatherized, numbers of water heaters older than ten years). Such indicators can be useful for strategies such as MEPS and building energy codes. Finally, “**benchmark**” indicators show energy efficiency by comparison of energy consumption or emissions relative to others. For example, these could be of some use in the Energy Management Commitment strategy (sec. III) as participating companies seek to demonstrate the efficiency of particular processes in comparison with a benchmark energy efficiency indicator of its competitors.

In the energy efficiency framework, the Ministry of Energy will decide which energy efficiency indicators it will use to guide its energy efficiency efforts during the formal participatory process to design the new Potential Study (sec. I.D), in which Direct Participants can influence the scope of the potential study that will produce information for the chosen indicators and support the Goal-Setting Process. We next take a closer look at what those two formal participatory processes should consist of and accomplish.

## D. DETERMINING ENERGY EFFICIENCY POTENTIAL

Setting goals and selecting strategies to improve energy efficiency requires two major types of information. One, discussed just above, is information about the current level of energy efficiency as seen through energy efficiency indicators. The other is information about where is the greatest potential to improve on that current energy efficiency. This is the role of a potential study. As a practical matter, a potential study often combines a snapshot view of current levels of energy efficiency as part of its assessment of areas for improvement.

There is no single, right way to determine the potential for energy efficiency improvement on an aggregated basis, such as across an economic sector or in a given geographic region. Rather, two principles should guide the design of such a study:

- What information will help the decision-maker(s):
  - Determine the current state of energy efficiency?
  - Set goals for that state at a future time?
  - Identify strategies to reach the goals?
  - Lay the foundation for measuring and verifying energy efficiency strategies chosen?

- Determine what resources it would take, if progress exceeds expectations, to accelerate the goals, as well as what it would take to slow down the goals if progress is slower?
- What other purposes might the study serve?

The scope and usefulness of the potential study about Chile’s current state of energy efficiency will depend almost entirely on information currently available. Even if this information is incomplete, it is worthwhile to select the methods of seeing the current state (by selecting energy efficiency indicators) and completing such information as much as possible. This will ground the study in current reality, as well as provide a roadmap for the data collection efforts that should occur over the following years.

One standard approach to identifying a desired future state of energy efficiency is grounded in the various technologies by which households and organizations can obtain the same or better outcome from a specific application of energy while using less energy. The detailed information on technologies—current and new—and savings that specific retrofit and new applications would produce is usually critical to designing energy efficiency services of the type contemplated by our proposed Energy Efficiency Services strategy (described in sec. III.D). This data can also be important to guide Evaluation, Measurement and Verification (EM&V) activities, establishing baselines for the energy use of typical applications for various technologies and identifying the extent and types of data that someone delivering a given energy efficiency program must collect.

Another approach is to look at the levels of energy efficiency others have achieved in energy end-uses and situations that are similar to the one the study considers. For example, one could look at how much energy per square meter office buildings in climates and latitudes similar to Santiago require. Where are the best practices and what types of technologies and other actions enable those results? What energy efficiency programs have others offered for what energy end-users and at what cost?

Still another approach is to consider what would be an ideal amount of energy use for various applications. For example, several years ago, California established a goal of all new residential construction achieving net zero energy use and all existing homes reducing energy use by 40 percent by 2020.<sup>31</sup>

Each of these approaches to determining potential has merit and warrants consideration. To the extent time and resources permit, we encourage Chile to use all three approaches—technologies & savings, comparative efficiencies, and ideal energy use goals—because that will provide the most complete basis for setting goals and

guiding strategies in pursuit of the goals. Which approaches to use and guidance on all methodological questions and assumption bases, should be the product of the formal participatory process to design the potential study, discussed below.

It is important to note that when potential studies are used as to guide energy efficiency action, retrospective analysis frequently shows that the savings expected in the study are lower than the realized savings. Put another way, the actual energy efficiency savings often surpass the potential study's projections.

## **E. THE FORMAL PARTICIPATORY PROCESS TO DESIGN THE NEW ENERGY EFFICIENCY POTENTIAL STUDY**

**The single most important reason to involve stakeholders in designing the energy efficiency indicators and the potential study and in setting goals is that it is difficult—if not impossible—to hold someone accountable to a goal for which they do not understand the basis or that uses incorrect information.** The objective of involvement is a potential study with transparently developed information, from which users of the study can interpret the results and draw their own conclusions.

As an initial matter, we acknowledge that the potential study on which Chile is currently relying is relatively recent.<sup>32</sup> Nonetheless, we are recommending that the Ministry of Energy commission the preparation of a New Energy Efficiency Potential Study to guide the first ten-year cycle of this Goal-Setting and Review Processes framework and provide the base level information that will be critical to establishing accountability for the various strategies selected. Our primary reason for this recommendation is the need to ensure all Direct Participants have the opportunity to influence the design and assumptions of the study, as well as Interested Persons. It may be that, during the participation process, the Direct Participants can advise the Ministry of Energy on portions of the original study that remain useful for the goal-setting process, so that it will not be necessary to entirely start from the beginning.

It is also critical to use the most recent data necessary when planning energy efficiency strategies. Given the dynamic changes in Chile's energy sector over the last five years, it is logical that a new potential study forms the foundation for Chile's great energy efficiency efforts.

The over-arching questions that the Ministry of Energy must address in the formal participatory process, as outlined above (sec. I.B), to design the potential study are these:

- What information does the study need to include so that it can be the basis on which the government sets the goal level of energy efficiency indicators selected to observe Chile's overall energy efficiency?
- What information does the study need to include so that the government can set the goal level of energy efficiency indicators to observe the various sector-specific strategies Chile is considering pursuing or monitoring to improve energy efficiency in those sectors?
- What information in the study is necessary to express the baseline energy efficiency status and Chile's potential energy efficiency status, using the energy efficiency indicators chosen?
- What understanding of that information do the stakeholders need to have in order to trust it in the goal-setting process?
- What other information should the study include to guide strategies, such as
  - The timing of issuing and revising MEPS and building energy codes?
  - Designing Energy Efficiency Services for economic and household energy end-use sectors?
  - Setting a high-level expectation for the potential energy efficiency improvement that the Energy Management Commitment could produce?
  - Measuring and evaluating activity under each of these and other possible strategies?
  - Expectations for and timing of updates to the potential study?

In addition, decisions made in the potential study's formal participatory process must resolve important methodology questions,<sup>33</sup> including:

- Methodologies for defining technologies and applications into the categories of "technical potential" and "economic potential;"

- Methods of screening methodologies for cost-effectiveness and the assumptions to use in determining cost-effectiveness, whether for the incremental total cost of the new technology or the future cost of energy;
- The scope of measures to include (e.g., does the study include energy efficiency improvement gained by switching energy sources, such as in solar water heating, or increasing the usefulness of consumed energy, such as in combined heat and power);
- Methods of modeling energy end-user actions as a result of the strategies; and
- Issues with energy use and cost forecasts, such as whether to use point estimates or ranges and whether to consider scenarios of future possibilities.

When the above questions are answered and formal participatory process to design the study is completed, the Ministry of Energy should commence conducting the new potential study. The results of that study will be the foundation for the goals—national and sector-specific—that the country will pursue over the following ten-year cycle.

## F. THE FORMAL PARTICIPATORY PROCESS FOR GOAL-SETTING AND REVIEW

Goals, or targets, have become a central feature of most countries' energy efficiency policies. For this proposal, the goals—expressed in selected energy efficiency indicators—provide the starting point and milestones for the accountability and flexibility that our framework aims to establish. Goals for the individual strategies will set expectations for what each sector can achieve and verify. Goals for Chile overall will set the expectation for what will happen from the total effect of all strategies and any other factors influencing energy efficiency. As the Information Division collects data, receives the results of strategy-related measurement and verification activity, and prepares reports over the years, it should compare expectations to actual results. With this:

- Organizations responsible for strategies can analyze and explain why outcomes either were better than expected or worse than expected, and involve stakeholders in designing any necessary adjustments to the tactics being used for the strategy.

- The Ministry of Energy can assess how well all of the strategies are contributing to the overall energy efficiency improvement sought and involve stakeholders in adding new strategies or making major adjustments to existing ones.

Pursuant to the results of the new potential study, as conducted by the Ministry of Energy, the formal participatory process to set the new national and sector-specific goals will begin. The decisions central to this participatory process include:

- Which set of goals—for what sectors and in what form—will express Chile's national energy efficiency improvement commitment and drive implementation and revision, as necessary, of the strategies put in place to achieve them?<sup>34</sup>
- By following what process, and with what frequency, will Chile report on the status of progress toward the national goals and engage in evaluation and learning around any gap between what was expected and what occurred?<sup>35</sup>
- Which strategies should the government pursue to increase energy efficiency over the period 2017 to 2027? In addition to the strategies included in this report, the strategies to be considered should include those to improve energy efficiency:
  - In the transportation sector;
  - In electricity distribution, transmission and generation; or
  - Those that will or could occur as a result of emissions reduction strategies.

Over time, the Ministry of Energy can engage more and more Ministries and parts of the national government in thinking about how their regulations, decisions and actions affect—or could affect—energy efficiency and in identifying strategies through which those regulations, decisions and actions can work to improve energy efficiency.

For these strategies, and the three strategies addressed in this proposal:

- What are the goals to which each stakeholder will be held accountable?
- What are the high-level costs associated with achieving the goals' benefits?

- What strategies that companies in the private sector and other non-governmental actors are already pursuing to increase energy efficiency should the government know about over the period 2017 to 2027? How can it monitor the results of these strategies?

This Goal-Setting and Review Framework creates a long-term, stable mechanism for the Ministry of Energy to coordinate all of the energy efficiency efforts among the country's different sectors and actors. It establishes a system of participatory processes in which stakeholders offer input and decision-makers make the best informed decisions possible, engendering mutual trust and accountability. It also produces a ten-year cycle of continual improvement: estimating potential, setting goals, devising strategies, enacting those strategies, collecting information, learning from that information, and estimating new potential. The following three sections describe specific strategies within this framework that we propose different types of energy end-users use to attain energy efficiency benefits during the initial cycle.



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## II. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY EFFICIENCY FOR NEW BUILDINGS AND APPLIANCES

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By far one of the most effective and cost-effective strategies for improving a country's energy efficiency, over time, is the adoption of building energy codes (BECs) for all types of buildings and Minimum Energy Performance Standards (MEPS) for all major energy-using types of equipment and appliances. These codes and standards change markets: what gets designed, sold, purchased and then used is more energy efficient because of the requirement. A significant portion of California's celebrated success in energy efficiency relates to codes and standards adopted, in some cases, over 20 years ago.<sup>36</sup>

This policy is so important that it appears as number six on the IEA's top 25 Energy Efficiency Policy Recommendations.<sup>37</sup> Over time, codes and standards can cause a sizable increase in energy efficiency and international experience is illustrative. Notwithstanding several decades of energy efficiency efforts in the United States, a 2009 study by the Institute for Energy Efficiency concluded that, by 2020, a moderate program of MEPS and BECs could save 2.5% of total forecasted energy use, while an aggressive program could save 7%.<sup>38</sup> This range comprised a sizable percentage of the total savings from electricity energy efficiency programs in the United States as estimated by the Electric Power Research Institute, also in 2009.

Notwithstanding known benefits, countries attempting to put rigorous BECs and MEPS in place over the last several decades have faced at least three major obstacles to reaping the benefits of this highly cost-effective strategy:

- The responsible government, for a variety of reasons including politics and competing priorities, experiences delays—sometimes quite long—in getting the building codes and MEPS adopted;
- Once adopted, the building codes and MEPS are fixed—they do not require the higher levels of energy efficiency that technological improvements and changes in the costs of energy might support; and
- Compliance is weak because (1) the enforcement of building codes is left to local governments that often lack adequate funding and trained personnel and no EM&V effort occurs and/or (2) the enforcement of MEPS lacks funding, attention, or EM&V.

### A. CHILE'S CURRENT BUILDING ENERGY CODES AND MINIMUM ENERGY PERFORMANCE STANDARDS

Chile's progress on a full set of aggressive BECs and MEPS is far from complete. With respect to building codes, the first requirements—regarding roof thermal insulation—for residential buildings took effect in 2000.<sup>39</sup> In January 2007, following a collaborative process with stakeholders, the Ministry of Housing's requirements for the thermal qualities of walls, floors and windows took effect. The third phase, which includes energy certification, is not yet implemented. In 2012, a system for voluntary energy certification of new Chilean houses took effect. This system will notify potential buyers of the level of energy efficiency achieved through the materials of the house and its major energy-using equipment, including heating, hot water, and lighting, and projections of the energy requirements for operating the equipment within the house.<sup>40</sup> However, the Ministry of Housing has no obligation to update the residential building codes or to issue codes for commercial or public sector buildings. Thus, the existing BECs have not been updated and Chile has no energy-related building codes for commercial or public sector buildings.

With respect to MEPS, the Ministry of Energy, since 2010, has had the legal power to issue MEPS for any product or equipment that uses any energy resource.<sup>41</sup> In May 2012, the Ministry of Energy published a regulation setting the process to issue MEPS.<sup>42</sup> The process includes notice to other Ministries and the opportunity for public participation. The Ministry has the role of issuing MEPS while the Superintendencia de Electricidad y Combustibles has the role of ensuring compliance. As of the date of this report, no MEPS have been issued, although a MEPS for light bulbs is expected in the second half of 2013.<sup>43</sup>

### B. ENHANCING THE STRATEGY FOR BECs AND MEPS

To ensure that Chile gets the greatest possible energy efficiency benefit from both BECs and MEPS, we recommend the following:

#### 1. Clarify Responsibility and Accountability for BECs

Chile's law presently designates the Ministry of Housing as responsible for the adoption of housing building codes, including relevant energy codes.<sup>44</sup> The law does not expressly require the Ministry of Housing to issue said codes for

commercial and public sector buildings. The law should do so. Over time, these types of buildings can significantly affect—for the better or for the worse—a country’s energy efficiency. Accordingly, **we recommend that the law expressly require the Ministry of Housing to issue and take responsibility for all of the BECs (residential, commercial and public buildings)**. The law clarifying this should also express expectations of both the Ministry of Housing and the Ministry of Energy with respect to BECs, including that the Ministry of Housing:

- Participate in the Goal-Setting and Review processes policy, described in Section I and run by the Ministry of Energy, taking accountability for the contribution that BECs make to the overall energy efficiency goals and reporting on progress toward those goals;
- Design and enforce measurement and verification for the building energy codes and provide independent evaluation of the effectiveness of the codes in achieving the desired outcomes; and
- Arrange for the collection of data regarding new buildings, including their compliance with the codes and resulting energy use, to support energy efficiency indicators and the Information Division.

The law should also establish that the Ministry of Energy support the Ministry of Housing’s work on BECs, providing staff expertise and connections with the energy communities that should be involved in the Ministry of Housing’s work.

## 2. Establish accountability for MEPS and BECs

We expect that the Goal-Setting process will result in information regarding:

- The types and numbers of new equipment and appliances that will or could be the subject of MEPS during the first ten-year cycle (2017-2027) and the associated energy efficiency gains.
- The types and numbers of new buildings that will or could be the subject of BECs during the first ten-year cycle (2017-2027) and the associated energy efficiency gains.

These transactional and defined improvement energy efficiency indicators can serve several purposes. First, they will allow the Ministries of Energy and Housing to schedule MEPS and BECs, respectively, for development according to the amount of energy efficiency gain possible, which will be a combination of the units expected to be acquired and the

likely energy efficiency savings that should result from the MEPS or code. Second, they will provide a metric for which the Ministries can gather data: once a MEPS is issued for a given piece of equipment or appliance, how many do end-users actually purchase? Once a BEC is in place, how many buildings subject to it are built? Combined with the energy efficiency gains associated with each MEPS or BEC, this will allow the government to estimate the extent to which the MEPS and codes are contributing toward the national goals—satisfying the needs for measurement and verification. Last, they can serve as the basis on which the Ministries engage in impact evaluation of the MEPS or BECs, studying the energy efficiency improvement associated with actual use of the equipment, appliance or building covered by each standard.

Thus, expected outputs from the Ministries of Energy and Housing, pursuant to this strategy for MEPS and BECs, respectively, include:

- A schedule for the issuance of each MEPS or BEC from the year 2017 until 2027, prioritized according to benefit.<sup>45</sup>
- The process the Ministry of Housing intends to follow in developing BECs and the means by which stakeholders may obtain notice of participation opportunities in that process.
- The timing and means by which the Ministries will report on units of equipment and appliances sold once a MEPS is issued, or the numbers of buildings constructed under a BEC, to enable reporting of the energy efficiency improvement.
- The schedule by which the Ministries will engage independent contractors to perform impact evaluations of each MEPS and BEC, and the means by which each will evaluate the effectiveness enforcement.

It is best practice internationally to update both MEPS and BECs every three to five years, increasing the energy efficiency required.<sup>46</sup> **We recommend that the law addressing responsibility as discussed above require that the Ministries adopt a schedule for revising each MEPS and BEC.** Because the respective Ministries are both currently engaged in developing MEPS and BECs, or have been before, these are strategies they can begin working on right away. They can then contribute the information they have gathered with respect to the MEPS and BECs to the formal participatory processes to design the new potential study and set new goals.

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## III. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY MANAGEMENT COMMITMENT FOR LARGE INDUSTRY AND MINING

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Chile expects industrial energy use to drive the overall growth in need for energy supplies through the end of this decade and beyond. Much of this will occur among the largest industrial and mining companies. Fortunately, the return on improving energy efficiency in these industries is often considerable, simultaneously improving the industry's competitiveness, reducing pressure to develop new energy supplies and infrastructure, and lessening environmental impacts of the industry's operation. To obtain these benefits, it makes sense for Chile to focus on the energy efficiency of its largest industrial and mining companies. It is also equitable: the MEPS/BECs and Energy Efficiency Services Strategy included in this proposal will reach almost every energy end-user in Chile, obligating them to bear certain costs in return for valuable assistance in improving energy efficiency. These strategies, however, will not reach Chile's largest end-users.<sup>47</sup> We designed the Energy Management Commitment to fill this gap.

### A. DRAWING ON INTERNATIONAL EXPERIENCE

Many countries, from fully to less developed, have focused attention on improving the energy efficiency of industry.<sup>48</sup> Most recently, in 2012, the IEA issued *A Policy Pathway Publication on Energy Management Programmes for Industry*.<sup>49</sup> This comprehensive guide describes the barriers to improving energy efficiency in industry, the significant benefits of doing so both for the companies involved and the countries within which they do business, the effectiveness of energy management systems in capturing these benefits and the positive role government can perform in supporting this. Drawing on numerous studies regarding similar government strategies across countries including Australia,<sup>50</sup> China, Canada, Denmark, the Netherlands, Austria, Russia, Sweden, and Finland, the guide explains that government policies and strategies requiring or in support of industrial energy management programs, "including legislation, incentives and guidance, can counteract, reduce or remove barriers."<sup>51</sup> Among the most successful government policies IEA identifies are:

- Overarching or target-setting policies such as voluntary schemes or negotiated agreements between industry and governments.
- Exemptions from taxes or regulations in exchange for [energy management program] participation, such as from an energy or carbon tax or emissions controls.

- Subsidies for energy audits.
- Reward programs and other forms of recognition.
- Mandatory implementation of energy management systems (such as described in ISO 50001).
- Public reporting of company performance to encourage best-in-class behavior.

Table 3 on the following page, drawn from the World Energy Council database, indicates the large number of countries with energy efficiency policies and strategies related to industrial energy end-users. As Table 3 indicates, vast resources and experience exist on which Chile can draw in designing the Energy Management Commitment strategy.

### B. RECOMMENDED COMPONENTS OF THE ENERGY MANAGEMENT COMMITMENT STRATEGY

#### 1. A Formal Participatory Process to Identify the Included Companies

The threshold issue for this strategy will be developing the criteria by which to identify current and future industrial and mining companies that will participate in it. We recommend that the Ministry of Energy conduct a formal participatory process to identify the companies that will participate in the Energy Management Commitment identification. The main questions to answer are:

- i. Which companies should participate? These will be those companies who will not participate in the Energy Efficiency Services Strategy because they do not take electricity at the distribution or sub-transmission levels.
- ii. Should any of the companies on this new list produced under question (i) *not* be there?
- iii. Are there any companies not on the list that for whatever reason *should* participate in the Energy Management Commitment?

#### 2. Capacity-Building

Although we expect that pursuing the Energy Management Commitment strategy will result in significant energy efficiency improvement, a second and also important outcome of the strategy is capacity building within the

**Table 3. International examples of industrial energy efficiency requirements, by country**

Country	Industrial Energy Efficiency Requirements
Algeria	Mandatory energy audits, Mandatory energy consumption reporting
Australia	Mandatory energy audits, Mandatory energy consumption reporting, Mandatory energy savings plans
Brazil	Mandatory energy savings plans
Bulgaria	Mandatory energy audits
China	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting, Mandatory energy savings plans
Costa Rica	Mandatory energy audits
Croatia	Mandatory energy audits, Mandatory energy consumption reporting
Czech Republic	Mandatory energy audits, Mandatory energy consumption reporting
Denmark	Mandatory energy managers, Mandatory energy consumption reporting, Mandatory energy savings plans
Estonia	Mandatory energy consumption reporting
France	Mandatory energy managers
Greece	Mandatory energy managers
Hungary	Mandatory energy consumption reporting, Mandatory energy managers (planned)
India	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting
Indonesia	Mandatory energy audits, Mandatory energy managers, Mandatory energy savings plans
Iran	Mandatory energy managers
Japan	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting, Mandatory energy savings plans
Malaysia	Mandatory energy managers, Mandatory energy consumption reporting
Malta	Mandatory energy audits
Mexico	Mandatory energy consumption reporting
Nigeria	Planned
Pakistan	Mandatory energy audits
Philippines	Mandatory energy consumption reporting
Poland	Mandatory energy managers, Mandatory energy savings plans
Portugal	Mandatory energy consumption reporting, Mandatory energy managers, Mandatory energy savings plans
Republic of Korea	Mandatory energy audits, Mandatory energy consumption reporting
Romania	Mandatory energy audits, Mandatory energy managers, Mandatory energy savings plans
Russia	Mandatory energy audits, Mandatory energy managers
Slovakia	Mandatory energy consumption reporting
Sri Lanka	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting, Mandatory energy savings plans
Syria	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting, Mandatory energy savings plans
Taiwan	Mandatory energy audits, Mandatory energy consumption reporting
Thailand	Mandatory energy consumption reporting, Mandatory energy managers, Mandatory energy savings plans
Tunisia	Mandatory energy audits, Mandatory energy consumption reporting, Mandatory energy savings plans
Turkey	Mandatory energy managers, Mandatory energy consumption reporting
UK	Mandatory energy audits, Mandatory energy consumption reporting
Vietnam	Mandatory energy audits, Mandatory energy managers, Mandatory energy consumption reporting

- Mandatory energy audits
- Mandatory energy managers
- Mandatory energy consumption reporting
- Mandatory energy savings plans

Source: World Energy Council

government, the broader public sector, and the companies, and between all of these. The key capacities include:

- Shared understanding of the drivers of energy use for these companies,
- Shared understanding of energy efficiency indicators that are meaningful to understanding,
- Common language regarding the decisions and actions in energy management planning,
- Easily understood energy use reporting tools,
- Better forecasting of medium-term energy needs, and
- Clear paths and processes for communication among all of the stakeholders.

**To achieve the necessary capability/capacity building, we recommend that participation in this strategy be mandatory for participating companies.** As the following indicates, however, much of the exact content of the commitment must emerge from interactions between the government—through the Ministry of Energy—and the companies themselves. The recommendations below are not an exhaustive list of all of this content, but they provide a good start.

### 3. Designing the Energy Management Commitment

**The Ministry of Energy and the companies should work collaboratively to design the Energy Management Commitment** such that it produces the capacities listed just above. Among the tasks likely to be needed to accomplish this, are:

- Developing a methodology for measuring energy intensity—both the baseline and the changes to energy intensity over the course of implementing the mandate. This should include the data required, acceptable means of producing the data, the calculations that will occur to transform that data into energy intensity information and the process and means by which the Ministry of Energy may audit an organization's reported energy intensity results.

- Establishing the required contents of a company's energy management plan and the annual progress reporting regarding activity under the plan.
- For example, the plans could include:
  - The baseline energy intensity and the energy intensity of any processes or sub-products that are important to understand the company's overall energy intensity.
  - Information on energy intensities achieved by similar industries and mining companies in Chile and in other countries.
  - The company's target energy intensity reduction and anticipated means of achieving that reduction.
- Annual progress reports could include:
  - The prior year's energy intensity performance.
  - Comparison of that performance to the annual target.
  - Analysis of the causes for any difference, positive or negative.
  - Planned actions to reach the target in the following year.
- The schedule by which companies file their commitment plans and annual progress reports.
- Developing the legal and procedural processes that the Ministry of Energy will follow in protecting the confidential information of any obligated company. Some of the information required and produced in connection with the Energy Management Commitment will include matters considered proprietary by the included companies. Accordingly, it will be necessary to determine specifically which information this is, the methods by which the government can protect its confidentiality.
- Acquiring useful information on energy intensity management best practices for the industrial and mining sectors represented by the companies participating in this commitment strategy.

The ISO 50001 may prove extremely useful to much of this, providing standardized terms and templates for components the Management Energy Commitment requires.<sup>52</sup>

#### 4. Carrots and Sticks

For those components of the Energy Management Commitment strategy that are mandatory—that is, necessary to ensure the capability-building described above—we recommend that the strategy involves penalties for non-compliance. The Ministry of Energy should identify these as part of the formal participatory process selecting the companies that participate in the commitment. This does not necessarily imply penalties for not meeting goals; rather, this means that companies could face fines for not doing the basic functions of participating in the commitment, such as reporting data and participating in meetings. We encourage the Ministry, the companies and other key stakeholders to collaborate on any rewards, incentives, tax rebates, technical support or other “carrots” that may be appropriate or helpful in assuring the goals of the strategy.<sup>53</sup>

## IV. ACCELERATED AND ADDED ENERGY EFFICIENCY STRATEGIES: ENERGY EFFICIENCY SERVICES STRATEGY FOR RESIDENTIAL, COMMERCIAL & PUBLIC SECTORS

Most countries committed to increasing energy efficiency provide energy end-users at least some assistance in achieving energy savings through energy efficiency services. Such services work to overcome the major barriers to increasing end-user energy efficiency through funded, targeted efforts that combine some or all of the following: information, financial incentives, technical help and training, and installation assistance or other required physical work. These are all coordinated with the Ministry of Energy's standards and labels, so that the same metric is used across all energy efficiency strategies.

A vast body of information is available on both the barriers that households, businesses and institutions and organizations in the public sector face to improve energy efficiency, and effective, efficient services that minimize or overcome those barriers. Energy Efficiency decision-makers can easily locate and access this information for ideas to apply to Chile.<sup>54</sup>

Services are generally designed to encourage energy users to replace the less energy efficient—whether an appliance, building material, or a process—with the more energy efficient, and to do so faster than would otherwise occur. Often, energy efficiency services can act in a manner complementary to building energy codes and MEPS by supporting the development and market acceptance of improvements not yet reflected in the mandatory requirements.

**Energy efficiency services are a key component of a country's overall energy efficiency improvement effort.** The IEA Top 25 Energy Efficiency Policy recommendations include a number that fall with the category of “energy efficiency services.”<sup>55</sup> In Chile, at least some of the initiatives included in the 2010 PNAEE study meet this definition of an energy efficiency service, for example:

- Buildings: grants for retrofit of low income housing and soft financing for private buildings;
- Appliances: replacement programs for residential and commercial refrigerators and various other major pieces of equipment; and
- Industry and Mining: incentives for cogeneration.

Some of the Chilean Energy Efficiency Agency's (AChEE) current offers might also fit this definition, including the special financing program to retrofit buildings of public interest (called Programa de Eficiencia Energética en Edificios Públicos, or PEEEP). The PNAEE and AChEE efforts, however, are far from the complete menu of energy efficiency services that many countries and states within the United States offer to energy end-users.

In the last decade, many energy efficiency services strategies have expanded to encompass assistance with distributed energy resources as well as classic energy efficiency. For example, the California Public Utilities Commission adopted a strategy in January 2006 called the California Solar Initiative, which provides more than US\$3 billion in incentives for solar-energy projects for households and business customers, with the objective of providing 3,000 megawatts (MW) of solar capacity by 2016.

### Behavioral energy efficiency measures: a new complement to energy efficiency services and technology.

Low-tech demand-side management (DSM) strategies are familiar—for example, subsidies to finance energy efficient light bulbs and refrigerators. Recently, new software-based approaches have emerged to engage energy consumers at scale, managing energy demand by empowering and motivating consumers to adopt energy efficiency measures. This approach, known as Behavioral Energy Efficiency, is currently being used to engage more than 25 million households and businesses across 8 countries. Over six years of results demonstrate that behavioral energy efficiency can successfully manage demand: average savings ranges of 1.5-2.5% per household have been seen which result in massive savings for utilities. Over the same period, behavioral energy efficiency programs have resulted in more than 3 terawatt-hours of energy savings, over USD \$350M in savings on consumers' bills and the abatement of nearly 5 billion pounds of carbon dioxide from entering the atmosphere. Furthermore, behavioral energy efficiency has proven a cost-effective measure, often outpacing installed measures in benefits as a measure of cost.<sup>56</sup> As Chile considers policy alternatives to bring its energy efficiency policy framework from good to great, behavioral energy efficiency can play an important role.

### A. GUIDING PRINCIPLES FOR ENERGY EFFICIENCY SERVICES IN CHILE

Below are several Chile-specific guiding principles we had in mind as we developed the Energy Efficiency Services Strategy:

Chile favors market solutions. Delivery of the services should involve energy service companies as often as practicable so that, over time, the services provided under this strategy become private transactions that do not

require governmental funding. Even service design can take advantage of the markets—international and otherwise—that exist for this expertise.

The most meaningful energy efficiency results for Chile will take place over time. An energy efficiency service might help an end-user make a short-term decision about retrofitting a building or buying new equipment, but the results of that decision will emerge in the long term as the end-user interacts with that building or appliance.

Energy efficiency will be more successful in Chile if it is integrated into how people live and work. Wherever possible, energy efficiency services should support increasing efficiency on a systemic basis, in order to integrate efficient energy use into the economy and culture.

Chile has many robust trade associations. These entities and other organizations that reflect and represent the perspectives and challenges of a set of energy end-users can be valuable not only in influencing service design but in helping with marketing and even delivery. Extra effort should occur to identify such organizations and involve them.

## **B. ADMINISTRATION OF THE ENERGY EFFICIENCY SERVICES STRATEGY**

Given all of these important characteristics of Chile's energy efficiency sector, and the range of energy efficiency services needed to reach the residential, commercial and public sectors, **we recommend that the government create an Energy Efficiency Services Administrator.**

This administrator's job will be to design effective energy efficiency services to help the different end-users in these sectors be more efficient in their consumption of energy, contributing to the national and sectoral goals set in the framework. The administrator will also fund these services (see Section V), measure and monitor the progress of the services and, report on its results to the Ministry of Energy.

### **1. Selection and Oversight of the Energy Efficiency Services Administrator**

Administering the Energy Efficiency Services Strategy will be a large job, and different countries have selected different types of entities to fill that role. Some administrators are governmental organizations (e.g. a department within a Ministry), not-for-profit (NFP) organizations, or for-profit organizations (most commonly these are electricity and/or natural gas distribution companies).<sup>57</sup> For the reasons described below, **we recommend that the administrator**

**be an independent not-for-profit organization, solely or primarily dedicated to fulfilling the responsibilities associated with being the administrator.**<sup>58</sup> The Ministry of Energy should select the administrator through a formal participatory process and supervise its work.

The primary reason for choosing an independent not-for-profit organization to act as administrator, rather than a governmental organization or distribution companies, is to enable clear accountability. Although it might be possible to establish some of these for a public entity that is part of the government, it would be uncommon. In particular, the possibility of the government, through the Ministry of Energy, terminating the responsibility of one organization to act as administrator and establishing this responsibility in another organization is hard to imagine if the organization is, itself, part of the Ministry of Energy. Moreover, with a public entity as administrator, stakeholders could not have the same role as they could if the entity is a not-for-profit organization, where stakeholders comprise the governing board of the organization.

Choosing Chile's electricity distribution companies to act as administrators within the areas to which they provide distribution service presents these same difficulties, as well as others. The accountability processes would not come naturally to Chile's electricity distribution companies, who have relatively little experience with extensive governmental regulation and the strategic and operational oversight that follows from it.<sup>59</sup> In addition, although termination of the electricity distribution companies' roles as administrators would be possible, it is unlikely that stakeholders could have a formal governance role as they could with a not-for-profit organization. A further complication with having electricity distribution companies act as administrators would be that the Energy Efficiency Services Strategy we recommend will pursue energy efficiency improvement in *all forms of energy*, not just electricity. This is one of the reasons some U.S. states have chosen a not-for-profit organization to act as administrator rather than their electricity or natural gas distribution companies. Also, currently, electricity regulation creates a disincentive for distribution companies to support energy efficiency measures, thus, the selection of distribution companies as administrators would require, at least, the amendment of their regulation to include a decoupling mechanism (see sec. VI.2). Finally, when electricity distribution companies act as administrators, they design and arrange delivery of services only in their own service territories. Because of this, economies of scale and market synergies are often lost.<sup>60</sup> One administrator can design the programs based on the characteristics of the various household and economic sector clients, rather than where they are located.

This is not to say that electricity distribution companies or any other entity or institution well-suited to providing energy end-users with energy efficiency services should have no role in the energy efficiency service. In fact, it may be excellent at *delivering* the services the administrator designs, either in the geography or household/economic sector with which the organization is most familiar.

## 2. The Administrator's Responsibilities

To successfully fulfill its obligations, the Energy Efficiency Services Administrator must embody two distinct skill sets. First, it must be able to manage large-budget energy efficiency services in an administrative and a public transparency forum. This includes engaging and obtaining ideas from a large number of stakeholders. Second, the administrator must also have the ability to do contract management and accounting “fulfillment” on a large-scale budget. It must identify, select, and manage as trade allies a significant number of companies—retailers, wholesalers, energy services companies, construction companies, trade associations and so forth—that will actually deliver the energy efficiency services, and ensure that these service providers maintain any and all necessary records, including those that will enable measurement and verification of the energy efficiency improvements. Regularly, the administrator will need to report on the energy efficiency improvement it has secured using the Energy Efficiency Services Fund (sec. V.B), and prove that it has performed its responsibilities in a cost-effect and efficient manner. If it has not met its goals, it will need to explain why.

All of this must occur with a high degree of transparency, as the engagement of stakeholders is critical to the success of the Energy Efficiency Services Strategy. **We recommend that the administrator implement all of the following forms of outreach and stakeholder engagement and be open to suggestions for additional ways in which it can fulfill this need:**

- Including representatives from the major household and economic sectors covered by the energy efficiency services on the organization's governing board.
- Forming and supporting a group of subject matter experts to advise it on strategy, service design, EM&V, and learning from its experiences.
- Maintaining on its website easy access to all of its relevant documents, including strategic plans, annual plans and budgets, annual reports, calendar, and impact and service evaluations.

- Making personal visits to key stakeholders, such as the electricity distribution companies or local government officials in the areas targeted, to solicit input on strategy and annual plans.

### The Energy Efficiency Administrator's Accountability Cycle

The Goal-Setting formal participatory process described in Section I will provide the administrator the high-level goals—likely expressed in defined efficiency improvement—that its energy efficiency services are expected to achieve during the period covered by the goals (in the initial cycle—2027). This will be the core of the administrator's accountability. Although the goal-setting process may identify goals for various sectors, **we recommend that the administrator have flexibility to design its strategies and make its annual plans as experience over time indicates.** The agreement between the Ministry of Energy and the administrator should specify any constraints, such as energy end-users or sectors (e.g., low-income households) for which the administrator must ensure some defined efficiency improvement.<sup>61</sup>

The administrator's accountability cycle includes each of the following major activities:<sup>62</sup>

#### a. Strategize

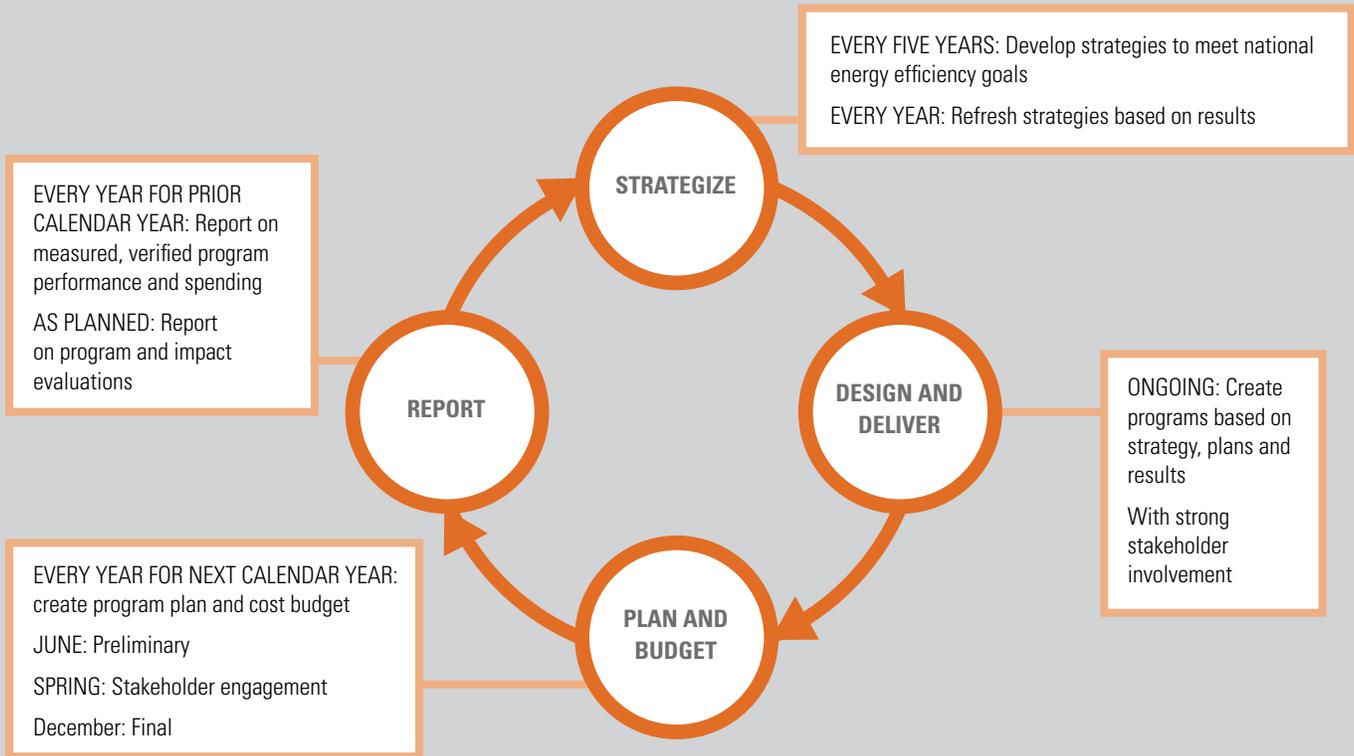
As soon as the national goal-setting process is complete, the administrator should engage in a strategic planning process by which it will select the major areas in which it intends to develop energy efficiency services and the high-level results it expects from those efforts over the next five years. The potential study done in support of the national goal-setting will be a primary source of information and, accordingly, the administrator should have had the opportunity to influence the design of that study and the goal-setting. The strategy is not a step-by-step “what” the administrator intends to do but, rather, a high-level “how” it intends to do its work.

Each strategic plan should include a high-level budget for meeting the goal, including program costs (design, delivery, EM&V) and the administrator's costs. The strategy and budget will enable the Ministry of Energy to decide the target size of the Energy Efficiency Services Fund (described in sec. V.B).

#### b. Design and Deliver

Using the strategy, the administrator will design a set of energy efficiency services that it believes will meet the defined efficiency improvement goal within any constraints set by the Ministry. These services will almost certainly be different among the various energy end-use sectors and may well differ by geographic region and other bases as well. We anticipate that the administrator may tap the international

## THE ENERGY EFFICIENCY ADMINISTRATOR'S ACCOUNTABILITY CYCLE



consulting community for assistance in designing programs, at least initially. Each design must describe how those delivering the services to energy end-users will acquire any and all data necessary for measurement and verification and for any eventual evaluations, impact or program.

### c. Plan and Budget

Using the strategy, the administrator will prepare detailed annual plans with:

- A services plan for the year, including all measurement and verification and any planned evaluations.
- A cost budget.
- Expected defined efficiency improvements per service.

Because continuity is important to success in energy efficiency services, it is a best practice to look not only to the next calendar year (we will call this the budget year), but also the year beyond that so that the administrator can plan in awareness of any known changes coming in that next year (which we will call the projection year).

### d. Report

As soon as information is available, the administrator should prepare and present to the Ministry of Energy a report on the prior year. This should occur before the start of the planning and budgeting process. The report should include:

- Summaries of the energy efficiency services offered during the past year and energy savings pursuant to those, based upon agreed methodologies;

- A comparison of savings pursuant to the services to the goals set for the administrator;
- A comparison of actual expenditures to budgeted expenditures;
- Analysis of the reasons for any differences in savings or costs; and
- A detailed description of the administrator's efforts to make its decisions in a manner that allowed stakeholder input.

The report should include the effects of any impact evaluations completed during the year on prior years' reported results, providing adjusted, annual and cumulative totals for defined efficiency improvements.

## C. THE "SELF DIRECTION OPTION" FOR THE SMALL INDUSTRY OR LARGE COMMERCIAL SECTORS

One component of the EE Services strategy that we highly recommend for end-users that use relatively large amount of energy, but who are not among the country's highest end-users, is the "**Self Direction Option**," which is used in some states in the U.S.<sup>63</sup> Designed as recommended, the self-direction option permits qualifying end-users with larger energy requirements (such as a small industrial client) or multiple sites (such as a grocery store or hotel chain, a municipality acting on behalf of all of its residents, or a local business association representing all of its members) to create customized energy efficiency services for their needs while maintaining equity with all other clients. We recommend that the administrator of the Energy Efficiency Services Strategy manage the self-direction option and that the option:

- Establish eligibility requirements to help clients decide whether it is worth their time and resources to pursue this and ensure that the potential benefits exceed the costs incurred.<sup>64</sup>
- Require an application.
- Include goal setting and planning.
- Require demonstrated savings to receive self-directed funds.
- Require annual reporting.
- Require demonstrated persistence of the energy efficiency improvement and continual improvement beyond it.
- Grant audit rights to the administrator (again, see below sec. III.D.4)

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## V: FUNDING MECHANISMS TO SUPPORT THE PROPOSED STRATEGIES

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Accomplishing the move to *great* energy efficiency improvements in Chile will require human, financial and other resources. These efforts will not succeed with a committed source of stable, long-term funding. We have therefore identified sources of support for all of the strategies we have proposed in the previous sections. BECs and MEPS are already a part of the Ministry of Housing and Ministry of Energy's purview, respectively, and therefore should already have budgets allocated for the activities proposed in Section II. As described in Section III, each company participating in the Energy Management Commitment will fund its own activities, usually seeing a net economic benefit for these investments. Therefore, the following section will address the support mechanisms for the Goal-Setting and Review Framework and the Energy Efficiency Services Strategy. Additionally, NRDC commissioned preliminary legal research to verify the constitutionality of these funding ideas and, to the best of this assessment, each of the following funding mechanisms is entirely within legal bounds.<sup>65</sup>

### A. SUPPORT FOR THE GOAL-SETTING AND REVIEW FRAMEWORK

As designed, the Goal-Setting and Review Framework described in Section I will identify these resource needs and, where necessary, assist in securing them from the government's budget. It is, in fact, one of the intentional designs of the framework to provide this very information. The Ministry of Energy and other ministries and government organizations participating in the Goal-Setting Formal Participatory Process should include in the information they contribute to that process the data on prior and planned expenditures to pursue the strategy and other major resource needs. In general, this will simply draw from those ministries' and departments' normal budget processes. Through the formal participatory process and any related informal processes, the governmental organizations accountable for energy efficiency improvement strategies or related decisions and actions can coordinate on resource needs, working to avoid any duplications of effort and making the most of available expertise.

Certainly some government bodies may have to redirect funding from one or another program to the new energy efficiency efforts. Yet it is worth noting that the government broadly will see benefits from this investment, as savings from its own electricity bills, among other things, become evident.

For strategies or activities to which stable, secure funding is critical, such as the Information Division (sec. I.C), the formal participatory processes can produce decisions that support designating their funding for special treatment. Our legal report indicates that it is possible to create a long term, secure, stable and flexible funding source for energy efficiency through the national budget.

### B. SUPPORT FOR THE ENERGY EFFICIENCY SERVICES STRATEGY

Energy efficiency services are functionally equivalent to energy commodity—electricity, natural gas, propane, firewood—services. With all of these services, and other pieces of equipment or buildings, the energy end-user accomplishes one or more outcomes important to business or life. The only difference between the two is the energy commodity services support achieving the desired outcome only once per purchase; end-users must purchase the commodities over and over again to continue securing the desired outcome. Energy efficiency services, on the other hand, can contribute to the outcomes over and over again because they change the nature of the equipment or buildings and, sometimes, how people use them, so that the energy end-user secures his or her desired outcome but the energy commodity required is less than it would otherwise have been. **We therefore propose an Energy Efficiency Services Fund collect revenues for energy efficiency services from the energy end-users who will have access to the services, through electricity distribution and sub-transmission tolls and tariffs, which are the means of payment for one of the major forms of energy commodity purchases in Chile.**<sup>66</sup>

#### 1. The Energy Efficiency Services Fund

The concept of an Energy Efficiency Services Fund, although called many different names, arose in connection with the decision of various states within the United States to deregulate electricity and natural gas markets in such a way that the supply of those energy sources would be competitive, while the delivery of the commodities remained under regulation. The states were concerned that energy efficiency services then being provided along with the sale of electricity and natural gas commodities would be lost in the transition to competitive markets. Approximately one-third of states within the U.S. now generate the equivalent of an Energy Efficiency Services Fund through collections under electricity or natural gas distribution tariffs.

## THE ENERGY EFFICIENCY SERVICES FUND



EESF = Energy Efficiency Services Fund

**We propose that collections for the Energy Efficiency Services fund occur from all energy end-users taking electricity at either the sub-transmission or distribution levels of the electricity system.** The collections will be designed as a certain number of pesos per kWh of energy used and/or kW of demand, depending on the design of the delivery tariff on which the end-user takes service. We recommend using kWh and kW consumption, rather than the amount of the bill as some United States utilities do, so that fluctuations in electricity commodity prices do not cause unnecessary instability in revenues for the fund. Although electricity use can vary considerably from month to month, it tends not to do so from year to year.

Ideally, energy end-users taking natural gas from natural gas distribution systems would also contribute to Energy Efficiency Services Fund because ways of improving the energy efficiency of outcomes such as heated water and warmed or cooled space for living and working involve both electricity and natural gas use. Although it would undoubtedly require a change in law, applying the charge to volumes distributed by natural gas companies would significantly improve the alignment between the energy efficiency program offerings and the amounts and types of energy the end-users covered by this policy use.<sup>67</sup>

### 2. The Size of the Energy Efficiency Services Fund

In general, the fund must provide the Energy Efficiency Services Administrator sufficient funds for the costs of planning, designing, implementing, reporting, and providing EM&V for a set of energy efficiency services capable of achieving the savings the Ministry of Energy identifies as coming from this strategy in the Goal-Setting formal participatory process. **We recommend that the administrator create high-level budgets in its strategy process and present those to the Ministry of Energy for a decision on the revenue needed from the fund.** The Ministry of Energy should set this revenue target in a formal participatory process to design the Energy Efficiency Fund.

It is likely that the fund required will change from time to time over the ten-year period of the Energy Efficiency Services Strategy for three primary reasons. First, the energy

efficiency goals and, thus, the associated costs are typically lower in the first years of such a strategy and then increase over time. The phase-in allows the administrator time to build capability in its design and delivery processes, making adjustments early on to improve participation and results. Accordingly, the Fund and collections for it are likely to be smaller initially, and then increase. Second, several years of results will be necessary to provide solid, Chile-specific information on the levels of incentives and other costs necessary to achieve the desired savings. While Chile can look to international experience to estimate what might be necessary, these will be estimates only. Specific sectors in Chile may need more or less incentives and other assistance than in other countries for various energy efficiency improvements. Last, the Ministry of Energy must set the fund's revenue target in consideration of the economic and other impacts it may have. Both of these may cause the fund and collections to rise or fall in different years.

### 3. Collecting the Energy Efficiency Services Fund

Given the National Energy Commission's role in setting and designing the distribution and sub-transmission tolls and tariffs, it is logical that this entity also be responsible for designing the Energy Efficiency Services Fund revenue target provided by the Ministry of Energy into a charge for each of the tolls and tariffs available to electricity clients for use of the distribution and sub-transmission systems. **We recommend that the National Energy Commission participate in the participatory process to design the Energy Efficiency Services Fund to set the initial design into the tariffs and tolls.** In subsequent cycles, it could do this upon a request to change the size of the collections.

The owners of the distribution or sub-transmission facilities, which today collect the money for the tolls and tariffs, will separate the portion attributable to the Energy Efficiency Services Fund from the tolls and tariff revenue and transmit it to the administrator, for use in fulfilling its responsibilities under the Energy Efficiency Services Strategy. The law should specify the government agency that will exercise oversight of the collection, transfer, and expenditures of the Energy Efficiency Services Fund.

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## VI. IMPLEMENTATION

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### A. THE ROLE OF LAW CHANGES

Most, if not all, of the policies we propose will require legal authorization. The development of this law should occur following the requirements and processes for accountability and transparency, in keeping with all that we have discussed so far. But, beyond these specific elements, **our final policy proposal is that Chile enacts a law that comprehensively expresses its commitment to energy efficiency as well as making the explicit authorizations this proposal requires.**

IEA advises that governments use law to articulate their energy efficiency policy purpose and intent.<sup>68</sup> Combining IEA's advice with our own, the minimum requirements for Chile would include:

- The energy efficiency vision for which the country is reaching, a process for obtaining the information by which the country can determine where it is in relation to this vision, set goals for progress and, after some time, determine whether and how far it has moved toward its vision.
- The reasons why government intervention is necessary.
- Key roles and responsibilities; including for setting goals, planning, implementing initiatives, evaluating the results of those, reporting the results, and revising plans based on the evaluation.
- Sources of and commitments to the funding necessary to move toward the vision, including any specific initiatives covered in the law.
- Commitment to following the processes and requirements of accountability and transparency, such as the use of formal processes and easy access to documents and information, including the assumptions and data relied upon in each.

Because of the importance of BECs and MEPS to Chile's long-term success with increasing energy efficiency, we suggest this overarching law also consolidate the authorities and requirements that presently exist into a comprehensive approach with a clear scope for the BECs and MEPS (i.e., what they apply to), an expectation of when the first complete set will be completed, accountability for and means of enforcement and evaluation of results, and an expectation of the timing by which the building codes and MEPS will increase the energy efficiency they require.

### B. DECOUPLING FOR ELECTRICITY DISTRIBUTION COMPANIES

Chile's distribution companies can have an important influence on the success of the Energy Efficiency Services Strategy and Fund, the accelerations of BECs and MEPS and the development of additional strategies.

With respect to the Energy Efficiency Services Strategy, the distribution companies can provide valuable information and insight to the administrator for use in designing energy efficiency services. Moreover, the business relationship distribution companies have with most of the clients to whom this policy applies is of great importance to long-term energy efficiency improvement. This business relationship includes, at a minimum, providing customer service around the delivery of electricity, such as providing the bill or responding to high bill complaints, requests to change tariff option, requests to start or change the nature of the distribution system connection. Some distribution companies already provide services additional to electricity delivery, however. All of these interactions present opportunities to interest a client in an energy efficiency service. Distribution companies have established forms and times of communication with their clients; they likely have experience regarding the approaches that could work well to raise awareness of the energy efficiency services. For these reasons, it may make sense for distribution companies to act as the delivery organization for some of the energy efficiency services the administrator designs, such as an on-bill financing program for deep retrofits of residential and commercial buildings.

In addition, the distribution companies (and sub-transmission owners, to the extent these are separate companies) will have accountability for collecting payments pursuant to the tariffs. Performing this responsibility well will require cooperation and diligence.

With respect to building energy codes, an Edison Electric Institute report<sup>69</sup> describes the support energy companies such as Chile's electricity distribution companies can provide to a successful effort:

- **Development:** During the development of building energy codes, [a distribution company] can help in the design of code language and cost effectiveness testing. Simplified code language is generally preferred as a simple code tends to be better enforced than a complex code.
- **Adoption:** If the current code lags readily available codes, [a distribution company] can actively support and promote the adoption of new building energy codes.

- **Compliance enhancement:** While the general business practices of [distribution companies] may [exclude] their involvement in direct inspection of completed buildings, a [distribution company] can become involved in compliance enhancement efforts by supporting third-party inspectors and plan reviewers.

Last, there are several energy efficiency strategies involving distribution companies that should receive serious consideration. There are technologies and operating protocols that can increase the energy efficiency of the distribution system itself. Some of these technologies fall within the category commonly called “Smart Grid.” Other Smart Grid technologies, particularly network-enabled, digital electricity meters, can help client set and achieve their efficiency goals by providing valuable information on energy use patterns. Using Smart Grid and other technologies, distribution companies could also assist their clients in demand response activities; i.e., the ability to reduce individual demand at times when collective demand is at its highest. The greatest benefits of demand response are usually economic and environmental: shifting use of electricity from peak times to times of lower use decreases the need to run the most expensive, least efficient generating resources on the system. Experience elsewhere, however, is that client participation in demand response also lowers overall energy use and increases efficiency.

**Because of and even beyond the distribution companies’ role in energy efficiency improvements, it makes sense to create an alignment between the financial drivers of these businesses and Chile’s energy policy. Chile’s current electricity regulation creates a throughput incentive: distribution companies prosper primarily by delivering increasing amounts of electricity. Such a business model is in serious conflict with a national goal of aggressive, growing energy efficiency. For these reasons, we recommend that the implementation of these strategies include decoupling distribution companies’ revenues from the consumption of electricity.**

Decoupling is a mechanism directed at eliminating the throughput incentive present in Chile’s electricity regulation by making distribution companies financially indifferent with respect to the implementation of energy efficiency measures. This mechanism will enable distribution companies to evolve into companies that provide a variety of energy-related services, some of which involve the use of electricity network infrastructure. It will do this, however, without harm to the profitability of these companies.

The decoupling mechanism has been implemented successfully in many states of the United States. For an explanation of the throughput incentive in Chile’s electricity regulation and of the decoupling mechanism, see “What is Chile waiting for to make energy efficiency a good business for everyone?” by the Natural Resources Defense Council.<sup>70</sup>

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## VII. TIMELINE AND INITIAL CYCLE

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Much of the Goal-Setting and Review processes policy and aspects of the energy efficiency strategies we propose will require legislation. Many aspects of this proposal also require time at the beginning to develop information and engage in the processes required to make them operational. Below we list the preparatory work required for the implementation and the renewal of the proposals described in this paper. Following this list, we have charts that graphically show preparatory work timing, as well as the first two years of implementation.

We have created this timeline with one constraint in mind: we believe that it is crucial for the success of this policy for most of the preparatory work, as well as the beginning of its implementation, to occur within the same administration. Completing development and starting implementation within a four-year government cycle will ensure stable leadership throughout the process and continuity and coherence between the crucial phases of design and implementation. This time frame will also avoid unnecessary delays, such as can occur if leadership changes with a new administration. Because of this constraint we have—when possible—indicated those tasks that can be done in parallel.

### 2014 – 2016

#### Goal-Setting and Review Framework

Draft law, discussion in Congress and publication of law

- The Ministry of Energy convenes a formal participatory process (FPP) to choose energy efficiency indicators and to design the content and methods of the potential study (covering through 2027) that will support goal-setting (FPP1).
  - After FPP1, the Ministry of Energy convenes a second FPP to set national goals till 2027 and to design the recurring and regular processes by which reporting and evaluation of progress against goals will occur (FPP2).
  - The outcomes of this process will include:
    - A target level of energy intensity and defined energy efficiency savings/improvement for each of the major economic sectors, for households and transportation
    - A division of those target levels into expected contributions from:
      - Energy end-users covered by the Energy Efficiency Services Strategy and Fund
      - The largest energy end-users covered by the Energy Management Commitment strategy
      - Any other strategy of similar importance
- The expected penetration of energy efficiency improvement related to BECs and MEPS: Output of the types and number for each new equipment and appliances that will or could be subject to MEPS and the energy efficiency gains associated with subjecting these to MEPS; and the types and numbers of new buildings that will or could be the subject of building codes and the energy efficiency gains associated with covering these buildings by such codes.
  - A high-level determination of the costs and benefits of the energy efficiency strategies contributing to the overall goals
  - After FPP1, the Ministry of Energy organizes the department that will be responsible for energy efficiency indicators and work begins to develop these.

#### Minimum Energy Performance Standards (MEPS) and Building Energy Codes (BECs) strategy

- Beginning immediately upon Administration endorsement of the policies proposed here and clear intent to follow them, the Ministry of Energy:
  - Sets a schedule for the issuance of each MEPS, prioritized according to benefit to 2027
  - Identifies the timing and means by which the Ministry will report on units of equipment and appliances sold once the MEPS is issued to enable reporting of the energy efficiency improvement.
  - Determines the schedule by which it intends to engage independent contractors to perform impact evaluations of each MEPS.
  - Revisits the prioritized schedule once FPP2 is completed to ensure that MEPS will issue as necessary to achieve the national energy efficiency goals.
- Beginning immediately upon administration endorsement of the policies proposed here and clear intent to follow them, the Ministry of Housing:
  - Sets a schedule for new building energy codes for the commercial and public sectors and for an update of the existing residential ones, prioritized according to benefit, to 2027.
  - Establishes the process it intends to follow in developing each building energy code and the means by which stakeholders may obtain notice of participation opportunities in that process

- Identifies the timing and means by which the Ministry will report on buildings added once the codes have been adopted and report the energy efficiency improvement (or energy intensity reduction) associated with the new buildings.
- Determines the schedule by which it intends to engage independent contractors to perform impact evaluations of each building energy code and the means by which it will evaluate the effectiveness of enforcement.
- Revisits the prioritized schedule once FPP2 is completed to ensure that building energy codes will be adopted as necessary to achieve the national energy efficiency goals.

### **Energy Efficiency Law is published Energy Management Commitment (EMC) strategy for Chile's largest energy end-users**

- After FPP2 sets the national and sectoral goals, the Ministry of Energy convenes FPP3 to determine who will be subject to the Energy Management Commitment.
- After FPP3, the Ministry of Energy convenes FPP4 to design the commitment, including:
  - A methodology (or methodologies) for measuring energy intensity, both the baseline and the changes to energy intensity over the course of implementing the mandate, and audit procedures for energy intensity calculations.
  - A plan for regular communication between the government and the companies about energy management and related issues.
  - The contents of companies' energy management plans and the annual reporting regarding activity under the plan.
  - The schedule by which companies will file plans and reports.
  - Determining the consequences for failure by participating company to make energy management plans, file reports or participate in capability-building meetings.

### **Energy Efficiency Services and Fund strategy for Chile's other energy end-users**

- The Ministry of Energy convenes stakeholders to develop accountability processes for the administrator for the Energy Efficiency Services and Fund, and then chooses and enters into a formal agreement with an administrator reflecting those accountability processes.
- After FPP2, the administrator engages in an open process for strategic planning by which it selects the major areas in which it intends to develop services and the high-level results it expects from those efforts over the next five years. The strategy includes a high-level budget for meeting the goal, with estimated costs for the various types of services and estimations of the administrator's costs.
- Using the administrator's high-level budget, the Ministry of Energy convenes FPP5 to set the required revenue for the Energy Efficiency Services Fund.
- After FPP4, the National Energy Commission also convenes FPP6 to design the tariff changes through which distribution and sub-transmission companies will collect the EE Services Fund.
- The administrator begins designing the content and delivery mechanisms for the energy efficiency services identified in its strategy.
- The administrator establishes eligibility and other requirements for the self-direction option, described as part of the Energy Efficiency Services Strategy.

### **2017 – 2027**

- Ministry of Energy performs an annual process to report on and evaluate the national goals.
- Per the schedules they have set, the Ministry of Housing and the Ministry of Energy complete full sets of building energy codes and MEPS, respectively, and update them every three to five years.
- Ministry of Energy runs the Energy Management Commitment Strategy:
  - Annually, companies report progress to the Ministry of Energy
  - Annually the Ministry of Energy reports progress under this strategy to the public

- Ministry of Energy oversees the administrator's management of the Energy Efficiency Services Strategy:
  - Companies and organizations apply to the self-direction option, if they so desire, and the administrator runs that program per the requirements set for it.
  - Annually, the administrator prepares detailed plans with a services plan for the year, including all measurement and verification and any planned evaluations, a cost budget, and expected defined efficiency improvements per service.
  - Annually the administrator presents a report to the Ministry of Energy on the prior year.
  - In 2021, the administrator engages in a strategic planning process for the next five years.
  - Annually, companies or organizations that opted for the self-direction option report to the administrator the status of their project, including any deviations from the original goals, budget and schedule.
- By 2023 the entirety of this framework is reviewed to assess progress and whether it is necessary for revisions to be made to the Energy Efficiency Law for the 2028-2038 cycle.
- During 2026 and 2027:
  - Ministry of Energy convenes a new FPP1 to design the content and methods of a new potential study (covering through 2038) that will support goal-setting and, following its completion, convenes a new FPP2 to set national goals for the period ending in 2038 and make any useful or necessary changes in the accountability processes.
  - Ministry of Energy manages processes to determine whether to:
    - Extend the Energy Efficiency Services Strategy and Fund, and Energy Management Commitment strategies,
    - Add additional aspects to those strategies, and/or
    - Replace those strategies with others.

## 2028 – 2038

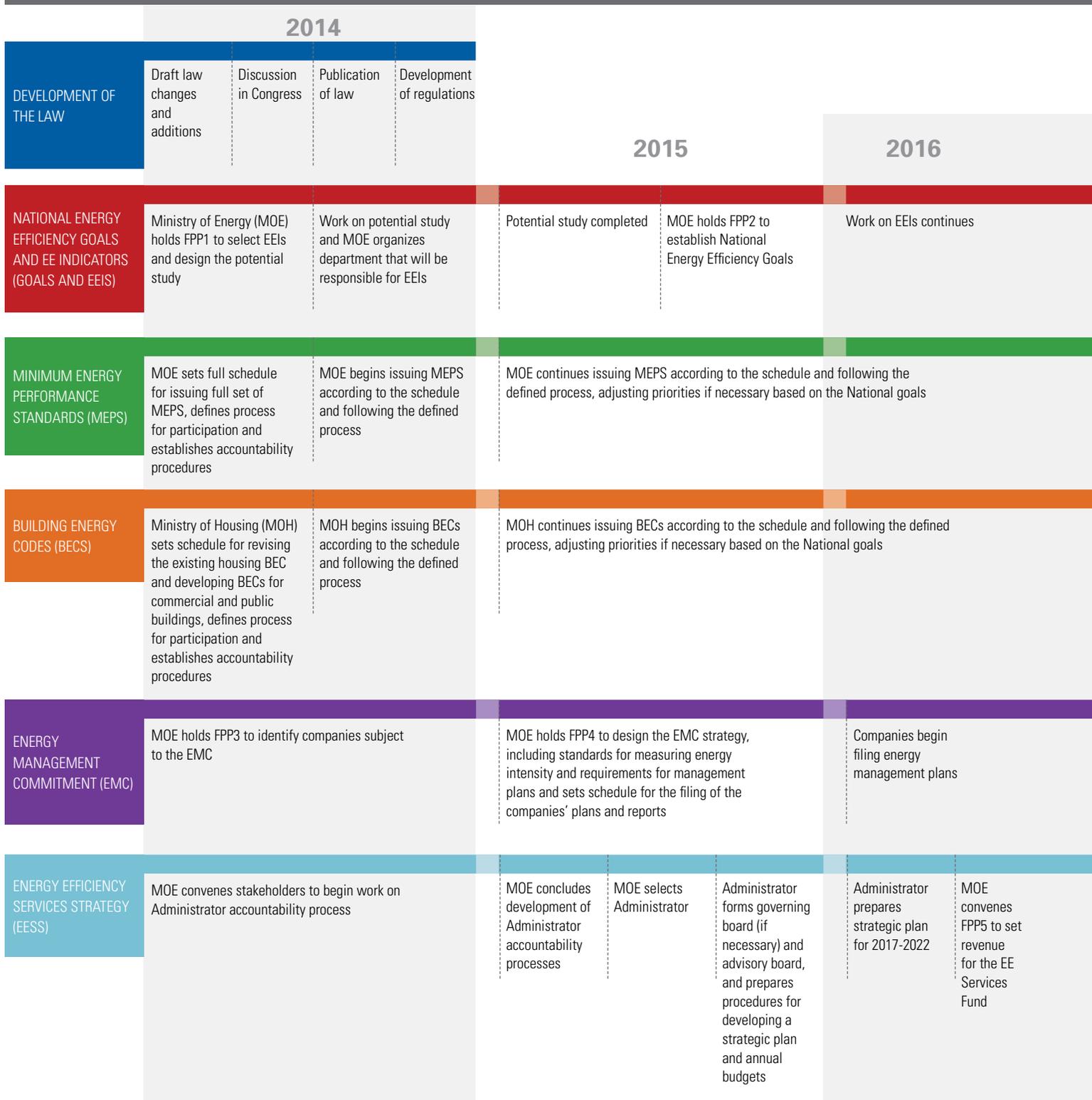
- 2028: If necessary, implementation work occurs on any new or revised strategies identified during the 2026-2027 processes.

### Key Assumptions:

1. The tight timeline for the draft, discussion and publication of the law is based on an assumption that the processes regarding the Energy Management Commitment and Energy Efficiency Services Strategy and Fund cannot begin without legal authorization. This constraint should be more thoroughly analyzed if the policy is put in place.
2. The Ministries of Energy and Housing can respectively begin following the policies regarding MEPS and BECs as soon as the government commits to the plan because we have assumed that neither requires law changes or additions. This assumption should be further analyzed should the policy be put in place.
3. The Ministry of Energy can hold a process similar to a FPP to select energy efficiency indicators and design the potential study and, upon its conclusion, select a contractor for the potential study, before a new law is issued because none of these activities requires law changes and additions. Again, should the policy be put in place, this assumption should be further analyzed.

The following charts in Figure 1 include the preparatory work required for the first two years of implementation of the policies described in this paper, as well as the entire initial cycle. Timing is approximate and we did not attempt to capture every activity. Figure 1 demonstrates the development of required activities and show which activities can be done simultaneously, as well as which must be sequentially.

**Figure 1. Initial Cycle Timeline**



**FORMAL PARTICIPATORY PROCESSES:**

- FPP1: Potential study design
- FPP2: Goal-setting
- FPP3: Energy Management Commitment participants
- FPP4: Energy Management Commitment design
- FPP5: Energy Efficiency Services Fund design
- FPP6: Energy Efficiency Services Fund size

**Figure 1. Initial Cycle Timeline** continued



**FORMAL PARTICIPATORY PROCESSES:**

- FPP1: Potential study design
- FPP2: Goal-setting
- FPP3: Energy Management Commitment participants
- FPP4: Energy Management Commitment design
- FPP5: Energy Efficiency Services Fund design
- FPP6: Energy Efficiency Services Fund size

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## VIII. CONCLUSIONS

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Chile's efforts to improve the efficiency with which it uses energy have been *good*. But the potential economic and other benefits to Chile, from a far larger increase in energy efficiency than current efforts will produce, are *great*.

Chile is ready to take this next step towards long-term, aggressive energy efficiency improvement, not only because it has been building its capacity in this regard since 2005, but also because there is consensus about energy efficiency as a sound energy policy. The previous two administrations—from different sides of the political spectrum—as well as many stakeholders agree that energy efficiency should be a priority in any long-term energy policy.

This paper has described a path to allow Chile to transform its energy efficiency efforts from *good* to *great* through the implementation of a 10 year, reviewable and potentially renewable framework policy that establishes clear and transparent goals and strategies as well as a funding mechanism, and that insures that all the information generated is known to everyone and that all the organizations involved in the policies are accountable for their actions and outcomes.

In summary, implementing these proposals would accomplish the following:

- A. Establish an understood and trusted goal for Chile's energy efficiency achievements and processes by which all stakeholders can know on a regular basis the progress that has been made toward that goal.** Chile will use robust, inclusive processes to create the EE Indicators by which it will assess its energy efficiency achievements, design a study to find baseline figures for those EE Indicators and identify means of improving them, and set national goals to guide the ongoing development of strategies that convert those identified means into actual improvement.
- B. Provide commitment to and stable funding for a well-staffed governmental department to develop and maintain the energy efficiency indicators and the information they produce.** Chile needs information about the current state of its energy efficiency and the potential for improving it to set goals. Once those goals are set, Chile will need information to know whether the strategies it is pursuing are, in fact, improving its energy efficiency.
- C. Ensure Chile receives the energy efficiency benefit of adopted, enforced, regularly updated MEPS for equipment and appliances and aggressive BECs.** Chile must accelerate the development of MEPS, which has barely begun, revise the now out-dated housing BEC, and promptly develop BECs for other types of buildings. Because the efficiency benefits of aggressive BECs and MEPS build over time with turnover in the stocks of buildings, equipment and appliances, the sooner these exist and the more regularly they are tightened, the sooner and more energy efficiency benefits will grow.
- D. Focus Chile's largest energy end-users—mines and industries—on improving their competitiveness and lessening their adverse impact on Chile's need for new energy supplies and infrastructure and on its environment by requiring that they make energy management commitments.** Chile expects mining and industrial energy use to drive the overall growth in need for energy supplies through the end of this decade and beyond. The goal of our proposal is to achieve simultaneously, the same or greater production and contribution to Chile's economy with lower energy use per unit of production than the current one. Companies under this program would commit to energy management programs that should produce the dual benefits of improved energy efficiency and far greater capability in the companies, the government and among stakeholders to converse and understand energy use, management and needs in these companies.
- E. Offer all of Chile's energy end-users, from households through industries<sup>71</sup> a comprehensive set of Energy Efficiency Services—designed to help them increase their energy efficiency through such assistance as information, financial incentives, technical help, and installation—and create a fund for these services collected through electricity tariffs.** Good energy efficiency services encourage energy end-users to replace the less energy efficient—whether a piece of equipment or appliance, internal or external building design and materials, or a process—with the more energy efficient, and to do so faster than would otherwise occur. To be effective, such services must be stable over time, building awareness and participation. This means that funding for the services must also be stable. The EE Services Fund will accomplish this, engaging those whom the services benefit in supporting them.

Although we expect that implementing these proposals will make Chile's energy efficiency efforts great and put its achievements on the path to greatness, more could and should still be done. Planning for new electricity and natural gas infrastructure should explicitly include consideration of improving energy efficiency. Chile should have a robust and well-used system of demand response, enabling all energy end-users to participate in moderating their energy demand to avert the need for costly, rarely used, energy infrastructure required by occasional high system peaks. Barriers to financing energy efficiency improvements, particularly those incorporated within building structures and long-lived, should be identified and removed.

Implementing these proposals will not be easy; it will require much work, resources and especially, leadership and commitment across the board, from politicians, to companies, to citizens. As a new administration takes office and parliament begins a new session, we hope our proposal will contribute to the discussions about Chile's energy future and the policies needed—and that could be implemented within the next four-year government cycle—to lead the country into a more sustainable future.

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## ANNEX 1: CHILE'S GOOD EFFORTS TO INCREASE ENERGY EFFICIENCY TO DATE

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Chile's recent past—since 2005—includes a considerable range of activities to encourage increased energy efficiency. As an example, joint work between the National Program for Energy Efficiency (Programa País Eficiencia Energética or PPEE) and the Chilean Development Corporation (Corporación de Fomento de la Producción or CORFO) resulted in three energy efficiency promotion instruments for private companies:<sup>72</sup>

1. The CORFO instrument known as Pre-investment in Energy Efficiency (Pre-Inversión en Eficiencia Energética);<sup>73</sup>
2. A credit line—including a preferential interest rate, grace periods of up to 18 months and payment terms from 2 to 12 years—to finance investments of up to US\$ 1 million for optimizing energy use in businesses; and
3. The CORFO Guarantee for energy efficiency projects.

In addition, over the period 2006 to 2009, funding for PPEE grew from \$1 million USD to \$34 million USD, and enabled, among other measures:<sup>74</sup>

A compact florescent lamps (CFL) distribution program;

- Energy labeling for equipment and appliances;
- Minimum mandatory standards for roofs (2000) and envelope insulation (2007), with planned revisions in 2015;
- The design of energy consumption simulation tools for new buildings;
- A home insulation retrofit program;
- A home energy certification program;
- Public buildings audits; and
- Audits in the industrial and mining sectors, co-funded with public resources (low interest loan) available for implementation.

Particularly noteworthy is Chile's strong energy labeling program, which as of 2012 covers refrigerators, freezers, microwaves, air conditioners, home entertainment devices (including their stand-by features), electrical motors and a variety of lighting types and related hardware. Labeling of all motorized vehicles with weight of 2,700 kg or less, used for transportation of people, was set to begin in February 2013.

Chile has also invested in improving its institutional framework for energy efficiency. In 2010 the Ministry of Energy was created, and within it, the Division for Energy Efficiency.<sup>75</sup> In 2011, the Chilean Agency for Energy Efficiency (Agencia Chilena de Eficiencia Energética or AChEE), a private-public entity, was also created. Since its formation, AChEE has engaged in a similarly wide variety of activities, including:

- For the Commercial, Public and Residential (CPR) sector:
  - Designing an energy efficiency profile manager and implementation of a training and management system;
  - A special financing program to retrofit buildings of public interest (PEEEP);
  - A certification program for existing buildings relating to their energy use; and
  - A program to incorporate energy efficiency criteria in new buildings.
- For the Industry and Mining sectors:
  - Promotion of energy management systems compliant with ISO 50001;<sup>76</sup>
  - Information and training regarding cogeneration projects; and
  - Development of a registry of consultants to ensure the quality of bidders for energy efficiency services.
- Other:
  - Education and training programs
  - Development of Evaluation, Measurement and Verification (EM&V) capability
  - Research and development activities

All of these efforts have been, and are, *good*. For several reasons, however, they are not *great* and are unlikely to support Chile's achievement of its energy efficiency potential. Although various government and non-government organizations and associations are working to support energy efficiency improvements, the following problems exist:

The national government:

- Lacks good information about the current state of energy efficiency in the country, including the two high energy intensity sectors of industry and mining whose projected energy demand drives much of the expected growth in Chile's need for energy infrastructure.
- Has a goal for energy efficiency improvement that:
  - Did *not* result from a process in which all those most responsible for the actions that would increase energy efficiency had an opportunity to be heard with respect to the decision on the goal;
  - Has *no* indicators by which Chile could know that it is more energy efficient, even if actual energy use in 2020 is 12% less than the forecast on which the goal is based;
  - Does *not* clearly relate to the strategies it or non-governmental organizations are pursuing regarding energy efficiency; and
  - Includes *no* processes for reporting on results or learning from differences between expected and actual conditions.
- Does not have expectations or timelines for the strategies it is pursuing, such as building energy codes (BECs) and Minimum Energy Performance Standards (MEPS) for equipment and appliances. MEPS are being pursued slowly; for some building types, energy codes were done but have not been revisited for years notwithstanding the growing importance to Chile of increasing energy efficiency and for others, no energy code exists.

- Has provided uneven and uncertain funding for its energy efficiency efforts and has not made possible adequate funding to provide the type and level of energy efficiency services that Chileans need to pursue energy efficiency's long-term benefits.

The associations and government divisions who are responsible for various energy efficiency strategies:

- Do not always involve all critical stakeholders in their planning, implementation and evaluation processes.
- Do not publish:
  - Their expectations of the energy efficiency improvement that their activities will produce.
  - The means by which they will measure and verify that the improvement occurred.
  - The results they achieved.

In this report, we recommend that the national government address these problems by building a strong framework for Chile's long-term sustained success in improving energy efficiency and adopting effective, proven strategies for increasing energy efficiency within the framework.

## ENDNOTES

- 1 National Energy Strategy 2012-2030, Energy for The Future, page 13.
- 2 Although other measures that contribute to energy efficiency—such as building codes— started earlier, we mention the year 2005 since that is the year the National Program for Energy Efficiency was created (Programa País Eficiencia Energetica or PPEE).
- 3 *Expansion Pressure: Energy Challenges in Brazil and Chile*, Bernardo Bezerra, Sebastian Mocarquer, Luiz Barroso, and Hugh Rudnick, IEEE power & energy magazine, April 19, 2012, *Digital Object Identifier 10.1109/MPE.2012.2188665*.
- 4 IEA 2012 World Energy Outlook Executive Summary at 2, OECD/IEA 2012, <http://www.iea.org/publications/freepublications/publication/name,33339,en.html>.
- 5 *Energía para el Futuro: Estrategia Nacional de Energía 2012-2030*; Gobierno de Chile (Feb. 2012) page 7, <http://www.minenergia.gob.cl/estrategia-nacional-de-energia-2012.html>.
- 6 Price Waterhouse Coopers, “Study on Chilean National Situation, Final Report,” Partnership for Market Readiness, Activity 4 (Nov. 30, 2012) <https://www.thepmr.org/content/chile-national-situation-case-study-pwc-2012>.
- 7 “Estudio de Bases para la Elaboración de un Plan Nacional de Acción de Eficiencia Energética 2010-2020”, Programa de Estudios e Investigaciones en Energía (PRIEN), Instituto de Asuntos Públicos, Universidad de Chile, Santiago (September 2010) – hereinafter PNAEE.
- 8 In the original in pesos. CL\$11,153,293,000,000 in the optimistic scenario, and CL\$6,066,698,000,000 in the pessimistic scenario. For conversion we used CL\$472=US\$1. The source material was unclear, so these are our best assumptions. PNAEE Executive Summary at xxii.
- 9 In the original in pesos. CL\$426.829.000.000. Same conversion as before. PNAEE Executive Summary at xxi.
- 10 Note that this economic value did not account for reductions in carbon dioxide (CO<sub>2</sub>).
- 11 From Ministerio de Energía, “Balances Nacionales de Energía,” 1991-2011, Gobierno de Chile.
- 12 From Partnership for Market Readiness, Activity 4.
- 13 Figures are from Partnership for Market Readiness, Chapter 7.
- 14 From PNAEE, Executive Summary page xviii. Percentages are from the “optimistic scenario” of increasing energy efficiency pursuant to the strategies in the Plan, as a percentage of the baseline 2020 energy use projection in the 2009 PROGEA forecast.
- 15 See, e.g. “Energy Efficiency Policies around the World,” World Energy Council 2008; Regulatory Assistance Project’s Policies to Achieve Greater Energy Efficiency, *Global Power Best Practice Series*, October 2012.
- 16 For example, Michigan passed a law in 2008 that required electricity distribution companies in the state to meet certain energy efficiency targets, and gradually increased the annual targets over 2008-2012. Act No. 295, Public Acts of 2008, Approved by the Governor October 6, 2008; Filed with the Secretary of State October 6, 2008; Effective date: October 6, 2008 Enrolled Senate Bill No. 213.
- 17 In California, the importance of the government’s long-term commitment to energy efficiency is exemplified by the five-member Energy Commission, whose members are appointed by the governor in staggered five-year terms and confirmed by the state Senate. As the governor’s administration lasts only four years, this commission assures that the governance structure is more stable than any single given administration. See the commission’s website for more info: <http://www.energy.ca.gov/commission/>.
- 18 The government divisions that regulate most electricity and natural gas distribution companies, for example, must make almost all of their decisions following FPPs. This includes California (whose energy efficiency policies underlie the Systep study), Vermont and Oregon (both referenced in this report). The IEA’s *Energy Efficiency Governance*, OECD/IEA (2010), Chapter 8 describes the policies other countries follow to involve stakeholders in energy efficiency decision-making.
- 19 As another example, very large energy end-users subject to the Energy Management Commitment would be required participants in the Goal-Setting Process because of the accountability they will bear for the energy efficiency potential identified in their part of the economy.
- 20 Energy Efficiency Governance, OECD/IEA 2010 (hereinafter IEA Governance) page 147.
- 21 Stephane de la Rue du Can, Jayant Sathaye, Lynn Price, and Michael McNeil, “Energy Efficiency Indicators Methodology Booklet,” Lawrence Berkeley National Laboratory, Environmental Energy Technologies Division (2010); available at: <http://www.escholarship.org/uc/item/6tz8873z>, page 1.
- 22 As suggested in the IEA Chile Energy Policy Review 2009 at page 49.
- 23 For example, it may be desirable to install energy metering devices and monitoring mechanisms in various types of buildings or around various types of processes to obtain statistically valid data on energy intensity.
- 24 Energy Efficiency Indicators: Best practice and potential use in developing country policy making, June 30, 2010. By G.J.M. Philipsen (Philipsen Climate Change Consulting), commissioned by The World Bank, at page 5.
- 25 Stephane de la Rue du Can, et al. “Energy Efficiency Indicators Methodology Booklet,” Lawrence Berkley National Lab.
- 26 Nathalie Trudeau and Isabel Murray, “Development of Energy Efficiency Indicators in Russia 2011;” International Energy Agency Working Papers, OECD/IEA (Aug. 2011).
- 27 “Energy Efficiency Indicators Database,” World Energy Council, viewed August 11, 2013, <http://wec-indicators.enerdata.eu/>. “Energy Efficiency Policies and Measures,” World Energy Council, viewed August 11, 2013, <http://www.wec-policies.enerdata.eu/institution.php>.
- 28 Comisión Económica para América Latina (CEPAL), “Taller Técnico del proyecto ‘Base de Indicadores de Eficiencia Energética para los países del Mercosur’ (BIEE)” United Nations (May 2012) <http://www.eclac.cl/cgi-bin/getProd.asp?xml=/drni/noticias/noticias/8/46618/P46618.xml&xsl=/drni/tpl/p1f.xsl>.
- 29 Though such indicators may mask underlying explanations, over time they tend to be close. A good example is the Odyssee database, Energy Efficiency Indicators in Europe, <http://www.odyssee-indicators.org/>.
- 30 IEA Governance at p. 149.

- 31 California Long Term Energy Efficiency Strategic Plan, September 2008, page 24, <http://www.cpuc.ca.gov/NR/rdonlyres/D4321448-208C-48F9-9F62-1BBB14A8D717/0/EEStrategicPlan.pdf>
- 32 We do not know, however, the age of the data used in the study.
- 33 Chris Kramer and Glenn Reed, "Ten Pitfalls of Potential Studies," Regulatory Assistance Project (Nov. 2012) <http://www.raonline.org/event/webinar-ten-pitfalls-of-potential-studies>.
- 34 We recommend that the Ministry consider using for this purpose a target level of energy intensity and defined energy efficiency savings/improvement for each of the major economic sectors, for households, and for transportation.
- 35 Most often, this is an annual process, done after data for the prior calendar year is available. See, e.g., Oregon and Vermont. An in-person meeting that is open to the public and to which specific stakeholders are invited is often part of the process.
- 36 See [http://www.energy.ca.gov/commissioners/rosenfeld\\_docs/rosenfeld\\_effect/presentations/NRDC.pdf](http://www.energy.ca.gov/commissioners/rosenfeld_docs/rosenfeld_effect/presentations/NRDC.pdf) estimating about half of the energy savings through 2003 as coming from building codes and appliance standards and <http://www.nrel.gov/docs/fy10osti/46532.pdf> at page 7. Also, see: [http://www.energy.ca.gov/releases/2013\\_releases/2012\\_Accomplishments.pdf](http://www.energy.ca.gov/releases/2013_releases/2012_Accomplishments.pdf) which shows that codes and standards have saved Californians more than \$74 billion in reduced energy bills since 1975.
- 37 Mandatory building energy codes and minimum energy performance. Governments should require all new buildings, as well as buildings undergoing renovation, to be covered by energy codes and meet minimum energy performance standards (MEPS) that aim to minimize life-cycle costs. Energy codes and MEPS should be enforced, regularly strengthened and take a holistic approach that includes the building envelope and equipment. IEA 25 Energy Efficiency Policy Recommendations, 2011 Update, at page 7.
- 38 Ingrid Rohmund, Kelly Smith, Sharon Yoshida, Adam Cooper, and Lisa Wood; "Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010 – 2020): IEE Whitepaper," by Institute for Electric Efficiency; (December 2009 and May 2011 Update).
- 39 This occurred under a "regulatory program for thermal conditioning" established by the Ministry of Housing in 1996, which was implemented by amending the OGUC (Ordenanza General de Urbanismo y Construcciones, a regulation) in three stages.
- 40 Ministerio de Vivienda y Urbanismo, "Sistema de Calificación Energética de Viviendas," Gobierno de Chile (viewed 2013) [http://www.minvu.cl/opensite\\_20120504133150.aspx](http://www.minvu.cl/opensite_20120504133150.aspx).
- 41 Ley 20.402 (D.O. 03/12/2009), modificó el Art. 4º letra H, del DL 2.224. -h) Fijar, mediante resolución, los estándares mínimos de eficiencia energética que deberán cumplir los productos, máquinas, instrumentos, equipos, artefactos, aparatos y materiales que utilicen cualquier tipo de recurso energético, para su comercialización en el país.
- 42 Decree 97 of 2011. Ministry of Energy.
- 43 Interview with the Ministry of Energy, Division of Energy Efficiency (May 2013).
- 44 For purposes of this draft, we are assuming that the Ministry of Housing has, or can receive through legislation, authority over and responsibility for energy building codes for all types of buildings and not just residences.
- 45 In addition, numerous international resources exist to support the processes for developing energy building codes and MEPS. For example, CLASP – the Collaborative Labeling and Appliance Standards Program – serves as the primary resource and voice for appliance, lighting and equipment energy efficiency worldwide. The Global Buildings Performance Network serves a similar function with respect to buildings. Both Ministries may be able to obtain grants or non-financial support from these and similar sources.
- 46 See for example: Mark Ellis, "Experience with Energy Efficiency Regulations for Electrical Equipment," International Energy Agency Information Paper, OECD/IEA (2007) pages 84-85; or Nancy Wasserman and Chris Neme, "Policies To Achieve Greater Energy Efficiency," *Global Power Best Practice Series*, Regulatory Assistance Project (October 2012) page 18. California and Florida are two states that review codes every three years. Connecticut recommends reviewing codes not more than every four years.
- 47 Potentially, some of the MEPS and BECs may reach these large industry and mining companies. These strategies will have little effect, however, on Chile's largest energy end-users.
- 48 Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World, Lynn Price, Environmental Energy Technologies Division, April 2005 (This work was supported by the Climate Protection Division, Office of Air and Radiation, U.S. Environmental Protection Agency through the U.S. Department of Energy under Contract No. DE-AC02-05CH11231)
- 49 IEA Industrial Energy Efficiency Guidebook, <http://www.iea.org/publications/freepublications/publication/policypathwaysindustry.pdf>
- 50 Australia, Canada and China all have significant mining industries. For information on the Australian strategy see <http://www.ret.gov.au/energy/efficiency/eeo/Pages/default.aspx>. For information on the Canadian strategy see <http://oee.nrcan.gc.ca/industrial/cipec/13673>. For information on China's strategy, see This one works: <http://china.lbl.gov/publications/chinas-top-1000-energy-consuming-enterprises-program-reducing-energy-consumption-1000-I>
- 51 IEA Industrial Energy Efficiency Guidebook at pages 8 and 12.
- 52 For more about ISO 50001, see "ISO launches ISO 50001 energy management standard," (June 2011), and ISO's *Win the Challenge with ISO 50001*, (June 2011).
- 53 Canada, for example, has long used a reward system to encourage companies in its industrial energy management strategy to meet individually-set energy efficiency improvement targets.
- 54 See, e.g., Energy Efficiency Program Best Practices, a publication of the National Action Plan for Energy Efficiency, [http://www.epa.gov/cleanenergy/documents/suca/napee\\_chap6.pdf](http://www.epa.gov/cleanenergy/documents/suca/napee_chap6.pdf).
- 55 Including, for Buildings: An ambitious timeline and renovation rate for cost-effective reduction of the energy consumption in existing buildings. . . . [including] Measures to aid building owners and occupants to improve energy efficiency in existing buildings, such as: i) Energy audits, energy ratings and certification schemes; ii) Incentives to encourage investments in long-lasting building envelope and system improvements, and increased market penetration of new high-efficiency products; iii) Training and other measures to improve the quality and reliability of building retrofit services; iv) Information on financing options; v) A strong commitment by governments to improve the efficiency of public-sector buildings. For Equipment/Appliances: financial incentives, procurement programs, endorsement schemes and other market-support measures focused on the most cost-effective, energy-efficient products available.

56 To be deployed in the United States, behavioral efficiency programs must demonstrate that the net present value of all program benefits exceeds the net present value of all program costs. For more information about savings from behavioral energy efficiency, see Allcott, Hunt, "Social Norms and Energy Conservation," *Journal of Public Economics*, (October 2011).

57 Some countries and states within the U.S. rely on the electricity and/or natural gas distribution organization to administer strategies similar to the Energy Services Strategy we propose. Often this occurs in combination with those companies' obligations to provide electric or natural gas energy to their clients and the energy distribution company administers energy efficiency services only in the area in which it provides distribution services. Others rely on a department within the government. Still others rely on not-for-profit organizations. Vermont and Oregon are primary examples of this as both rely on not-for-profit organizations whose governing boards include representatives of beneficiaries of the energy efficiency services. Both states have had notable success in increasing energy efficiency. The non-governmental organizations in those states follow best practices in accountability and transparency and have brought both stability and innovation to the energy efficiency programs offered for end-users in those states.

58 AChEE is the most likely and logical choice for this role. We are not making a recommendation one way or the other because our concern is with the nature of the relationship between the Ministry and the administrator and, in particular, the accountability designed into that relationship.

59 In the U.S. electricity companies are subject to economic regulation that establishes their rates based on a litigated, adjudicatory determination of their actual cost of service. Over the many decades in which this has been the policy, the states that perform this regulation for retail electricity rates developed comprehensive schemes for performing their rate-setting duties that include authority over an electricity company's budgets, its issuance of debt or equity, its electricity resource planning and acquisition of resources, among other things. All electricity companies have strong relationships with the state regulatory agencies that oversee them, involving daily contact, the filing of many reports and applications throughout a year, and numerous processes through which stakeholders participate in decisions the regulatory agency makes in the course of its regulation. Within this environment, adding regulatory oversight of how the electricity company managed a responsibility for spending funds collected from its clients on energy efficiency services was natural and easy. Indeed, many states do this through on-going oversight of actual costs, rather than through the Energy Efficiency Services Fund we propose.

60 This is why the U.S. state of Vermont chose a not-for-profit organization to act as its administrator, and it has one of the best performances in North America. See "Vermont" under the American Council for an Energy-Efficient Economy's State Energy Efficiency Policy Database, available at <http://www.aceee.org/sector/state-policy/vermont>.

61 It is relatively common for laws authorizing a systems benefit charge such as we propose to contain some of these constraints, such as requirements for attention to low-income energy end-users or geographic/population equity. The manner in which the Oregon Public Utility Commission exercises its oversight of this administrator is a good model for the Ministry of Energy to follow. Documents related to this oversight can be found at <http://energytrust.org/About/policy-and-reports/>.

62 This process is adapted from the one followed by the Energy Trust of Oregon, a third-party administrator of the public purpose charge that most Oregon electricity and natural gas users pay on their monthly energy bills. The Energy Trust is accountable for managing large sums (its 2012 budget was \$173.7 million USD and its 2013 budget \$178 USD) and spending those to achieve all cost-effective electricity and natural gas energy efficiency in Oregon.

63 See, for example, material on the self-direction option offered in Oregon at <http://www.oregon.gov/energy/cons/pages/sb1149/business/self-direct.aspx>, for Michigan at [http://www.michigan.gov/mpsc/0,4639,7-159-52495\\_54478--,00.html](http://www.michigan.gov/mpsc/0,4639,7-159-52495_54478--,00.html), and for Wisconsin at: <http://docs.legis.wisconsin.gov/statutes/statutes/196/374>.

64 For example, some states in the United States set a threshold of 1 MW in electricity use for a client to qualify to use a self-direction option.

65 Guillermo Jiménez Salas, "Informe Legal: Financiamiento de Políticas Públicas de Eficiencia Energética Mediante Cargo a los Usuarios y Mediante Presupuesto Público," Natural Resources Defense Council (2013).

66 This is not the first time such a fund has been proposed for the Chilean context. The 2009 System study, commissioned by the National Energy Commission, analyzes this concept and estimated the fund that would be generated by a charge equivalent to 1% and 2% of overall electricity bills, if such charge were applied to the 12 biggest Chilean electricity distribution companies. *Introducción de la Eficiencia Energética a través de incentivos a las empresas distribuidoras*, System Ingeniería y Diseños (January 2009) p. 111.

67 If the Energy Efficiency Services Fund can include natural gas, then the only major fuel sources for these energy end-users not covered would be firewood and liquid petroleum gas (LPG), which are used primarily for space heating and cooking. Because buildings that use firewood or LPG for heating or cooking could, at any time, convert the heating source to natural gas or electricity, one could argue that clients using those fuels should be eligible for energy efficiency programs that address heating and cooking applications. Also, the government could add its own resources to the Energy Efficiency Services Fund to allow the administrator to coordinate programs for heating and cooling across all types of end-users, regardless of the energy source used.

68 See IEA Energy Efficiency Governance, Chapter 2. IEA reports that some early laws have proven seminal, with their main elements being widely replicated in later legislation, often on a regional basis. Many countries in Asia have used the Japanese Rational Use of Energy Law (1979) as a template, including China, India, Korea, Thailand and, most recently, Vietnam.

69 Integrating Codes and Standards Into Electric Utility Energy Efficiency Portfolios, IEE Whitepaper August 2011, citing IEE Whitepaper, Assessment of Electricity Savings in the U.S. Achievable through New Appliance/Equipment Efficiency Standards and Building Efficiency Codes (2010-2025), May 2011.

70 ¿Qué está esperando Chile para hacer de la eficiencia energética un buen negocio para todos?, Natural Resources Defense Council (2013). For a description of how the decoupling mechanism could be implemented in Chile, see *Introducción de la Eficiencia Energética a través de incentivos a las empresas distribuidoras*, System Ingeniería y Diseños (January 2009).

71 This is except for the mines and industries covered by the Energy Management Commitment strategy.

72 Project document, Chile: Encouraging the Establishment and Consolidation of an Energy Efficiency Service Market in Chile, Global Environmental Facility (GEF), November 4, 2010 (hereinafter GEF Project Document) pages 9-10. See at <http://www.thegef.org/gef/node/3805>.

73 This program provides a direct subsidy to companies with annual net sales up to US\$ 33 million to cover up to 70% of the total cost of energy efficiency consulting services including i) assessment to quantify potential energy savings, ii) implementation plan and/or iii) financial analysis of energy efficiency measures. GEF Project Document at 9.

74 Chile Energy Policy Review, International Energy Agency 2009, ISBN 978-92-64-07314-2, pages 97-98.

75 In May 2013 the Ministry of Energy released its Plan de Acción for energy efficiency through 2020, highlighting activities spanning i) the industrial and mining sector, with measures such as promoting the implementation of management systems based on ISO 50001; ii) the transportation sector, through the promotion of efficiency standards and information mechanisms, among other measures; iii) the building sector, with the revision of currently legally mandated requirements, among other measures; and iv) the appliances sector, with the labeling of products that use gas and water, among other measures.

76 ISO 50001:2011 provides a framework of requirements for organizations to develop a policy for more efficient use of energy, including targets, use of data, measurements, review of results and continuous improvement. See <http://www.iso.org/iso/home/standards/management-standards/iso50001.htm>.







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