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Harnessing the Invisible Fuel:

How to unlock the energy and water efficiency potential of the UAE private sector

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ABOUT EWS-WWF

Emirates Wildlife Society is a national (UAE) environmental non-governmental organisation established in 2001 under the patronage of HH Sheikh Hamdan bin Zayed Al Nahyan, Ruler's representative in the western region and Chairman of Environment Agency-Abu Dhabi.

Emirates Wildlife Society works in association with WWF, one of the world's largest and most respected independent conservation organisations, with offices in 100 countries. The association is commonly known as EWS-WWF.

Our vision is to build a future where humans live in harmony with nature.

Our mission is to conserve nature and reduce the most pressing threats to the environment. We work with people and institutions in the UAE and region, to implement conservation solutions through science, research, policy, education and awareness.

For more information please visit uae.panda.org

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We are also immensely grateful to the many individuals and organizations that attended our roundtable events or took the time to share feedback with us in writing. This encompasses representatives from many leading public and private sector entities in the UAE, including Abu Dhabi National Exhibition Centre, Archcorp, Baringa Partners LLP, Crowne Plaza, Dubai Chamber – Centre for Responsible Business, Dubai Supreme Council of Energy, Emirates Green Building Council, Executive Affairs Authority, Federal Customs Authority, Federal Electricity & Water Authority, HSBC UAE, Liberty Automobiles, Majid Al Futtaim, Maaar Energy, Masdar Institute, UAE Ministry of Climate Change and Environment (FKA Ministry of Environment and Water), UAE Ministry of Energy, National Bank of Abu Dhabi, Abu Dhabi Quality and Conformity Council, Regulatory & Supervisory Bureau Dubai and Unilever Middle East.

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LIST OF ABBREVIATIONS

ADDC	Abu Dhabi Distribution Company
ADNOC	Abu Dhabi National Oil Company
ADWEA	Abu Dhabi Water and Electricity Authority
AED	United Arab Emirates Dirham
BMS	Building management system
CFL	Compact fluorescent lamp
COP	Conference of Parties (UN Climate Change Conference)
DEWA	Dubai Electricity and Water Authority
DSM	Demand-side management
EAD	Environment Agency – Abu Dhabi
EER	Energy efficiency ratio
ESCO	Energy Services Company
ESMA	Emirates Authority for Standardization and Metrology
EWS-WWF	Emirates Wildlife Society in association with World Wide Fund for Nature
FCA	Federal Customs Authority
FEWA	Federal Electricity and Water Authority
GCC	Gulf Cooperation Council
GHG	Greenhouse gases
GSO	GCC Standardization Organization
IEA	International Energy Agency
IMF	International Monetary Fund
LED	Light-emitting diode
LEED	Leadership in Energy and Environmental Design
LFL	Linear fluorescent lamps
LNG	Liquefied natural gas
MEPS	Minimum energy performance standard
NGO	Non-governmental organization
QCC	Quality and Conformity Council
RSB	Regulation and Supervision Bureau – Abu Dhabi
SEWA	Sharjah Electricity and Water Authority
SME	Small to medium enterprise
TNS	TNS Global (fka Taylor Nelson Sofres)
UNEP	United Nations Environment Programme
USEPA	United States Environmental Protection Agency

FOREWORD



Tanzeed Alam,
Director of Climate & Energy

The success of the world's efforts to mitigate climate change essentially hinges on the rapid deployment of two key solutions: renewable energies and energy efficiency. Energy and water efficiency represent a significantly under-exploited resource that could immediately unlock multiple environmental and economic benefits in the UAE.

The recent Paris Agreement to try to limit global temperature rise to 1.5°C shows that the global community wants to take concerted action to limit the severe and irreversible damage that climate change could cause to our ecosystems and livelihoods.

The UAE is especially vulnerable to climate change risks, including the loss of coastal infrastructure and ecosystems, as well as reduced food and energy security, and public health. The UAE government has started to demonstrate progressive leadership by taking important steps to addressing these challenges, such as the decision to develop a post-oil strategy, the creation of the new Ministry of Climate Change & Environment and the Dubai Clean Energy Fund. The next five years will be crucial in determining whether we can keep climate change in check.

That is why the EWS-WWF Climate & Energy Programme is dedicated to making climate change a national priority and transforming the UAE economy to one that is low carbon and resilient to climate change. From now until 2020, our focus will be on scaling up renewable energy and energy efficiency, and tackling the risks posed by climate change. For energy efficiency, this means there is an urgent need to eliminate key barriers that are preventing the uptake of efficient behaviours and technologies.

This publication builds on insights gained from the UAE's first statistically representative survey of energy and water efficiency in the private sector, conducted by EWS-WWF in 2014/15 and published in a previous report entitled *What is Holding Back the Private Sector?* The following pages form part of our continued effort to ensure that the UAE can realize the full potential offered by energy efficiency.

The report begins by outlining seven concrete and actionable recommendations for UAE policymakers. Chief among them is the development of a national climate change and energy policy, which includes clear greenhouse-gas reduction targets and detailed plans for implementation and monitoring. Such a policy should prioritise energy efficiency alongside renewable energy as critical mechanisms to reduce carbon emissions. For the three issue papers in this publication, EWS-WWF teamed up with RTI International to delve deeper into the key findings from the survey and learn more about the top three barriers identified by survey respondents and key local stakeholders.

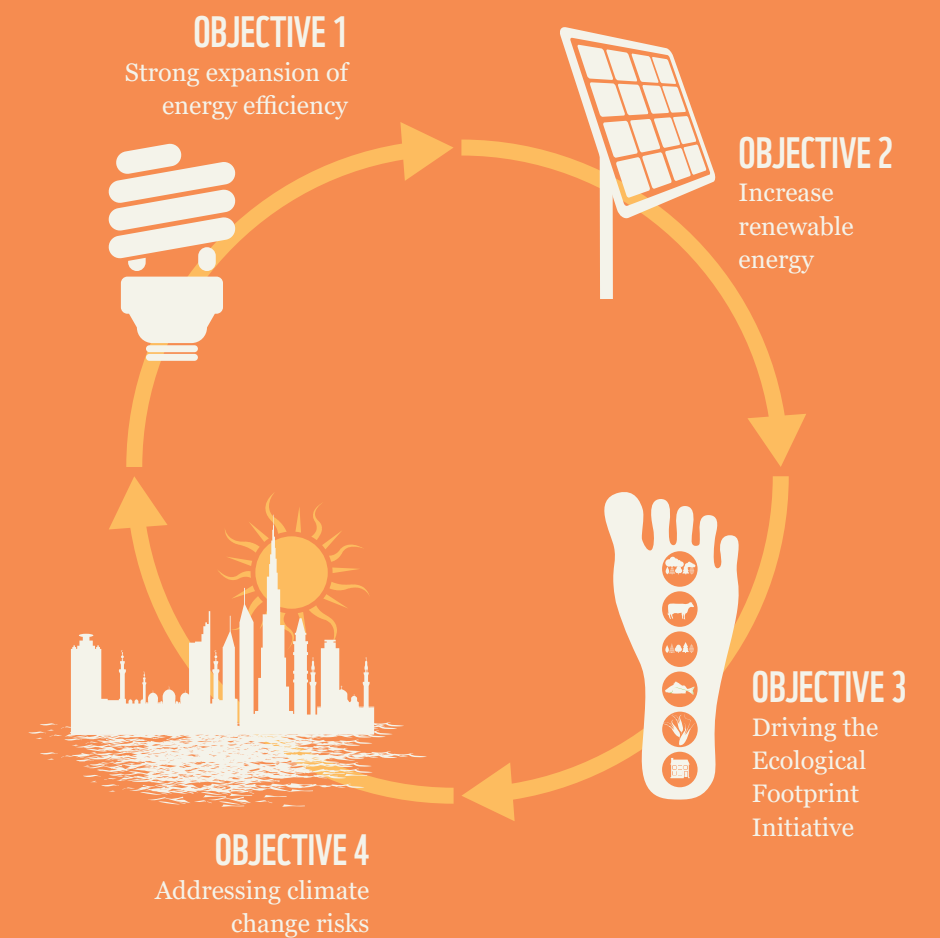
As the only international NGO working on climate change and energy issues in the GCC, we seek to propose solutions and inspire action. We hope this report will serve to generate dialogue and facilitate collaboration among policymakers, private sector decision-makers, researchers and civil society.

Tanzeed Alam
Climate & Energy Director
EWS-WWF

CALL FOR SUPPORT

WITH STRONG PARTNERS, WE CAN SCALE UP OUR IMPACT

EWS-WWF wants to see the UAE economy embrace low-carbon development and a resilience to climate change. Our five-year Climate Change & Energy Programme focuses on the following:



To find out how your organization can become part of the solution, contact:

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**HOW TO ADDRESS KEY
BARRIERS FOR ENERGY AND
WATER EFFICIENCY IN THE UAE**

A summary for policymakers

INTRODUCTION

The purpose of this paper is to summarize the top three barriers for energy and water efficiency in the UAE and outline recommendations to address them. The barriers have been derived from the UAE's first statistically representative survey of 363 businesses in the UAE. The intended audience of this paper includes federal and emirate-level policy-makers concerned with energy and the economy, utility decisionmakers and others working towards energy efficiency and climate change mitigation. The paper aims to contribute to the advancement of comprehensive and effective policies based on research by stimulating dialogue among key stakeholders and informing policy and decisionmakers in regard to the wide-scale adoption of energy and water efficiency.

In order to encourage policy action, EWS-WWF intends to de-brief top-level decisionmakers on the key recommendations and highlight the need to address the critical issues brought to light through this project.

CLIMATE CHANGE AND ENERGY EFFICIENCY

The recent international climate agreement in Paris to limit global temperature rise to, ideally, 1.5°C means that the world and the United Arab Emirates (UAE) will need to significantly change the way in which it produces and consumes energy. Left unchecked, global temperatures are likely to rise well beyond 1.5°C, leading to substantial impacts on food, water, infrastructure, health and well-being of people, including in the UAE. These issues mean that the UAE needs to make climate change action a national priority.

This will require the country to:

- Take proactive action internationally to ensure the Paris agreement is implemented effectively;
- Lead by example domestically on climate change mitigation by setting ambitious domestic greenhouse gas (GHG) reduction targets and plans with sufficient investment to achieve them;
- Start to implement science-based climate change adaptation plans.

The UAE has seen considerable economic development, which has led to significant growth of GHG emissions of an average of 5 per cent per year from 1994 to 2013¹. In 2014, the energy sector accounted for 80 per cent of all GHGs, with 35 per cent directly coming from the power sector (MoENR, 2016), notably for electricity and water production. Energy demand is expected to nearly double by 2030 and water use to increase 44 per cent by 2025 (UNEP, 2013).

¹ This average has been calculated using the Ministry of Foreign Affairs' 3rd National Communication (MOFA, 2012a) and the 2012 and 2013 Greenhouse Gas Inventory by Ministry of Environment and Water (MoEW, 2014a) and Ministry of Energy (MoEN, 2015), respectively



THE UAE HAS STARTED TO TAKE STEPS TOWARDS ENERGY EFFICIENCY, SUCH AS SUBSIDY REFORM - BUT MANY BARRIERS STILL EXIST

Globally, energy efficiency provides a significant opportunity to sharply reduce emissions needed to stay below 1.5°C, where by 2020 it could reduce emissions by 49 per cent (IEA, 2013). However, the opportunity has not yet been fully realized, with two-thirds² of energy efficiency potential predicted to remain untapped until 2035 unless policies change (IEA, 2014b). In the UAE, where energy and potable water are mostly cogenerated in power plants, energy and water efficiency could contribute to almost half of the country's potential to reduce carbon dioxide emissions and at much lower costs than many measures to increase energy supply (Masdar, 2009).

While the UAE has started to take some steps towards energy efficiency, such as through modest subsidy reform of electricity and water, there still exist many barriers towards achieving the full potential that it has to offer. Taking into consideration these barriers will help inform policies to ensure that they are designed to be the most effective.

Over four years of EWS-WWF working with private sector organizations to reduce carbon emissions³, it became apparent that they face numerous barriers to reducing their carbon emissions through energy and water efficiency. To identify the most common barriers, EWS-WWF conducted a statistically representative survey across small, medium, large companies in Abu Dhabi, Dubai and Sharjah⁴, the results of which are in the report *What is Holding Back the Private Sector?*. The survey found that only 4.4 per cent of the 363 surveyed companies had implemented either energy or water conservation measures.

The survey also identified the most common perceived barriers:

1. High costs of energy efficiency technologies (37 per cent);
2. Low availability of efficient product (34 per cent) and lack of market accessibility (27 per cent)⁵;
3. Limited understanding of electricity and water subsidies (25 per cent).

The three issue papers⁶ presented in this publication were developed to further investigate these barriers in order to better understand them and begin to identify potential solutions to accelerate the private sector's participation in efficiency. The issue papers also incorporate feedback from three roundtable meetings held with a wide range of stakeholders from across the UAE, in September 2015.

² For buildings, the unrealized potential is even more drastic, with an estimated 80% of efficiency opportunities to remain untapped by 2035 (IEA, 2014b).

³ For more information about the Heroes of the UAE private sector project, please visit http://uae.panda.org/ews_wwf/achievements/heroesoftheuae_achievement

⁴ For more information, please read *What is Holding Back the Private Sector? A UAE investigation into energy and water efficiency barriers?* (EWS-WWF, 2016)

⁵ Given the overlap, the market accessibility and product availability barriers were combined into one issue paper.

⁶ Issue papers jointly developed by EWS-WWF and RTI International: 1) *Technology Costs as a Barrier to Energy and Water Efficiency in the Commercial Sector of the UAE*; 2) *Barriers to Electricity and Water Efficiency in the UAE: Product Availability and Market Accessibility*; and 3) *Electricity and Water Subsidies and the Impact on Consumption in the UAE*

SUMMARY OF THE TOP THREE BARRIERS

1. HIGH COST OF ENERGY AND WATER EFFICIENT TECHNOLOGIES

Survey respondents identified this as the primary barrier to implementing energy and water conservation measures and practices in the UAE. The first issue paper, *Technology Costs as a Barrier to Energy and Water Efficiency in the Commercial Sector of the UAE*, concluded that technology costs as a barrier are not just about the “off the shelf” price but rather perceived high technology costs. In this context “high technology costs” may not necessarily only reflect purchase costs, but indicate that the benefits of the new technology do not exceed the cost of adoption.

In this light, there are a wide range of factors, which could influence the cost effectiveness (a comparison/analysis of benefits in relation to cost) of efficient electricity and water technologies:

- **High transaction costs:** On the cost side, high transaction costs can be significant and impact cost effectiveness negatively. Transaction costs include planning and researching the technology, getting approval and buy-in from company management and any follow-up work such as documenting implementation or verifying the savings achieved. The lack of product information or limited product availability influence transaction cost and could as well lead to a higher purchase price. The lack of information can also contribute to heightened uncertainty and risk associated with investing in high efficiency technologies, which in turn could contribute to the perception that costs are higher for more efficient products and technologies.
- **Lack of capital or high cost of financing:** Can contribute to the perception that technologies are expensive.
- **Low utility tariffs:** As a result of subsidies, they prevent significant savings from energy efficient technologies and negatively impact the cost effectiveness equation. Thus, the longer it takes to reap the savings, the less incentive to invest in high efficiency technologies.
- **Limited development and application of standards for efficient equipment:** The UAE market is a relatively small, immature market with few product and building standards, which affects the level of demand for efficient products and therefore product availability. As a result, there are fewer technology options leading to less competition and no economy of scale to drive prices lower. While some standards in the UAE have been introduced, there has not been a long history of standards adoption that would promote a larger, more competitive market for such technologies, which would drive down prices. Furthermore, new building standards require proper enforcement to minimize incremental costs by forcing the installation of efficient technologies during construction, when costs are lower (compared to retrofitting).



IN A CLIMATE OF RAPID ECONOMIC GROWTH, THE MARKET HAS BEEN FLOODED WITH INEFFICIENT AND LOW-QUALITY PRODUCTS

2. LOW AVAILABILITY OF PRODUCTS AND LACK OF MARKET ACCESSIBILITY

The second issue paper, *Barriers to Electricity and Water Efficiency in the UAE: Product Availability and Market Accessibility*, investigates the underlying causes that limit access to highly efficient products and marketplaces. In a climate of rapid economic growth, the market has been flooded with an abundance of inefficient and low quality products, making it difficult to access those technologies that are most efficient. Efforts to introduce measures to improve quality and efficiency of products available to consumers have only been moderately successful to achieve a more mature market.

Similar to technology costs, several underlying and interrelated factors have limited product availability and market accessibility:

Codes, standards and labels

Product codes and standards are implemented to ensure that obsolete and inefficient technologies do not continue to dominate the market. A variety of standards and regulations, at both the federal and emirate level, have been enacted, or are being considered, that could directly or indirectly affect the use and availability of energy and water efficiency products. There are numerous government bodies pursuing these measures, but they often work in silos, creating a patchwork of codes, standards and labels. For example, the Emirates Authority for Standardization and Metrology (ESMA)’s Emirates Quality Mark and Abu Dhabi’s Trustmark and energy efficiency labels such as EU Energy Label and US Energy Star. Ultimately, this patchwork can contribute to confusion in the marketplace, affecting the ability of consumers to access the most efficient products and contributing to loopholes that suppliers can take advantage of.

As a result of a lack of capacity to enforce standards across the UAE, the reputation of product performance in the UAE can be negatively impacted; as it creates uncertainty and risk that prevents implementation and ultimately leads to a lack of credibility. Local governments that are tasked with verifying implementation of products or standards, in most instances, have not allocated sufficient manpower or technological resources to enforce and inspect the products. Strong standards are one of the foundations to successful energy efficiency policies and, beyond enforcement, there needs to be periodic impact assessment to improve the standard requirements. Building strong standards requires sufficient capacity at government institutions responsible for their development and implementation.

Subsidized electricity and water tariffs

The history of subsidized electricity and water in the UAE has led to an environment where conservation has not been perceived as a pressing issue and economic incentives for investment in efficiency have been suppressed. Low tariff rates do not incentivize energy conservation and ultimately lead to a lower demand for efficient products and thus, limiting availability of products.

3. LIMITED UNDERSTANDING OF ELECTRICITY AND WATER SUBSIDIES

The third issue paper, *Electricity and Water Subsidies and the Impact on Consumption in the UAE*, investigates electricity and water tariff subsidies as a barrier. Government subsidies for electricity and water are defined as the difference in the true cost of production and distribution, minus the tariff rate charged to the customer.

There are two issues with tariffs and subsidies affecting the uptake of energy and water efficiency.



First, subsidies artificially lower tariff rates, distorting price signals and decreasing the benefits of efficient technologies, which, in turn, limits the development of an effective market for efficient products in the UAE.

Second, as the survey results indicate, consumers may not be fully aware of the true cost of electricity and water and the resulting subsidies. And in many emirates the information on the calculation of true cost of power and water is not publicly available. The true calculation analysis is complex given the co-production of electricity and desalinated water, subsidized natural gas as an input, upstream subsidies for land-use, infrastructure and construction materials, and fail to capture environmental and health impacts. In addition, the tariff rate and true cost calculations are not uniform across emirates. With the lack of transparency, it can make it more difficult for businesses to anticipate changes to tariffs thus increasing the level of uncertainty and risk in doing business, which can affect the willingness to invest in efficiency.

UNCERTAINTY AND A LACK OF TRANSPARENCY CAN AFFECT THE WILLINGNESS TO INVEST IN EFFICIENCY

AT A GLANCE

How to address key barriers for energy and water efficiency in the uae

7 recommendations for policymakers

- 1 Develop a national climate change and energy policy and implementation plan
- 2 Improve institutional governance and capacity
- 3 Develop policies based on sound science, open and inclusive stakeholder engagement
- 4 Develop science-based standards, labels and codes
- 5 Continue reform of electricity and water tariffs
- 6 Develop financing initiatives to support energy and water efficiency uptake
- 7 Conduct communication that empowers consumers to make more effective decisions

RECOMMENDATIONS

+1.5°C



AN EFFECTIVE
FEDERAL CLIMATE
CHANGE AND ENERGY
POLICY WOULD
ESTABLISH A VISION
THAT VALUES ENERGY
EFFICIENCY AS A
RESOURCE

Effectively addressing these barriers will require a multipronged approach as many complex issues need to be systematically addressed.

1. DEVELOP A NATIONAL CLIMATE CHANGE AND ENERGY POLICY AND IMPLEMENTATION PLAN

While the UAE has a green economy agenda, UAE Vision 2021 and emirate-level plans, there is no federal climate change and energy policy and implementation plan. Such a policy should be informed by these already existing visions, but include GHG reduction targets, as well as plans for how energy efficiency and renewable energy will be scaled up across the emirates. The development of such a policy would naturally fall within the remit of the Ministry of Energy and the Ministry of Climate Change and Environment.

A key component to this policy is establishing a vision that values energy efficiency as a resource, giving efficiency priority alongside renewable energy efforts. As outlined in the IEA 2011 recommendation for energy efficiency policies, the strategy and implementation plan should describe barriers to efficiency investments, set clear objectives and timelines that include carbon reduction targets (incorporating energy efficiency targets) and identify specific policy measures and programmes to realize efficiency objectives. Furthermore, it is also crucial to track implementation progress and update plans regularly. In order for this to happen, institutions, roles and responsibilities must be identified for planning, implementing and monitoring efficiency policies and programmes.

2. IMPROVE INSTITUTIONAL GOVERNANCE AND CAPACITY

In order to avoid the duplication of efforts, it would be important to increase alignment and coordination between the federal and emirate levels, and inter-emirate governmental bodies. Coordinated strategic efforts at the federal level would likely be more efficient, if actions are implemented at the emirate level – and the Ministry of Energy can play a key role to facilitate this. Institutions, both on the federal and emirate level, must also have adequate resources to effectively implement energy efficiency measures. This involves having skilled and trained employees as well as the financial resources to implement plans.



AN OPEN PROCESS
NEEDS TO BE
DEVELOPED THAT
BUILDS TRUST,
SHARES INFORMATION,
SEEKS FEEDBACK AND
REMAINS OPEN TO
CHANGE

3. DEVELOP POLICIES BASED ON SOUND SCIENCE, OPEN AND INCLUSIVE STAKEHOLDER ENGAGEMENT

As the 2011 IEA recommendations for energy efficiency policies outline, research and data are the foundations of effective energy efficiency and demand side management (DSM) policies. While there is significant international research regarding these issues, the UAE is a unique market and, with better information, policies can be tailored to meet the country's specific needs.

Open and public data and research will facilitate cooperation and collaboration that will accelerate the identification of solutions and improve efficiency. Some areas for further research include:

- Assessing the potential energy, economic, environmental and social impacts of efficiency policies.
- Evaluate policies to help identify key issues that need to be addressed for effective implementation. Furthermore, research helps to identify and manage any unintended consequences and trade-offs, as well as key strategies and stakeholders that can ensure effective implementation.
- The relationship between efficiency and price of technologies.
- Understanding to what extent and why, technology costs are perceived as such a significant barrier to efficient technology adoption.
- Analysis of the GHG reduction potential of proposed standards to inform the prioritization of the development of standards. This research will positively impact the development of effective standards and implementation.

Policy development and consultation cannot be a 'box ticking' exercise to demonstrate buy-in and cut corners. A comprehensive and open process needs to be developed across government, private sector and civil society that builds trust, shares information, seeks feedback and remains open to change. Following such a process will ensure more genuine buy-in and support for implementation of policies. It will also help to identify implementation plans and develop partnerships between organizations to facilitate this.

4. DEVELOP SCIENCE-BASED STANDARDS, LABELS AND CODES

Effective standards, labels and codes drive demand and stimulate the supply market, providing consumers with increased product availability. The availability of more energy efficient equipment would improve economies of scale and lower technology costs - an essential policy outcome to pursue in light of the top barrier identified in the survey (IE perceived high technology costs).

- More standards are needed across a broader range of categories to capitalize on the efficiency opportunity by increasing demand for efficient technologies and removing inefficient ones.
- Standards and labels must be stringent, visible and trusted in the market.
 - The development of standards should be prioritized based on certain criteria, such as safety, as well as the potential to reduce GHG emissions.
 - Enforcement of standards and labels should occur so poor-quality, inefficient products are removed from the market, to build trust in the UAE market. This would reduce the impact of the assumption that efficient products are more expensive compared to inefficient ones.
 - Increased government funding of enforcement would help ensure that codes and standards achieve the intended expansion of efficient technologies and the corresponding reductions in consumption.
 - Currently, there are no building codes that mandate retrofitting existing buildings. Additionally, for new buildings, more stringent enforcement of building codes would help the adoption of high efficiency technologies. Standards make it easier for builders to recoup the incremental costs of efficiency investments at the time of construction.
- To be successful in preventing sub-standard products in the marketplace, there needs to be coordination and capacity building across standard-making bodies, including the Federal Custom Authority and the Department of Economic Development.
- Periodic review of standards and labels is important to make sure they are up to date and match the level of technology available in the market. Standards should also be communicated effectively.
- Harmonize efforts for labelling and standards across the UAE to reduce confusion in the market and use resources more efficiently. A lack of consistency and commonality across codes, labels and standards leads to increased costs and limited product availability.
 - Entities, such as ESMA and QCC, should work together to reduce confusion by eliminating redundant labels and ensuring that labels are providing consumers with the right information, inclusive of anticipated savings, as well as developing underpinning education/awareness campaigns for end users to understand what those labels mean and how the product can best be utilized.

INCREASED GOVERNMENT FUNDING OF ENFORCEMENT WOULD HELP TO ENSURE THAT CODES AND STANDARDS ACHIEVE THEIR INTENDED GOALS

- The UAE is a small market, so more efforts to align at the Gulf Cooperation Council (GCC) level and with international best practices would be a more effective way of ensuring better success in this area. However, it is important that this approach is timely and does not hinder national efforts.
- Standardization bodies also need to incorporate lessons learned into future standards, codes and labels, and understand the impact of standards and labels on market transformation. Have overall/average prices changed when a regulation/standard is implemented, or have prices remained the same? Valuable insights could be obtained on potential market failures that persist, factors that may be limiting market transformation and consumer adoption, and additional policies that need to be undertaken

5. CONTINUE REFORM OF ELECTRICITY AND WATER TARIFFS

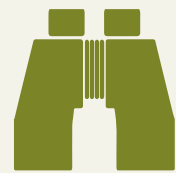
More tariff reforms are needed, with federal coordination of efforts to manage and inform consumer expectations. An energy efficiency policy that eliminates subsidies on electricity and water tariffs would not only incentivize investment in energy efficiency, it would also further unleash financial resources that could be re-invested into the economy in other ways that facilitate GDP growth. As a result, such a policy would also enhance the competitiveness of the private sector to support the UAE's economic diversification.

ELIMINATING SUBSIDIES ON ELECTRICITY AND WATER WOULD ENHANCE THE COMPETITIVENESS OF THE PRIVATE SECTOR AND SUPPORT THE UAE'S ECONOMIC DIVERSIFICATION

- Transparency of true-cost calculations must be coupled with awareness of true costs, which are based on a common, agreed-upon formula used across all emirates. This calculation approach should include accounting for all direct and indirect subsidies included in submarket fuel prices and other government services used as inputs to production (such as electricity consumed for pumping water, distribution, transmission, supply management). Information on the core costs would help standardize the method for calculating and disseminating the true cost.
- Tariff reform that sets utility rates at a level that takes into account the full range of true costs, societal and environmental externalities, positively impacting the cost effectiveness of energy and water efficiency products, while also incentivising behaviour change.

6. DEVELOP FINANCING INITIATIVES TO SUPPORT ENERGY AND WATER EFFICIENCY UPTAKE

Introduce financing schemes to enable consumers to purchase the most efficient equipment. A diversity of financing mechanisms needs to be available for both SME's and large corporations, as their efficiency needs differ and they might require different technologies. The private sector could also play a role in advancing financing for energy and water efficiency by offering products aimed at financially incentivizing customers to increase their level of energy and water efficiency. Examples of financing schemes to consider are green loans, product rebates and green bonds.



THE EXPECTATION OF WHAT CORPORATE RATES WILL BE IN THE FUTURE HAS AS MUCH IMPACT ON INVESTMENT DECISIONS AS EXISTING TARIFF RATES

7. CONDUCT COMMUNICATION THAT EMPOWERS CONSUMERS TO MAKE MORE EFFECTIVE DECISIONS

The communication and dissemination of information is crucial for consumers to find the best products and make more informed decisions. This goes beyond just awareness. It also involves transforming the way people think and behave. The myth that efficient products are more expensive, for example, needs to be broken down, as does the assumption that efficient practices are not compatible with economic growth. Two key ways to achieve this is through labels and public product platforms with adequate information about efficiency and savings. Product platforms that provide savings potential about available products and information about where to purchase them can be developed by any number of players: business industry, government, NGOs. Examples include TopTen and the U.S. Energy Star product database. A UAE platform would help increase demand for efficiency products, and support market transparency.

Communicating about true cost calculations and the government's intent to move toward cost-reflective tariffs would be an effective way to increase awareness of subsidies. The expectation of what corporate rates will be in the future has just as much impact on investment decisions as existing tariff rates.

UNDERSTANDING THE
TOP THREE BARRIERS
TO ENERGY AND WATER
EFFICIENCY

1. INTRODUCTION



THE FIRST STATISTICALLY REPRESENTATIVE SURVEY OF THE PRIVATE SECTOR ON ENERGY AND WATER EFFICIENCY BARRIERS

Studies have shown that the UAE has some of the highest electricity and water consumption rates in the world. Some of this consumption is a function of the harsh environment and the need for cooling. But a significant share is due to inefficient equipment, buildings and consumer behaviour.

To understand the barriers to the adoption of energy and water efficiency, EWS-WWF conducted the first statistically representative survey of the private sector on energy and water efficiency barriers in the UAE. The purpose of the survey was to understand what were the most important barriers hindering the UAE's private sector from achieving wide-scale energy and water efficiency and to begin to identify solutions to mitigate these barriers.

In addition, EWS-WWF commissioned the development of a series of issue papers, in collaboration with RTI International, to spark dialogue with representatives from the private and public sector experts in the topic. In September 2015, a series of three roundtable meetings were held with a wide range of stakeholders from the UAE to gather feedback on the issue papers to enhance understanding of what is required to unleash large scale energy and water efficiency.

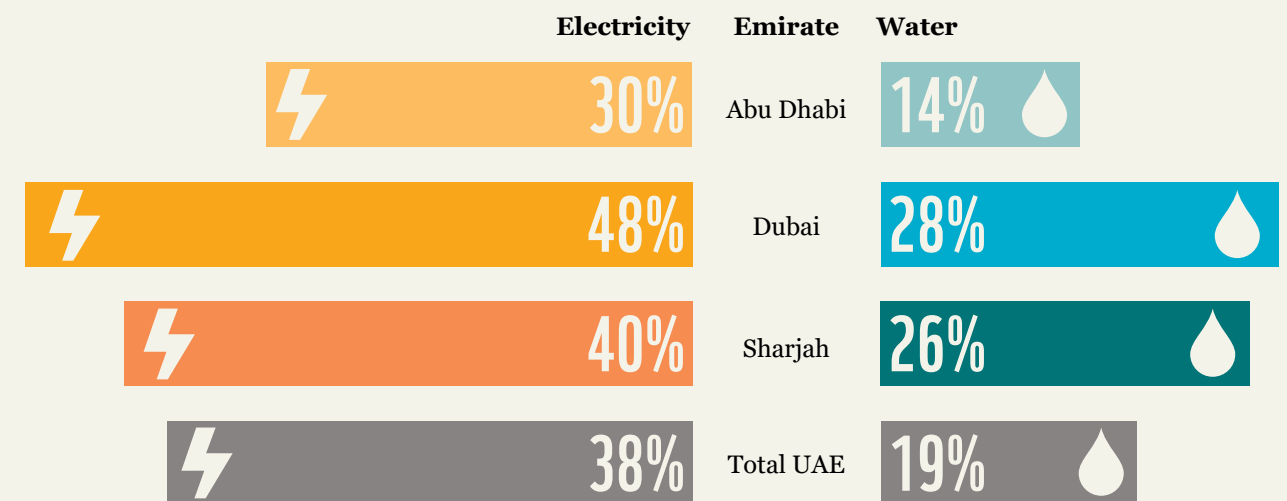
These discussions were used to refine the issue papers and to inform the development of an executive summary, which summarizes the EWS-WWF's position on energy and water efficiency in the private sector and outlines recommendations for policymakers to accelerate the uptake of energy and water efficiency measures by the commercial sector.

The commercial sector in the UAE consumes 38 per cent of electricity and 19 per cent of water. This represents a sizable opportunity to reduce consumption.

By engaging with companies through the **Heroes of the UAE Private Sector Project**¹, EWS-WWF identified many barriers organizations face in their pursuit of energy and water efficiency. These include market barriers, financial barriers, information barriers, institutional and regulatory barriers, and technical barriers.

To support this analysis, in 2014, EWS-WWF contracted TNS² to conduct 363 face-to-face interviews with employees tasked with energy and water management in small, medium and large companies in Abu Dhabi, Dubai and Sharjah.

Figure A.1 Commercial sector's share of electricity and water consumption in the UAE



Sources: DEWA (2014), Statistics Center - Abu Dhabi (2014), FEWA (2015a), FEWA (2015b), SEWA (2015a) and SEWA (2015b).

¹ Heroes of the UAE, EWS-WWF's private sector engagement campaign, ran from 2009-2014 and is now closed; for more information: http://www.uae.panda.org/ews_wwf/achievements/heroesoftheuae_achievement/

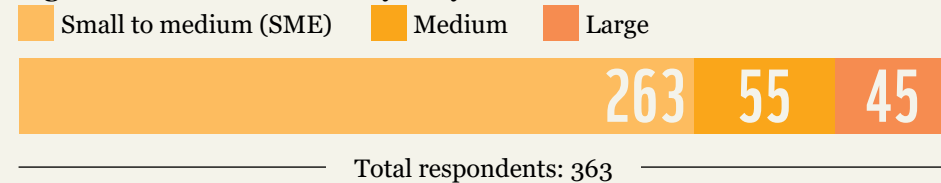
² TNS (formerly known as Taylor Nelson Sofres) is a leading market research and market information group: www.tnsglobal.com

2. THE SURVEY: METHOD AND KEY FINDINGS

2.1 SURVEY FINDINGS

To investigate the impact of barriers to energy and water efficiency adoption, EWS-WWF contracted TNS to conduct a statistically representative survey of 363 face-to-face interviews with employees tasked with energy and water management in small, medium and large companies (see Figure A.2) in Abu Dhabi, Dubai and Sharjah (see Figure A.3). Figure A.4 shows a breakdown of companies by type of business.

Figure A.2 Businesses surveyed by size



NOTE: As a function of annual turnover, SME is defined as those below AED 100 million, medium size as businesses between AED 100 million and 500 million, and large size as those with at least AED 500 million in annual turnover.

Figure A.3 Business surveyed by emirate

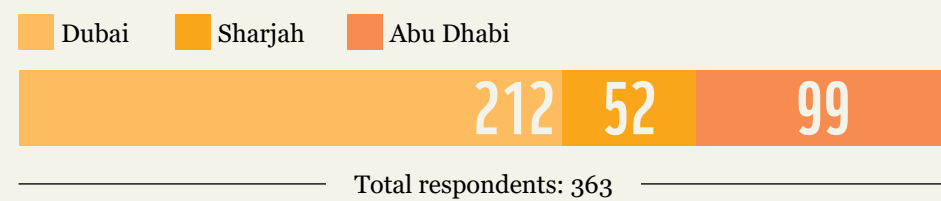
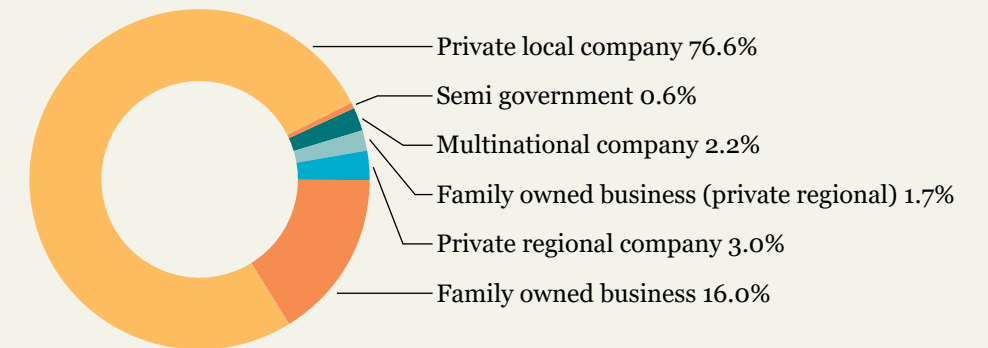


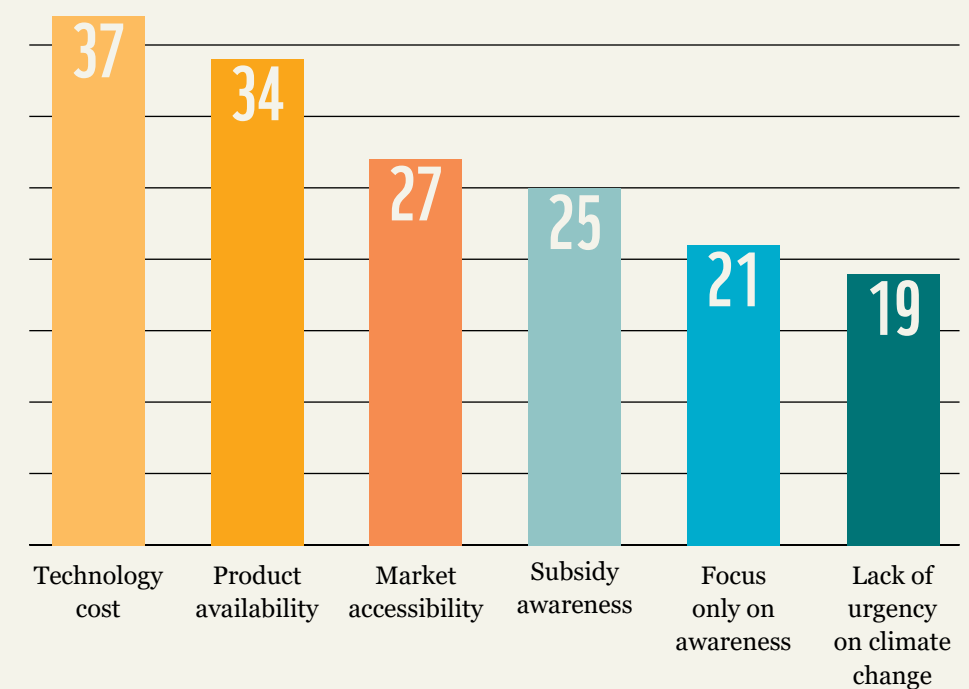
Figure A.4 Breakdown of respondents by business type



The percentage of respondents representing businesses that had adopted either energy or water efficiency measures reflects the low penetration rates of such measures in the UAE. Overall, only 4.4 per cent of the companies had implemented either energy or water conservation measures: 5.8 per cent of the companies from Dubai, 3.7 per cent of the Sharjah businesses and only 2.1 per cent of the companies located in Abu Dhabi. Among those companies that had adopted high efficiency energy or water measures, 88 per cent had adopted lighting measures, 75 per cent had implemented measures associated with A/C, 75 per cent had adopted other electricity conservation measures and 38 per cent had adopted measures for reducing water consumption.

4.4 %
OF THE COMPANIES
HAD IMPLEMENTED
EITHER ENERGY OR
WATER CONSERVATION
MEASURES

Figure A.5 Top six energy and water efficiency barriers for the UAE private sector (%)



TECHNOLOGY COSTS AS A BARRIER TO ENERGY AND WATER EFFICIENCY IN THE COMMERCIAL SECTOR OF THE UAE

Issue paper 1

1. INTRODUCTION

This paper is intended to stimulate dialogue with representatives from the private and public sector who are experts on the topic. Preliminary analysis indicates that, for the commercial sector, a contributing factor to the perception that efficient technologies are costly is the lack of accurate information on the full range and life cycle costs and benefits of efficient products. The most immediate solutions would be to address the financing (for example, green loans) and informational aspects of the technology cost barrier, as well as potentially provide direct incentives, such as rebates.

It is essential that attention be given to the broader suite of barriers underlying many of the technology cost issues, such as:

- Subsidized utility tariffs;
- Relatively few standards for energy/water efficient equipment;
- Limited enforcement of existing Minimum Energy Performance Standards (MEPSs), building codes and standards.

2. CURRENT LANDSCAPE AND IMPACT OF BARRIERS

The cost and perceived benefits of a new technology will influence its adoption. However, when an individual or company indicates that a given energy or water consuming technology is too costly, what they are typically implying is that the benefits of the new technology do not exceed the cost of adoption. Thus, when investigating technology cost as a barrier to adoption, one must also investigate all the underlying factors influencing its benefits, as well as the full life-cycle (not only purchase) costs.

37%
CITED TECHNOLOGY COSTS AS THE PRIMARY BARRIER TO IMPLEMENTING ENERGY AND WATER CONSERVATION MEASURES

There are a wide range of factors which influence the cost effectiveness of efficient electricity and water technologies. On the benefits side, the most obvious is the cost of electricity and water. If tariff rates embed significant government subsidies, then the monetary savings from investments in efficiency will be suppressed. On the cost side, if there is a lack of information or limited product availability, the search and acquisition costs (often referred to as transaction cost), as well as the purchase price may be high. In addition, the availability and cost of financing impacts the overall technology cost. Thus, as is discussed below, there are a bundle of interconnected market barriers that will impact the perceived cost of efficient technologies.

2.1 TECHNOLOGY COSTS AS A BARRIER

Most respondents to the EWS-WWF survey identified technology cost as the most significant barrier to implementing efficiency measures in the commercial sector. This certainly seems to be a reasonable outcome; one would expect that, although some efficiency products and options are relatively mature, other new or emerging products are likely to have higher costs as they are introduced to new markets and production processes are still being refined and optimized. Before investigating this outcome of the survey further, a review of the literature is useful for putting this finding in the context of international studies and the situation outside of the UAE.

2.1.1 Barriers to energy efficiency measures

A 2013 review of 26 empirical studies that addressed the role of barriers in adoption of energy efficiency measures found that the most prevalent barrier reported was that companies placed *low priority* on energy efficiency. Just behind *low priority* were *lack of information* and *lack of capital or financing*.¹ The other top barriers to adopting energy efficiency measures were *lack of time to adequately research options*, *split incentives*, *payback period* and *the technical risks* associated with implementation. Most of these factors are linked directly or indirectly to technology costs.

¹Although they are related concepts, lack of capital and financing and technology costs are not the same; lack of financing could apply both to a technology that is relatively inexpensive and to a technology that is too costly to be worth the time or investment.

One study indicated technology costs to be a primary barrier. This study, by Fleitera et al., reported on the results of an empirical study using data from a 2010 survey to evaluate an energy audit programme for small to medium-sized enterprises (SMEs) in Germany. The analysis concluded that the “...first, and arguably clearest, finding ... is that high investment costs ... appear to impede the adoption of [energy efficiency measures].” The study goes on to conclude that the “... lack of capital slows ... adoption, primarily for larger investments.” Two points of clarification are worth mentioning in regard to the study. First, based on what little information is provided, the 2010 German survey included both commercial and industrial enterprises. This distinction is important because energy efficiency measures that apply to industrial operations tend to be process-specific, more specialized and typically require a higher investment than most energy efficiency measures for commercial operations. The second point of clarification is that, similar to the lack of capital, the “high investment costs” are likely to extend well beyond the cost of the technology and very likely include transaction costs.

However, a 2014 study concluded that, although the lack of capital was often cited as a barrier, the adoption rate was no higher among SMEs when minimal capital investment (increased maintenance, for example) was required to implement the energy efficiency measure. The study added that, for non-manufacturing enterprises, “... none of the financial metrics (cost savings, capital cost or payback period) were shown ... to be statistically significant for implementation rates, supporting the assertion made in the interviews that less tangible factors, such as lack of information or entrenched behavior, were likely limiting energy efficiency improvements in this sector” (DECC, 2014).



BARRIERS OFTEN ARE RELATED TO THE PERCEPTION THAT WATER IS CHEAP AND ABUNDANT; THEREFORE, THERE IS NO REASON TO CONSERVE IT

2.1.2 Barriers to water efficiency measures

In terms of water conservation measures, most studies have focused on programmatic/implementation barriers to regional conservation programmes. However, in terms of water customers, one study found that the barriers often are related to the perception that water is cheap and abundant; therefore, there is no reason to conserve it as a resource. In addition, funding has historically focused primarily on supply side efficiency, rather than the demand side for water (WSDE, 2003).

A 2004 study for the California Urban Water Agencies found that the primary barriers for the commercial, industrial and institutional sector were not cost or funding related (A&N, 2004); instead, the critical barriers included

- Lack of reliable savings estimates
- Lack of in-house technical skills
- Adversity to changes
- Language barriers
- Low priority

It is worth noting that the above study considered water efficiency through a different lens than the local context in the UAE, where the true cost of potable water is determined by desalination processes, resulting in high production costs and high carbon component.





In summary, previous international studies of both energy and water efficiency measures and programmes found technology costs to be an issue, but were mixed as to whether cost was the primary barrier to adoption. But again, these international studies, mostly conducted in the United States and European Union, reflect an environment that differs from the UAE in terms of tariff structure, market availability, product information and historical attitudes toward conservation.

2.2 OVERVIEW OF HIGH EFFICIENCY TECHNOLOGIES AND COSTS

For the purposes of the EWS-WWF survey, energy and water conservation technologies were categorized as one of the following: lighting, air conditioning, other electrical items and water. For each of these categories, the universe of technologies is broad and the costs also vary from relatively inexpensive to very costly. In some cases, there are conditions (“structural barriers”) that eliminate options to the types of technologies that a company can implement. An example of a structural barrier is a commercial tenant located in a high-rise building that is cooled with a chiller system: installing a more efficient air conditioning (A/C) technology is not an option for the tenant because the cooling system is building-wide and the building owner or property manager would make any decisions to change the technology or system operation.

For these four categories of high efficiency technologies, Table 1.1 lists the more common high efficiency options and the relative costs in the United States, which likely reflects the situation in Europe, parts of Asia and Australia, where there have been long-standing policies on energy and water conservation. In general, the relative costs of the various technologies are a function of the type of technology, its level of maturity and the ease with which the technology can be adopted (i.e., labour requirements).

Table 1.1 Example options and relative costs for high efficiency technologies

Lighting 		Air conditioning 		Other electrical 		Water 	
	Cost ^a		Cost ^a		Cost ^a		Cost ^a
CFL ^b	L	High efficiency A/C unit or system	L/M	Motion sensor	M	High efficiency fixtures	L/M
LED ^c	H	Improved maintenance	M	Programmable thermostat	L		
T8 LFL ^d	M	Other optimization	M	BMS, enhanced BMS ^e	H	High efficiency appliances	M
Linear T5 LFL	M	Switch to district cooling	H	High efficiency power supplies	H		
Electronic ballast	M			High efficiency IT equipment	H		
				High efficiency appliances	M		

^a Relative costs: L = low; M = medium; H = high.

^b Compact fluorescent lamp (CFL)

^c Light-emitting diode (LED)

^d Linear fluorescent lamps (LFL)

^e Building management system (BMS)

THERE IS LITTLE CORRELATION BETWEEN PRICE AND EFFICIENCY DUE TO DIFFERENCES IN ECONOMIES OF SCALE AND HENCE COST

As indicated in Table 1.1, costs vary by technology. In general, technologies that entail a simple retrofit of basic equipment, such as lighting products or low-flow water fixtures, are relatively mature, mass produced and relatively inexpensive. In contrast, technologies that are new, or emerging, or must be customized to the installation, are often much more expensive. An example of this is high efficiency power supplies for office equipment, which, in most cases, would require an extensive analysis of options for replacing the power supplies with more efficient ones that are also compatible with the equipment or replacing the equipment with integral high efficiency power supplies.

In 2010, ESMA implemented a labelling scheme for small A/C units, whereby all units must be labelled with a star rating based in large part on the unit's energy efficiency ratio (EER):

- ★★★★★star rating: EER greater than 7.1
- ★★ to ★★★★★ star rating: EER values between 6.3 and 7.1
- ★ star rating: EER values between 5.9 and 6.3
- Banned: EER less than 5.9

Thus, the greater the star rating, the higher the efficiency. However, data collected by the authors, which are summarized in Figure 1.1, shows that there is no strong correlation between star rating and unit cost (i.e. cost per tonne of cooling). On a per-tonne basis, average costs for 1- and 2-star units are less than the average for units with higher star ratings, but some 5-star units cost less than 1- or 2-star units and the highest average costs are for A/C units with a rating of 3 stars (RTI International, 2015). This lack of correlation is not unique to the UAE; research by the International Energy Agency (IEA) found that, for many high efficiency technologies, there is little correlation between price and efficiency due to different volumes of production leading to differences in economies of scale and hence cost(IEA, 2007).

Based on the results of a 2012 survey of lamps in Abu Dhabi, the unit costs for the most common types of high efficiency lamps were comparable to the unit costs for incandescent and halogen lamps found in the market (see Figure 1.2). The exception was LED lamps, which cost several times as much (RTI International, 2012). Thus, replacing existing incandescent or halogen lamps with comparable compact fluorescent lamps (CFLs) would be relatively inexpensive, whereas replacing existing lamps with light-emitting diode (LED) lamps would not. However, as noted above, most commercial lighting is largely in the form of linear fluorescent (LFL) luminaires. Replacing an existing LFL luminaire with another more efficient type of LFL could be moderately inexpensive because of the minimal labour involved and the lack of a need to switch out fixtures.

HIGHER EFFICIENCY NEED NOT BE MORE EXPENSIVE

Figure 1.1 Small A/C unit cost by ESMA Star Rating

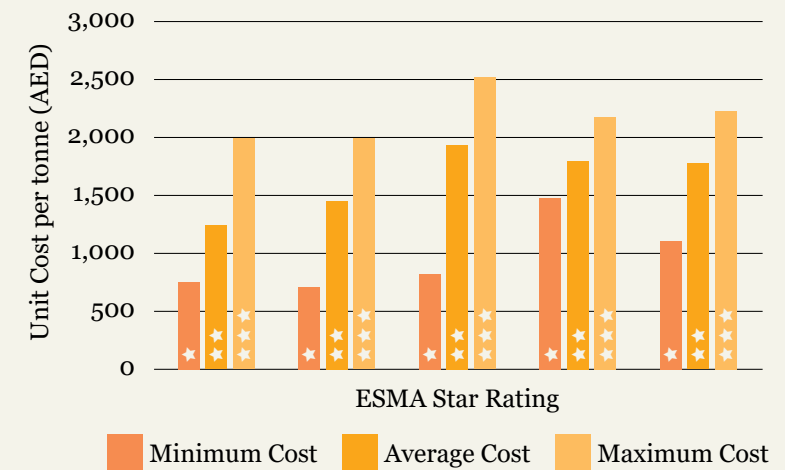
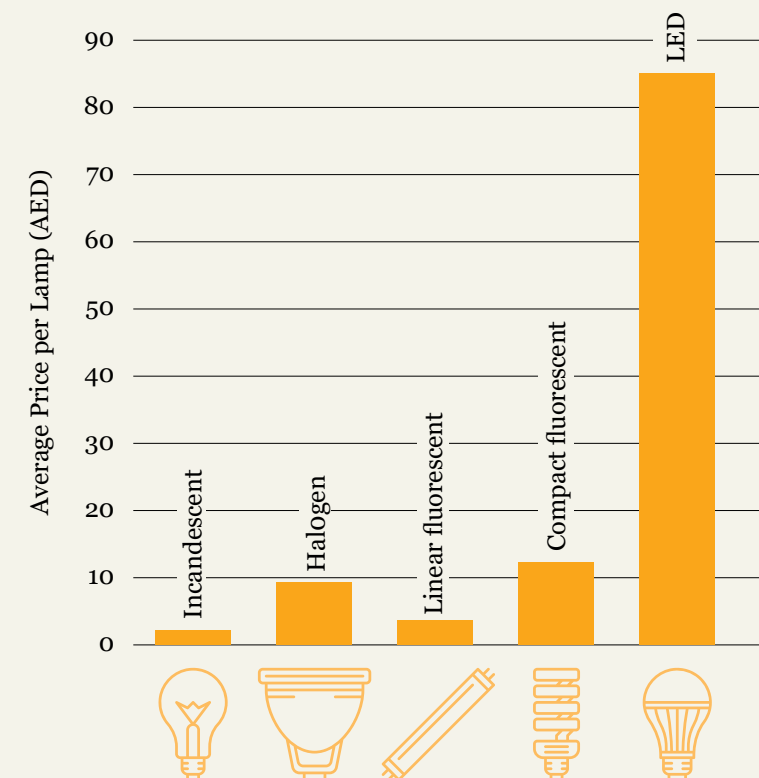


Figure 1.2 2012 Abu Dhabi lighting survey



Thus, it seems to be the case for the UAE marketplace that higher efficiency need not be more expensive, but more analysis would need to be done to conclude whether this is the case for all technologies. Whilst the A/C and lighting examples provided cover products that have recently been regulated by ESMA for efficiency levels, it would be useful for more research to be completed on unregulated products in energy and water efficiency to uncover costs of products. It would also be useful to understand from further research whether overall/average prices change when a regulation is put into place or if prices remain the same.

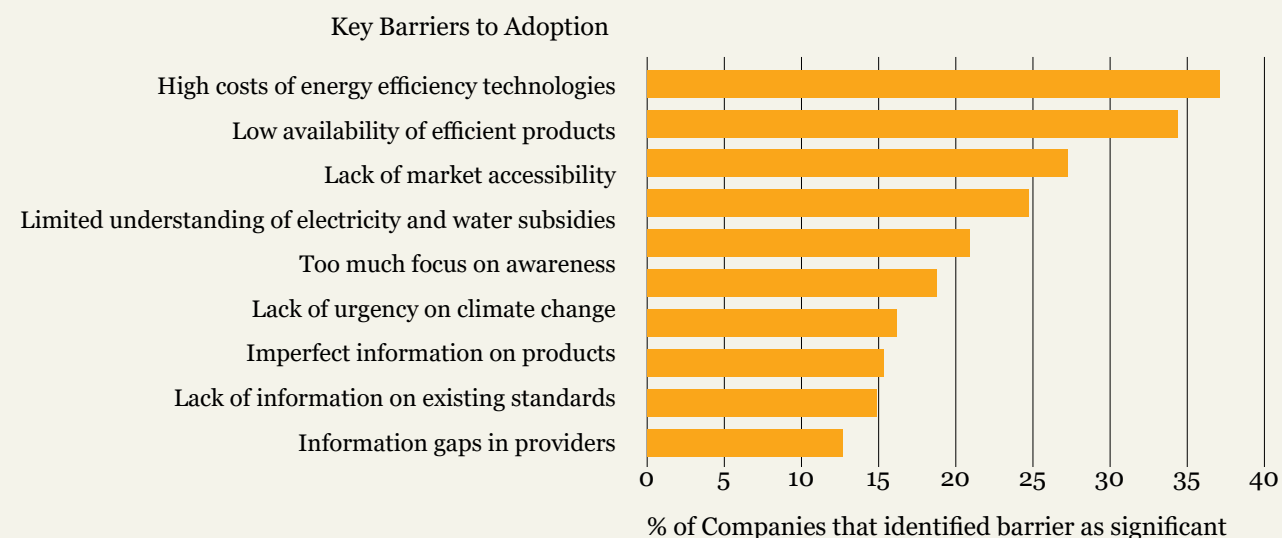
2.3 SURVEY FINDINGS

As indicated by the previous research cited above, the finding that technology costs are the primary barrier to high efficiency technology adoption in the UAE is inconsistent with the results of international studies. Among the most likely reasons for this outcome are that the international studies are not representative of the situation in the UAE and respondents could have been thinking of “technology costs” as encompassing more than just the “off the shelf” price.

2.3.1 Analysis of survey results related to barriers

The surveyors read a list of more than 40 barriers to adopting energy and water efficiency measures and asked the respondents to identify the specific barriers his or her company faced. The barriers fell into six categories, Figure 1.3 provides the frequency with which the top ten barriers were identified.

Figure 1.3 Top barriers to adoption identified by survey respondents



Although the survey results did not pursue the details as to why businesses concluded that technology costs were a significant barrier to high efficiency energy and water technology adoption, the respondents may have viewed costs much more broadly than simply the purchase price of high efficiency retrofit products. The following are interrelated factors/barriers respondents may have included in their perception of high technology costs:

- 1. Transaction costs** affect the cost of technology adoption.² For example, RTI International’s experience in trying to find 5-star-rated window A/C units in the Abu Dhabi market provides an example of how one element of transaction costs: researching and tracking down high efficiency units in the local market can be labour intensive. Information published by ESMA indicates that window A/C units with 4 or 5-star ratings should be readily available in the

² Transaction costs include the cost of planning and researching the technology, getting approval and buy-in from company management and any follow-up work such as documenting implementation or verifying the savings achieved.



LACK OF FINANCING AND CAPITAL HAVE BEEN FOUND TO BE MUCH MORE OF A BURDEN TO ADOPTION THAN TECHNOLOGY COSTS

market. However, after contacting four major suppliers of window A/C units in Abu Dhabi, the authors compiled data on 19 window A/C units available in the local market and only two had a rating of more than 2 stars: one unit had a 3-star rating and the other a 5-star rating (RTI International, 2015). In addition, attempts by the authors to obtain a list of window units that have been certified as 4 or 5-star units have been unsuccessful. To further complicate the situation, the manufacturer’s literature provides EER values for their products that typically are based on testing under T1 conditions (35°C), but ESMA requires testing at T3 conditions (46°C). Because there can be an appreciable drop in efficiency when A/C units are operated under higher temperature conditions, the EER values provided by the manufacturer often are not indicative of the ESMA star rating. Had a list of 4 and 5-star units been readily available, there still would be the need to invest significant time into weighing the costs and benefits of various A/C units. Comparing the annual operating costs of multiple A/C units would entail inputs for the purchase price, unit cost of electricity (tariff rate), A/C unit efficiency, annual operating hours or cooling load, and the expected lifetime of the product.

- 2. Lack of capital or high cost of financing** may also have factored into how respondents defined technology costs. As previous research has indicated, lack of financing and capital have been found to be much more of a burden to adoption than technology costs. Given that most of the survey respondents represented SMEs, it is likely that many of the companies had short investment horizons that did not allow for the type of long-term planning and investment that larger companies can assume. More recently, the UAE has seen momentum related to implementing measures to increase access to finance, such as the government framework led by the Etihad Energy Service Company (Etihad ESCO), which stimulates the ESCO market allowing alternative ways of funding retrofitting through shared or guaranteed savings. Other types of financial instruments have yet to be implemented.
- 3. Value of electricity and water savings** depend on the tariff rate. When responding to the question on barriers, survey respondents could likewise have implicitly been thinking beyond the off-the-shelf price and more in terms of cost-benefit analysis. In the case of Abu Dhabi, where utility costs are heavily subsidized, survey participants may have concluded that many high efficiency options do not provide enough value to offset the incremental costs or that the long payback periods provide little incentive to invest in high efficiency technologies. Although this is less relevant in Dubai and Sharjah, there will still likely be less incentive to invest in retrofitting when tariffs do not fully encompass the real cost of producing electricity and water.

Contributing to technology cost considerations is the lack of readily accessible information on the available high efficiency products and measures; the various cost factors associated with them, including transaction costs and other hidden costs (e.g., the overhead cost of management and the cost of staff training); and benefits of using those high efficiency technologies. Gathering the information needed, then evaluating and comparing the full cost of technology adoption and the potential benefits in terms of direct savings and other factors, can require a significant investment in time and effort. The lack of information can also contribute to heightened uncertainty and risk associated with investing in high efficiency technologies, which in turn could have contributed to the perception that costs are higher for more efficient products and technologies.

DEMAND IS IN LARGE PART DRIVEN BY THE PRESENCE, OR LACK, OF EQUIPMENT AND BUILDING STANDARDS MANDATING ENERGY AND WATER CONSERVATION

2.3.2 Summary of barriers from the survey

It is likely that technology costs are more of a barrier in the UAE than in other developed countries. Most of the international studies have been conducted in European countries and the United States, which have larger, more established markets and a longer history of standards to promote or mandate energy and water efficiency for decades. By European standards, the UAE is a small market and one would expect the correspondingly smaller market to provide fewer options in terms of technologies.

Smaller markets can lead to higher technology costs in two ways:

- First, with fewer options for high efficiency technologies, there may be less competition to drive prices lower;
- Second, smaller markets preclude having the economies of scale that also can bring prices down.

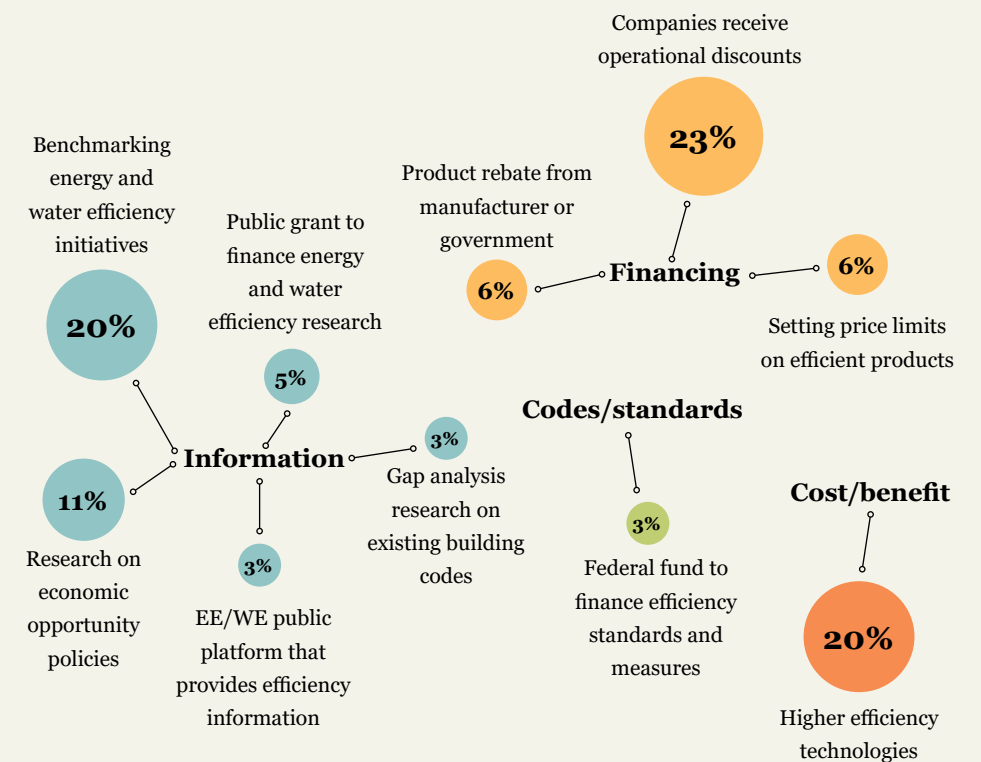
The fact that efficient products are in the early adoption phase in the UAE can likewise contribute to higher costs. This can be seen by the relative number of companies that have adopted efficiency measures in the survey: 4.4 per cent. The demand for efficient technologies is in large part driven by the presence, or lack, of equipment and building standards mandating energy and water conservation. Although there are codes and standards that incorporate efficiency criteria, the mandates are a fairly recent development and many target new construction rather than existing buildings. For example, it is only in the past five years that Abu Dhabi emirate adopted the international energy conservation code, plumbing code and Estidama (Arabic for sustainability) programme, all of which require high efficiency technologies in new buildings. Thus, there has not been a long history of adoption that would promote a larger, more competitive market for such technologies, which would drive down prices. It is evident the market will require more time to mature and that increased tariffs will allow for more movement on retrofitting, allowing for demand to increase and thus moving toward a more mature market.

3. OPPORTUNITIES AND SOLUTIONS

3.1 SOLUTIONS IDENTIFIED FROM THE SURVEY AND ROUNDTABLE MEETING

In addition to identifying barriers to energy and water efficiency, the survey participants were asked to identify possible solutions to overcoming those barriers and Figure 1.4 summarizes the results for the technology cost barrier. The top three solutions, which accounted for more than 60 per cent of the total, were discounts for companies that implemented high efficiency technologies (23 per cent), improvements in technology efficiencies (20 per cent) and benchmarking high efficiency measures (20 per cent).

Figure 1.4 Solutions to resolving the technology cost barrier



The identified solutions fall into four categories: those related to the lack of information on technologies, solutions that involve financing and one those associated with cost-benefit, and codes and standards.

3.1.1 Solutions related to financing

Respondents identified three solutions related to financing: *operational discounts*, *price limits* and *product rebates*.

Operational discounts from having invested in energy/water efficiency were considered the top solution at 23 per cent. This solution does not routinely appear in the literature and it is unclear how receptive authorities would be to it, but it could serve as an alternative financial incentive.

Setting price limits on efficient products was identified as a potential solution by six per cent of the survey respondents. This approach would likely involve subsidies or rebates going to suppliers and is not an approach that has been used widely in other countries.

Product rebates to consumers (six per cent) in contrast, are a proven solution to increasing adoption of efficient technologies and have been a hallmark of demand-side management programmes in the United States and elsewhere by offsetting the initial purchase price of high efficiency fixtures and appliances. Although they may not be applicable to the UAE, tax credits, which are basically a form of rebate, also have been instrumental in the United States in increasing the penetration rates of high efficiency technologies. Rebate programmes are usually run by the local utility companies, which in the UAE are government owned and operated at the emirate level, making it possible for the utility to provide certain discounts or rebates after a customer demonstrates investment in efficiency. For example, a company could receive a lower slab rate after proving that they have invested in retrofitting and meeting certain efficiency criteria. The UAE could also consider a federally implemented programme that would ensure consistency and benefit from economies of scale. Given the level of government subsidies in the UAE, this seems like a practical solution that could prove to be very successful because the government savings from subsidy reduction would likely more than offset the cost of the incentives.

With all of these solutions, free ridership is a potential issue³. Free ridership can make measuring the effectiveness of a programme difficult. However, the current low adoption rates found from the survey indicate free ridership may not be much of a concern.

³ Free ridership is where an individual or company receives an incentive (low-cost financing or rebate) for implementing an efficiency measure they would have done anyway in the absence of the incentive.

3.1.2 Informational solutions

50%
OF THE SOLUTIONS
IDENTIFIED RELATE
TO THE LACK
OF ADEQUATE
INFORMATION ON
HIGH EFFICIENCY
TECHNOLOGIES

A theme that seems to pervade the survey results on technology costs is the critical role of information in the decision-making process. Half of the solutions identified relate to the lack of adequate information on high efficiency technologies. Without information on factors such as the installation costs, availability, compatibility, reliability, life expectancy and maintenance costs, it is difficult to make an informed decision on whether a high efficiency technology is cost-effective.

Benchmarking high efficiency initiatives (20 per cent), described to respondents as *benchmarking energy/water efficiency initiatives in the UAE with international best case practices to understand gaps and policy recommendations*, is practiced among many multinational corporations. Having a better idea of where a business stands in terms of its peers and competitors, and how much savings are achievable, could help incentivize companies to adopt more high efficiency technologies. This solution would most likely be driven internally by the companies involved.

Three of the solutions focus on increasing research (economic opportunity policies, water and energy efficiency, and building code gap analysis) to help close the information gap. Although some companies may be willing to pool their resources to fund such an effort, funding is more likely to come from the government. An example in the United States is the Energy Information Agency, which engages in research to increase the knowledge base on energy usage and conservation.

3.1.3 Higher efficiency technologies

Increasing the efficiency of technologies was second only to operational discounts as a possible solution to lowering technology costs. Higher efficiencies, without corresponding cost increases, would improve the cost-effectiveness of a technology and increase the appeal to companies that are looking to improve their footprint. However, increasing efficiency may not be practical for many, if not most technologies. The key to improving efficiencies is research.

3.1.4 Federal fund to finance efficiency standards and measures

Codes and standards are the driving force behind adoption of efficient technologies in many countries and the UAE has enacted several such legal requirements in the past decade. However, codes and standards are only effective if they are enforced and this is an area where there is considerable room for improvement. Although additional standards are needed, particularly for improving the efficiency of existing buildings through the technologies found inside, increased government funding of enforcement activities would ensure that the codes and standards achieve the intended expansion of efficient technologies and the corresponding reductions in consumption. Otherwise, without adequate enforcement and measurement, the initial savings are much less likely to be achieved, resulting in a significant lost opportunity.

3.1.5 Other potential solutions

Additional solutions, outside of those proposed through the survey, that would either directly or indirectly support the reduction or removal of the high technology cost barrier include:

1. **Tariff reform** does not directly affect technology costs. However, when coupled with better, more readily available information on the life-cycle costs of high efficiency technologies, higher tariffs improve the overall economics of adoption by increasing the value of the savings achieved. In parallel with improving the information on life-cycle cost, increasing the awareness of benefits would help advance adoption by facilitating a better understanding of the potential savings. Tariff reform would also mean faster payback for technologies, meaning that savings from reduced consumption of energy and water would pay the upfront cost of the technology back faster, thus decreasing the perception of high technology costs. Increasing this rate of return could also then stimulate more demand for high efficiency technologies, thus shifting the landscape of the market.
2. **The availability of high efficiency products** in the marketplace plays an important role in adoption by raising awareness, reducing the time and effort associated with searching for high efficiency options, and by increasing competition, all of which can act to reduce the costs of the technology. Thus, another indirect solution to technology costs is to increase product availability. Lack of product availability is another barrier that survey respondents prioritized and is being explored through a separate yet complementary issue paper (see *Barriers to electricity and water efficiency in the UAE: product availability and market accessibility*, p. 44). This barrier will be looked at in-depth and potential solutions identified.
3. **More stringent and stricter enforcement of building codes and standards** would also help the adoption of high efficiency technologies by minimizing the incremental cost to the commercial sector. Installing efficient technologies at the time of construction is always less costly and would help build demand, which could further drive down costs because of economies of scale. Without building standards, construction companies tend to install lowest priced equipment in new building developments because it is difficult to pass on the cost of highly efficient equipment in the price of the building (e.g., informational issues). Standards help level the playing field for efficiency making it easier for builders to recoup the incremental costs of efficiency investments at the time of construction.

MORE STRINGENT AND STRICTER ENFORCEMENT OF CODES AND STANDARDS WOULD HELP THE ADOPTION OF HIGH EFFICIENCY TECHNOLOGY



MORE OPTIONS FOR FINANCING WOULD ALLEVIATE SOME OF THE UNCERTAINTY AND RISK ASSOCIATED WITH INVESTING IN HIGH EFFICIENCY TECHNOLOGIES

4. The commercial sector would benefit from **increased availability of loans to help finance adoption of high efficiency technologies**. Although this may not have an immediate effect on technology costs, it would help promote adoption, increase demand for high efficiency technologies and therefore help mature the market rendering these technologies more affordable over time. Because SME's tend to have shorter investment horizons, and thus larger financial constraints, it might be more effective to specifically target smaller companies for increased financing opportunities. Providing more options for financing would also help alleviate some of the uncertainty and risk associated with investing in high efficiency technologies. The private sector, more specifically banks, could also play a role in advancing financing for energy and water efficiency by offering products aimed at financially incentivizing customers to increase their level of energy and water efficiency. Providing green *sukuks* (Islamic bonds) is another potential financing option that should be considered.
5. **Other actions by the government** that could ease the barrier associated with technology costs include a programme whereby the Ministry of Energy provided retrofits on high efficiency products in federal buildings, which could help drive the demand for such products, thereby reducing costs. The Ministry of Energy also reportedly is developing a law that will establish minimum efficiencies for water and energy use. One of the objectives of the law is to ensure a more rational use of energy and water and change patterns of consumption by individual households and commercial premises. Internationally, many governments use their purchasing power to transform and grow markets for high efficiency technologies. In the UAE, a mandate for government entities to use high efficiency products could generate a sizable market demand for such products because government agencies control a significant portion of the economy and hence a large share of office buildings. The government might also promote insurance, or mandatory product guarantees for high efficiency technologies and products to help reassure the investor and mitigate risks. A revenue-neutral option for reducing the costs of high efficiency products would be a "feebate" system, whereby inefficient equipment is taxed and the resulting revenues are used to subsidize more efficient technologies. In addition, efficiency standards also can be tightened over time as lower efficiency equipment disappears from the market. Finally, in the case of value added tax, which is being considered across the GCC, there could be exemptions for high efficiency products.

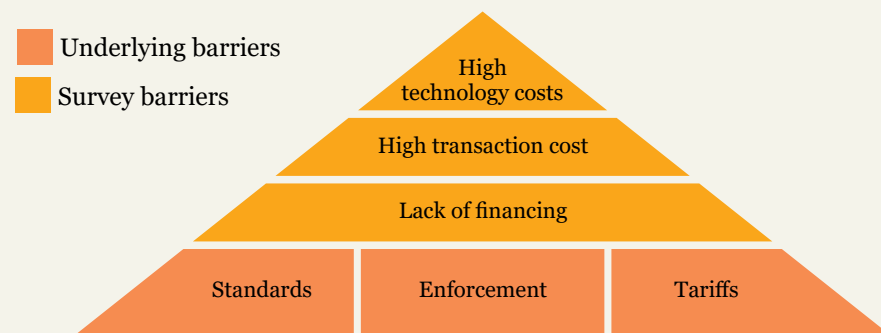
THE MOST IMMEDIATE SOLUTIONS WOULD BE TO ADDRESS THE FINANCING AND INFORMATIONAL ASPECTS OF THE TECHNOLOGY COST BARRIER AND PROVIDE DIRECT INCENTIVES SUCH AS REBATES

3.2 CONCLUSION

The EWS-WWF survey identified technology costs as the top barrier to adopting high efficiency energy and water technologies in the UAE. A contributing factor to the perception that efficient technologies may not be affordable is the lack of accurate information on the full range and life cycle costs and benefits of efficient products. Similarly, the solutions for eliminating the technology cost barrier, as identified by survey participants, highlight the need for readily-available financing and reliable information to support the cost-benefit analysis of low-efficient and high-efficient technologies. Thus, as suggested by the survey, most immediate solutions would be to address the financing (for example, through green loans) and informational aspects of the technology cost barrier, as well as potentially provide direct incentives such as rebates.

In addition, it is essential that attention be given to the broader suite of barriers underlying many of the technology cost issues, such as subsidized tariffs, relatively few standards for energy/water efficient equipment and limited enforcement of existing MEPSs and building codes and standards (see Figure 1.5).

Figure 1.5 Underlying barriers to high technology costs



The system in which the UAE operates is multi-layered and the perception of high costs can be based on many different issues and potentially underlying factors which need to be addressed through:

1. The development of strong standards and labels that drive demand and stimulate the supply market. More efficient equipment would improve economies of scale and lower costs.
2. Enforcement of existing standards so poor quality and inefficient products are removed from the market and do not distort customer perception of prices for efficient technologies.
3. Low tariffs and their associated high subsidies distort the cost benefit evaluation of efficient technologies, which if changed would lead to a change in perception of technology costs.
4. Finally, research is needed to better understand to what extent, and why, technology costs are perceived as such a significant barrier to efficient technology adoption. The government can play a greater role in understanding energy and water technology adoption. This will also require involvement from the private sector in order to advancing initiatives and ensure their implementation.

BARRIERS TO ELECTRICITY AND WATER EFFICIENCY IN THE UAE: PRODUCT AVAILABILITY AND MARKET ACCESSIBILITY

Issue paper 2

1. INTRODUCTION

34%
OF SURVEY
RESPONDENTS
CITED THE LOW
AVAILABILITY OF
EFFICIENT PRODUCTS
AS A KEY BARRIER

27%
SAW A LACK
OF MARKET
ACCESSIBILITY AS A
SIGNIFICANT BARRIER

This paper focuses on the availability of energy and water efficient products in the UAE marketplace and the information available to consumers to help them make informed purchasing decisions. Due to the overlapping nature of two of the prioritized barriers identified in the EWS-WWF survey of energy and water efficiency in the UAE private sector – namely, low availability of efficient products and lack of market accessibility – they are addressed jointly here.

This paper is intended to stimulate dialogue with representatives from the private and public sectors who are experts on the topic. Preliminary analysis indicates that the UAE needs to address multiple, interrelated issues to mitigate the underlying barriers that are hindering product availability and market accessibility.

Specific areas of investigation include:

- What are the underlying causes that limit access to highly efficient products in the commercial sector?
- How do the size and maturity of the market differ across emirates?
- What information is available in terms of labelling, search sites and consumer ranking services?
- How do informational problems affect adoption and transaction (information gathering, search, selection)?

Findings include the following:

- Having strong standards and labels that are visible and trusted in the market is essential.
- Periodic review of standards and labels is important to make sure they are up to date and communicated effectively.
- The market should be continually monitored for compliance and regulations appropriately enforced. This would facilitate trust in the products and services being purchased in the UAE.
- The communication and dissemination of information is crucial for consumers to find the best products and make more informed decisions.
- Coordination between federal and local entities in conservation activities is important to avoid duplication of efforts and to align resources.
- The UAE is a small market, so more efforts to align at the GCC level and with international best practices would be a more effective way of ensuring better success in this area.
- Tariff reform is a crucial enabling factor to incentivize retrofitting, but other complementary measures should also be considered, such as financing schemes to enable consumers to purchase the most efficient equipment.

2. CURRENT LANDSCAPE AND IMPACT OF BARRIERS

The level of product availability and market accessibility for efficient electricity and water products is driven by a wide range of underlying and interrelated factors. The history of subsidized electricity and water in the UAE has led to an environment where conservation has not been perceived as a pressing issue and economic incentives for investment in efficiency have been suppressed. The existence of subsidies, in combination with a codes and standards infrastructure that is still in the early stages of development, has led to the present state of limited product availability and market accessibility for efficient products. As discussed in this paper (and its companion papers: *Technology costs as a barrier to energy and water efficiency in the commercial sector of the UAE*, p. 28; and *Electricity and water subsidies and the impact on consumption in the UAE*, p.68), a combination of barriers will need to be addressed to improve the situation.

This section reviews the current market conditions related to codes and standards, labelling and market trends, and discusses current federal and emirate-level initiatives. This overview is followed by a summary of the findings from EWS-WWF's survey, which investigated the barriers to adoption of efficiency electricity and water measures as faced by the private sector.



THE DEVELOPMENT
OF STANDARDS
AND LABELS FOR
ENERGY AND WATER
EFFICIENCY HAS
LAGGED, WHICH HAS
RESULTED IN THE
UAE BEING FLOODED
WITH INEFFICIENT
PRODUCTS

2.1 CURRENT MARKET CONDITIONS

UAE markets for electricity and water consuming products have developed rapidly over the past few decades as the country experienced a population and economic boom. Partly because of this rapid growth, the development of standards and labels for energy and water efficiency has lagged, which has resulted in the UAE being flooded with inefficient products, mainly originating from Asia (Papadopoulou et al, 2013). For example, as shown in Figure 2.1, China is the largest exporter to the UAE of electrical and electronic goods, with shipments almost tripling from 2005 to 2011. Similarly, imports from Malaysia have increased almost 500 per cent over this time period for these commodities.

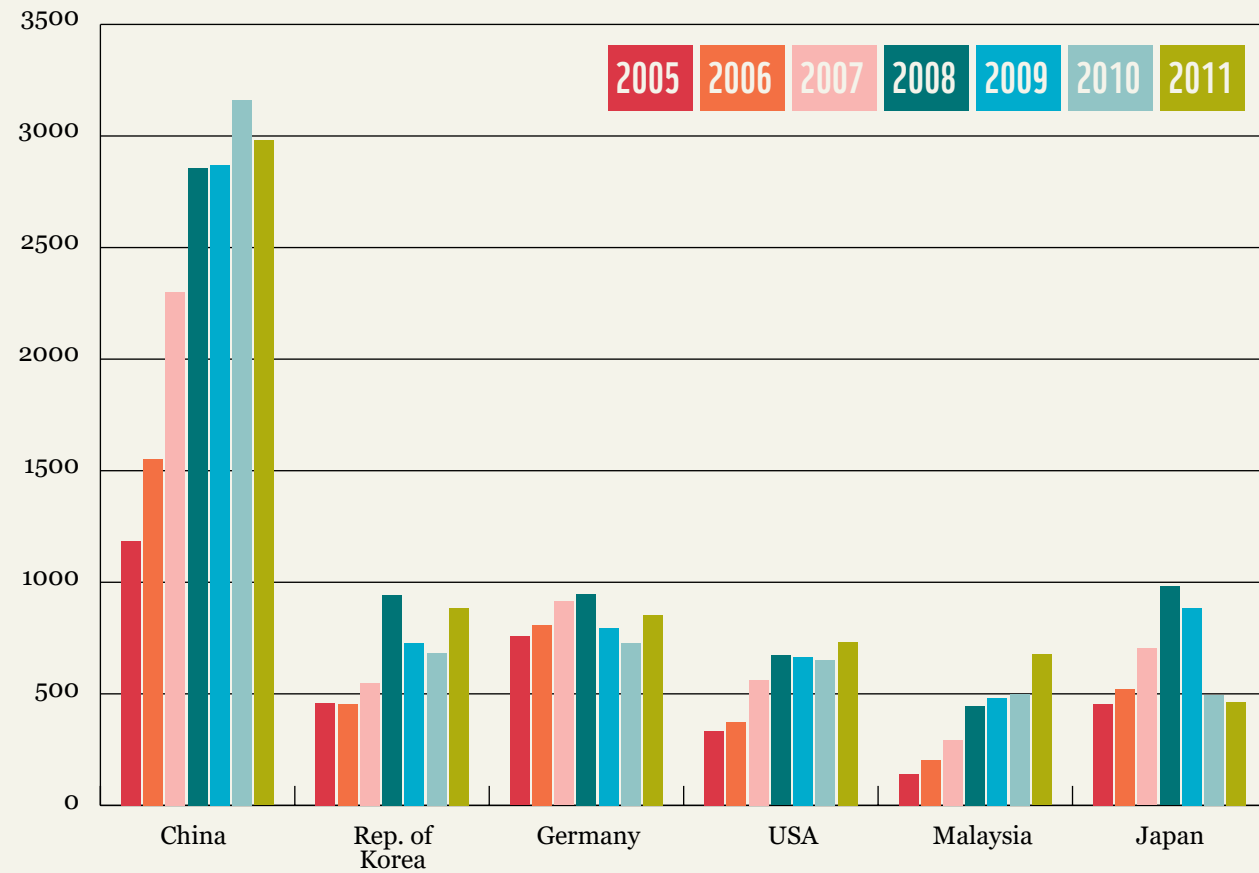
In response to the influx of inefficient products, the government, private sector and non-governmental organizations (NGOs) have rolled out several initiatives targeted at increasing the efficiency and improving the quality of the products available to consumers. These initiatives have included a combination of strategies, such as the following, designed to grow the markets for highly efficient electricity and water products:

- Product codes and standards
- Product labelling
- Market growth strategies

However, as discussed below, these initiatives to date have been only moderately successful and have led to limited information on, and a lack of availability of, highly efficient products. As discussed in Section 3, additional solutions are needed to mitigate these barriers to adoption.

Figure 2.1 Top countries supplying electrical and electronic goods to the UAE (2005–2011)

UAE imports of electrical and electronic goods (value in USD million)



Source: United Nations Comtrade Database (United Nations, 2015).

ADDITIONAL
MINIMUM ENERGY
PERFORMANCE
STANDARDS ARE
NEEDED FOR A WIDER
RANGE OF PRODUCTS

2.1.1 Product codes and standards

Product codes and standards are typically set to ensure that obsolete and inefficient technologies do not continue to dominate the market (Klinckenberg Consultants, 2009). A variety of standards and regulations have been enacted, or are being considered, that could directly or indirectly affect the use and availability of energy and water efficiency products in the UAE. However, additional minimum MEPSs are needed for a wider range of products and monitoring/tracking systems should be developed to ensure enforcement.

At the federal level, ESMA has enacted MEPSs for a number of appliances, which are primarily based on efficiency ratings, but also include other factors such as environmental concerns. Air conditioners were targeted first because cooling constitutes more than 60 per cent of electricity consumption. The new standards eliminated the lowest performing 20 per cent of units in the UAE market (Nachmany et al, 2015). Systems are rated according to a star system (rating of five stars indicates the most efficient) and systems that do not meet the minimum requirement are not allowed into the country (Meltze, Hultman & Langley, 2014). The minimum performance standard and rating system were then expanded to refrigerators and freezers in 2012 and to washing machines in 2013. Implementation of the star rating system is mandatory throughout the UAE.


Another example is ESMA’s recent regulations for residential lighting products in the UAE. The regulation puts forth requirements for lighting products in terms of electrical safety, energy efficiency, functionality, hazardous substance limits and safe disposal. It banned all incandescent lamps and other products that do not meet the standards specified in the regulation; prohibits their entry into the country for retail after July 1, 2014; and bans all retail sales after January 1, 2015. Although this regulation was targeted at residential household use, it is likely to have spillover benefits in the commercial sector where incandescent and halogen lamps are in use. However, it is not clear that the certification and labelling requirements are being implemented fully and there is no publicly available data to indicate the level of success or enforcement.



THERE IS NO PUBLICLY
AVAILABLE DATA TO
INDICATE THE LEVEL
OF SUCCESS OR
ENFORCEMENT

Currently, Ministry of Energy and concerned entities across the seven emirates are reviewing a draft law aimed at institutionalizing water and electricity demand side management practices in all building typologies across UAE. The draft law is expected to be adopted with its executive bylaws to follow soon after the formation of a proposed Emirates Energy Efficiency Council. The anticipated law applies to all territories including free zones, economic zones, industrial and residential sectors. It exempts military installations, Ministry of Interior buildings as well as embassies and international organizations.

One of the main mandates of the proposed Council is to set normal consumption rates for all typologies and revises those once every three years. The anticipated law also suggests that all commercial and residential buildings must disclose their water and electricity consumption rates to tenants prior to contract signature or before ownership transfer.



THE MINISTRY OF ENERGY HAS MADE THE CONSERVATION OF ENERGY AND WATER ONE OF ITS STRATEGIC PRIORITIES

Recently, the Ministry of Energy and Etihad Energy Services Company (Etihad ESCO) have signed a Memorandum of Understanding (MoU) to exchange expertise on developing a federal energy services market in the UAE. The MoU also covers energy conservation in buildings, especially government headquarters, explores the potential for launching projects in energy conservation and aims at developing strategies dedicated to enhancing the opportunities of the ideal use of energy in the UAE, as the Ministry made the conservation of energy and water one of its strategic goals.

Individual emirates have also introduced (or are in the process of introducing) efficiency and environmental product standards. Abu Dhabi's Quality and Conformity Council (QCC) will roll out a certification programme for air conditioning units in 2016 aimed at upholding Estidama¹ requirements, which are more stringent than ESMA's in the areas of efficiency and phasing out nonchlorofluorocarbon refrigerants (i.e., no R22 refrigerants allowed) (Amaya, 2015).

With regard to building codes, each emirate has a different set of codes used to guide development. Dubai Municipality has created the local Green Building Codes for all new buildings starting in 2014, but to date no such codes are in place for existing buildings. Estidama is a government initiative in Abu Dhabi that was first launched in 2010 and mandates that all new development applications for communities must satisfy a combination of codes and standards for new buildings and villas (Zaman, 2015). Initially, the initiative was faced with significant opposition from the market and unsatisfied customers, mainly villa owners, whose construction costs were inflated because of the lack of products, increased charges from the consulting offices and the long time it took to issue building permits. Since then, the rating requirements have been relaxed and focus mainly on energy and water conservation and are now being implemented widely across new buildings in Abu Dhabi's government and private sectors.

¹ Abu Dhabi has also launched an initiative for building efficiency through Estidama, its sustainable buildings programme. The Estidama Pearl Rating System is a five-point ("pearl") system modeled on an LEED system. According to an executive order, all new buildings in Abu Dhabi must meet the minimum "1-pearl" rating from September 2010; all government buildings must meet the "2-pearl" rating.

2.1.2 Product labelling in the UAE

An integral component of implementing performance codes and standards is a comprehensive labelling system. Information problems are mentioned consistently in the energy efficiency literature and, along with behavioural failures, are often given as the primary explanation for the energy efficiency gap (Sanstad, Hanemann & Auffhammer, 2006). Consumers' lack of information about the availability of and savings from energy and water efficient products is often given as a reason why they systematically underinvest in efficiency. The idea is that consumers often lack sufficient information about the difference in future operating costs between more efficient and less efficient goods necessary to make proper investment decisions (Howarth & Sanstad, 1995).

The UAE has several labelling entities. However, there is no unified standard for energy labelling requirements and several competing marks are used. There are multiple reasons related to market size and mechanics for the lack of a unified standard. For example, in the eyes of large international manufacturers the UAE market is too small to invest in customized labelling of their products intended for regional sale. This problem is exacerbated by the different quality certifications required across the Emirates.

The following are some of the leading marks found on products in the UAE:

- ESMA has its Emirates Quality Mark: Awarding the Emirates Quality Mark means the product has been tested and deemed identical to the standards and the producer of this product has an effective system of quality management (Emirates Authority for Standardization and Metrology, n.d.).
- Abu Dhabi's QCC has its own Trustmark: QCC introduced its Trustmark in Abu Dhabi to communicate that a product or system conforms to various health, safety and environmental standards. Currently, there are two versions of the Trustmark—one for accuracy and the other for environmental performance.
- These two marks compete with the GCC Conformity Marking, established by the GCC Standardization Organization: this marking is not a quality mark but rather a marking that signifies the conformity of products at least to the essential requirements of health, safety and environment. Affixing of the GCC Conformity Marking will be compulsory for product categories that will be the subject of GCC technical regulations (GCC Standardization Organization, n.d.).
- In addition, many products carry international labels from the European Union (EU) or United States. For example, the U.S. Environmental Protection Agency (USEPA) EnergyStar label can be found on compact fluorescent lamps (CFLs) packaged in the UAE. However, sometimes these labels are counterfeited and illegally placed on inefficient, low-quality products.²

The existence of multiple labelling systems can lead to confusion and actually make it more difficult for consumers to assimilate product information. Consistency and simplicity are needed for labelling systems to be informative. Furthermore, consumers may find it difficult to understand/process the competing information.

² During one visit to the Dragon Mart free trade zone, lamps were found with the EnergyStar label, but the wording was spelled "Nergy Star."



SEVERAL INITIATIVES HAVE BEEN IMPLEMENTED IN THE UAE [...]. HOWEVER, NONE OF THEM HAVE HAD STRONG MONITORING SCHEMES

2.1.3 Market growth strategies for energy- and water-efficient products

Internationally, rebates, tax credits and free installations have all been used to promote early adoption of high efficiency technologies and stimulate market transformation. Several initiatives have been implemented in the UAE to attempt to “jump start” and establish mature markets for high efficiency electricity and water products, and some examples are provided below. However, as noted in the barriers Section 2.2, these efforts have been marginally successful.

Most, if not all, countries in the region are implementing public awareness campaigns using varying approaches to promote CFLs. Campaign materials are usually distributed to maximize the outreach to consumers in both urban and rural areas. Linked with this are sometimes the distribution of free products to promote familiarity. For example, as part of a Clean Development Mechanism programme, the Dubai Carbon Centre is planning to distribute up to 800,000 compact fluorescent lamps (CFLs) free of charge to residents of high-density Dubai suburbs during a campaign to promote awareness and acceptance of CFLs.

Notable in the UAE was the Watersavers Campaign, to address water efficiency in the residential and commercial sectors. This campaign was launched in 2010 to fit Watersavers (e.g., aerators that reduce faucet and showerhead flow rates) in every tap in every single home and place of work in Abu Dhabi emirate. The programme was designed to be delivered in phases; in phase one of the campaign, which ended in December 2010, the Environment Agency–Abu Dhabi (EAD) targeted 55,000 residences (averaging five to six devices each) in Abu Dhabi’s Al Zahiyah/Tourist Club area. The latest publicly available information reported that EAD teams had installed 76,494 water-saving aerators in 4,563 apartments, commercial buildings, hotels and offices and in a hospital and a mosque in Abu Dhabi’s Tourist Club Area Club Area (H2O Middle East, 2010).

The **Heroes of the UAE campaign**, jointly developed by EWS-WWF and EAD, up until 2014, had been working with UAE households, schools and companies to promote electricity and water conservation. Internationally, it is recognized that an important goal to see efficiency measures implemented is to inform companies that straightforward, practical and cost-effective solutions are readily available to ensure success and provide information and tools to lower adoption costs (Gelil, 2011).

The Dubai Electricity and Water Authority (DEWA) consistently distributes free energy and water efficiency appliances during society engagement drives and interactions with their customers (DEWA, 2013). In Abu Dhabi, the Regulation and Supervision Bureau (RSB)’s Powerwise and Waterwise initiatives have looked to promote adoption of efficient products by educating people and distributing free products. And as part of Earth Hour 2014, where the focus was on switching to energy efficient lights, Philips and RSB AD donated CFLs that were included in packets distributed to companies and individuals.³ However, none of these initiatives have had strong monitoring schemes, post giveaways, to see if individuals or companies actually installed them and continued to use them upon replacement.

³ Information was not available at the time of writing this draft of the paper on activities in Sharjah.

INITIATIVES AIMED AT HIGHER STANDARDS AND SOLUTIONS CAN LEAD TO THE FRAGMENTATION OF AN ALREADY RELATIVELY SMALL MARKET, CREATING LOOPHOLES WHERE SUB-PAR PRODUCTS FLOURISH

Finally, a voluntary initiative entitled Make the Switch was launched in the UAE in 2008 to increase awareness and promote the benefits of energy efficiency. The main goal of the initiative is to encourage the use of CFLs in the residential and commercial sectors. The programme was launched by a UAE-based clean technology company (Ecobility) with the assistance of corporate partners and supporters. The campaign aimed to introduce 1 million CFLs to households and commercial buildings. It made the lamps available at an exceptionally low price because of contributions made by Nakheel, a major UAE real estate company. The campaign managed to sell more than 900,000 CFLs, leading to an electricity savings of nearly 0.5 TWh and a carbon reduction of about 0.3 Mt. This initiative demonstrates the role that corporations can play in raising public awareness and facilitating market transformation (Flip Media, 2009).

In more recent years, initiatives of this nature have significantly slowed down in the UAE and the reason is unclear. It could be that the global recession and drop in oil prices have limited or shifted resources. However, it should be noted that in the presence of government-subsidized electricity and water, conservation programmes can be budget-cutting initiatives.

2.1.4 Federal versus emirate-level initiatives

A common theme emerging from the market assessment is the interplay between federal and emirate-level initiatives. There is a perception in the UAE that local governance and initiatives have much more impact in the respective emirate than federal initiatives. This perception may stem from how the constitution is laid out. The constitution, which was made permanent in 1996, specifies that all powers not specifically allocated to federal institutions remain the prerogative of the individual emirates. Each of the seven emirates has its own government, which functions in tandem with the federal government.

As a result, implementation problems can occur because different emirates have different levels of development (i.e., Abu Dhabi and Dubai may be more ready and able to promote energy and water efficiency, whereas smaller emirates are not as able because they lack infrastructure and the necessary resources). Subsequently, federal standards, laws, or programmes are designed to engage and address the minimum requirements applicable to all communities. This approach, where, for example, QCC standards may be more stringent than federal standards from ESMA, may not be in the best interest for larger, wealthier and more advanced emirates. And the development of separate measures, regulations and initiatives aimed at higher standards and solutions can lead to the fragmentation of an already relatively small market, creating loopholes where sub-par products flourish.

LOCAL GOVERNMENTS HAVE NOT ALLOCATED SUFFICIENT MANPOWER OR TECHNOLOGICAL RESOURCES [...]. THIS IS ALSO TRUE AT THE FEDERAL LEVEL

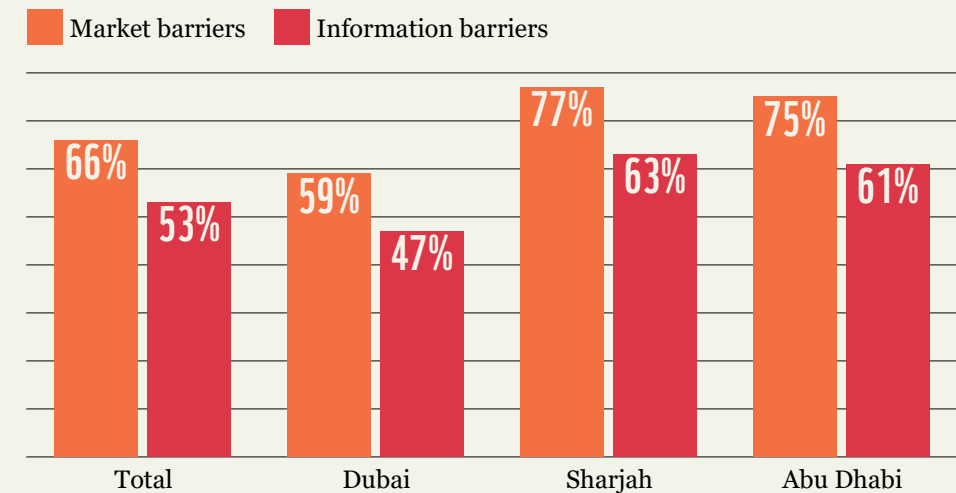
Even between Abu Dhabi and Dubai, we find similar but non-complementary programmes such as Estidama in Abu Dhabi and Dubai’s Green Building Regulations & Specifications.⁴ The former encompasses mandated government requirements modelled after Leadership in Environmental Design (LEED) and the latter is a programme also modelled after LEED with different criteria than those used in Abu Dhabi. However, a common obstacle in the different emirates is the lack of proper enforcement of newly endorsed standards or federal requirements. Irregular or absent enforcement sheds a negative light on the performance of products in the UAE; as it creates uncertainty and risk that prevents implementation. This could be a result of the lack of information available and lack of credibility in the system due to no enforcement. Local governments that are tasked with verifying the implementation and uptake of the improved products or standards, in most instances, have not allocated sufficient manpower or technological resources to enforce and inspect the products. This is also true at the federal level where ministries face severe capacity and resource constraints to monitor the market.

2.1.5 Background summary

In summary, the UAE is in the early stages of developing markets for high efficiency products and associated standards/labelling compared with other developed countries. For example, many products do not have minimal efficiency standards (such as commercial lighting) and, where standards or rating systems do exist, the efficiency ratings are frequently lower than those set in the United States or EU.⁵ Additional and more stringent MEPSs and their enforcement would have a significant impact on increasing the availability of highly efficient products and help mitigate the impact of information problems.

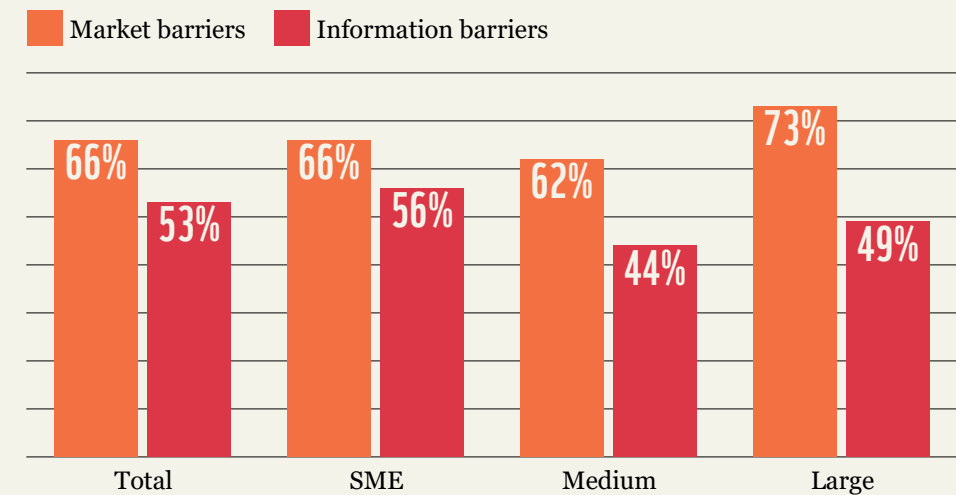
The survey explored a range of barriers to adopting energy and water efficiency measures in the commercial sector. As shown in Figure 2.2, market barriers and information barriers were consistently identified as issues limiting the adoption of efficiency across the Emirates. In fact, these two barriers were always ranked in the top three in terms of frequency of mention (financial barriers were also ranked in the top three). Respondents in Dubai viewed market and information barriers slightly less significant, possibly because of Dubai’s move to higher tariff rates. Regardless, approximately half of respondents from Dubai considered these important issues.

Figure 2.2 Percentage of respondents identifying barriers by emirate



In terms of company size (see Figure 2.3), large companies viewed market barriers as more significant than informational barriers, indicating perhaps that larger companies are more likely to have the in-house expertise and/or resources to overcome information problems. For SMEs, market barriers and information problems were closer in frequency. But again, regardless of company size, close to half (or more) of respondents considered these important issues to be solved.

Figure 2.3 Percentage of respondents identifying barriers by company size



⁴ These programmes also then compete with the Ministry of Public Works’ federal Green Buildings Programme’s codes.

⁵ For example, the ESMA Star Rating (highest rating) for window air conditioners specified an EER > 7.11. The minimum criterion for the U.S. EnergyStar programme is EER > 9.8. Thus, a unit can have a 5-Star ESMA rating, but not meet EnergyStar requirements. Note that, starting in October 2016, ESMA is increasing the star ratings. Under the new rating system, a 5-Star unit will need to have an EER > 8.51 for window units and > 9.01 for mini-splits. However, these still do not meet EnergyStar requirements.

2.2 MARKET BARRIERS

Six types of market barriers were identified in the EWS-WWF's survey: availability of products, market accessibility, transaction cost of products, split incentives, payment fragmentation and price distortion. Note that the percentages in Figure 2.4 and Figure 2.5 reflect a response identifying one or more of these six market barrier categories.

As shown in Figure 2.4, availability of products was consistently the most frequently cited market barrier and the second most cited barrier across all categories. Thirty-four per cent of all respondents indicated that product availability was the barrier faced most often in their energy and water conservation efforts. This response was most frequently mentioned across all three size categories and was also the top mentioned market barrier in all three emirates (see Figure 2.5), although the frequency did vary slightly across emirates, with a larger portion of Sharjah respondents mentioning it as an important barrier.

Figure 2.4 Market barriers faced by organizations in implementing energy and water efficiency by company size (% of respondents)

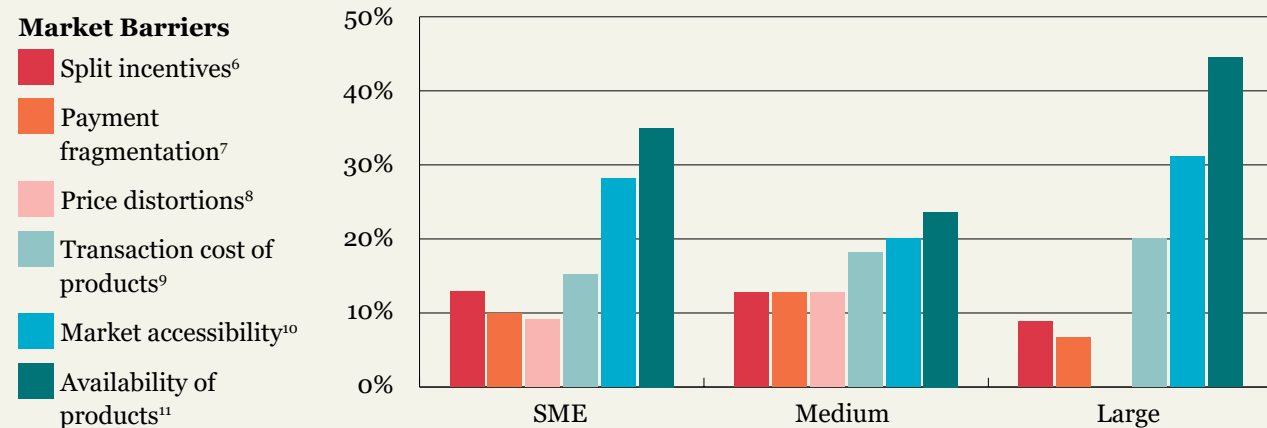
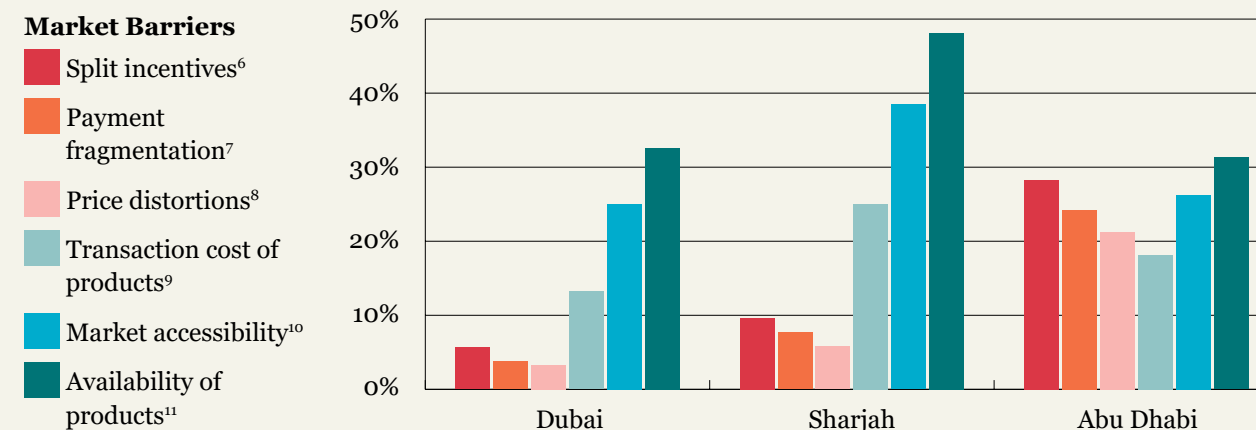


Figure 2.5 Market barriers faced by organizations in implementing energy and water efficiency by emirate (% of respondents)



Market accessibility was the second most common market barrier and the third most common barrier across all barriers, listed by 27 per cent of respondents. This frequency was consistent across all size companies and in two of the three emirates. In many ways, product availability and market accessibility capture related factors; thus, it is not unexpected that they would be correlated.

An interesting finding shown in Figure 2.5 is that the ranking of market barriers for Dubai and Sharjah is identical. Both emirates face similar, higher tariff rates, which appears to generate similar market barrier responses. Sharjah's frequency is higher than Dubai's, potentially indicating less developed markets for highly efficient products. Abu Dhabi, in contrast, shows a much more even distribution across market barrier categories: payment fragmentation and price distortion are on par with availability and access.

The differences in perceived market barriers across the Emirates is likely due to differences in their tariff structures and the resulting direct and indirect effects. The Abu Dhabi government pays the greatest subsidy for energy and water consumption across all of the emirates. DEWA now charges most of its customers what it refers to as the full cost of electricity. Sharjah has also recently levied a new tariff system for the consumption of electricity and water on commercial and industrial entities (Sadafy, 2014). Tariffs and subsidies were also an important issue that was prioritized in the survey results and is being explored in another complementary issue paper.¹²

2.1.1 Complementary barriers: information barriers

Information and awareness of the benefits of efficient products drive demand and, hence, affect product availability and market accessibility. Figure 2.6 lists the frequency with which individual information barriers were cited (note that Figure 2.7 and Figure 2.8 list the percentage of respondents who identified one or more information barriers). Overall, the most commonly cited issue was that creating awareness in the office alone was not sufficient to drive implementation/adoption

⁶ Or "principal-agent problem, the potential difficulty in motivating one party to act in the best interests of another when they may have different goals or different levels of information" (World Energy Outlook, OECD/IEA, 2012).

⁷ Different utility payment strategies exist in the market that hinder energy and water efficiency. In many cases, landlords/property developers do not monitor nor communicate the actual consumption to tenants (World Energy Outlook, OECD/IEA, 2012).

⁸ Government subsidies for energy and water cause distortions in perception in investing in energy and water efficiency.

⁹ The market cost of efficient products can affect the decision of adoption since the over-inflation of prices in technologies makes the efficiency opportunities underestimated (World Energy Outlook, OECD/IEA, 2012).

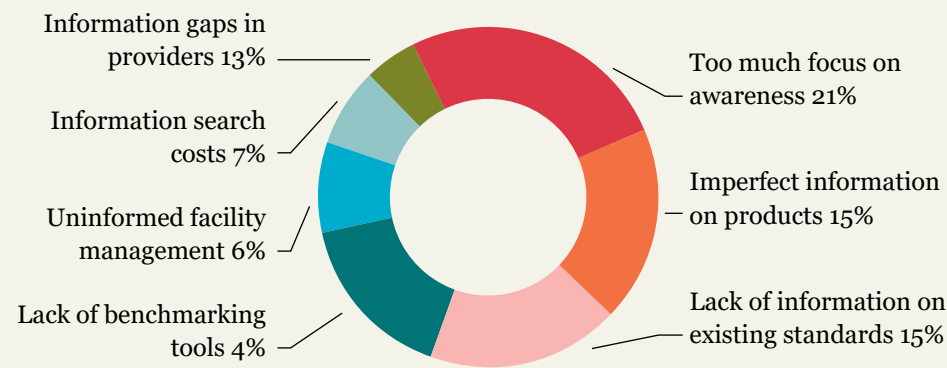
¹⁰ The level of accessibility in the energy and water efficiency market in the UAE will have an impact on the extent to which consumers utilize technologies and change behaviour.

¹¹ Should efficient products sold in a market not meet the required efficiency standards, this could create a loss in trust in consumers propelling them to halt investments in efficiency.

¹² Issue paper 3: Electricity and water subsidies and the impact on consumption in the UAE

of energy and water efficiency initiatives. Twenty-one per cent of the surveyed participants said that their company had focused on awareness but was yet to implement any retrofit activities.

Figure 2.6. Information barriers (frequency)



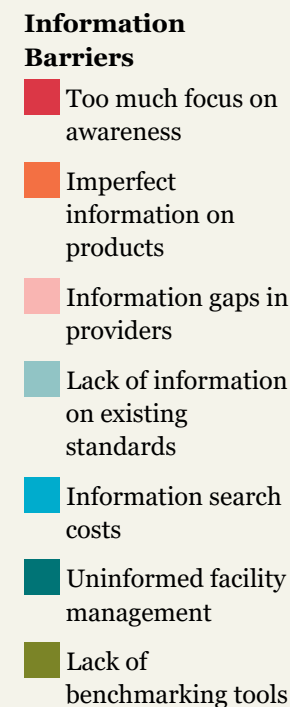
The most frequently cited barriers relate to information deficiency, ranging from imperfect/insufficient information on products and from efficiency providers, to the lack of information on existing standards, to search costs while gathering this efficiency information. To reiterate, awareness of the need for efficiency is not sufficient—reliable, comprehensive information on products and services needs to be available for a reasonable cost to support the analysis and decision-making process.

Different insights can be gleaned when the information barriers are identified by company size and emirate. At the corporate level, different orders of barriers have been identified with different sizes of operations. For example, for large companies, focusing only on awareness dominated the information barrier categories (see Figure 2.7). This barrier was followed by the cost of information search as the second most cited barrier, which is somewhat unanticipated because one might expect larger companies to have more access to efficiency information through centralized resources or more resources for which to obtain the information. Perhaps companies require more specific information related to their specific sector type to be able to make adequate comparisons.

For medium size companies, focusing only on awareness was also dominant. But lack of benchmarking tools and cost of information were also relevant, cited by close to 10 per cent of respondents. The desire for benchmarking tools may imply that medium organizations need more support/analysis to convince management to make efficiency investments.

Figure 2.7 shows that, for SMEs, focusing only on awareness was still the most cited, but barriers related to insufficient information on products, standards and providers was almost equally problematic as a barrier. This finding may imply that SMEs rely more on these publicly available information sources and hence would benefit most from improvements in these areas.

ORGANIZATIONS
NEED MORE SUPPORT
TO CONVINCE
MANAGEMENT
TO MAKE ENERGY
EFFICIENCY
INVESTMENTS



At the emirate level, the survey results indicate slightly different perceptions across the three surveyed emirates (see Figure 2.8). In Sharjah, for example, the lack of information on existing standards and information gap on providers are the foremost barriers for implementing large and effective energy and water efficiency programmes. These findings imply that the government needs to improve its communication of standards and its implications (both federal and emirate levels) and that local markets might not be effective in communicating information on efficient products and providers.

Figure 2.7 Information barriers faced by organizations in implementing energy and water efficiency by company size (% of respondents)

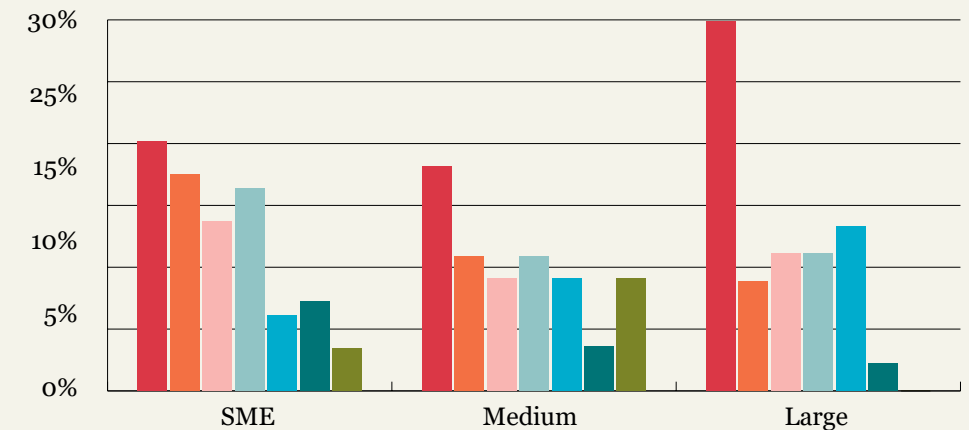
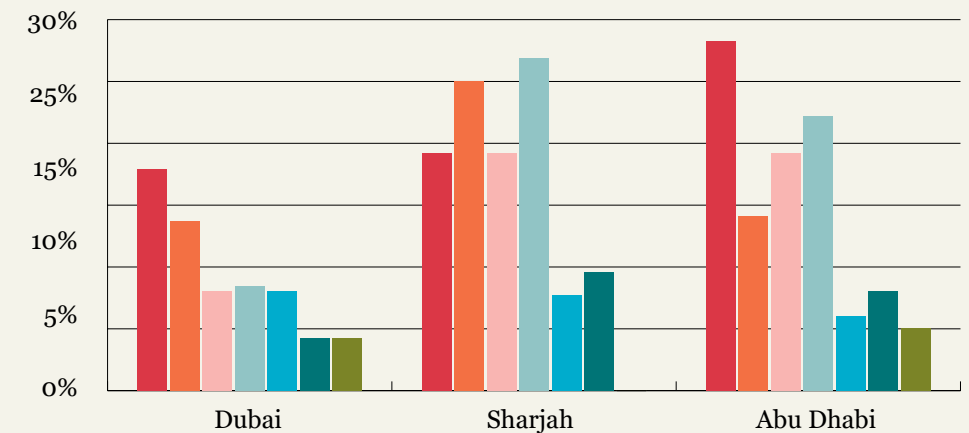


Figure 2.8 Information barriers faced by organizations in implementing energy and water efficiency by emirate (% of respondents)



In contrast, Dubai's and Abu Dhabi's main information barrier related more to an internal corporate policy of promoting awareness but not always following through with energy audits to inform and drive retrofit initiatives. In Dubai, barriers related to lacking information on products, standards and providers were all well below 10 per cent, indicating that their markets and government activities are more mature.

Survey respondents indicated that barriers related to market accessibility and the availability of products are limiting the adoption of more efficient electricity and water technologies. It was also reported that information problems are significant factors in stunting the development of these markets.

3. OPPORTUNITIES AND SOLUTIONS

3.1 SOLUTIONS IDENTIFIED FROM THE SURVEY AND ROUNDTABLE MEETING

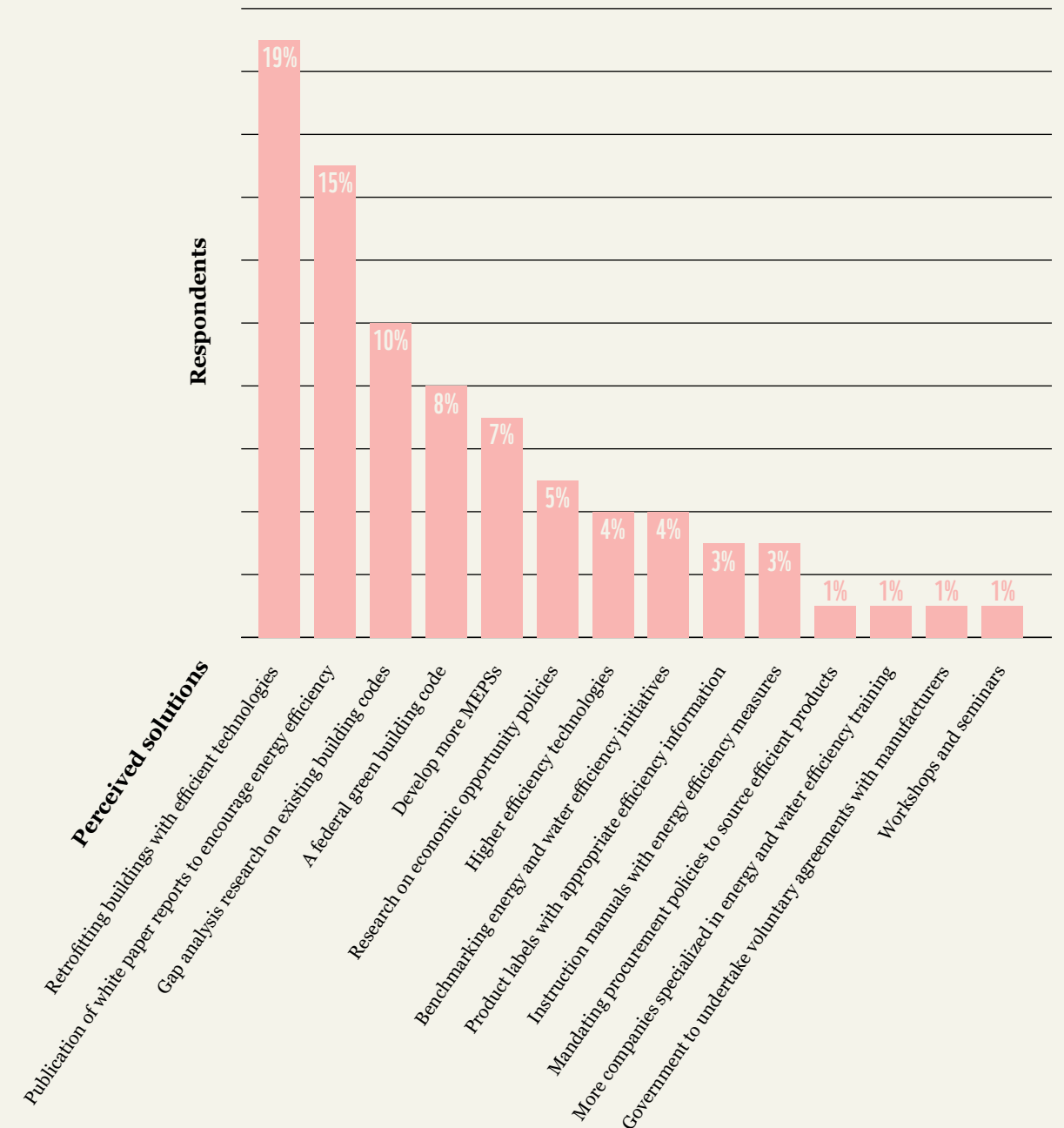
3.1.1 Product availability

As would be expected, many of the leading solutions offered for product availability were similar to those offered for market accessibility. Twenty-six per cent of suggestions were that the government enter into voluntary arrangements with manufacturers (as opposed to or in addition to import standards) to provide efficient products to different markets (see Figure 2.9). Although this may seem like an appropriate short-term approach, voluntary, non-market-based commitments by manufacturers and importers are not likely to be successful. This solution could also relate to mandating procurement policies to source efficient products. Many governments around the world use their purchasing power to transform and grow markets for highly efficient products¹³. In the UAE, government agencies control a significant portion of the economy and hence a large share of office buildings. Mandating MEPSs for electricity and water consuming devices in their buildings would instantly generate a sizable market demand for highly efficient products.

As shown in Figure 2.9, the second and third most cited solutions for product availability were providing specialized training and instructions on how to use the different products to help identify them and maximize the sought-after efficiency (e.g., providing instruction manuals with energy efficiency measures and companies specialized in training on those measures and their implementation). This finding is related to the informational solutions discussed in the following section and would help generate increased demand for highly efficient products. They should be a key component of an integrated solution to improve product availability but on their own may not generate sufficient momentum to move the market.

MANY GOVERNMENTS AROUND THE WORLD USE THEIR PURCHASING POWER TO TRANSFORM AND GROW MARKETS FOR HIGHLY EFFICIENT PRODUCTS

Figure 2.9 Perceived solutions to product availability



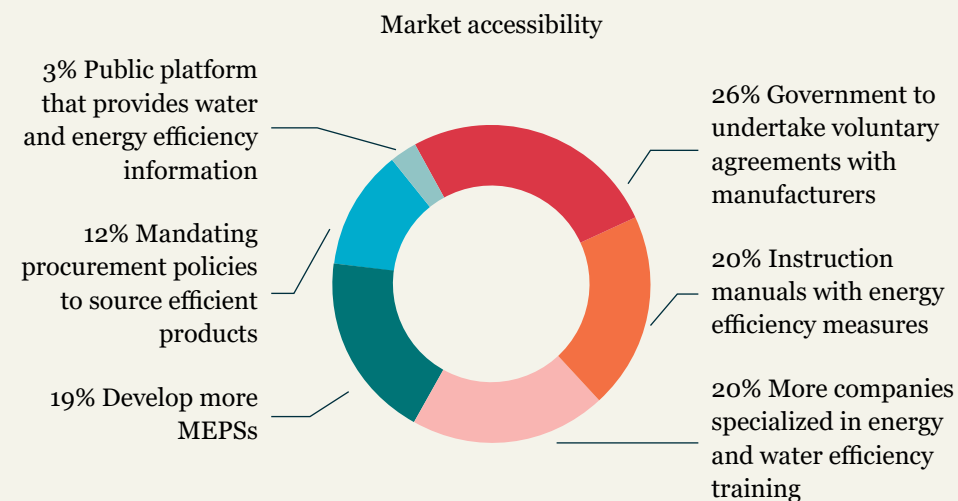
¹³The U.S. Department of Energy has published final rule 10 CFR 433: Energy Efficiency Design Standards for New Federal Commercial and Multi-Family High-Rise Residential Buildings (July 9, 2013).²⁴ The scope of the new standard comprehensively covers the building envelope, HVAC, water heating, power, lighting and other equipment for different climate zones.

3.1.2 Market accessibility

The most common suggestions to remove market accessibility barriers were for additional workshops and seminars. These could be provided by government agencies, NGOs, or private-sector trade associations. Over the years, the UAE has hosted many high-profile conferences that have called for increased electricity and water efficiency. The 2015 EcoCities conference in Abu Dhabi is a prime example as well as large-scaled platforms like the World Future Energy Summit, the World Green Economy Summit and RetrofitTech Summit, among many others. However, most of these conferences and workshops are not targeted at building energy managers and provide high-level discussions of savings and benefits as opposed to disseminating product-level performance and accessibility information. When appropriately targeted programmes have been rolled out (such as EWS-WWF's *Heroes of the UAE*), their impact has been hampered by resource constraints. If workshops and seminars are to be successful, a fully funded, large-scale effort needs to be supported by the federal government or a consortium of emirates. This support would help generate the high profile needed for acceptance and to leverage economies of scale.

A FULLY FUNDED, LARGE-SCALE EFFORT NEEDS TO BE SUPPORTED BY THE FEDERAL GOVERNMENT OR A CONSORTIUM OF EMIRATES

Figure 2.10 Perceived solutions to market accessibility barrier



Based on the high reliance on the government to address market accessibility, one might think that developing more MEPSs and endorsing a federal green building code would have ranked higher, but as shown in Figure 2.10, they represent a fraction of the solutions provided. This finding may reflect the fact that federal systems are not perceived as very effective at enforcing these codes and standards.

3.1.3 Complementary solutions: information

As shown in Figure 2.11, product labels and standards transparency were two of the most commonly cited solutions in the survey targeted at informational problems. As discussed in Section 2, efforts have been made in these areas, but their success is questionable. Standards and labels are meant to help the market recognize energy efficiency and act on it. Without the information provided by labels and the communication of standard requirements, consumers and other end users are often unable to make an informed decision about the true cost of a product and what is required by law. As a result, manufacturers lack the incentive to improve the energy performance of their products because there is no way for the market to recognize and value this aspect.

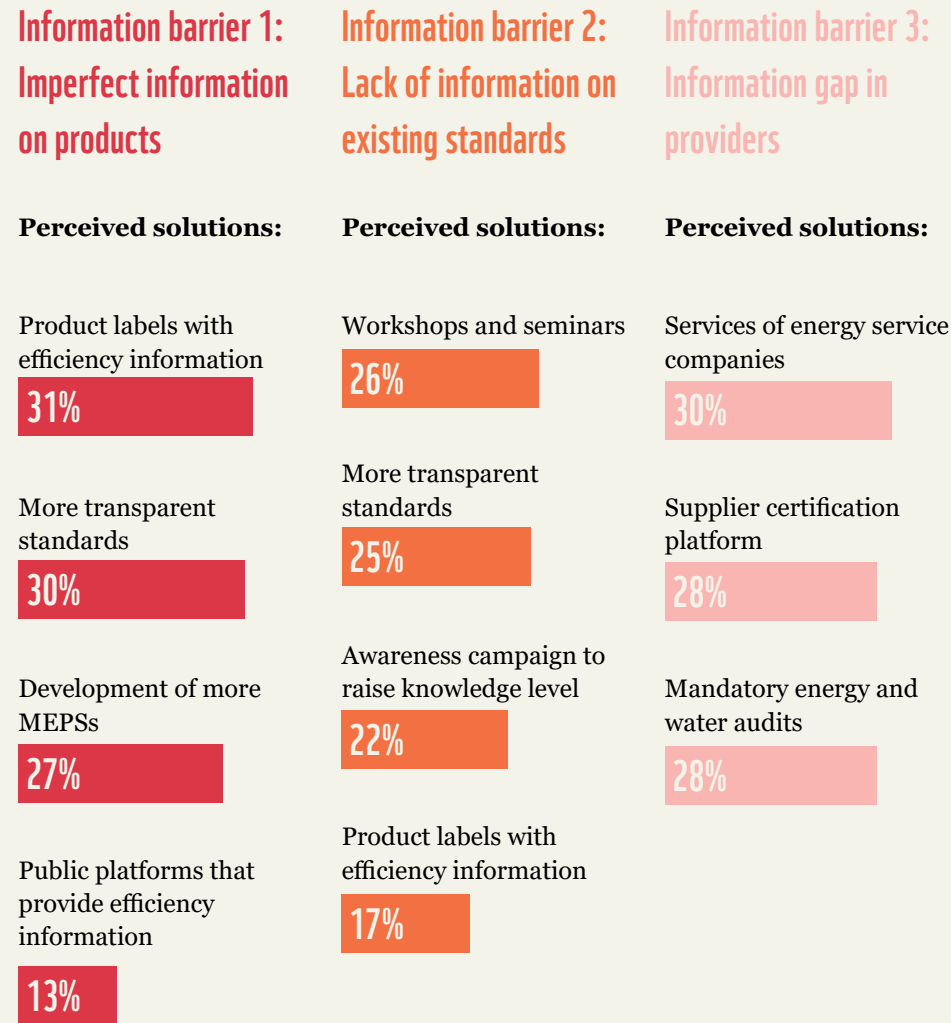
END USERS ARE OFTEN UNABLE TO MAKE INFORMED DECISIONS ABOUT THE TRUE COST OF A PRODUCT AND WHAT IS REQUIRED BY LAW

Public platforms to provide efficiency information were identified as part of the solution to information barriers as well as barriers to market accessibility. However, in all instances, they were ranked relatively low, potentially indicating a lack of familiarity with these types of platforms in the UAE.

Platforms such as TopTenUSA have become common in the United States, China, Russia and countries within the EU. They have been used to create a push-pull mechanism to shift end-use consumption to more efficient products.¹⁴ Frequently, they support the development of MEPSs by providing transparent information to end users on the energy savings potential of available products in the market. The platforms also provide information on where products can be purchased. TopTen has now become the European portal to unbiased scientifically proven information on energy efficiency, which can be presented to governments and involved stakeholders in implementing energy electricity and water efficiency measures (www.topten.info). Government, NGO, or private-sector development of similar platforms for the UAE and their promotion could help solve many of the informational barriers identified in the survey, grow the demand for efficiency products and support market transparency.

¹⁴ See <http://www.toptenusa.org/> as an example.

Figure 2.11 Perceived solutions to information barriers (% of respondents)



3.2 CONCLUSION



The barriers cited in the survey of accessibility of markets and availability of high efficiency electricity and water products are, in many ways, symptoms of broader underlying issues. Increased information on and awareness of efficient products will increase demand. However, information alone will likely not transform the market at a pace sufficient to meet the various efficiency goals put forth by federal and local governments. Continued tariff reform is needed to provide the financial incentive for investment in electricity and water efficiency. And increased development and enforcement of efficiency standards will be needed to create the core demand that will create mass markets and drive down prices.

Demand-side management activities targeted at the commercial sector have been successful internationally in increasing electricity and water efficiency. These programmes have historically been implemented through local utilities because of their knowledge of and communication links with electricity and water consumers. Such programmes could be effective in the UAE to disseminate information, increase awareness, provide a clearing-house for product and producer information, and provide incentives needed to jump start key product markets. The UAE must ensure that only trusted products reach the market through entire supply chain management, which can be achieved through standards development with efficiency requirements, more rigorous customs requirements¹⁵ and standards body monitoring of the market to ensure that requirements are being met in the marketplace and consumer information is available for products on the shelf (e.g. labels, peer-to-peer platform, etc.). Ideally, this effort would be coordinated at the federal level, with implementation at the local level, to leverage economies of scale and compensate for the different levels of resources and capabilities across the Emirates. The private sector can play important support roles in promoting the programmes and educating consumers about their benefits, but without centralized coordination and full-scale implementation, fragmented efforts will be modestly successful.

To the extent possible, the UAE should strive for consistency and commonality across its electricity and water efficiency codes and standards. There is a valuable role for local entities in contributing to the development of codes and standards and their related testing, monitoring and enforcement. However, variations between federal and local efforts and variations across emirate-level codes, standards and labelling lead to confusion for consumers and providers, which increases cost, limits availability and creates barriers to adoption. First entities, such as ESMA and QCC, should reduce confusion by eliminating redundant labels and then ensuring that labels are giving the right information, inclusive of anticipated savings and the underpinning education/awareness of end users to understand what those labels mean and how the product can best be utilized.

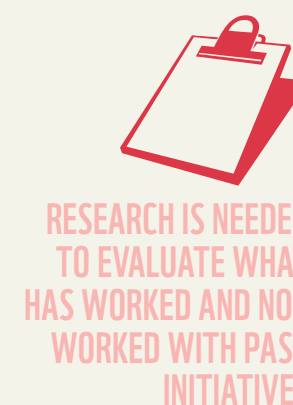
¹⁵ Federal Customs Authority (FCA) has new system called single window, which connects with all departments across the UAE. This helps in distributing special orders in 2-3 working days rather than 10-15 working days, therefore quicker action is taken on importing good quality products. However, Free zones do not follow FCA's rules so far but plans are in place to bring compliance to the designated zones.

But the issue that still remains is the stage at which the label is developed and the entity responsible for that; currently, manufacturers affix the labels and control the information it contains. The sought label need to be applied after manufacturing.

A noteworthy example that regulatory authorities in the UAE can mimic is the Australian experience; where a “Best in Place” approach was adopted to overcome the market size and regional consistency issues. The approach is based on adopting the existing widely accepted international best practices and standards as they are in the first pass. This adoption is supported by a rigorous measurement and verification (M&V) scheme that monitors and evaluates performance and applicability to market and intended use, then looking at customizing adopted standards or eliminating some as the market develops forward. In parallel, the authority also unifies regulations and strengthens baselining mechanisms from the start.

Energy-using products are increasingly traded globally; thus, there is an increasing tendency to harmonize elements of product policy between countries and major trade blocks. Countries can benefit from this trend by taking advantage of the product energy efficiency policies applied in major trade blocks of the world by harmonizing their policies with those of their trade partners.¹⁶

The UAE should address these barriers in the context of the GCC region and not its market only. While working with other GCC countries on global market accessibility and labelling and enforcement/penalties, it must also take proactive steps toward developing consistent codes and standards across the Emirates, building national testing capabilities and labelling schemes, and ensuring the proper and consistent level of enforcement across the seven emirates. Specifically, there is a need for better harmonization within the UAE (e.g., QCC, ESMA quality marks) and then across the GCC as well, where the common GCC market may require a common approach to standards and labels at the regional level. Having stated that, despite having a small geographical market, the UAE has a strategic



location and is leading the GCC in energy efficiency policies; hence, according to its growth and demand, it is not small and, given the slow pace of GCC decision-making, this might actually prove to be counterproductive and slow harmonization down.

And finally, further research is needed to evaluate what has worked and not worked with past initiatives. The UAE has a standardization body, which has developed standards and labels, but the extent to which these have transformed the market is unclear. In fact, the survey results highlight that accessing the solutions and finding the right products are key issues that need to be addressed. Little information is available on how the market has transformed for high efficiency air conditioners, refrigerators or lighting in the UAE as a result of recent MEPSs. Valuable insights could be obtained on potential market failures that persist, what may be limiting market transformation and consumer adoption, and what additional policies need to be undertaken.

In summary, the UAE needs to address multiple, interrelated issues to mitigate the underlying barriers that hinder market accessibility and product availability of efficient products. These issues include:

- Having strong standards and labels that are visible and trusted in the market is essential.
- The communication and dissemination of information is crucial so consumers can find the best products and make more informed decisions.
- Periodic review of standards and labels is important to make sure they are up to date and communicated effectively.
- The market should be continually monitored for compliance and regulations appropriately enforced. This would facilitate trust in the products and services being purchased in the UAE.
- Coordination between federal and local entities in conservation activities is important to avoid duplication of efforts and to align resources.
- The UAE is a small market, so more efforts to align at the GCC level and with international best practices would be a more effective way of ensuring better success in this area. In transition, a model similar to the Australian experience might be adopted and applied.
- Tariff reform is a crucial enabling factor, but other complementary measures should also be considered, such as financing schemes to enable consumers to purchase the most efficient equipment.

¹⁶ For example the Australian policy of adopting the world’s best standards for their own use. Because the Australian market is too small to induce the development of more efficient products, Australia decided some years ago to focus their attention on aligning national policies with those of their most ambitious trade partner. This policy ended years of stagnation in their market transformation and resulted in a rapid increase in energy efficiency levels for a range of products.²⁵

ELECTRICITY AND WATER SUBSIDIES AND THE IMPACT ON CONSUMPTION IN THE UAE

Issue paper 3

1. INTRODUCTION

This paper focuses on the impact of electricity and water subsidies on the commercial sector's investment in efficiency, both in terms of technology adoption and implementation of best practices. It is intended to stimulate dialogue with representatives from the private and public sectors who are experts on the topic. Preliminary findings are that a lack of awareness of the existence of subsidies is a problem in itself, but it feeds into a larger set of barriers and a wider context, as discussed in this paper.

25%
OF SURVEY
RESPONDENTS
IDENTIFIED
THE LIMITED
UNDERSTANDING OF
ELECTRICITY AND
WATER SUBSIDIES AS
A KEY BARRIER

In particular, this paper investigates the awareness of subsidies and how subsidies influence corporate behaviour. The issues are the following:

- Do business decisionmakers realize that the level of energy and water subsidies provided by the government in different emirates and that the tariffs companies pay are much lower than the true cost of production?
- To what extent do subsidies influence attitudes, behaviour and investment related to energy and water efficiency?
- Do businesses realize the impact recent tariff changes have had on their utility bills and that further tariff reform is likely?

Historically, subsidies and a lack of awareness of them have distorted price signals and limited the development of a robust market for high efficiency products. Subsidies are part of a much larger interconnected network of barriers and tackling the issue needs a comprehensive approach.

This approach could include, but not be limited to:

- Developing transparent true-cost calculations;
- Targeting awareness of these true costs;
- Developing a federal roadmap for tariff reform to manage and inform expectations.

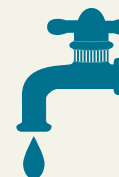
2. CURRENT LANDSCAPE AND IMPACT OF BARRIERS



CURRENT CONSUMER CHARGES FOR ELECTRICITY AND WATER CREATE DISINCENTIVES WHEN USERS ARE MAKING ENERGY EFFICIENCY INVESTMENTS

The presence of subsidies feeds into a larger set of barriers that were investigated as part of the survey conducted by EWS-WWF. Historically, subsidies and a lack of awareness of them, have distorted price signals and increased the perceived cost of efficient technologies (by lowering benefits), which has, in turn, limited the development of an effective market for high efficiency products in the UAE.

Current consumer charges for electricity and water do not reflect the true production costs and, therefore, create disincentives when end users are making energy efficiency investments and consume these resources inefficiently¹. In both the short and long runs, cost-reflective tariffs are likely to support and incentivize many of the desired behaviours that would lead to a per capita reduction in consumption. In addition, when combined with appropriate education and awareness programmes, tariff reform has been shown to be an effective component of a demand-side management (DSM) strategy in reducing energy and water consumption. However, there are concerns associated with implementing tariff reform, such as attitudes about government's role in providing social services, impact on the poor and wealth distribution. In addition, as identified in the survey results as a common barrier, consumers may not be fully aware of the true cost of electricity and water and the resulting subsidies. And in many emirates the information on the true cost of power and water is not publicly available. This lack of awareness (or uncertainty of the magnitude) of subsidies creates a barrier to reform in that it affects public acceptance of increased tariff rates. If the general perception is that electricity and water production are relatively inexpensive, then efforts to increase rates will be met with resistance.



CONSUMERS MAY NOT BE FULLY AWARE OF THE TRUE COST OF ELECTRICITY AND WATER AND THE RESULTING SUBSIDIES

2.1 HISTORICAL PERSPECTIVE

Individuals' perspectives of government's role in providing social services, in general, and energy and water subsidies, specifically, are deeply rooted in the region's traditions and customs. The political system continues to retain the traditional values at formal and informal levels, while working to keep pace with economic and social change. The leadership is highly regarded for performing these dual roles of modernizers and guardians of the cultural heritage. This dual role has historically generated an expectation within the population that its leaders would provide for them and some view subsidies as a way of sharing the nation's wealth with the broader population. From this perspective, subsidizing electricity and water has been a logical service for the UAE's leaders to provide.

As the UAE witnessed an explosion of wealth and population following the oil boom of 1973, the Emirates were able to use their oil revenues to improve the quality of life of the people. The UAE's political system continued to evolve,

¹ Although recent tariff reforms in Abu Dhabi have introduced "cost reflective tariffs" for end-users who exceed a set daily limit, they only apply to residential consumers and not the commercial sector.

enabling the country to develop a modern administrative structure while ensuring that traditions of the past were maintained and preserved. During the boom from 2001 to 2008, Dubai's electricity demand grew at 10 per cent or more annually. In the last year before the crash—2007—it soared by 17 per cent. During this period, the attitude was business comes first and environmental and sustainability issues could be addressed later. This mindset also prevailed in Abu Dhabi and Sharjah, as reflected in the emphasis on rapid growth, the prevalence of subsidies and lax environmental regulations.

But now, authorities are starting to acknowledge that the breakneck pace of development has stressed natural resources throughout the UAE. Efforts to achieve developed status within a 20- to 30-year span have created significant challenges for sustainable resources and environmental protection at both the federal and emirate levels. In addition, there is currently a shift of culture from flagrant consumption to sustainable consumption.

A history of subsidies in the UAE and the Gulf region in general has contributed to the problem. Subsidized electricity and water have not only supported the residential and commercial sector, but also created agricultural and industrial sectors that are dependent on subsidies.

A recent International Monetary Fund (IMF) report (2015) calculated that UAE electricity subsidies in 2014 were \$5.7 billion. This represents \$631 per capita. When natural gas (which is the main fuel for electricity and water production), petroleum and coal are added, the total energy subsidy for the UAE is \$34.6 billion, which represents \$3,830 per capita. It should be noted that the UAE is not alone in the region with its history of subsidies. The IMF estimated that Qatar, Kuwait, Saudi Arabia and Bahrain all have greater per capita energy subsidies than the UAE.

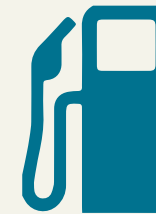
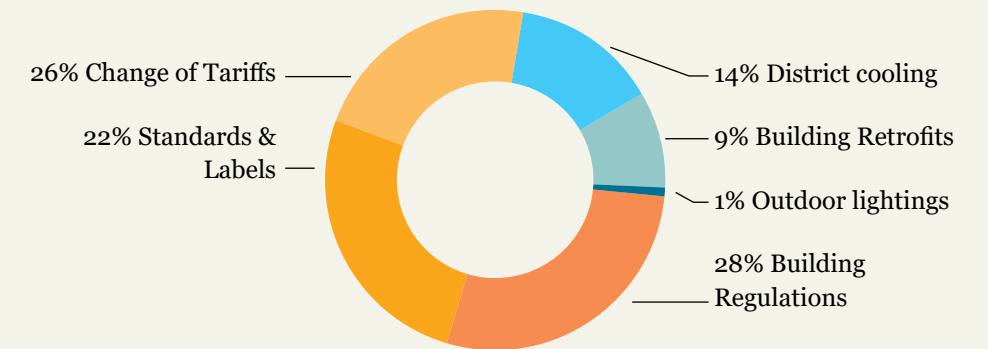
It has become evident that the growth in electricity and water consumption is not sustainable. In 2009 and 2010, Sharjah had a series of power outages that raised concerns about available generation capacity. In 2010, unable to secure new supplies of low-cost natural gas from its neighbors, Dubai began importing liquefied natural gas (LNG) at sometimes 10 times the price of its legacy supplies.

Recently, Abu Dhabi has turned to nuclear power as a major new source of energy to meet projected demands. The Emirates signed an accord with Washington that allows countries to build nuclear plants that do not enrich or reprocess uranium. Abu Dhabi plans to build four plants by 2017 and to generate about 23 per cent of the emirates' power from nuclear by 2020. Dubai plans to source nuclear energy from Abu Dhabi to contribute 7 per cent of its electricity supply by 2030, as per the Dubai integrated energy strategy.

UAE ELECTRICITY
SUBSIDIES IN 2014
WERE
\$5.7
BILLION. THIS
REPRESENTS
\$631
PER CAPITA.

THERE IS CURRENTLY
A SHIFT OF CULTURE
FROM FLAGRANT
CONSUMPTION
TO SUSTAINABLE
CONSUMPTION

Figure 3.1 Contribution of DSM initiatives under Dubai Integrated Energy Strategy toward target of 30% reduction by 2030 (compared to business as usual, covering 6 out of the 8 planned initiatives)"



FUEL PRICE
DEREGULATION WAS
IMPLEMENTED FOR
THE FIRST TIME ON
AUGUST 1, 2015, BY
THE MINISTRY OF
ENERGY

It has also become evident that supply-side solutions alone will not solve the problem. Decades-old subsidies have made the GCC and other Middle East countries some of the world's most inefficient energy and water consumers, and there is a growing consensus in the UAE that a comprehensive conservation plan is needed. In addition, the national attitude to energy and water consumption has been changing along with growing environmental awareness in part influenced by a younger generation. Furthermore, there is a movement across the Emirates to diversify away from an oil-based economy and develop new sources of employment that build on alternative energy and conservation. Alternative energy would provide a clean sustainable source of supply and conservation would reduce the need for additional generation capacity.

In response, Dubai has established its Supreme Council for Energy, tasked with designing an energy strategy. A critical component of the plan is the emphasis on energy and water efficiency, with a targeted reduced consumption of 30 per cent for both.² A key point is that the plan relies more heavily on market forces, which are to be driven in large part by increased tariff rates. This willingness to drive consumer behaviour through prices represents a fundamentally different approach to managing demand in the UAE, trending away from the historical views of subsidies and an entitlement for the population. This trend has also been applied in the UAE through fuel price deregulation, which was implemented for the first time on August 1, 2015, by the Ministry of Energy and resulted in increased fuel prices.

The impacts of rising tariff rates are not fully documented, but rising rates are widely viewed as having an impact. For example, in Dubai, although population growth has meant increasing consumption, electricity use per resident has been dropping. This decrease in consumption has allowed Dubai to delay its 1.6 GW Hassyan power plant. And the hope is for efficiency improvements to save 30 per cent of business-as-usual consumption by 2030.³

² Six of the eight initiatives in the strategy contribute toward the 30 per cent reductions in electricity and (potable) water consumption. The other two initiatives are 1) Demand Response Systems Initiatives would include using strategies such as time-of-use tariffs and direct load control and curtailable load management to reduce peak consumption of energy and 2) Water Reuse and Efficient Irrigation, led by the Dubai Municipality, to increase the use of efficient irrigation techniques and the promotion of reused water.

³ Dubai's DSM strategy includes eight pillars: Building Regulations, Building Retrofits, District Cooling, Standards for Appliances and Equipment, Water Reuse and Efficiency Regulation, Outdoor Lighting, Power and Water Tariff rates, and Demand Response.

Dubai's success in reducing energy and water demand through market forces, bolstered by tariff reforms that are intended to signal the true cost of electricity and water, may be an example for other emirates to follow. The UAE's future energy transformation will likely be driven by economics as much as environmentalism. If so, the proper pricing of resources and the full disclosure and awareness of subsidies will be essential in driving sustainability.

2.2 CURRENT TARIFF RATES AND SUBSIDIES



LACK OF DISCLOSURE OF THE FULL COST OF ELECTRICITY MAY STILL BE A BARRIER TO ADOPTING EFFICIENT TECHNOLOGIES AND BEST PRACTICES

Recent increases in tariffs across the emirates have helped send the proper pricing signal to end users and should have a direct impact on consumption and the amount of subsidy required by the electricity and water sector. However, tariff reform has not proceeded at that same pace in all emirates; hence, the existing level of subsidy varies. Only the Emirate of Abu Dhabi has been proactive in communicating the true cost of electricity and water and yet it is still unclear how successful these efforts have been and to what extent behaviours and investment decisions have been influenced.

As the survey findings show, lack of disclosure of the full cost of electricity and water and the associated subsidies may still be a barrier to adopting efficient technologies and best practices even though initiatives have been launched to communicate information on subsidies.



Abu Dhabi has introduced new utility bills that separate electricity and water and show the actual supply cost, amount of subsidy and customer bill (which is the difference between the actual cost and the subsidy). But other emirates have not engaged in such awareness activities at the customer level, nor do they publicly communicate the true cost.

The following is a brief overview of the current tariff rates, the level of subsidies and the uncertainties in calculating the true cost of electricity and water.

2.2.1 Tariff rates

Tariff rates are set individually by each emirate. In Dubai and Abu Dhabi, the Regulation and Supervision Bureau (RSB) implements the rate structure. The other emirates (including Sharjah) have historically adopted rates set at the federal level by the Federal Electricity and Water Authority (FEWA). Thus, as shown in Table 3.1, the commercial rates vary across emirates.

Table 3.1 Current commercial electricity and water tariffs

Emirate	Electricity 		Water 	
	Consumption (kWh)	Tariff +fuel surcharge/ kWh	Consumption (IG ^a)	Tariff
Abu Dhabi	All	AED 0.16	All	AED 0.018
Dubai	0–2,000	AED 0.295	0–10,000	AED 0.041
	2,001–4,000	AED 0.345	10,001–20,000	AED 0.046
	4,001–6,000	AED 0.385	20,001+	AED 0.052
	6,001+	AED 0.445		
Sharjah^b	0–2,000	AED 0.28	0–10,000	AED 0.035
	2,001–4,000	AED 0.33	10,001–20,000	AED 0.04
	4,001–6,000	AED 0.37	20,001+	AED 0.046
	6,001+	AED 0.43		

a Conversion: 1 m³ = 219.969 IG

b SEWA tariffs are the ones as disclosed by Federal Electricity and Water Authority: Article stating that Sharjah tariffs are the same as FEWA. FEWA tariffs are also used by the remaining emirates not listed in the table: http://www.khaleejtimes.com/kt-article-display-1.asp?xfile=data/nationgeneral/2014/December/nationgeneral_December222.xml§ion=nationgeneral.

THE NEW RATES INCLUDE 40 FILS/KWH FOR THE INDUSTRIAL SECTOR

THE COST OF GENERATING ELECTRICITY CAN BE AS HIGH AS 65 FILS/KWH

In general, Dubai and Sharjah have moved closer to a full cost of electricity and water, but since true costs analysis has never been communicated, it is unclear to what level current tariffs are in contrast with the true cost. Having kept electricity tariffs flat since 1998, DEWA introduced a new tariff structure on March 1, 2008, aimed at encouraging consumers to conserve energy. Effective January 1, 2011, DEWA again increased tariffs because of escalating oil and gas prices.⁴ This surcharge includes the development of a new LNG terminal as part of a strategic gas supply strategy.

Effective 1 January 2015, Abu Dhabi implemented, for the first time in several decades, a new rate structure for water and electricity tariffs.⁵ However, Abu Dhabi's increases were not as aggressive as those by Dubai or FEWA, with the commercial sector maintaining a subsidy of close to 50 per cent. However, in the tariff adjustments of 2015, Abu Dhabi increased the electricity and water rates for government office buildings to full cost, potentially foreshadowing that the commercial rate may follow sometime in the future.

Effective October 1, 2015, Sharjah raised its commercial and residential electricity tariff from 20 to 30 fils/kWh. The new rates include 40 fils/kWh for the industrial sector. This decision was made in light of estimates that the cost of generating electricity can be as high as 65 fils/kWh.⁶ Also effective 1 January 2015, FEWA increased the electricity tariff by 5 fils/kWh for government offices, expatriate residents and commercial establishments.⁷

Both Dubai and Sharjah have slab rates for the commercial sector.⁸ Slab rates (also referred to as step or block tariff structures) increase the rate for high levels of consumption. The concept is to discourage excessive use by charging the marginal units of consumption at a higher rate. This approach is socially attractive because it provides the proper price signal at the margin without burdening the base load consumption with the higher rates.

⁴ <http://www.guide2dubai.com/living/DEWA-bills-dubai.asp>

⁵ In 2016, RSB Abu Dhabi introduced another light tariff reform for the residential sector, which saw an increase of rates for consumers exceeding daily consumption rates set by the regulator. However, the changes did not affect commercial sector tariffs. For more details see www.rsb.gov.ae.

⁶ <http://gulfnews.com/news/uae/general/sharjah-raises-power-tariff-by-50-per-cent-1.511909>

⁷ <http://gulfnews.com/news/uae/environment/fewa-bills-increase-by-5-fills-per-kw-h-1.1427257>

⁸ Note that Abu Dhabi currently has a slab tariff structure for residential customers but not for the commercial sector.

2.2.2 Subsidies

Government subsidies for electricity and water are then defined as the difference in the true cost of production and distribution, minus the tariff rate charged to the customer. Table 3.2 shows the true cost of electricity and water reported by RSB Abu Dhabi. Based on this figure, the electricity subsidy is AED 0.08/kWh (0.24–0.16) and the water subsidy is AED 0.029/IG (0.047–0.018).

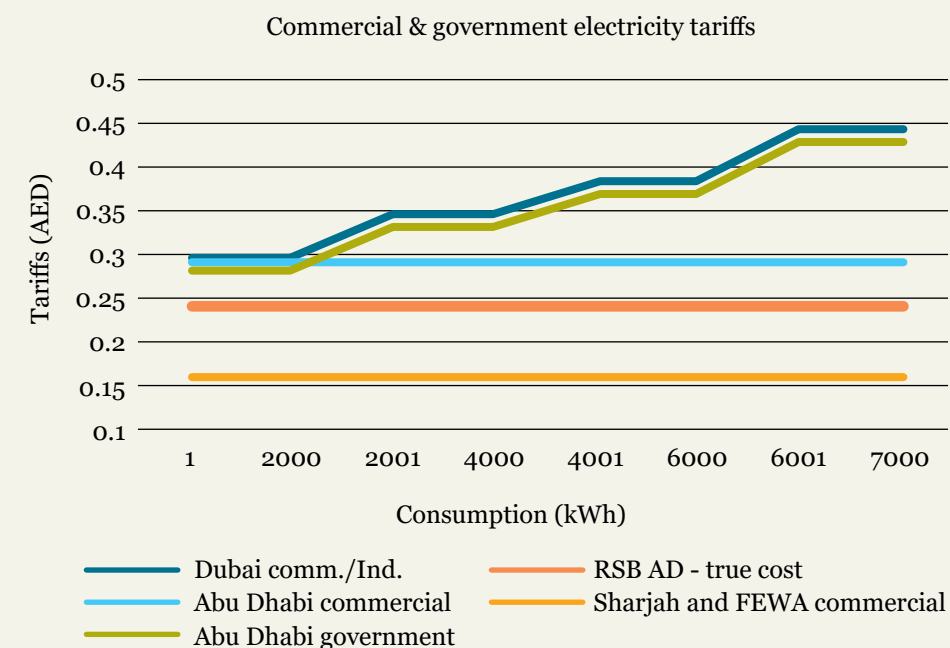
Table 3.2 True cost and subsidy for the commercial sector in Abu Dhabi

	ELECTRICITY (/KWH) ⚡	WATER (/IG) 💧
True cost	AED 0.241	AED 0.047
Subsidy	AED 0.08	AED 0.029

^a RSB Abu Dhabi, 2013–2014 report on costs for electricity and water.^{*}

The true costs of electricity and water are not available for Dubai and Sharjah, but assuming they are similar to costs for Abu Dhabi, there appears to be little to no subsidies being provided in Dubai or Sharjah (see Figure 3.2). However, this could be misleading because of uncertainties/discrepancies in calculating the true cost. In addition, the true cost of power and water can vary greatly by month and time of day.

Figure 3.2 Comparison of commercial electricity tariffs and reported Abu Dhabi true cost with Dubai, Sharjah/FEWA and Abu Dhabi commercial tariffs



^{*} Electricity and water tariffs for residential and government buildings in the Emirate of Abu Dhabi rose to true cost in January 2015, while the commercial sector maintained subsidy levels of almost 50 per cent.

2.2.3 Uncertainties related to the true cost and associated subsidies

The method for calculating the true cost of electricity and water in the UAE has been the topic of discussion and controversy for many years. A variety of factors makes the analysis complex:

- The co-production of electricity and desalinated water makes partitioning costs across these joint products difficult. For example, if water desalination is viewed as using waste heat from power generation as the input, the cost of water will be lowered as opposed to assuming equally weighted co-production. And, in the extreme, in some months during the winter, power plants are operated primarily to generate water (air conditioning demand decreases during the winter, but water demand remains relatively constant).
- Subsidized natural gas is also used as an input in electricity and water production and distorts the true cost. Long-term contracts with Qatar and other sources have locked in the price of imported natural gas well below the current market value.⁹ In addition, swing gas from the Abu Dhabi National Oil Company (ADNOC) provided during peak periods (by reducing natural gas use for enhanced oil recovery) is also provided to the power and water sectors well below market value. If these production input subsidies were included in the true costs of electricity and water, the subsidy to the consumer shown in Table 3 would increase.¹⁰
- Additional upstream subsidies, such as subsidized land use, infrastructure and construction materials, also affect the calculation for the true cost of electricity and water.
- Environmental and health impacts are not captured in the tariff rate. These include CO₂ emissions, pollutants and related health care costs and/or lost labour productivity due to resulting health issues.
- In addition, the true cost of electricity varies by season and time of day. The subsidies cited by the government are typically based on the average cost of power over the full year. However, peak electricity costs can be much higher because of the use of less efficient peaking units and higher priced fuel (LNG or diesel).¹¹ Thus, the commercial sector, which has high air conditioning loads, may receive a higher subsidy than industry, which has flatter base load profiles. Sharjah has cited the true marginal cost as being as high as 65 fils/kWh.¹² In some DSM studies conducted by the Executive Affairs Authority–Abu Dhabi, a marginal cost of AED 0.45/kWh was used to capture the seasonal and time-of-day higher costs. This difference between the marginal cost and average/levelized cost of electricity significantly influences the level of subsidies generated and the magnitude of savings associated with energy efficiency initiatives.

⁹ “Historically, the UAE was able to produce or import gas for less than USD 2/MBtu. Today, due in part to high sulphur content, new domestic production could cost up to USD 8/MBtu, while liquefied LNG imports which started in 2010 in Dubai and may begin on a larger scale in Abu Dhabi as early as 2016, cost USD 12-18/MBtu” (Masdar/IRENA, 2015).

¹⁰ Also note, including environmental or health-related externalities would increase the level of subsidy even more. See IMF (2015) for methods and estimates of total energy subsidies from a social perspective.

¹¹ Note, this is less of an issue for water because of storage capabilities and less seasonal variation in demand.

¹² <http://gulfnews.com/news/uae/general/sharjah-raises-power-tariff-by-50-per-cent-1.511909>

2.3 PRESENCE AND AWARENESS OF SUBSIDIES

2 OUT OF 3
BUSINESSES TRACK
THEIR CONSUMPTION
OF ENERGY AND
WATER IN THE OFFICE
SPACE

The continued presence of subsidies for electricity and water, the uncertainty in calculating the true size and the lack of communication of the subsidies contribute to an overall environment that discourages investments in efficiency. In general, low tariff rates reduce the benefits (return) from investing in efficiency, making highly efficient products seem more expensive, dampening the market and limiting availability. Thus, even when investments make sense from a social perspective, they may not be economical from a company’s perspective.

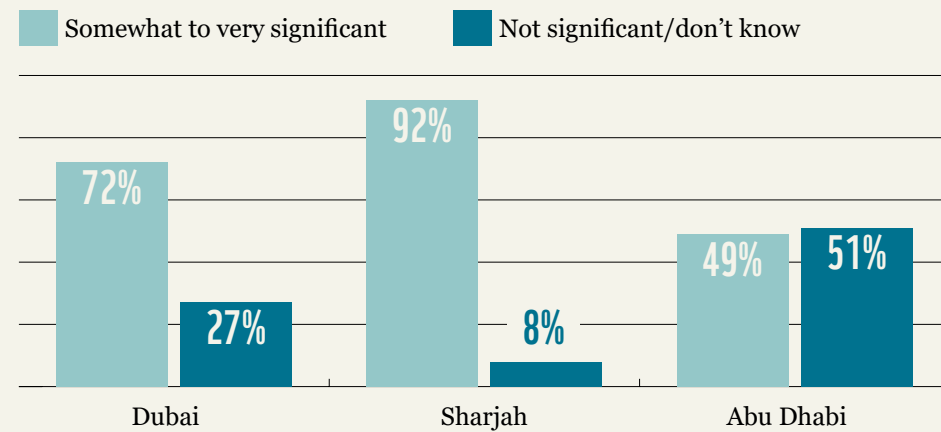
A related question is do the decisionmakers or facility/building managers in office buildings know about the level of energy and water subsidies in the UAE? If not, does this lack of knowledge impede acting on energy and water efficiency because it is not considered a priority?

The EWS-WWF survey found that two out of three businesses track their consumption of energy and water in the office space. Most companies used their utility bills for tracking information. In general, companies perceived the size of their utility bill to be somewhat to very significant for their operations and approximately half of the companies have set targets to reduce electricity and water consumption. These findings were relatively constant across corporate size (with larger corporations tending to be slightly more concerned).

However, as shown in Figure 3.3, the perceived significance of utility bills is less in Abu Dhabi where subsidies are the greatest.

This survey was conducted during December 2014 and January 2015, before commercial entities obtained their bills based on the new tariff. Therefore, this analysis may change with the new tariff structure. This might be an indication that perceptions are driven by the tariff rate being paid, as opposed to the true cost of subsidized electricity and water.

Figure 3.3 Perceived significance of utility bill

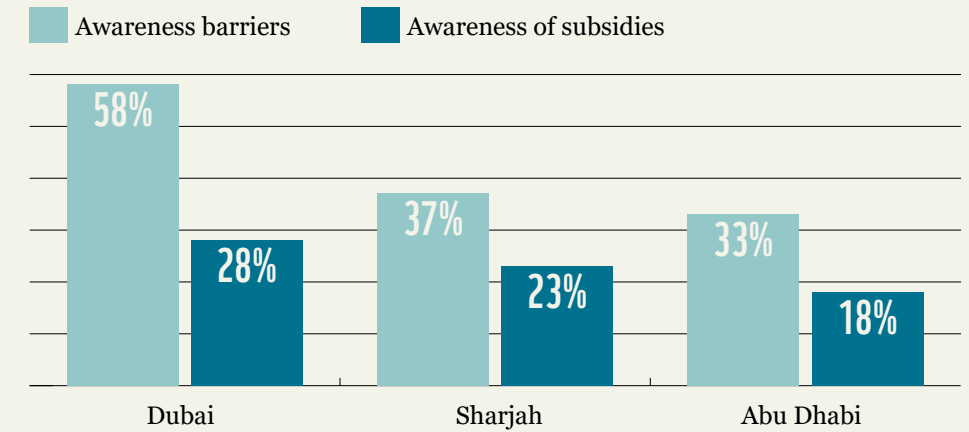


IN ABU DHABI, TARIFF RATES ARE APPROXIMATELY 40% LESS AND USAGE IS APPROXIMATELY 30% GREATER THAN IN DUBAI AND SHARJAH

For the survey population, utility bills were approximately 10 per cent less in Abu Dhabi than in Dubai and Sharjah. Given that tariff rates are approximately 40 per cent less, usage is approximately 30 per cent greater in Abu Dhabi than in Dubai and Sharjah. This may simply be an extension of pure corporate economics in that lower prices lead to greater consumption on the margin (positive demand elasticity). Alternatively, or in conjunction, this could reflect a lack of awareness of subsidies and that consumers are not incorporating the true cost of electricity and water when they make their consumption and/or efficiency investment decisions.

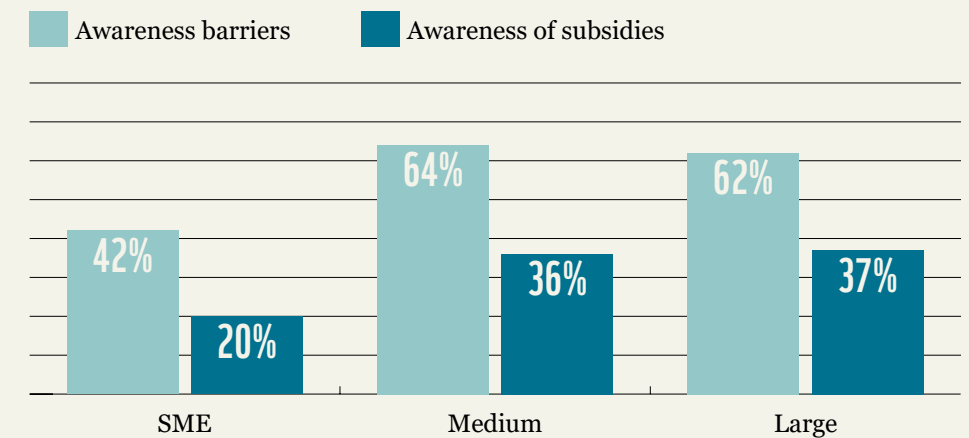
Overall, awareness issues (not just restricted to subsidies) were considered to be less of a barrier to energy and water conservation in Abu Dhabi where tariffs are low and subsidies are high. Table 3.4 shows the percentage of respondents that consider awareness, in general, and awareness of subsidies, specifically, a barrier to energy and water conservation. Abu Dhabi considered awareness less of a barrier and Dubai considered awareness most important.

Figure 3.4 Percentage of respondents that consider awareness a barrier to energy and water conservation



As shown in Table 3.5, smaller organizations were less concerned with awareness being a barrier. It could be that SMEs view themselves as having few opportunities or less control over their electricity and water consumption and hence are less concerned with awareness.

Figure 3.5 Awareness viewed as an issue by company size



In general, emirates with higher tariff rates are more aware of past subsidies and view their utility bills and the awareness of subsidies as more important. This could be because they feel they are already paying close to the true cost of electricity and water and are concerned that consumers in emirates with lower tariff rates are behaving differently and need to be educated.

Respondents facing lower tariff rates were less concerned about their utility bills (which seems logical). In addition, they were less concerned about awareness of subsidies; however, it is unclear whether their decreased concern regarding awareness is because of a lack of interest or because they think the population is already well informed about the true cost of electricity and water. Abu Dhabi began including in customers' bills the amount of subsidy associated with their electricity and water consumption (see Figure 3.3). Thus, this information has been available, but as reported in the survey, does not appear to have had a significant impact on consumption.

2.4 PRICE ELASTICITIES FOR ELECTRICITY AND WATER

Increasing tariff rates and educating consumers about the subsidies will only be effective if they lead to changes in behaviour and investments in efficiency. The degree to which demand changes in response to a unit price change is referred to as demand elasticity with respect to price (percentage change in demand/ percentage change in price).

For commercial customers, demand elasticity depends on factors such as:

- The ability to influence consumption (if they are leasing, what control does the company have over technology/efficiency?);
- Short-term versus long-term perspectives of business opportunities and occupancy decisions;
- The availability of resources, both financial and staff, to investigate and pursue efficiency opportunities.



THERE IS AN URGENCY FOR TARIFF REFORM NOW BECAUSE IT WILL TAKE TIME TO REALIZE THE FULL LONG-TERM BENEFITS

Previous studies have found for the commercial sector the short-run price elasticity is approximately -0.20 and the long-run price elasticity estimate is approximately -1.0 (Bernstein & Griffin, 2006). The long-term elasticity is larger than the short-run elasticity because in the long run companies have more options and opportunities to invest in efficiency. Thus, one would expect to see smaller behavioural change (savings) in the short run and greater changes in the long run. This could imply that there is an urgency for tariff reform now because it will take time to realize the full long-run benefits.

There is no empirical evidence to support the premise that commercial companies in the UAE are less demand elastic with respect to price compared with other countries. However, one could speculate that local business practices and regulation could influence companies' ability to manage/influence/drive efficiency and that the transient nature of businesses and the workforce can lead to short-term business models.

In conclusion, subsidies for electricity and water, as well as other sectors of the economy, have been a historical reality (and expectation) in the UAE and other GCC countries. This practice has influenced many of the other barriers to adoption of energy and water efficiency. For example, subsidies have stunted the markets for high efficiency products by reducing the benefits to consumers and making new, more efficient technologies, appear to be more costly than they are relative to standard efficient products. Survey respondents appear to believe that increasing the level of awareness of subsidies is an important first step in acknowledging this underlying factor which is a key driver for many of the other barriers to adoption identified in the survey. However, increasing awareness alone will not be as effective as tariff reform which actually reduces the level of subsidies.

Opportunities and solutions to issues related to subsidies were provided by survey respondents and discussed at a roundtable meeting held in Abu Dhabi, in September 2015, focused specifically on this topic.

Figure 3.6 Example of an ADDC utility bill showing subsidy calculation

Customer support
 contact centre 800 2332
 via email contactcentre@addc.ae
 by post PO Box 219, Abu Dhabi
 visit our website www.addc.ae
 SMS 2800

Customer details
 Customer ID 123456789
 Account number 5234430000
 Bill number 523443049037
 Bill date 04/09/2011
 Please pay by 14/09/2011
 Premises ID 5234430702
 Type <Flat/Villa>

Estimated reading

Supply address: ADDRESS ADDRESS ADDRESS ADDRESS
Landlord: NAME NAME NAME NAME NAME

Meter details
 Meter number 0591668508
 Meter reading 118337
 Total units 5,457
 Date of meter reading 04/09/2011
 Days of use 16

Your electricity bill

AED	Account activity
1,564.25	Balance from last bill
1,000.00	Payments received since last bill
564.25	Amount in arrears
Consumption charges	
480.00	3,200 units at 15 fils/unit
338.55	2,257 units at 15 fils/unit
818.55	Total
1,506.13	Actual cost at 27.6 fils/unit
687.58	Subsidy
818.55	Charged to customer
0,000.00	Other charges
0,000.00	Adjustments/Corrections
1,382.00	Total to pay

Customer details

Your payment slip

BENEFICIARY NAME
 CUSTOMER NAME
 BILLING ADDRESS LINE 1
 BILLING ADDRESS LINE 2
 BILLING ADDRESS LINE 3
 BILLING ADDRESS LINE 4

Bill number 523443049037
 Account number 5234430000
 Bill date 04/09/2011
Total to pay 1,382.80
 Please pay by 14/09/2011

We're leading the way in energy change. Find out more at www.addc.ae

3. OPPORTUNITIES AND SOLUTIONS

3.1 SOLUTIONS IDENTIFIED FROM THE SURVEY AND ROUNDTABLE MEETING



SUBSIDY
TRANSPARENCY,
CONSISTENT
CALCULATION
METHODOLOGY [...] AND A STATEMENT
THAT THE UAE IS
GOING TO MOVE TO
FULL COSTING WOULD
HAVE THE GREATEST
IMPACT

The EWS-WWF survey asked for potential solutions to the lack of awareness of existing subsidies. Respondents provided three main suggestions and weighted them equally.

3.1.1 Awareness campaign to raise the knowledge level of subsidies

An awareness campaign to raise the knowledge level of subsidies would ensure that companies and their management/workers were fully aware that the tariff rate they are paying does not cover the full cost of electricity and water. Whereas most individuals know that electricity and water have been subsidized in the past, they may be under the misperception that recent tariff increases have eliminated that problem. Additionally, it is unclear whether the attempts to communicate the true cost of subsidies have been effective in increasing awareness of subsidies and whether increasing awareness has had a measurable impact on consumption levels.

In March 2012, Abu Dhabi introduced new water and electricity bills to facilitate a better understanding and at-a-glance visibility of whether usage was average—“in the green”—or above ideal average—“in the red.” The main message was that following tariff changes, staying “in the green” is the cost-effective and sustainable option. Now the bills also include an explicit accounting of the amount of subsidy covered by the government. This is one example of activities that could be expanded to increase awareness of subsidies.

In addition, more specific and localized examples of tested awareness campaigns could be instituted, such as awareness on consumption through smart meter displays. Results from an RSB–Abu Dhabi Powerwise programme about smart metering showed that “the majority of results are attributed to the customer display unit and customer education because they are present throughout the entire 24-hour period,” whereas peak pricing, which increases the tariff during peak hours (2 pm to 8 pm), resulted in “very little electricity shifted from peak hours to off-peak hours,” only 0.76 per cent attributed to time-of-day pricing.

3.1.2 Workshops and seminars

Workshops and seminars would be helpful in communicating the true cost of electricity and water production. These could be linked to existing business conferences and potentially a focus of the upcoming Dubai Expo 2020. Existing workshops and seminars have been widely implemented in Abu Dhabi and Dubai, with perhaps less emphasis in Sharjah, about energy, sustainability and green measures. Whether workshops and seminars have had an impact should be further investigated to identify if demand from the private sector has, in fact, changed. More investigation should be done on the type of content or topics the private sector would value to help them reduce consumption.

3.1.3 White paper reports

White paper reports to encourage energy efficiency were cited by survey respondents as being an important part of the information dissemination plan for subsidy awareness. Public announcements about efficiency goals and targeted reduced consumptions are typically vague and results go uncommunicated. A more robust documentation of the true cost of electricity and water and transparent discussion of the level of subsidies and their impact on economic activity is needed.

All three of the solutions identified by survey respondents have merit. However, it could be said that the first two (awareness campaigns and workshops/seminars) have been underway to some degree. Whereas they are an important component of a comprehensive plan, they may not solve the awareness issue by themselves. What is likely to be most effective in tackling the awareness barrier is the documentation and public dissemination of the true cost of electricity and water. Subsidy transparency, consistent calculation methodology (uniform across emirates) and a statement that the UAE is going to move to full costing would have the greatest impact

3.1.4 Complementary barrier: lack of urgency

Whereas lack of urgency for improvements in energy and water efficiency is not a solution, it does support the need for the informational and educational activities identified by survey respondents. This is related because even if consumers are aware that there is some level of electricity and water subsidies, they may believe this issue can be addressed in the future. Historically, this has been the prevalent view—existing consumption and subsidies are not sustainable—but short-term growth is more important now.

The survey respondents identified several solutions to address the lack of urgency (listed in order of frequency below), many of which are the same as for subsidy awareness issues, indicating that these barriers are related and intertwined:

- Targets for annual consumption reduction
- Awareness campaign to raise the knowledge level
- Workshops and seminars
- Support from an Energy and Water Efficiency Centre
- White paper reports to encourage energy efficiency

3.1.5 Transparency of the true cost of power and water

A common and transparent approach for calculating the true cost of power and water needs to be developed and implemented across the UAE. Information on the core costs, such as the ones shown in Figure 3.7, would help standardize the method for calculating and disseminating the true cost. Note that Figure 3.7 is not intended to be a comprehensive approach, but illustrates how actual system payments and subsidized inputs could be included when calculating and disseminating information on the full size of subsidies. A common approach used across all emirates would help communicate this information.

Figure 3.7 Components of the true cost of power and water

Dubai		Abu Dhabi	
	Supply Management		ADWEA/ADWEC
DEWA	Distribution		ADDC/AADC
	Transmission		Transco
System Payments	Variable O&M		
	Generation	Capital payments	IWPPs
		Fuel payments	
Subsidies	Fuel Subsidies		
	Land and other input subsidies		
	Financing subsidies		
	Externalities (CO ₂ , PM, NO _x)		

Source: These components were identified during the subsidy roundtable meeting held in Abu Dhabi, on 7 September 2015.

3.1.6 Transparency of future tariff reform and indexing

Communicating future trends and government's intent to move toward cost-reflective tariffs would be an effective way to increase awareness of subsidies. Many electricity and water efficiency investments are long-term decisions. High efficiency equipment can have 10- to 20-year life expectancies and changing employee behaviour and attitudes can take time. Thus, the expectation of what corporate rates will be in the future has just as much impact on investment decisions as does the existing tariff rate.

Transparency of the true cost and how tariff rates are likely to change in the future would reduce uncertainty and lower the risk of investments in energy and water efficiency. Information on how seasonal and time-of-day costs vary would help the commercial sector plan for potential changes in time-of-use tariff structures.

The development and communication of price indices, which would drive tariff changes would also be useful. Historically, tariffs have not been indexed to inflation or energy prices and this has led to a gradual decrease in the real (inflation-adjusted) tariff rate over time. If consumers think that electricity and water might be less expensive in the future, this will influence their investment decisions in efficiency and conservation. However, tariffs are not likely to decrease in the future and this changes the trend moving forward, which should be confirmed by the government and communicated to consumers. Providing information that tariff rates will likely continue to rise to approach the true cost of electricity and water would be helpful in managing future expectations.¹³

Tariff rate projections in all emirates and the fact that they are indexed to inflation should be part of a broader commercial education/communication programme. The message is to be forward looking and invest now.



¹³ For example, in Abu Dhabi, the government rate has moved to true cost (29.3 fils/kWh) with the commercial sector increasing from only 15 to 16 fils/kWh. The authors speculate that this could be a signal to the commercial sector that future rate increases should be expected, but this has not been stated officially. If the commercial sector is likely to be next to be moved to true cost, communicating this information now could influence current longer-term investment decisions in efficiency.



LEVERAGING
MARKET FORCES TO
PROMOTE ADOPTION
IS ESSENTIAL—AND
THIS REQUIRES TARIFF
REFORM

3.2 CONCLUSION

The existence and lack of awareness of subsidies is a major barrier to the adoption of energy and water efficiency technologies in the UAE. Subsidies also feed into a larger set of barriers and a wider context, as discussed in this paper. Increasing the awareness of subsidies is a first step, but requires commercial companies and their employees to be willing to act on altruistic motivations. Leveraging market forces to promote adoption is essential—and this requires tariff reform. In this light, one of the key benefits of increasing the awareness of subsidies may be the increased social acceptance that tariff reform is needed and should be expected in the future, hence influencing efficiency investment decisions.

Historically, subsidies and a lack of awareness of them have distorted price signals and limited the development of a robust market for high efficiency products. DSM programmes (rebates, loans and facilitating ESCOs) have the potential to promote early adoption of efficiency products but may only be temporary solutions should tariff reform not reflect the appropriate true cost of the utilities provided.

Subsidized electricity and water leads to a conglomerate of barriers and tackling the issue needs a comprehensive approach. This approach could include, but not be limited to,

- Developing transparent true-cost calculations;
- Targeting awareness of these true costs;
- Developing a federal roadmap for tariff reform to manage and inform expectations; and
- Monitoring the impact of tariff reform on awareness, perceptions and consumption.

A continued lack of transparency and uncertainties regarding the true levels of subsidies due to differences in calculation methods will definitely hinder the process. Underpinning any and all initiatives to increase the awareness of subsidies and subsequent tariff reform is the development of an agreed upon approach to calculating the true cost of electricity and water, and communicating this effectively. This calculation approach should include accounting for all direct and indirect subsidies included in submarket fuel prices and other government services used as inputs to production (such as electricity consumed for pumping water). Ideally, this true cost would eventually be tied to tariff rates. However, in the interim, communicating the actual subsidy being provided by the government and the full accounting of resources linked to consumption of electricity and water is an important step in setting the stage for future policy initiatives.

Another issue that warrants further discussion is the extent to which activities are organized at a federal- versus emirate-level. Admittedly, the seven emirates are different in terms of their customer base and resources available to invest in demand side and may have different views on tariff structure subsidies. However, coordinated efforts at the federal level would likely be more efficient. And given the interconnected nature of electricity and water supply, an optimal policy should be based on the conditions and trends across all the emirates.

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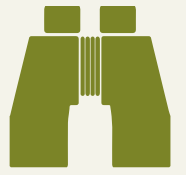
6. تطوير خطط تمويل للطاقة المتجددة ومبادرات كفاءة استهلاك الطاقة: تقديم خطط للتمويل

لتمكين المستهلكين من شراء المعدات الأكثر كفاءة. يلزم توافر مجموعة متنوعة من آليات التمويل لكل من الشركات الصغيرة والمتوسطة والشركات الضخمة، حيث يختلف حجم احتياجاتهم من الكفاءة وقد تتطلب هذه الشركات تقنيات مختلفة. كما يمكن أيضاً للقطاع الخاص أن يلعب دوراً في تعزيز التمويل لكفاءة الطاقة والمياه من خلال تقديم مخططات تهدف إلى تحفيز المستهلكين بطريقة مادية لزيادة كفاءة الطاقة والمياه لديهم. تتضمن أمثلة الخطط التمويلية التي يجب أن يُنظر فيها القروض الخضراء، والتخفيضات على المنتجات، والسندات الخضراء.

7. التواصل مع المستهلكين وتحفيزهم على اتخاذ قرارات فعّالة.

تعد أنشطة الاتصال ونشر المعلومات التي تتجاوز التوعية أمراً بالغ الأهمية للمستهلكين للعثور على أفضل المنتجات واتخاذ قرارات أكثر استنارة. فهي تضمن تغيير طريقة تفكير وتصرف المستهلكين. يجب تغيير رأي المستهلكين عن افتراضات قائمة عن كفاءة استهلاك الطاقة والمياه والتي تشمل الافتراض أن المنتجات ذات الكفاءة العالية هي أكثر تكلفة، وكذلك الافتراض أن الممارسات الفعّالة غير متوافقة مع النمو الاقتصادي. ويتحقق ذلك من خلال طريقتين رئيسيتين وهما تطوير الملصقات ومنصات المنتجات العامة التي تقدم معلومات وافية حول كفاءة استهلاك الطاقة والمياه والوفورات الناتجة من استخدام المنتجات الكفوءة. يمكن تطوير منصات المنتجات من قبل عدد من الجهات المعنية: قطاع الأعمال والحكومات والمنظمات غير الحكومية لتقديم الوفورات المتوقعة من استخدام المنتجات المتوفرة وأماكن شرائها. وتعد "توب تين" وقاعدة بيانات منتجات نجمة الطاقة الأمريكية من أنجح هذه المنصات. وسيساعد وجود منصة إماراتية على زيادة الطلب على منتجات الكفاءة وتزويد المستهلك بجميع المعلومات عن كل المنتجات المتوفرة في السوق التجاري.

كما إن التواصل بشأن حسابات التكلفة الحقيقية ونية الحكومة في التوجه إلى تعريفات تعكس التكلفة ستكون طريقة فعّالة لرفع الوعي عن الدعم الموفر لجميع المستهلكين. ولدى توقعات التعريفات المخصصة لشركات القطاع الخاص المستقبلية نفس تأثير أسعار التعريفات الحالية على اتخاذ قرارات متعلقة باستثمارات شركات القطاع الخاص.



لدى توقعات التعريفات المخصصة لشركات القطاع الخاص المستقبلية نفس تأثير أسعار التعريفات الحالية على اتخاذ قرارات متعلقة باستثمارات شركات القطاع الخاص.

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4. وضع معايير، وملصقات، وأنظمة مستندة إلى أسس علمية

تقود الطلب وتحفز العرض مما يوفر للمستهلكين توفراً متزايداً من المنتجات. ذلك أن توفر المزيد من المعدات والتقنيات ذات الكفاءة يحسن اقتصاديات النطاق الواسع ويخفض تكاليف التكنولوجيا. وهذه سياسة ملحة يجب تطبيقها لتخفيض تأثير أهم عائق لتطبيق معايير الكفاءة وهو ارتفاع تكلفة تقنيات اعتماد كفاءة الطاقة والمياه.

- هناك حاجة للمزيد من المعايير عبر نطاق واسع من الفئات للاستفادة من فرصة الكفاءة من خلال زيادة الطلب على التقنيات الكفوءة وإزالة التقنيات ذات الجودة المنخفضة.

- يجب أن تكون المعايير والملصقات صارمة وواضحة وموثوق بها في السوق.

- يجب إيلاء الأولوية لوضع المعايير بناءً على مقاييس محددة مثل الأمان فضلاً عن إمكانية خفض انبعاثات الغازات الدفيئة.
- يجب إنفاذ تطبيق المعايير والملصقات مما يترتب عليه إزالة المنتجات رديئة الجودة وغير الكفوءة من السوق وبناء الثقة في السوق التجاري الإماراتي. سيساعد ذلك في تقليل فرص الاعتقاد بأن التقنيات الكفوءة أغلى من التقنيات غير الكفوءة.
- ستساعد زيادة التمويل الحكومي لتنفيذ المعايير والأنظمة في تحقيق التوسع المقصود للتقنيات ذات الكفاءة وما يقابله من تخفيض الاستهلاك.
- حالياً، لا توجد قوانين تفرض التعديل التحديثي للمباني القائمة. بالإضافة إلى ذلك؛ فإن تنفيذ قوانين البناء الصارمة للمباني الجديدة سوف يحفز تبني التقنيات ذات الكفاءة العالية. تطبيق المعايير والقوانين سيسهل تعويض التكاليف الإضافية للاستثمارات في التقنيات الكفوءة في وقت البناء.

- يجب التنسيق وبناء القدرات عبر هيئات المعايير لتحقيق النجاح في منع دخول المنتجات التي لا تستوفي المعايير في الأسواق التجارية. يتضمن ذلك العمل مع الهيئة الاتحادية للممارك ودائرة التنمية الاقتصادية.

- تعد المراجعة الدورية للمعايير والملصقات أمراً هاماً لضمان تحديثها وتوافقها مع مستوى التكنولوجيا المتوفرة في السوق. يجب أيضاً إيصال وإبلاغ المستهلكين عن المعايير الموجودة بشكل فعّال.

- يجب تنسيق الجهود المبذولة بشأن الملصقات والمعايير عبر دولة الإمارات العربية المتحدة للحد من الإرباك في الأسواق التجارية واستخدام المصادر بطريقة منتظمة. ضعف الاتساق والتطابق عبر الأنظمة، والملصقات، والمعايير يؤدي إلى محدودية توفر المنتجات.

- يتعين على الهيئات المعنية، مثل هيئة الإمارات للمواصفات والمقاييس ومجلس أبوظبي للجودة والمطابقة، أن تتعاون معاً للحد من الإرباك وإزالة الملصقات الزائدة عن الحاجة ومن ثم ضمان صحة المعلومات التي ترد على الملصقات وشمل الوفورات المتوقعة والأسس العلمية المستندة لتطويرها وتوعية المستخدمين بفهم ما تعنيه هذه الملصقات والطريقة الأمثل لاستخدام هذه المنتجات.

إزالة دعم التعريفات للكهرباء والمياه ستعزز تنافسية القطاع الخاص لدعم التنوع الاقتصادي بدولة الإمارات العربية المتحدة.

- تعد دولة الإمارات العربية المتحدة سوقاً صغيراً لهذه المنتجات لذا فإن بذل الجهود للتنسيق على مستوى مجلس التعاون الخليجي والاستعانة بأفضل الممارسات الدولية ستكون طريقة أكثر فعالية لضمان زيادة الطلب على المنتجات الكفوءة. من الهام أن يطبق هذا المنهاج في الوقت المناسب ولا يعرقل الجهود الوطنية.

- دمج الدروس المستفادة في المعايير، والأنظمة، والملصقات المستقبلية. على الهيئات المعنية فهم تأثير المعايير والملصقات على تحول السوق: هل تغيرت الأسعار الكلية/متوسط الأسعار عند تنفيذ قانون/معيار، أم بقيت دون تغيير؟ يمكن الحصول على المعلومات القيمة حول إخفاقات السوق المستمرة، ولكن ماذا يمكن أن يحد من تحول السوق واعتماد المستهلكين لهذه المنتجات، وماهي السياسات الإضافية التي يلزم اتخاذها.

5. الإصلاحات المتواصلة لتعريفات الكهرباء والمياه أمر ضروري،

مع التنسيق الإتحادي للجهود المبذولة لإدارة توقعات المستهلك وتوفير المعلومات التي تبني عليها. إن سياسة كفاءة استهلاك الطاقة التي تتضمن إزالة دعم التعريفات للكهرباء والمياه لن تحفز فقط الاستثمار في كفاءة استهلاك الطاقة لكنها أيضاً ستكشف عن موارد مالية يمكن إعادة استثمارها من قبل الحكومات المعنية في الاقتصاد لتنمية الناتج المحلي الإجمالي. نتيجةً لذلك ستعزز تنافسية القطاع الخاص لدعم التنوع الاقتصادي بدولة الإمارات العربية المتحدة.

- يجب لتبني الشفافية في حسابات التكلفة الحقيقية أن تقترن بالتوعية بالتكلفة الحقيقية المبنية على معادلة متفق عليها عموماً وتستخدم في جميع أنحاء الإمارات. يجب أن يتضمن منهج الحساب حصر كل الدعم المباشر وغير المباشر المدرج في أسعار وقود السوق الفرعية وخدمات فرعية وحكومية أخرى تستخدم كمدخلات للإنتاج (مثل الكهرباء المستهلكة لضخ المياه، وتوزيع الكهرباء والمياه ونقلها وإدارة الإمداد). وستساعد المعلومات عن التكاليف الأساسية على توحيد طريقة حساب التكلفة الحقيقية ونشرها.

- إصلاح التعريفات التي تحدد أسعار الكهرباء والمياه والتي تأخذ في الحسبان المجموعة الكاملة من التكلفة الحقيقية والعوامل الخارجية الاجتماعية والبيئية وبذلك تؤكد فعالية تكلفة منتجات كفوءة باستهلاك الطاقة والمياه مما يحفز التغيير السلوكي.

- وبالنهاية، يتطلب إصلاح التعريفات رصد الآثار فيما يتعلق بالتوعية والإدراك والاستهلاك ومن ثم دمج الدروس المستفادة لضمان النتائج الإيجابية.

التوصيات

سيطلب التصدي لهذه العوائق منهاجاً متعدد الجوانب، ويلزم معالجة العديد من القضايا المعقدة بشكل منظم.

1. وضع سياسة وطنية للتغير المناخي والطاقة وخطة تنفيذ

برغم أن دولة الإمارات العربية المتحدة لديها أجندة اقتصاد أخضر، ورؤية 2021، وخطط على مستوى الإمارات المتعددة، إلا إنه لا توجد سياسة إتحادية بشأن التغير المناخي والطاقة. ينبغي أن تصاغ هذه السياسة بناءً على هذه الرؤى الموجودة، لكي تتضمن أهداف خفض نسبة انبعاثات الغازات الدفيئة، وكذلك خطط عن كيفية توسيع استخدام وتطبيق معايير كفاءة الطاقة والطاقة المتجددة عبر الإمارات. من المتوقع أن توكل وزارة الطاقة بوضع هذه السياسة. ومن العناصر الأساسية لهذه السياسة وضع رؤية لتقييم كفاءة الطاقة كمورد، مع إعطاء الأولوية لجهود كفاءة استهلاك الطاقة والطاقة المتجددة. وفقاً لما ورد في توصيات وكالة الطاقة الدولية 2011 بشأن سياسات كفاءة الطاقة؛ يجب أن تصف الاستراتيجية وخطة التنفيذ العوائق أمام استثمارات الكفاءة، وتضع أهدافاً واضحة، وأطر زمنية تتضمن أهدافاً نسبية لخفض انبعاثات الكربون (التي تشمل أهدافاً لكفاءة الطاقة)، وتحديد تدابير السياسات المحددة والبرامج لتحقيق أهداف الكفاءة. بالإضافة إلى ذلك، من الأهمية البالغة تتبّع التقدم المحرز في التطبيق وتحديث الخطط بانتظام. لتحقيق ذلك يجب تحديد أدوار المؤسسات ومسؤولياتها لتخطيط سياسات وبرامج الكفاءة وتنفيذها ومراقبتها.

2. تحسين حوكمة وقدرات المؤسسات المعنية

من المهم زيادة التعاون ما بين الهيئات على مستوى الإمارة وعلى المستوى الاتحادي أيضاً لتفادي الإزدواجية في الجهود المتعددة في الدولة. كثيراً ما توجد جهود متنافسة وغير منسقة على النطاق الإتحادي ونطاق الإمارة والهيئات الحكومية بين الإمارات ولذلك سيكون تفادي ازدواجية الجهود والمواءمة بين الموارد أمراً فيماً وهاماً. ذلك أنه من المرجح أن تكون الجهود الاستراتيجية المنسقة على المستوى الإتحادي أكثر كفاءة إذا نفذت الإجراءات على مستوى الإمارات واستطاعت وزارة الطاقة لعب دور رئيسي لتسهيل ذلك. ينبغي أيضاً أن يكون لدى المؤسسات على كل من المستوى الإتحادي ومستوى الإمارة موارد وافية لتنفيذ تدابير كفاءة الطاقة بشكل فعال حيث يتضمن ذلك توفير كل من الموظفين ذوي المهارة والمديرين وكذلك الموارد المالية لتنفيذ الخطط.



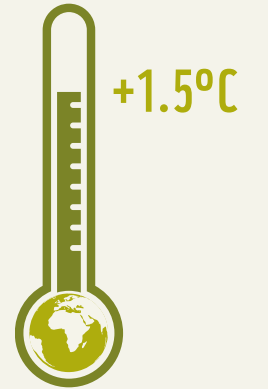
يلزم تطوير عملية شاملة ومنفتحة عبر القطاع الحكومي والقطاع الخاص والمجتمع المدني التي تبني الثقة وتشارك المعلومات وتطلب التغذية الراجعة وتبقى منفتحة على التغيرات

3. وضع سياسات بناءً على الأسس العلمية السليمة وفتح باب المشاركة الشاملة لأصحاب المصلحة

وفقاً لما ورد في توصيات وكالة الطاقة الدولية 2011 بشأن سياسات كفاءة الطاقة، فإن البحوث والبيانات هي أسس سياسات كفاءة الطاقة وإدارة الطلب الفعالة. على الرغم من وجود بحوث دولية هامة بشأن هذه القضايا، إلا إن دولة الإمارات العربية المتحدة تعد سوقاً فريداً، ومع توافر جودة معلومات أفضل، يمكن تصميم السياسات لتلبية الاحتياجات الخاصة للبلاد. فالبحوث والبيانات المفتوحة والعامّة ستسهل سبل التعاون والتأزر الذين يتيحان تسريع إيجاد الحلول وتحسين الكفاءة. بعض المجالات التي تتطلب إجراء المزيد من البحوث تتضمن:

- تقييم الآثار ووفورات الطاقة والفوائد البيئية والاجتماعية المحتملة لسياسات الكفاءة.
- تقييم السياسات للمساعدة على تحديد القضايا الرئيسية التي يلزم معالجتها لتحقيق تنفيذ فعال. بالإضافة إلى ذلك، تساعد البحوث على تحديد وإدارة أي عواقب غير مقصودة وبتأثيرها وتحديد الاستراتيجيات وأصحاب المصلحة الرئيسيين الذين يمكنهم ضمان فاعلية التنفيذ.
- العلاقة بين الكفاءة وأسعار التقنيات
- فهم لأي مدى يتم اعتبار تكاليف التكنولوجيا عائقاً كبيراً أمام اعتماد تقنية الكفاءة وما السبب وراء ذلك.
- تحليل إمكانية خفض نسب انبعاثات الغازات الدفيئة بالمعايير المقترحة وبذلك اتخاذ قرار بشأن المعايير التي ستبناها الدولة أولاً. سيؤثر هذا البحث إيجابياً على وضع معايير فعّالة وتنفيذها.

لا يمكن لوضع السياسات والتشاور أن يتحوّل إلى ممارسة روتينية لاختصار الطرق، بل يلزم تطوير عملية شاملة ومنفتحة عبر القطاع الحكومي والقطاع الخاص والمجتمع المدني التي تبني الثقة وتشارك المعلومات وتطلب التغذية الراجعة وتبقى منفتحة على التغيرات. سيضمن اتباع هذه العملية مشاركة فعّالة ودعم لتنفيذ السياسات. كما أنه سيساعد أيضاً على تحديد خطط التنفيذ وإقامة الشراكات بين المنظمات لتسهيل ذلك.



سيؤدي وضع سياسة لتغير المناخ والطاقة على النطاق الإتحادي إلى تقدير إمكانية كفاءة استهلاك الطاقة والمياه واعتبارها مورداً مهماً للدولة.

تعريفات الكهرباء والمياه المدعومة

أدت درجة الدعم للكهرباء والمياه في دولة الإمارات العربية المتحدة عبر السنين إلى خلق بيئة لا تعد فيها قضية الحفاظ على البيئة قضية ملحة، وبذلك تم تحية فرص تقديم حوافز اقتصادية للاستثمار في مجال الكفاءة. فانخفاض تعريفات الكهرباء والمياه لا يحفز على الحفاظ على الطاقة ويؤدي إلى انخفاض الإقبال على المنتجات الكفوءة وبهذا ينخفض توافر تلك المنتجات.

3. محدودية فهم دعم الكهرباء والمياه

التقرير الأخير التي يتناول القضية تحت عنوان "دعم الكهرباء والمياه وتأثير ذلك على الاستهلاك في دولة الإمارات العربية المتحدة" يبحث دعم تعريفات الكهرباء والمياه باعتبارها عائقاً لتنفيذ مبادرات ومعايير الكفاءة. يُعرّف الدعم الحكومي للكهرباء والمياه على أنه الفرق بين التكلفة الحقيقية للإنتاج والتوزيع والمعدل التعريفي الذي يدفعه المستهلك. توجد مشكلتان متعلقتان بالتعريفات والدعم واللذان تؤثران على اتباع كفاءة الطاقة والمياه. أولاً، يخفض الدعم سعر التعريفات بشكل متكلف مما يسبب بانحراف الإشارات السعرية وفوائد التقنيات الكفوءة المادية، وهذا يحد من تطوير سوق تجاري فعّال لمنتجات كفاءة في دولة الإمارات العربية المتحدة. ثانياً، وفقاً لما تشير إليه نتائج المسح، قد لا يكون المستهلكون مدركين تماماً للتكلفة الحقيقية للكهرباء والمياه والدعم الناتج عن ذلك. وفي العديد من الإمارات؛ تكون التكلفة الحقيقية للطاقة والمياه غير متاحة للعمامة. فالتحليل الحسابي الحقيقي معقد بسبب الإنتاج المشترك للكهرباء والمياه المحلاة، والغاز الطبيعي كمدخل، والدعم التصاعدي لاستخدام الأراضي والبنية التحتية ومواد البناء، لكنها لا تأخذ بعين الاعتبار التأثيرات البيئية والصحية السلبية. بالإضافة إلى ذلك، فإن أسعار التعريفات وحسابات التكلفة الحقيقية غير موحدة في جميع الإمارات. ومع الافتقار إلى الشفافية قد يكون توقع التغييرات على التعريفات أكثر صعوبة للشركات، بذلك يرتفع مستوى عدم التيقن والمخاطرة بالقيام بالأعمال مما يؤثر على الرغبة في الاستثمار في مجال الكفاءة.

يمكن للافتقار إلى الشفافية أن تؤثر على الرغبة في الاستثمار في مجال الكفاءة.

نظرة مختصرة

كيفية التصدي للعوائق الرئيسية لكفاءة استخدام الطاقة والمياه في دولة الإمارات العربية المتحدة

7 توصيات لصناع السياسات

1 وضع سياسة وطنية للتغير المناخي والطاقة وخطة تنفيذ.

2 تحسين حوكمة وقدرات الجهات المعنية.

3 وضع سياسات بناءً على الأسس العلمية السليمة وفتح باب المشاركة الشاملة لأصحاب المصلحة.

4 وضع معايير وملصقات وأنظمة مستندة إلى أسس علمية.

5 الإصلاحات المتواصلة لتعريفات الكهرباء والماء أمر ضروري.

6 تطوير خطط تمويل للطاقة المتجددة ومبادرات كفاءة استهلاك الطاقة؛ تقديم خطط للتمويل.

7 التواصل مع المستهلكين وتحفيزهم على اتخاذ قرارات فعالة.

ملخص العوائق الثلاثة الرئيسية

1. ارتفاع تكلفة تقنيات اعتماد كفاءة الطاقة والمياه

حدد المستجيبون للمسح الاحصائي أن هذه النقطة هي العائق الرئيسي أمام تطبيق إجراءات وممارسات الحفاظ على الطاقة والمياه في دولة الإمارات العربية. يشير تقرير بحث القضية الذي يتناول هذه النقطة تحت عنوان " اعاقه تكلفة التكنولوجيا العالية لاعتماد كفاءة الطاقة والمياه في القطاع الخاص في دولة الإمارات"، إلى أن التكاليف التقنية لا تعد عائقاً بسبب السعر المعروض فحسب، بل أيضاً بسبب تكاليف التقنية العالية المتصورة. وفي هذا السياق فإن "ارتفاع تكاليف التكنولوجيا" قد لا يعكس تكاليف الشراء فقط، بل يشير إلى أن فوائد التكنولوجيا المادية لا تتجاوز تكلفة تبنيها. وفي ضوء ذلك فإن ثمة مجموعة كبيرة من العوامل التي يمكن أن تؤثر على فعالية تكاليف اعتماد تقنيات كفاءة الكهرباء والمياه (مما يعني مقارنة/تحليل للفوائد فيما يتعلق بالتكاليف):

- ارتفاع تكاليف التطبيق والتشغيل فيما يتعلق بالتكلفة، يمكن لتكاليف التطبيق والتشغيل المرتفعة أن تكون بالغة وذات تأثير سلبي على فعالية التكلفة. تشمل تكاليف التطبيق والتشغيل والتخطيط والبحث في التكنولوجيا والحصول على الموافقات من مديري الشركات وتنفيذ جميع أعمال المتابعة مثل توثيق تنفيذ مبادرات الكفاءة أو توثيق الوفورات المحققة. يؤثر نقص المعلومات عن أو محدودية توافر المنتجات على تكاليف التطبيق والتشغيل وقد يؤدي أيضاً إلى ارتفاع سعر الشراء. كما يمكن لنقص المعلومات أن يساهم في ارتفاع عدم التيقن والمخاطر المرتبطة بالاستثمار في التقنيات الكفوءة، مؤدياً إلى ارتفاع التكاليف المتصورة للمنتجات والتقنيات الكفوءة.
- قلة رأس المال أو ارتفاع تكاليف التمويل يؤدي إلى التصور أن أسعار التقنيات مرتفعة.
- انخفاض تعريفات المرافق، وهو نتيجة توفير الدعم والذي يعيق تحقيق مدخرات كبيرة من كفاءة الطاقة ويؤثر سلباً على معادلة فعالية التكلفة. لذا كلما طال الوقت لتحقيق المدخرات كلما قل الحافز للاستثمار في تقنيات عالية الكفاءة.
- محدودية تطوير وتطبيق معايير المعدات الكفوءة

يعد السوق التجاري الإماراتي صغيراً نسبياً وغير ناضج بما لديه من معايير قليلة خاصة بالمنتجات والبناء، مما يؤثر على مستوى الطلب على المنتجات الكفوءة وبالتالي على توافر تلك المنتجات. نتيجة لذلك، يقل عدد خيارات التكنولوجيا مما يؤدي إلى انخفاض المنافسة وعدم وجود اقتصاديات النطاق الواسع لتخفيض الأسعار. على الرغم من إدراج بعض المعايير في دولة الإمارات العربية المتحدة، فلم يمض الكثير من الوقت على تبني المعايير التي من شأنها تعزيز سوق تجاري أضخم لهذه التقنيات مما يؤدي بدوره إلى انخفاض الأسعار. وعلاوة على ذلك فإن معايير البناء الجديدة تتطلب تنفيذاً سليماً للتقليل من التكاليف الإضافية من خلال الإلتزام بتركيب التقنيات الفعالة أثناء عمليات البناء، حيث تنخفض التكلفة مقارنةً بإدخال التعديلات.



في مناخ شهد نهوياً اقتصادياً سريعاً فإن السوق التجاري قد عُمر بالكثير من المنتجات غير الكفوءة والمنخفضة الجودة

2. قلة توفّر المنتجات الكفوءة وإمكانية دخولها السوق التجاري

هذا التقرير الذي يتناول القضية تحت عنوان "عوائق اعتماد كفاءة الكهرباء والمياه في دولة الإمارات العربية المتحدة: توافر المنتجات وإمكانية دخول السوق التجاري" يبحث الأسباب الجذرية التي تحد من إمكانية الحصول على المنتجات ذات الجودة العالية والكفوءة. وفي مناخ شهد نمواً اقتصادياً سريعاً فإن السوق التجاري قد عُمر بالكثير من المنتجات غير الكفوءة والمنخفضة الجودة مما يصعب من إمكانية الوصول إلى التقنيات الأكثر كفاءة. لم تلق الجهود التي بذلت لإدخال إجراءات تحسين الجودة والكفاءة للمنتجات المتوفرة للمستهلكين سوى القليل من النجاح في المساهمة بنضوج السوق التجاري. وعلى غرار تكاليف التقنيات فإن العديد من العوامل الجذرية والمترابطة قللت من توافر المنتجات وإمكانية دخولها للسوق التجاري.

الأنظمة، والمعايير، والملصقات

تتفد أنظمة ومعايير المنتجات لضمان عدم استمرار التقنيات القديمة وغير الفعالة في السيطرة على السوق التجاري. وعلى كل من المستوى الاتحادي ومستوى الإمارة، ومدى توافرها، بإمكان بعض القوانين واللوائح التي شُرعت أو التي يُنظر في تشريعها أن تؤثر بشكل مباشر أو غير مباشر على استخدام منتجات كفاءة الطاقة والمياه. ويوجد الكثير من الهيئات الحكومية التي تسعى إلى اتخاذ هذه التدابير، لكنها غالباً ما تعمل بشكل فردي في إنشاء مجموعة متنوعة من الأنظمة، والمعايير، والملصقات (على سبيل المثال، علامة الجودة الإماراتية الصادرة عن هيئة الإمارات للمواصفات والمقاييس وعلامة الثقة التي صدرت في إمارة أبوظبي وملصقات كفاءة الطاقة مثل ملصق الطاقة الصادر عن الاتحاد الأوروبي ونجمة الطاقة الأمريكية). في نهاية الأمر، قد تساهم هذه المجموعة المتنوعة من الملصقات إلى إرباك الأسواق، مما يؤثر سلباً على قدرة المستهلكين على الحصول على المنتجات الأكثر كفاءة وفي ذلك أيضاً مساهمة في إحداث ثغرات قد يستغلها الموردون لصالحهم.

من الممكن أن تتأثر سمعة أداء المنتجات الكفوءة سلباً بنقص الإمكانيات لتطبيق المعايير في جميع أنحاء الدولة حيث قد يتسبب ذلك في عدم التيقن وزيادة المخاطر التي تحول دون التنفيذ وبالنسبة لضعف مصداقية المعايير والأنظمة. لا تخصص الحكومات المحلية المكلّفة بالتحقق من تنفيذ المنتجات أو المعايير في معظم الأحيان قوة عاملة أو موارد تكنولوجية كافية لتنفيذ المعايير وفحص المنتجات. وتعد المعايير الصارمة من أسس نجاح سياسات كفاءة الطاقة، وكما أنه هناك حاجة لإجراء تقييم دوري لقياس أثر تحسين متطلبات المعايير. ذلك أن بناء معايير صارمة يتطلب وجود قدرة كافية في المؤسسات الحكومية المسؤولة عن تطويرها وتنفيذها.

مقدمة

تهدف هذه المقالة إلى تلخيص أهم ثلاثة عوائق تحول دون كفاءة الطاقة والمياه والتوصيات حتى يتم التصدي لها في دولة الإمارات العربية المتحدة. تم استنتاج هذه العوائق من استتصاء احصائي يمثل 363 شركة في دولة الإمارات العربية المتحدة. ويشمل الجمهور المستهدف من هذه المقالة صناع السياسات المعنيين بالطاقة والاقتصاد على المستوى الاتحادي وعلى مستوى الإمارة ، وصناع القرار المتخصصين في المرافق، وهؤلاء الذين يسعون إلى تحقيق كفاءة الطاقة وتخفيض أثار التغير المناخي. وتهدف هذه المقالة إلى المساهمة في النهوض بتطوير سياسات شاملة وفعّالة وتستند إلى البحوث من خلال تحفيز الحوار بين أصحاب المصالح الرئيسيين وإطلاع صناع السياسات والقرار فيما يتعلق باعتماد واسع النطاق لكفاءة الطاقة والمياه. تهدف جمعية الإمارات للحياة الفطرية أن تشارك توصيات الأبحاث مع صانعي القرارات، وأن تسلط الضوء على أهمية معالجة العوائق الموجودة في القطاع الخاص لتنفيذ تدابير الكفاءة.

التغير المناخي وكفاءة الطاقة

اتفاقية المناخ العالمية التي عُقدت مؤخراً في باريس بهدف الحد من ارتفاع درجات الحرارة بالدرجة المثالية التي تبلغ 1.5 درجة مئوية تعني أن العالم ودولة الإمارات العربية المتحدة سيحتاجان إلى إحداث تغيير جذري في طريقة إنتاج واستهلاك الطاقة. إذا لم تُتخذ خطوات جادة لمواجهة الأزمة، فمن المتوقع لدرجات الحرارة العالمية أن ترتفع أكثر من درجتين مئويتين، مما يؤدي إلى حدوث تأثيرات كبيرة على الطعام، والمياه، والبنية التحتية، وصحة ورفاهية الشعوب؛ بما في ذلك دولة الإمارات العربية المتحدة. تعني هذه القضايا أن دولة الإمارات العربية المتحدة تحتاج لجعل أحداث التغير المناخي أولوية وطنية.

سيتطلب ذلك من الدولة القيام بالتالي:

- اتخاذ إجراءات استباقية على مستوى دولي لضمان الفعالية في تنفيذ اتفاقية باريس.
- أن تكون الدولة مثالاً يُحتذى به محلياً بشأن التخفيف من تغير المناخ بوضع أهداف وخطط محلية ملموحة لتخفيض الغازات الدفيئة المدعومة بالاستثمار الكافي لتحقيقها.
- البدء في تنفيذ خطط التكيف للتغير المناخي المستندة على أسس علمية.

شهدت دولة الإمارات العربية المتحدة تطوراً اقتصادياً ضخماً، مما أدى إلى زيادة كبيرة في انبعاثات الغازات الدفيئة بمعدل 5% سنوياً من عام 1994 إلى 2013¹. في عام 2014، أنتج قطاع الطاقة 80% من جميع الغازات الدفيئة للدولة، حيث كان المصدر المباشر لـ 35% من هذه الإنبعاثات إنتاج الكهرباء والماء (وزارة الطاقة، 2016). من المتوقع أن يتضاعف الطلب على الطاقة بحلول 2030، ويرتفع استخدام المياه بنسبة 44% بحلول عام 2025 (برنامج الأمم المتحدة للبيئة، 2013).

^[1] حسب هذا المعدل بالاستعانة بالبلاغ الوطني الثالث لوزارة الشؤون الخارجية (وزارة الشؤون الخارجية، 2012 أ) وقوائم جرد غازات الدفيئة 2012 و2013 من وزارة البيئة والمياه (وزارة البيئة والمياه، 2014 أ) ووزارة الطاقة (وزارة الطاقة، 2015). على التوالي


بالرغم من الخطوات التي اتخذتها دولة الإمارات العربية المتحدة لتطبيق معايير وسياسات زيادة كفاءة استهلاك الطاقة ومنها تقليل الدعم لأسعار تعريفات الطاقة والمياه لكن العوائق الرئيسية ما زالت موجودة

أما على الصعيد العالمي، فإن كفاءة الطاقة تقدم فرصة هامة للحد من الانبعاثات بصورة كبيرة والتي تلزم إبقاء معدل ارتفاع درجة الحرارة العالمية أقل من 1.5 درجة مئوية، وبحلول عام 2020 يمكنها خفض الانبعاثات بنسبة 49% (الوكالة الدولية للطاقة، 2013). وعلى الرغم من ذلك، فإن الفرصة لم تُدرك بالكامل بعد، فمن المتوقع عدم تحقيق ثلثي² إمكانية كفاءة الطاقة حتى حلول عام 2035 ان لم يتم تغيير السياسات والمعايير المطبقة حالياً (الوكالة الدولية للطاقة، 2014 ب). وفي دولة الإمارات العربية المتحدة، حيث يتم غالباً التوليد المشترك للطاقة ومياه الشرب في محطات الطاقة، يمكن لكفاءة الطاقة والمياه أن تساهم بالحد من انبعاثات ثاني أكسيد الكربون بحوالي النصف وبتكلفة ضئيلة مقارنةً بالتدابير التي تتخذ لزيادة إمدادات الطاقة (مصدر، 2009).

وعلى الرغم من بدء دولة الإمارات العربية المتحدة في اتخاذ بعض الخطوات الجادة تجاه تحقيق كفاءة الطاقة، مثل الخطوات التي تم اتخاذها والتي هدفت إلى إصلاحات متواضعة للدعم الحكومي لأسعار الطاقة والمياه، لا يزال هناك الكثير من العوائق تجاه تحقيق كامل إمكاناتها. أخذ هذه العوائق بعين الإعتبار سيساعد في تطوير السياسات لضمان فعاليتها عند تطبيقها.

عملت جمعية الإمارات للحياة الفطرية بالتعاون مع الصندوق العالمي لصون الطبيعة مع منظمات القطاع الخاص لمدة أربعة أعوام للحد من انبعاثات الكربون³، ولوحظ أن هذه الشركات تواجه العديد من العوائق لحد انبعاثات الكربون من خلال تطبيق تدابير كفاءة الطاقة والمياه. ويهدف تحديد العوائق الأكثر شيوعاً، أجرت جمعية الإمارات للحياة الفطرية مسحاً إحصائياً عبر المشاريع الصغيرة والمتوسطة والمنشآت التجارية متوسطة الحجم والمنشآت التجارية كبيرة الحجم في أبوظبي ودبي والشارقة⁴ والذي تم استعراض نتائجه في تقرير "ما هي حواجز القطاع الخاص في اعتماد سياسات كفاءة استهلاك الطاقة؟". وجد هذا المسح أن 4.4% فقط من الشركات تطبق تدابير كفاءة الطاقة أو المياه. كما حدد المسح أيضاً العوائق المدركة الأكثر شيوعاً وهي كما يلي:

1) ارتفاع تكاليف تقنيات اعتماد كفاءة الطاقة (37%)

2) قلة توفر المنتجات الكفوءة (34%) وإمكانية دخولها السوق (27%)⁵.

و3) قلة الوعي عن مستوى الدعم الحكومي لأسعار تعريفات الكهرباء والمياه (25%).

أعدت أبحاث القضية⁶ للتوسع في بحث هذه العوائق بهدف تحقيق فهم أفضل لها والبدء في تحديد الحلول الممكنة لتسريع مساهمة القطاع الخاص في اعتماد الكفاءة. اعتمدت أبحاث القضية النهائية تعليقات من أصحاب المصالح المشتركة من جميع أنحاء دولة الإمارات العربية المتحدة وذلك من خلال ثلاثة اجتماعات عقدتها الجمعية.

^[2] بالنسبة للبيانات، فإن الإمكانات غير المحققة حتى أكثر تطرفاً، حيث النسبة المقدرة لتظل فرص الكفاءة غير مستغاد منها بحلول عام 2035 تبلغ 80% (وكالة الطاقة الدولية، 2014 ب).

^[3] للمزيد من المعلومات حول مشروع أبطال القطاع الخاص، يرجى زيارة http://uae.panda.org/ews_wwf/achievements/heroesofthuae_achievement

^[4] للمزيد من المعلومات، يرجى قراءة تقرير موجز مسح جمعية الإمارات للحياة الفطرية بالتعاون مع الصندوق العالمي لصون الطبيعة

^[5] باعتبار تداخل الموضوعين، جمع عائقا إمكانية الوصول إلى السوق وتوافر المنتجات في وثيقة واحدة تتناول القضيتين.

^[6] وضعت وثائق القضية بالاشتراك ما بين جمعية الإمارات للحياة الفطرية بالتعاون مع الصندوق العالمي لصون الطبيعة ومعهد البحوث المثلثية الدولي: 1) تكاليف التكنولوجيا باعتبارها عائق لكفاءة استخدام الطاقة والمياه في القطاع التجاري لدولة الإمارات: 2) العوائق أمام كفاءة استخدام الكهرباء والمياه في دولة الإمارات العربية المتحدة: توافر المنتجات والوصول إلى السوق: 3) دعم الكهرباء والمياه والتأثير على الاستهلاك في دولة الإمارات العربية المتحدة.

^[1] اغتنام الوفود غير المنظور: استغلال الفرص المتاحة لتطبيق معايير كفاءة استهلاك الطاقة والمياه في القطاع الخاص في دولة الإمارات

^[2] اغتنام الوفود غير المنظور: استغلال الفرص المتاحة لتطبيق معايير كفاءة استهلاك الطاقة والمياه في القطاع الخاص في دولة الإمارات

كيفية التصدي للعوائق الرئيسية لكفاءة استخدام الطاقة والمياه في دولة الإمارات العربية المتحدة - ملخص لصناع السياسات

مارس 2016

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عن جمعية الإمارات للحياة الفطرية (بالتعاون مع الصندوق العالمي للطبيعة)

إن جمعية الإمارات للحياة الفطرية إماراتية بيئية غير ربحية أنشئت تحت رعاية صاحب السمو الشيخ حمدان بن زايد آل نهيان، ممثل الحاكم في المنطقة الغربية ورئيس مجلس إدارة هيئة البيئة- أبوظبي وذلك في عام 2001.

تعمل جمعية الإمارات للحياة الفطرية منذ تأسيسها بالتعاون مع الصندوق العالمي للطبيعة، وهو أحد أكبر المنظمات البيئية المستقلة في العالم وللصندوق شبكة مكاتب تنتشر عبر 100 دولة.

تكمّن رؤيتنا في بناء مستقبل مستدام يعيش فيه الإنسان بتناغم مع الطبيعة، وهدفنا هو المحافظة على البيئة بالتصدي لأهم التهديدات والضغط عليها. نحن نعمل مع الأفراد والمؤسسات في دولة الإمارات والمنطقة لتطبيق حلول المحافظة البيئية وذلك من خلال إجراء البحوث العلمية، وتطوير السياسات والتوصيات، والتعليم والتوعية البيئية.

للمزيد من المعلومات يرجى زيارة موقعنا uae.panda.org

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في دولة الإمارات