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ENERGY SAVINGS CERTIFICATES: TOWARD BEST PRACTICES AND STANDARDS

Issue Brief

Julia Currie
Program Manager, Global Energy and Sustainability

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INTRODUCTION

Energy savings certificates (ESCs) are tradable instruments that represent the avoidance of a defined amount of energy use. ESCs have been in existence globally for nearly a decade, but these records still lack a standard definition as governments in the United Kingdom, Australia, Europe, and the United States have tailored ESC programs to their unique goals. While past research on ESC programs has focused on their specific design (e.g., questions of ownership and measurement and verification procedures) further research is needed to clarify best practices for ESC adoption. Existing ESC programs and new schemes being developed can provide insights into best practices. This experience will guide a global standard for ESCs – a critical first step for growing the ESC market and driving demand for energy efficiency improvements.

A NATURAL OUTGROWTH

ESCs grew from government regulations that require utilities to reduce growth in their energy load by helping their customers be more energy-efficient. Energy Efficiency Resource Standards (EERS) are similar in character to Renewable Portfolio Standards (RPS) that require utilities to meet a certain percentage of their energy load with renewable forms of generation. ESCs can be used in either of these two types of standards and are in fact found in both EERS and RPS mandates. ESCs are often complemented by supply-side Renewable Energy Credits (RECs), which have a much more active market. ESCs are also called energy efficiency certificates, energy efficiency obligations, tradable white certificates, and white tags.[1] In a typical program, a company or utility that exceeds its required load reduction through efficiency can accumulate ESCs and sell them to or trade them with companies or utilities that are short of their target.

Many U.S. states and other countries have passed EERS or similar programs that require utilities to meet a specified percentage of their annual load growth with efficiency improvements. Compliance with government-imposed energy efficiency standards is currently the main driver of ESCs, but voluntary market expansion is a possibility as the overall ESC market matures and broadly applied standards are developed. A common ESC platform that enables both mandatory and voluntary participation in trading would greatly benefit the growing market.

[1] "The Bottom Line on Energy Savings Certificates." Eliot Metzger, World Resources Institute. October 2008.

EXISTING ESC PROGRAMS

ESC programs have their roots in initiatives such as the U.K.'s Energy Efficiency Commitment of 2002, New South Wales' Greenhouse Gas Abatement Scheme of 2003, and Italy's White Certificate Scheme of 2005. In the U.S., Connecticut and Nevada have enabled ESCs, but only Connecticut has an active trading market. These programs demonstrate the breadth of approaches to ESC program implementation.

United Kingdom

The U.K. scheme, the Energy Efficiency Commitment (EEC), began in 2002 with three phases lasting three years each. The EEC is an obligation for electricity and gas retailers with more than 50,000 customers to reduce energy use in the residential sector. It is administered by the U.K. energy regulator, the Office of Gas and Electricity Markets (OFGEM), and half of all reductions must be met through projects serving economically distressed residential customers. The program cites specific energy conservation measures that can be used to meet the commitment, and savings are counted ex-ante. Three types of credit trading are allowed: trading between two obligated parties, trading between an obligated party and a third party such as an energy service company (ESCO), and banking of savings certificates by an obligated party between compliance periods. This latter form (temporal trading) is the only trading measure that has been used significantly.[2] Energy reduction in the first two phases of the EEC was heavily achieved through measures like insulation and compact florescent lighting installation, which are very cost-effective. The cost to the economy of saving one kWh of electricity in the first phase was 1.3 pence, compared to the purchase price of one kWh at 6.7 pence.[3]

New South Wales

The Australian state of New South Wales (NSW) implemented an energy efficiency obligation called the Greenhouse Gas Reduction Scheme Demand Side Abatement Rule (GGAS) in January 2003. That program was transformed into the Energy Savings Scheme (ESS) in July 2009. Under the ESS, obligated electricity retailers, generators, and some wholesale market customers are required to reduce electricity consumption, beginning with 0.4 percent of total NSW electricity sales and escalating to 4 percent of total sales by 2014.[4] Those obligated groups may use ESCs to meet their requirements. The ESCs are created through energy efficiency actions in the residential, commercial, and industrial sectors, and each ESC represents the avoidance of one tonne of carbon dioxide emissions.[5] A penalty can be issued for non-compliance with the efficiency obligation. The penalty in 2009 was $24.50 per MW,[6] and in May 2010, the price per ESC in the NSW scheme was approximately $20 per tonne.[7]

Italy

Italy's energy efficiency program began in January 2005 with the goal of reducing energy intensity per unit of gross domestic product (GDP) by two percent annually until 2015 and scaling up reductions to 2.5 percent annually until 2030.8 The Titoli Efficienza Energetica (TEE) program is overseen by the Authority of Gas and Electricity (AEEG). Distributors, ESCOs, and industrial and non-industrial customers are granted ESCs (which are called Energy Efficiency Titles) for electricity or gas usage reductions.[9] Savings must be from implemented projects, not behavioral programs, and only savings achieved over and above market trends and legislative requirements are counted. Italy has an active over-the-counter trading market between the individual obligated parties.[10] Penalties for non-compliance may be issued by the AEEG and range from 25,000 to 155,000,000 euros. Because of success in the TEE program, penalties have not needed to be enforced. Prices for ESCs in Italy averaged approximately 70 euros between 2006 and 2009[11] with each ESC signifying the avoidance of consumption of one tonne of oil equivalent.[12]

[2] "Design of White Certificates: Comparing UK, Italy, France, and Denmark." Togeby, Mikael, Dyhr-Mikkelsen, Kirsten, and James-Smith, Edward. November 2007.

[3] "European Experience of White Certificates." Lees, Eoin. May 2007.

[4] "Report of the Prime Minister's Task Group on Energy Efficiency." Commonwealth of Australia. July 2010.

[5] "Energy Savings Scheme." http://www.ess.nsw.gov.au/ Accessed December 27, 2010.

[6] "Report of the Prime Minister's Task Group on Energy Efficiency." Commonwealth of Australia. July 2010.

[7] "Australia: Energy Efficiency – NSW Energy Savings Scheme Offers Dollars for Action." Economo, Evan. May 2010. http://www.mondaq.com/australia/article.asp?articleid=99948. Accessed December 27, 2010.

[8] "The Potential for Energy Savings Certificates (ESC) as a Major Tool in Greenhouse Gas Reduction Programs." Hamrin, Jan, Vine, Edward, and Sharick, Amber. May 2007.

[9] "Design of White Certificates: Comparing UK, Italy, France, and Denmark." Mikael Togeby, Kirsten Dyhr-Mikkelsen and Edward James-Smith, Ea Energy Analyses. November 2007.

[10] "The White Certificates system in Italy: results and perspectives." Russolillo, Daniele. November 2008.

[11] "White Certificates in Italy." Pavan, Marcella. December 2009.

[12] "Energy Efficiency and Renewable Energy: Italy – National study." Glorioso, Carmen, Lionetti, Mario, and Presicce, Francesco. March 2007.

Connecticut

The U.S. state of Connecticut's ESC program is part of the state Renewable Portfolio Standard. Four percent of Connecticut's energy must come from Class III sources by 2020. Those sources include customer-sited combined heat and power, electricity conservation programs, load management programs, and waste heat recovery projects. The Electricity and Energy Efficiency Act (House Bill 7432) allowed mandated utility markets to begin ESC trading on Jan. 1, 2007. The program is administered by the state Department of Public Utility Control (DPUC). Electricity usage may be reduced by third parties who are eligible to earn ESCs and sell them to electricity providers. Each ESC represent one MWh of electricity usage avoided. Electricity providers that fail to meet efficiency requirements during an annual period must pay a penalty to DPUC or purchase an ESC from another party. Prices for ESCs in Connecticut have a floor of $10/MWh and average at $20-25/MWh.[13]

[13] "The Bottom Line On... Energy Savings Certificates." World Resources Institute. October 2008.

	United Kingdom	New South Wales	Italy	Connecticut
Eligible entities and projects	· Top electricity and gas providers · Residential projects only; preference for economically distressed areas	· Electricity retailers, generators, wholesale consumers · Residential, commercial, industrial projects	· Electricity and gas distributors, ESCOs, consumers · Projects from all sectors	· Electricity retailers and generators · Commercial and industrial projects
Pricing of certificates	· Not applicable at this time	· Private market · Average $20/ tonne CO_2 avoided	· Private market · Average €70 per tonne of oil equivalent	· Minimum floor is set by public utility · Average $22.50 per MWh avoided
Trading of certificates	· Not applicable at this time	· Trading online through Independent Pricing and Regulatory Tribunal (IPART)	· Managed by Electricity Market Operator (GME) through registry	· Issued by public utility regulator
Measurement and verification	· Deemed savings only	· (1) Deemed savings, (2) measured factors, (3) system monitoring	· Reported yearly · (1) Deemed savings, (2) measured factors, (3) system monitoring	· Reported quarterly · (1) Deemed savings, (2) measured factors, (3) system monitoring, (4) modeled savings

NEW APPROACHES EMERGING

Established ESC markets have seen limited expansion, but new structures of ESC programs are beginning to emerge, building on the experiences in Australia, Europe, and the U.S.

India: Perform, Achieve, Trade

India announced the Perform, Achieve, Trade (PAT) program in July 2010, and it will begin in April 2011. Because India's manufacturing industry accounts for nearly 50 percent of the country's commercial energy use,[14] the PAT program seeks to reduce energy and emissions from more than 700 of the country's top industrial energy consumers.[15] These manufacturers, from industries such as steel, cement, and petro-chemicals, are called Designated Consumers, and each is tasked with designing its own efficiency plan based on targeted, industry-specific reductions. The scheme has three steps:

1. **Set goals.** Firms must set a specific energy consumption target for each plant.
2. **Reduce.** Firms must meet the reduction target in three years.
3. **Trade.** Firms that exceed their targets will be issued tradable certificates, and those that do not will need to buy certificates to meet their targets or face penalties.

The PAT program will be administered by the Bureau of Energy Efficiency, which will collect data and issue certificates online. Because the program does not permit trading until energy conservation measures are achieved, the tradable certificate market will not become active until 2014.

South Africa: Energy Efficiency Demand Side Management

The Electricity Regulation Act of 2006 in South Africa included provisions for introducing energy efficiency regulation. In 2010, the country released a first draft of its Energy Efficiency Demand Side Management (EEDSM) program, which was in review going into 2011. If it is approved, the program expects to achieve:

- Demand curtailment to reduce pressure on power generators in the event of excessive demand for power.
- Cost-effective energy efficiency, especially when compared with the expense of building new coal, natural gas or renewable power generation to meet growing demand.
- Quick deployment of energy efficiency technologies across the residential, commercial, and industrial sectors, as well as growth in building energy efficiency service companies that can provide well-paid local employment.
- Mitigation of greenhouse gas emissions and resultant climate change impacts.
- Reduced energy bills for program participants.[16]

[14] "Analysis of the potential of Mandatory Trading in energy saving certificates to drive energy efficiency in the Indian industrial sector." Camco, Confederation of Indian Industry, and ABPS Infra. 2010.

[15] "Perform, Achieve, and Trade: A New Direction for Indian Industry." Anjali Jaiswal, Natural Resources Defense Council. September 2010.

[16] "Revision of Regulatory Rules for Energy Efficiency and Demand Side Management including Standard Offer Programme." National Energy Regulator of South Africa. June 2010.

The EEDSM program would allow ESCOs, equipment suppliers, and other organizations to receive payment for demand reductions certified by a third-party monitoring and verification organization. Payment would be based on the performance of the specific energy efficiency measures. The payments would be determined by the long-run marginal cost of electricity supply, or by the estimated cost of subsidies to attract commercial efficiency bids (a decision on this point was pending as of the end of 2010). Eskom, South Africa's largest public electric utility, would release funding for the program's administration upon approval from the National Energy Regulator of South Africa (NERSA). Projects that shift load from high-demand times to off-peak hours would not qualify for funding. While the EEDSM policy is still under review, it highlights that private-sector participation will be necessary to realize the public sector's energy efficiency goals.

DIVERSE APPROACHES

Current and new ESC programs reveal the variations within each scheme to meet energy savings goals. For example, each program uses a different unit of energy for ESCs, which can make savings and program comparisons challenging. Some programs, like those in Italy and Connecticut, offer active trading markets while others, as in the U.K., have not needed certificate trading to meet stated goals. India's PAT program puts reduction requirements directly on the shoulders of energy consumers, while other programs leave reduction requirements to generators and retailers. Measurement and verification requirements also vary widely within programs.

Program review for ESCs is still in its infancy, as all of the programs are less than a decade old. Research has focused on questions surrounding ESC ownership, eligibility criteria, measurement and verification procedures, and permanence. Beyond this discussion, best-practice analysis should be undertaken to drive expansion of ESCs and stimulate investment in energy efficiency overall. Given that energy efficiency expenditures in the U.S. and Canada grew over 40 percent from 2009 to 2010 to $7.5 billion[17] and are on the rise globally, ESCs can facilitate that growth in new and interesting ways. In the future, clear definitions and information about proven approaches can stimulate broader adoption of ESCs and help engage both the public and private sectors in their growth.

[17] "Efficiency Budgets Grow Rapidly." Zach Lazar, Alliance to Save Energy. http://ase.org/efficiencynews/efficiency-budgets-grow-rapidly. Accessed January 4, 2011.

MOVING FORWARD

Existing ESC schemes in the U.K., Australia, Europe, and the U.S. highlight differences in program design that each state or country has employed to meet its own energy efficiency goals. As ESC policy expands into new markets such as India and South Africa, the need grows stronger for clarity and standardization in the definition and applicability of certificates. Existing programs can provide a platform for research that aims to identify best practices that will help guide development of ESC programs worldwide.

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