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White certificate trading: A dying concept or just making its debut? Part I: Market status and trends

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ABSTRACT

Energy-saving certificate trading programs within the U.S. have not had the success of their counterparts abroad due to the energy efficiency reduction targets not being stringent enough to incite trading. Programs exist in Italy, Denmark, France, the UK and Australia, and each is unique in what it allows to qualify, its units, and other details. The Italian market is the most robust in terms of volumes traded, but programs in Australia are strong and growing.

1. Introduction

Energy efficiency has long been touted as a cost-effective way to meet climate change mitigation goals. A 2014 American Council on Energy Efficiency (ACEEE) report found that energy efficiency, with an average cost of 2.8¢/kWh saved, is far below the cost of other forms of generation like wind, coal, natural gas, biomass, and nuclear energy, which range from 3 to 15¢/kWh (ACEEE, 2014). Some 29 states now have energy efficiency resource standards, which require electric power producers to reduce their constituents' electric loads. Targets for these reductions are set in the future and typically increase over time. For example, Minnesota's Energy Efficiency Resource Standard requires reductions of 1.5% average electric sales annually (DSIRE, 2018). In order to meet these types of energy efficiency reduction targets, provisions that would allow energy savings certificates, which usually represent megawatt-hours (MWhs) of energy savings, to be traded amongst regulated entities are in place in Connecticut, Nevada, and Pennsylvania. This energy-reduction credit trading also exists in Italy, the Australian states of New South Wales and Victoria, Great Britain, Denmark, and France (Hamrin et al., 2007).

The name of these energy reduction certificates differs from market to market. Connecticut calls them conservation credits or Class III RECs, and, in these markets they each represent 1 MWh of energy savings. Within voluntary U.S. markets, they are termed White Tags, a trademark of the private company Sterling Planet that originates them; each represents 1 MWh or 1000 cubic feet of natural gas saved. Within the Italian market, they are called energy-saving certificates (ESCs) and are equal to one metric ton of oil equivalent. This paper will refer to these tradable instruments as a "white certificates" when used in a general way and when they are not linked to a particular compliance program, since this is most internationally recognized name for them.

The idea to use tradable white certificates has its origins in both the cap-and-trade markets for sulfur oxide, nitrogen oxides, and greenhouse gases and in the renewable energy certificate markets. In these markets, entities can either make changes to their equipment to reduce their own emissions, or they can choose to purchase credits from other suppliers that can be used towards their own targets. Within sulfur oxide, nitrogen oxides, and greenhouse gas markets, reductions made elsewhere can be purchased and claimed by the entity that claimed them in lieu of reductions made onsite. Within renewable energy markets, renewable energy certificates (RECs) representing 1 MWh of electricity can be sold to entities that must comply with required state-level targets for renewable energy generation or to voluntary customers who want to support renewable energy.

In the early 2000s, many market observers thought that white certificates would have the same success as RECs. However, no organization followed through with the creation of a standard for white certificates because of difficulties with the public perception of this intangible commodity and challenges. Despite the difficulty white certificates had in the voluntary market and within the U.S. in general, they have helped other countries meet their energy-reduction goals economically, and in many countries have well-developed accounting, monitoring, and verification systems. The mechanics of how white certificates can be used to create emission reductions works slightly

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differently in each market, but in general the steps include:

1. A baseline of electricity and/or heat usage[1] is established for facility or groups of buildings that will serve as the project boundary. It is essential that this baseline be accurate, and ideally should consist of an average of several years of data to account for weather abnormalities. This baseline will serve as a counterfactual point that can be used as a comparison to the electricity and/or heat usage after the project has been completed.
2. A regulated entity either creates energy reductions by installing more efficient equipment or changing consumer behaviors, or the entity may purchase certificates from a market, an energy service company (ESCO), or another company who has made these reductions themselves or on behalf of a client. The client uses accepted technologies to achieve these reductions and uses approved monitoring and verification to ensure that these energy reductions are made.
3. The regulated entity may use these white certificates to reduce their overall emissions or energy usage.
4. The regulated entity surrenders enough white certificates to equal their required emission or energy reductions to the regulatory agency. (Sometimes a third party must verify the energy savings before they are submitted to the regulatory body.)
5. A regulatory agency audits the claimed emissions or energy reductions and verifies them by either comparing energy and/or heat usage to the baseline established or to models that reflect an average usage for a particular facility without energy efficiency upgrades.
6. The white certificates are tracked and retired by the regulatory agency to comply with state or federal legislation.

By trading white certificates, regulated entities are theoretically able to lower their overall cost of compliance as the cheapest reductions possible within the market territory are able to be made and are fungible throughout the market. Preliminary research in this area has in fact shown that these certificates are cost effective (Giraudet and Finon, 2015) and some countries like Italy have adopted this program and implemented it on a wide scale in order to provide cost containment (Pela, 2015).

Given this reality, this series of articles will investigate why tradable white certificates have not had more success in U.S. markets. In order to answer this question, the current market status of white certificates markets in the U.S. and those abroad will be explored in the first of three articles. Then, the second article will address specific challenges to trading white certificates, why these challenges exist, and how white certificate markets have approached these obstacles. The challenges that will be addressed include the definition of a white certificate, its ownership, and the tracking of white certificate sales. After the introduction to each of these challenges, this paper will discuss how these challenges are being addressed in each market. The final article in this series will discuss the future potential for trading of white certificates in the U.S. through future national legislation as proposed in the Clean Power Plan, under state energy efficiency resource standards, and in voluntary markets.

2. Current market status of white certificates worldwide

2.1. Trading in U.S. states

Some 29 states have requirements for energy efficiency that oblige utilities to reduce their customers' demands by certain percentages before target dates in the future, though only three states have formally undertaken trading schemes to manage this commitment. The following section examines Connecticut, Michigan, Nevada, and Pennsylvania, where trading has occurred. Sometimes these requirements exist in stand-alone legislation, but often they are a part of the state's renewable portfolio standard (RPS), which requires that a particular state's electrical providers source a certain percentage of their energy from renewable sources. There are usually target dates specified for these requirements, and the amount of renewable energy required usually increases over time. As a part of these RPSs, there is sometimes a carve-out requiring a certain percentage of this renewable energy to be sourced from solar energy or from energy efficiency measures. And, if the state legislation allows, energy reductions can be met by onsite reductions and/or through trading of white certificates. The details of the programs in states with white certificate activity will be discussed in alphabetical order below. Information related to the challenges that white certificates face will be discussed in Section 2.

2.1.1. Connecticut

Connecticut has an RPS requirement that 28% of the state's electricity be classified as either a Class I, II, or III REC by 2020. Class I and II are varying types of renewable energy, and Class III includes energy efficiency and conservation, combined heat and power projects, and systems that recover waste heat or pressure from commercial and industrial processes. The RPS specifies that 4% of that 28% must be a Class III REC (DSIRE, 2017b). Investor-owned and competitive electricity providers must own and retire enough Class III REC certificates annually or pay an alternative compliance payment of $31/MWh (Holt, 2010).

Even though trading of these Class III RECs has been allowed since 2007, little has occurred because there is a surplus of certificates. The Class III REC price floor is $10/MWh, and the price ceiling is $31/MWh (Connecticut Department of Energy and Environmental Protection, 2013). In 2008, the average price of a Class III credit was about $21–26/MWh, but in 2010, the Class III RECs traded near the price floor of $10/MWh and have remained there

(Nelson, 2012; Holt, 2010). If this price floor were not in place, then these Class III RECs would trade at even lower prices of possibly $2–3/MWh due to the oversupply (Maddox, personal communication, Dec. 14, 2017).

The New England Power Pool Generation Information System keeps track of RECs traded by type and quarter. Fig. 1 shows interesting trends in these REC projects thus far. Conservation and load management (C&LM) projects were favored at the beginning of the market, but then waned in popularity in 2014 due to the low prices and the cost and complexity involved in monitoring and verifying these projects. Combined heat and power projects have steadily gained in popularity because of the simplicity of metering these projects, instead of having to use statistical sampling and deemed savings for individual, civil-sector energy efficiency measures, which is necessary for C&LM projects. Demand response programs have not been successful at all, perhaps due to their costliness to implement.

The surplus of these combined heat and power Class III RECs and attendant trading at the price floor since 2010 can be attributed to the many ways in which energy savings projects are completed in Connecticut. Firstly, retail customers are assessed $0.003/kWh as a system benefit charge, which goes into a conservation and load management fund (C&LM). The statewide energy efficiency budget from these programs for 2018 is $268 million (Eversource Energy et al., 2017). These funds can be used to create Class III RECs by utilities, which helps these utilities generate a surplus of these Class III RECs. Revenues from the Class III REC sales are reinvested in the C&LM programs.[2] Secondly, energy efficiency and demand response can bid

[1] Some white certificate programs award certificates only for electricity savings, whereas others award certificates for natural gas saved. Therefore, the authors have referred to both heat and electricity usage here.

[2] Until 2010, utilities could sell these credits through long-term contracts, requests for bids, and brokers; however, regulation in 2010 required utilities to sell Class III credits