

1 Introduction

1.1 Motivation

Interest in the opportunities for slowing electricity demand growth by improving end-use efficiency is increasing in many IEA countries. Rising concerns about the costs and environmental effects of increasing electricity production and other constraints on new generating capacity in some countries are stimulating this interest. (...) The hundreds of electricity end-use technologies differ widely among the 21 Member countries of the IEA in their application and intensity (...) One of the principal findings is that while significant further capital stock is replaced by new, more efficient technologies, even further gains are possible. (...) All IEA Member countries have government or utility policies which are aimed, at least in part, at improving the efficiency of electricity end-use. Although few have very extensive efforts in this area, IEA countries have some experience with each of the major types of policies that might be used to accelerate efficiency improvements. (IEA 1989: 3; 11; 16)¹

The quotations are from a study of the IEA that is more than 20 years old. Back then most the policy instruments, or incentive mechanisms, to foster end-use efficiency were already in place – including utility programmes. Many of the elements and objectives have persisted: energy security, cost effectiveness and environmental benefits are still among the objectives of fostering end-use energy efficiency. Similar technologies are still believed to hold a big energy-saving potential. However, the situation has somewhat changed: in 1989, climate change was not as prominent on the political agenda as it is today, and energy markets were on the point of being liberalized².

Today, the energy system is believed to be on the verge of a great transformation towards a low-carbon economy (European Commission 2011; Ethik-Kommission Sichere Energieversorgung 2011; SRU 2011; WBGU 2011). In all scenarios for this low-carbon economy, energy efficiency as well as the devel-

¹ Citations are indicated with quotation marks in the continuous text and otherwise by the format (italic, text block).

² In the UK, the Gas Act of 1986 (HM Government 1986) can be seen as the start of liberalization and privatization in Europe.

opment of renewable energies plays a pivotal role. What steps are to be taken to close the energy efficiency gap?

A critical first step in the design of effective policies for improving electricity end-use efficiency is examining the regulatory framework for and participation of electric utilities. (...)Electricity utilities might play an important role in implementing a number of such programmes (...) They could do either on their own initiative as any public or private business or in response to government regulation. In any case, it is essential that governments and utilities work co-operatively in designing and implementing effective policies to improve end-use efficiency. Many of the actions that might be considered desirable by governments are best implemented by utilities. But if the utilities view the policy as conflicting with their own business objectives, effective implementation may be hampered. This emphasizes the need for governments to design policies that are economically attractive to utilities if the utilities will be implementers. Similarly, in order to achieve certain utility load objectives, it may be most effective if governments took appropriate action. (IEA 1989: 125f)

White certificate instruments to foster end-use energy efficiency³ did not exist in 1989. This rather new policy instrument builds essentially on the idea of compelling energy companies to effect some energy savings in the end uses.

Will WCIs help to close the energy efficiency gap? And will policy instruments be more effective if governments and energy companies work cooperatively on their design and implementation?

I encountered this policy instrument while researching the emerging European emissions trading scheme (EU ETS) in 2005. Among the rich literature on the EU ETS, some papers examine ways of integrating white, green⁴ and black⁵ certificates (e.g. Bonneville & Rialhe 2005). I became curious and learned about the ongoing research projects, including yet another tradable permit scheme to be discussed in Europe. At that time Britain, Italy, and France were reported to be those European Member States that had at least an established legal basis to set up a WCI, even if not yet in place. Given the early experience of the EU ETS and the differing positions of Member States on it, the question immediately arose of why Member States with different regulatory traditions in energy policy would chose the same policy instrument. Why would France, a country with neither previous experience nor traditions of tradable permit schemes, decide to implement a WCI? Why would Britain and France opt for the same policy instrument given the differences in their energy market structures and in their regu-

³ Note that – other than the IEA quotation from 1989 – White Certificate Instruments embrace not only energy efficiency in electricity uses but also gas and other fuels.

⁴ Certificates for renewable energy production.

⁵ Certificates of emissions trading schemes.

latory traditions? Why would Italy be among those countries pioneering the introduction of a new policy instrument even though it was typically not counted as a leader in environmental policy? Is this policy instrument the one-size-fits-all solution to fill the energy efficiency gap? Analysis of the introduction of the policy instrument thus appeared to be a promising dissertation topic.

White certificate schemes have entered the policymaking agenda in an increasing number of countries both in the European Union (EU) and worldwide. Choosing a policy instrument's name and creating a policy image turned out to be a crucial explanatory element of my analysis. A starting point for my analysis was thus to seek the origin of the term 'white certificates'. The term was probably first used at the turn of the 21st century: Italy decided to implement a white certificate instrument (WCI)⁶ in 2001. However, throughout my research I could not determine the origin of the term or the precise moment when it first appeared. Some of the experts I interviewed told me that the term was a European Union's creation while others believed it originated to be in Italy. Britain, Italy, and France introduced the policy instrument some years ago. The same holds true for the Australian state of New South Wales. More recently, Denmark changed an existing policy instrument to a scheme that is now also considered as a WCI. In addition, Flanders has a similar scheme and it was reported in an expert interview that the Dutch government has reconsidered introducing the policy instrument. While the scheme had been on the agenda also in Sweden and Hungary, it was rejected in both countries. The National Energy Efficiency Action Plans (NEEAPs) of the European Member States reveal that Poland, Bulgaria, and Romania have at least considered implementing the idea. With its energy concept of September 2010, the German Ministry of the Environment launched a pilot project on WCIs. Outside the European Union, the policy instrument is finding increasing support, including in South Korea and other states of Australia.

It became apparent to me that the WCI was much more complex than the EU ETS. The schemes differ considerably, since the EU ETS is a so-called cap-and-trade scheme while the WCI is a baseline-and-credit scheme. As a 'project-based scheme' the WCI is very similar to the clean development mechanism (CDM) or the joint implementation (JI) – two flexible mechanisms enshrined in the Kyoto Protocol besides the ETS (e.g. Newell & Paterson 2010: 133). In addition, the complexity exists not only in the mechanism, but in the policy area under investigation – energy efficiency policy. 'Energy efficiency' is a term that comprises multiple purposes and implementation possibilities. Many actors and

⁶ However, even if the first draft legislation of the Italian WCI dates back to 2001, it referred only to 'titoli di efficienza energetica', not to 'certificati bianchi'. The first documents that I found utilizing the term 'white' or the equivalent in translation date back only to 2004.

sectors will have to be involved in order to achieve significant improvements in energy efficiency. Energy efficiency policies are thus linked to manifold barriers that will have to be addressed by policy instruments.

The analysis addresses two main topics. First, analysis of the political process of policy instrument choice can be expected to reveal the complexity of end-use energy efficiency. It therefore may provide some insights into certain overarching factors explaining policy instrument choice in end-use energy efficiency. In this sense, the analysis addresses people working in the field of energy efficiency, especially decision-makers: can we make a policy instrument a solution to the problem by finding ways to implement it? There is a lack of studies of the politics of energy efficiency, unlike with, for example, climate policy or renewable energy policy. This study is an attempt to contribute to filling this gap in the literature by focusing on a policy instrument that is on the one hand a very specific case and can only be regarded as a niche, but on the other hand covers a broad range of end-use energy efficiency topics and as a result has gained political weight, so that analysing the introduction of the WCI may provide insights into energy efficiency policy in general.

Second, the analysis is intended to contribute to the discussion of policy instrument choice as a separate field of policy analysis. It aims to explore a rather novel approach in policy instrument choice by making use of theoretical approaches typically used in international relations and applying it to classical interest-based policy analysis.

To help the reader to understand the core subject of the analysis, I introduce the policy instrument before proceeding to investigate my research topics. But first, the following section aims to guide the reader through the research process.

1.2 Inductive-deductive research process

The underlying research question and empirical knowledge about the issue at hand have evolved over time in an inductive–deductive process. With the observation of the appearance of a new policy instrument, some obvious ad hoc research questions (see above) were formulated. These questions guided the in-depth examination of the existing literature and further helped to explain the empirical reality of WCIs. While the characteristics of the policy instrument as a hybrid scheme as will be further illustrated below, the research question changed the course of the examination, and the theoretical approach became more apparent. In going back and forth from institutional theory and the literature on policy instrument choice to the case of WCIs, the underlying research puzzle became clearer. Readers of the following analysis should bear in mind this inductive–

deductive conduct of the research. The outline of the analysis does not fully mirror the chronological research process. Rather, it is adapted to the logic of the research puzzle. Thus, some insights that have emerged from examination of the case of WCIs in practice have been anticipated in the chapter on the theoretical approach. Accordingly, this analysis cannot be regarded as an attempt to falsify a fixed hypothesis. Rather, it aims to explore theoretical ways of explaining policy instrument choice in the special case of end-use energy efficiency. It thereby links policy instrument choice with institutional change. A core assumption is that the type of policy instrument as well as its image has an influence not only on policy instrument choice but also on its effectiveness due to the interaction with existing regulatory traditions and the prevailing policy style.

Since the inductive–deductive research process does not allow for strict hypothesis testing, five assumptions are formulated in subsection 1.3.6 in order to guide the research process. It is believed that the specificity of the case given various complexities (complex steering mechanism, complex set of actors, complex challenge of end-use energy efficiency), makes it suitable for presenting many challenges of instrument choice as well as challenges of end-use energy efficiency governance. While generalizations are not legitimate due to the composition of the research, the results are expected to present a range of plausible and relevant dynamics in a field of complex decision-making.

1.3 White Certificate Instruments

The following section introduces the policy instrument, its origins, its main energy efficiency delivery mechanism, and its key design features, both theoretically and in practice. This allows the reader to get an understanding of the object of study.

White certificate instruments are mandatory energy-saving targets for energy companies to be delivered through end-use energy efficiency measures. In order to deliver the target, WCIs contain a range of flexibility provisions, which are explained further below. To avoid confusion about the terms, this analysis differentiates between the terms ‘white certificate instruments’ (WCIs), ‘energy-saving obligations’, ‘tradable white certificate schemes’ (TWC), and ‘white certificates’.

The term ‘white certificate instrument’⁷ is used most frequently since it comprises all approaches that utilize an energy-saving obligation with some kind

⁷ I decided to include the term ‘white certificates’ to name the policy instrument under investigation since this is the catchword that experts use mostly informally instead of energy saving certificates or energy saving certificates.

of flexibility provision. This does not necessarily entail the issuing of ‘white certificates’ but may entail trading the obligation, energy-saving projects, or the savings attached to such projects. It does not include voluntary approaches, that is, those schemes without a mandatory saving obligation where only certificates are generated and possibly sold.

The term ‘energy-saving obligations’ refers only to mandatory energy-saving quotas and gives no information about a possible trading option. The term ‘tradable white certificates’⁸ is used for end-use energy policy instruments that have both a saving obligation expressed as a quota and a trading option for certificates in place that provide proof of the amount of energy saved. By contrast, ‘white certificates’ are the certified savings, that is, the ‘certificates issued by independent certifying bodies confirming the energy savings claims of market actors as a consequence of energy efficiency improvement measures’ as defined in the end-use energy efficiency and energy service directive – Directive 2006/32/EC – of the European Parliament and the European Council (2006).

*1.3.1 How do WCIs work?*⁹

Energy-saving obligations may be imposed on companies operating in generation, in transmission/ distribution, or in retail businesses. The responsible authority (e.g. ministry or regulator) fixes an overall saving target to be delivered in a fixed period of time. The target may, for instance, be derived from a political commitment to reduce annual energy consumption by one per cent. This relative target can accordingly be transposed into an absolute target with the help of historical data or projections. The target can be expressed in various units, such as carbon dioxide (CO₂) emissions, primary energy (tonnes of oil equivalent, toe), or final energy (kilowatt hours, kWh). The overall target is then allocated to the companies concerned by applying a key reflecting, for example, the companies’ market shares in terms of turnover, delivered energy, or number of customers. Typically, in order to protect small companies from bearing a disproportion-

⁸ White certificates are also referred to as energy efficiency titles (EET) (Oikonomou & Patel 2004: 3) or as tradable certificates for energy savings (TCES) (Bertoldi & Rezessy 2006: 1).

⁹ Note that the paragraphs referring to existing schemes and design options in Chapter 1 consists of a compilation of knowledge the author gained during the research process. The most important references the presented insights are reflecting are Bertoldi & Rezessy (2006, 2008), Bertoldi et al. 2010, Bürger & Wiegmann 2007, Capozza 2006, Mundaca & Neij 2009, and Eyre et al. 2009 but also the expert interviews. A more detailed and differentiated account of the sources and references will be provided in Chapter 4 on the research community and in Chapters 5-7 on three case studies.

ate energy-saving burden, only companies above a certain size¹⁰ are subject to an obligation.

Importantly, an energy-saving obligation does not cap the overall delivery of energy to final customers. Thus, an absolute target is not equal to an absolute reduction of energy consumption: while the target is formulated in absolute terms (e.g. saving 100 terawatt hours, TWh, of energy), the savings are attached to measures and do not guarantee an absolute reduction of energy consumption in end uses. This measure may lead to a more efficient use of energy through the use of more efficient appliances. But it does not control for overcompensation. Under which conditions these savings really lead to an overall reduction in energy consumption depends, among others, on the additionality of the measure. There are several possible ways for actors to comply with the obligation:

- The companies concerned carry out energy efficiency measures in end-use sectors. In principle each end-use sector can be included as a target sector, but most practical examples are found in the residential sector. For each project the resulting amount of energy savings is accredited to the delivering actor.
- Companies conclude agreements with other companies, for example by tendering a programme which is then carried out with the help of manufacturers of energy-efficient products, installers, or energy-service companies.
- Companies subject to obligations do not at all themselves actively carry out energy-efficiency projects. Instead, they purchase energy savings (e.g. in the form of white certificates if this option is available) after the project has been carried out by a third party. If trading of certificates is involved in the scheme, it can take the form of bilateral contracts or trading on the spot market.
- Companies could be released from their obligations by paying a fixed penalty or buy-out price.

Figure 1 illustrates the principles of WCIs.

¹⁰ The minimum size of a company can be defined in terms of a minimum number of customers or a minimum amount of energy delivered.

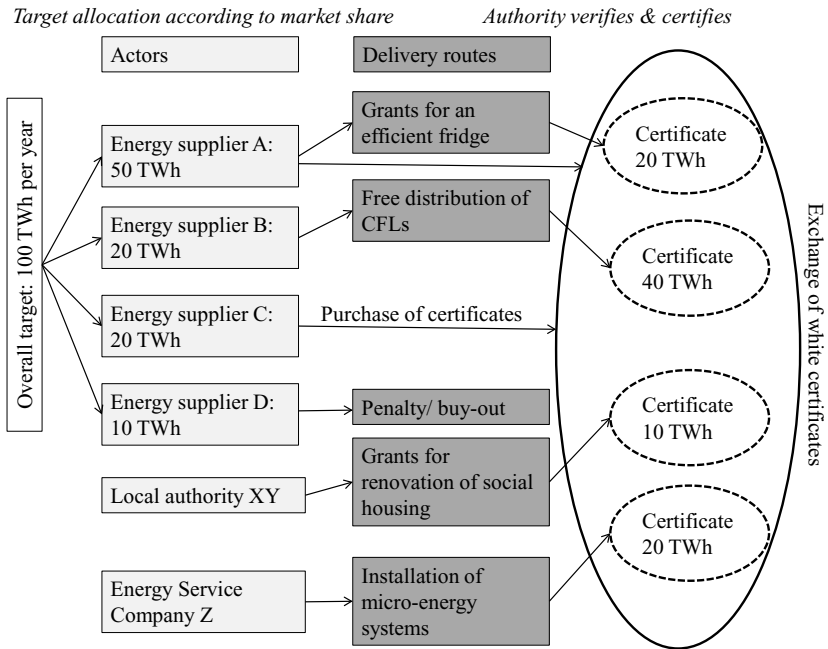


Figure 1: WCIs: energy efficiency delivery mechanisms (Source: Author)

1.3.2 Two sources of WCIs

The figure cannot display the two sources of WCIs. It is important to understand that there are two sources since they set the paths for the discourses of energy efficiency, to which I will turn later on (see section 2.5).

There are two distinct sources of energy saving obligations: demand side management and tradable permit schemes. The two approaches to energy saving obligations imply different perspectives and associated objectives and regulatory traditions. These differences influence the policy design of obligations and most probably their impacts¹¹.

First, WCIs can be understood as a distinct framework mechanism to incentivize demand side management (DSM) through utility activity (e.g. Labanca &

¹¹ As it has been adumbrated above, the dissertation is based on the assumption that policy design has an influence on the policy instruments' effectiveness. Effectiveness is always attached to the goals the policy instrument aims to achieve. Thus, the policy instruments' impact, that is, the degree of their effectiveness, depends on design choices. The term 'impact' comprises not only statements about effectiveness but also effects that policymakers did not foresee.

Perrels 2008; Didden & D'haeseleer 2003). Other DSM mechanisms involve energy companies as responsible actors for energy efficiency programmes in end use, such as integrated resource planning or the provision of energy services. The defining feature of a WCI is that it is a mandatory target to be realized via concrete measures at the end-users' site (Didden & D'haeseleer 2003). The DSM tradition dates back to the first energy crisis (1973 and 1979/80) when energy savings were perceived as an alternative to increased energy supply. Thus, security of supply, peak load reduction, and cost-efficiency are broader objectives associated with DSM.

Second, WCIs can be understood as quotas similar to those for renewable electricity or emission caps that form the basis of trading schemes ('cap-and-trade')¹². The energy company may trade the obligation, the energy saving activity, or certified energy savings (white certificates). With or without certificates, the idea all WCIs have in common is to meet mandatory energy saving targets cost-effectively by allowing actors some flexibility in meeting their target. Flexibility provisions include the range of eligible measures, the scope of eligible target sectors, the eligibility of third actors to take part in delivering energy savings, banking of energy savings, offsetting early savings, and, most prominently, trading (e.g. Mundaca & Neij 2009). Tradable permit schemes are traditionally set up for environmental protection. Recently, especially since the rise of emissions trading, they have become associated primarily with climate policy.

As mentioned above, emissions trading is to some extent related to WCIs since both schemes could be designed to reduce greenhouse gas emissions in the energy sector¹³. However, the lessons from ETS that can be applied to WCIs are limited, mainly because the latter are project-based. Therefore, insights gained from experiences with project-based mechanisms, especially CDM, are valuable (e.g. Newell & Paterson 2010: 133). Ensuring additionality, that is, saving effects above business as usual, has been a crucial question for project-based mechanisms. This includes finding the proper baseline and monitoring mechanism. Increasing experience of CDM projects worldwide has shown that trade-offs have to be made between the most cost-effective savings (e.g. those realized in projects reducing greenhouse gases other than CO₂) and those that are politi-

¹² 'Cap-and-trade' is the commonly used term for emission trading schemes that make use of an overall emissions cap. That is, only a limited amount of emissions are allowed to be emitted. For every unit of emission, the emitter has to hold so-called permits. Emitters holding excess permits may sell them to emitters who want to emit more than initially expected.

¹³ The unit of the emissions trading schemes is t CO₂. The carbon savings are to be achieved by energy savings (partly through efficiency gains) mostly on the generation/ supply side. Energy saving obligations may also be defined in savings of CO₂. Other common units are primary energy or final energy, all of which may be converted to CO₂-savings. However, the accuracy of determining the savings is watered down by applying conversion factors.

cally preferred but imply higher costs per unit of CO₂ saved (e.g. development of renewable energy)¹⁴. This again highlights the importance to the definition of the kinds of objectives that the eligible measures should achieve and how these measures can be incentivized. How to ensure that the measures promoted under the scheme do not undermine other objectives? How to ensure that specific objectives are achieved? The policymaker has to be clear about the trade-off between cost-effectiveness and the qualitative benefits associated with the savings.

1.3.3 Measurement of savings

WCIs are usually not designed as self-monitored schemes. They require monitoring and verification of savings, and – if necessary – the application of sanctions. This has at least two implications. First, an actor has to be determined and equipped to administer the scheme and to carry out measurement and verification. Second, rules have to be devised to determine the energy savings resulting from the projects. There are several ways to do so (see especially Capozza 2006: 105ff):

- Measures and their respective saving values are fixed *ex ante*. As a result, a list of deemed or standardized savings for eligible measures is available for actors concerned.¹⁵

¹⁴ Newell & Paterson (2010: 130) use one example to identify one of the core problems of CDM: 'Early on the market was also distorted by mega-projects which target greenhouse gases (GHGs) with a high level of what's called Global Warming Potential (GWP). Gases with a higher GWP act as more powerful drivers of the greenhouse effect. Hydrofluorocarbons form one such family of gases where one tonne of HFC-23 is equivalent to 11,700 tonnes of CO₂. The distortion comes from the fact that the credits countries receive for projects are related to this GWP. So a project to phase out HFC-23 for example produces a significantly larger financial return than a CO₂ reduction project for example – in fact it can earn 11,000 times as many CERs as a CO₂ reduction project! Consequently 70% of the CERs in the first one and half years of the CDM were issued for abating gases other than CO₂.' While the type of measures eligible under WCIs in industrialized countries differs from those under the CDM, analogous problems have been reported, as shown in the case study section below.

¹⁵ The list of measures for which standardized saving values are determined is constantly growing. It can be regarded as one of the benefits of the development of energy-saving obligations and similar policy instruments that experts systematically aimed at determining *ex ante* default values for savings. The EMEES project is especially dedicated to monitoring and evaluating energy savings with regard to the Directive 2006/32/EC on end-use energy efficiency and energy services (<http://www.evaluate-energy-savings.eu/emees/en/home/index.php>). However, there are limits to setting up default values for energy-saving measures. Behavioural measures and informative measures are the most difficult to evaluate. There have been some attempts to account for measures targeting behavioural change within the Danish energy-saving obligation. From 2010 on, this option has barely existed in the Danish case (Bach 2009). Also in the British and the French scheme there are some experimentations with including behavioural measures (see chapters 5 and 6).

Energy Efficiency Governance

The Case of White Certificate Instruments for Energy
Efficiency in Europe

Steuer, D.S.

2013, XXV, 382 p. 17 illus., Softcover

ISBN: 978-3-658-00680-8