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Discussion of implementing Utility Obligations in Austria by considering European Experiences

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Summary

In terms of addressing climate change in a cost effective way, reducing demand for energy and improving efficiency became one of the key policy objectives. Therefore, the European Union has set a target for 2020 of saving 20% of its primary energy consumption compared to BAU projections. But this target is threatened to be failed from today's point of view. EU Low Carbon 2050 Roadmap confirms this issue and states that with current policies, only half of the 20% energy efficiency target would be met by 2020. Accordingly European Commission has published a new proposal for a new energy efficiency directive and repealing Directives 2004/8/EC and 2006/32/EC (COM (2011) 370 final). One of the main proposed measures is the implementation of mandatory energy saving measures which imposes suppliers obligations on Member States. Thus this paper analysis the energy efficiency utility obligations in implementing countries in EU namely United Kingdom (UK), France (FR), Italy (IT), Denmark (DK) and Flemish region of Belgium (BE-Flem) and discusses the possibility of implementing utility obligations in Austria taking the experiences and specific lessons learned of implementing countries.

Keywords: Energy efficiency, Utility obligations, Country experiences

1 Introduction

Energy efficiency obligations mean in general manner that the energy suppliers and/or distributors are obliged to achieve a specific energy saving target in a specific timeframe. After implementation of different energy saving measures they obtain certificates which are commonly called as "White Certificates (WC)" that can be traded and exchanged, but this issues is not pre-condition.

Understandably this policy is not welcomed by utilities for different reasons:

i. They don't want to force their costumers to take efficiency measures as they should not be called to account for the behaviors of costumers (opinion of Austrian utilities based on (WKÖ, 2011))

ii. Why should a company implement measures which lead to less consumption of own produced commodity?

iii. This measure may disrupt the competiveness (e.g. increasing of end energy prices through recovering of cost from customers or some market players may discriminated or privileged).

On the other hand, the contra arguments can be listed as follows:

i. Utilities differ fundamentally from other companies as their product represents a necessity for modern human life which deserves also key attention in public regulation.

ii. The production of this commodity is accompanied with environmental problems. In this respect the utilities claim to overtake their responsibility by undertaking energy efficiency measures. Hoverer, in practice in a liberalized market it appears that this works in general appropriately by obligating them to undertake such measures.
iii. Usually the end users – especially in the residential sector – are not aware of their benefits if they purchase energy efficiency goods or carry out energy saving measures.
iv. Traditionally end users think myopic, i.e. they want to recover their investment in short term while utilities calculate the amortization over a longer time period (closer or equal to the lifetime of the specific measure) (Haas and Wirl, 1992).
v. Utilities have in general financial and human resources as well as competence in marketing and engineering and they can mitigate the risk and uncertainty faced by consumers (Bertoldi and Rezessy, 2009).

1.1 Method of approach

As a first step the characteristics of utility obligations as currently implemented in various European countries will be indicated building on a literature survey. This includes a documentation of how these obligations work in the analyzed countries whereby attention is given to identify the differences between country-specific implementations and which advantages or disadvantages may arise from them.

The common approach for a comparative analysis of Austria with other countries is to take into account economical conditions as well as energy-related indicators, such as energy consumption, GDP, CO2 emissions etc. Accordingly these countries will be compared in respect of their dependency on fossil fuels and of their energy market structure. This comparison will allow understanding how the utility obligations are designed in implementing countries and what are the reasons for these design features.

1.2 General information of utility obligations implemented within Europe

Currently within the European Union energy efficiency obligations for utilities are implemented in the UK, France, Italy, Denmark and Flemish Region of Belgium. Figure 1 illustrates the general utility structure in Europe and which countries impose obligations on which utilities as well as their target sectors.

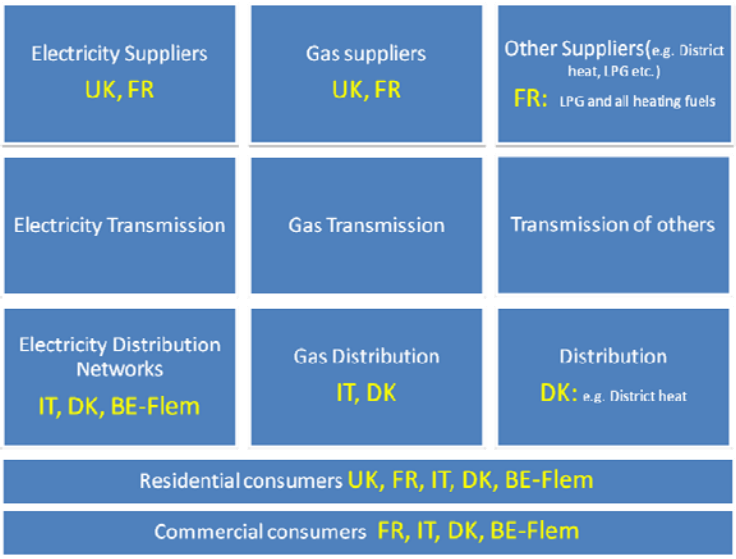

Figure 1: General utility structures in Europe, which utilities are obligated by implementing countries and related sectoral coverage (residential and commercial consumers)

Subsequently the general frameworks of implemented utility obligations are explained briefly by country.

1.2.1 EEC-CERT in United Kingdom

Within Europe the UK is the most experienced country with respect to utility obligations for energy efficiency measures, i.e. the obligation scheme started already in 1998. The energy efficiency commitment (EEC) is a legal requirement imposed on electricity and gas suppliers in order to improve energy efficiency in the UK's household sector. EEC is not a tradable certificate mechanism but bilateral trade of energy savings between two suppliers is allowed. The suppliers (retailers) are obligated to increase energy efficiency in households in the regulatory rounds in 1998, 2000, 2002, 2005 and 2008. During these periods, although the name of instrument has been changed, the continuity of implementations has been maintained (Eyre et al., 2009). In 2008 the name EEC was changed to CERT (Carbon Emission Reduction Target) and obligation is expressed in CO2 savings (i.e. carbon weighted by the carbon content of saved energy fuel) as the carbon emission reduction has high policy priority in UK's energy policy.

Within this program energy suppliers undertake activities such as marketing for energy-efficient products or offering subsidies for energy efficiency measures. These measures are delivered by several ways such as contracts with installers, retailers local authorities etc. CERT means for the end users that energy suppliers provide them grants or offer assistance to implement efficiency measures and / or renewable energy technologies for their homes while it is not precondition to be customer of these gas or electricity suppliers. Most energy suppliers provide loft and cavity wall insulation for free to certain building owners (e.g. elderly people over 70 years) (UK-EST, 2012)

1.2.2 ITALY

The utility obligation scheme in Italy has been implemented since July 2004 with the aim of increasing end-use energy efficiency. The obligation is imposed to electricity and gas distribution companies (distribution system operators) which have at least 50,000 customers

(Di Santo et al., 2011). The reduction target is set in primary energy, accounted in tons of oil equivalents (toe), and the saving can be derived through actions among end-users (Di Santo et al., 2011). Before 2008 targets were set separately for low and high voltage consumers. This has been changed to distinguish among residential and non residential consumers from 2008 on. One of the central elements of this scheme is the trading of certificates which are called EET (Energy Efficiency Titles).

1.2.3 FRANCE (ESC- Energy Saving Certificates)

The energy efficiency obligations to the energy suppliers in France started in 2006 for a 3 year period with initially the aim to use the energy efficiency potential especially in the building sector. Currently the scheme covers all sectors (industry, residential, tertiary, transport) and comprises about 50 electricity, gas, LPG, heating and cooling suppliers whose sales to the building sector exceed a certain threshold (i.e. 100 GWh/a for LPG and 400 GWh/a for others) as well as all household oil suppliers (Eyre et al., 2009). The target is set in final energy which leads to stronger incentives to save non-electric fuels (Eyre et al., 2009). This scheme targets energy savings among all final energy consumers outside the scope of the EU-ETS. An energy saving certificate is derived after the saving is delivered. The scheme allows full trade of white certificates. However, (Bertoldi and Rezessy, 2009) state that the trading is still uncommon since less than 4% of all attributed certificates were actually traded in January 2009.

1.2.4 Belgium FLANDERS (REG-Rational Energy Use)

In Flanders regional utility obligations have been imposed on 16 electricity distributors since 1st of January 2002. The obligation is expressed in primary energy and does not allow the trading of certificates. Targets are defined separately for residential and non-residential sectors. According to (Bertoldi et al., 2010) a saving in size of 2% (of average supplied electricity in previous two years) has to be achieved for the residential sector, whereas a saving target of 1,5% is set for the non-residential sector. The annual total target was equal to 0.58 TWh in 2008. During the last period which ended in 2011 the obligations have been fulfilled by organising specific information sessions, by offering higher financial support (+20%), voucher of 150 Euro for the most energy efficient refrigerators and washing machines, premium for roof insulation as well as energy scans. Additional to these actions in the new period 2012, 800 Euro premiums will be provided for condensing boilers (Collys, 2011) .

1.2.5 DENMARK

In Denmark energy efficiency obligations are set for the electricity, natural gas and district heating grid companies. The target is set in final energy so that any kind of energy in terms of final energy is reduced. While the obligation is imposed on grid companies, the most of activities have been implemented by commercial daughter companies (Togeby et al., 2009). The annual target was 2,95 PJ and has been over-achieved by grid companies between 2006 and mid 2009 whereby 47% of total savings were achieved in private enterprises, 7% in the public sector and 44% in the household sector (for more detail see (Schalburg, 2011)). The measures are implemented through financing and audits or a mixture of both.

1.3 Comparison of key parameter

In Denmark and Flanders saving are measured for the first years. In ***Denmark*** energy savings are recorded as final energy, so all energy types count equally. 1 kWh saving can mean 1 kWh electricity or district heating despite the carbon content can vary significantly across different final energy sources. In the case of "conversion projects" - i.e. when converting electric heated houses to district heating, electricity is weighted with a factor 2.5 (Togeby et al., 2009).

In ***Flanders*** "primary" energy savings are calculated multiplying the saved first year end use energy by using in the case of electricity with a factor of 2.5 and for all other energy carriers a factor of 1 (Labanca, 2006).

In ***Italy*** lifetime of saving is defined as 5 years whereas for heating and cooling a measure accounts for 8 years. In the Italian program saving is accounted via two ways: deemed saving approach and engineering estimates approach. Deemed saving approach is used for some actions for what AEEG has defined "special files" on standardized savings. This simplifies the evaluation of savings on the basis of installed units or the produced kWh (e.g. solar heating, windows replacement etc.) (Di Santo et al., 2011). If it is not possible to obtain a standardized method the engineering estimates approach serves as alternative. This approach considers different parameters and requires some measurements in contrast to the deemed saving approach.

Table 3 summarizes for all assessed countries the definition of energy efficiency targets and their compliances in the previous obligation periods as well as the height of target set for the current period. Accordingly, it can be seen that except Denmark (based on average of 2006 and 2007 where a couple of district heat distribution networks could not fulfill their obligations ((Togeby et al., 2009) all countries have achieved their targets and the targets for the current period have been extended.

Table 1: Summary of energy saving targets and target achievement

Target	UK	France	Italy	Denmark	BE-Flem
Measurement unit of saving	Carbon	Final energy kWh cumac[1]	Primary energy (toe)	Final energy	Primary energy
Compliance period	3 years	3 years	1 year (multi annual target period; usually 3)	1 year (multi annual target period; usually 3 years)	1 year (multi annual target period; usually 3 years)
Previous Target°	2005-2008 130,2 TWh (fuel standardised energy)	2006-2009 54 TWh lifetime discounted	2005-2009: 6,5 Mtoe (75.6 TWh)	From 2006 2,95 PJ/a (0.82 TWh/a)*	2% of last two years electricity consumption of residential sector 1.5% for non-residential In 2008: Total 0.58 TWh (annual)
Target achievement°	180 TWh	65,2 TWh	6,6 Mtoe (76.8 TWh)	2,87 PJ/a (Average of 2006 und 2007)*	0.58 TWh in 2008 (annual)
Current Target	Between 01.04. 2008-31.12.2012 293 MtCO2	2011-2013 345 TWh (cumac)	Cumulative saving 6 Mtoe in 2012	(from 2010) 5,4 PJ/a (1,5 TWh/a)*	Not apparent

° Source of entire row: (Bertoldi et al., 2010) except * (Togeby, 2008)(Togeby et al., 2009)

[1] Cumac: The word cumac means added and discounted

In France and UK targets refer to a period of three years. Thus, suppliers have to comply with their obligations within these three years. In other countries multi annual target period are defined (usually three years) whereas compliance period is set to one year (e.g. the yearly average of three years).

Table 2 indicates main design characteristics of analyzed programs. Accordingly it can be seen that the dominant measures implemented differ by country. While in the UK between 2005 and 2007 approx. 60% of measures are cavity wall and loft insulations, in Italy 65% of all measures are derived by implementation of CFL (Compact Fluorescent Light) (Bertoldi et al., 2010).

Table 2: Main characteristics of assessed obligation schemes°

Design Features	UK	France	Italy	Denmark	BE-Flem
Obligation holder	Electricity and gas suppliers with at least 50,000 residential customers	All Energy suppliers (except transport)	Electricity and gas distributors	Electricity, gas and heat distributors	Electricity distributors
Policy scope	Residential	All except EU-ETS	All end users	All end users	Residential and non energy intensive industry and service
Main delivery agents	Energy suppliers	Energy suppliers	ESCOs	Commercial daughter companies	ESCOs
Price Regulation	None	To be defined	Distribution charge (regulated tariffs)	Distribution charge (regulated tariffs)	Distribution charge (regulated tariffs)
Trading	Only between suppliers (No transparent white certificates)	Yes (White certificates market)	Yes (White certificates market)	n/a	n/a
Trading actors	Energy suppliers only	Energy suppliers, public sector and businesses	Any	Non	Non
Target set by	Regulator	Government	Government	Government	Flemish Government
Administrator	Regulator (Ofgem)	Government	Regulator (AEEG)	Danish energy authority	Flemish Government
Penalty	A fine up to 10% of the suppliers turnover (related to size of miss)	2 Eurocents per kWh	not explicitly defined (related to non -compliance)	n/a	1 €cent/kWh missed + fine not eligible for tariff
Dominant measures in terms of savings	Insulation	Heating equipments	Lighting	Horizontal technologies in Industry	Glazing, boilers, insulation

°Based on Sources: (Eyre et al., 2009), (Lees, 2007), (Mundaca, 2007), (Bertoldi et al., 2010), (Bertoldi and Rezessy, 2009)

1.4 Calculation (measurement) of energy saving

In Denmark and Flanders saving are measured for the first years. In ***Denmark*** energy savings are recorded as final energy, so all energy types count equally. 1 kWh saving can mean 1 kWh electricity or district heating despite the carbon content can vary significantly across different final energy sources. In the case of “conversion projects” - i.e. when converting electric heated houses to district heating, electricity is weighted with a factor 2.5 (Togeby et al., 2009).

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Table 3 shows how far these programs consider lifetimes of saving and discount rate[2] as well as the possibility of banking and borrowing of saving (or certificates). Except in France none of the programs consider a discount rate. In the UK within the previous obligation programs (EEC1- and EEC-2) saving was discounted because the target was set in carbon weighted final energy[3]. This is disestablished within CERT as the target is now set in terms of CO2 reduction (Bertoldi and Rezessy, 2009).

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[2] Discount rate in respect of saving can be understood as deterioration of technical measures over its lifetime actualizing annual savings for different measures with different life spans (Bertoldi and Rezessy, 2009)

[3] Target on carbon weighted final energy considers the carbon content of fuel saved. The target for EEC-2 in UK (2005-2008) was fuel standardised lifetime discounted 130 TWh.

[4] Italian Regulatory Authority for Electricity and Gas

[5] For instance every m² of solar thermal panel replacing an electric boiler corresponds to 0.154 toe (Note however that this value differs by predefined locations) (Di Santo et al., 2011)

Table 3: Key parameters for the calculation of saving, banking and cost recovery

Features	**UK**	**France**	**Italy**	**Denmark**	**BE-Flem**
Lifetimes of saving	Differ by measures (discounted physical lifetime)	Differ by measures (discounted physical lifetime)	5 years (8 years for heating and air conditioning measures)	First year saving only (one-year lifetime)	First year saving only (one-year lifetime)
Discount rate	in CERT no discounting	4%	No discounting	No discounting	No discounting
Banking, borrowing	Banking of excess savings between phases (EEC-1 to EEC2, EEC-2 to CERT)	Banking for three compliance periods	Banking till 2012[6] Borrowing for 1 year if under compliance below 40%	Banking till 2011	Banking of excess saving
Cost recovery	Suppliers can pass on their costs through prices in a liberalized market	The law allows an increase in energy regulated tariffs corresponding to costs approved by the public authority	A charge on electricity and natural gas distribution rates	The cost recovery regime is a levy paid by all costumers equal to 0.06 Eurocent/kWh on average in the case of electricity	Costs are recovered by end consumers through energy tariffs that are set annually on the basis of budget estimates from network operators for the following year7

In contrast to that in ***UK*** and ***France*** lifetime saving is considered and this changes due to measures. Formula [1] shows how saving is calculated in ***UK`s CERT*** program based on information provided by (Ofgem, 2011).

$$TS = \left(AE_{before} - AE_{after}\right) * C_c * LT \qquad [1]$$

TS : *Total saving in tCO2 lifetime*
AE_{befor} : *Annual energy consumption before*
AE_{after} : *Annual energy consumption after*
C_c : *CO2 coefficient*
LT : *Lifetime of measures*

In ***France*** the cumulated life time discounted saving is measured. This can be shown based on the following formula.

$$TS = \sum_{i=0}^{LT-1} \frac{AS}{(1+r)^i} \qquad [2]$$

TS : Total saving (cumulated lifetime discounted saving)
AS : Annual saving (AE_{before}- AE_{after})
r : *Discount rate (4%)*
LT : Life time of measures

[6] Certificates are valid for three compliance periods until 2012 which amount to 9 years.

[7] Costs caused by the programmes for one customer group are included in the network tariffs for that customer group (Labanca, 2006).

2 A closer look on country specifics – Cross-country comparison of CO_2 and energy-related indicators

In this section the implementing countries are compared with Austria with respect to their CO_2 and energy indicators. All key indicators are listed in Table 4. Correspondingly Austria is after Belgium the second country where final energy consumption per capita is highest. Austria's electricity consumption in the residential sector is also the second highest whereas this range can also be seen for the industrial electricity consumption. Austria's total final energy intensity (final energy consumption to produce a unit of GDP) is also high and amounted in 2009 to 106 toe/M€_2000[8]. Because of hydro share in the electricity production Austria CO_2 intensity per unit of final energy is lowest after France. The highest CO_2 intensity for 2009 has UK by 3,2 tCO_2/toe.

Table 4: Key indicators (general, energy, CO2); based on Odyssee Database (Odyssee, 2012)

Indikator in 2009	Unit	Austria	Belgium	Denmark	France	Italy	United Kingdom
Population	in 1000	8,192	10,840	5,510	62,474	60,340	61,792
GDP per capita	€_2000 /cap	28,931	26,117	33,014	25,418	20,018	29,431
Primary energy per capita	kgoe/cap	3948	**5350**	3506	4158	2711	3171
Final Energy per capita	kgoe/cap	**3083**	**3178**	2677	2475	2007	2243
Residential electricity consumption/capita	kgoe/cap	**172**	159	158	**212**	98	165
Industrial elelctricity intensity	toe/M€_2000	**9.28**	**9.93**	4.02	6.34	8.14	4.64
Total Primary energy intensity	toe/M€_2000	136	**205**	106	164	135	108
Total Final energy intensity	toe/M€_2000	**106**	**122**	81	97	100	76
Energy Import dependency°	%	**65**	**74**	-19	51	**83**	27
CO_2 emissions per capita	t CO2/cap	7.2	8.6	7.8	5.3	6.3	7.3
CO_2 intensity (total CO2/total final energy)	t CO2/toe	2.3	2.7	2.9	2.1	3.1	**3.2**

° Data is derived from Eurostat (The indicator is calculated as net imports divided by the sum of gross inland energy consumption plus bunkers)

Based on data from (Eurostat, 2012) average energy dependency in 27 EU countries is 54%. Although electricity generation is mainly based on domestic renewable sources like hydro, biomass and industrial waste Austria's energy dependency of 65% is above the EU average due to significant imports of natural gas, oil etc.

Figure 2 shows that energy intensity has been decreasing in all countries over past years. In respect of energy intensity the highest values can be observed in Belgium in final energy as well as in primary energy. The level of energy consumption per capita decreased from 1990 to 2009 only in Denmark (3%) and the UK (13%) while in other countries the specific consumption has increased. The highest increase over this period has occurred in Austria: 21% in terms of primary energy and about 30% in terms of final energy consumption.

[8] High energy intensities indicate a high price or cost of converting energy into GDP.

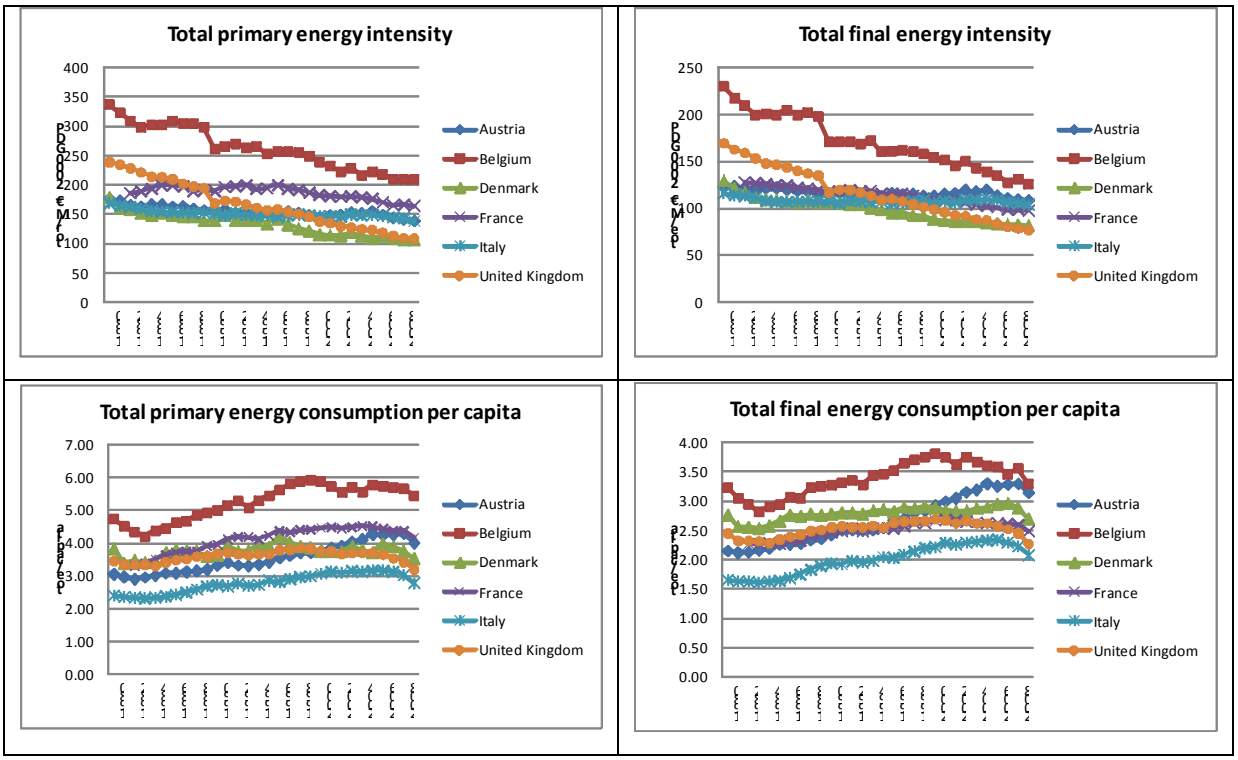


Figure 2: Development of primary and final energy intensity as well as energy consumption per capita (Data source (Odyssee, 2012))

Note : Climatic corrected[9] final and primary consumption has been considered.

Figure 3 and Figure 4 show the development of CO_2-related indicators. In the case of CO_2 intensity for electricity consumption the lowest values are indicated for France since nuclear energy accounts for about 78% of domestic electricity generation. Over past years the highest values can be seen in Denmark due to the dominance of coal in electricity generation. Denmark's profile exhibits high fluctuations which can be explained by the variation of electricity exports and the related carbon intensity of exported electricity. On the other hand the implementation of energy efficiency measures and the increase of wind energy have led to a strong decrease in CO_2 intensity in this country in the residential as well as the industry sector.

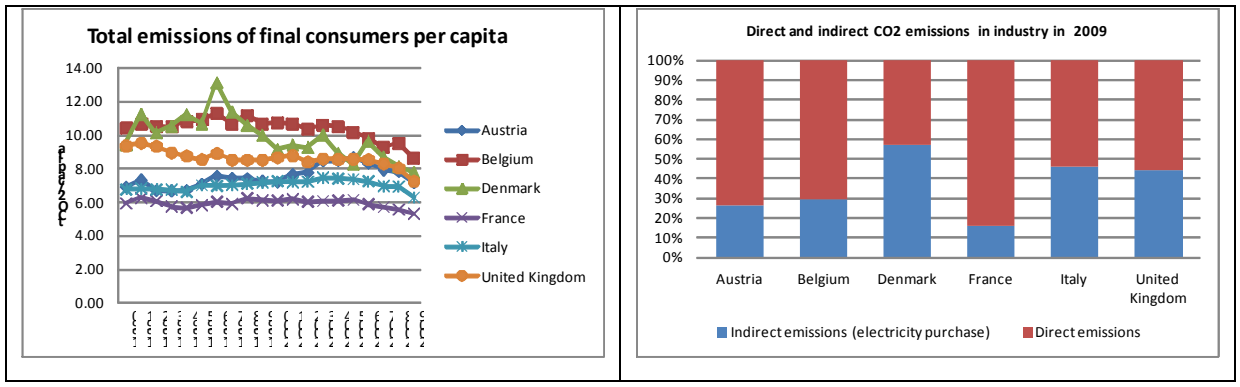
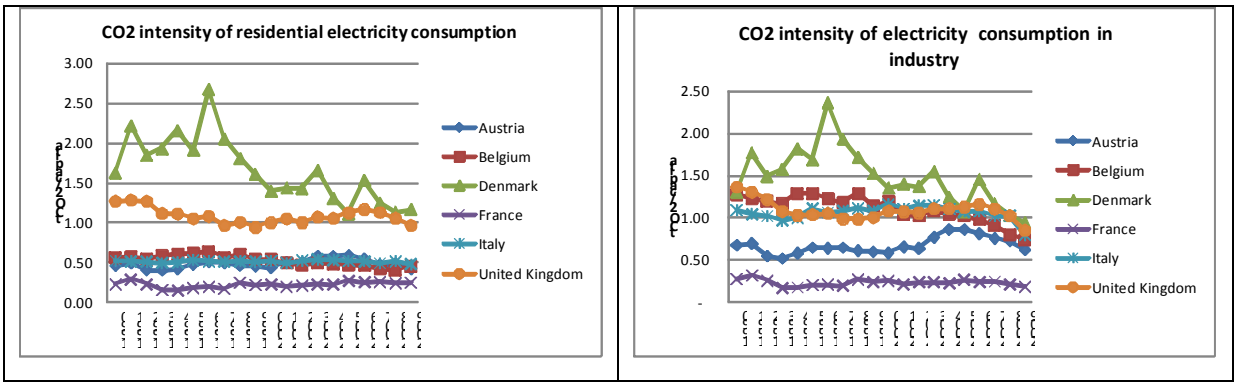


Figure 3: Development of total CO_2 emissions per capita over the years (left) and direct and indirect (electricity-related) emissions in 2009 (right) (Data Source: (Odyssee, 2012))

[9] Climatic corrections enable to measure energy trends independent on the yearly variations in the winter severity (EEA, n.d.)



Source: (Odyssee, 2012)

Figure 4: Development of CO_2 intensity of electricity consumption in the residential (left) and the industry (right) sector (Data source (Odyssee, 2012)).

Figure 5 illustrates the development of indicators on final energy, electricity, gas and energy consumption for space heating in the residential sector.

In Italy final energy consumption per inhabitant is significantly lower in comparison to other countries which can be explained by preferable climate conditions (and consequently a lower demand for space heating). Nevertheless Italy's energy dependency in 2009 is 83% which indicates an extraordinary high dependency on energy imports since domestic energy resources are scarce.

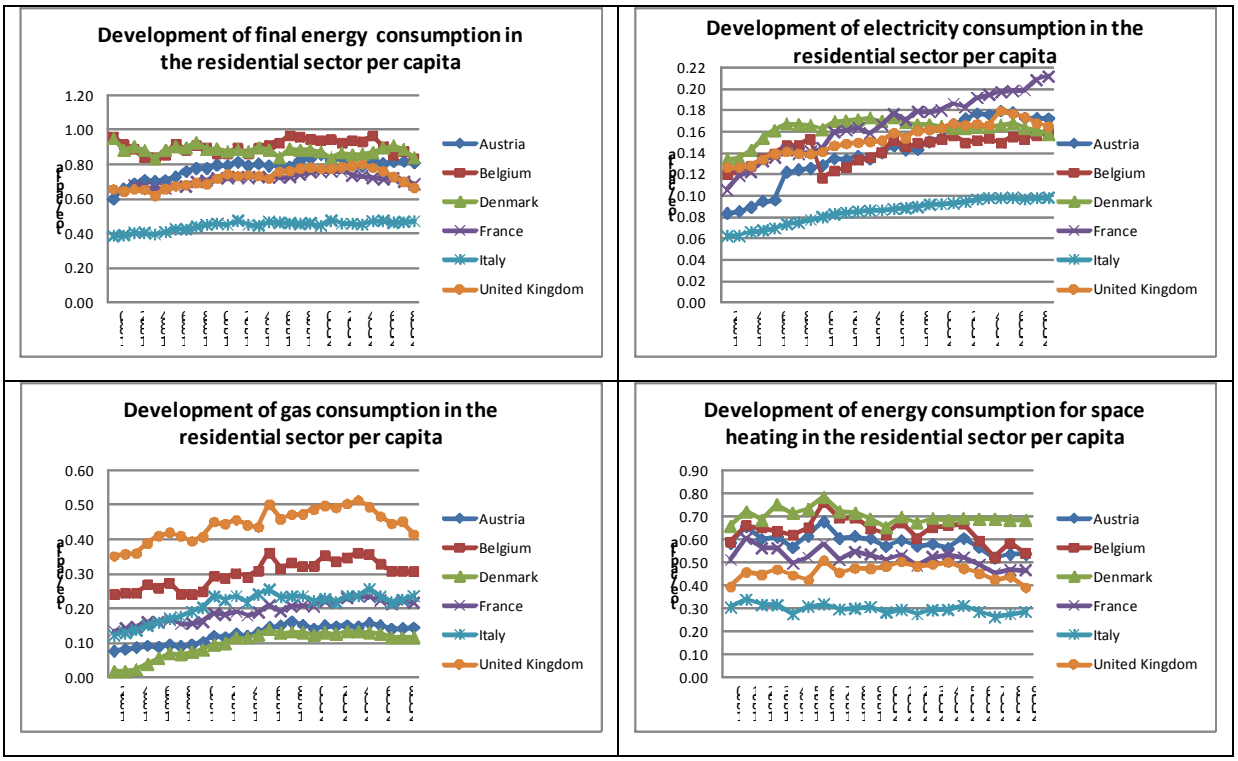


Figure 5: Development of energy indicators in the residential sector (Data Source: (Odyssee, 2012))

Note: for the development of final energy and space heating consumption in the residential sector, climate corrected values are considered.

Electricity consumption in the residential sector is increasing among all countries at least until 2004. From this year on the consumption is slightly decreasing in Austria whereas in Denmark and the UK the decrease can be seen more clearly. In contrast to other countries electricity consumption in France is still increasing.

In the case of residential gas consumption UK is the leading country with the highest specific consumption per capita among all. On the other hand gas consumption has been decreasing strongly since 2005. (Lees, 2011) explains this trend in the case of gas with the implementation of energy efficiency obligations which have doubled in 2005. In his article Lees (2011) says that the gas consumption reduced around 15% between 2004 and 2009 although the number of gas costumers increased by 7%. In the framework of energy obligations in UK 75% of energy saving measures comes from insulations measures thus this program has high impact on reduction of gas demand.

From 2006 a clear decrease is observed in gas consumption in Belgium where almost half of households are heated by gas. In Belgium beside implementation of distributor obligations in Flanders from 2003 on, enforcing of thermal insulation standards since 2006 in the households and tertiary buildings (Mure-Odyssee, 2011) played decisive role for this reduction.

Among all countries energy consumption for space heating is in Italy lowest whereas in Denmark it is highest. Denmark's high consumption can be argued with generally large homes and cold climates of Scandinavian countries in comparison to other European countries.

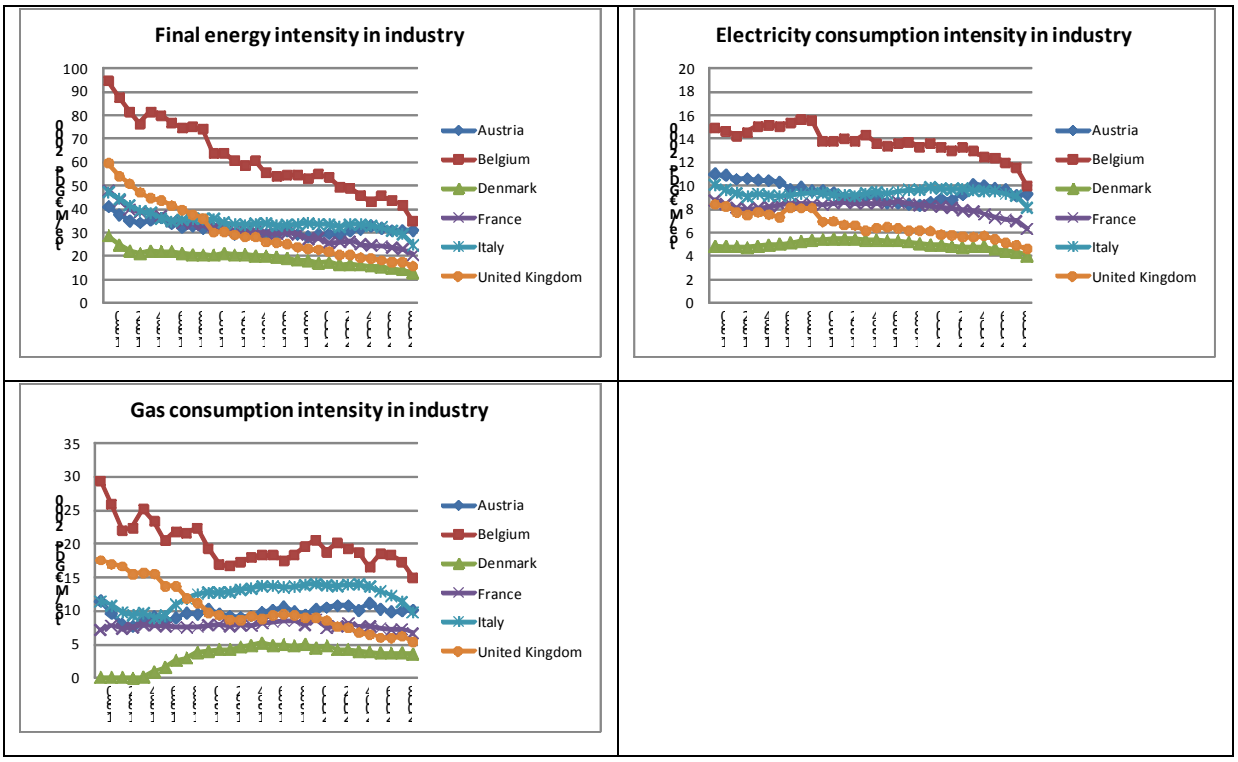


Figure 6: Development of energy indicators in the industry sector (Data Source: (Odyssee, 2012))

On the other hand, except UK in other countries the obligations to the utilities cover industry sector as well. The example from Denmark is notably in the case of electricity saving in the industry sector. (Togeby et al., 2009) states that electricity utilities focused on industrial companies especially as they could minimise the utility costs in relation to the large energy users.

3 What can we learn for Austria?

It is not to aim of this paper to recommend for Austria whether obligations on utilities should be imposed or not. Nevertheless the comparative analysis of programs implemented in other countries shows that there are some crucial points for the design of these programmers and the actual implementation, respectively. Of key relevance appears to point out which advantages or disadvantages these design features do have. Table 5 offers a list of advantages and disadvantages for certain design features as derived from literature.

Table 5: Summary of advantages and disadvantages of selected design features

Design Features	Country	Advantages	Disadvantages
Lifetime energy saving	FR, UK	More capable of promoting structural actions like building improvements measures	
Annual (first year energy) saving	FL,DK	First year saving ensures that new projects are implemented each year (Bertoldi and Rezessy, 2009)	Discrimination of longer life measures such as building improvements. Promoting measures mainly with short payback time (Lees, 2007)
Short life time of measures	IT		Discrimination of longer life measures such as building improvements. Promoting measures mainly with short payback time (Lees, 2007)
Annual progress report	UK	Obliged companies must report on annual progress which allows to monitor the activities (Bertoldi and Rezessy, 2009)	
Annual Targets	DK,IT, Bel FL	Give the system administrator the possibility to correct for any implementation flaws (Bertoldi and Rezessy, 2009)	
Obligation holder: distribution companies	Bel-FL, IT, DK	• Distribution companies are local monopolies, often under regulated tariffs, thus more stable. • With an appropriate tariff structure their revenues can be decoupled from sales of energy (Bertoldi et al., 2011). • Obligation on distribution companies stimulated the third actors like ESCOs (in Italy 75% of certificates delivered by ESCOs) (Bertoldi et al., 2011).	• These companies don't have direct link to final users (Bertoldi et al., 2011). • Lack of interest of energy companies under obligations • Lack of skills to deliver energy efficiency by distributors and/or high cost of in house implementing as compared to market-sourced certificate purchase (as the case in IT) (Bertoldi et al., 2011).
Obligation holder: suppliers	UK, FR	• The suppliers have a stronger link to end-users • Suppliers can take advantage of the marketing and retail skills (Bertoldi et al., 2011). • Suppliers have financial resources and and knowhow.	• Supplier obligation could conflict with their revenues which are from selling energy (Bertoldi et al., 2011). • Competition might be distorted.

Based on this analysis it can be concluded that a well designed and implemented utility obligation would also contribute to reduce the energy consumption in Austria. Since design and implementations play decisive role the attention should be given to learn from other countries. In this respect it is important for Austria to define its own priorities respectively – for instance which sectors should be targeted or which energy unit should be set as measure for accounting the saving obligations. (Eyre et al., 2009) emphasizes that the target metric has a big impact on the mix of measures. Although Austria's electricity consumption per capita is high compared to other countries (except France) due to the high share of

renewable sources in electricity generation, its carbon content per capita is low. Hence if Austria decides to implement utility obligations a carbon or primary energy metric it can be expected that this would lead to less reductions in the electricity sector. Thus, a metric in terms of final energy can be recommended.

As summarized above imposing obligations on distribution companies or suppliers have advantages as well as disadvantages. The question for Austria which utility should obligated can be answered through different considerations like which sectors should be covered, should ESCOs be encouraged, how the costs should be recovered etc.

For the implementation of programs cost for the society as well as the amount of energy saving should be ex-ante estimated and also compared with other energy efficiency measures (e.g. obligations versus standards).

The measurement or calculation of savings has also an essential impact on the selection of measures to be taken. Considering of lifetime saving leads to implementation of measures with high investment costs and long lifetimes such as thermal insulation of buildings. Moreover, in order to estimate the real impact of an instrument the side effects such as rebound, free riders, spill over etc. as well as the “additionality” should also be analyzed in prior.

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