

# **Linking Reforms and Energy Efficiency to Explore the Possibilities for IRP and DSM in the Liberalized Internal European Electricity Market**

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## **ABSTRACT**

This paper investigates the impact of the completion of the liberalized European Internal Electricity Market on Integrated Resource Planning (IRP) and Demand-Side Management (DSM). The results presented are part of the outcomes of a study analyzing the possibilities of IRP and DSM in this new industry environment. The study, finished in May 2000, is based on empirical surveys of both the present and the emerging electricity market structures, as well as of IRP and DSM activities in the European Union countries. The interim results were discussed with practitioners from the eight countries participating in the study.

The first part of the paper presents a dynamic characterization of the restructuring process in each of the European Union countries participating in the study. Topics include the planning procedures and the legal, regulatory and institutional frameworks with regard to the incentives or disincentives for IRP and DSM. The second part of the paper reviews the past, present and planned DSM and IRP support mechanisms, including public benefit charges, rate-making, obligations. Finally, a relationship is established between the electricity market structures and characteristics, and the level of IRP and DSM activities. The results show the difficulty in finding a common field for action at European Union level. Proposals for such common action are presented in a second paper at this Conference.

## **Introduction**

Electricity was one of the tradable goods that was resisting the most to the realization of the internal market for goods, capitals and people in the European Union. A European Directive establishing the rules of an Electricity Internal Market (EC 1996) was accepted in 1996 and the Member States were required to adopt these rules in 1999 (2000 for Belgium and Greece). This Directive gives to the Member States a rather wide freedom in reaching competition. It is the result of a long and difficult process of harmonization due to the diversity of the electricity sector industry in the EU countries, the historical and political trajectory having contributed to the most varied situations.

As a consequence, the adoption of a common policy for energy efficiency at EU level involving the electricity industry is a formidable challenge. It requires the identification of intersections upon which to build actions while simultaneously giving attention to “subsidiarity”<sup>1</sup> issues.

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<sup>1</sup> The principle of subsidiarity states that decisions should be taken as closely as possible to the citizens. Therefore, the European Union (a conglomerate of independent states) should only act when the objectives of the proposed action cannot be sufficiently achieved by the Member States and that can be better achieved by the European Union.

To investigate the subject, the European Commission, under the framework of the SAVE program, mandated a group of institutions from eight European countries (Germany, Belgium, Denmark, France, Italy, Portugal, Sweden, United Kingdom) led by the Wuppertal Institut from Germany. This study, entitled "IRP in a Changing Market" (Wuppertal Institut et al. 2000), had two main objectives: (1) to investigate the possibilities of doing IRP and DSM<sup>2</sup> in the restructured Internal European Electricity and Gas Market; (2) to develop recommendations to stimulate IRP and DSM in the liberalized electricity and gas markets, both at European and National level.

This study, finished in May 2000, is based on two empirical national questionnaires. One survey is dedicated to describing the market characteristics while the second survey dealt with DSM mechanisms, programs and services, and experiences with Integrated Resource Planning. The interim results and recommendations for policy were discussed with practitioners in National workshops held in the eight countries participating in the study.

### **Hypotheses to Study the Relationship between Market Characteristics and the Occurrence of DSM**

A cross comparison analysis has been made in order to: (1) identify the characteristics that favored or disfavored the development of DSM; (2) find the common characteristics that can allow the implementation of mechanisms at EU level and the ones that have to be decided at the national level; (3) find out if the reforms are fostering or reducing the positive characteristics. The analysis resulting from the two surveys allowed the study of the conditions for success of mechanisms and their transferability. To answer these questions, a number of factors were hypothesized to be influential on the occurrence of DSM, including:

- *Level of centralization and integration of the electricity industry.* Highly vertically integrated electricity companies in theory should be better suited for IRP and DSM given the possibility to weigh supply-side and demand-side measures on equal terms;
- *Price regulation and incentives to DSM.* Explicit price regulation should influence a company's ability to adapt to the regulation principles, for example on how to recover costs and determine how profits depend on kWh sales;
- *Level of retail competition.* Retail competition should lead to fewer DSM programs<sup>3</sup> but may stimulate DSM services;
- *National policy and general attention to energy efficiency and environmental issues.* A general attention to energy efficiency and environmental issues may be positive for DSM, unless the perception prevails that there is no need to involve the ESI to do DSM. Also, a country with polluting electricity production may pay greater attention to DSM.
- *Philosophy behind policy and general utility culture.* Electricity companies that have been regulated to specialize in the generation, transmission and distribution of electricity are likely to resist DSM more than non-specialized utilities;
- *The occurrence of DSM prior to reform.* A history of DSM and associated learning should facilitate post-reform DSM.

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<sup>2</sup> We consider here that "Demand-Side Management" is any customer-oriented activity of energy companies or organisations related to them which comprises energy savings, load-management and fuel switching.

<sup>3</sup> DSM programs and services are specific activities targeted to energy end-users or market agents. DSM programs are activities not entirely paid for by the customer or agent who directly benefits. DSM services are directly paid for by the agent that directly benefits.

The analysis consisted of testing the validity of these hypotheses. However, we are aware that the relations of cause and effects might not be straightforward, the reason why country summaries are also presented as individual case studies with singular combinations of characteristics and instruments. These hypotheses are discussed on the basis of observations made for the eight EU-countries that have been subject to careful analysis in this study and, when relevant, other countries.

In order to provide a background for the testing and discussion of the hypotheses, a brief summary of electricity sector country characteristics is provided, followed by a characterization of the past present and future experiences in IRP and DSM activities and mechanisms.

## **Characterization of the Restructuring Process in the European Union**

This chapter presents the results of the country surveys that addressed all the market characteristics as regard to the incentives or disincentives for IRP and DSM, and to the possibility of adopting mechanisms for the promotion of IRP/DSM at EU level. These include the past, present and emerging situation of the following electricity market structures characteristics: vertical concentration and unbundling, market access; regulation; energy efficiency attitudes; energy marketing activities.

The restructuring process in the EU is in most countries driven by the IEM Directive on the Common Rules of the Internal Electricity Market. However, as the former electricity market structures were very different, restructuring took also very different paths in the EU countries, within the rules defined by the IEM Directive. The United Kingdom, for example, started restructuring in the 80's (well before the IEM Directive) while France is just starting a process for introducing the strict minimum changes to comply with the directive. Table 1 describes the situation in the participating countries regarding the restructuring process.

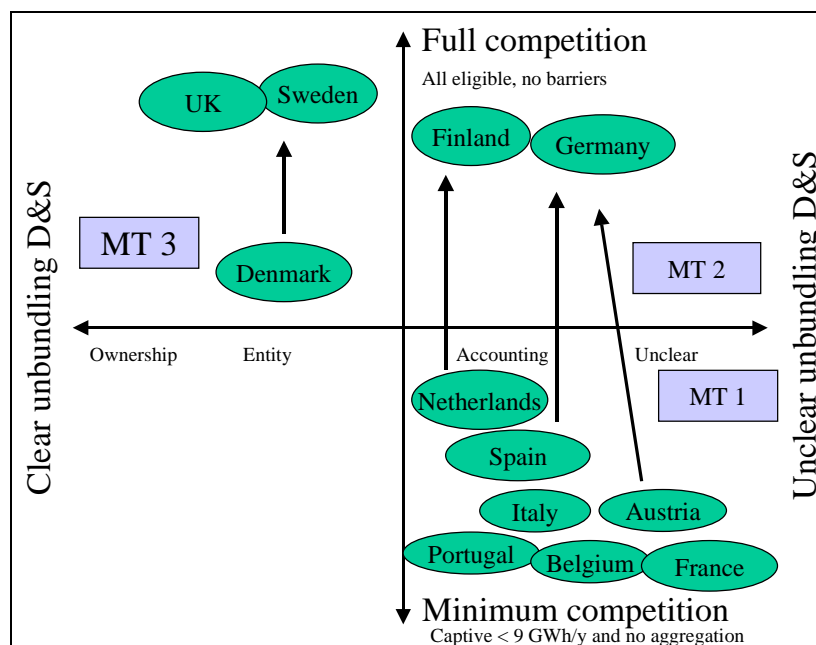
The EU markets have characteristics that led to different combinations for every country. However, it is possible to define basic market types taking into account two characteristics: the level of retail competition (over the minimum required by the IEM Directive, ap. 26%) and the unbundling of the distribution and supply activities. Figure 1 illustrates the EU countries situation regarding the following three market:

- Market Type 1 - Partial competition. It is a market that still has non-eligible customers, and hence franchise monopolies for the supply to these customers; in some cases, only the minimum market opening required by the IEM Directive is implemented (ap. 26% in 2000);
- Market Type 2 - Full competition, not clearly defined. All customers are eligible customers, but the rules for market access may not be very clear, and the distribution network companies and the retail supply companies are not clearly separated;
- Market Type 3 - Full competition. All customers are eligible customers, the rules for market access are very clear, and the distribution network companies and the retail supply companies are clearly separated (at least by entity).

**Table 1. Country situations regarding restructuring and/or IEM implementation**

Country	Before Restructuring or IEM-implemентаion	Restructuring and/or IEM-implementation
Belgium	High level of vertical integration and near monopoly for the private company Tractebel- Electrabel.	Reluctance both on government and industry and only minimal unbundling and market opening required by IEM starting 1999.
Denmark	Generation (Elsam and Elkraft) owned jointly by many small municipal energy companies (~70).	Some initial reluctance but starting 1998 implementation goes faster and further than required. Unbundling by separate entity
Germany	Diverse and complex market with eight large generators, 55 regional and 580 municipal distribution supply companies. Ownership of various types.	Rapid deregulation starting 1998/99. Formal full retail competition but with obscure pricing and without clear rules for the new market. Unbundling only by separate accounting.
France	Vertically integrated monopoly state owned EdF controls the electricity sector.	With reluctance IEM is transposed in 2000 (with delay) respecting the strict minimum required by the IEM Directive.
England & Wales	Central generation and transmission company (CEGB) and regional distribution and supply monopolies (Area Boards), resulting from post-war nationalizations.	Restructuring starts in 1989/90 (well before the IEM) and includes privatization and splitting up CEGB. Full retail competition is adopted.
Italy	High level of vertical integration and state owned monopoly ENEL as result of nationalizations.	Restructuring starts in 1999 going slightly further than IEM requires. Includes breaking up ENEL and privatization.
Portugal	High level of vertical integration and state owned monopoly EDP as result of nationalizations during the 1970s.	Restructuring, started in 1991, included privatization and unbundling by legal entity but not by ownership (under a holding). It has been faster but not further than required.
Sweden	Generation (50% of total) and transmission in state-owned company. Some private generators and mostly municipal distribution/supply companies (~250) in a relatively de-integrated market.	Restructuring starts in 1996 going much faster and further than required in IEM. Unbundling monopoly functions by legal entity. Full retail competition.

**Figure 1. Unbundling of Supply from Distribution vs Retail competition**



## Past, Present and Planned DSM and IRP Activities and Support Mechanisms

This chapter reviews the past, present and planned DSM and IRP experiences and support mechanisms<sup>4</sup>, including public benefit charges, rate-making and obligation<sup>5</sup>s. Table 2 presents the level of DSM activity and the attention given to DSM in the implementation of the IEM Directive while table 3 summarizes the mechanisms in place in the participating countries.

**Belgium.** The highly centralized structure does not appear to have supported the development of IRP and DSM. Only some local DSM programs by distribution-supply companies have been undertaken before the first national DSM program was implemented in 1996. Long term planning includes a small part of investments on DSM with stated objectives for energy savings, although this can not be considered IRP. A levy (approximately 0.025 cEuro/kWh) has been agreed in order to reach those objectives. There is attention to include in the reformed market an obligation on distribution companies to do DSM, which is so far limited to Flanders.

**Denmark.** The decentralized system is characterized by bottom-up ownership of generation by municipal utilities. Denmark gives high attention to energy and environmental issues in general, has a strong energy efficiency policy and has had the strongest system for IRP and DSM in Europe. This is partly the result of a tradition to regulate, although negotiating with energy companies, which has facilitated considerable incentives to support DSM during and after IEM-implementation. Denmark is the only country where an effective IRP obligation mechanism exists, which is considered to be the mechanism that has contributed the most for the development of DSM activities. Since 1995, the plans are made in co-operation between all utilities according to guidelines from the Ministry. According to the Electricity Act adopted in early 2000, long-term plans still exist as a public service obligation and the ministry issues guidelines on planning and, with more attention than before, implementation of DSM activities. Network companies are responsible for implementing the DSM plan issued and electric companies are required to offer DSM services (on commercial basis) to obtain supply franchise rights.

Two different kind of earmarked funds exist: (1) an "agreed expense level" (0,08 cEuro/kWh) on all customers used by electricity distribution companies; (2) another one on the residential and public sectors (also 0,08 cEuro/kWh) used and administered by the Electricity Saving Trust, funded from a special levy. Furthermore, a part of a carbon-based tax can be recycled to industries for CO<sub>2</sub> reduction projects. The level of DSM activities has been the highest in Europe and the implementation of the IEM directive is not intended to change this situation. Furthermore, ceilings for CO<sub>2</sub> emissions allocated to the electricity sector have been defined.

**France.** Long term planning is performed where demand is supposed to be influenced through the marginal cost-based tariff structure. DSM is performed only when tariffs are believed to be ineffective. Large-scale load management programs have been carried out for a long time in domestic water heaters. A very small part (1%, corresponding to 0,0005 cEuro/kWh) of a levy collected to feed a the FACE-Fund for Rural electrification is dedicated to DSM programs, RES

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<sup>4</sup> DSM mechanisms are instruments, targeted at entities, like energy companies, and are aimed at promoting DSM programs or services, which are directed at end-users.

<sup>5</sup> Obligation is a legally binding target set for the energy companies. The obligation can be set by legislative bodies, by the regulatory body, included in the license or as an extension of public service obligations.

and CHP. The most effective mechanism has been the voluntary agreement with the National energy agency - Ademe, which amounted to 15 million Euro for the period 1996/1999.

**Germany.** Around 200 electric utilities, particularly municipal, have carried out around 500 DSM programs and services during the 1990's. However, the 1998 energy law introducing full retail competition has reduced the DSM activities particularly for the smaller customers, as it was not accompanied by a clear regulation regarding DSM. The energy companies now are focused on lowering the prices and no longer use the still existing possibilities for recovering DSM expenses and a part of their lost of revenues through tariffs for the domestic and small commercial customers. For larger industrial, commercial and public customers, however, an increasing number of electricity companies are introducing energy efficiency services. Only in Germany ESCOs had implemented relevant DSM services. Germany is the only country among the eight countries studied that reported significant ESCO activities. The only IRP experience that has been carried out is the LCP Hanover (1995) case study, which was only partially implemented due to the deregulation.

**Italy.** No relevant mechanisms for supporting IRP or DSM have been existing and the level of DSM activities has been very low in the past. On the IEM directive transposition, it is stated that distribution companies are required to do DSM, although the quantity and the structure have not yet been specified. The former progressive consumption tariff for the residential consumers might be abolished. Residential customers have actually been offered degressive tariffs in the spring of 2000. Also a DSM program cost recovery mechanism through tariffs has been created.

**Portugal.** IRP, including the identification and assessment of demand-side actions is required by law to be included in the long-term planning for the public electricity system. However, there are no guidelines or mechanisms to implement the plan. A DSM cost recovery mechanism through tariffs has been created, but energy companies have not used it. The price regulation comprises a non-by-passable levy to be used for environment or energy policy achievement, which so far is only used to support RES and CHP development. When DSM becomes a policy objective, funds can be collected by this levy.

**Sweden.** The regulatory intervention has been light-handed. Formal mechanisms for IRP or DSM do not exist and no IRP experiences have been reported. In the past, as a response to the oil crisis, many efforts in EE were made by national agencies. Before restructuring, all major utilities undertook some DSM programs and could include them in their costs to be recovered through tariffs. However, with the postponing of the nuclear plants phase-out and de-regulation process, DSM activities slowed down. Nowadays, the energy efficiency activities and regulation are under responsibility of the Swedish National Energy Agency, which is financed by the state budget. Energy companies are now providing energy services on a commercial basis, but it is not clear to what extent they result in energy efficiency improvements. This is revealed by a recent market survey where very few were able to answer this question which suggests that results are poorly monitored and evaluated (Bergmash et al. 2000).

**United Kingdom.** The most important and effective mechanism involving the electricity industry in DSM is the Energy Efficiency Standards of Performance. It is in fact a combination of mechanisms that includes: (1) the obligation to deliver a specified amount of energy savings

to their customers; (2) the creation of an entrepreneurial organization - the Energy Saving Trust – to assist the Regulator in administering, implementing and evaluating energy efficiency programs; (3) an allowance to electricity suppliers to collect a levy from small customers (£1,2 per year and consumer, formerly 1£).

**Table 2. Past and present level of DSM activities**

Countries	Past Level of DSM	Description	Attention to DSM in the IEM implementation
Belgium	Low	DSM was and still is marginal ( 1 <sup>st</sup> program in 1996)	Yes, an obligation to do DSM in Flanders
Denmark	High	Since 1992 Distribution and supply companies are invited to set up energy conservation. Efforts have increased as result of the agreed expense level. Commercial DSM services should evolve.	Yes, as an obligation for DSM, an agreed expense level and an entrepreneurial organization
France	Low	Tariff at marginal costs for 20 years, extensive load management activities, agreement between EDF and ADEME	No
Germany	Medium, decreasing with IEM	Municipal utilities particularly active in developing DSM programs in the past. ESCOs and some energy companies in developing DSM services	No
Italy	Low	Municipalities are responsible for the few DSM activities.	Yes but weak and no practical results yet
Portugal	Low	In the past a few DSM activities have been done (financed by EDP), but, they slowed down with privatization	Yes but weak and no practical results yet
Sweden	Low	Some DSM has been done by utilities but not through systematic IRP or regulatory incentives. DSM services are developing fast.	No
England & Wales	Medium-low	Limited to the activities under the Standards of Performance for small customers. Some DSM services are developing for larger customers	Yes, an obligation for DSM, a allowed expense level

**Table 3. Past and present DSM support mechanisms**

Countries	DSM Obligation	Public benefit charge	Price regulation	
			Type of regulation <sup>1</sup>	Recovery of DSM-costs
Belgium	Past: No, Now: Yes	Yes, very small 0,025 cEuro/kWh	Cost plus	No
Denmark	Yes <sup>2</sup> , in D	Yes <sup>2</sup> , two "levies" of 0,08 cEuro/kWh very effective	Cost plus zero	yes
France	No	Yes, 0,0005 cEuro/kWh	Price-cap cost based	no
Germany	No	no	Cost plus, now irrelevant; self-regulation / benchmarking Cost plus	In some cases, not anymore
Italy	Past: No, Now: yes	no	Past cost plus; Now: multiple driver target <sup>6</sup>	Past: No Now: yes
Portugal	No	no	Past: Cost based; Now: multiple driver target	Past: No Now: yes
Sweden	No	no	Benchmarking	Past: yes Now: No
England & Wales	Yes <sup>3</sup>	Yes <sup>3</sup>	Multiple driver target	Yes <sup>3</sup>

<sup>1</sup> The type of regulation refers to the monopoly segments: the supply function for franchise customers in Portugal and Italy; the distribution in England & Wales, Sweden, Germany; the transmission, distribution and supply for the other countries.

<sup>2</sup> Combination an agreed expense level for distribution companies to do DSM. One of the "levies" only applies to domestic and public customers.

<sup>3</sup> Combination of an obligation to reach Standards of Performance and an allowance to surcharge

<sup>6</sup> Multiple Target Driver: hybrid ratemaking regulation scheme based on a set of variables (e.g. number of customers in addition to kWh sales, productivity increase and inflation) to determine a revenue target over time.

## The Past and Future of IRP in the EU

Only Denmark has adopted an effective IRP obligation and very few experiences in IRP in the other participating countries have been reported (see table 4). Furthermore, the IEM made the traditional "macro-IRP" more difficult with the unbundling of traditional functions. Portugal is the only country where such a mechanism exists but with no real framework to make it effective. In Denmark, the traditional "macro-IRP" has been replaced by a more limited "micro-IRP", or integrated assessment of supply and demand options performed by the distribution companies. IRP - in its "macro" or "micro" versions - is nearly not possible to get accepted at a European level.

**Table 4. Integrated Resource Planning in the European Union (participating countries)**

Countries	IRP obligation	Past Experiences of IRP
Belgium	No. Long term plan for supply expansion included an investment in the Demand-side (1% of investment required). Long term planning will continue without IRP requirements.	First but limited IRP experience in power expansion plan.
Denmark	Since 1994, the Electricity Act states that: distribution companies are required to do DSM plans; generation and transmission companies and ISO make scenarios for generation and transmission. The Ministry gives guidelines and co-ordinates the all Plan (20 years). All utilities implement it. After 2000: A new framework Law has been adopted and will be complemented by the ministry. The new DSM obligation only requires DSM plans, and not comparisons with generation alternatives	Yes. Every 2 years: 1995, and 1997. For 1997-2030 Utilities common organizations compile the Energy companies' contribution and report to the Ministry. Cost/Benefit analysis is standardized. The Ministry reviews and might ask for further analysis
France	No. Long term planning but not IRP	No
Germany	No	One experience at local level (Hanover). In 1993/1995 for the period 1995/2010. DSM was implemented (61 to 92 M Euro)
Italy	No	No
Portugal	Yes, established in 1995, Long-term planning of the generation system based on IRP is required, performed by the Ministry under proposal of the ISO and advice from the regulatory entity. Implementation is not mentioned.	Not relevant. Only a IRP Pilot planning study was performed in 1995, for 1992-2010. It was not implemented
Sweden	No	No
England & Wales	No	Not relevant. Only local plans for small areas.

## Market Characteristics and the Occurrence of DSM

In this chapter, the relationship between the electricity market structures and characteristics, and the level of IRP and DSM activities is discussed. This is done by testing the validity of the hypotheses mentioned in the introduction.

**Level of centralization and integration of the electricity industry.** DSM has been most prevalent in markets with relatively little centralized and vertically integrated systems, e.g., Denmark and the Netherlands, conversely to countries with centralized and vertically integrated ESI like France, Belgium, Italy and Portugal. Furthermore, the few DSM-programs undertaken



in, for example, Germany, Belgium and Italy were mostly done by municipal distribution/supply companies. These companies have been more active on DSM in nearly all countries. This observation is contrary to the theoretical perspective where vertically integrated companies, being able to compare supply and demand-side options, would be best suited to do IRP and DSM. A quantitative analysis also shows that the net revenue losses from DSM-programs in Europe were lower for distribution/supply companies than for vertically integrated companies (i.e., incl. generation and transmission) in all eight countries. A notable exception is the extensive load-management for water-heaters in France, driven by supply-side concerns for optimizing the nuclear based, generation system.

Vertically integrated companies in the USA, which showed a large DSM activity based on IRP, were stimulated or obligated by an explicit regulation to do DSM. This has not been the case in Europe. A plausible explanation is that vertically integrated monopolies in Europe were state-owned and generally not explicitly regulated, leading to the prevalence of the generation function on the companies' internal culture, and to a paradoxical disrespect to some public service principles. An interesting exception that confirms this fact is Denmark, where, although the energy companies are somehow vertically integrated, the "bottom-up ownership" implies a completely different strategy when compared to the traditional "top-down" vertically integrated companies. The production is in this system driven by the needs, eliminating the "culture of generation" that leads to the creation of a demand for the supply.

Therefore, **decentralization** seems to facilitate the development of DSM, but needs support mechanisms, specially after reforms, like in Denmark, where DSM will continue, while in Sweden and Germany – the lack of mechanisms are stopping DSM. **Vertical integration** does not seem helpful (Italy, France, Portugal) and, the American experience is unlikely to be replicated in the EU.

**Price regulation and incentives to DSM.** Price regulation in the eight European countries pre-reform has not been strong neither explicit and was or is typically cost-based. This approach has in some cases facilitated DSM-programs but not supported or stimulated them. Denmark is the only country where there was an explicit program cost-recovery mechanism. In other countries where DSM-programs were never on a big scale, program costs could be absorbed in the overall budget immediately or with delay until the next rate case. There is no case where electricity suppliers were explicitly allowed profit sharing or higher returns on DSM investments.

Post-reform or in the reform process, paradoxically, greater attention to DSM incentives in regulation appears to be paid in countries that historically had centralised monopolies with little DSM experience. This is the case of England, Italy and Portugal where the creation of an explicit regulation included the creation of such mechanisms. Conversely, there has been virtually no attention to this aspect of price regulation in Sweden and Germany. However, it remains to be seen whether incentives are effective in, for example, Italy and Belgium. They have, so far, not been effective in Portugal. In England, the existence of a strong regulator was instrumental to the introduction of an obligation, Standards of Performance, and allowance to recover costs.

In conclusion, it appears that the introduction of DSM-mechanisms through price regulation has been easier in countries with a history of price regulation or a perceived need for regulation in the reformed market, such as, England, Denmark and Italy.

**Level of retail competition.** The degree of market opening and retail competition has direct effects on DSM. An obvious hypothesis and observation here, and the experience from elsewhere, is that supplier-operated DSM-programs are not compatible with retail competition and thus DSM spending decreases with competition. This trend has been most clearly observed in Sweden and Germany. Mechanisms and obligations, primarily for distribution companies or distribution/supply companies in captive markets, can be implemented to counter this trend. It is possible that spending on DSM programs may actually increase, especially if the level of DSM activities was low prior to market reform, but it requires strong incentives through regulation.

Another hypothesis is that retail competition will lead to an increase in commercial DSM-services. This appears to be the case in Sweden and perhaps England but it remains to be seen how the market for DSM-services develops. In, for example, Germany and France there are some expectations that DSM-services will increase. Whether an increase in DSM-services actually produces more energy efficiency than was the case before reform, or a regulated market could have produced, is an open question.

**National policy and general attention to energy efficiency and environmental issues.** It is likely that strong environmental and energy policy in general would generate good conditions for DSM. On the other hand, DSM could be crowded out by other efforts, making strong policy negative for DSM programs. It is not clear from this study that there is any correlation. Some observations can be made however. It appears that high general attention to environmental issues as in Sweden and Germany, manifested for example in EMAS and ISO-14000 registrations, is beneficial for the DSM-services market (Bergmash et al. 2000). Another observation is that if electricity production is considered clean, a perception partly held in Sweden and France, it appears that the interest for regulatory incentives is reduced.

**Philosophy behind policy and general utility culture.** One hypothesis is that companies that are highly specialized in electricity generation and transmission and distribution will be less likely to get involved in DSM. In some cases, like for EdF-Electricité de France, the company is limited in its activities in order to prevent the monopoly from competing unfairly in other areas. The specialization may result from explicit instructions or regulation and/or evolved as a company culture. As noted earlier, across the eight countries studied, local/regional distribution/supply companies, often involved also in district heating and gas, have been more likely to undertake DSM-programs than specialized companies.

It could be argued that there is nothing that can change a monopoly company culture faster than subjecting it to competition, giving the possibility of moving from the core business of maximizing the kWh sales. There is a trend towards reduced specialization in, for example, Sweden, Germany and even in traditional monopolistic companies like EDP in Portugal, as electricity companies move into telecommunications, finance or consulting companies to generate income for their cadres of engineers. Competition increases customer orientation and if customers demand DSM-services (which so far does not seem to happen for small and medium consumers), or can be convinced into buying it, the suppliers of electricity are likely to be players on that market. Whether this is for the worse or better in terms of energy efficiency is not clear.

**The occurrence of DSM prior to reform.** This factor is difficult to assess given the limited DSM experience in Europe. In the case of Sweden, some programs were operated in the late

1980s and early 1990s but activities ceased when the closing of the first nuclear reactor was postponed through a 1991 agreement and deregulation discussions started. However, experiences gained under monopoly are now considered an asset and most medium-sized or large suppliers offer DSM-services in the industrial and commercial sectors.

In Denmark, a history of IRP and DSM largely driven by regulation, explicit or through agreements between energy companies and the government, paved the way for regulatory DSM-incentives in the competitive market. Many states in the U.S., with a history of regulated DSM incentives, have also adopted mechanisms to promote DSM in competitive markets (Kushler, 1999), although in some cases a debate is launched on whether electric companies are the best agent to administer funds from a public benefit charge (Eto et al. 1998; NARUC 1999).

## Conclusions

The historical evolution of the electricity sector in each of the EU Member States have resulted in very different systems, which makes it difficult to harmonize the rules to build an integrated electricity market, for which the IEM Directive is a first important step. Similarly, each of the countries developed its own level and type of DSM in accordance with their motivations and characteristics of their system.

In this paper, which is based on results from the "IRP in a changing market" European study (Wuppertal Institut et al. 2000), we have tried to find the intersections on which to build a European policy for this demand-oriented action that takes into account the subsidiarity principle. For this, we tried to identify the conditions that have favored DSM and IRP in the past, which mechanisms have been successful and under which conditions, and the possibilities given by the new organization of the EU electricity sector.

The study gives evidence that there is very little IRP experience in the EU, and shows that an obligation to perform IRP at European level is not possible. Regarding DSM, the study shows the difficulties in finding a common field for action at European Union level, but also identifies promising possibilities exemplified in some countries.

Restructuring in the EU might develop some characteristics which have been positive for DSM, namely: (i) unbundling, since unbundled or bottom-up ownership have favored DSM; (ii) the appearance of explicit and, in some countries, independent regulation (instead of self-regulation) seems to favor the adoption of DSM mechanisms; (iii) less specialized electricity suppliers, which may adopt energy efficiency more easily.

A tradition of DSM has favored the adoption of DSM mechanisms in a new environment, since a debate was already present. The level of retail competition requires re-thinking the agents and the way of doing DSM (particularly, DSM programs), but solutions can be found relying on policy and regulatory support. Retail competition may also develop a market for energy services, at least for larger customers, but the control of its actual content of efficiency needs technical and legal support. In conclusion, several solutions exist to support DSM, but political will is needed.

Restructuring in the EU, under the IEM Directive that established the rules for the organization of the ESI, has disturbed the equilibrium in which (the few) DSM activities were being carried out. Therefore, this Directive needs to be complemented by a demand-side oriented framework to harmonize objectives and establish some means at European level. Proposals for such common action are presented in a second paper at this Conference (Thomas et al. 2000).

## References

- Bergmash Mikael, Anders Lewald, Lars J. Nilsson and Mats Strid. 2000, "The Role of Energy Efficiency in the Deregulated Swedish Electricity Market." *In Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*, Washington D.C.: American Council for an Energy Efficient Economy.
- Crossley, David, Greg Watt. 1999. *Summary of Developed Mechanisms, Mechanisms for Promoting Energy-Efficiency and DSM in Changing Electricity Businesses*. May. Practionners workshop. Sophia Antipolis, France. Task VI of the International Energy Agency Demand-Side Management Programme.
- [EC] European Community. 1996. *Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity*. Official Journal NO. L 027 , 30/01/1997 P. 0020 – 0029.
- Eto, Joseph, Charles Goldman, Steven Nadel. 1998. *Ratepayer-funded energy-efficiency programs in a restructured industry : issues and options for legislators*. Berkeley, Calif. Lawrence Berkeley National Laboratory and American Council for an Energy-Efficient Economy for the US-DOE, LBNL-41479.
- Hamrin, Jan, Ed Vine, Nick Eyre. 1998. *Public Policy Implications of Mechanisms for Promoting Energy-Efficiency and DSM in Changing Electricity Businesses, Research report n°2*. San Francisco, Calif.: Task VI of the International Energy Agency Demand-Side Management Programme, Center for Resources Solutions.
- [IEA] International Energy Agency. 1999. *Electricity Market Reform: An IEA Handbook*, Paris, France. International Energy Agency.
- Kushler, Martin. 1999. *Summary tables of Public Benefit Programs and Electric utility restructuring*, American Council for an Energy-Efficient Economy, [www.aceee.org](http://www.aceee.org).
- [NARUC] National Association of Regulatory Utility Commissioners. 1999. *Environmental issues and policies of Public Utility Commissions- Energy Efficiency Policies of PUC - Program funding Mechanisms and Administrative Structures*. NARUC Energy Regulatory Database, <http://www.naruc.org>.
- Thomas, Stefan, Carlos Lopes and Lorenzo Pagliano. 2000. " The possibilities for policy supporting DSM in the liberalised Internal European Electricity and Gas Markets " *In Proceedings of the 2000 ACEEE Summer Study on Energy Efficiency in Buildings*, Washington D.C.: American Council for an Energy Efficient Economy.
- Wuppertal Institute, ACE, ADEME, ARMINES, CCE, DEA, energy piano, EEE, EST, InterRegies, Lund University, and Politecnico di Milano. 2000. *Completing the market for Least-Cost Energy Services, Strengthening Energy efficiency in the Changing European Electricity and Gas Markets*. Wuppertal, Germany: Wuppertal Institute.

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