



World-wide non-mandatory involvement of electricity utilities in the promotion of energy efficiency and the Portuguese experience

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ABSTRACT

The interest in the promotion of energy efficiency by utilities at the demand-side started in the seventies caused by the high prices of oil and suffered a drastic set back during the restructuring of the electricity sector. However, growing awareness on the positive effects of energy efficiency on the economy and on the environment, led many countries/jurisdictions to impose utilities' engagement in the promotion of energy efficiency. In other countries/jurisdictions utilities encourage their customers to improve energy efficiency, on a non-mandatory basis. In this paper, the non-mandatory involvement of electric utilities in the promotion of energy efficiency at the demand-side is addressed. Some world-wide examples are given, detailing the Portuguese experience. Although this participation is important, it seems that countries/jurisdictions with regulatory impositions obtain more satisfying results.

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Contents

1. Introduction	319
2. Experiences with non-mandatory involvement of utilities in the promotion of EE	320
2.1. European countries	321
2.2. American countries	322
2.3. Asian countries	323
2.4. African countries	324
2.5. Australasian countries	324
3. The Portuguese case-study	325
3.1. Demand-side management plans	325
3.2. Demand-side efficiency promotion plan (PPEC)	325
3.3. Utilities participation in the PGP and PPEC editions	327
3.3.1. Demand-side management plans (PGP)	327
3.3.2. Demand-side efficiency promotion plan (PPEC)	328
4. Conclusion	329
Acknowledgments	330
References	330

1. Introduction

Traditionally, the supply side of the energy system was responsible for ensuring the provision of energy in conditions

requested by the demand. Ensuring sufficiency and security of supply under the current conditions, where the economy is based on fossil fuels, is no longer viable. Non-fossil resources for energy generation have limitations. Besides the increase of several environmental and health issues/concerns on nuclear energy, uranium is also not an infinite resource. Renewable energy sources are not yet, and probably will not be, based on currently known technologies, a true alternative to fossil fuels, under current and projected consumption levels, due to the low density

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of primary energy flows. Also, the environmental impact of energy use, mainly from fossil sources, is not addressed by the current energy business model [1]. In developing countries, mainly those with very low electrification rates, the need to ensure an electricity supply adequate to a reasonable quality of life is of even greater importance. The infrastructures of the electricity system of those countries are usually old, fragmented and unreliable, with high technical and commercial losses, dependent on expensive and carbon intensive fuels. Power sectors in these countries are subject to increasingly frequent power shortage events. Although these events seldom have a single and the same cause, they are usually associated to underinvestment in infrastructures, increasing demand growth, and natural causes such as drought, hot/cold weather [2]. In these cases, the electricity system does not meet its purpose of ensuring the needs of the population. This inability to deliver the amount of energy required within acceptable quality parameters may be an opportunity for utilities to engage in the promotion of end-use energy efficiency, not only as an opportunity to reduce demand, but also due to social and political pressure. For electric utilities, implementing energy efficiency programmes represents, in the short-term, incurring upfront costs and, in the long-term, losing revenues from electricity sales due to lower consumption values.

Utility-based demand-side management (DSM) programmes started after the oil crises of the 1970s, under regulated environment, when utilities were mostly vertically integrated and quite a number of them publicly-owned. In the early 1990s, DSM programmes were already adopted by many utilities, integrated in resource plans where both the supply and demand side were considered as equivalent alternatives in the planning procedure (addressed as integrated resource planning—IRP). The deregulation of the electricity industry that started in the 1990s, threatened DSM. During this period utilities were more focused in the restructuring process and, due to uncertainties on the availability of funds and to the new regulatory environment, investments in DSM dropped sharply. The availability of funds to energy efficiency programmes managed by utilities is a key factor to involve utilities in developing EE programmes. Altogether, the risks of not recovering the programme costs, the revenues losses, or failing profits, may be discouraging. Several approaches are used to address the loss of revenues or fowling profits that utilities may experience due to successful EE programmes. The most commonly found are decoupling sales from profits and utilities/shareholder incentives. Decoupling is a process used to compensate utilities for the reduction of sales due to energy efficiency programmes. The rates are periodically adjusted to reflect the difference between actual energy sales and the sales forecast used in the rate setting process. Also, and as a stimulus for the companies to keep working for more savings, some countries/states created shareholder incentives that reward utilities for the successful implementation of energy efficiency programmes [3].

The participation of utilities in the promotion of energy efficiency (EE) measures is mostly carried out under mandatory regulations. Either through the imposition of savings targets or through mandatory implementation of EE measures, utilities become involved in the promotion of EE. Besides the costs of the programmes, improving EE would, most certainly, reduce the utilities revenues. Some precautions are taken to avoid the companies' financial ruin. Different countries (or jurisdictions) address the issue diversely, for instance, through a mix of programme cost recovery, remuneration of sales, and sharing of benefits from energy efficiency programmes [4]. The most common regulatory mechanisms, according to Sam Swanson [5], are energy efficiency obligations (EEO), integrated resource planning (IRP), stable funding, market adaptation to foster EE investments, requirement of disclosure of demand-side resource opportunities

in system resource plans, performance incentives, tariff design, and independent energy efficiency providers.

However, there are some examples of voluntary involvement [6]. In this context, non-mandatory means that companies are not obliged to engage in EE promotion in order to keep their license. Additionally, some temporary programmes involving utilities are also mentioned in this paper. In the next section the involvement of the utilities in the promotion of EE in different countries/jurisdictions in the different continents is addressed, highlighting the cases of non-mandatory involvement. The Portuguese case in presented in Section 3, namely referring the existing regulation for the involvement of electric utilities in the promotion of EE measures under the demand-side plans framework (Section 3.1) and under the demand-side efficiency plans (Section 3.2). The characterization of the involvement of electric utilities in the promotion of EE in Portugal under both programmes is addressed in Section 3.3.

2. Experiences with non-mandatory involvement of utilities in the promotion of EE

The ACEEE's State Energy Efficiency Scorecard report, based on an annual evaluation of the US states commitment to foster energy efficiency, with the intent to reveal the best practices, results in benchmarking the efforts of states on EE policies and programmes. In its fifth edition, the 2011 report examines the state policies in six areas, (1) utility and public benefits programmes and policies; (2) transportation policies; (3) building energy codes; (4) combined heat and power; (5) state government initiatives; and (6) appliance efficiency standards. For the assessment of each state's performance regarding utility-sector EE programmes, five items are scored: electricity and natural gas programmes budgets for 2010, incremental electricity programme savings for 2009, energy savings targets (EERS), and performance incentives and alternative regulatory business models. EERS and alternative business models are instruments for the provision of incentives and removal of barriers for the promotion of EE in the demand-side by electric utilities. The results from 2010 and 2011 showed that the states with non-mandatory involvement are among the ones that received the lowest scores in most items, occupying generally the last positions in the ranking, reflecting a weak involvement and results of utilities in the promotion of EE measures. The top positions are generally occupied by states that invest in EE programmes, which set energy savings targets, and that have mechanisms to encourage utilities and to remove disincentives. These are the cases of Vermont, Massachusetts, Rhode Island, Minnesota, and California. These are also the states that accomplished more savings. Generally utilities in these states pursue "deep savings", instead of, the so-called, "lowest-hanging fruit" (typically the replacement of lighting technologies). "Deep savings" approaches focuses on programmes such as whole-building retrofits and comprehensive changes addressing technologies and their use, trying to obtain the most possible savings from each participant customer. The top states accomplished savings above 0.84% of retail sales while the states without mandatory involvement attained under 0.2% savings of retail sales [7,8].

Several international organizations, such as the World Bank, the International Finance Corporation (IFC, is a unit of the World Bank), the United Nations Development Program (UNDP), the United States Agency for International Development (USAID), the Asian Development Bank, among others, have been financing DSM activities, through loans, some of them with grants from the Global Environment Facility (GEF). This kind of collaboration for the development of DSM projects helps building local

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