

California Experience in Energy Efficiency: Lessons for Chile

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ABSTRACT: California is the leader state of the US in implementing successful energy efficiency programs. After the electricity crisis of 2000-2001, the government of California started an aggressive plan to encourage private institutions to implement energy efficiency programs. In particular, California was the first state in implementing an incentive mechanism that decouples the benefits of energy utilities from their sales. Such a mechanism is currently being implemented or under consideration in most of the states of the US. This paper analyzes the incentives mechanisms adopted in California in order to effectively promote the implementation of energy efficiency programs among the different stakeholders of the energy markets. The program-implementation details of such mechanisms provide important lessons for systems with no energy-efficiency programs in the electricity sector, like the Chilean electricity system, to design an incentive structure that effectively promote energy efficiency among the participants of the market.

Keywords: energy efficiency, decoupling mechanism

1. INTRODUCTION

California is the leader state of the US in implementing successful energy efficiency (EE) programs. After the electricity crisis of 2000-2001, the government of California started an aggressive plan to encourage private institutions to implement EE programs. Improving EE involves several actions, which depend upon the economic sector that is considered. Identifying the differences in energy consumption among the diverse sectors of the economy is a necessary first step for being successful in implementing EE programs. This paper focuses on the electricity delivery sector and the potential for EE within this sector.

Traditionally, California used a rate-of-return regulation for electricity ratemaking setting. Traditional rate-of-return ratemaking operates under a cycle of

utilities filing periodic rate cases to set utility revenue requirements. Once the revenue requirement is set and the rate impacts are divided among the customer classes, the prices of energy are set such that revenues from sales are expected to meet the associated variable costs projected during the period covered by the rate case, as well as fully recover the fixed costs of the utility. During the rate case period, utilities revenues are dependent on the sales of energy in the market. A fluctuation in sales volume, whether from energy efficiency, weather, or economic fluctuations, has the effect of creating revenue volatility and associated risks to both the utility and ratepayers. During periods of higher than average energy usage, whether attributed to weather extremes or economic boom, customers overpay fixed distribution costs, and utilities earn more than their projected return, essentially a windfall unrelated to

utility management of its operations. Conversely, with increased energy efficiency, mild weather, or more difficult economic times, consumers reduce usage and their bill payments fall short of covering approved fixed costs. The utility suffers a loss, again not connected to the utility's controllable actions. As such, traditional rate-of-return ratemaking encourages short-term sales of energy, covering the variable costs and increasing contribution to fixed costs. This encouragement towards increased sales discourages utilities from pursuing energy efficiency since the utilities lose revenue from sales not made because of the success of the energy efficiency programs. This disincentive of lost utility revenues is one of the primary short-term disincentives to the promotion of energy efficiency programs by utilities.

California has decided to face this disincentive for EE issue through the implementation of a regulatory mechanism that decouples utilities revenues from the energy sales levels. The next section reviews in details such a mechanism.

The rest of the paper is organized as follows. Section 2 reviews in details the history of decoupling mechanisms in California. In Section 3, we present some lessons for Chile from the California experience. Finally, section 4 concludes the paper.

2. DECOUPLING MECHANISMS IN CALIFORNIA

2.1 Pre-Restructuring Period

In the late 1970s, California utilities were under traditional rate of return regulation when, due to the first energy crisis, the State made a concerted effort to reduce customer consumption. Besides a large increase in spending on energy efficiency programs, the California Public Utilities Commission (CPUC) instituted inverted rate structures where consumers pay low rates for consumption less than a baseline amount and high rates for usage above the baseline.

The high tail block rates provided customers with a strong incentive to reduce consumption, but also magnified revenue variability due to weather and EE.

After implementing the new rate design, the CPUC opened an Investigation for gas utilities because weather impacts and fuel-switching were shown to cause extremely large revenue shortfalls or windfalls. Revenue decoupling was adopted in Decision 88835 as a solution for gas utilities in 1978. The CPUC adopted a decoupling mechanism entitled the Supply Adjustment Mechanism (SAM). SAM compensated California gas utilities for any change in revenues due to sales fluctuations. Consequently, the utility received revenues for lost sales that arose because of unexpected weather, customer conservation response to the new rate design, and energy efficiency programs. Any differences between a utility's CPUC-authorized revenues and its actual sales-based revenues were tracked in a balancing account. Under and over-collections of revenues in the SAM balancing account were recovered or refunded semiannually through changes in rates. This new approach took sales fluctuations off the table, but still required utilities to effectively manage their operations, in order to keep costs under control to achieve their respective authorized rates of return.

While the inverted rate structure was also adopted for electric utilities in the 1970s, revenue decoupling was not extended to electric utilities until the early 1980s in their General Rate Cases. By 1982 the CPUC had adopted a decoupling mechanism, entitled the Electric Revenue Adjustment Mechanism (ERAM), for all California investor-owned electric utilities. With revenue decoupling, the differences in sales forecasts, which had become contentious, were rendered mute. As with SAM, ERAM compensated the California electric utilities for any change in revenues due to a change in sales. Consequently, the utility received revenues for lost sales that arose because of

unexpected weather and economic patterns and energy efficiency programs. The purpose of ERAM was to ensure that each of the California electric utilities would be entitled to collect an amount of money which would enable them to recover their fixed costs, notwithstanding any effects of energy efficiency programs on sales and associated revenues. The CPUC-authorized revenues were adjusted annually to reflect any changes to the utility's capital expenditures, costs of capital and interest rates, and changes in operational costs. Any differences between a utility's CPUC-authorized revenues and its actual sales-based revenues were tracked in the ERAM balancing account. Under and over-collections of revenues were recovered or refunded through changes in rates the following year.

Both the SAM and ERAM enhance the desirability of energy efficiency programs to the California utilities and to the utilities' customers. Not being at risk for sales fluctuations, the utilities had no disincentive to pursue energy efficiency. Utility customers, faced with high marginal rates, had a strong incentive to purchase energy efficient equipment to reduce their energy bills. Aggressive energy efficiency programs in the early 1980s led to the development of leading edge, high-efficiency equipment and appliances. These new products then made it possible for California to adopt the most stringent building and appliance standards in the US.

While decoupling removed disincentives to the pursuit of energy efficiency, establishment of performance-based financial incentives in the early 1990's provided positive incentives for utilities to pursue energy efficiency. The energy savings resulting from EE programs offered in the pre-1998 era provided approximately \$1.5 billion in net resource benefits to California customers.

2.2 Restructuring Period

Gas industry restructuring began in California in the mid 1980s. First, competition from alternate fuels led to abandonment of the inverted rate for large customers. Tail block rates that did not accurately reflect costs created an incentive for uneconomic fuel-switching and/or bypass and so were changed in 1983.⁴ Then major restructuring decisions, 86-12-009 and 86-12-010, allowed large customers to buy their gas directly from producers or marketers and phased out revenue decoupling over a two year period for this large customer group. This rate structure was modified to a declining block rate structure for some large customer groups and fixed charges for other large customer groups, so that tail block rates tended to reflect variable costs. In the early 1990s, the rate structure moved to a straight volumetric rate for the large customer class and in 1994, as part of a Global Settlement, D.94-07-064 adopted a sales incentive mechanism for Southern California Gas Company (SoCalGas) that ran through 1999. EE programs for these customers were eliminated, the thinking being that their bills were large, so that they had the incentive to invest in cost-effective energy efficiency without regulator intervention.

At the onset of restructuring in the electric industry in the late 1990's, California dropped its revenue decoupling policy for electric utilities and support for performance incentives for EE programs. In a 1996 Decision, the CPUC stated "Introduction of competition for generation will render ineffective the CPUC's past approach of supporting Demand Side Management by using ERAM to counter the utility's economic incentive to increase sales." In addition, ERAM conflicted with the proposed freeze on customer rates which was part of the restructuring legislation. The CPUC moved funding of energy efficiency to a Public Goods Charge paid for by all electric customers regardless of who was providing retail service. Energy efficiency

program administration was proposed to move from the utilities to third parties.

Consistent with the move to reliance on competition in markets for energy, the CPUC shifted its focus on energy efficiency from maximizing resource benefits from the EE programs to reliance on the market to provide an optimal amount of EE services, with energy efficiency programs designed to reduce market barriers for EE products and services. Prior to restructuring, the resource acquisition focus of EE was considered an alternative to supply resources in an overall integrated resource planning process. With utilities no longer in the role of integrated resource planning, the role of public support for energy efficiency in California changed. In D.97-02-014, the CPUC indicated that "our focus for energy efficiency programs has changed from trying to influence utility decision makers, as monopoly providers of generation services, to trying to transform the market so that individual customers and suppliers in the future, competitive generation market will be making rational energy choices." This change of emphasis lasted until the California Energy Crisis and the inadequate amount of generation required an emergency focus on EE as an alternative to generation (which could not be built fast enough to bring supply and demand into balance).

In 1997, in D.97-07-054, the CPUC adopted a revenue-per-customer indexing mechanism for SoCalGas, providing an automatic adjustment to revenues to account for new or departing customers in addition to adjustments for inflation and productivity. The CPUC maintained the existing revenue decoupling mechanism for the small customer group and kept in place the existing sales incentive mechanism for the large customer group. The revenue-per-customer indexing mechanism provided performance incentives for providing quality service to customers in a potential future environment with retail competition. Revenue decoupling removed incentives for increasing sales to the small customers and

was supportive of energy efficiency spending. The SoCalGas revenue-per-customer mechanism ran from 1997 through 2003 and demonstrated that revenue decoupling is compatible with performance-based regulation. However, due to the California Energy Crisis, significant retail competition never materialized to test how well revenue decoupling would work in a competitive environment.

2.3 Actual Decoupling Mechanism in California

In 2001, in the midst of the California Energy Crisis, California legislature enacted Assembly Bill 29x which required the CPUC to again remove the link between utility revenues and sales for electric IOUs. Specifically, the legislature stated that the CPUC should "ensure that errors in estimates of demand elasticity or sales do not result in material over or under-collections of the electrical corporations." The California Energy Commission adopted decoupling mechanisms for each California electric utility as part of the subsequent rate cases. The revenue balancing mechanisms adopted for the California utilities again apply between rate cases and remove the EE disincentive by allowing for rate adjustments based upon actual electricity sales, rather than test-year forecast sales. In concert with these new decoupling mechanisms and the enacting of the California Energy Action Plan, which puts EE at the forefront of resource procurement, the California IOUs have returned to large-scale EE investments.

With the electric utilities returning to a central role in resource planning, EE has returned to its place as an alternative to supply-side resources. California IOUs consider EE investments before acquiring additional generation through long-term solicitations. The CPUC is now also revisiting its policy for a shareholder performance incentive for EE.

3. LESSONS FOR CHILE

California experience provides important lessons for systems with no EE programs in the electricity sector, like the Chilean electricity system, to design an incentive structure that effectively promote EE among the participants of the market.

Revenue decoupling is an excellent mechanism for energy utilities where EE goals are driving down sales per customer through EE programs, building and appliance standards, and rates designed to encourage conservation and EE (i.e., where the marginal variable price far exceeds the marginal variable cost) and where utilities have a central role in long-term resource acquisition. It is simple to implement and avoids the difficulties in forecasting sales in other methods of accounting for EE impacts.

The implementation of the decoupling mechanisms was plausible in California because there was a rate regulation system in the US. In Chile, electricity rates are formally regulated only for residential customers, implying that the implementation of a decoupling mechanism would first require a modification of the Chilean electricity law to allow the regulation of the totality of the electricity tariffs.

Another factor to take into consideration when evaluating the impact of the implementation of a decoupling mechanism in Chile is the fact that Chilean electricity tariffs are revised and adjusted every six months (instead of every three months like in California), which could lead to a less robust solution against the precision in the sales of energy.

Moreover, another important issue is the way how the costs of EE programs are covered. In California, the Public Goods Charge provides a huge source of monetary resources for implementing EE programs. In Chile, policy makers have historically avoided such a type of direct charges to consumers, which raises the important issue of how the costs of EE programs would be

covered in the eventuality that Chile implemented a decoupling mechanism.

4. CONCLUSION

When compared to the other alternate approaches to breaking the link between utility revenues and the promotion of EE, the revenue decoupling mechanism tends to provide a more comprehensive approach to aligning the utility needs with the benefits derived from EE programs. It maintains the promotion of customer-driven conservation, not provided in a ratemaking scheme geared towards fixed-charges, continues to support the non-utility EE activities not provided through a LRAM mechanism, and allows the utilities to maintain a focus on EE programs, which result in real reductions in energy savings.

The use of decoupling mechanisms in California has assisted the state in addressing the key policy issue of the loss of sales that results from the highly-successful EE programs in the US. The development and implementation of regulatory mechanisms for all of the IOUs in California has contributed to resurgence in the use of EE as a primary energy resource. Such mechanisms can be used as a resource for other countries, like Chile, in their discussions and development of an appropriate means to also deal with the implications of energy usage reductions attributed to the use of EE programs as a resource.