Energy Efficiency and Load Management under Changing Electricity Market Conditions

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ABSTRACT

Many countries are initiating reforms of their electric power sectors to stimulate private investment, increase operation and management efficiencies, and lower the cost of power. These countries are unbundling vertically-integrated utilities into distinct generation, transmission, distribution and retail supply companies; introducing commercial management principles to government-owned monopolies; and in many cases transferring operation or ownership to private companies. Electric industry restructuring will force regulators and policy makers to re-examine the effectiveness of existing mechanisms for promoting load management and energy efficiency. It is uncertain whether restructuring reforms will increase or decrease the effectiveness of existing mechanisms to promote energy efficiency or will affect customers' willingness to invest in energy efficiency on their own. This paper assesses (1) the potential effectiveness of the reform of the electricity industry on promoting energy efficiency and load management, and (2) the potential effectiveness of new mechanisms for promoting energy efficiency and load management under different types of electricity or market reform.

Introduction

Electric industry restructuring will force regulators and policy makers to re-examine the effectiveness of existing mechanisms for promoting load management and energy efficiency (e.g., Baxter 1996; Hadley and Hirst 1995; Messenger and Shapiro 1995; Tonn and Schweitzer 1996). In some cases, electric industry restructuring replaces the long-standing relationship between a single monopoly provider and protected customer franchise with a new set of relationships among retail electricity suppliers and customers who may now be free to choose suppliers. In these types of situations, markets, not government regulators and utility monopolies, will have a significant influence in determining future energy production and customer consumption decisions. However, it is uncertain whether restructuring reforms will increase or decrease the effectiveness of existing mechanisms to promote energy efficiency or will affect customers' willingness to invest in energy efficiency on their own.

This paper assesses (1) the potential effectiveness of the reform of the electricity industry on promoting energy efficiency and load management, and (2) the potential effectiveness of new mechanisms for promoting energy efficiency and load management. This paper is organized in the following way. After first describing the types of reforms the electricity industry is experiencing (commercialization, privatization, unbundling, and the introduction of competition), we present four generic electric industry models for assessing the implications of changing industry structures on energy efficiency and load management

activities. At the end of the paper, we describe 25 mechanisms for promoting energy efficiency and load management.

This paper is a result of work completed within Task VI of the International Energy Agency's Demand-Side Management Program. The title of Task VI was "Mechanisms for Promoting Demand-Side Management in Changing Electricity Businesses." The work of Task VI was supported (through cost and task sharing) by thirteen participating countries plus the European Commission. Participating countries provided one or more Experts who were responsible for contributing to the work of the Task. Reports resulting from this project are found in Crossley et al. (1998, 1999, 2000).

Methodology

Task VI developed a range of practical mechanisms for promoting the implementation of energy efficiency and load management in changing electricity businesses, such as in restructured electricity industries and competitive electricity markets. The mechanisms analyzed in this paper were developed by the authors during Task VI in consultation with the Task VI Experts. At Expert meetings, the authors discussed with the Experts the different components of this study: e.g., public policy goals and objectives, program and policy barriers, electricity industry models, and mechanisms for promoting load management and energy efficiency. The authors and the Experts identified "holes" where new mechanisms might be needed under new market rules or structures, developed new mechanism concepts to fit under new market conditions, and held workshops to further refine the most promising of these concepts.

Drafts of the developed mechanisms were presented to Practitioners Workshops held in Australia, France and Japan; the practitioners were government policy analysts, energy-efficiency experts, and program managers. The purpose of these workshops was to present preliminary summaries of the mechanisms developed in Task VI for comment by a range of practitioners who might be involved in using the mechanisms. The Practitioners Workshops were designed to provide a "reality check" on the practicality of the developed mechanisms.

The information collected at the Experts meetings and the Practitioners Workshops was organized and analyzed by the authors in the context of the effects of electricity sector liberalization on energy efficiency and load management activities. The results of that analysis are presented in this paper.

Definition of a Mechanism

To clarify the following discussion, a distinction is made between mechanisms and programs. *Mechanisms* are primarily government-sponsored initiatives that aim to overcome policy and program barriers that prevent the pursuit of cost-effective energy-efficiency and load management activities and the achievement of national energy policy goals.[1] Mechanisms assist the effective implementation of programs but are targeted at the organizations that develop and implement these programs. In contrast, energy-efficiency and load management *programs* are specific actions taken by utilities and others, with the aim of

[1] Policy barriers are barriers to achieving public interest goals through energy efficiency and load management (reflecting a societal perspective), and program barriers are barriers to the implementation of specific energy efficiency and load management programs (reflecting a customer perspective). Policy barriers can influence program barriers, but program barriers have relatively little influence on policy barriers (Crossley et al. 1999).

influencing energy-using behavior at the customer level. Programs are targeted at energy end-users, as distinct from mechanisms that are targeted at the developers and implementers of programs. In some cases, it may be difficult to distinguish clearly between a mechanism and a program; nevertheless, the distinction between the two should be kept in mind.

Electricity Industry Structures

Prior to examining energy efficiency/load management mechanisms in detail, it is important to understand the driving forces for change and the major influences shaping the reform of the electricity industry.

Reform of the electricity industry. In many countries, the electricity industry is starting to change as reforms are made to the present system. The reform process results in one, or typically more, of the following changes in the power sector: commercialization, privatization, unbundling, and the introduction of competition. It is important to recognize that most reforms occur over a period of years, and thus tend to occur in stages across a continuum of policy and structural changes.

Commercialization. Commercialization involves introducing commercial objectives into the management and operation of a state-owned (public) utility. Most countries view commercialization as an intermediate step toward privatization and other reforms. Under commercialization, the utility becomes a business entity subject to the same tax laws, prices and accounting rules as other private sector companies. Commercialization often imposes separate cost accounting for generation, transmission, and distribution services.

Privatization. Privatization means transferring publicly owned power sector assets to private ownership. A country may decide to allow private development of some, or all, of the new power sector infrastructure. Under privatization, some countries are opening generation to private investment, further privatizing transmission and distribution, and even restructuring the sector to introduce competition and independent regulation.

Unbundling. When the electricity sector is ”unbundled,” vertically integrated utilities are separated into legally and functionally distinct companies providing generation, transmission, distribution and retailing services. Implementation of unbundling varies between countries. In some unbundled power sectors, the distribution subsectors are horizontally divided according to geographic franchises. Some countries have separated the physical aspect of distributing electricity to final customers from retail services (marketing, bill collection, customer information, energy efficiency and load management, etc.) while others have kept them within the same entity.

Competition. Although the “wires” portion of the electricity sector (transmission and distribution services) is generally considered a natural monopoly, competition may be introduced into the system for selling power to the grid (wholesale competition) and providing electricity to end use customers (retail competition). In one form of wholesale competition, independent power producers (IPPs) bid for long-term contracts with power purchasers. Although there are almost as many different styles of bidding as there have been solicitations, in most cases, the monopoly utility issues a solicitation seeking bids from project sponsors for capacity and energy, with the award going to the lower cost supplier. In

another form of wholesale competition, some countries are creating spot or short-term markets for wholesale power as an alternative to long-term contracts. Under this model, multiple generators bid (typically over half-hourly intervals) to be dispatched by a transmission company or independent operator of the transmission system (ISO). The wholesale purchaser relies on competition to ensure that bids approximate marginal costs.

In addition to wholesale competition, a few states and countries are experimenting with retail competition for some or all customer classes. Typically, retail competition is phased in over time to aid in the transition to competitive markets where it is believed it would not be possible to change the system for all customers at one time. Retail competition can be introduced through different mechanisms. In one, multiple power generators have direct access to the transmission and distribution networks (for a charge), allowing them to compete to supply final customers regardless of their location and who owns the wires. In another model, independent retail service providers (which do not own any generation facilities) buy power from generators, contract for the use of transmission and distribution facilities, and sell the power to end-use customers. It is important to point out that competition does not necessarily mean deregulation. In fact, while the type of regulation may change, it appears that the amount of formal regulation may increase rather than decrease with the introduction of a competitive market.

Electricity Industry Models

For ease of analysis, this paper uses four generic electric industry models to enable the development of general and consistent comparisons and conclusions (Table 1). The four models are: (1) Model 1 – Vertically integrated, regulated monopoly; (2) Model 2 – Unbundled monopoly; (3) Model 3 – Unbundled, limited competition; and (4) Model 4 – Unbundled, full competition.

It is important to note that these models represent a continuum of possibilities. It is likely that few countries will ever experience any of the structures exactly as described here, particularly Model 4, but rather will develop variations of these structures. Accordingly, we have not identified specific countries with these models. Moreover, evolution to new structures may be neither sequential nor flow in only one direction. It is possible, for example, that a country which moves into Model 3 may later revert back to Model 2. However, the models act as useful tools for assessing the effects of changing industry structures on energy efficiency and load management activities.

Table 1. Four Generic Electric Industry Models

Model 1 - Vertically integrated, regulated monopoly.. The electricity utility controls and undertakes all business functions: generation, transmission, distribution, wholesale and retail energy supply and services. There is no competition at any level. Utilities have the obligation to serve customers within their own region. Government regulates the utility to prevent monopoly abuse. All customers in the region must buy energy from that utility.
Model 2 - Unbundled monopoly. Generation is separated from all other functions: several generation companies serve distribution companies and, possibly, major industries. Generators and distributors maintain monopoly status: the generation company has the exclusive right to supply customers within its franchise area, and the distribution companies have a monopoly to serve customers in their respective areas. Transmission is provided by generators, distributors, or a separate entity or entities. Government regulates the monopolies to prevent monopoly abuse. Competition may occur at the generation level, but there is no competition at the retail level. All customers in a region must buy energy from the retail utility, which holds the franchise to their geographical area.
Model 3 - Unbundled, limited competition. Generation is separated from natural monopoly functions: many generation companies serve distribution companies and, possibly, major industries through a competitive wholesale market. Generators have open access to the transmission and distribution grid. Transmission is provided by generators, distribution companies, or a separate entity or entities. Government regulates the transmission and distribution system to prevent monopoly abuse. There is competition at the wholesale level: primarily among generation companies, and there may be some competition through the use of self-generation by large customers. But with this one exception, there is no competition at the retail level.
Model 4 - Unbundled, full competition. Generation, transmission and distribution functions are separated. There is competition among generators (generators have open access to the transmission and distribution grids). There is complete competition at the wholesale and retail level. At the retail level, two new organizations supply electricity to end-use customers. Independent retailers (who have no interest in the distribution 'wires' business) purchase electricity in bulk from the wholesale market and only sell to end users. Brokers provide a similar service without ever owning the electricity. There is some oversight (regulation) of the wholesale and retail markets to ensure a more efficiently operating market and to prevent abuse of market power. In addition, government regulates (or maintains ownership of) the monopoly transmission and distribution systems.

Incentives and Disincentives for Energy Efficiency and Load Management

The incentives for energy efficiency and load management under commercialization or privatization changes can generally be maintained or strengthened through thoughtful regulatory and government support. The introduction of unbundling or retail competition substantially complicates the situation. However, even problems caused by unbundling are amenable to regulatory solutions. The most complex and difficult area is the introduction of competition because of the related pressures by many stakeholders for reduced governmental intervention (e.g., owners of existing utility companies that do not want the status quo to change in order to maintain their economic power). Where privatization, unbundling and

competition are introduced simultaneously, it may be difficult for government to analyze the complex interactions and to anticipate the most likely outcomes.

Table 2 summarizes the incentives and disincentives for energy efficiency and load management under the four major electricity sector reforms. The table highlights some of the major features though there are likely to be many exceptions for a particular country. Also, there can be interactions when more than one reform is undertaken simultaneously, either magnifying certain effects or counteracting others.

Table 2. Power Sector Reforms and Implications for Energy Efficiency and Load Management

Electricity Sector Reform	Incentives for Energy Efficiency and Load Management	Disincentives to Energy Efficiency and Load Management
Commercialization	▪ Increased electricity costs, as tariff subsidies are removed and revenue collection improved ▪ Regulatory support for energy efficiency and load management that may include integrated resource planning	▪ A kWh saved represents lost revenue to utility; utility goal may be to maximize kWh sales, or to maximize profits, or some combination of the two ▪ Key market barriers remain
Privatization	▪ Regulatory support for energy efficiency and load management that may include integrated resource planning	▪ A kWh saved represents lost revenue to utility; utility goal may be to maximize kWh sales, or to maximize profits, or some combination of the two ▪ Key market barriers remain ▪ Higher discount rates
Unbundling	▪ Regulatory support for energy efficiency and load management that may include integrated resource planning ▪ Separate energy and demand charges	▪ A kWh saved represents lost revenue to utility; utility goal may be to maximize kWh sales, or to maximize profits, or some combination of the two ▪ Key market barriers remain ▪ No integrated resource planning[2]
Competition	▪ Regulatory support for energy efficiency and load management that may include integrated resource planning ▪ Energy efficiency and load management used as a marketing tool ▪ ESCO industry development ▪ Domestic consumers' costs may remain high	▪ A kWh saved represents lost revenue to utility; utility goal may be to maximize kWh sales, or to maximize profits, or some combination of the two ▪ Key market barriers remain ▪ Lower and more variable short-term costs (especially for large customers)

[2] Integrated resource planning (IRP) provides a forum in which demand-side resources and supply-side resources are critically evaluated in determining a cost-effective resource plan. In the absence of IRP, supply-side options are traditionally examined first; if there is an insufficient supply of energy, then energy-efficiency options may be considered.

The Effects of Industry Reform on Barriers to Energy Efficiency and Load Management

In general, no form of restructuring will remove all (or even most) of the barriers to energy efficiency and load management, although it may change them. While electricity industry reforms may help to reduce some barriers to energy efficiency and load management, they also leave untouched other barriers to implementation of end-use improvements (such as inadequate information and capital, and environmental externalities). They may also increase the magnitude of some barriers such as split-incentives.

Policy barriers (e.g., import tariffs and duties on energy-efficiency products) that are related to market structure may change significantly with restructuring (especially unbundling and competition). In Model 4, the utility no longer plays all of the roles it has assumed in traditional structures (e.g., generation and transmission), and some barriers become more significant (e.g., the complexity of dealing with competing retailers). Program barriers will remain and some may be increased by commercialization and competition, regardless of whom is responsible for the programs. In all cases, the legal, policy and regulatory framework is critical as this affects the incentives to energy suppliers who may also be asked to promote programs. To the extent that privatization is introduced into any of electricity industry structure, this will magnify the importance of many of the program barriers. The combination of variables (commercialization, privatization, unbundling, and competition) within any particular structure results in a complex interaction so that there may be barriers and incentives unique to that particular situation. The case for intervention remains for any structure if energy efficiency is an important policy goal or tool, but the nature of the intervention (i.e., the appropriate mechanisms) will change. A more detailed analysis of the impact of industry reform on barriers is described in Crossley et al. (1999).

Mechanisms for Promoting Energy Efficiency and Load Management

In identifying concepts and ideas for mechanisms to be developed, the authors worked with the Task VI Experts in reviewing existing mechanisms which were already implemented in the 13 countries which participated in Task VI. The authors and the Experts then developed a set of generic mechanism types into which all the existing mechanisms could be categorized; the categories were (1) control (directing energy businesses to change behavior), (2) funding (providing funding for other mechanisms), (3) support (providing support for behavioral changes by customers and electricity businesses), and (4) markets (using market forces to encourage behavioral changes by customers and electricity businesses). Each of these generic types was then examined to determine which types were suitable for further development. Factors taken into account in making this determination included:

- whether the mechanism addressed more than one barrier to energy efficiency and load management;
- whether the mechanism would be effective in restructured electricity industries;
- whether the mechanism would require modification to become effective in restructured electricity industries; and
- whether the mechanism had already been extensively developed and implemented.

The authors and the Task VI Experts also undertook a brainstorming workshop to identify any "new" mechanisms that could be developed to promote energy efficiency and load management in restructured electricity industries. The Experts identified 25 mechanisms for further development; mechanism descriptions for all 25 developed mechanisms are found in Crossley et al. (2000). In several meetings, the Experts then examined the usefulness and/or relevance of each of the 25 mechanisms developed in Task VI under three aspects of electricity industry restructuring: unbundling, commercialization/privatization; and competition (Table 3). The direction of the arrows reflects the consensus of the Task VI experts on the usefulness and relevance of the mechanism. If an expert(s) disagreed, then there was discussion until agreement could be reached. The discussions were based on (1) the experience of a mechanism under one of the reform models, and (2) the experts' experience with similar types of programs in their own country. Since many of these mechanisms have not been implemented on a wide-scale basis for a long time period, there was no discussion on the actual effectiveness of each mechanism.

It is interesting to note that the relative importance of two mechanisms does not change in response to any of the aspects of electricity industry restructuring. These mechanisms are: *Taxes on energy;* and *Tax exemptions and incentives for energy efficiency*. When unbundling occurs, the relative importance of many of the mechanisms remains unchanged. Two mechanisms become less useful or relevant - *Integrated resource planning* and *Aggregating electricity purchases to achieve energy efficiency*. Eleven mechanism become more useful or relevant. The mechanism *Public benefits charge for energy efficiency* is the most useful and relevant. When commercialization/privatization occurs, only one mechanisms becomes less useful or relevant: - *Integrated resource planning*. Eighteen mechanisms become more useful or relevant. As with unbundling, the mechanism *Public benefits charge for energy efficiency* is the most useful and relevant.

When competition occurs, the relative importance of most of the mechanisms changes, with most of them becoming more useful and relevant. One mechanism becomes less useful or relevant - *Integrated resource planning*. Three mechanisms remain unchanged: *Revenue regulation, Taxes on energy*; and *Tax exemptions and incentives for energy efficiency*. The remaining mechanisms become more, or much more, useful or relevant.

Summary

The promotion of energy efficiency and load management under commercialization or privatization changes can generally be maintained or strengthened through thoughtful regulatory and government support. The introduction of unbundling or retail competition substantially complicates the situation. However, even problems caused by unbundling of utility service functions are amenable to regulatory solutions. The most complex and difficult area is the introduction of retail competition because of the related pressures by many stakeholders for reduced governmental intervention. Where privatization, unbundling and competition are introduced simultaneously, it may be difficult for government to analyze the complex interactions and to anticipate the most likely outcomes. The public policy analysis of the developed mechanisms presented in this paper has attempted to provide some indication of their likely effectiveness in promoting energy efficiency and load management in countries experiencing one or more of these reforms.

Table 3. Usefulness and/or Relevance of Developed Mechanisms under Various Aspects of Restructuring

MECHANISMS	EFFECTS OF VARIOUS ASPECTS OF RESTRUCTURING ON MECHANISMS		
	Unbundling	Commercialization/ Privatization	Competition
Control Mechanisms			
Mandatory sourcing of energy efficiency. Mandatory sourcing of energy efficiency is a legal requirement imposed by government on electricity businesses and large electricity customers to include in their retail sales mix or wholesale purchases with defined energy-efficiency outcomes. [European Union, Finland, United Kingdom, United States]	↑	↑	↑↑
Energy efficiency license conditions for electricity businesses. This mechanism establishes a legal framework to require electricity businesses to consider and promote energy efficiency, as part of the conditions under which they are granted a licence to carry out their business. [Australia, Norway]	X	↑	↑↑
Integrated resource planning (IRP). IRP is a planning methodology that seeks the least-cost option for meeting customers' energy-service needs, and includes the evaluation of all supply- and demand-side options. [Denmark, United States]	↓↓	↓	↓
Energy efficiency and load management as alternatives to network expansion. This mechanism comprises the development and implementation of regulation which requires network operators to investigate whether demand-side alternatives to network augmentations are more cost-effective than the supply-side option. [Australia, Canada, Norway]	↑	↑	↑↑
Revenue regulation. The total "allowable" revenue of an electricity business is set each year at a particular dollar figure, and within this revenue cap, the business is free to set the structure and levels of retail prices in any way it chooses. [Australia, United Kingdom, United States]	↑	X	X
Funding Mechanisms			
Public benefits charge for energy efficiency. This mechanism is a method of raising funds from the operation of the electricity market, which can then be directed to energy efficiency and load management activities. [Belgium, Norway, Portugal, United States]	↑↑	↑↑	↑↑
Financing of energy efficiency by electricity businesses. This mechanism focuses on developing the role that electricity businesses can play in bundling together financing and energy-efficiency services for their customers, particularly as a means of developing new business opportunities. [United States]	X	↑	↑
Support Mechanisms			
Sustainable energy training schemes for practitioners. The training schemes, focusing on energy efficiency and renewable energy technologies and applications, are designed to improve the trainees' ability to achieve sustainable energy outcomes. [Australia, Denmark, Japan, Norway]	X	X	↑
Energy centers. This mechanism involves the establishment of organizations with the sole or main purpose of promoting energy efficiency and load management. [Canada, Japan, Korea, Norway, Sweden, United Kingdom]	↑	↑	↑↑

MECHANISMS	EFFECTS OF VARIOUS ASPECTS OF RESTRUCTURING ON MECHANISMS		
	Unbundling	**Commercialization/ Privatization**	**Competition**
Creating entrepreneurial energy organizations. This mechanism involves the creation by government of organizations with clear responsibilities for achieving energy-efficiency outcomes, and they are expected to become self-funding over time. [Australia, United Kingdom]	↑	↑	↑↑
Developing the ESCO industry. This mechanism involves government encouraging the development of an energy services sector that is commercially focused and independent of electricity market regulation; ESCOs provide energy services to all customers. [Japan, Korea, United Kingdom, United States]	↑	↑	↑↑
Promotion of energy efficiency by industry associations. This mechanism involves industry associations promoting energy-efficiency services to their members. [Australia]	↑	↑	↑
Aggregating electricity purchasers to achieve energy efficiency. This mechanism enables customers to influence electricity businesses through exercising consumer purchasing power in a competitive retail electricity market. [United States]	↓	↑	↑↑
Voluntary agreements for energy efficiency. These are formal agreements between a responsible government body and a business or organization, and they state that the business or organization will carry out specified actions to increase energy efficiency. [Australia, Finland, Korea, The Netherlands]	↑	↑	↑↑
Market Mechanisms			
Taxes on energy. Energy taxes are imposed by government in the energy supply chain, with the expectation that increased prices to the end user will encourage energy efficiency. [Denmark, The Netherlands, United Kingdom]	X	X	X
Tax exemptions and incentives for energy efficiency. This mechanism uses tax exemptions and incentives to provide signals promoting investment in energy efficiency to end-users. [France, Japan, Korea, The Netherlands]	X	X	X
Providing consumption information on customers' electricity bills. Under this mechanism, electricity businesses provide specific information about a customer's level of electricity consumption on that customer's electricity bill, thereby encouraging the customer to improve their energy efficiency. [Finland, Japan, Norway]	X	↑	↑↑
Communicating pricing and other information for energy efficiency. This mechanism motivates customers to alter their electricity-using behavior through the electricity retailer communicating strong pricing incentives and other information to change behavior. [Australia]	↑	↑	↑↑
Energy performance labelling. This mechanism provides information to end users about the energy-using performance of products such as electrical appliances and equipment, and buildings. [Australia, United States]	↑	↑	↑

MECHANISMS	EFFECTS OF VARIOUS ASPECTS OF RESTRUCTURING ON MECHANISMS		
	Unbundling	**Commercialization/ Privatization**	**Competition**
Developing an energy efficiency brand. This mechanism increases awareness of energy-efficient products and services by means of a marketing campaign focused on a specific product brand. [Canada, Switzerland, United States]	↑	↑	↑↑
Cooperative procurement of energy efficient appliances and equipment. In this mechanism, buyers who purchase large quantities of energy-using appliances and equipment cooperate to define their requirements, invite proposals from manufacturers and suppliers, evaluate the results, and actually buy the product. [Germany, Sweden, United States]	X	↑	↑
Energy performance contracting. This mechanism involves a contractor (typically an ESCO) guaranteeing energy savings for a site over a specified time period, carrying out the appropriate energy-efficiency improvements, and receiving payment from the actual cost reductions achieved through the energy savings. [Australia, Canada, United States]	X	↑	↑
Competitive sourcing of energy services. In this mechanism, proponents specify their requirements for energy services to several providers (e.g., ESCOs); the responses to the specification are then evaluated on a competitive basis, and commercial arrangements implemented with the selected providers. [United States]	X	↑	↑↑
Competitive sourcing of demand-side resources. In this mechanism, electricity businesses and/or other parties specify their requirements for energy efficiency and load management in an RFP; the responses to the RFP are then evaluated on a competitive basis, and commercial arrangements implemented with the selected providers. [Australia, Japan, United States]	X	↑	↑↑
Demand-side bidding in competitive markets. In this mechanism, customers bid into a wholesale electricity pool at a price level above which the customer will reduce their demand for electricity. [Norway, United Kingdom]	X	↑	↑↑

Key to Effects on Mechanism	
↓↓	Mechanism is much less useful and/or relevant
↓	Mechanism is less useful and/or relevant
X	No change
↑	Mechanism is more useful and/or relevant
↑↑	Mechanism is much more useful and/or relevant

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