The Impacts of Electricity Industry Reforms on Electricity Prices

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Abstract

Electricity industry reforms were expected to establish the primacy of pricing mechanism in the electricity industry. This mechanism would foster competition, and hence lead to improved efficiency and lower electricity prices, it was argued. Further, such a mechanism would reflect the scarcity of resources, and offer appropriate signals for attracting new investment. Emerging evidence however suggests that there exist significant disparities between expectations from reform and its actual outcomes. Much of the debate on the possible reasons behind such disparity has been carried out from a neoclassical perspective; it attributes these disparities to political factors – lack of political will to reform, and too much governmental interference. This perspective, this paper argues, is narrowly-focused, and largely ignores the importance of socio-cultural and political factors on shaping the electricity pricing mechanism. This paper develops a more comprehensive discussion on these factors and their connections with electricity pricing, and establishes the basis for a wider discourse on pricing issues.

INTRODUCTION

Electricity industry reforms have been underway worldwide for nearly three decades now. The majority of developed countries and more than 70 developing countries have undertaken steps to reform their electricity industries (Besant-Jones 2006). The reform was expected to establish the primacy of pricing mechanism in the electricity industry. This, it was argued, would result in efficient allocation of resources, drive down electricity prices, and provide appropriate signals for system expansion (Bacon and Besant-Jones 2001). However, emerging evidence suggests that there is significant disparity between expectations from reform and its actual outcomes (Nagayama 2007, Wamukonya 2003). Much of the debate on the possible reasons behind such a disparity has been carried out from a neoclassical perspective. This perspective, as argued by Sharma (2003), is narrowly-focused, and largely ignores the importance of socio-cultural, political and economic factors on shaping the electricity pricing mechanism. This paper develops a more comprehensive discussion on these factors and their connections with electricity pricing, and establishes the basis for a wider discourse on pricing issues.

METHODOLOGICAL FRAMEWORK

In this paper, the pricing mechanism for electricity is viewed as an institution through which electricity trading is facilitated. Its formation and evolution is informed by the underlying social Mental Model (North 1990, 2005). The Mental Model reflects the human ideology on how the pricing mechanism for electricity should be structured. It is developed based on the past experiences which inform human beliefs of what would work, and is subject to continuous change as a result of learning from current experience of what actually works.

The methodological framework for this study comes in two parts. Part one seeks to analyse the connections of socio-cultural, political and economic factors with the electricity pricing mechanism. It examines the historical evolution of electricity pricing mechanism under specific social, political and economic contexts, and tries to identify how the ideologies emerged from these contexts and how they shaped the contours of electricity pricing mechanism. Part two focuses on the reform-induced country practices in electricity pricing. It examines four major elements of this new mechanism including: wholesale pricing, transmission prices, distribution pricing and retail pricing.

HISTORICAL EVOLUTION OF ELECTRICITY PRICING MECHANISM

This section of the paper provides a historical narrative on the key factors that have shaped the evolution of electricity pricing mechanisms.

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Early Development (late 19th century ~ 1910s): The late 19th century saw the emergence of electricity industry in the industrialised world. This emergence was largely catalysed by the technological advancements in electricity and the business opportunities it offered. In the subsequent years, the technology of electricity generation was diffused by foreign investors into several non-industrialised countries. At that time, the structure of electricity industry was fragmented, comprised of a number of scattered systems. These systems were mainly built around the populated areas or mining towns. The ownership of the industry was a mixture of public and private, with a large proportion being held by the private interests. The electricity pricing mechanism was typically based on a self-determination principle, and local authorities determined their own rules for granting concessions to the investors for supplying electricity services.

Industry Consolidation (1920s ~ 1970s): The following three decades after 1914 were marked by considerable turbulences in the global political economic landscapes. Some of the most important events during this period included two World Wars and the Great Depression. These events had profound influence on shaping the prevailing ideologies, and there emerged two schools of thought (Marxism and Keynesianism) that strongly criticised the pre-war capitalism doctrine of *laissez faire*, and argued for a more active role for the government in reviving the social and economic progress of war damaged economies.

These ideologies were further assisted by the growing awareness of the criticality of electricity as an essential ingredient for the development of a modern, economically prosperous, socially cohesive society. Besides, it was widely believed that electricity industry was characterised by economies of scale, and that large and lumpy investments were required to build large-scale generators and long-distance high-voltage transmission lines. It was also generally acknowledged that such investments were far beyond the ability of private sector to mobilise.

Influenced by these ideologies, the governments played a progressively important role in the post-war development of the electricity industries. In many countries, laws and legislations were enacted to acquire privately-owned electricity assets, state-owned enterprises (SoEs) were created to own, develop and operate these assets. The SoEs were normally structured as vertically-integrated companies that performed the functions of electricity generation, transmission, and/or distribution. They were also charged with the responsibility of developing and financing investment in power projects, and for setting and adjusting electricity prices.

During this period, the electricity prices were determined largely by the SoEs under the controlling and oversights of the government on the basis of administration control. Under this arrangement, electricity prices were normally used by the government as a tool to achieve a set of public objectives. For example, in many countries, the cross-subsidisation of rates between different customer classes was encouraged by the government to support its wider social development program. Rate-of-return pricing mechanisms were widely used by the government to encourage investment in large power projects which could create job opportunities and subsequently contribute to vivify the local economies.

Market Reform (1980s ~ 2010): The decades of the 1970s and 1980s witnessed the end of post-war economic boom, and the world economy began to step into recession. There were several important events during this period that contributed to the recession including the two oil shocks, the fall of Bretton Woods System and the Vietnam War. This recession manifested in the form of stagflation in the Western countries, and of debt crisis in many developing countries.

For the Western countries, this recession differed from many previous recessions; high unemployment coincided with high inflation. Keynesianism was unable to explain this phenomenon because it assumes that the economy may either experience stagnation or inflation.. The economic downturn and Keynesianism's inability of finding the solution to the economic problem of the time provided opportunities for neoclassical economists to criticise Keynesianism. Besides, the demise of the Soviet Union and the end of the Cold War in 1989 ended the battle of conflicting ideologies about how society should be organised. It apparently symbolised the triumph of capitalism against communism. Neoclassical credo gained ascendancy after four decades of dominance by the Keynesianism and Marxism, and it eventually culminated in the Washington consensus.

The Washington consensus refers to the ideological belief that 'the combination of democratic government, free markets, a dominant private sector and openness to trade as the recipe for prosperity and growth' (Gilbert and Vines 2000). This ideology has been widely accepted by the Western countries to restructure their national economies so as to reinvigorate economic development. It was also recommended to the developing countries by the IMF and the World Bank through their structural adjustment loans.

Under this context, in the 1980s many countries began to reform their electricity industries as part of the broader economic reform program. This led to a reorganisation of the electricity pricing mechanism based on competitive market principles.

ELECTRICITY INDUSTRY REFORM AND THE ADVENT OF NEW PRICING MECHANISM

This section of the paper provides an overview of the salient features of the new pricing mechanism that emerged as a consequence of the introduction of market reforms as noted in the previous section. These features are discussed in this section in the context of wholesale pricing, transmission pricing, distribution pricing and retail pricing. This overview is developed separately for two groups of countries namely, the Competitive Markets Group and the Transition Markets Group. The Competitive Markets Group includes: Argentina, Australia, Brazil, Canada, Chile, Germany, New Zealand, Nordic countries (Denmark, Finland, Norway, and Sweden), Singapore, United Kingdom (UK) and United States (US). The Transition Markets Group includes China, Indonesia, Malaysia, the Philippines, South Korea, and South Africa and Thailand.

In the **Competitive Market Group**, electricity reform resulted in a re-definition in the role of the government in the power sector. As part of reform, the economic operation of the sector (including, supply-demand balance, planning and new investments) is largely arbitrated by market mechanisms, with the scope for governmental intervention limited to providing broad policy directions, administering the conduct of the market mechanism, and preventing anti-competitive behaviour and monopolistic abuse (Bacon and Besant-Jones 2001). The emerging new market mechanism consists of four major components: wholesale pricing, transmission pricing, distribution pricing and retail pricing (Joskow 2006).

Wholesale pricing: Various countries in this group have organised market mechanisms for wholesale pricing essentially into two types, namely, pool market and power exchange. The wholesale electricity markets in Australia, Canada (Alberta), Latin American countries, Singapore, and New Zealand, are organised as pool markets. The power exchange model is adopted in the United States (PJM) and European countries.

More centralised model of pool market (one-sided pool) is adopted in Australia, and Latin American countries. On the demand-side, the system operator forecasts the future demand for electricity, and dispatches the generators against this. In Alberta and New Zealand, a two-sided pool is used to arrange wholesale electricity trading. In this model, generators are dispatched by the system operator according to the demand curve developed on the basis of demand-side bidding.

The wholesale electricity trading in European countries and USA (PJM) is organised as a voluntary power exchange with physical bilateral contracts traded on the OTC market. This market model is based on self dispatching principle, which allows the generators and buyers to freely negotiate bilaterally agreements on power supply. The system operator is only responsible for maintaining the supply-demand balance and ensuring the reliability of the system.

Locational pricing (nodal pricing or zonal pricing) is widely used, which reflects the cost of transmission congestion and system losses at different points of the network. This provides incentives to invest in additional network to high price areas so as to solve congestion problems. Only Alberta electricity market uses uniform pricing. The results have however been disappointing. It is argued by ATCO Power (2007) that the uniform pricing almost always produces infeasible dispatch schedules, and out-of-market actions are always required.

The dispatching in most spot markets for electricity is integrated with market for ancillary services and the allocation of scarce network capacity, except the markets in EU such as APX, EEX and Nord Pool. This is because APX, EEX and Nord Pool are the operators of the regional power exchanges, and the balancing

markets are operated by national TSOs to manage transmission congestion and real-time imbalance of supply-demand within their control areas.

An active financial market is vital to provide insurance for market participants to manage price volatility. The majority of the electricity markets in this group are complemented by active financial markets with the exception of New Zealand and Singapore. In New Zealand, because of the lack of active financial market, generators hedge price risk through vertically integration with retailers. This is cited as one of the major barriers for investment in generation (NZIER 2007). In Singapore, the imposition of vested contracts on generators provides them with price certainty to some degree.

The wholesale electricity markets in Australia, Canada (Alberta), European countries, New Zealand, Singapore, and US (PJM) are energy only markets with no capacity payments. The incentives for investment in new generation capacity are largely left to the market. However, in all the markets, spot prices are capped to limit the potential exercise of market power. This may distort the spot price to offer accurate price signal.

Table 1 provides a summarised overview of the main features of wholesale pricing mechanisms for countries in this group.

Transmission and Distribution pricing: Transmission and distribution networks are vital segments of the power system. Delayed expansion of networks could lead to increased future costs. Conventionally cost-of-service regulation has been widely used to regulate network pricing that allows the recovery of all the costs associated with providing network services with a guaranteed reasonable rate of return. This approach does not provide incentives for cost minimisation and efficiency improvements but tends to reward over-investment. In countries in this group, attempts have been made to reform the regulation for network pricing so as to improve investments and operation efficiency of the networks. There are mainly three approaches that are widely used, namely, price cap, revenue cap and yardstick regulation.

Revenue or price caps are used in Australia, New Zealand, Germany, Norway and United Kingdom. Yardstick regulation is used in Netherlands. The regulatory methodology used in Sweden is a combination of cost-of-service regulation and yardstick regulation. In PJM and Alberta, transmission pricing is still regulated by cost-of-service regulation. A summary of transmission and distribution pricing is shown in Table 2.

Retail pricing: Although most countries of Competitive Market Group have extended retail competition to all consumers, they still provided the choice to small residential consumers of staying with their default service providers under regulated retail prices. A summary of retail pricing features is shown in Table 3.

Significant steps have been undertaken by the countries in the **Transition Market Group** to reform their electricity industry. Former vertically-integrated national electric utilities have been (at least legally) unbundled into generation, transmission and distribution. The ownership of these utilities has been partially transferred to the private sector. In some countries (such as, China, Malaysia, Thailand) the government remains the dominant shareholder, and private investors are invited to build power plants to produce electricity – Independent Power Producers (IPPs). Governmental involvement in the day-to-day commercial business activities of the power sector has been largely reduced and their responsibilities have been mainly limited to rule-making and regulation. But the market mechanisms in these countries is still at their initial stages of development and have not yet attained the level of maturity evident in countries in the Competitive Markets Group (as discussed above). Electricity trading in these countries is mainly organised along the Single-Buyer Model. Under this model, the national electric utility is the single buyer in the market that purchases electricity from IPPs under long-term Power Purchase Agreements (PPAs). The IPPs are normally selected through an open tendering process (Rector 2005, Woo 2005, Woodhouse 2005, and Yang 2006).

Table 1 Summary of the Wholesale Electricity Pricing Mechanism

Country		Spot Markets						Ancillary Services		Risk Hedge Mechanisms		System Adequacy
		Market Types	Bidding	Participation	Demand-side Bidding	Pricing	Price Caps	Integrated Dispatch	Services Procurements	Bilateral Trading	Formal Financial Market	
Mature Markets Group												
Argentina		Pool Market	Cost-based	Mandatory	×	-	×	√	-	√	None	-
Australia		Pool Market	Price-based	Mandatory	×	Zonal	√	√	Market Based	×	Active	Left to Market
Brazil		Pool Market	Cost-based	Mandatory	×	-	×	√	-	√	None	Mandatory Auction
Canada (Alberta)		Pool Market	Price-based	Voluntary	√	Uniform Marginal	√	√	Market Based	√	Active	Left to Market
Chile		Pool Market	Cost-based	Mandatory	×	-	×	√	Market Based	√	None	Mandatory Auction
EU	Germany	Power Exchange	Price-based	Voluntary	√	Zonal	√	×	Market Based or Mandatory Obligation	√	Active	Tendering or Market Based
	UK	Power Exchange	Price-based	Voluntary	√	Zonal	√	×		√	Active	
	Nordic Countries	Power Exchange	Price-based	Voluntary	√	Zonal	√	×		√	Active	
New Zealand		Pool Market	Price-based	Voluntary	√	Nodal	×	√	Market Based	√	Inactive	Left to Market
Singapore		Pool Market	Price-based	Mandatory	×	Nodal	√	√	Market Based	√	None	Left to Market
USA (PJM)		Power Exchange	Price-based	Voluntary	√	Nodal	√	√	Market Based	√	Active	Auction
Transition Markets												
China		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-
Indonesia		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-
Malaysia		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-
Philippines		Pool Market	Price-based	Mandatory	√	Nodal	-	-	-	-	-	-
South Korea		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-
South Africa		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-
Thailand		Single Buyer	-	-	-	Regulated	-	-	-	-	-	-

Sources: various

Table 2 Transmission and Distribution Pricing

Countries	Regulator	Pricing	
		Transmission	Distribution
Australia	AER	Revenue Cap	
- NSW			Price cap
- VIC			Price cap
- QLD			Revenue cap
- SA			Price cap
- ACT			Revenue cap
- TAS			Revenue cap
- WA			Revenue cap
New Zealand	Commerce Commission	Revenue Cap	Revenue Cap
Canada			
- Alberta	AUC	COS	COS
United States			
- PJM	FERC	COS	-
European Union			
- Germany	Bundesnetzagentur	Revenue Cap	Revenue Cap
- Netherland	Energiekanar	Yardstick	Yardstick
- Norway	NVE	Revenue Cap	Revenue Cap
- Sweden	STEM	COS with yardstick	COS with yardstick
- United Kingdom	Ofgem	Price Cap	Price Cap

Note: AER – Australian Energy Regulator, AUC – Alberta Utilities Commission, FERC – Federal Energy Regulatory Commission, NVE - Norwegian Water Resources and Energy Directorate, STEM - Swedish Energy Agency, COS- Cost-of-Service.

Sources: various

Table 3 Retail Pricing

Countries	Regulator	Retail Competition	Pricing Control	Default Services
Australia				
- NSW	IPART	2002	Price cap	Regulation
- ACT	ICRC	2003	Price cap	Regulation
- VIC	ESCV	2001	None	Market-based
- QLD	QCA	2007	Price cap	Regulation
- SA	ESCSA	2003	Price cap	Regulation
- TAS	OTTER	2009	Price cap	Regulation
- WA	ERAWA	2009	Price cap	Regulation
New Zealand	Electricity Authority	1994	None	Market-based
European Union				
- Denmark	DERA	2002	-	Regulation
- Finland	EMA	1997	None	Market-based
- France	CRE	2007	-	Regulation
- Germany	BNA	1998	-	Market-based
- Netherlands	OER	2001	None	Market-based
- Sweden	SEA	1999	-	Market-based
- United Kingdom	Ofgem	1999	None	Market-based
United States				
- Pennsylvania	PUCP	2000	None	Regulation
- Texas	PUCT	2002	None	Market-based

Notes: DERA – Danish Energy Regulatory Agency, EMA – Energy Market Authority, ESCV- Essential Services Commission of Victoria; QCA – Queensland Competition Authority; ESCOSA- Essential Services Commission of South Australia; ERAWA – Economic Regulation Authority of Western Australia; OTTER – Office of the Tasmanian Economic Regulator; CRE – French Energy Regulator, BNA – German Energy Regulator, IPART – Independent Pricing and Regulatory Tribunal; ICRC – Independent Competition and Regulatory Commission; OER – Dutch Energy Regulator, SEA – Swedish Energy Agency, Ofgem – Office of the Gas and Electricity Markets, PUCP – Public Utility Commission of Pennsylvania, PUCT – Public Utility Commission of Texas; WAPC – Weighted Average Price Cap; SWIS – South West Interconnected Systems; ETS – Emission Trading System; MRET – Mandatory Renewable Energy Target.

Sources: various

PRICING OUTCOMES IN THE REFORMED ELECTRICITY MARKET

This section of the paper provides an overview of the pricing outcomes in the two groups of countries, namely, Competitive Markets Group and Transition Markets Group. This overview should enable insight into general trends in electricity prices, and assessment to be made of the integrity of various arguments for reform, for example, reform will foster competition through the working of the market mechanism, contribute to lower electricity prices, and offer timely signals for electricity system expansion. This overview should also establish a platform for undertaking a wider discourse on pricing issues.

Market mechanism does contribute to reducing the cost of operating power system

Tables 4 and 5 provide a snapshot of general trends in electricity prices for households and industrial consumers. It is argued by the proponents of reform that reform and its contingent competitive market pricing mechanism will improve the overall efficiency of operating the power system, and pass down these efficiency gains to the end-users in the form of lower electricity prices. It is noticed that there is a declining trend in average electricity prices for households and industrial consumers over the period 1995–2000, in countries in the Competitive Market Group, thus supporting the above argument. However, besides competition, there are so many other factors that could have contributed to these declining trends, e.g. slow load growth, and decline in the prices of fuels (oil, natural gas and coal) for electricity generation. Thus the question is: how much of the declining trend attributable to reform.

Figure 1 illustrates the general trends in average electricity and fuel prices for the OECD countries. A review of this figure suggests that there is a strong correlation between average electricity and fuel prices except in the period 1995–2000 when market mechanisms in most OECD countries began to function – suggesting that prior to reform, fuel prices were the main factors that influenced electricity prices. Table 6 demonstrates the incremental rate of electricity and fuel prices. A review of the table suggests that although the average fuel prices steadily increased at an annual rate of 4.4 percent over the period 1996–2000, there was a perceptible reduction in electricity prices in the OECD countries over this period – a period coinciding with heightened reform activities in these countries.

This appears to suggest that market-based pricing mechanisms do contribute to efficiency improvement, and consequently lower electricity prices. A number of studies also find similar results. For example, according to Moran (2006), reform in Australia has significantly improved the labour productivity of the generation segment. The improvement ranges from fivefold in Victoria to 50 percent in Queensland. Moran (2006) also argues that the distribution segment has operated more efficiently since the introduction of reform. Newbery and Pollitt (1997) argues that reform of the Central Electricity Generation Board (CEGB) in Britain has delivered substantial efficiency enhancements – labour productivity doubled, and real fuel costs per unit electricity generated fell dramatically. Pollitt (2008) shows that the average real tariff in the Greater Buenos Aires Area of Argentina decreased from 9.1 cent/kWh in 1992 to 6.4 cent/kWh in 2001. It is also argued that this fall is almost entirely attributable to market-based pricing mechanisms.

Market mechanism cannot provide sufficient incentives for system expansion

Market-based pricing, it is contended by reform advocates, reflects the scarcity of electricity, and hence offers more appropriate signals for new investment. However, emerging evidence suggests that the market-based mechanisms have largely failed to provide sufficient signals needed to attract new investment. The power crisis in California in 2000-01, the power black-outs in New York, London and Italy in 2003, large-scale blackouts in Chile during late–1998 and early–1999 and in Brazil in 2001 all signify the inability of market mechanism to deliver new investment.

Several studies have also substantiated this observation about the inability of competitive pricing mechanism to attract new investment. For example, Doorman and Wangensteen (2000), Borg *et.al* (1998) and Amundsen *et.al* (2006) show that in Nordic countries the installed capacity grew slowly after reform while demand continued to develop at a relatively quick rate. As a result, over-capacity inherited from the pre-reform era has been gradually absorbed. Joskow (2007) examines the performance of US wholesale competitive markets, and argues that there existed a number of market imperfections and institutional constraints that have the effect of keeping wholesale prices for energy and operating reserves below their efficient levels during hours when prices should be very high and provide insufficient net revenues to support the capital costs of an efficient portfolio of generating facilities. Brunekreeft and Bauknecht (2006) also expresses the same concern that lower wholesale electricity prices in German electricity market could not recover the capital cost and may hinder the incentives for new investment.

The lack of equity of electricity pricing

Electricity reform appears to have had a relatively benign-to-positive effect on industrial electricity prices in most markets. As shown in Tables 4 and 5, the ratio of household/industrial electricity prices increased after reform. This provides credence to often-heard argument that electricity industry reform is generally biased in favour of large, industrial consumers who have been able to secure low energy prices either through their early exposure to the generally low wholesale spot prices (in regimes of excess capacity), or long-term low-priced contracts with generators.

Table 4 Electricity Prices for Household **US c/kWh (2005 prices)**

	1978	1980	1985	1990	1995	1997	1999	2000	2002	2005	2007	2009	2010
Competitive Markets Group													
Argentina	-	-	-	-	-	7.2	8.8	5.5	-	7.4	2.8	-	-
Australia	1.0	1.4	2.3	5.0	6.2	6.4	5.8	5.4	6.2	6.9	8.2	9.1	10.5
Brazil	-	-	-	-	2.6	2.9	2.2	-	-	7.3	10.3	19.0	-
Canada	0.8	1.2	2.2	3.9	4.7	4.9	4.7	4.7	5.0	7.6	9.3	9.0	10.3
Chile	-	-	-	-	-	6.9	4.2	3.5	3.8	6.5	10.4	15.5	16.7
Denmark	2.3	4.2	5.2	12.0	16.9	16.5	18.2	17.9	19.9	29.5	35.7	39.6	39.5
Finland	2.0	2.9	3.2	8.1	9.6	8.9	8.3	7.4	8.4	12.1	15.1	18.9	19.2
Germany	4.4	5.7	5.6	12.0	17.7	14.3	13.8	11.2	13.0	21.2	27.3	34.6	35.2
New Zealand	0.5	0.9	1.1	4.1	6.4	7.6	6.0	5.3	6.6	13.6	17.0	17.0	20.9
Norway	0.8	1.2	2.0	5.3	6.4	6.6	5.6	5.3	7.8	12.2	13.6	14.5	19.7
Singapore	-	-	-	-	-	-	-	-	8.8	11.1	14.8	17.0	20.6
Sweden	1.3	2.1	2.1	6.5	8.5	9.3	9.1	9.0	10.9	13.4	20.3	20.7	23.5
USA	1.4	2.3	4.3	5.3	6.6	6.9	7.0	7.2	7.8	9.4	11.3	12.6	12.9
UK	1.4	3.0	3.4	7.8	9.9	10.3	10.0	9.5	9.6	14.9	23.6	22.9	23.2
Average	**1.6**	**2.5**	**3.1**	**7.0**	**9.6**	**8.4**	**8.0**	**7.7**	**9.0**	**12.4**	**15.7**	**19.3**	**21.0**
Transition Markets Group													
China	-	-	-	-	2.6	4.4	-	-	-	-	-	-	-
Indonesia	-	-	-	1.2	2.0	1.8	1.5	1.6	3.4	5.8	7.8	8.0	-
South Korea	1.2	2.8	3.4	5.0	7.8	7.4	6.7	7.1	6.3	8.9	10.7	8.7	9.7
South Africa	0.3	0.5	0.5	1.9	2.8	3.1	3.1	3.1	2.9	6.1	-	-	-
Thailand	1.3	2.2	2.9	3.6	5.4	5.4	5.1	5.4	5.8	7.2	9.7	11.0	-
Average	**0.9**	**1.8**	**2.3**	**2.9**	**4.1**	**4.4**	**4.1**	**4.3**	**4.6**	**7.0**	**9.4**	**9.2**	**9.7**

Sources: Energy Prices and Taxes (IEA); Energy Statistics Report (OLADE).

Table 5 Electricity Prices for Industry **US c/kWh (2005 prices)**

	1978	1980	1985	1990	1995	1997	1999	2000	2002	2005	2007	2009	2010
Competitive Markets Group													
Argentina	-	-	-	-	-	4.9	4.9	4.6	-	4.7	5.9	-	-
Australia	0.7	1.0	1.6	3.2	4.8	4.6	4.1	3.9	4.1	4.3	4.6	5.4	6.0
Brazil	-	-	-	-	2.6	2.9	2.2	-	-	-	-	-	-
Canada	0.5	0.8	1.5	2.7	3.2	3.3	3.3	3.4	3.7	5.5	6.6	6.3	7.6
Chile	-	-	-	-	-	-	-	3.5	3.8	6.5	10.4	15.5	16.7
Denmark	1.6	2.1	2.8	4.6	5.6	5.4	5.8	5.3	6.7	9.3	10.5	12.1	12.7
Finland	1.6	2.2	2.5	4.9	5.3	4.6	4.2	3.7	4.2	7.0	8.4	10.5	10.4
Germany	2.4	3.3	3.2	6.6	8.7	6.5	5.2	3.8	4.7	8.4	11.3	14.9	-
New Zealand	0.4	0.8	0.9	2.5	3.4	3.8	2.8	2.5	3.1	6.1	7.2	7.3	8.6
Norway	0.4	0.6	1.1	2.5	-	-	-	1.7	3.0	4.3	4.9	6.4	8.3
Singapore	-	-	-	-	-	-	-	-	6.6	8.0	11.6	13.4	16.8
Sweden	0.8	1.4	1.5	3.7	3.5	3.1	-	-	-	-	7.9	8.9	10.4
USA	0.9	1.6	2.8	3.2	3.6	3.7	3.4	4.1	4.4	5.7	6.8	7.5	7.6
UK	1.0	2.2	2.3	4.7	5.3	5.3	5.5	4.9	4.8	8.7	14.0	14.9	14.1
Average	**1.0**	**1.6**	**2.0**	**3.9**	**4.6**	**4.4**	**4.1**	**3.8**	**4.5**	**6.5**	**8.5**	**10.3**	**10.8**
Transition Markets Group													
China	-	-	-	1.2	2.4	3.1	3.3	3.4	3.5	3.7	4.0	1.2	-
Indonesia	-	-	-	0.9	1.8	1.7	1.7	2.3	3.8	5.9	8.4	8.7	-
South Korea	0.8	2.3	3.0	3.6	4.3	4.0	3.8	4.4	4.3	5.9	7.3	6.5	-
South Africa	0.1	0.2	0.3	0.9	1.6	1.5	1.3	1.3	1.1	2.2	-	-	-
Thailand	1.1	2.1	2.9	3.5	4.8	4.8	4.7	5.1	5.2	6.6	7.8	8.5	-
Average	**0.7**	**1.5**	**2.1**	**2.0**	**3.0**	**3.0**	**3.0**	**3.3**	**3.6**	**4.9**	**6.9**	**6.2**	**-**

Sources: Energy Prices and Taxes (IEA); Energy Statistics Report (OLADE).

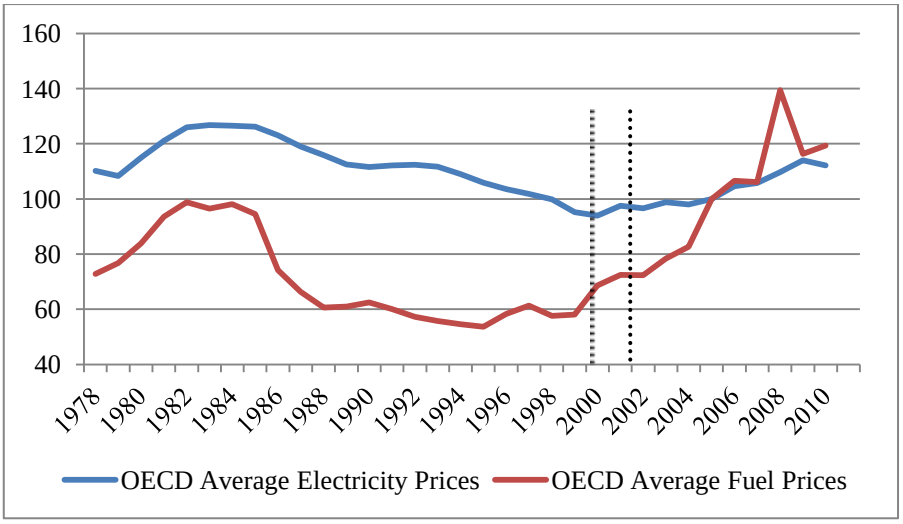

Figure 1 Average OECD Electricity Prices and Fuel Prices

Table 6 Incremental Rate of Electricity and Fuel Prices (%)

	1981~85	1986~90	1991~95	1996~00	2001~05	2006~10
OECD Europe Average Electricity Price	0.4	-0.9	-1.0	-3.3	1.8	4.4
OECD America Average Electricity Price	1.8	-2.9	-2.1	-1.9	0.8	0.2
OECD Average Fuel Prices (Oil, Natural Gas and Coal)	0.2	-3.9	-2.7	4.4	9.5	3.0

Sources: various
Note: Changing rates are estimated

A WIDER DISCOURSE

The discussion above suggests that there exists a significant disparity between expectations from reform and its actual outcomes. The countries in Transition Market Group are still on their way to develop electricity market mechanisms. So the failure of reform to lower electricity prices in these countries can be attributed to the lack of depth of reform. In the Mature Market Group, despite the still arguable success of delivering lower electricity prices, the market-based pricing mechanism has largely failed to provide timely price signals for system expansion. This, it is argued by some, is mainly due to political factors – lack of political will to reform, and too much governmental intervention in the operation of electricity markets (see, for example, Jamasb 2006, Millan 2006). The question is: why there is strong political resistance to reform?

As discussed earlier in this paper, the electricity industry reforms were strongly motivated by ideological changes in the 1980s and 1990s, from Keynesianism and Marxism to Neoclassicism. This resulted in the changing of the role of the government from an operator to a regulator. As operator, the government directly ran the power system not only to provide electricity services to the end-users but also to facilitate wider social development. However, with their role being redefined as regulator, these public objectives have been left to be pursued by profit-driven private sector. In many cases, when the market-based pricing mechanisms fail to provide such incentives for private entity to pursue these public objectives, governmental interferences become inevitable.

The formation of the electricity industry and its pricing mechanisms is informed by a combination of social, political, and economic considerations. The market-based pricing mechanism, that is driven exclusively by economic considerations, may not only be inherently weak but may have some conflicts with other considerations, which could further distort the functioning of the market

mechanism. This paper therefore is of the view that it is important to clarify the real objectives of reform, and to employ the most appropriate model to achieve these objectives. Through this, a richer perspective on the role of prices and the mechanism for pricing could emerge.

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