Electricity Reform in APEC Economies – The Way Ahead

Setting objectives, adopting and implementing strategies, measuring, monitoring and managing progress
Electricity Reform in APEC Economies — The Way Ahead

A review for the APEC Energy Working Group of APEC’s program of micro-economic reform of the electricity supply industry and recommendations of future directions

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Executive Summary

This report reviews APEC’s program of micro-economic reform of the electricity supply industry (ESI) and recommends future directions.

A question of necessity for both developed and developing economies

In all APEC economies, the original and ongoing need for ESI reform is to improve economic efficiency, industry and corporate governance, regulatory practices, pricing outcomes and, if possible, environmental outcomes. The reform of the ESI obviously is of great relevance to the welfare of populations throughout the APEC region.

The ESI of each APEC economy has its unique characteristics and needs but the needs of developed and developing economies differ greatly.

In the developed economies, the main challenge of ESI reform has been primarily to improve sectoral efficiency. There have been major gains in this regard.

By contrast, in the developing economies, the challenges of ESI reform have been to address a range of deeper and more chronic issues: lack of access by many citizens to affordable electricity supply, under-investment in electricity infrastructure, other sectoral inefficiencies, poor governance, unpredictable regulation, uneconomic electricity pricing and adverse environmental outcomes, as well as the challenge of how to cope with high demand growth. In this context, many ESI structures and processes inherited from previous times do not have the funding, commercial and technical capabilities to address these challenges and to efficiently underwrite the huge expansion of infrastructure which will become necessary in the coming decades.

For these far-reaching challenges, nothing less than optimal responses are required. The rationale for micro-economic reform of the ESI is to facilitate these responses, wherever possible, by stimulating new competencies and by encouraging new investors to compete with existing industry participants, under predictable regulatory regimes, thereby narrowing the gap between the volume and quality of presently available electricity services and what will in future be required.

Micro-economic reform of the ESI is not so much an option by which these challenges can be addressed but more a question of necessity.

The APEC experience: gathering pace but uneven experience

Micro-economic reform of the ESI in APEC economies continues to gather pace. In the last few years, the reform movement has swept across developing economies in the APEC region at a similar rate to developed economies. However, even in (and sometimes especially in) the more developed economies, reform experience has been very uneven. In a few economies, the economic payoffs have been huge. In others, there have been sub-optimal outcomes and a few spectacular failures.

The APEC program of micro-economic reform

In 2000, the APEC Energy Working Group (EWG) commenced a three-phased study of micro-economic reform of the ESI in APEC economies:

- Phases I and II involved a study of reform experience in selected economies, resulting in the publication in 2001 of a *Manual of Strategic Principles*.

- Phase III, the final phase, involved a workshop in South East Asia, followed by a review of the application of APEC’s strategic principles.

In 2002, for the purposes of Phase III, the Australian Government engaged a three-member consulting group to design and conduct the workshop and to provide this report. The consulting group comprised Peter Smiles & Associates, ResourcesLaw International and Country Energy, all from the Australian State of New South Wales.

The APEC Phase III workshop was held in Cebu, Philippines, in December 2002. It was hosted by the Philippines Department of Energy, with the support of USAID. At the Cebu workshop, there was general support for the APEC strategic principles, although it was apparent to everyone that most APEC economies are at different stages along the path of micro-economic reform.

**Conclusions**

The consulting team has reached some broad but firmly-held conclusions about ESI reform in APEC economies:

(i) Governments remain responsible for the outcomes of ESI reform irrespective of any changes in industry structure and ownership. This is a fundamental responsibility which cannot be left to a regulator.

(ii) Any government which is unable to substantiate the success of its ESI reform program exposes its reforms to resistance by industry participants and the community, as well as to the risk of a political backlash.

(iii) ESI reform must be individually tailored to each economy according to its particular needs, resources and circumstances and its stage along the reform path.

(iv) Notwithstanding the efficiency gains to be derived from ESI reform, the overriding principle must always be to maintain the security and stability of the entire power system. This is what differentiates reform of the ESI from reform of other industries.

(v) It is plain that ESI reform in many parts of the world has suffered from an excessively top-down, one-dimensional approach, with insufficient attention paid to power system security and enterprise-level reforms.

(vi) Almost half of the cost of delivered electricity in many economies is attributable to the vital network services of transmission and distribution, the supply of which, unlike generation, can seldom be made contestable. A simple enough point, really, but not fully appreciated by all architects of reform programs.

(vii) Around the world, the ESI is an industry sector in the process of breakup into two distinct sub-sectors, one potentially contestable (generation and supply)
and the other largely impervious to market forces (transmission and distribution). This point also needs to be more fully appreciated.

(viii) The early introduction of a predictable system of professional regulation is an essential element of ESI reform, especially if private investors are to be attracted.

(ix) ESI reforms at the enterprise level can produce major gains by commercializing, corporatizing and, in some cases, privatizing electricity utilities and by providing them with economic incentives to operate to high technical and commercial standards. This can be achieved without the risks, at least initially, of attempting to create a competitive electricity market.

(x) The introduction of a competitive electricity market will entail very high risk to consumers if supply is already scarce or becomes scarce, because this can trigger unaffordable prices. Competitive electricity markets are unsuited to developing economies in the early stages of reform.

(xi) Without introducing a competitive electricity market as such, much of the ESI can still be made competitive by separating the transmission function and by requiring competitive tenders for the supply of fuel, generating capacity and other capital works, goods and services.

(xii) Even in the case of already-installed generating capacity, arrangements can still be made for competition by merit order dispatch on a cost-plus basis, with profit and bonus margins awarded accordingly. This avoids the risk of price gaming in a competitive market where dispatch is based on prices and not on costs. This more limited form of competition lacks the vigor and the rigor of, for example, capital markets. However, it is more suited to developing economies that may lack operational experience in competitive market environments and may wish to control the pace of reform.

(xiii) Competitive electricity markets can naturally develop, and are already developing, through trading between power systems which becomes possible through the interconnection of sub-national and national power systems. This has been the historical pattern of emergence of electricity markets.

(xiv) Historical fears of dependence on foreign capital are dissipating in APEC economies.

(xv) Attracting private investment is a vital ongoing need but, since the mid 1990s, private investors in the ESI have become more risk-averse. Today, it is less safe for governments to assume that their “reformed” electricity sectors will attract the requisite level of private investment. In this context, it is a matter always to be remembered that underpricing of electricity destroys the incentive to invest in essential infrastructure and is unsustainable.

(xvi) In the absence of any “reform standard”, an objective-setting, measuring and monitoring system is a pivotal element in managing ESI reform. Such a system can assist governments to establish realistic reform targets and can enable them to measure and monitor performance in achieving desired outcomes. A monitoring system can also promote common understanding of
reform targets amongst all stakeholders, in addition to providing potential investors with an indicator of rationality.

Finally, “a lot of valuable reform experience gets lost”. Trapping this experience, and being able to tap into it when desired, is an important element of institutional strengthening and capacity-building for all APEC economies.

Overall, and especially at a policy level, an increasing degree of consensus about the operational aspects of micro-economic reform of the ESI is evident amongst APEC economies. Nonetheless, there is a need to continue to build common understanding and institutional capacity in this very important field.

**Recommendations**

The consulting team has put forward four recommendations:

1. **The 1997 APEC Manual of Best Practice Principles for Independent Power Producers** remains valid and should continue to be promoted amongst APEC economies.

2. **The 2001 APEC Manual of Strategic Principles for micro-economic reform of the ESI** should also continue to be promoted amongst APEC economies.

3. Each APEC economy should fashion an ESI reform implementation methodology for its particular needs, which can be based on the following five steps:
   - setting clear national energy policy objectives
   - identifying reform risks and “road blocks”
   - adopting and implementing realistic reform strategies
   - ensuring the reforms are project-managed, and
   - establishing a central unit to regularly monitor reform progress.

   Such a reform implementation methodology is elaborated in sections 6 to 11 of this report and an implementation template is provided in Table 4.

4. The APEC Energy Working Group should consider developing regional performance indicators to monitor the progress of ESI reform.

Robert Pritchard
on behalf of the consulting team

Peter Smiles & Associates
ResourcesLaw International
Country Energy

November 2003
1. Introduction

1.1 Background to the APEC Micro-Economic Reform Program

In 1998, APEC Energy Ministers authorized the APEC Energy Working Group (EWG) to undertake a three-phased study of micro-economic reform of the electricity supply industry (ESI) in APEC economies in order to promote and implement a strategy for institutional strengthening and capacity building. The program commenced in 2000.

A previous study had been undertaken in 1997 of best practice principles for independent power producers; that is, principles to effectively encourage efficient independent power production as a way to boost supply to meet the increasing demand for electricity in developing APEC economies. The output from this study was APEC’s Manual of Best Practice Principles for Independent Power Producers.1

A further three-phased study was then undertaken.

Phase I of the study examined the progress being made by APEC member economies on the implementation of APEC’s Manual of Best Practice Principles for Independent Power Producers.

Phase II of the study involved the preparation of a Manual of Strategic Principles,2 setting out a series of high-level, best practice principles for designing, implementing and managing the reform of the ESI. The manual provided member economies with 68 recommended policy principles to guide them in micro-economic policy formulation. The manual had a high-level focus and did not purport to be overly prescriptive of what individual economies should actually do in the implementation stage.

Phase III of the study (the final phase) was aimed at assisting individual economies, in a practical way, in implementing micro-economic reform of the ESI.

1.2 The Purpose of this Report

In 2002, the Australian Government engaged a three-member consulting group for Phase III. The consulting group comprised:

- **Peter Smiles & Associates**, consultants on commercialization of electricity utilities (represented on the consulting team by Peter Smiles)

- **ResourcesLaw International**, policy, legal and regulatory consultants in the energy sector (represented on the consulting team by Robert Pritchard) and

- **Country Energy**, Australia’s largest, state-owned, rural electricity distribution utility (represented on the consulting team by Leith Elder).

All members of the consulting team have international experience and are based in the Australian State of New South Wales. Although the entire ESI in New South Wales has remained firmly in state ownership, it has been very extensively reformed. Over the last

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decade, it has experienced the unbundling of industry functions, the unbundling of the state-wide generation and transmission utility, the disaggregation of generators, the corporatization of all of the state-owned electricity enterprises, the introduction of a competitive power pool, the commencement of retail competition and the advent of independent regulation.

The initial task of the consulting team was to design and conduct a workshop to review the operational aspects of micro-economic reform in the electricity sector of APEC economies. This workshop was conducted in Cebu, Philippines, in December 2002 and was hosted by the Department of Energy of the Philippines with the support of USAID. The purpose of the Cebu workshop was to explain and demonstrate the APEC strategic principles of micro-economic reform in the electricity sector and to obtain feedback from participants on their experiences and perceptions of progress.

The Cebu workshop was attended by over 80 participants, representing seven economies and 50 public and private sector organizations. The Association of South East Asian Nations (ASEAN) was represented at the workshop by the Jakarta-based ASEAN Centre for Energy. India, although not an APEC economy, sent an observer from its Ministry of Power.

The consensus of the Cebu workshop was:

- there was general support for the APEC strategic principles of ESI micro-economic reform, provided that they were tailored to the particular circumstances of each economy;
- there should be a structured approach to implementation;
- a measuring and monitoring system should be set up to effectively manage implementation;
- because “a lot of valuable reform experience gets lost,” an APEC-sponsored program should be established to provide expert advice and to share experience; and
- regional performance indicators should be developed to assist in monitoring micro-economic reform.

The purpose of this report is to assess the current position of the APEC program of micro-economic reform of the ESI (encapsulating the previously published APEC reports) and to recommend future directions for ESI reform implementation, with particular emphasis on the economies of South East Asia.

1.3 Methodology

The methodology of the consulting team was:

- to review the precursor APEC reports and other current literature on micro-economic reform in the electricity sector.

3 A bibliography of current literature is set out in the appendix of this report.
to obtain feedback on ESI reform in various APEC economies from participants at the Cebu, Philippines workshop;¹

to take a “snapshot” assessment of the current status of ESI reform in a number of APEC economies; and

to apply what they know from their practical experience in ESI reform in both developed and developing economies.

The participation of Country Energy, a state-owned electricity enterprise, enabled the consulting team to draw on its decade-long experience as an object of commercialisation, corporatization and other ESI reforms in New South Wales.

1.4 The Structure of this Report

This report is structured as follows:

• the rationale for micro-economic reform of the ESI is considered, highlighting the differences in the reform objectives of developed and developing economies (section 2)

• APEC’s 1997 Manual of Best Practice Principles for Independent Power Producers is re-evaluated (section 3)

• APEC’s 2001 Manual of Strategic Principles for micro-economic reform of the ESI is summarized (section 4)

• the very uneven experience with ESI reform in APEC economies is briefly overviewed (section 5)

• a five-step methodology for implementing ESI reform is elaborated (sections 6 – 11) and a template for implementation which can be utilized by economies in the early stages of reform is provided

• in the final section, the overall conclusions and recommendations of the study are specified (section 12).

2. The Rationale for Micro-Economic Reform of the ESI

2.1 A Question of Necessity

Apart from health and education, there is probably no industry sector whose efficiency is of greater relevance to the welfare of world populations than the ESI.

In many APEC developed economies, the ESI has been characterized by state ownership and a lack of competition, sometimes accompanied by excessive investment and poor productivity. As well, it has often been saddled, to varying degrees, by weak governance at the enterprise level, interventionist regulation, cross-subsidies and uneconomic pricing.

In many APEC developing economies, many of these characteristics have also been present. However, there have been some important additional factors including:

- the inability of investment flows to keep pace with growing populations and growing demand;
- confusion and overlapping of regulatory and service provision functions, making it difficult for independent, commercial service provision; and
- sub-optimal environmental outcomes, generally because mitigation measures have been unaffordable.

Unless changes are made, APEC developing economies will struggle to bring about the huge expansion in installation of electricity infrastructure required in the coming decades. It is necessary to utilize new economic tools and to introduce new industry participants that will provide the required technical, commercial and funding capabilities.

2.2 The Principal Purpose of ESI Reform: Greater Economic Efficiency

Throughout the 1990s, the trumpeted aim of ESI reform around the world has been to improve economic efficiency. This was to be achieved by utilizing a variety of economic tools to achieve the more effective and efficient use of resources. These tools have included reforming the way enterprises are managed; reforming the way industries are structured and regulated; and promoting competition to facilitate resource use towards customers’ true preferences at the lowest possible prices.\(^5\)

According to whether one is concerned with, on the one hand, a developed economy or, on the other, a developing economy, ESI reform objectives can be very different. In developed economies, the main emphasis is on promoting competition whereas, in developing economies, the typical first priority has to be on promoting the expansion of electricity supply to meet increasing demand, that is, on attracting new investment in generating capacity and in the construction or augmentation of transmission and distribution networks.

Always, however, the overriding principle in ESI reform must be to maintain the security and stability of the entire power system for present and future populations. This is what distinguishes micro-economic reform of the ESI from micro-economic reform of other industries.

Power system security and stability entails three principal elements: (1) an adequate reserve margin of generating plants, ideally with a diversity of fuel sources (2) a reliable and unconstrained transmission system to transport energy from the points of production to load centers and (3) reliable, well-maintained distribution systems at local and regional levels to deliver energy at lower voltage levels to end-users. All three elements comprise essential infrastructure for the people as a whole.

2.3 The Gains and Potential Gains from Greater Economy-Wide Efficiency

Without discounting the argument that some of the short-run efficiency gains from ESI reform can be offset by long-term productivity losses if industry skills and know-how are allowed to diminish, it is very clear that there have already been some huge payoffs in several APEC economies.

In Australia, for example, authoritative studies show that, by 2000, electricity reform had already resulted in GDP gains of around US$1 billion per annum, compared with the reference case of no reform.6

In the United States, since Congress enacted the Energy Policy Act of 1992, competition among power plants for wholesale customers’ business has largely replaced traditional cost-of-service regulation of wholesale power sales. According to the US Department of Energy, relying more on markets has saved US customers US$13 billion per annum over the cost of traditional regulation.7

Although measurement of the precise gains is very difficult,8 the clarion call for reform continues unabated: the most recent modelling simulations carried out for the APEC Energy Working Group have indicated that comprehensive energy sector liberalization in APEC economies as a whole could, by as early as 2010, result in GDP gains of around US$71 billion (in 1999 prices).9 This is almost the equivalent of the Chilean economy! The largest contribution would come from the reform of electricity because of the fundamental part electricity plays as an input to production processes and as a component of household expenditure.

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9 ABARE, supra, footnote 5, p 116.
2.4 The Need to Attract Private Investors

In all APEC economies, but particularly in developing economies, there is a vital ongoing need to attract private capital to fund future required investment in electricity infrastructure in order to maintain supply and to meet growing demand. Increasingly, much of this is beyond the capacity of the often traditional public sector service providers as other competing needs for social capital, such as health and education, become more pressing.

Attracting private investment can be a far more important purpose of micro-economic reform of the ESI than, for example, a drive for the total elimination of “monopoly rents”. Underpricing of electricity destroys the incentive to invest in essential infrastructure and is unsustainable. The danger is that underpriced electricity today will lead to an inadequate power system tomorrow.

Micro-economic reform of the ESI should lead to electricity prices which are reflective of commercial realities and should in turn facilitate domestic capital mobilization as well as attract foreign capital. However, governments in both developed and developing economies cannot any longer take it for granted that their “reformed” electricity sectors will continue to attract the requisite level of private investment. As the World Bank recently noted:

“There are myriad technical issues surrounding the design of effective policy and regulatory frameworks, ranging from details of risk allocation to the design of markets, subsidy schemes, regulatory institutions, and tariff adjustment mechanisms…. the key challenge is political rather than technocratic: how to manage the transition to infrastructure provision on a more commercial basis.

Annual investment flows to private infrastructure projects in developing countries grew dramatically from 1990 to 1997, but by 2001 had fallen back to the levels of the mid-1990s…. Future prospects will depend on the willingness and ability of governments to grapple with the underlying reforms and to create opportunities attractive to private investors, who can be expected to be more discriminating than in the mid-1990s.”

The volatility of private investment flows into developing economies, including the dramatic effect of the 1997 Asian financial crisis, is vividly illustrated in table 1 below.

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TABLE 1: ANNUAL PRIVATE INVESTMENT IN ELECTRICITY PROJECTS AND PRIVATIZATIONS IN DEVELOPING ECONOMIES OF EAST ASIA AND PACIFIC

<table>
<thead>
<tr>
<th>Year</th>
<th>Value US$ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>0.1</td>
</tr>
<tr>
<td>1991</td>
<td>0.5</td>
</tr>
<tr>
<td>1992</td>
<td>5.1</td>
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<td>1993</td>
<td>6.2</td>
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<td>1994</td>
<td>7.8</td>
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<td>1995</td>
<td>7.9</td>
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<td>1996</td>
<td>12</td>
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<tr>
<td>1997</td>
<td>15.1</td>
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<tr>
<td>1998</td>
<td>5.6</td>
</tr>
<tr>
<td>1999</td>
<td>1.6</td>
</tr>
<tr>
<td>2000</td>
<td>3.9</td>
</tr>
<tr>
<td>2001</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: World Bank, PPI Project Database

Micro-economic reform has a key role in dampening the volatility of private investment flows. The global supply of capital is plentiful but investors are characteristically risk-averse and will not invest in economies where their capital will be put at risk by regulatory or market uncertainty.

2.5 Governments Remain Responsible for Outcomes

Irrespective of the present and future structure and ownership of the ESI, governments remain responsible for ensuring the desired micro-economic outcomes are achieved. This is a fundamental responsibility which cannot be left to a regulator. Each government should fashion an ESI reform implementation methodology for its particular needs, commencing with the setting of clear national energy policy objectives. A methodology for doing this is elaborated in sections 6 to 11 of this report.
2.6 How Are the Desired Economic Outcomes to be Achieved?

The task of achieving positive economic outcomes by introducing competition into the ESI is deceptively simple.

Successfully attracting private capital into a competitive market, where entrepreneurs take all of the risks and the community is assured of best possible prices and services through competitive pressures, is clearly an optimal outcome. Investors generally prefer to face the disciplines of a competitive market rather than regulation with its attendant risks of uncertainty and political intervention. However, the plain proposition to embark upon micro-economic reform of the ESI begs a number of questions:

- should competition be introduced at economy-wide level, enterprise-level or both?
- what are the various economy-wide and enterprise-level reform options and how do they interrelate?
- what are the costs and benefits of each reform option?
- what are the risks and the opportunities of each reform option?
- what is the appropriate sequence of steps for each economy?
- what is the best timing for reform — fast or slow?
- how do you ensure that the community is better off?
- how do you maintain control of the reform process?
- how can you keep track of what is going on?
- what will make the investors come?
- what will scare the investors away?

This paper outlines a five-step reform methodology by which individual APEC economies can provide their own answers to these questions.
3. **APEC’s Manual of Best Practice Principles for Independent Power Producers**

APEC’s pioneering *Manual of Best Practice Principles for Independent Power Producers* (hereinafter referred to as “the IPP Principles”) was issued in 1997.11

The report of the APEC Phase 1 study of micro-economic reform of the ESI was issued in October 2000.12 It described the progress of implementing the IPP Principles in a number of APEC economies.

The main recommendations of the Phase I report were:

- institutional and regulatory structures should be formulated to create a stable framework for power sector development, including for IPPs, towards a competitive future;
- procurement, tender, bid and evaluation processes should be transparent, competitive and include consideration of environmental factors;
- power purchase agreements should allow for transition to competitive markets and include means by which to allocate risks to those parties best able to manage those risks; and
- clear regulatory, taxation and foreign exchange regimes need to be established to facilitate private investment.

The Phase I report showed that, by 2000, the focus of most APEC economies had shifted from the development of individual IPP projects to issues connected with more general reform of their energy sectors and economies as a whole. The overall finding was that the broad objectives underlying the IPP Principles were being implemented, not by mechanisms specifically directed to IPPs, but by the development of policies and strategies seeking to broadly reform the ESI.

During the 1990s, IPPs temporarily fell out of favor for various reasons. Many power purchase agreements reflected poor commercial deals: some were simply over-generous to the developers; other developers were allowed to make explicit charges to compensate for country and project risk and the cost of capital, sometimes with electricity prices being denominated in US dollars.

With increased commercial maturity and better governance, these commercial mistakes are less likely to be repeated. Better project financing and risk management methods also will make future IPP investments more realistic.

The Asian financial crisis in the late 1990s also caused a temporary surplus of generating capacity. In this situation, there was little need to attract new IPP investment but this has now changed and there is again a need to attract massive levels of new investment. We therefore believe that IPPs will continue to play an

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11 APEC Energy Working Group, supra, footnote 1.

important part in underwriting future generating capacity expansion in most APEC economies.

The consulting team’s evaluation is that the IPP Principles are still valid and that the APEC Manual of Best Practice Principles for Independent Power Producers should continue to be endorsed in the pending large power expansion phases.
4. **APEC’s Manual of Strategic Principles for Micro-Economic Reform of the ESI**

The APEC Phase II report examined micro-economic reform generally in the ESI of member economies and resulted in the publication of APEC’s *Manual of Strategic Principles* in August, 2001. The APEC manual outlined 68 strategic principles covering all aspects of micro-economic reform of the ESI. These principles encompassed the eight areas summarized in table 2 below:

**TABLE 2: A SUMMARY OF APEC’S STRATEGIC PRINCIPLES FOR MICRO-ECONOMIC REFORM OF THE ESI**

- **Policy Objectives**
  - Focus on local needs & gain commitment
- **Managing the Reform Process**
  - Set up a reform unit and carefully program reform
- **Industry Structure**
  - Commercialize, corporatize & introduce competition if you can
- **Legal & Regulatory Framework**
  - Formulate good ESI & supporting commercial laws
- **Wholesale Market Mechanism**
  - Establish if you can but be careful to align rights & accountabilities
- **Transmission & Distribution**
  - Regulate & promote efficiency
- **Retail Tariffs & Contestability**
  - Introduce contestability but ensure benefits > costs
- **Privatization**
  - Privatize if financially and socially desirable

Conceptually similar reports have also been published in recent years by other international organizations and these were reviewed by the consulting team in preparing this report.14

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13 APEC Energy Working Group, supra, footnote 2.

It might usefully be highlighted at this point that, in many APEC economies, almost half of the cost of electricity delivered to customers by modern, integrated power systems is attributable to the network services of transmission and distribution, not to the procurement of primary energy (fuel) and its conversion to electricity by generators. Although this is a relatively simple, straightforward proposition, its significance has not been fully appreciated by all architects of ESI reform programs.

The unbundled cost of delivered electricity in the Australian State of New South Wales is depicted in table 3 below. It is pointed out that the relation between unbundled components of cost in any power system will fluctuate with generating costs (principally fluctuating fuel costs) and is linked to customer density in each local distribution area.

**TABLE 3: UNBUNDLED COST OF DELIVERED ELECTRICITY**

Electricity transmission and distribution networks are of course “natural” monopolies, in the sense that it is not economically feasible to replicate them so as to be able to provide potential users of their services with a choice of supplier. They are largely impervious to market forces. For this reason micro-economic reform of this industry sub-sector must be approached in a conceptually different way to the generation and supply sub-sectors. Please refer to the further discussion in sections 9.2 and 9.3 of this report.

Before proceeding to examine how, in the light of what is now known about the rationale for ESI reform and reform models, an economy might successfully embark upon an ESI reform program, we provide in the next section a very brief overview or “snapshot” of what is currently going on in a number of APEC economies.
5. An Overview of Current ESI Reforms in APEC Economies

5.1 Summary of Overview

In almost all APEC economies, ESI micro-economic reform is continuing to be evaluated, modified and applied. Outcomes have been generally positive but overall experience has been very uneven.

In some APEC developed economies, there have been very substantial economic gains but competitive electricity markets have not always been established successfully and “reform fatigue” is an oft-heard complaint.

In the last few years, the ESI reform movement has swept across APEC developing economies at a similar rate to APEC developed economies, largely explained by a growing policy consensus and a “strong demonstration effect.”

At the same time, in many APEC developing economies, population growth has driven such a rapid increase in electricity demand that it has outstripped the capacity of power systems to keep abreast of the increase.

Interconnection of power grids is gradually occurring between APEC economies, bringing an increase in cross-border trade in electricity and creating the conditions for the emergence of regional electricity markets.

We elaborate briefly below.

5.2 ESI Reform in Some APEC Developed Economies

Australia

Virtually all of Australia’s traditional utilities have been split up into competing business entities and corporatized and a competitive electricity market has been successfully established. As indicated in section 2.3, Australia has already achieved very substantial GDP gains from its extensive ESI reforms.

However, Australia has experienced an uneven pattern of reform because of the problem of gaining agreement from multiple states in its federal system of government. This has caused a number of deficiencies, including confused governance arrangements and intrusive regulation. Privatization has taken place to date in only two States: South Australia and Victoria. A new national regulator is to be established in 2004.


17 “Just as the energy reforms have brought benefits, it seems clear that there are serious deficiencies in some of the reform areas. These deficiencies are either areas that still need to be addressed or they have emerged as unintended consequences of the recent reforms. It is clear that important steps need to be taken to achieve a truly national and efficient energy market”, Final Report, Council of Australian Governments’ Energy Market Review, Canberra, Australia, 20 December 2002.
**Japan**

Japan’s ESI has traditionally been comprised mainly by nine large privately-owned vertically-integrated “general electric utilities”, with 100% market share in their respective service areas. In addition, the Electric Power Development Company (EPDC), jointly owned by the government and the nine utilities, has performed the national mission of developing new generation and transmission infrastructure.

Following the enactment in 2002 of the Basic Law on Energy Policy, a program of “economic structural reforms” will be carried out in Japan, consistent with ensuring security of supply and harmony with the environment. In 2003, a law was enacted for the privatisation of EPDC (renamed J-Power) which will see the nine general electric utilities dispose of their shares.

None of the Japanese general electric utilities will be split up. However their transmission and distribution segments will be financially ring-fenced and all relevant information will be “firewalled” under the rules and oversight of a neutral transmission system organization. Cross-area wheeling charges will be abolished and a voluntary wholesale electricity market will be established.18

**New Zealand**

After a prolonged drought affecting its hydro-dependent system, the New Zealand government has been obliged to address the failure of its deregulated market to provide sufficient future generating capacity. The government recently decided to establish a new Electricity Commission to contract for required reserve capacity, in effect making the government an investor of last resort (see box 1).

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BOX 1: THE NEW ELECTRICITY COMMISSION IN NEW ZEALAND

“The Government wants an electricity system that copes better with extremes and to achieve this wants more reserve generation available to run in very dry years. Because such plant will not run often enough to pay for itself by normal commercial investment criteria, the market cannot be relied on to deliver it …

The [Electricity] Commission will be responsible for managing the electricity sector so that electricity demand can be met in a 1-in-60 dry year without the need for national power conservation campaigns. It will do this by contracting with generators for provision of dry year reserve generation capacity and fuel. These reserves will be withheld from the market until dry years, when they will be released into the market at a high price …

The Commission will have the power to recover the cost of reserve generation in the manner it judges to be most efficient, for example through a levy. The necessary portfolio of reserve generation is expected to be built up within about three years …

The Commission will be empowered to require generators to offer long-term electricity hedge contracts into the market, for a nominated proportion of their reliable capacity, if it decides this is necessary to safeguard against under-investment in ordinary generation. Related powers to require electricity retailers and major electricity users to hedge a set proportion of their consumption will also be provided for …”

NZ Ministry of Economic Development, Report to APEC Energy Working Group, May 2003

Russia

In April 2003, Russia’s new Law on the Electric Power Industry finally became effective. This has now cleared the way for very extensive reforms of the national utility RAO UES. Russia’s reforms are based on a recognition of the fundamental difference between the competitive generation sector and the monopoly, non-competitive, network sectors. The national utility will be completely split up and progressively privatized.19

Singapore

In Singapore, the ESI has been restructured to introduce competition in generation and supply. There are now three competing generation companies and a separate transmission and distribution network company. The Energy Market Authority of Singapore has been established as industry regulator and as system operator. In 2003, a wholesale electricity market commenced and retail competition is now being progressively introduced. Singapore has deferred its previous plans for privatization.

19 Anatoly Chubais, “Russia: Building on Success”, presentation to Annual Conference for IG Renaissance Capital Investors, Moscow, 3 June 2003.
**United States**

In the United States, the ESI has been evolving towards a market-based approach for well over a decade, with mixed results. As indicated in section 2.3, the US has already achieved very substantial savings.

Reform experience has been very uneven because of the complexities of the US federal system of government. The PJM power system stands out as perhaps the leading global example of a successful, large regional power system. By contrast, there has been the disastrous Californian experiment with a compulsory power pool, which needs no further comment from us. It is considered unlikely that market structures which reliably produce reasonable prices throughout the US will be finally developed without strong Federal Energy Regulatory Commission (FERC) intervention.20

5.3 ESI Reform in Some APEC Developing Economies

**China**

Over the past 20 years, China’s generating capacity has expanded enormously. Around-one third of new capacity has been developed with the involvement of IPPs. China continues to struggle to expand capacity to keep up with increasing demand but is expected to reach an installed capacity of almost 400,000 MW by the end of 2005.

China is fully committed to the introduction of competition in power markets.21 In December 2002, China split up its State Power Corporation (SP), unbundling transmission from generation. It also split up SP’s generation assets into five competing companies. The State Electricity Regulatory Commission (SERC) has since been established, becoming the first regulatory commission in China’s public utilities sector. The SERC has the function of issuing licenses and supervising competition in the ESI. Regional electricity markets are presently being trialled.

**Indonesia**

In Indonesia, most new generating capacity in the 1990s was developed by foreign IPPs and its ESI became exposed to very serious financial problems by denominating the price of electricity purchased from IPPs in US dollars. Indonesia has gradually worked its way out of these problems.

In September 2002, Indonesia enacted its new Electricity Law. The new law provides a sound legal framework for the unbundling of the functions of its national utility PLN, the establishing of an Electricity Market Supervisory Board and the progressive introduction of competition in those areas of Indonesia where this is technically, economically and socially feasible.

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Malaysia

In Malaysia also, most new generating capacity has been developed by IPPs. However, Malaysia wisely denominated the price of electricity produced by IPPs in its domestic currency, thereby avoiding Indonesia's financial problems. The national utility Tenaga Nasional Berhad (TNB) has been listed on the stock exchange whilst retaining its vertically integrated structure. TNB has experienced some difficulty matching contracts for the purchase of power from IPPs with contracts to supply local distribution companies.

Philippines

The Philippines led the way in build-operate-transfer (BOT) power projects in the 1990s but low retail tariffs kept the electricity sector in an unsustainable financial position. A comprehensive Power Reform Act was passed in 2002. The ESI has now been unbundled. Intended further steps on the reform agenda include the privatization of power transmission assets and generating plants.

Thailand

In Thailand, around 55% of electricity is generated by the Electricity Generating Authority of Thailand (EGAT), the government-owned generation and transmission utility. The remainder is purchased by EGAT from IPPs, cogenerators, renewable energy producers and neighbouring economies.

In 2002, Thailand pulled back from a very ambitious restructuring program but decided to maintain the privatisation plan with a view to corporatizing and partially privatizing EGAT and the two distribution utilities in 2004. Independent regulation has been planned for some time but has not yet been introduced. The ultimate industry structure remains undecided.

5.4 Interconnection and Cross-Border Trade

It is appropriate at this point to extend the focus of the discussion from purely domestic aspects of micro-economic reform to include external considerations.

Competitive electricity markets can naturally develop, and are already developing, through trading between power systems which becomes possible through the interconnection of sub-national and national power systems. Interconnection brings a range of economic, system security and other benefits to the participants. Cross-border energy trade also acts as an impetus to broader economic growth and encourages wider economic cooperation between the exporting and importing countries.

Micro-economic reform of the ESI in each economy will facilitate cross-border trade once compatible industry structures and predictable regulatory systems are introduced, particularly if the transmission function is separated and an open access regime is established (about which we elaborate in section 9 of this paper).

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Power system security is not just a concern in domestic ESI reform but is an important concern in cross-border interconnection because electricity supply is regarded as a strategic asset and a matter of national security.

The risks of sabotage and terrorist activity are today of great public interest. However these risks are nothing new; they have been with us since the first days of interconnected operation of power systems. These risks apply to all transmission grids, both within national borders and across international borders. The point to be made about transmission and interconnection is that they reduce the vulnerability of otherwise isolated power systems to events of force majeure which are beyond the control of transmission system operators, especially storms, but also including sabotage and terrorist activity. In the EU, it has been accepted that the best guarantee of security of supply and consumer protection is an integrated electricity and gas system.  

South East Asia and the ASEAN power grid

In 1998, the ASEAN Summit endorsed a plan, known as “ASEAN Vision 2020”, to achieve an ASEAN economic region by the year 2020. The ASEAN Plan for Action for Energy Cooperation 1999–2004 now covers the energy component of ASEAN Vision 2020 and involves the region-wide participation of all ten countries of South-East Asia. One of its aims is, by 2004, to institute the policy framework and implementation modalities for the realization of a Trans-ASEAN energy network covering both the ASEAN power grid project and the Trans-ASEAN gas pipeline project.

The ASEAN power grid project is now being accelerated. Three interconnections are already operational and another 11 are planned in the coming years.

The Greater Mekong power grid

The proposed Greater Mekong power grid project is part of the larger ASEAN power grid project.

The Greater Mekong region has a population exceeding 300 million. The region is made up of the six economies that border the Mekong river, namely Cambodia, the Lao People’s Democratic Republic (Lao PDR), Myanmar, Thailand, Viet Nam and Yunnan Province of China. Electricity consumption has in recent years been typified by rapid growth, driven by economic growth, industrialization, urbanization and globalization of trade. Thailand is at present the dominant power market in the region, representing around 60 per cent of total demand.

There are abundant energy resources in the Greater Mekong region but they are unevenly distributed. Each economy’s power system is isolated from each of the others except for Thailand and Lao PDR which are interconnected, albeit inadequately, and some islanded interconnections with distribution level loads. The opportunity for power

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24 ResourcesLaw International, supra, footnote 22, Appendix 1.

trade there has been described as arising from “the mismatch of supply and demand among countries in close proximity”.\(^\text{26}\)

The hydropower potential of the Greater Mekong region is huge, some 1000 TWh annually. If it is assumed that 50 per cent of this hydropower potential is economically and environmentally feasible, this represents a potential generating capacity of about five times the present total generating capacity in the entire region.\(^\text{27}\) The potential economic payoffs for the region from this project are readily apparent.

**North-East Asia**

In North-East Asia, there is also great potential for future power system interconnections amongst China, Japan, North and South Korea, Mongolia and Russia, although plans are still in their relative infancy.\(^\text{28}\)

The simple point is that ESI reform has a key part to play in the process of facilitating cross-border energy trade amongst many APEC economies.

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\(^{28}\) ResourcesLaw International, supra, footnote 22, Appendix 3.
6. A Five-Step Methodology for Implementing ESI Reform

As mentioned in section 2, governments remain responsible for ESI reform outcomes irrespective of any changes in industry structure and ownership.

However, because political, economic and industry conditions differ markedly between economies, any economy should be cautious in adopting another economy’s precedents. This general caveat applies especially to developing economies, even more especially if they find themselves pressured by the IMF, by multilateral banks or by aid agencies to adopt complex, developed economy models.

In the light of the foregoing overview of current ESI reforms in APEC economies, it is suggested that governments cannot delegate responsibility for the outcomes of ESI reform to a regulator nor can they simply set a process of reform in train and watch what happens.

Instead, it is suggested that governments should explicitly acknowledge responsibility for ESI reform outcomes and implement ESI reform by a five-step methodology which entails:

- setting clear national energy policy objectives
- identifying reform risks and “road blocks”
- adopting and implementing realistic reform strategies
- ensuring the reforms are project-managed, and
- establishing a central unit to regularly monitor reform progress.

In the absence of any “reform standard”, the fifth and final step is particularly emphasized (“… if you can’t measure reform, you can’t manage it”).

Each of these five steps is separately described in the following sections of this report. A template for implementation is set out in table 4 below.
TABLE 4: AN IMPLEMENTATION TEMPLATE FOR APEC
ESI MICRO-ECONOMIC REFORM

Setting objectives, adopting and implementing strategies, measuring, monitoring and managing progress

- Government takes responsibility for ESI reform outcomes irrespective of structure and ownership
- Provide feedback to government

- Establish central planning and reform monitoring unit

- Apply key performance indicators
  - System security
  - Access to service
  - Service levels
  - Electricity prices
  - Private investment
  - Financial viability

- Review, adapt, adopt principles
  - APEC Strategic Principles
  - APEC IPP Principles

- Set clear objectives
- Identify risks

- Adopt and implement strategies

- Establish predictable regulatory system
  - Separate transmission
  - Commercially reform govt enterprises
  - Attract private investors

- Prepare for a competitive future
  - Design competitive market
  - Gradually dismantle anti-competitive barriers

- Develop competition
  - Wait for equilibrium of supply and demand
  - Commence wholesale competitive market
  - Introduce retail competition
7. Setting National Energy Policy Objectives

The first step in ESI reform is for governments to set clear national energy policy objectives based on its national energy priorities. The national energy priorities of an economy typically include those set out in table 5 below:

**TABLE 5: TYPICAL NATIONAL ENERGY PRIORITIES**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensuring national energy security over a 20-30 year time scale</td>
<td></td>
</tr>
<tr>
<td>Encouraging domestic oil and gas exploration and development</td>
<td></td>
</tr>
<tr>
<td>Encouraging diversity and self-sufficiency in supply of primary energy forms (sources of fuel for electricity)</td>
<td></td>
</tr>
<tr>
<td>Ensuring the security and stability of the national power system</td>
<td></td>
</tr>
<tr>
<td>Encouraging the integration of energy markets both within and across national borders</td>
<td></td>
</tr>
<tr>
<td>Enabling all customers to afford electricity service under market conditions</td>
<td></td>
</tr>
<tr>
<td>Extending electricity supply to unserviced areas</td>
<td></td>
</tr>
<tr>
<td>Protecting the environment and reducing the potential impact of climate change</td>
<td></td>
</tr>
<tr>
<td>Achieving sustainability as an ultimate goal</td>
<td></td>
</tr>
<tr>
<td>Attracting adequate investment into essential infrastructure</td>
<td></td>
</tr>
<tr>
<td>Promoting an increase in use of renewable resources in the generation sector</td>
<td></td>
</tr>
<tr>
<td>Encouraging technological development</td>
<td></td>
</tr>
<tr>
<td>Addressing the loss of competitiveness of an indigenous fuel industry (typically coal being displaced by gas)</td>
<td></td>
</tr>
<tr>
<td>Cushioning the impact of unemployment caused by industry reforms or by changes in technology</td>
<td></td>
</tr>
<tr>
<td>Determining how much power an independent regulator should be given and how, and to whom, the regulator should be made accountable</td>
<td></td>
</tr>
</tbody>
</table>

All of these national energy concerns, if an ESI reform process is to proceed smoothly, need to be clearly expressed as national energy policy objectives and accommodated in an ESI reform "road map" with measurable and realistic milestones. Furthermore, the participation of all key stakeholders in the drafting of the road map is essential.

In developed economies, priority is often given to promoting efficiency and re-directing social investment out of electricity into other government priority areas. In developing economies, the emphasis is more likely to be upon attracting finance for new infrastructure to improve the availability and quality of electricity supply.

In all cases, the underlying theme is about changing and improving the micro-economic model in order to produce better outcomes; that is, to enhance overall public welfare. Governments and their officials remain responsible for outcomes: they must be able to clearly enunciate what they are trying to achieve in national terms and then be able to track progress.
8. Identifying Reform Risks

In the opinion of the consulting team, substantial resources have been wasted in many APEC economies in attempting to implement and justify sub-optimal micro-economic reform choices that should never have been made in the first place.

Reform risks

Reform risks and deficiencies which have been apparent in various economies and which the consulting team considers need to be guarded against include:

- **One-dimensional solutions** — too much time has been spent following the fashion and mimicking “the best model” and not enough time examining real needs; too much time has been wasted on one-dimensional solutions and not enough time on the real, multi-dimensional problems; too much time has been spent on prescriptive solutions and not enough on diagnosis.

- **Political differences** — causing stops and starts in the reform process. This has been a consequence of political differences between and amongst stakeholders (ministers, politicians, bureaucrats, regulators, utilities, investors, trade unions and end-users). These political differences have been nurtured by changes of government and changes of ministers or other office-holders.

- **Legal impediments** — the need for new legislation often resulting in the reform process being delayed. Most electricity industry reform cannot be implemented unless the laws which regulate the industry are changed.

- **Lack of support of all stakeholders** — necessary for consistent on-going progress.

- **Failure to recognise important public policy or social concerns** — resulting in loss of community support (examples include the promotion of wider economic growth, reduction in greenhouse gas emissions, other environmental concerns, and retention of jobs).

- **Failure to restructure the industry** — resulting in an inability to achieve the intended reform goals.

- **Failure to provide against sovereign risk** — deterring private investors.

- **Unpredictable, unreliable or excessively intrusive regulation** — also deterring private investors. We return to this in section 9.1.

- **Inadequate performance management instruments (such as franchises, licences and price/service regulation)** — resulting in an inability to oversight performance in the public interest.

- **Flaws in market design** — for example, the introduction of compulsory, energy-only power pools before all necessary preconditions for competition are established. We return to this in section 9.5.

- **Other deficiencies** — resulting in other delays and difficulties. These deficiencies have included:
(a) failure to promote effective competition
(b) failure to attract investment ahead of time
(c) failure to balance wholesale market price fluctuations against considerations of price affordability
(d) failure to ensure robustness under alternatives, including extreme conditions
(e) failure to provide for any mechanism of demand side management and
(f) failure to promote distributed generation.

• **Inadequate internal preparations within utilities for commercialization and possible privatisation** — resulting in under-performance and inadequate sale prices.

Often, it is left to the regulator to fill in the gaps and to interpret the rules. Perhaps it is little wonder that many ESI reforms have failed to fully achieve their intended purpose.

**Effect on private investors**

These deficiencies have also contributed to frequent “changes of heart” by private investors — resulting in consolidation of investments in some jurisdictions, disinvestments in others and an increasing reluctance on the part of new investors to risk their capital in any jurisdictions which do not offer regulatory certainty.

As mentioned in section 2.4 of this report, the World Bank recently suggested that private investors can be expected to be more discriminating than in the mid-1990s. However, the consulting team believes it is already plainly evident that investors in the electricity sector have become more risk-averse.

**Road blocks**

Risks are necessarily associated with ESI reform because the outcomes of change are not always predictable, particularly if a competitive market is one of the reform strategies. Risks which are not properly identified, quantified and managed within a reform program will likely become “road blocks” if they are perceived by stakeholders, particularly governments and investors, as actually or potentially threatening.

The consulting team emphasized at the Cebu workshop the value of a reform implementation monitoring capability as a means of managing ESI reforms:

> *If you lack a capability for substantiating the success of your ESI reforms – if, for example, you cannot justify any loss of jobs that may occur – the reform program may suffer a political backlash. If that occurs, the reform program will be at risk of arbitrary political intervention, one of the greatest fears of investors.*

An obvious conclusion is that top-down, one-dimensional, micro-economic reform of the ESI does not fit the needs of most APEC economies, particularly the fundamentally different needs of developed and developing economies. We return to the subject of reform monitoring in section 11 of this report.

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29 World Bank, supra, footnote 10.
9. Adopting and Implementing ESI Reform Strategies

In discussing ESI reform, we prefer to talk in terms of strategies or initiatives, rather than "models" or things to be mimicked. The adoption and formulation of a particular reform strategy will naturally depend on what reform outcomes a government wishes to achieve and the sequence it wishes to pursue. Five suggested ESI reform strategies are listed in table 6 below.

TABLE 6: SUGGESTED ESI REFORM STRATEGIES

<table>
<thead>
<tr>
<th></th>
<th>Establish predictable professional regulation (see section 9.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Governments can establish a predictable system of professional regulation, which simulates market outcomes</td>
</tr>
<tr>
<td></td>
<td>• This can be achieved either by contract or by legislation</td>
</tr>
<tr>
<td></td>
<td>Separate transmission (see section 9.2)</td>
</tr>
<tr>
<td></td>
<td>• Transmission can be separated relatively easily and with no regrets</td>
</tr>
<tr>
<td></td>
<td>• A non-discriminatory, open access regime can then be established to allow generators and distributors to have access to the transmission grid</td>
</tr>
<tr>
<td></td>
<td>Carry out enterprise-level reforms (see section 9.3)</td>
</tr>
<tr>
<td></td>
<td>• Reforms at the level of the individual enterprise do not carry the glamour of other reform options</td>
</tr>
<tr>
<td></td>
<td>• These reforms carry great potential for gains in economic efficiency</td>
</tr>
<tr>
<td></td>
<td>Attract private investors (see section 9.4)</td>
</tr>
<tr>
<td></td>
<td>• To reduce the drain on the public purse, the private sector can be invited to develop new infrastructure or to purchase existing assets</td>
</tr>
<tr>
<td></td>
<td>• Competitive procurement procedures should always be utilized</td>
</tr>
<tr>
<td></td>
<td>Prepare the ESI for a competitive future (see section 9.5)</td>
</tr>
<tr>
<td></td>
<td>• Set up a potentially competitive industry structure, first by separating transmission, then by splitting up the generation sector into potentially competitive business units and nurturing a general competitive environment</td>
</tr>
<tr>
<td></td>
<td>• In proceeding further, a competitive electricity market cannot evolve by itself — a market has to be created by appointing an independent system operator and by introducing rules to facilitate competitive trading</td>
</tr>
<tr>
<td></td>
<td>• Competitive power pools are unsuited for developing countries in the early stages of reform</td>
</tr>
</tbody>
</table>

Each of these five reform strategies is discussed separately below.
9.1 A Predictable System of Professional Regulation Which Simulates Market Outcomes

Market outcomes can be simulated in regulation by applying benchmarked pricing and service levels. This transforms monopolistic utilities into price and service level “takers” (and not “makers”), which is parallel to what happens in effectively competitive markets.

A predictable system of professional regulation is a key element in attracting private investors in the ESI. For investors in network businesses, predictability is an essential requirement. Predictable network regulation involves three elements:

(i) **Proper regulatory balance** — the interests of all industry participants and of consumers at large must be taken into account. There must be a proper balance and the regulatory system should not be excessively intrusive lest it drive investors away.

(ii) **Regulatory accountability** — the regulator must always act diligently and be kept properly accountable; there is a need for firm legal control to limit any tendency on the part of the regulator to exercise individual discretion.

(iii) **Regulatory review** — equally important as regulatory accountability is the occasional need to review the regulations themselves — to ensure they are achieving the desired policy goals. People cannot comply with regulations if they cannot understand them and they will not want to comply if the regulations are at odds with common sense. Because they are legally accountable for the correctness of their decisions, regulators tend, understandably, to be unwilling to depart from the strict parameters of the regulations under which they operate, even where the merits of doing so may be apparent. Therefore the regulations themselves must be occasionally reviewed and, if they are not doing their job, they should be scrapped and replaced. This task remains the responsibility of governments.

As with the establishment of the transmission utility itself, there are two ways of establishing a system of professional regulation: the government either can negotiate a regulatory contract with the transmission utilities or it can legislate to hand over regulatory responsibility to an independent regulatory agency. With either option, the regulatory procedures need to be both transparent and efficient.

9.2 Separation of Transmission

In addition to enterprise-level reforms, described in the following section, the safe, “no regrets”, ESI reform strategy for any economy is to separate the electricity transmission function from generation, not to start by introducing competition in generation.

Even if it is never intended to establish competition at the generation level, or at any other level in the industry, this recommendation is almost invariably appropriate in any jurisdiction that does not already have a separate transmission utility. Some economies might never need to take another step in the reform process until this first initiative has been successfully taken.

It is possible for the incumbent utility to establish a separate transmission business without the requirement of legislation. In that way, much of the controversy that arises
with legislative reforms can be avoided until after a system of contract-based reorganisation and regulation has been trialled.

There are various degrees of separation: the closest is financial “ring fencing”, where all of the transmission assets, liabilities, costs and revenues are isolated and separately accounted for. This rudimentary reform can be followed by managerial separation, by the establishment of a subsidiary and, before long, by full legal separation.

Two consequential requirements arise from this “no regrets” stage of industry reform, irrespective of the degree of separation:

(i) Obligation to serve — because transmission assets are vital arteries for everyone who depends on electricity, and for economies as a whole, transmission service operators need to be legally compelled (via a system of licensing and technical and economic regulation) to provide proper service. This will require transmission service operators to:

• provide a transmission system which is secure, efficient and reliable (ensuring that network assets are reasonably secure against acts of sabotage);

• guarantee non-discriminatory access to everyone who needs transmission service, especially all new market entrants;

• carry out all necessary line maintenance and augmentation in a timely manner; and

• progressively enhance the capacity of the transmission system, in line with forecast increases in demand, to ensure the system remains unconstrained.

It is convenient to mention at this point that similar requirements should also apply to the operators of distribution networks.

(ii) Economic regulation of transmission and distribution networks — transmission and distribution service providers must be given economic incentives which are commensurate with their service obligation. If, by more efficient operation, by investment in additional or replacement equipment or by augmentation of capacity, they provide an enhanced transmission and distribution service, they must be allowed to recover their costs of doing this over an appropriate period. On the other hand, they cannot be allowed to exploit other industry participants or consumers by charging exorbitant, monopolistic prices (“monopoly rents”).

The issue of what is the best approach to the economic regulation of electricity transmission and distribution networks is a vexed one which could easily occupy several additional papers. This is not just an academic issue of whether performance-based regulation is “better” than cost of service regulation. As highlighted earlier, almost half of the cost of delivered electricity in many modern electric power systems is attributable to the natural monopoly services of transmission and distribution, not to generation, and these services can never be exposed to serious competition. As soon as transmission is separated and as soon as network tariffs are unbundled,
seemingly-endless and sometimes bitter arguments will start between providers and users of these services. The users typically will exert pressure on the economic regulator to protect them against imposition of monopoly rents, whether this is real or just apprehended.

The explanation for these arguments is the complete lack of symmetry between (1) what present users may consider to be the “value” of current service and (2) what network providers actually need to invest in order to maintain and augment a secure and reliable network for the use of all existing and potential future customers. It is emphasized that system security and stability should **always** be the paramount consideration.

Despite any arguments between users and network providers, all industry stakeholders will eventually develop a more realistic appreciation of their respective positions after transmission has been separated. Separation of transmission also sets a sound platform for further reforms when they are appropriate.

### 9.3 Enterprise-Level Reforms

Enterprise-level reform options are much less glamorous than other ESI reform options but can provide the benefits of better enterprise focus, better pricing, commercialization, corporatization, business development enhancement, privatization and external optimization. Again, this is a subject which could easily occupy several additional papers. Some of the actions that can be taken under each of these headings are listed in table 7 below.

**TABLE 7: SOME EXAMPLES OF ENTERPRISE-LEVEL REFORMS**

<table>
<thead>
<tr>
<th>Better Enterprise Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Defined business units are established</td>
</tr>
<tr>
<td>• Expenditures are related to revenues to promote accountability</td>
</tr>
<tr>
<td>• Accrual accounting is introduced</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Better Pricing (User-Pays)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• User-pays is introduced to better manage the use of scarce resources</td>
</tr>
<tr>
<td>• Politically-inspired cross-subsidies are replaced</td>
</tr>
<tr>
<td>• Previously non-transparent economic transactions are revealed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commercialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shareholder “value added” emphasis begins to appear</td>
</tr>
<tr>
<td>• Profit centers may be deployed throughout the organization to promote commercial behavior</td>
</tr>
<tr>
<td>• Commercially oriented internal business units replace former departments</td>
</tr>
<tr>
<td>• Finance and accounting systems are remodelled along commercial lines</td>
</tr>
<tr>
<td>• Employee conditions are renegotiated to embody a more commercial and efficient culture</td>
</tr>
<tr>
<td>• Internal resources are re-aligned into core and non-core, with the latter becoming subject to competition and outsourcing</td>
</tr>
</tbody>
</table>
### Corporatization

- Separate incorporation occurs
- The utility is provided with a governance structure, objectives and accountabilities of a commercially incorporated company
- A shareholding framework is established
- Political interventions are made transparent and accountable
- Commercial rates of return are expected to be earned from funds employed
- Dividends become payable
- Political cross-subsidies become funded from government sources
- Efficiency benchmarks are imposed for both recurrent and capital operations
- Competition becomes permissible

### Business Development Enhancement

- Key competencies become recognized as commercially valuable
- Entry into new markets is allowed as competition intensifies
- Value-adding services in addition to traditional activities are recognized as commercially valuable
- Alliances with other commercial entities are allowed to leverage new competitive strategies
- Joint ventures and partnerships begin to be considered
- Business development becomes recognized as a necessity to earn commercial returns and to offset competitive inroads into traditional activities

### Privatization

- Emphasis is given to facilitating a competitive market in order to avoid privatization of monopolies
- Further internal organization and process re-design occurs to enhance competitiveness in readiness for sale
- Sale can be complete or partial
- Complete sale can be by trade sale or share issue
- Partial sale can be through joint ventures, regional franchises, specific service franchises, management contract, build-own-operate arrangement or outsourcing
- A privatization plan is developed
- Offers are evaluated, due diligence and contractual arrangements are completed
- Sale is implemented

### External Optimization

- Previous internal optimization gives way to external optimization; that is, in the market
- A decision is made whether to be a niche or large-scale “market player”
- Markets become national and international
- National and international branding occurs
- Back office functions (previously considered core) are outsourced and merged for economies of scale
- Mergers and acquisitions take place to achieve economies and effectiveness of scale
9.4 Attracting Private Investors

As indicated very early in this report (in section 2.4), the need to attract new investment is a vital ongoing need in all APEC economies and is of itself a key purpose of micro-economic reform of the ESI. The historical fears of foreign capital are dissipating amongst APEC economies. However, investors in the ESI are easily scared away by regulatory or market uncertainty.

Generation sector investment

The consulting team emphasizes that, contrary to oft-heard claims, high peak prices in a competitive electricity market do not provide dependable “price signals” at a sufficiently early stage to reliably attract requisite levels of generating capacity investment. The linkage is very tenuous because there are so many other related and unrelated considerations (including political, regulatory and environmental issues) which investors will weigh before they make major long-term investment decisions. Investment in hydro-dependent systems, for example, will not increase simply because droughts occur from time to time. Recovery of invested capital is very uncertain for any new peaking unit. Governments may still need to be ready to step in as investors of last resort (see the New Zealand case in box 1 of section 5.2).

IPPs and merchant power plants

The continuing importance of IPPs has been referred to in section 3. If there is no excess generating capacity in a market, creating competition to invest in new generating capacity will be a more important priority than trying to create competition amongst existing generators.

The rate of take-up of investment in “merchant power plants” has failed to meet earlier expectations. It is apparent that, in all APEC economies, investors and lenders will continue to expect long-term power purchase agreements from creditworthy offtakers before they put their capital at risk in long-term, capital-intensive generation investments. Generators simply must have creditworthy, dependable, long-term customers, who will need to come mainly from the ranks of distribution (or “load-serving”) utilities.

Privatization

Where market reform involves the selling of state-owned assets, there is always an important public interest in maximizing the proceeds of sale (in some parts of the world, there have been some scandalous cases of privatizations for less than full value).

In some early privatizations (for example, in the Australian State of Victoria), investors paid very high prices for generating plants before they understood the extent to which

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30 It has also been pointed out that “... rainfall does not increase in response to high electricity prices,” Frank Wolak, “Designing Competitive Wholesale Electricity Markets for Latin American Countries”, OECD/IADB Forum on Latin American Competition, Paris, France, 2003.

31 “What will replace the merchant model for power generation remains to be seen but it is likely to be founded on a central role for the load-serving utilities. At a minimum, regulatory commissions will encourage or compel them to enter into contracts for capacity sufficiently in advance of need so that shortages do not arise ... and power prices do not reach the astronomical levels that would result if shortages began to materialize”, Jacob J Worenklein, “The Global Crisis in Power and Infrastructure: Lessons Learned and New Directions”, Journal of Structured and Project Finance, Spring 2003 p 8.
subsequent competition in generation would depress revenue. Investors nowadays are much more wary.

Some governments have down-played plans to introduce competition in generation until state-owned assets have been sold, thus maximizing values, and have then introduced a competitive electricity market to lower prices for the electorate. There is obviously a need for governments to be very open about all contemplated structural and regulatory reforms at the time of privatizing state-owned assets.

**Transmission and distribution sector investment**

It has become a matter of common belief that investment in essential public infrastructure, such as transmission and distribution networks, is relatively risk-free because of their natural monopoly character and the absence of competition. In the short term, this is usually true. In the longer-term, however, owners of these assets must expend substantial capital in maintenance, upgrading and augmentation to ensure their continuing reliability. If regulators, by capping network tariffs at artificially low rates, do not permit asset owners to fully recover these expenditures in a timely manner, the profitability of network investments can be jeopardized, essential capital works are likely to be deferred and power system security can be undermined. See again the earlier discussion of economic regulation of transmission and distribution networks in section 9.2.

**9.5 Preparing the ESI for a Competitive Future**

Most vertically integrated utilities can be more economically efficient if they are “unbundled” into generation, transmission and distribution/retail utilities and if the unbundled parts are then run along commercial lines. However an unbundled electricity industry structure is not necessarily more efficient than a vertical monopoly in every economy — there may be isolated or smaller power systems in some economies where a vertically-integrated structure should remain as the preferred structure; that is, where the additional transaction costs of a competitive structure will exceed the efficiency gains.

In any case, a competitive electricity market cannot evolve by itself — it must be created by disaggregating (splitting up) the ownership of the power stations, by appointing an independent system operator and by introducing market rules to regulate competitive trading.

**Designing a competitive electricity market**

If a government decides to move to the stage of creating a competitive electricity market, the first requirement is to thoroughly understand what is required and to keep the design simple.

In 2001, a World Energy Council (WEC) study on electricity market design identified a number of flaws in the design of markets in Asia-Pacific and other countries. They were not your typical flaws, in the sense of mistakes about technical issues, but were more fundamental errors resulting from a mismatch between market reform objectives and the excessively complex models that were often chosen for the introduction of competition.32

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32 World Energy Council, “Electricity Market Design and Creation in Asia Pacific,” London, UK, 2001. The author of this study was Graham Thomas of GT Power Consultants of the UK; the study committee was chaired by Robert Pritchard of ResourcesLaw International.
Much of electricity industry reform seems to have been focussed on the top-down, one-dimensional approach of mandating competition in the generation sector without proper acknowledgement of what this might actually require. According to the WEC study (with which the consulting team agrees), the successful introduction of competition in generation has at least seven preconditions:

(i) **An attractive investment environment** – competition in generation always depends on having generating capacity which exceeds demand. Attracting the investment to maintain excess capacity is a basic requirement for the success of a competitive market (see again the discussion in section 9.4).

(ii) **Reserve plant margin (excess generation system capacity) of between 20–25%** – sustained competition is always vulnerable to a generator not being able to operate for the bidding period concerned. Ideally, therefore, excess generation system capacity should always be greater than the capacity of the largest generator.

(iii) **Many competing generators** – the exact number depends on the similarity of the competing generating plant. As price setting occurs throughout the full demand range, there need to be competitors at every demand level. For plants utilizing the same fuel source and with similar cost structures (rarely the case in reality), five competitors would be the minimum number.\(^3^3\) For dissimilar plant, no competitor should represent more than 10% of the total capacity.

(iv) **High current prices in generation and supply** – prices must be high at the commencement of the market. If prices are close to or even below production cost, the introduction of competition, which itself has a cost, is likely to raise prices. In such circumstances, unrestrained competition may be dangerous for many end-users unless there are market-modifying measures to take account of social impacts.

(v) **The will to lower electricity prices** – if a country does not actually want to lower prices, because it has a need for steady or higher prices, to pay off debt or to add to generating capacity, there is little point in introducing competition; there are simpler ways, such as price regulation, of achieving the desired price profile.

(vi) **Easy access to the grid** – obviously, the difficulty of negotiating satisfactory conditions for transmission services must not present a barrier to new generation entrants.

(vii) **A well-connected or unconstrained grid** – there must only be minor constraints in the transmission grid. Transmission constraints will give rise to different competitive zones ("market-splitting"). Generators who are sheltered by a transmission constraint will be able to extract higher prices.

\(^3^3\) Other studies suggest that even greater numbers are required for effective competitive conditions to apply.
The APEC consulting team considers that a competitive power pools are especially unsuited for developing countries in the early stages of reform.\(^{34}\)

Even in developed economies with adequate generation capacity, “full” competition in generation will not be possible in the absence of only one of the above seven preconditions, although obviously some competition will be achieved.

**Market models**

There are two main market models which, with variations, have been used in ESI reform:

(i) **Compulsory pool with system marginal price** — this model was the first to be used in electricity market reform. It has been replaced in the UK and California but has been relatively successful in Australia. Generators and all wholesale suppliers must bid into the pool. A capacity element can be included.

The WEC study reported that frequent price setting adds greatly to complexity and cost, especially in terms of the information systems needed and new metering. It found the system required to operate the UK’s former compulsory pool to be more complex than the London Stock Exchange’s trading and settlement system.

The cost of frequent price setting is difficult to justify because, typically, only some 5% of customers can respond to short-term price signals. Special arrangements can be made for this 5% without burdening the whole market with the complexity of real-time or short-interval pricing.

(ii) **Bilateral contracts market with dispatch priority and system balancing** — this model became popular in the mid to late 1990s. Its origins lie in Scandinavia and in the Eastern region of the United States. This model has now been adopted in the UK and has recently been endorsed by the US Federal Energy Regulatory Commission as the basis for their “standard market design”.

The bilateral contracts model is more straightforward and simple. Bilateral contracts allow generators to plan ahead in a more informed way and allow customers to do the same, accommodating and negotiating their respective concerns in a more realistic way than compulsory pools allow. Competition is more aggressive than in mandatory pools because a physical contract must be won in order for plant to be dispatched.

Longer bidding periods add to the competitive pressure on generators. If the bidding period is a season or year, the market risk is high and the generator’s incentive to bid prices close to costs is also high. On the other hand, with half hour or daily bids, a generator can always hope to operate in the near future.

\(^{34}\) “For developing countries with fast-growing power demands that exceed the available supply capacity for the foreseeable future, the persistence of large supply shortages also rules out the possibility of competitive power pools because the development of competition requires adequate supply capacity to meet all segments (base, peak and shoulder) of the load on the power system,” R W Bacon and J Besant-Jones, supra, footnote 15.
Delinking dispatch from price setting

Under either of the two main market models, the consulting team agrees with the recommendation of the WEC study that generation dispatch and price setting should be considered independently. The purpose of dispatch is to meet demand within the set stability and frequency parameters, taking into account transmission constraints.

The information needed for dispatch is plant availability, the technical parameters of the plant and the transmission system, and costs to determine a basic merit order and non-merit order requirements. Although dispatch needs to be carried out in real time, the information required for dispatch does not change frequently and relatively simple information systems can be used. Even where costs tend to be quite stable, price volatility is more often due to market opportunities than it is to changes in underlying costs.

Dismantling other anti-competitive barriers

In restructuring and preparing the ESI for a competitive future, other anti-competitive barriers need to be systematically identified and dismantled. Each economy will have its unique features but some of the more common reforms include:

- introducing penalties against those networks which apply anti-competitive or discriminatory treatment against other industry participants
- requiring competitive tenders for construction and operations and
- eradicating corruption by the enactment of anti-corruption laws and by mandating transparent procurement procedures.\(^{35}\)

Market power and the inadequacy of competition laws

There is nothing \textit{per se} illegal about firms possessing market power, or even monopoly power, but the issue of how to prevent the abuse of market power in volatile markets such as electricity raises a serious legal difficulty. Where parties collude to fix prices at artificially high levels, traditional competition laws, which depend on proof of evil intention by the colluders, are ill-suited to the regulation of electricity markets.\(^{36}\)

Parties are only prosecuted if it can be proven that their purpose is to damage one or more of their competitors or to deter them from competing in the market. Parties are not prosecuted merely for maximising their sale prices, unless they can be shown to have colluded.

Because electricity cannot be stored and demand is inelastic, electricity markets are uniquely volatile and price spikes regularly occur. When this happens, by monitoring generator outage rates and changes in generator bidding patterns, regulators try to see if anything unfair has occurred. Traditional competition laws do not work in electricity markets and electricity regulators may need special powers to intervene.

Dealing with stranded costs


Prior investments or commitments, which could be recovered under pre-reform conditions, may not be recoverable following market reform. Fair arrangements to deal with such "stranded costs" are called for, although such arrangements will always distort competition to some extent. This report does not discuss how to deal with stranded costs, except to comment that the issue is much easier to manage in the case of government-owned entities than it is in the case of IPPs.

9.6 Combining Economy-Wide and Enterprise-Level Reforms

All potential micro-economic reforms are linked to a greater or lesser extent. They can be combined in a way that is reinforcing but, if this is not done well, it can be divisive.

The various combinations of reforms (that is, at industry and enterprise levels) are illustrated in table 8 below with the value-adding combinations indicated as low, medium and high.
TABLE 8: MICRO-ECONOMIC REFORM OPTIONS — LIKELY VALUE CREATION

<table>
<thead>
<tr>
<th>Industry reforms</th>
<th>Vertical Integration</th>
<th>Competitive Acquisition of New Capacity</th>
<th>Competitive Wholesale Market</th>
<th>Full Retail Contestability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise reforms</td>
<td>Create focus</td>
<td>Poor focus, i.e. no separation of: generation, transmission, distribution</td>
<td>It finances new investment but may or may not be economical</td>
<td>Creates acute focus on profitable generation</td>
</tr>
<tr>
<td></td>
<td>Better pricing: eg reflective of resources used</td>
<td>Higher prices, but likely cross subsidies which could be policy</td>
<td>Prices may go up due to factoring in cost of capital</td>
<td>Could lower prices but unpredictable</td>
</tr>
<tr>
<td></td>
<td>Commercialization</td>
<td>Provides business tools by which to better manage</td>
<td>Provides business tools by which to better manage</td>
<td>Provides business tools by which to better manage</td>
</tr>
<tr>
<td></td>
<td>Corporatization</td>
<td>Provides accountability - if benchmarked</td>
<td>Helps in counter-party contractual relationships</td>
<td>Needs unbundling of generation, transmission &amp; distribution</td>
</tr>
<tr>
<td></td>
<td>Business Development</td>
<td>Limited competition allowed in (outsourcing) and out (new ventures)</td>
<td>Incumbent utility may take stake in IPP</td>
<td>• Retail &amp; generation likely to converge • So will networks</td>
</tr>
<tr>
<td></td>
<td>Possible privatization</td>
<td>Privatized monopolies are hard to regulate</td>
<td>Introduced IPPs will be private</td>
<td>Private investment is better in markets</td>
</tr>
<tr>
<td></td>
<td>External optimization</td>
<td>Creates effectiveness of size, good platform for international growth but may not be efficient</td>
<td>International bids are usually called</td>
<td>Not relevant</td>
</tr>
</tbody>
</table>

The above table illustrates that the combination of vertical integration and private ownership is unlikely to yield high values (to customers).

Enterprise reforms, particularly of corporatization and commercialization, supported by the superior focus provided by unbundling of generation, transmission and distribution functions (possibly in a subsidiary company arrangement) are likely to yield high values and are appropriate to whatever industry-level reforms are likely to be introduced. Value yielding is facilitated by economic incentives based on benchmarking.

The table also illustrates where value-yielding micro-economic reform of the ESI can commence in advance of the introduction of a competitive electricity market.
10. Project-Managing ESI Reforms

Having agreed on the nature and extent of the reform program, ESI reformers need to manage and schedule its implementation (as well as to monitor progress as discussed in the following section). Application of a traditional project management approach is appropriate, as illustrated in table 9 below:

**TABLE 9: A PROJECT MANAGEMENT APPROACH**

As may be interpreted from the above table, an ESI reform program needs to be:

- scoped with an initial (framework) plan
- planned in detail with appropriate resource allocations and
- implemented, including with resource scheduling and control.

Who is to be made responsible for project-management of each reform step obviously depends on the nature of the step and the capacity and experience of the personnel available. A mixture of internal and external resources is usually appropriate. An important part of the project management approach is to have an implementation schedule. However, this scheduling will be determined by the actual implementation approach adopted which will in turn depend upon local circumstances and will vary from economy to economy.

We again emphasize the highly political nature of ESI reform. Inadequate management of the politics of the reform process has been responsible for ill-defined and over-ambitious objectives, causing many stops and starts.
11. Monitoring ESI Reform Progress

If an ESI reform implementation monitoring capability is to be installed in an economy, a number of questions arise:

- what reliable measurements can be used for the purpose?
- how can you measure something as vague as "reform success"?
- how can you measure whether an industry sector is efficient or not?
- how is productivity to be measured?
- without reliable and commonly understood measurements, how can a government really be sure that public welfare is being improved by a micro-economic reform process?

Governments understandably have been reluctant to take comprehensive action to remedy structural or regulatory difficulties until they have fully understood the problem and have developed confidence in the likely outcomes of remedial action. Instead, they have tended to take short-term interventionist action. This tendency is likely to continue unless governments employ reliable mechanisms by which they can evaluate the progress of their industry reform programs.37

At the Cebu workshop, the APEC consulting team demonstrated a user-friendly PC-based system for measuring and tracking ESI reform success known as the "Pritchard-Smiles Reform Monitor". Such a system focuses upon monitoring key performance outcomes both in a past and prospective sense; that is, past and current year performance and projected future year performance.

**Functions of a monitoring system**

An ESI reform implementation monitoring system:

- will identify core targets for micro-economic reform of the ESI
- will promote easy-to-understand communications
- will provide stakeholder control over the reform process, and
- will hold planners, implementers and operators accountable for achieving required results.

**Monitoring system design philosophy**

The design philosophy underpinning a monitoring system is that governments can underpin reform success by establishing a high-level core capability for planning, co-ordinating and monitoring reform implementation, by deploying all detailed capabilities outside the core and by allocating accountabilities for outcomes.

37 ABARE has succinctly expressed this principle: “…to judge outcomes, it is necessary to understand what the reform process is trying to achieve,” ABARE, supra, footnote 5, p 37.
The design philosophy of a monitoring system is depicted in table 10 below. This depicts the central planning and reform monitoring function located at the core with all responsibilities for implementation and all resources for the detailed and more complex areas of reform deployed outside the core.

### TABLE 10: DESIGN PHILOSOPHY OF A REFORM MONITORING SYSTEM

Centralize planning, deploy complexity

The eight consecutively numbered reform areas depicted outside the core in the above table correlate with the eight groups of APEC’s Strategic Principles depicted in table 2 on page 15 of this report. Naturally, the precise allocation of responsibilities in a particular economy will depend on the reform strategies chosen and on the institutions available, or to be established, to take responsibility for implementation.

The function of the central planning and reform monitoring unit is not to be responsible for setting policy objectives (which remains the responsibility of governments) nor is it to be responsible for implementing or managing the reforms (which becomes the responsibility of industry participants and designated entities); rather, it is to monitor what is done, or should be done, by others and to regularly publish the results. This provides important feedback for government and for industry participants on how the reforms are progressing by reference by pre-determined and transparent criteria.

The monitoring unit’s position on the reform implementation template is illustrated in table 4 on page 25 of this report.
Criteria for monitoring ESI reform

As emphasized earlier, system security and stability must always be the paramount consideration in decisions about ESI reform.

Six criteria called key performance indicators (KPIs) have been chosen to illustrate how micro-economic reform outcomes can be measured and monitored, as depicted in table 11 below. Some KPIs are technical; others are financial. The list is not by any means exhaustive. Each KPI can be used separately or can be aggregated with others to provide an overall “score”.

TABLE 11: KEY PERFORMANCE INDICATORS FOR MONITORING ESI REFORM

A monitoring system works by comparing actual results achieved to date and prospective results with the benchmarks and targets embodied in an economy’s ESI reform program.

Other criteria which are commonly used include GDP gains, capacity utilization, system load factor, fuel supply availability, fuel costs, thermal efficiency, labor productivity, network losses, debt to equity ratio, and other financial indicators. The indicators chosen should be unambiguous and easy to communicate.
Different rates of future improvement in the various KPIs can be utilized in a monitoring system in order to identify the pace and extent of changes required to achieve individual and collective micro-economic reform targets. This information can then be deployed (in increasing detail, as may be desired) both upwards to politicians and government officials and downwards to those who are to be held accountable for actual implementation of the reform.\(^{39}\)

By developing common benchmarks, APEC economies would not only be able to monitor their own ESI reform performance by reference to their own performance criteria but would be able to compare their relative progress with neighboring economies. This would be of advantage when the opportunity arises for interconnection and cross-border electricity trade.

\(^{39}\) Without over-simplification, it is possible for ESI reform progress to be regularly reported in chart form to everyone including political leaders, industry participants, consumers and people still without access to electricity. Further information on monitoring systems can be found in the consultants’ report on the Cebu workshop: Peter Smiles et al, supra, footnote 4.
12. Overall Conclusions and Recommendations

This report has reviewed the APEC micro-economic reform program for the ESI and has recommended a number of future directions.

Reform problems requiring attention

A number of crucial reform problems require attention: these include the trend of following fashion and mimicking “the best model”, the stop-start nature of the reform process, legal impediments, flaws in market design and changes of heart by investors.

In developed economies, the focus of reform has been primarily to improve efficiency and there have been major gains in this regard. However, even in developed economies, there have been many stops and starts.

In the developing economies, the original and on-going need for micro-economic reform is to address deeper and more chronic issues of under-investment, other inefficiencies, poor governance, poor regulation, unaffordable pricing, very high demand growth and adverse environmental outcomes. In this context, traditional power sector structures and processes inherited from previous times do not have the capabilities to effectively or efficiently bring about the huge expansion in infrastructure required in the coming decades for these emerging economies.

Summary of conclusions

The consulting team have reached some broad but firmly-held conclusions as set out in the Executive Summary. In summarizing these conclusions, we would like to emphasize the following:

- The most rudimentary point is that governments remain responsible for the outcomes of ESI reform, irrespective of any changes in industry structure and ownership. This is a fundamental responsibility which cannot be left to a regulator.

- ESI reform must be individually tailored to each economy according to its particular needs, resources and circumstances and its stage along the reform path.

- Notwithstanding the efficiency gains to be derived from ESI reform, the overriding principle must always be the maintenance of the security and stability of the entire power system. This is what differentiates reform of the ESI from reform of other industries.

- Attracting private investment is a vital ongoing need but, since the mid-1990s, private investors in the ESI have become more risk-averse. Today, it is less safe for governments to assume that their “reformed” electricity sectors will attract the requisite level of private investment. In particular, underpricing of electricity destroys the incentive to invest in essential infrastructure and is unsustainable.

- As became apparent from the Cebu workshop, “a lot of valuable reform experience gets lost”. Trapping this experience, and being able to tap into it when desired, is an important element of institutional strengthening and capacity-building for all APEC economies.
**Reform implementation methodology**

In the absence of any “reform standard”, an objective-setting, measuring and monitoring system is a pivotal element in managing ESI reform. Such a system can assist governments to establish realistic reform targets and can enable them to measure and monitor performance in achieving desired outcomes. A monitoring system can also promote common understanding of reform targets amongst all stakeholders, in addition to providing potential investors with an indicator of rationality.

This report has outlined a five-step reform implementation methodology which can be adapted for each APEC economy. These steps comprise:

- setting clear national energy policy objectives
- identifying reform risks and “road blocks”
- adopting and implementing realistic reform strategies
- ensuring the reforms are project-managed, and
- establishing a central unit to regularly monitor reform progress.

A template for implementation of ESI reform is provided in table 4 on page 25.

**Recommendations**

There is a need to continue to build common understanding and institutional capacity in the operational aspects of micro-economic reform of the ESI amongst APEC economies. The consulting team therefore puts forward four recommendations:

1. The 1997 APEC *Manual of Best Practice Principles for Independent Power Producers* remains valid and should continue to be promoted amongst APEC economies;

2. The 2001 APEC *Manual of Strategic Principles* for micro-economic reform of the ESI should also continue to be promoted amongst APEC economies;

3. Each APEC economy should fashion an ESI reform implementation methodology for its particular needs, which can be based on the five steps outlined above; and

4. The APEC Energy Working Group should consider developing regional performance indicators to monitor the progress of ESI reform.

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Appendix

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