IAEE INTERNATIONAL ASSOCIATION FOR ENERGY ECONOMICS

IAEE Newsletter

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Second Quarter 2004

President's Message

As you receive this edition of the *Newsletter* we will be very close to the Iranian affiliate's conference in Tehran, taking place on May 25-27, under the enthusiastic Chairmanship of Majid Abbaspour. Despite the U.S. Administration's refusal to permit the IAEE to sponsor this conference, registrations have exceeded expectations and Reza Farmand and his program team have provided a stimulating and wide-ranging collection of topics (see links to the IRAEE from the IAEE web site). I hope to see you there, for *Energy and Security in the Changing World*.

Indeed, energy security appears to be the flavour of the day, again. However, for those of us who remember energy market events of 30 years ago the banner may read the same, but today's issues encompass a far greater range and complexity of concerns. In fact, it may not be too much of an exaggeration to state that the resilience of energy systems to extreme events is a major problem confronting contemporary industrialised society. So it comes as no surprise to find that many of the plenary sessions at the 24th Annual North American conference of the USAEE/IAEE in Washington, July 8-10 this year, address (either explicitly or implicitly) questions of energy security, reliability, availability, and so on. The topic re-surfaces later in the year, dominating the theme of the Czech affiliate's conference in Prague, November 22-23, *Critical Infrastructure in the Energy Sector: Vulnerabilities and Protection*.

The Swiss affiliate has designed an outstanding program for its *Modelling in Energy Economics and Policy* conference in Zurich, September 2-3, with an impressive list of speakers already confirmed. This is not just a conference for energy econometricians, it's for all IAEE members who want to understand how markets, and particularly non-conventional energy and environmental markets, should work (but often do not).

Further details of all of these conferences can be found elsewhere in this Newsletter and/or on the IAEE web site.

The Council of the IAEE will be meeting immediately before this year's North American Conference in Washington. Comments and suggestions (or even constructive criticism) on all aspects of the Association's current and longer-term strategies and objectives are most welcome. In particular, Council is interested in receiving comments on services it currently provides, and suggestions for new or expanded services for members. Your ideas and views can be sent directly to IAEE Headquarters via iaee@iaee.org.

Tony Owen

Editor's Notes

Erling Mork takes issue with Ferdinand Banks' article in the First Quarter 2004 issue of the *IAEE Newsletter*, denigrating the Nordic Electricity Exchange, Nord Pool. He defends Nord Pool, noting that while it is not perfect, it has stood the test of time and should improve in the future.

Tony Baldwin explains why electricity market price volatility is not a flaw, but an inherent part of an efficient electricity spot market. The flaw is failing to hedge against it. He goes on to make the point that the main reason for moving to a market is to improve economic and environmental performance. A spot market ensures that cheaper generation is used ahead of more expensive sources.

Paul Tempest traces the history of Qatar in the framework

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Editor's Notes *(continued from page 1)*

of the Mid-East oil and gas industry, noting the fundamental difference between oil and gas and how Qatar has moved to the technological forefront in developing outlets for its gas. He notes economic and social welfare factors and some of the geopolitical considerations in concluding that Qatar will play a leading role in the economic development and political stabilization of the Mid-East.

Pierre-Olivier Peneau notes that due to its unique characteristics, electricity has never been clearly categorized, nor included, as a good or a service in international trade agreements. This is about to change, as WTO and FTAA negotiations, both ending in 2005, work on the inclusion of all energy services in the list of services that are up for liberalization. His article explores the mechanisms in which this is done and analyzes the consequences of such a change.

Jon Ludwigson, Frank Rusco and David Walls examine a database of power plant developments in North America and explore the nature of the decision of when and where to build. The development process for new electric generation is long, the early development costs are small but significant; many hazards lurk in the regulatory arena, so ex ante developers plan multiple options for a given development budget. As more information comes available, some options are abandoned sequentially until only projects that will be completed remain.

Jyoti Painuly and Norbert Wohlgemuth report that a lack of financing has been one of the important barriers adversely affecting the widespread use of renewable energy technologies. They discuss problems related to financing these technologies by focusing on the models used in several developing countries, and reviewing some of the lessons that can be learned on accelerating the availability of finance for these technologies.

DLW

FUTURE USAEE / IAEE EVENTS

Annual Conferences

July 7 - 10, 2004	24th USAEE/IAEE North American Conference Washington, DC Capital Hilton
September 2-3, 2004	6th Annual IAEE European Conference Zurich, Switzerland Swiss Federal Institute of Technology
November 22-23, 2004	1st Annual CZAEE International Conference Prague, Czech Republic The Municipal House
June 3-6, 2005	28th IAEE International Conference Taipei, Taiwan Grand Hotel

7th USAEE/IAEE/Allied Social Science Association's Meeting, Philadelphia, PA – January 7 - 9, 2005

The IAEE annually puts together an academic session at the ASSA meetings in early January. This year's organizing committee will be Carol Dahl of the Colorado School of Mines and Fred Joutz at George Washington University.

The theme for the session will be "Volatility in Energy Markets."

Papers presented at the session will be published in the Proceedings of the next North American Conference of the USAEE/IAEE.

The program including abstracts will be posted at www.iaee.org/en/conferences by September 1, 2004.

For complete ASSA meeting highlights and pre-registration information please visit:

http://www.vanderbilt.edu/AEA/anmt.htm

!!!!!MARK YOUR CALENDARS – PLAN TO ATTEND!!!!!

Energy, Environment and Economics in a New Era

24th Annual North American Conference of the USAEE/IAEE
July 8 – 10, 2004 • Washington, DC – Capital Hilton Hotel

Dear Energy Professional:

We are pleased to announce the 24th Annual North American Conference of the USAEE/IAEE, Energy, Environment and Economics in a New Era, scheduled for July 8-10, 2004, in Washington, DC at the Capital Hilton Hotel.

Please mark your calendar for this important conference. Some of the key themes and sessions for the conference are listed below. The plenary sessions will be interspersed with concurrent sessions designed to focus attention on major sub-themes. Ample time has been reserved for more in-depth discussion of the papers and their implications.

A New Era in Oil Market Management?
- Future investment requirements and crude oil prices
- The International Energy Forum: Agenda of producer-consumer dialogue
- Role of intergovernmental coordination in balancing industry investment

Competition in the Electricity Industry?
- International comparisons of privatization and restructuring
- Federalism and competition in North America: States and Provinces
- Competitive strategies

The Price of Balancing the North American Gas Market
- Meeting long-term capital requirements
- Industrial demand destruction
- Implications for energy efficiency, conservation and environmental protection

Impact of Climate (Non) Policy on the Energy Sector
- The impacts of the Kyoto Protocol on the Canadian energy sector
- Climate policy uncertainties and business risks
- Implications for multi-national companies in the United States

International LNG
- Global supply/demand balance
- Frameworks for LNG supply investments
- Impediments to increased LNG utilization

Vehicle Fuel Efficiency
- Policies to reduce petroleum use by passenger vehicles
- Cost-effectiveness of greenhouse gas measures
- Reducing transportation oil use: substitution vs. efficiency?

Russian Energy
- Russia's electricity sector: Can reform be implemented and what will it look like?
- Russia's infrastructure: How will new pipelines and export capacity be developed?
- Developments in Russia's gas sector

Commercial Issues: Operating in Volatile Markets
- Current market developments on energy and environmental trading post-Enron
- Renewable energy trading emissions trading
- Weather derivatives

The Global Energy, Environment and Investment Outlook
- Long-term energy investment outlook
- Energy, environment and developing countries
- Global energy outlook

State & Regional Ascendancy in Energy Policy
- Environmental drivers for states' push on energy policy
- Texas: An unlikely leader on this front
- A state patchwork: Implications for Federal regulation?

Energy Security
- The cost of oil security
- Global oil supply projections – how realistic?
- LNG – will enough be available?

Sustainable Transport
- Projections of transportation demand
- Implications for oil demand
- Urban planning and urban transport

Electricity Reliability: How Much, By What Means, at What Cost?
- How much would different customers pay to avoid an outage?
- What mechanism could work to create a market allowing customers such choices?
- What would this mean for electric industry infrastructure, imperatives and investment?

There are 28 planned concurrent sessions. Given the location of the meeting in Washington, DC, we anticipate a good draw to our concurrent sessions.

Washington, DC is an inspiring city and a great place to begin (arrive early to celebrate Independence Day/July 4th) or end a vacation. Single nights at the elegant Capital Hilton Hotel are $155.00 per night. Contact the Capital Hilton Hotel at 202-797-5820 or 1-800-HILTONS to make your reservations. Conference registration fees are US $570.00 for USAEE/IAEE members and US $670.00 for non-members. Your registration fee includes 3 lunches, 3 receptions and numerous coffee breaks, all designed to increase your opportunity for networking. These prices make it affordable for you to attend a conference that will keep you abreast of the issues that are now being addressed in the energy industry.

Our current program announcement can be found by visiting http://www.iaee.org/en/conferences Please take advantage of the pre-registration discounts and make both your conference and hotel reservations as soon as possible. July in Washington is a celebration! Further information on Washington, DC may be obtained at: http://www.dcregistry.com/sights.html

If you have any questions call 216-464-2785 / usaee@usaee.org. We look forward to seeing you at the 24th Annual North American Conference of the USAEE/IAEE.

Visit the Conference website at http://www.iaee.org/en/conferences

Nord Pool: A Successful Power Market in Difficult Times

By Erling Mork*

Editor's Note:This article is in rebuttal to the article by Ferdinand Banks, *Economic Theory and an Update on Electricity Deregulation Failure in Sweden,* in the First Quarter Issue of *IAEE News,* arguing that Nord Pool has not been particularly successful.

In the new world of deregulated, liberalised and restructured electricity markets, the Nordic market is often considered to be among the best. The Nordic electricity exchange, Nord Pool, considers itself the leading electricity exchange in the world. Yet Dr. Ferdinand Banks writes that Nord Pool is "overpraised" and has many flaws. I am one of the first to admit that the Nordic market is not perfect, as it faces difficulties such as low liquidity, lack of investment and regulatory risk. However, Dr. Banks has portrayed this market in a manner which I feel is undeserved, and in some instances, untrue. I hope to present another perspective on the current state of electricity markets in the Nordic region.

The first point I wish to address is Nord Pool's role in spot and derivative markets. One of Dr. Banks' major points, as he states in his conclusion, is that "...bilateral and other forward arrangements should maintain the dominant role in electricity trading, while conventional futures and options should be minimized...". For Nord Pool an important aspect of the market has been allowing it to trade freely and without undue restrictions both for physical and financial markets. Unlike other markets, such as the initial UK Power Pool, Californian power exchange CALPX and the current Spanish power exchange OMEL, the Nordic spot market has always been based on voluntary participation. Nord Pool's spot market share has grown over the years to about 33% of physical consumption as long-term bilateral contracts have expired and more volume is sent over the spot exchange. The "competition" the exchange faces from bilateral markets encourages it to improve its products, settlement procedures and bidding systems. Far from intending that the Nordic market be a large-scale spot market, as Dr. Banks claims, this physical part of the exchange was intended to exist aside physical bilateral and financial markets.

In the same way, Nord Pool's financial market has grown from the origins of bilateral and over-the-counter markets. Contrasting with many major exchanges, Nord Pool's direct membership approach essentially gives players a choice of whether to trade directly over the exchange or bilaterally. The decision to clear OTC-traded standardised contracts in 1998 was a deliberate choice to encourage liquidity growth in the market as a whole, rather than force liquidity over the exchange. In 2003 about 32% of financial volume was traded over the exchange. Standardised contracts are used for bilateral trading as well. This is why volume figures which sum the total amount traded and cleared, such as those published by *The Economist* (July 26, 2003), are in fact a meaningful measure of market size. Indeed, in 2003, which was a poor year volume-wise, players traded 1743 TWh either OTC or over the exchange. In 2002 the volumes were nearly double. Partially due to this free choice of trading place, we believe the share of non-cleared contracts (exotic derivatives, physically settled contracts, etc.) to be small, less than 5%. This is not a market which is forcing exchange mechanisms where they do not belong. On the contrary, most Nord Pool contracts listed today were initially traded bilaterally.

This explains why Nord Pool lists exchange-traded forwards, an unusual beast in financial markets. While short contracts are listed as futures, long contracts (currently those listed forward two months and up to four years) are listed as forwards. While the degree of standardisation has increased liquidity and volumes, many players in both bilateral and exchange markets find daily cash mark-to-market margin calls difficult to manage for long-term contracts. Note that this does not mean less security: Nord Pool's clearing mechanism ensures that daily losses on forwards are guaranteed by collateral or cash. Dr. Banks raises the question of why we, as opposed to the norm for futures exchanges, need to list derivatives up to several years forward? The answer lies in the nature of the commodity, and as the article points out repeatedly, electricity is unique. Non-storability makes seasonality important, and market players do not have the choice of whether to buy and hold or hedge. Hedging is the only option, so long-term hedging must be available. Liquidity is highest for medium-term forwards, and longer products are currently suffering from thinner markets caused, in part, by high price volatility. This is one of the challenges Nord Pool currently faces.

At this point I must point out that what Dr. Banks refers to as Contracts for Differences (CfDs) or swaps have a very special role in the Nordic market. Basis risk arises, according to Hull, when "the asset whose price is to be hedged may not be exactly the same as the asset underlying the futures contract."[1] In the Nordic derivatives market, this occurs when the futures or forward, which use the *area non-specific* "System Price" as a reference, deviates from the spot price *in a specific geographical area* to which the player is exposed. In not tying forward and futures to a specific area (of which there are 6-8 at any give time), players are able to trade without taking delivery area into account, which increases liquidity. The Nord Pool CfD is used to hedge this basis risk, the additional risk that the area price might deviate from the reference "System" price. Unlike the CfD known from the UK, which is a fixed-to-floating swap, this CfD can be viewed as a "reference-to-area" swap. This contract is mainly used for hedging rather than trading, and so volumes are naturally somewhat limited. This model has been successful in building overall market volume by maintaining liquidity in the reference contract.

Nord Pool has been successful as well in attracting many

* Erling Mork is Senior Manager, Statistics and Analysis, Nord Pool ASA.

[1] See footnotes at end of text.

large players as traders, many of whom have not been based in the Nordic region and have used--and still use--Nord Pool as a "training ground" for trading electricity markets elsewhere, and I do not understand the basis for the statement to the contrary. Unfortunately for the markets, however, many major players exited trading operations following the Enron scandal. The realisation of the level of risk present in these markets came late to some, and caused a market consolidation. In some ways Nord Pool is still recovering from this loss, compounded by extraordinarily high prices and volatility in the winter of 2002-2003, which further tightened players' grip on risk capital. All the same, Nord Pool welcomed 20 new members to its financial market in 2003, and see large institutions again looking towards the Nordic region. The growth of the German market has competed for traders' attention and will hopefully foster a healthy competitive environment.

Is Nord Pool the perfect electricity market? Far from it. As touched on here, liquidity and volumes have suffered due to lack of risk capital and high volatility. The need for a variety of traditional and untraditional products spread liquidity more than it might for conventional commodities. Some issues not discussed here are equally important: taxation, lack of investment, end-user issues and environmental concerns. But both the Nordic market as a whole and the Nord Pool exchange have withstood the test of time. Rather than declaring this a failed experiment, we should work to continuously improve on what is by several measures a success.

Endnotes

1 Hull, John C., *Options, Futures, and Other Derivatives*, Fifth Edition, Prentice Hall, 2003, pg 75.

Electricity Market: Price Volatility No Flaw

By Tony Baldwin

When electricity spot prices spiked recently, the Major Users Group (which includes Comalco, Carter Holt, Pan Pac Forest Products and Winstone Pulp) protested: "The market is inherently flawed. Generators are price-gouging."

It is an easy catch-cry, but closer analysis shows the Major Users are likely to be wrong.

Over the weekend of 9 January 04, a section of the main North-South transmission line was blown over in a storm. Cheap hydro electricity from the South Island was temporarily unavailable in the North Island. In addition, some power stations in the North Island were out for maintenance. The result was a temporary power shortage in the North Island.

Spot prices in the North Island jumped sharply. For five hours on 12 January, prices spiked from 3c to $1.04 a unit. However, as soon as the damaged transmission line was repaired and hydro electricity from the South Island could once again flow north, North Island spot prices dropped back to around 3c per unit.

Spot prices jumped for two reasons. First, to reflect the higher cost of generating replacement power in the North Island. Second, to ensure that total consumption reduced to equal available supply. In any electricity system, supply and demand must always be equal.

The last units of available generation capacity are typically offered at high prices. This signals that supply is about to run out. For example, in December 03 the last increments of supply from Huntly (gas-fired) and Clyde (hydro) were offered at $2 a unit.

Generators are unlikely to have jacked-up their prices to exploit the temporary shortage. Publication of their pricing schedules is expected to show they were consistent with prices offered before the transmission outage occurred.

In short, the spot market worked well. The Major Users' claims appear to be unfounded. Volatility is an inherent part of an efficient electricity spot market. It is not a flaw.

The flaw is failing to hedge against it. Purchasing power on a fixed-price contract avoids spot market volatility.

Too many large electricity buyers appear not to understand price risk in relation to electricity. They do not seem to have digested how and why prices move, and do not accept that volatility in power prices is a business risk, like interest and exchange rates, which they have to manage – not the Government.

Generation costs vary dramatically. Key drivers are fuel costs (oil is more expensive than gas and coal), scarcity of water (the value of hydro increases sharply in 'dry periods'), transmission constraints (congested power lines can isolate some generation capacity) and consumer demand which varies with the time of day, weather and changing levels of economic growth.

The purpose of a spot market is to ensure that cheaper generation is used ahead of more expensive sources.

Many people believe the notion of an electricity market is simply a misnomer. No doubt, Jane Clifton spoke for most in saying: "…the mischief lies in the idea that electricity can be marketised...a benevolent, efficient state monopoly would be preferable." (*Listener,* May 2003)

Certainly, many Major Users prefer Government-controlled electricity systems as they find it much easier to win taxpayers subsidises in their power prices.

The main reason for moving to a market is *to* improve economic and environmental performance. Corner-stone aims include more efficient investment in new generation, and electricity consumption based on efficient price signals. The old government monopoly fell well short on these objectives.

Over the past 15 years, a standard model has emerged around the world. Professor Stephen Littlechild, the former regulator of the UK electricity market, points out that it has

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* Tony Baldwin is based in Motueka, New Zealand. This is an edited version of an article by Mr. Baldwin that appeared in the *New Zealand Hearld* earlier this year.

five essential elements:

- A separate transmission company, which may be privately owned, providing non-discriminatory access;
- Privately owned and competing generation companies bidding into a spot market;
- Privately owned distribution networks providing non-discriminatory access;
- The retail market open to competition; and
- An independent regulatory body.

New Zealand's electricity market design is consistent with this model, which has been applied in the UK, Australia, the USA, Sweden, Norway and several other countries.

On a technical level, our spot market is leading-edge in the world. Indeed, as Professor Bill Hogan of Harvard University has observed: "…the NZ electricity market design has been at the forefront of best practice…[and] involved extensive consideration of the experience of other countries."

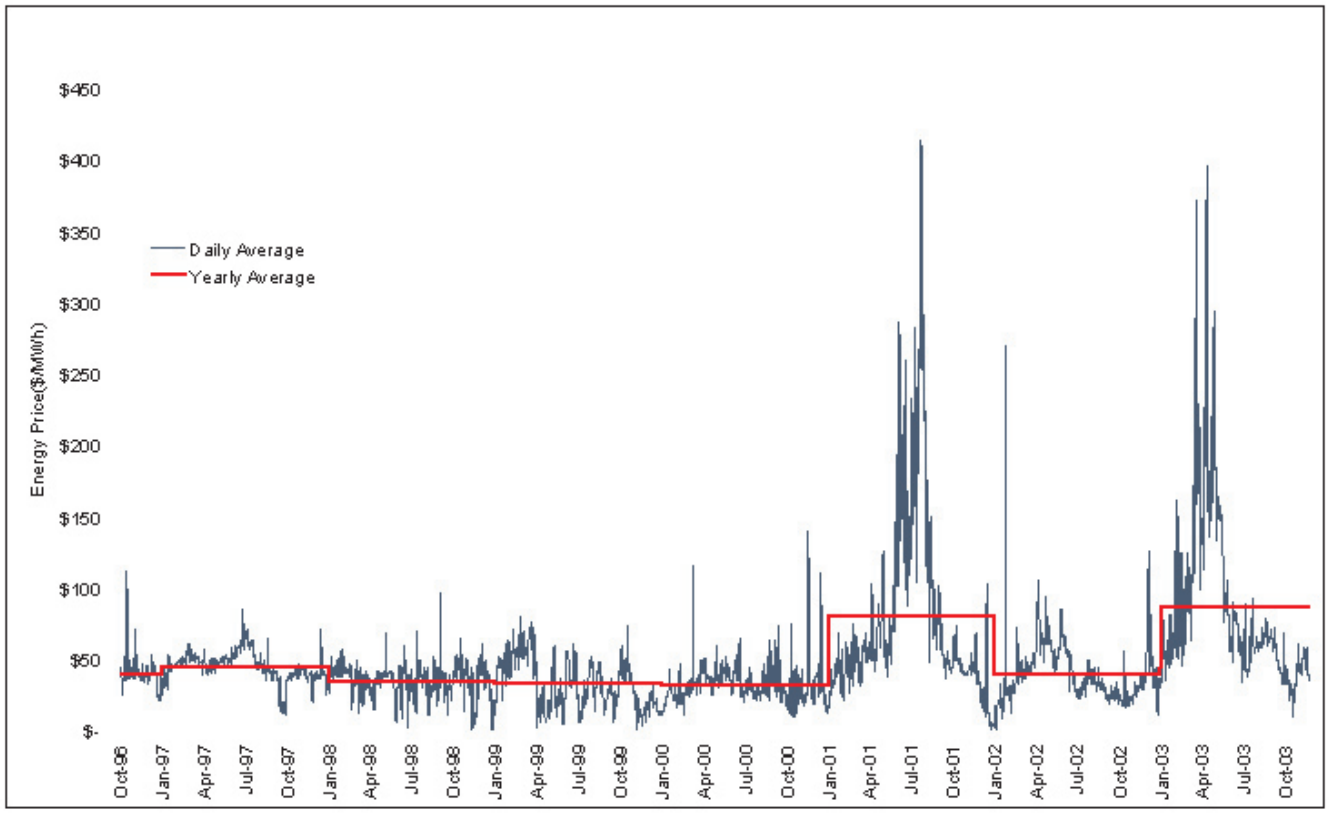
Overall, the NZ market is still in transition. It has underperformed in several areas. Government-owned generators have failed to cross-hedge. Generators have vertically-integrated (balancing their output with retail customers), which has reduced their incentives to offer hedges. Major Users have been reluctant to purchase hedges. There is no competitive market reference point for longer-term electricity prices. And the retail market is less competitive than it could be.

These weakness are caused by five missing key elements. The first three are:

- A liquid market for buying and selling electricity hedges;
- An efficient demand-side response mechanism; and
- A financial mechanism for hedging against transmission constraints;

With careful guidance from the new Electricity Commission, these absent elements can be mitigated. While the Commission's potential powers are extremely wide and, if used unwisely, capable of imposing net costs, the Commission's new role also creates an opportunity for positive action that industry division has previously prevented.

Daily Average NZEM Haywards Reference Price
1 October 1996 to 23 November 2003



Qatar: A Strong New Bridge In Global Energy

By Paul Tempest*

Qatar, with 33 years of OPEC membership, is again poised to play a pivotal and enhanced role, both within the Gulf oil and gas export framework and beyond, in the global energy producer/consumer dialogue, Some geo-political implications of these developments are outlined briefly in the conclusions to this paper.

The current and prospective massive expansion of natural gas production in Qatar is already securing leadership status for Qatar in the international trading of liquefied natural gas (LNG) and technological frontier status in gas to liquids (GTL) innovative technology

Qatar is no stranger to the politics of oil and gas. Qatar first produced oil in 1949. Its representative, Hassan Kamel, was present at the inaugural conference of OPEC in Baghdad in 1960 and Qatar joined the organisation in the following year. For two significant years (1977 and 1978), between the two oil-price shocks of the seventies, it provided a most distinguished OPEC Secretary-General in the person of Ali Jaidah. Indeed throughout the history of OPEC, it has, from time to time, contributed mature and considered advice to the organisation and loyal support to its Arab neighbours in the Gulf. The most recent OPEC President, Abdullah bin Hamad Al Attiyah, Qatar's Second Deputy Prime Minister and Minister of Energy, has vigorously upheld this stance.

Qatar is now a second-tier global oil producer. Oil production is at present only 1% of the global total and the global oil reserve share is only 1.5%. Outside attention today is focussed on the vast natural gas reserves (9.2% of the global total at end-2002, see Table 1) and the extensive development currently underway to bring this gas to new and old gas export markets.

LNG production and exports in Qatar are expected to triple in the next ten years. Already in 2002 (see Table 2) exports exceed the combined total of the other two Gulf LNG producers, UAE and Oman, and represent 12.4% of total global LNG exports. By 2010, under most scenarios, Qatar's global share will have surpassed that of Algeria today (17.9%) probably reaching 20% and in some scenarios 25% of the global market. No other LNG producer is exhibiting anything like the same scale of growth.

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*Paul Tempest first worked on Qatar while he was in the Bank for International Settlements, Basle in 1963/4. He and his wife first visited Qatar in 1967 while at MECAS, Lebanon studying Arabic. On a third secondment in from the Bank of England, he was resident in Doha in 1970-71 as General Manager of the Qatar and Dubai currency authority. He has returned regularly to Doha first on behalf of the Bank of England, the World Bank and British Gas, then in 1985-91 on behalf of Shell International and most recently with a British trade mission in 1992 and in connection with the World Petroleum Congress Asia Regional meetings in December 2003.He has served as President of the IAEE(1984), Director-General of the WPC (1991-99) and is currently Vice-President of the BIEE. He is CEO of the Windsor Energy Group and Senior Consultant of MEC International and PTA London.

Qatar is, therefore, well on the way to becoming the giant of the global LNG market, still small alongside its counterpart in the oil market, the Kingdom of Saudi Arabia, but nonetheless endowed with a growing power of market leverage, based on abundant gas resources, competitive, state-of-the-art and highly efficient production and processing technology and on high ratings for political, economic and social advancement

A fundamental difference between oil and gas in international marine trade is that, whereas all oil, whether crude or product, can be traded and sub-divided more or less freely once it is on the high seas, the development of Liquefied Natural Gas is still dependent on long-term supply contracts to dedicated markets for the bulk of the supply. Only on the back of these long-term supply contracts can the gas industry secure adequate front-end finance for this high-cost technology. Further, the importers must be able and ready to absorb regular shipments of gas through a pipeline network to dedicated end-users. Creating such a network and market is also expensive and takes time. Qatar is well ahead of its competitors in developing these long-term relationships and in ensuring that the industrial infrastructure and markets are adequately developed to take new Qatari gas. In addition Qatar is in the strongest position among LNG producers to stimulate the development of a global LNG spot market, still in its infancy at present.

Qatar is also in the technological forefront in developing other outlets for its gas, most notably in ground-breaking Gas To Liquids (GTL) technology, where its latest projects are among the largest in the world and also in the use of natural gas as feedstock for the production of methanol, ammonia, urea, ethylene and other petrochemicals.

Table 1
Qatar And Gulf Oil And Gas Reserves
% share of total global proven reserves

	Oil	Gas
Qatar	1.5	9.2
Saudi Arabia	25.0	4.1
Iraq	10.7	2.0
UAE	9.3	3.9
Bahrain	*	0.1
Iran	8.6	14.8
Total Gulf	64.3	35.1

Source: BP Annual Statistical Review of World Energy, June 2003
* less than 0.1

Table 2
Gulf/Arabia Exports Of Liquefied Natural Gas 2002
bn cu metres

	To--				
	USA	**Europe**	**Japan**	**S.Korea**	**Total**
Qatar	1.0	2.2	8.4	7.0	18.6
UAE	-	0.6	5.9	0.3	6.8
Oman	0.1	1.3	1.1	5.5	8.0

Source: BP Annual Statistical Review of World Energy, June 2003

In anticipation of this enhanced position in global energy, Qatar has, over the last five years, implemented a

policy of balancing market risk. Whereas the bulk of Qatar gas will be directed to Japan, South Korea, India, China and other Asian consumers, LNG supply contracts have also been signed with United States and European consumers and Qatari petrochemicals readily find markets in both the Atlantic and Pacific Basins.

The process has been accelerated by working in close partnership with leading multinationals such as Shell, ExxonMobil, ChevronTexaco, ConocoPhillips, Sasol and Total and by competitive tenders attracting the leading international supply and contracting companies.

Close bilateral relations with oil and gas consumer governments have led to a variety of trade and other bilateral agreements where no one government is in a position of dominance.

Liberalisation of trade and investment is already yielding major economic and political dividends. Overseas investors are promised a wide range of new incentives including a 10-year exemption from income tax.

Great efforts have also been made to settle outstanding border/frontier/median line issues with Iran, Bahrain, Saudi Arabia and UAE. There are also new projects in hand to supply Qatar gas by undersea pipeline across Bahrain and offshore Saudi Arabia to Kuwait and other proposals include a gas export pipeline running in the opposite direction through UAE and Oman to liquefaction and loading terminals on the Batina Coast outside the Straits of Hormuz. Another major project is to construct a road causeway to Bahrain thus providing an alternative road passenger and heavy goods route to and from Saudi Arabia and the Levant.

Qatar has also over the past few years taken the decision not to follow Dubai into mass tourism, but to provide four and five-star hotel and conference capacity (ten so far and another six being planned) to meet all major business international conference needs: recent highlights include the World Trade Organisation meetings, the second Asia regional conference of the World Petroleum Congress and, in prospect, the Asian Games in 2006. Qatar Airways has been rapidly expanded and from 2007 will be based in a new international airport, one of the first to be planned for the next generation of superjumbo aircraft such as the double-deck Airbus A380.

A programme of new university, college and schools building and funding projects has attracted wide regional interest and an influx of students from Saudi Arabia, Iraq and UAE.

So much for the dynamism of the Qatar economy at present and its prospects. Already the indigenous Qatari population enjoys per capita income barely equalled anywhere else and can expect it to double within a decade and triple within another ten years.

Some Economic And Social Welfare Factors

Unlike the major and much larger states of the region, Qatar is likely to be able to satisfy the employment needs of its young population. There is no particular pressure to diversify industry and manufacturing. A rapidly expanding hydrocarbon sector is likely to provide adequate opportunity and spill-over service jobs for most of the new Qatari graduates and school-leavers. The total population of about 620,000 has many expatriates on short-term contract. The governance of Qatar is, therefore, particularly enhanced in times of fluctuating economic growth by this degree of employment flexibility.

In social welfare, Qatar has become a regional trend-setter. A national referendum has recently ratified (by 96%) a draft constitution expounding the principle of universal suffrage. Women, although still largely embedded in their tribal and family structures, already have equal rights and improving employment opportunities.

Some Geo-Political Considerations

The Gulf producers hold 65.4% of proved global oil reserves and 36.0% of proved global gas reserves. The tapping of this resource is the key to ensuring adequate global energy supply for the next half-century: the International Energy Agency predicts a rise in demand of at least 60% and possibly over 100% over the next 20 years, most of the increment to be provided within this period by oil and gas. The central issue is to what extent can we rely on the Gulf producers to expand their capacity, production and exports on time.

Within the oil sector, there is still much doubt about the ability of the Gulf states to provide the perceived necessary increment. Competition between the Atlantic and Pacific Basin consumers is likely to be intense with China, Japan and South-East Asia holding the strongest cards. However, acceleration of gas exports will help to alleviate this problem.

Middle East rivalries remain but are somewhat diminished. In 2003, the US/UK intervention in Iraq unsettled the markets, particularly the finance markets and placed a sharp brake on petroleum exploration and development investment, resulting in more cautious international financing of such projects. Yet the clouds now appear to be clearing with progress in the elimination of weapons of mass destruction, the reconstruction of Iraq and a friendlier climate emerging between Iran and the United States.

An important point today for the rest of the world is to identify the current leading role-models in the Gulf. In the nineteen thirties and forties, Bahrain, seat of the British Political Residency and an oil producer from 1934, performed this leadership function, ceding the role to much more affluent Kuwait through the fifties and early-sixties. By the mid-sixties, Saudi Arabia had taken over as undisputed leader of the new Gulf Co-operation Council and prevailed in the eighties as the 8-year Iran-Iraq war sapped the strength and influence of the two rivals.

Beyond these three giants, Saudi Arabia, Iran and Iraq, the leadership of the ten Emirates passed from Kuwait to Abu Dhabi/UAE on the Iraqi invasion of Kuwait in 1990. Abu Dhabi had enjoyed very fast growth once Shaikh Zayyid had taken over in 1967 and the booming UAE attracted the attention and became the envy of the entire region.

Saudi Arabia will continue to dominate the oil market but, preoccupied with its own precarious domestic economy and turbulent internal politics, the Kingdom is less able or

willing to project a leadership role within the Gulf Co-operation Council states. For a start, the perceived threats of Saddam Hussein's Iraq and the Ayotollah's Iran have almost vanished: there is much less need for such leadership.

Within the nine Gulf Emirates plus the Kingdom of Bahrain, the baton of regional role-model is again passing to the fastest-growing, namely Qatar:

- Qatar's central location in the Gulf, roughly equidistant from Kuwait and the Straits of Hormuz is a significant asset. In geographical terms, Qatar makes the perfect Gulf hub for regional military defence, civil aviation, marine services, education, and maybe ultimately finance and petroleum technology;
- Qatar's traditional alignment with Saudi Arabia remains stronger than that of any other Gulf state;
- The part privatisation of the gas industry and extended welcome to the foreign investor has yielded vast economic benefit, a point not lost on some of the more closed economies of the region.
- External military support is close at hand.

Conclusions

Qatar has already today a significant part to play as lead role-model in the economic development and political stabilisation of the Middle East. As income from gas exports expands, the security of the gas installations, sea-lanes, choke-points and stability of the consumers becomes a much higher priority. The development of gas, much less divisive than oil, points towards strong durable relations with Japan, South Korea, India and China and also with the USA and Europe. Qatar, therefore, has the potential to become a most valuable political and economic bridge in the future geo-politics of energy.

Czech Association for Energy Economics
International Association for Energy Economics

1ST ANNUAL CZAEE INTERNATIONAL CONFERENCE 2004

The Municipal House, Prague, Czech Republic
November 22-23, 2004
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IMPORTANT NOTE: ALTHOUGH THE WEATHER MIGHT BE RATHER COLD AT THIS TIME OF YEAR, LUNCHES AND DINNERS WILL BE WARM AND TASTY. A SELECTION OF THE FINEST CZECH BEERS AND WINES WILL ALSO BE AT YOUR DISPOSAL, AND THE CHRISTMAS SHOPPING SEASON WILL BE IN FULL SWING.

The Treatment of Electricity in the Free Trade Area of the Americas

*By Pierre-Olivier Pineau**

Introduction

International trade agreements are reshaping the economic context of the world by allowing freer flow of investments, goods and services. Energy and electricity products have this particular characteristic of ranging over both good and service classifications. How is electricity, in particular, treated within these trade agreements, which clearly distinguish between goods and service sectors? How can the electricity sector be affected by new agreements? We answer these questions with a specific focus on the Free Trade Area of the Americas (FTAA). We start by setting the international trade context and then study how electricity is considered in the General Agreement on Trade in Services (GATS), in the North American Free Trade Agreement (NAFTA) and in the FTAA. An analysis on the probable consequences of the FTAA on the electricity sector is then made.

The International Trade Context

The FTAA negotiations bring together the 34 democratic countries of the Western Hemisphere that all agreed in the 1994 Summit of the Americas to unite their economies in a single free trade agreement. They are all members of the World Trade Organization (WTO). Because the FTAA will mostly prevail over previous local trade and integration agreements, we focus our attention on it. But before presenting the FTAA, we provide in the following sections some background information on the WTO's GATT and GATS and on the NAFTA, because they set an important context for the FTAA.

The WTO: GATT and GATS

As international trade increased after the 1947 GATT, and expanded beyond goods, for which the GATT was designed, the need for an international body overseeing all trade issues (negotiations and disputes in all sectors) was being felt worldwide. The Uruguay Round of Multilateral Trade Negotiations (usually simply referred to as the "Uruguay Round") took place between 1986 and 1994 among signatories of the original GATT. It led to the creation of the WTO, in 1995, the institution dealing with international trade issues. Along with the creation of the WTO, the results of the Uruguay Round were an update of the GATT[1] and the creation of the GATS, to set the ground for trade in services and well as for further liberalization in these sectors. Other agreements reached at the end of the Uruguay Round deal with Trade-Related Aspects of Intellectual Property Rights (TRIPS), dispute settlement, trade policy review mechanism and plurilateral agreements. A new "round" of WTO negotiations started in 2001 after a conference in Doha, with many trade issues on the agenda, such as agriculture, services and electronic commerce, among others (see WTO, 2001a, for all areas and more details on the content of the negotiations).

The GATS is built on the same principles used in the GATT, but applied to service sectors. It represents an international effort to develop a global *multilateral trading system* in services, as opposed to specific *regional agreements* among different countries, leading to regional free trade integration, but also to differently integrated groups of countries, such as the European Union, Mercosur or NAFTA.[2] The GATS does not dictate liberalization in services, but sets a framework on how liberalization of trade in services should be done, with a schedule of commitments each country submits and has to follow.[3] Hence, the GATS only applies to sectors in which member countries make commitments. Three important principles in the GATS define the backbone of this framework:[4] (1) Most Favored Nation (MFN) treatment; (2) Market Access and (3) National treatment. Transparency in regulation and information is also an important principle (article III of the GATS).

The MFN treatment principle (article II) compels member countries to treat service providers from all countries as well as the foreign service provider that has the most favored treatment. This means that if a country has specific rules that favor a service provider from another country, then these rules should apply to all service providers, without discrimination with respect to their country of origin. However, to limit the scope of MFN, a list of exemptions can be submitted by each country, to exclude some sectors from the MFN requirement (see article II.2 and Annex on article II Exemptions).

The two other principles, market access (article XVI) and national treatment (article XVII), apply only to sectors that countries voluntarily want to liberalize. In such a case, they list the liberalization commitments they want to make for each sector of their choice. This list is called the "Schedule of Specific Commitments" and is defined in article XX.

The market access principle spells out six different types of limitations that a country cannot use to prevent a service supplier to operate in its territory (article XVI, 2a to 2f). The six forbidden types of limitations are limitations on:

- the number of suppliers in the market (in any possible manner);
- the value of transactions or asset values of the supplier;
- the quantity of services offered by suppliers;
- the number of employees of the suppliers;
- the legal status of suppliers that can provide services;
- the amount of foreign ownership in the supplier's capital.

Finally, the national treatment principle simply states that foreign suppliers should be treated exactly as national

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[1] See footnotes at end of text.

suppliers.

To sum up, it can be said that rather than directly opening the service sectors to international competition, the GATS sets a common backdrop for future liberalization in the service industries. With its "positive listing" approach (a sector has to be explicitly mentioned as a country commitment to liberalization to be subject to international trade), rather than mandatory liberalization, it leaves room for various speeds of progress to signatory countries.

The NAFTA

The NAFTA was signed in 1994 between Mexico, the United Sates of America and Canada to create a free-trade area for goods and services covering the three member countries.[5] It differs from the GATS in the way sectors are subject to liberalization, removal of trade barriers and absence of governmental favorable treatment. Under NAFTA, all goods and services from the member countries are subject to international competition without restrictions. Countries do not have to "commit" themselves in the sectors of their choice. The same principles of MFN, market access and national treatment are found in this agreement.

However, although NAFTA may first appear to be all-inclusive, its structure conveys a lot of distinctions between sectors. This limits the scope of influence of NAFTA to some sectors, and excludes some strategic sectors from international competition. Also, in some instances, it avoids the need to introduce regulatory reforms to eliminate protections provided by national laws. The main sectors benefiting from a special treatment under NAFTA, and for which a specific chapter has been written to exclude them from the general rules defined otherwise, are Energy (Chapter 6), Agriculture (Chapter 7), Telecommunications (Chapter 13), Financial services (Chapter 14) and Cultural industries (Chapter 21, Annex 2106).

Other less important reservations exist, as specified in the Canadian, U.S. and Mexican schedules of Annex I, but also in other chapters and annexes. These reservations specify special treatment under NAFTA for sectors such as fisheries, transportation (especially air transportation) and others.

Furthermore, Annex III contains some limits of the applicability of NAFTA in some sectors, with a list of "Activities Reserved to the State". Although this annex is presented as relevant to the three member countries, only Mexico has a schedule of activities that are under the exclusive power of the State. For instance, the government of Mexico has retrained the right to provide all energy goods and services to the population (petroleum, electricity, nuclear power), as well as for some other sectors, such as postal service or railroads. Canada and the U.S. do not have such power under NAFTA.

NAFTA is, therefore, a significant step forward in terms of trade liberalization of goods and services for the three member countries. It goes beyond the GATT and the GATS, because it automatically includes almost all sectors in the created free-trade area, which is the world's largest one. However, with numerous chapters on specific sectors and many annexes spelling out restrictions to free markets and international trade, NAFTA is far from being the ultimate stage of liberalization.

The FTAA

The negotiations for the Free Trade Area of the Americas (FTAA) started in December 1994 with the First Summit of the Americas in Miami.[6] The goal of the negotiations is to sign an agreement by January 2005, in order to have a free trade area into force by December 2005. This regional agreement builds from the GATT, GATS and NAFTA in the sense that it is consistent with both WTO agreements, but without a generalized positive listing approach. A negative listing approach is used in the FTAA, as in NAFTA: sectors have to be excluded to avoid coverage by the agreement. It also takes into considerations other regional agreements.[7]

However, a slightly different negotiation approach is adopted in the FTAA, compared to NAFTA. Goods and services are dealt with in a very inclusive manner, with little mention of specific sectors and exclusions to the agreement. Exceptions are mainly limited to agriculture (the only specific sector for which a chapter is devoted), air transport (that is simply not affected by the FTAA) and governmental activities and services. This being said, the same principles found in the GATS and NAFTA are again found: MFN treatment, market access and national treatment. In chapter 8 on services, however, the possibility for countries to have a "list of specific commitments" is introduced.[8] This would lead to an approach similar to the GATS "positive listing" approach in the service sector if the countries agree in the negotiations on this principle. However, this concept of a list of commitments, as spelled out in the current draft agreement (FTAA, 2002), is introduced much less formally than in the GATS, where the third part is specifically devoted to commitments (articles XVI to XVIII of the GATS). In the FTAA, the mention of this list of commitments is relegated to a section that is not even an article in the current version, and which has an unclear interpretation.

The key innovation of FTAA is, therefore, to include almost all sectors in the liberalization process, leading –if negotiations are successful– to an immense region of free trade where almost all economic activities will have to be opened to international competition, in a level playing field in each country with respect to MFN treatment, market access and national treatment.

Electricity in Trade Agreements: a Good or a Service?

To see how Western Hemisphere electricity sectors could be affected by the FTAA, it is important to understand how the different products involved in the electricity supply are defined in the different trade agreements in terms of *goods* or *services*. We first present how electricity is classified in the main international product classification systems, covering different types of goods (commodities) and services. In the following sections, we analyze how NAFTA, the GATS and the FTAA treat electricity.

International Classification Systems

The Statistics Division of the Department of Economics and Social Affairs of the United Nations maintains a list of international family of economic and social classifications.[9] Among the different types of classifications, the different product classifications help understand how different products are included in trade agreements. For instance, the 1947 GATT is an international agreement on goods, not explicitly including –nor excluding– electricity. This is paralleled by the fact that the Harmonized Commodity Description and Coding System (HS)[10] does not strictly include electrical energy as a good (it is *optionally* considered as such in this system). Indeed, as reported in WTO (1998), the GATT was never comprehensively applied as a framework for international electricity trade, simply because the non-storable nature of electricity did not lead to its inclusion in the commodity category. As an illustration of the little relevance of the GATT to the electricity sector, one can see Plourde (1990) where energy implications of the GATT and the 1987 Canada-United States Free-Trade Agreement are discussed, with very little impact on the electricity sector (access to transmission lines being an exception).

The place of electricity in different service classification systems is also unsatisfactory. Indeed, the WTO Services Sectoral Classification List (referred to as "W/120" see WTO, 1991) does not include electricity. Only "services incidental to energy distribution" are considered as services, and this would exclude most of the electricity sector (from production to distribution). The complexity of the nature of electricity and of its sector, involving a vast range of different intermediate products, is probably well demonstrated by the four different sections and many subclasses in which electricity-related products are listed in the Central Product Classification (CPC, Version 1.1 2002).

Electricity in the GATS

The text of the GATS specifies that this agreement covers "any service in any sector except services supplied in the exercise of governmental authority" (Article I, 3b). Governmental services are further restricted to "any service which is supplied neither on a commercial basis, nor in competition with one or more service suppliers" (Article I, 3c). However, electricity supply and the electricity sector in general, are not considered to be subject to the GATS. This comes from the ambiguity mentioned previously on the nature of the "electricity product" and is formalized in the GATS structure by the absence of almost all energy services from the W/120 list. This explains why there is only a limited literature on how the GATS could affect the electricity sector. The only contribution found was Griffin Cohen (2001), which provides a Canadian perspective on the issue. In this section, beyond reporting on the position of electricity in the GATS, we review how negotiations that have followed the signature of the GATS in 1994 could lead to the inclusion of the electricity sector.

In a Background Note on Energy Services (WTO, 1998), a general portrait of energy services in the GATS is provided. It describes how liberalization could take place in a GATS framework, with some indications on how energy is treated in other free trade agreements. It points to the need of clarifying how energy and electricity services are classified, as goods and/or services. Consequently, this theme is part of the new Doha round of GATS negotiations that started in 2000.[11] The energy sector is indeed included as a specific sector in which countries want be able to make specific commitments. Chile, the U.S. and other countries have explicitly expressed their desire to see the energy sector included. In their position, stated in WTO (2000a and b), the U.S. ask to explicitly include energy services in the W/120 list, to allow all countries to reap the benefits of liberalization, as it is argued. For its part, Chile in WTO (2001b) calls for a much broader inclusion of types of services in the GATS, including energy services, but also air transport services. Other proposals by the European Union (WTO, 2001c), Japan (WTO, 2001d) and Venezuela (WTO, 2001e) also support the inclusion of energy services in the GATS negotiation agenda and a renewed classification for energy products.

With this background, a Negotiating Proposal on Energy Services (WTO, 2002) has been put forth, setting a basis for the new round of negotiations. The global goal is, of course, to fully bring this sector under the GATS in order to favor more liberalization, but some willingness to "guarantee the right of developing countries to regulate and handle the supply of energy services in their territories in order to meet their domestic policy objectives" is also mentioned (paragraph 5 of WTO, 2002). As developments in negotiations occur, the extent to which the energy sector, and electricity supply, will be fully and clearly included in the GATS should be determined by January 2005, the scheduled deadline of these negotiations.

Electricity in the NAFTA

Electricity, as an energy product, receives in NAFTA a similar treatment to the one it had in the 1987 Canada-U.S. Free Trade Agreement (FTA), in the case of Canada and the U.S. Mexico, however, has reserved for itself a very different treatment. This section provides a presentation of the place of electricity in NAFTA, using the text of the agreement (Government of Canada et al., 1994) and research papers on NAFTA and the energy sector (Plourde, 1993, Horlick, Schuchhardt and Mann, 2002, and Bradley and Watkins, 2003).

The characterization of electricity as a good in NAFTA draws on the Canada-U.S. FTA, GATT and HS classification of goods. This treatment of electricity as a good tends however to exclude from the agreements the service sub-sectors associated to electricity supply. Indeed, NAFTA essentially acts as a trade and investment promotion tool for goods in this sector, leaving all energy service sectors free of direct pressure to be further liberalized. What follows describes the situation for Canada and the U.S., as Mexico excluded itself from these provisions through annexes 602.3 and III. In the case of Mexico, the State remains the dominant market regulator and actor, even if some private investment and energy

trade are partially authorized.

Under normal circumstances,[12] no quantitative or price restrictions in trade in energy can be imposed by the countries, but a system of import and export licenses can, however, be used (article 603) to regulate –to some extent– energy exchanges. In practice, however, these licenses have never been binding. Trade and investment in electricity are therefore open to U.S. and Canadian companies in both countries, but serious de facto limitations characterize the electricity sector through the presence of State monopolies in many American States and Canadian Provinces. Articles 1502 and 1503 on Monopolies and State Enterprises indeed maintain the right of governments to establish, designate and authorize monopolies and State enterprises in any sector, as long as other NAFTA requirements are respected. In the case of electricity, this allowance of State enterprises and monopolies leaves all States and provinces with the possibility to heavily regulate the electricity sector, granted that electricity trade with other jurisdictions and investment are conducted according to NAFTA rules.

In effect, NAFTA has changed little of the electricity sector, first because no new obligation was introduced from the Canadian-U.S. FTA and, second, because Mexico excluded itself from a similar agreement. A few jurisdictions have, however, taken the initiative to liberalize their electricity sector, the infamous examples being the State of California, and to a lesser extent the Canadian provinces of Alberta and Ontario.

Electricity in the FTAA

As the FTAA is still under negotiations, any analysis is limited by the fact that no definitive document is available. However, a second draft of the agreement is available (FTAA, 2002) and initial principles have been laid out, where consistency with the "rules and disciplines of the WTO" is stated.[13]

The general approach of the FTAA is to make no a priori exclusions in services in the negotiations. The excellent background paper on services made by CEPAL (1998) has been used in the preparation of the FTAA. This document presents the complexity of defining services through an academic literature review of the definitions of service, reviews the principles on which liberalization can be introduced in this sector and the possible impediments to market access.

Following this broad, inclusive, sectorial approach, no explicit mention of electricity and energy products, as goods or services, is made in the second draft of the FTAA. This means that, a priori, all electricity goods and services will be treated exactly as any other goods and services, with the implication that no barriers to trade and investment could be maintained in the electricity sector. Enforcement of MFN treatment, market access and national treatment would be guaranteed for all service providers of all signatory nations. This has, however, to be mitigated by some different ways of defining exemptions, which are now reviewed.

Table 1
Draft FTAA Articles Leading to Possible Exemptions in the Electricity Sector

FTAA Chapter	Article	Description
1. General and Institutional Issues	13.1	Some special sector treatment could be permitted due to differences in the levels of development between countries
4. Investment	1.3 a) to c)	Economic activities reserved by countries on Annex XX (unfound in the draft) or for national securities reasons.
	1.3	Parties may exclude investment in certain sector (easier to do for smaller economics)
	12.1	Some exempted sectors may be listed in this article
	12.2	Some principles [national treatment, MFN, performance requirements...] may not apply so some sectors listed in an annex.
	12.3	MFN does not apply to some sectors listed.
	12.9	Smaller/developing economies can maintain reservations in sensitive sectors.
5. Market Access (for goods)	4.10	(page 5.3) Smaller/developing economies can benefit from more favor able tariff elimination conditions.
	page 5.16-5.17...	Temporary safeguard measures.
8. Services	1.7	For smaller/developing economies there shall be flexibility in meeting the commitments of this chapter.
	1.8	Comprehensiveness of the coverage shall be linked to the extend and rate at which the modes of supply for this provision of services are liberalized.
	1.9	No provision of this Chapter shall be construed to prevent a Party from having the right to regulate and to introduce new regulations to achieve domestic policy objectives.
	2.3	Smaller/developing economies can list exceptions to MFN treatments.
	5.1	Positive/negative listing has to be decided for national treatment.
	5.6	Smaller/developing economies can list exemptions to national treatments.
	8	Definition of service exclude "other activities conducted by a public entity for the account of or with the guarantee or using financial re sources of the government."
	page 8.17	"sectors in which commitments re undertaken": this leaves the door open for countries to *not* commit some sectors to MFN treatment, market access and national treatment.
	page 8.24	List of specific commitments (for market access and national treatment).
	page 8.24	Reservations of MFN treatments/Non-conforming measures.
10. Competition Policy	2.2	Monopolies are protected as a right for Parties to designate and maintain a monopoly

The *non*-distinct treatment of the electricity (and energy) sector is at variance with the GATS (that currently does not cover most of the energy sector) and with NAFTA (that excludes it from the full scope of the agreement through a dedicated chapter). It can, however, be noticed that some other sectors receive a distinct treatment in the FTAA: agriculture, many social services, financial services, air transport services and some other smaller sectors (which are excluded from the coverage of chapter 8 on services in article 1.2).

However, beyond these sectors, the FTAA will most probably also contain different provisions to protect specific sectors that some countries may not want to see open to international trade and investments, with full MFN treatment, market access and national treatment. Table 1 presents the draft FTAA articles that could directly be applied to the electricity sector to exempt it from FTAA coverage.

The analysis of Table 1 leads to a few conclusions:

- Developing countries will benefit from more acceptance to *not* open some sectors to trade and investment (chapter 1, 13.1; chapter 4, 12.9; chapter 5, 4.10; chapter 8, 1.7, 2.7, 5.6).
- Monopolies will not have to be terminated (chapter 8, 1.9; chapter 10, 2.2).
- Countries will be able to exempt some sectors without having to use a smaller/developing economies-type provision or having to create a monopoly (chapter 4, 1.3, 12.1-3; chapter 8, 5.1, 8, paragraphs on page 8.17 and 8.24).
- Coverage of the FTAA for services will depend on the level of liberalization (chapter 8, 1.8).

These articles should allow the signatory countries to exempt parts of the electricity sector from the FTAA, even if no particular treatment for electricity and energy has been included in the design of the agreement.

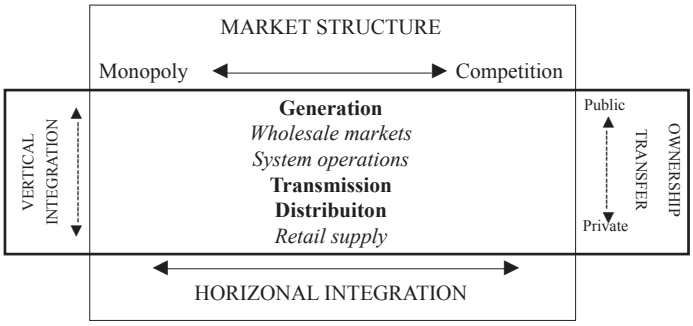
However, the main trend in trade agreements is to not treat differently the energy/electricity sector from other goods and services sectors. This introduces difficulties for countries not to open this sector to international trade and investment. Even in the presence of some provisions allowing exemptions to be defined and specific commitments to be made, in the long run, the same coverage in very likely to apply to all sectors. Exemptions will have to be regularly justified to be maintained, and are presented only as temporary measures, until "further liberalization" is made. Indeed, specific commitments have to be broadened over the years, and this will have to include all electricity sector goods and services, at least if the objectives adopted in the FTAA and GATS negotiations are kept the same: "to enhance competition and improve market access" (FTAA, chapter 1, article 2.c) and reaching "the early achievement of progressively higher levels of liberalization of trade".[14]

Impact on the Electricity Sector

The electricity sector is a multiplayer industry with many different sub-sectors. Figure 1 displays these sub-sectors, along with the four types of reforms that can be undertaken: (1) Ownership transfer (between different types of public and private ownerships); (2) Market structure change (from monopoly to competition or vice-versa); (3) Vertical integration or de-integration (or unbundling) and (4) Horizontal integration or de-integration.

Objectives of the GATS and FTAA are to foster trade and international investment in all sectors, preferably in a competitive environment, to support economic growth and prosperity. The main tools used to reach these goals are the three principles we have previously presented: MFN treatment, market access and national treatment. To these, transparency and competitiveness should also be added because they are central elements of these agreements (FTAA, chapter 1, article 2.c for competition).

Figure 1
The Electricity Sub-sectors and the Four Types of Reforms



As definitive electricity sector classification has not yet been agreed on, some ambiguity on how to treat different sub-sectors could be encountered in the application of FTAA. However, as the agreement is very inclusive and does not separately consider the electricity sector, the assumption should be that the whole sector will be covered by the agreement. Consequently, the six sectors presented in Figure 1 should not receive any a priori exemption from FTAA coverage, and could only be excluded if it is authorized to exclude them from the application of the three guiding principles. Furthermore, if retail supply of electricity is considered to be a distinct sub-sector from distribution in the sector classification (as in Figure 1), then pressure to apply the principles distinctively in the two sectors (distribution and retail supply) will be felt, opening the way to more unbundling of the sector.

The FTAA, and the underlying GATS, cannot directly dictate changes in the competition level of a sector, but rather prompt the implementation of the three principles, depending on the extent to which the sector is covered by the agreement. They can also make pressure to increase the level of transparency and competitiveness in the different sectors covered. We analyze in Table 2 how each principle can affect the electricity sector.

Other Considerations

There are also two other aspects where inconsistencies between the current legislation and the FTAA might raise some issues:

- Hydropower concessions and their ownership. The use

Table 2
The Electricity Sector and FTAA: Matrix of Possible Consequences

Sub-sectors	MFN Treatment	Market Access	National Treatment	Transparency	Competitiveness
Generation		No restrictions			No subsidies (tax exemptions, fast depreciation, water rights, etc,)
Wholesale markets		*Public* wholesale market			Spot Market
Systems operations	No country specific restrictions in	Regular tenders for concessions	No national	All information public (contracts,	Competitive tenders for the concession
Transmission	rights to operate	Regular tenders for concessions Open access to lines	privilege	systems use, water levels, etc.)	Competitive tenders for the concession
Distribution					Competitive tenders for concessions
Retail supply					Choice of retailer No price control

of water is not always priced according to market principles. This problem could lead to the creation of tradable water permits, where a "market price" would be set. These ideas are explored by organizations such as the World Bank (see Thobani, 1995). The owners, usually the government (mostly federal utilities in the U.S. or provincial in Canada), do not always behave according to profit maximization objectives.

- The second problematic aspect is the definition of some segments of the electricity supply as a "public service". The notions of "public service" and "public utility" are not recognized in the FTAA. The FTAA only defines "service supplied in the exercise of governmental authority" (services not supplied on a commercial basis and by more than one competing suppliers, see FTAA, chapter 8, article 1.6) and excludes some sectors from the FTAA (e.g., public education, health, see previous sections of this article), but not electricity service. However, many jurisdictions still see some electricity sub-sectors as an important public service.

Conclusion

Although still not finalized nor endorsed, the FTAA could lead to important changes in the electricity sector, especially if the electricity sector is fully included in the GATS. These changes could only lead to more unbundling and more market-based policies, because they are the only ones consistent with the MFN treatment, market access and national treatment principles. There is not, however, unanimity in the economics and energy policy community on the necessity to have reforms in this direction, and even less agreement on the consumer's side. Furthermore, local jurisdictions (States and Provinces) would lose some of their powers in the electricity sector, as policies based on international agreements will prevail over local policies. Decision makers and citizens should be fully aware of this and its consequences before endorsing the FTAA.

Footnotes

[1] There is now a "GATT 1994" that is the updated version of the "GATT 1947". See the Annex 1A of WTO (1994).

[2] See OECD (1995) for more on the distinctions between multilateral trading system and regional agreements.

[3] Commitments are made for specific sectors and for different *modes of supply*. Services are categorized into four different modes of supply (GATS, article I.2). The supply of a service from a *provider* in one country to a *consumer* in another country can be made through: Mode 1 - Cross-border (only the service "travels"); Mode 2 - Consumption abroad (the consumer travels); Mode 3 - Commercial presence in the consuming country (the provider has a permanent commercial presence abroad); or Mode 4 - Presence of natural persons (staff of the provider travels to the point of consumption).

[4] See WTO (1999) for a complete introduction to the GATS.

[5] The text of NAFTA and more information on the agreement can be found at the NAFTA Secretariat's web site: www.nafta-sec-alena.org

[6] The Second Summit of the Americas was in April 1998 in Santiago (Chile), the Third was held in Quebec City (Canada) in April 2001. Many other Ministerial meetings and Negotiating Group meetings (from the 9 different negotiating groups) have been held more frequently (see FTAA, 2003, for more details).

[7] FTAA's chapter 1, article 4 on Application and Scope of Coverage of Obligations establishes that the FTAA "shall co-exist with bilateral and subregional agreements, and does not adversely affect the rights and obligations that one or more Parties may have under such agreements, to the extent that such rights and obligations imply a greater degree of integration than provided for [in the FTAA]" (4.3).

[8] For the specific paragraphs on this list of specific commitments, see the Section on other issues related to the above ("the above" being the eight articles of the chapter 8 on services), page 8.24 of FTAA (2002).

[9] See the paragraph *International Economic and Social Classifications* at the web site http://unstats.un.org/unsd/methods.htm

[10] The Harmonized Commodity Description and Coding System (HS) is maintained by the World Customs Organization. A 6-digit code is attributed to about 5,000 commodity groups. HS was agreed on in 1983 and is a modification of the 1950 Convention on Nomenclature for the Classification of Goods in Customs Tariffs. The goal of HS is to facilitate the identifications of internationally traded commodities for customs tariffs and statistical purposes.

[11] Although the Doha round only started in 2001, sector negotiations had already begun and were included in the Doha declaration (WTO, 2001a).

[12] Extraordinary circumstances, defined in article 607 of NAFTA, are essentially national security measures. They allow countries to restrict exports.

[13] The principles of negotiation can be found in the yearly Ministerial Declaration of the 34 participating countries, since 1995, at www.ftaa-alca.org or in chapter 1, article 3 on Principles, in FTAA (2002).

[14] Introduction to the GATS, in the Annex 1B of WTO (1994).

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Buying an Option to Build: Regulatory Uncertainty and the Development of New Electric Generation

*By Jon Ludwigson, Frank W. Rusco and W. David Walls**

Introduction

The electricity industry is in the midst of fundamental change as a result of federal and state (or provincial) efforts to restructure the industry, thereby introducing and increasing the intensity of competition in wholesale and retail markets (Borenstein et al., 2002; Joskow, 2000; Littlechild, 2000; Stoft, 2002; Wolfram, 1999). One key feature of restructuring has been a move away from centralized planning, wherein utilities, in conjunction with state public utilities commissions, planned for development of new generating capacity and transmission upgrades in order to meet expected increases in future demand. In its place, a decentralized process of development and investment decisions—largely by non-utility companies—is evolving; Ishii and Yan (2002), for example, analyze the "make or buy" decision faced by independent power producers in the deregulated U.S. wholesale power market. Unlike the rate-regulated regime of the past, the development and investment plans of these myriad companies are not subject to approval of public utilities commissions, nor are they coordinated in any way by a central body. This is particularly true in states that have aggressively pursued retail restructuring—sometimes requiring or encouraging their utilities to divest generating resources—but it is also the case in other states to the degree that non-utilities find it attractive to develop new generating resources in those states.

Under restructuring, states will no longer oversee the entire process of development and investment in new generating capacity. However, state entities still wield significant power to influence investments through licensing and permitting processes, through the terms of interconnection agreements, and more generally, through state decisions regarding whether and how far to pursue restructuring of their retail markets. Specifically, state and local agencies responsible for air and water quality and land use decisions must grant approval for companies to begin construction or operation of new power plants. The role of these agencies is to ensure that any new development is in compliance with relevant laws, ordinances, and regulations. There is considerable variation across states in the administration of the development process and thereby in the costs developers must incur to gain approval from state and local entities.

Federal environmental laws and regulations, as well as laws protecting endangered species also play a role in determining where and how new power plants are built. For example, proposed new power plants in any area that is not in compliance with EPA air quality regulations are subject to "new source review," requiring plant owners to purchase or otherwise acquire air emission credits equal to or in excess of their planned emissions. Often the new source review permits are issued by state agencies that have gained approval from the EPA to grant such permits. In the event that a proposed new power plant might impinge on the habitat of an endangered species, developers must also get approval from other federal and state agencies.

The costs of early development—the so-called soft development costs incurred prior to breaking ground for construction—are a small fraction of total costs to build but they are significant in magnitude, running between several hundred thousand and many millions of dollars. The magnitude of these soft development costs depends on the characteristics of the site, specific state and local requirements, and on how long the regulatory approval process takes—something that varies widely across states. For example, in a report on new generation development in three states, the U.S. General Accounting Office (2002) found that the average number of months required to gain state approval to cite a large power plant—defined as a plant with greater than 200 MWs of generating capacity—required about 8 months in Texas, 13 months in Pennsylvania, and 14 months in California. These soft development costs reflect the cost to developers of acquiring an option to build a power plant.

In addition to the development costs associated with acquiring regulatory approval, new power plants must be interconnected with the transmission grid, frequently requiring costly upgrades to the system to maintain reliability. The terms under which these new power plants are allowed to interconnect and the distribution of the costs of upgrades is another critical factor that determines where and when power plants are built. Again, there is considerable variation across states in the interconnection costs, and a developer's share of these interconnection costs can run from a few hundred thousand to tens of millions of dollars, depending on the characteristics of the existing transmission system and on how the costs are assessed.

Many hazards lurk in the regulatory arena. Because the development process can be long—running to many years in some cases—regulatory and market conditions may change considerably, causing developers to reassess the relative merits of each of their projects. Abrupt changes in regulatory environments can cause developers to flee. For example, during 2000 and 2001, high electricity prices and projections of future high prices in California, led to a flurry of new development projects in that state. Subsequently, California suspended its retail competition and required all consumers to buy from the state's utilities at regulated rates. Since the state's suspension of retail competition and the renegotiation of long-term contracts entered into in the winter and spring of 2001, most of the proposed projects have been cancelled or postponed, and currently, very little new development is taking place in the state. It should be noted that California's

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suspension of retail competition was necessary in order to ensure that the state utilities could charge prices high enough to recover the costs of power purchased by the state at high prices during the height of the electricity crisis. These prices are considerably higher than current or expected future wholesale prices in the state.

Market uncertainty also adds to the risk of committing development resources. Energy prices have proven to be quite volatile across regions and over time. Market and regulatory uncertainty interact because longer or less certain approval processes to build new power plants or associated transmission upgrades increase developers exposure to market risk. Conversely, when development is delayed or abandoned because of regulatory uncertainty the resulting supply shortfalls can lead to greater price volatility. In the next section we explore the decision making process of power plant developers. In the remainder of the paper we examine the experiences of states in attracting new generation development, the types of generators being built, and the actions of states vis-à-vis restructuring.

New Generation Development

Power plant developers look for the highest return on their investment, conditional on the risk of their portfolio of projects. In order to mitigate the risk across regulatory jurisdictions and over time, power plant developers may diversify their investments across regions and states, and across power plant type and fuel sources. In addition, because the regulatory approval process is long and outcomes uncertain, developers often plan multiple options for a given development budget—"real options" in the parlance of Dixit and Pindyck (1994). As more information is revealed about the future prospects at different sites, options are abandoned sequentially until eventually, only projects that will be completed remain.

Developers compete to build power plants in the right locations and at the right time to meet expected demand. Suitable locations generally require a nexus of access to fuel sources, transmission lines, and water for cooling. For example, developers of natural gas fired power plants—the predominant technology being built in recent years—look for sites with access to high volume gas pipelines with excess capacity. Similarly, coal fired plants need access to rail lines, or direct access to coal at the source.

Access to transmission suitable for interconnection is critical for developers. The costs to developers of gaining transmission interconnection vary from hundreds of thousands of dollars to hundreds of millions depending on the location of the new power plant, the effects of adding generating capacity on the entire system, and on how the costs are assessed. The terms under which interconnection is approved vary a great deal across states and control areas as do the distribution of upgrade costs. For example, in Texas upgrades required to interconnect new power plants are paid for through a surcharge on electricity sold to all consumers, while in California, developers have been required to pay for any upgrades deemed necessary by the local transmission owner—generally a local utility company.

The implications of different approaches to assessing interconnection costs on power plant location can be profound. When the costs are borne by consumers, developers can focus more on finding locations with lower development costs, easier access to fuel sources, and water for cooling. It is also possible under these conditions that there will be over-building of transmission upgrades, because developers do not bear the costs of any negative externalities they impose on other grid users when adding generating capacity at a point increases transmission congestion, thereby limiting incumbent generating plants' outputs. In addition, this approach may lead to concentration of generating units at some distance from the load it serves, because land costs may be lower and environmental issues, such as air quality, less prevalent on such sites.

On the other hand, when developers bear the full cost of upgrades, they look for sites with lower interconnection costs, which—given the nature of the flow of electricity and of congestion in the existing transmission grid—may encourage development closer to the load it will serve. However, it may cause under-building of upgrades because the developers are not compensated for any positive externalities accruing to electricity consumers. From the perspective of efficiency, the ideal is to assess upgrade costs on developers in the amount equal to the negative externalities imposed on other transmission users, and assess costs on consumers in the amount that they benefit from the new capacity. In practice, there is a great deal of uncertainty about the value of either externality, but it is fairly clear that neither extreme—assessing all costs to consumers or all costs to developers—is optimal except under extreme conditions.

Cooling water is essential for many of the most commonly built power plants. For the most part, this requires locating near a source of fresh water, although some designs allow the use of waste water. The volume of water drawn by power plants in the United States is quite large, ranking second only to agriculture. The water-cooling processes used in most newer power plants loses less water to steam in the atmosphere than do older technologies—most of the water is recaptured and returned to its source. However, returning warmer water to a fresh source can have negative environmental implications, and these issues have led to controversy and delays or denials of permits in some cases.

Finally, developers and investment bankers also prefer, other things equal, stable regulatory jurisdictions and clear market rules for trading electricity. Very few states have established and maintained clear paths to retail restructuring and this creates regulatory uncertainty. Specifically, only 17 of the 50 states and the District of Columbia have enacted and implemented legislation allowing consumers to choose their retail electricity provider. Even among the states with retail choice programs, the states have simultaneously reduced and frozen retail rates at levels that have discouraged retail competition. A lack of retail competition also feeds back into the development of new capacity by limiting the ability of developers to enter into long-term supplier contracts with

large consumers or multiple retail sellers. At the federal level, there has been a great deal of regulatory uncertainty caused by a lack of consensus among legislators and regulators about the scope and pace of competitive measures in wholesale power markets and with regard to electricity transmission.

Data Source and Construction of Sample

The data used in this paper are compiled primarily from monthly reports of the NewGen database published by RDI, a division of Platts. RDI gathers data on new generation projects from trade publications and state and federal data sources and reports the status of each of the projects they identify as of the reporting month. These new projects include upgrades and incremental additions to existing power plants—as in the case of nuclear plants—as well as completely new power plants. The status reports identify projects as being in one of six categories—proposed/early development, advanced development, under construction, operating, tabled, or canceled. A seventh category applies to projects that are being retired. We are only dealing with gross additions to generation in this paper because we are focusing on how projects transition from one status to the next, and retirements do not transition through the status categories in the same way as new generation projects. For the purposes of this paper, we define a project as a unique power generating plant that could be completed independently of any other units. Projects progress through the stages of early development, advanced development, construction, and finally operation. Projects may also be tabled or cancelled at any point in the process. In making the individual power generating plant the unit followed through time, we diverge from the definition of project adopted by RDI.

The NewGen database is designed to present a cross-sectional snapshot of the development of new generating facilities each month. As such, RDI does not publish historical time series of the status of projects. Instead, each monthly edition of the NewGen database supplants the previous month, in which newly identified projects are added and projects that have been in the operating or the cancelled status for over a year are removed. In addition, correction of errors, discovered in a given month, are not corrected in previous months of the database. Therefore, in order to develop such a panel of new generation projects, we accumulated individual monthly reports and merged them by a unique project identifier. This identifier combined information about the type of generating unit under development, the expected date of completion, the primary fuel of the unit, and other fields defined by RDI. Changes by RDI recorded in later months had to be traced back to past months to make sure the series were accurate. For example, a proposed project to build a 1000 MW capacity combined cycle natural gas plant may have been announced in the trade press and be listed by RDI that month as proposed. Subsequently, RDI may have received information from another source that the project is actually comprised of two separate combined cycle generating plants, each of 500 MW capacity and that these two units have different expected completion dates. Henceforth, this project would be divided into two phases by RDI, but would still be listed as a single project in previous months. There-

Table 1
New Projects by Owner Type, Jurisdiction, and EIA Restructuring Status

State	Status	Non-Utility	Utility	State	Status	Non Utility	Utility
AB	n.a.	40	6	NB	n.a.	2	2
AL	Not Active	23	9	NC	Not Active	10	8
AR	Delayed	19	3	ND	Not Active	2	2
AZ	Active	36	15	NE	Not Active	0	12
BC	n.a.	14	5	NF	n.a.	1	8
BJ	n.a.	9	3	NH	Active	3	0
CA	Suspended	193	22	NJ	Active	19	0
CH	n.a.	3	0	NM	Delayed	23	6
CO	Not Active	20	10	NS	n.a.	1	2
CT	Active	14	1	NV	Delayed	29	2
DC	Active	1	0	NY	Active	50	22
DE	Active	7	2	OH	Active	50	16
FL	Not Active	51	41	OK	Delayed	24	6
GA	Not Active	36	11	ON	n.a.	22	4
IA	Not Active	10	7	OR	Active	20	5
ID	Not Active	8	2	PA	Active	51	5
IL	Active	105	13	PQ	n.a.	3	11
IN	Not Active	37	11	RI	Active	3	0
KS	Not Active	6	7	SC	Not Active	12	8
KY	Not Active	28	10	SD	Not Active	5	4
LA	Not Active	39	6	SK	n.a.	2	1
MA	Active	21	2	TN	Not Active	18	13
MB	n.a.	0	1	TX	Active	114	15
MD	Active	11	2	UT	Not Active	6	13
ME	Active	9	0	VA	Active	36	6
MI	Active	34	7	VT	Not Active	3	2
MN	Not Active	18	11	WA	Not Active	38	11
MO	Not Active	10	14	WI	Not Active	29	16
MS	Not Active	23	7	WV	Delayed	14	1
MT	Delayed	22	2	WY	Not Active	14	1
MX	n.a.	16	8	Total		1467	440

fore, we had to correct past monthly entries whenever we discovered such a correction in information for later months.[1] The adjustments and deletions described above resulted in 1,907 unique projects with complete cases that we follow over the thirty-month interval.

Descriptive Overview of New Projects

Table 1 shows a tabulation by state/provincial jurisdiction of new projects that were owned by non-utility or utility companies and according to Energy Information Administration designations of state restructuring status. Overall, 77% of the new projects were owned by non-utility companies and 23% by utilities, with considerable variation across jurisdictions ranging from 90% of new projects being non-utility in California to 79% of new projects being utility-affiliated in Quebec. Note that restructuring status is only applicable to states in the United States. We include Canadian and Mexico because there is considerable trade of electricity between these regions and the United States.

Table 2 shows a tabulation of new projects by plant type and whether the projects are non-utility generation or utility generation. About 71% of all new projects are of the combustion turbine or combined cycle types accounting for 78% of the entire generating capacity of all new projects. Also, approximately 80% of these combined cycle and combustion turbine projects are owned by non-utility companies. Table 2 also shows that non-utility development is responsible for the bulk of renewable fuel generation. Specifically, non-utility companies account for 86% of the projects involving geothermal, solar, waste, or wind, and 52% of hydroelectric projects. The table also illustrates the predominance of natural gas as fuel source in new power plant development. The categories "Combined Cycle" and "Combustion Turbine", accounting for 78% of generating capacity under development, use natural gas as fuel source almost exclusively.

Table 3 shows that the majority of development projects have been in states that restructured—this includes California, which has recently suspended retail choice, but still has a centralized wholesale market run now by the California Independent System Operator. When we include states that delayed restructuring—states that passed some sort of restructuring legislation, but then delayed its implementation—61% of all projects under development have been in states that took some actions that signaled restructuring plans, compared to states that have been inactive entirely. In part this may be explained by the fact that the states taking restructuring actions generally had higher retail rates to begin with. For this reason, the value of additional units was greater in these states than in the inactive states. However, this is not the whole story. The ability of private generators to make money depends on restructuring status, because a state that allows retail competition will have more potential buyers of power than a state that still relies on a monopoly utility structure at the retail level. In addition, state actions to restructure signal intent on the part of state legislators and regulators to develop competitive electricity markets, making these states more desirable for non-utility investors. The bulk of utility development is in states that took no restructuring steps. Specifically, utilities accounted for 35% of total projects under

Table 2
New Projects by Owner Type, Plant Type, and Capacity

Plant Type	Non-Utility	Utility	Total	sum(cap.)	mean(cap.)
CC/Cogen	55	6	61	27897.1	457.33
CT/Cogen	54	6	60	9382.98	156.38
Coal	71	34	105	70931.74	675.54
CoalCogen	5	1	6	2117	352.83
CombCycle	471	89	560	356317.1	636.28
CombustTurb	587	207	794.4	210340.3	264.91
Geothermal	8	1	9	1026.9	114.1
Hydro	28	26	54	13811.45	255.77
InternCombust	16	11	27	674.45	24.98
Nuclear	7	23	30	10603.7	353.46
Other Boiler	25	13	38	8157.42	214.67
Solar	13	6	19	15.14	0.8
Waste	20	1	21	214.59	10.22
Wind	107	16	123	11682.21	94.98
Total	1467	440	1907	723172	379.2197

Table 3
Projects by Plant Type, Restructuring Status and Owner Entity

	Non-Utility Projects by EIA Restructuring Status			
Plant Type	Active	Delayed	Not Active	Suspended
CC/Cogen	18	5	18	3
CT/Cogen	21	3	16	4
Coal	16	16	36	1
CoalCogen	3	1	1	
CombCycle	222	50	136	36
CombustTurb	225	34	194	115
Geothermal	1	1	5	
Hydro	3	3	7	1
InternCombust	2	3	4	6
Nuclear	7			
OtherBoiler	4	1	6	5
Solar	4	1	8	
Waste	12	4	4	
Wind	46	13	24	5

	Utility Projects by EIA Restructuring Status			
Plant Type	Active	Delayed	Not Active	Suspended
CC/Cogen	2	1	3	
CT/Cogen	1	4		
Coal	6	1	23	
CoalCogen	1			
CombCycle	16	5	47	6
CombustTurb	61	10	120	11
Geothermal				
Hydro	1	1	2	1
InternCombust	10	1		
Nuclear	11	1	9	1
OtherBoiler	5	1	5	2
Solar	6			
Waste	1			
Wind	2	11		

[1] See footnotes at end of text.

development in states that did not pursue restructuring, but only accounted for 14% of projects in states that were either actively pursuing restructuring or had delayed their restructuring implementation.

Finally, Table 4 illustrates the real options nature of power plant development. For example, for non-utility owned projects, over 25 percent of the projects in the sample were cancelled or postponed indefinitely by the last month in the sample period. Another 23 percent of the projects in the sample had been completed and were operating during the last sample month, and the remaining projects were at various other stages of development. This pattern is consistent with developers treating each project under development as an option to build that will be continually evaluated in light of changing regulatory and market environments. Over time, as more information is revealed about the relative values of various options, developers abandon the less valuable projects. Table 4 also shows an apparent difference between utility and non-utility development of new generation. For example, only about 13 percent of the utility owned projects had been cancelled or postponed at the end of the sample period while about 43 percent were operating. This difference between ownership types is also consistent with the view that early power plant development reflects an option to build rather than a firm plan. Utility owners are typically building projects to meet load requirements in their service areas where they are quite familiar with the market and regulatory history. In contrast, non-utility developers may look for opportunities to build in many different regulatory jurisdictions and across very different markets leading to greater regulatory and market uncertainty. Greater uncertainty increases the value of the option to build and should lead to a greater proportion of project starts that end in cancellation or postponement.[2]

Table 4
Status of New Projects at End of Sample Period

Status	Non-utility	Utility	Total
EarlyDevelop	274	68	342
AdvanDevelop	258	73	341
UnderConstr	211	56	267
Operating	338	187	525
Tabled	196	23	219
Canceled	180	33	213

Conclusions

The addition of new power plants is much more prevalent in states that have either restructured their retail electricity markets or signaled an initial intent to do so than in states that have taken no restructuring actions. New power plant development is also more prevalent in areas of the country with a robust wholesale market infrastructure, such as exists in well established ISOs or RTOs. We also found a difference in the ownership of new power plants across states, with non-utility companies accounting for the bulk of new power plants in states taking restructuring actions, while utilities still have a strong or dominant role in new development in states that have not restructured at all. These patterns indicate that state regulatory actions are an important determinant of how well restructuring at the national level will ultimately work. The bulk of the potential benefits of restructuring the industry will come from improvements in efficiency of wholesale generation and sale of electricity and this depends critically on the ability of new companies to enter and exit. However, non-utility companies are far less likely to make the investments necessary to achieve these benefits in states that are not committed to developing a competitive environment. Finally, regulatory and market uncertainty create an environment in which developers invest in real options to build power plants, giving up or exercising their options over time as better information is revealed. The absence of a clearly defined federal restructuring policy and the inconsistency of regulatory approaches taken by states and provinces, therefore, increases total development costs and creates barriers to achieving the goal of competitively supplied electricity. The further exploration of the real options nature of power plant development is the subject of ongoing work by the authors.

Footnotes

[1] A more complete description of the database and the steps followed to develop it can be found in Ludwigson et al (2003).

[2] Utilities in states that have not restructured their retail electricity markets also face captive demand and are typically still rate-regulated. These utilities typically get approval to build new projects and with that approval comes an almost certain guarantee that they will get a normal regulated rate of return on their investment, as their total approved costs are eventually passed on to consumers. This also partially explains the lower proportion of "false starts" in the utility owned projects.

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Renewable Energy Financing; What Can We Learn from Experiences?

By Jyoti Prasad Painuly and Norbert Wohlgemuth*

Why Focus on Financing?

Estimates for the contribution of renewables to world energy supply vary widely. In the IEA estimates, for example, in the business as usual scenario (with the continuation of present government policies and no major breakthrough in technologies) renewables usage grows but their share in total energy supply declines to 12.5% due to relatively higher growth of the energy demand. However, in an Alternative Policy Scenario, that considers new energy and environment policies in OECD countries, the share of renewables increases to 25.4% by 2030.

Studies indicate significant growth potential for renewables, particularly in scenarios where environmental constraints are imposed, for example on CO_2 emissions:

- World Energy Council: Business as usual scenario: growth from 18% to 21% of world needs by 2020. In an ecologically-driven scenario: growth from 18 to 30% of world needs by 2020;
- United Nations: growth to 30% of world needs met by renewables by 2025 and 45% by 2050;
- Wuppertal Institute: increase of renewable energy share in the world's energy mix to more than 60% by 2050.

Thus, the world market for renewable energy systems can be expected on the order of several billion U.S. dollars annually (WEC, 1997). The World Bank estimates that developing countries will need 5 million megawatts of new electrical generating capacity over the next four decades. With the world's current installed capacity at about three million megawatts, this represents more than doubling of the capacity. In financial terms, this represents an investment of about 5 trillion dollars. The investment potential is huge even if renewables were to capture only 3-5% of this market. When investment in distribution channels and end user financing is added to this, the investment requirement multiplies manifold.

Wiser and Pickle (1998) find that one of the key reason that renewable energy technology (RET) policies are not more effective is that project development and financing processes are frequently ignored or misunderstood when designing and implementing renewable energy policies. Many RETs are no longer considered experimental; they have proven to work well in commercial settings throughout the world. In many countries public policies and government regulations change market conditions, making it easier for non-conventional technologies to compete. Even though many sustainable energy investments are "bankable", the financial community overall has been slow to provide financing for projects (Sonntag-O'Brien and Usher, 2004).

Decision-makers receive mixed signals from the investment literature about the issue of when it is appropriate to develop RETs substitutes for fossil fuels. In the case of renewable energy investments, cautious financial institutions often overestimate the risks and decide against extending loans or providing other forms of financial support for otherwise sound projects. In the end, projects that might be good investments and yield a global environmental benefit fail to go forward because of a misperception of the risks involved.

What are the Barriers?

Given the huge potential opportunities in renewables, why are entrepreneurs and financial institutions not rushing to cash on the opportunity? The answer is that renewable energy technologies (RETs) have to overcome a series of barriers before they can penetrate the market. The barriers have been discussed in detail in the literature on renewable (Painuly, 2001; Martinot and McDoom, 2000; G8 Renewable Energy Task Force, 2001; IEA, 2003; Wohlgemuth, 2001; Davidson and Turkson, 2001). In the initial stages of development, technical barriers predominate. In order for a technology to become cost-effective, market barriers such as inconsistent pricing structures typically have to be overcome. Then there are institutional, political and legislative barriers which hinder the market penetration of technologies, including problems arising from a lack of awareness of, and experience with new technologies and lack of a suitable institutional and regulatory structure. Finally, there are social and environmental barriers, which result mainly from a lack of experience with planning regulations which hinder the public acceptance of a technology. A sound strategy to increase the market penetration of renewables will need to address all these barriers.

However, the largest barrier to greater renewable energy use is its cost, despite the cost reductions achieved over recent years. But other obstacles, particularly for the increased use of renewable electricity, include subsidies and other support for competing conventional fuels (especially coal and nuclear power). Lack of full cost pricing when determining the cost of competing energy supplies also hinders the development of renewable energy since the cost of environmental impacts are usually not included in energy prices. High discount rates and competition on short-term electricity prices, as seen in electricity markets undergoing a change in regulatory framework, may disadvantage projects with high capital costs but low running costs, such as renewable electricity systems - unless governments set up schemes designed to replace and substitute for estimated deficiencies of the market place. The high cost of renewables and perceptions about the technology make it difficult for RETs to access finance. As a result, financial barriers appear to be most prominent for developing renewables. Several financial support programs have been taken up by international agencies, and public as well as private funds have been created to provide access to finance (Wohlgemuth and Painuly, 2002; Sawin and Flavin, 2004).

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Supply Side Financing

Investment subsidies. Investment incentives are often used to reduce project developers' capital costs and can take various forms such as; (a) direct subsidies that can be capital subsidy as per kW of rated capacity or as a percentage of investment, (b) tax credits, based on investment made in the project, (c) others such as duty exemption or lower import duties on equipments for RETs, accelerated equipment depreciation, property tax reductions, and value-added tax rebates. Some drawbacks of these type of subsidies include vendors inflating equipment prices to capture a higher subsidy in case of (a), abuse of tax credits and complexity and distortions inherent in manipulating the tax system.

Operating Incentives. One of the most important and sought after incentives is creation of market through power purchase agreements for an investor in electricity generating capacity through renewables. This includes access to transmission and distribution grid. It is also most important to obtain finance from financial institutions. For example, the 1978 Public Utilities Regulatory Policies Act (PURPA) in the United States which mandated that utilities purchase all independently generated power at their avoided cost. Operating incentives are normally performance based, as these are paid per kWh of electricity generated. Although superior due to their link with performance, these can be risky for investors as against investment subsidies that are paid up-front. The UK, Spain and Germany have been paying operating subsidies on a per kWh basis. However, the level of subsidy is determined differently; in the UK, it is through a competitive auction, while in Germany it is administratively set. In the United States, existing renewable electricity projects are paid an administratively determined operating incentive, while new projects must competitively bid for the per-kWh incentive (CEC, 2000). Operating incentives are also paid as a production tax credit per kWh basis. This strategy was employed by the United States since 1992, for example, in promoting wind and biomass energy.

Fixed higher payments upon delivery. A fixed payment per kWh of electricity generated is made, depending on technology used. The approach has been used successfully in Germany (Krewitt and Nitsch, 2003). Small-scale investors can also enter the market in this case. The overall impact on renewable energy development would depend on the level of price paid. This approach ("feed-in tariffs") has, in many cases, proven highly effective in stimulating investment in RE.

Competition. With the introduction of competition into electricity markets, RE funding has in some instances also been organised competitively in order to promote economic efficiency. The experience with tendering models has, however, generally been disappointing (Sawin and Flavin, 2004).

Green pricing and green certificates. In this case, competition is supplemented with the possibility for consumers to select their supplier according to environmental quality criteria. Consumers get an opportunity to support renewables by paying a premium for electricity generated from renewables. The approach creates a market niche for renewables. Bird et al. (2002) give an overview of international green power markets. In a variation of this concept, the supplier of renewable electricity gets a "Green Certificate" that can be sold in the market. However, this requires development of a market for such certificates. Nielsen and Jeppesen (2003) give an overview of tradable green certificates in European countries. In analogy to green certificates there are also black certificates (representing carbon credits) and white certificates (representing energy efficiency credits).

Carbon tax. Some countries such as The Netherlands, Sweden, and Denmark levy a carbon tax on fossil fuels due to the greenhouse gas emissions from use of these fuels. Since this is a tax on competing fuels, it helps renewables become competitive.

Preferential Financing for Renewables. Special financing terms such as lowered interest rates or longer repayment horizons are offered in this case. The result is reduction in project costs. For example, special funding agencies created by governments in Germany and India provide loans for renewable energy projects at below-market interest rates. The risk perceived by financial institutions is higher in the case of renewables (Wiser, 1997), making financing costly compared to conventional energy investments. Special financing facilities reduce this cost and may bring it to a normal or below normal level.

End-user Financing

Although supply side regulation and financing are relatively less cumbersome, end user financing mechanisms have become more popular in developing countries for reasons such as targeted financing (e.g., the poor can be subsidised), promotion of decentralised systems, etc. Some of the mechanisms include (Derrick, 1998):

Revolving funds. A fund is created specifically to support one or more renewable technology, which lends money to end users. The interest charged covers the cost of running the fund. Targeted subsidies can also be provided through such funds; donors provide grants to the fund and the fund lowers the interest rates for the targeted segment. An example is a fund created to lend for purchases of solar home systems (SHS) in India.

Renting, leasing and hire purchase schemes. In case of renting, a community or entrepreneur can own the facility and rent it to users, for example a photovoltaic (PV) charging station to charge batteries. Hire purchase schemes by sellers makes credit available to the end user, but mostly for a short term. Interest rates on such credit tend to be high. Leasing is also an option, for example, solar electrification companies could lease SHS. Users pay a monthly lease rental in this case.

Credit through Co-operatives. A loan is made available to the co-operative and borrowers are members of the co-operative. Default in such cases is low as the track record of the co-operatives can be checked. This mechanism has been particularly successful to provide credit to the poor. For example, lending by Grameen Bank in Bangladesh, and in India by various rural banks to self help groups. Self help groups are formed by poor households, and are similar to co-operatives in functioning. There are several success stories

of lending by banks through self help groups, that have benefited the poor and the banks had practically no defaults.

Lessons from Case Studies

Revolving Funds / Soft Loan Windows

Revolving Fund for Small Hydro Schemes in Peru

A revolving fund for financing micro hydro power plants was set up in 1994 through an agreement between the Inter-American Development Bank (IDB) and ITDG-Peru, an NGO. The project is an example of a successful financial model that combines subsidised loans and technical assistance through shared efforts between technical co-operation agencies and government institutions (G8 Renewable Energy Task Force, 2001). The project was initiated with the view to provide electricity to remote areas, not reachable through conventional grid. The fund has provided loan finance to 15 rural electrification projects of municipalities, 5 projects of the private sector and one project of the co-operative. A loan amount of $700,000 was given, which leveraged $2.5 million from government and other agencies to provide electricity to 15,000 people. Technical assistance for proposal preparation was provided and regional and local workshops were arranged to create awareness. The project needed social intermediation, forming pre-electrification committees or other ad hoc organizations to operate and maintain the plant (Barnett, 1998), and required technical intermediation in addition to financial intermediation. Repayment levels have been high but considerable time and effort had to be expended to market both the fund and the idea of hydro.

Seed Funding For Solar Home Systems in Bangladesh

Grameen Bank in Bangladesh set up a not-for-profit subsidiary, Grameen Shakti (GS), which is involved in the marketing, sales, servicing, credit provision and other activities related to PV Solar Home Systems (SHS) business. GS had started operations in 1996 and planned to install 100,000 SHS by the year 2000 (Lewis, 1997) but found the process of building customer confidence in systems time consuming and costly. In addition, long distances, poor transport infrastructure, impassable roads during monsoons, low literacy rates, cash-and-barter based transactions and lack of technical skills, all contributed to the high transaction costs of operating the rural PV business (G8 Renewable Energy Task Force, 2001). In 1998, International Finance Corporation (IFC) provided access to GEF funds through its Small and Medium Enterprises (SME) program, which enabled GS to offer better credit terms to their customers and their sales figures reached 2000 systems by the year 2000. The financing scheme that started with 50% of the system price as down payment and the remaining 50% in 6 months in six equal monthly instalments was modified from time to time and now requires only 15% of the system cost as down payment and the remaining 85% can be paid within 3 years time in equal monthly instalments with 12% service charge on the outstanding amount. GS plans to introduce 4 to 5 years financing scheme for the poor rural people. PV systems are also used for income generation activities such as for lighting in shops, clinics, restaurants, sawmills, rice mills, etc. and for cellular phone service. GS activities, besides providing credit, included training of local people to install and maintain PV systems, training of customers in application and maintenance of PV systems (Barua, 2001).

The experience at Grameen Shakti indicated that the process of building customer confidence and demand became less time consuming after a "critical mass" of installations and they believe that after three to four years of profitable growth they will be able to obtain additional financing from commercial banks. Grameen Shakti is also involved in development of wind power and biogas.

The project thus used GEF loan financing to support a project which was unable to obtain commercial financing due to high risk perception, and is expected to provide significant growth and scale-up for commercialisation.

PV Market Transformation Initiative (PVMTI) in India

The PVMTI was launched by the International Finance Corporation (IFC) to provide financial support to private sector ventures that encourage further market development for PV. Of the total US$25 million of GEF funds available for investment for projects in India, Kenya and Morocco, US$15 million was allocated to India. The PVMTI is aimed at accelerating the sustainable commercialisation and financial viability of PV technology and addresses market barriers by making available appropriate financing to stimulate business activity. The activities include; (i) providing finance to sustainable and replicable commercial PV business models, according to individual business plans through a competitive bidding process; (ii) financing business plans with commercial loans at below-market terms or with partial guarantees or equity instruments and; (iii) provision of technical assistance to PV businesses on planning, financing operations and technology. Seven investments had been approved by 2001, of which four in India.

The Solar Development Group

The World Bank and IFC along with a number of charitable foundations and the GEF, have developed the Solar Development Group (SDG). SDG is structured to be both a financing window for small PV enterprises in developing countries which will leverage private sector funds into this emerging sector and a business advisory service (G8 Renewable Energy Task Force, 2001). The SDG is expected to accelerate the development of viable, private sector business activity in the distribution, retail sales and financing of off-grid rural electrification applications in developing countries. PV would be taken up by the SDG first due to its increasing demand in developing countries. SDG will consist of two separate programs: (i) Solar Development Capital (SDC) which is an investment fund of approximately US$ 30 million for financing private sector PV or PV-related companies and financial institutions; and (ii) Solar Development Foundation (SDF) which is expected to disburse approximately US$ 20 million in grants or "soft" loans both to companies and programs that further SDG's mission. A total of 10 local PV companies have already received financial support through SDF and another 12 are expected to be funded during 2001.

A pipeline of over 200 companies in 57 countries have been identified and are under evaluation for possible support.

PV Solar Home System Financing in India

Financing Solar Home Systems is a four-year project funded by the United Nations Foundation (UNF) and Shell Foundation, designed to help accelerate the market for credit to finance the Indian rural solar energy sector. The project is being implemented by Syndicate Bank and Canara Bank, two of India's major banking groups.

The project helped develop credit facilities in the banks to build up lending portfolios specifically targeted at financing SHS in regions of South India poorly served by conventional financial institutions. The project uses the funding to "buy-down" the cost of financing a SHS at the retail level - in effect, a subsidy that lowers the interest rate on a loan taken by a customers to purchase a system. This relatively new approach differs from the traditional program that offers a subsidy on the capital cost of purchasing a system, which can lead to price distortions for systems. The target is to finance about 20,000 SHS over a period of three years. A US1 million dollar support is expected to leverage bank funds to the tune of $6-7 million.

The approach is designed to offer concessional finance that will become unnecessary once the barriers faced by mainstream financial institutions – such as perceptions the technology will not work as designed – have been addressed and the credit-worthiness of rural solar customers proven.

Renewable Energy Support Mechanism in California

A renewables support mechanism has been adopted to collect a total of US$540 million from electricity customers between 1998 and 2002 to support existing, new, and emerging RETs for electricity generation (Wohlgemuth and Madlener, 2000). These funds are to be collected by the utilities through a non-bypassable charge on distribution service ("system benefits charge"). California Energy Commission (CEC), who is responsible for administering the fund, has divided the funds into the following four primary categories:

- *Existing Technologies.* This is to provide support to already existing projects which continue to require financial support to remain operational. The existing technologies are further divided into three tiers, in which Tier 1 includes biomass and solar thermal projects (currently least cost-effective technologies), Tier 2 includes wind, and Tier 3 includes geothermal, small hydro, digester gas, landfill gas, and municipal solid waste (currently most cost-effective). Target prices and incentive caps (on per kWh basis) have been stipulated for each Tier.
- *New Technologies.* For new technologies funds are to be allocated *on a simple auction basis*, with funds with least support requirement as criterion for allocation. However, there is a cap on production incentive on per kWh basis.
- *Emerging Technologies.* The $54 million in the Emerging Renewable Resources Account is used to fund the "Buydown Program", a multi-year program of payments to buyers, sellers, lessors or lessees of eligible electricity generating systems that are powered by emerging renewable resources. (CEC, 2000) Emerging technologies eligible to participate include PV, solar thermal electric, fuel cell technologies that utilise renewable fuels, and small wind systems of not more than 10 kW. To ensure that the costs of these systems decrease over time, the level of buydown payment declines in five steps.
- *Consumer Credits.* Consumer credits are meant to help stimulate an active retail market in which consumers choose to purchase electricity from renewable energy suppliers. Consumers who choose such green power can receive an incentive on their electricity bills based on fund availability and renewable component in the electricity.

Energy Enterprise Development

African Rural Energy Enterprise Development (AREED) Initiative

The United Nations Environment Programme, in partnership with E&Co, have set up the AREED Initiative with funding support from the United Nations Foundation. The AREED initiative seeks to develop sustainable energy enterprises that use clean, efficient, and renewable energy technologies to meet the energy needs of the poor, thereby reducing the environmental and health consequences of existing energy use patterns. AREED provides enterprise development services to entrepreneurs and early-stage funding, in the form of debt and equity, to help build successful businesses that supply clean energy technologies and services to rural African customers. Services include training, hands-on business development assistance and, for promising businesses, early-stage investment and assistance in securing financing. AREED currently has a pipeline of more than 30 projects.

In each country, AREED is partnering with a local NGO or development organisation to which it will seek to transfer the technique of energy enterprise development so as to support long-term rural energy enterprise development. AREED has found that effectively transferring the technique of energy enterprise development to local organisations requires a significant time commitment.

Multipurpose Funds

Dutch Green Fund System

The Green Fund strongly promotes investments in new (green) technologies and projects by providing soft loans with low interest rates. The general public investing in the Green Funds receives an income tax exemption on the income from the investment, making an investment in a Green Fund more or less competitive with other funds. The projects for funding by a Green Fund are screened on their economic, environmental and social merits. The Government awards green certificates to the projects thus implemented, and also audits the system. Initially only projects in the Netherlands were eligible for funding, but in 1995 the scope was extended to projects in developing countries and economies in transition (Kwant, 2003).

The Green Fund System has been a successful program with active involvement of the financial sector and general public (G8 Renewable Energy Task Force, 2001). In the be-

ginning, the public heavily subscribed to the Green Funds and pushed the banks to set up more Green Funds. Between 1995 and 1999 over 1400 projects were issued with green certificates, to a value of over 1.8 million EU. This included over 300 sustainable energy projects and nearly 700 wind turbines.

Renewable Energy and Energy Efficiency Fund (REEF) for Emerging Markets

Launched by the International Finance Corporation (IFC) together with support from the GEF and several other private and public sector groups, REEF is a private equity fund that seeks to make minority equity and quasi-equity investments in profitable, commercially viable private companies and projects that include electricity generation primarily fuelled by renewable energy sources, energy efficiency and conservation, and renewable energy/efficiency product manufacturing and financing. REEF will operate in emerging market countries worldwide and consider investment in projects with total capitalisation requirements of between US$ 1 million and US$ 100 million.

Renewable Energy Investment by the World Bank

The Bank has supported renewables through various projects involving a variety of financing mechanisms. Following Martinot (2001), these can be classified as follows:

Support for renewable energy financing. The examples of such projects include the India Renewable Resources Development project that supported wind power development in India. Supported by a favourable regulatory framework and investment tax policies, by 2000, more than 1200MW of wind turbine capacity had been installed in India. In Sri Lanka, the Energy Services Delivery project provided financing to private-sector small-hydropower developers besides testing microfinancing schemes for installations of rural SHS. The project had supported 21MW of small hydropower by independent power producers (IPPs) through commercial-banks. The issue of business financing for delivery of rural energy services and credit to improve the affordability of those services among rural households was tested through the microfinance model to finance SHS in Sri Lanka (see earlier section for details).

Support for electric power policy frameworks. A sugar bio-energy project in Mauritius indirectly catalysed electricity generation from bagasse. The investment climate for renewable energy power projects encompassing public and private partnerships lead to development of regulatory frameworks for IPPs. In Sri Lanka also, regulatory frameworks evolved for IPPs as a result of private sector participation in hydro power development through the World Bank support. However, tariffs in the Sri Lanka project were related to short-run avoided utility costs and these hampered hydro power development after tariffs crashed to 3.5 cents/kWh in 1999 from 5 cents/kWh in 1997, due to the downturn in oil prices.

Support for rural energy enterprises. This includes Sri Lanka mentioned above, and financing for rural energy enterprises (SHS) under the SME Program in Bangladesh (see earlier section), Vietnam and the Dominican Republic. In Vietnam, a credit delivery scheme was devised to increase sales by the private dealer. In the Dominican Republic, the financing helped develop a fee-for-service business model. 3500 SHS had been installed by 2000.

Financing Energy Services for Small Scale Energy Users (FINESSE). This is a joint UNDP/World Bank program in operation in Asia since 1991. The program focuses on bundling renewable energy projects for funding, selecting appropriate financial institutions to implement the project, and arrange technical assistance. It has been applied extensively in Asia, and lately in Africa.

Summary and Conclusions

The role of renewables in meeting the world energy requirements is expected to increase dramatically due to sustainability and global environmental considerations. World electricity generating capacity may more than double in the next four decades and this offers a huge opportunity to develop renewable energy. Most of this is expected to take place in developing countries. However, renewables face several barriers today, impeding their deployment on a commercial scale. Cost competitiveness with other fuels combined with risk perceptions related to new technologies has resulted in a lack of availability of finance to renewables, particularly in developing countries. Financing problems thus represent one of the most important barriers in expanding renewables' usage. Several national as well as international agencies have tried to address this barrier through a variety of measures in both developed as well as developing countries. Direct and indirect investment subsidies (through tax breaks, for example), operating incentives through regulatory measures that require higher payment to power generated from renewables, green energy marketing strategies are some of the supply side mechanisms successfully used, mostly in developed countries. Preferential financing for renewables has also been made available in several countries. Financing mechanisms on the end user side have also evolved; thus revolving funds have been used to provide credit to the end users, renting and leasing schemes have been promoted by utilities or third parties, and hire purchase options have also been explored.

Revolving funds have shown considerable promise with successes in developing small hydro schemes in Peru, expanding use of SHS in Bangladesh, and building up supply potential for SHS in India. In several cases the achievements have been below originally planned levels but it only reflects the challenges that renewables face in dissemination due to their relatively high cost and low paying capacity of end users in developing countries. One of the features of some schemes, for example in case of SHS in Bangladesh, has been modification of schemes based on learning. The schemes in developed countries have been carried out through regulatory measures, obviating the need for direct interaction with end users, and thus avoiding high transaction costs. This has worked well in developed countries in introducing renewables for electricity generation and modified regulations based on the experience are now being implemented in several countries; for example new renewable support mechanism

in California, Feed Law in Germany and so on. Other market instruments such as green certificates, green funds, etc. are also now being tried out. This, however, has limited utility in a developing country context where major initiatives have been for decentralised options, often at the end user level. End users face the twin problems of access to credit and the high cost of credit, even if available, due to risk perception of the financial institutions of the renewable technologies as well as the borrower (end users are often poor). The projects such as financing of SHS in India and Bangladesh seek to address these twin issues. However, a favourable regulatory framework, along with credit support and incentives can be instrumental in driving upwards renewable energy capacity, as evidenced in the case of India's wind power program.

Development of renewable energy enterprises is another activity that received attention from several agencies. UNEP's AREED program in Africa has been successful in developing renewable energy enterprises that promise to multiply in the future once the experience is replicated elsewhere. A beginning has been made with a similar program launched in Brazil. Other such programs include FINNESSE by UNDP and World Bank, SME by the IFC and so on. The efforts in building capacity for small scale energy enterprises in developing countries is in line with the attempt to introduce decentralised and stand alone options (such as SHS, biogas) to provide renewable energy to the customers.

Although supply side initiatives have been around for some time, initiatives on the end user side are relatively new and still evolving. With increasing experience, these are expected to improve and address the barriers to renewables financing. In many cases the mechanisms needed may be unique to the type of renewable and socio-economic profile of the end users. That means the projects seeking to develop and test mechanisms should be flexible enough to accommodate specific needs and yet with potential for application in a large area. It is important to note that no single mechanism can succeed everywhere, and, therefore, a variety of mechanisms on the supply as well as end user side are needed. Current initiatives on all fronts are, therefore, a welcome development for promoting renewables.

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- The Middle East Situation and Energy Security
- Regulation vs Deregulation of the Energy Market
- The Impact of GHGs Emission Control on Energy Supply and Demand
- Rethinking Nuclear Energy
- Prospects of New Energy Technology
- The Scope and Potential of Renewable Energy

***** CALL FOR PAPERS *****

Abstract Submission Deadline: 2 December 2004

(Include a short CV when submitting your abstract)

We are pleased to announce the first Call for Papers for the 28th IAEE Annual International Conference entitled 'Globalization of Energy: Markets, Technology, and Sustainability', scheduled for 3-6 June 2005 at the Grand Hotel in Taipei. Please mark your calendar for this important conference. There will be at least 7 plenary sessions and 27 concurrent sessions, as well as 5 poster sessions. During the conference, we will also ensure that you and your spouses can enjoy the wonderful hospitality and rich content of traditional Chinese and Taiwanese culture.

Abstracts should be double-spaced and between 300-500 words giving an overview of the topic to be covered. Abstracts must be prepared in standard Microsoft Word format or Adobe Acrobat PDF format and within one single electronic attachment file. Complete contact details should be included in the first page of the abstract, which should be submitted to the CAEE conference secretariat either through the e-mail system (as an electronic mail attachment) or the postal system (in a 1.44Mb diskette) to: **Yunchang Jeffrey Bor**, Ph.D., Conference Executive Director, Chung-Hua Institution for Economic Research (CIER), 75 Chang-Hsing Street, Taipei, Taiwan 106, ROC, Tel: 886-2-2735-6006 ext 631; 886-2-8176-8504, Fax: 886-2-2739-0615, e-mail: iaee2005@mail.cier.edu.tw

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IAEE BEST STUDENT PAPER AWARD: US$1,000 cash prize plus waiver of conference registration fees. If interested, please contact IAEE headquarters for detailed applications/guidelines. **STUDENT PARTICIPANTS**: Please inquire about scholarships for conference attendance to **iaee@iaee.org**

6TH IAEE EUROPEAN CONFERENCE 2004

Hosted by:

Swiss Association for Energy Economics (SAEE) and Centre for Energy Policy and Economics (CEPE)

Modelling in Energy Economics and Policy

Swiss Federal Institute of Technology Zurich (ETH) – Zurich – Switzerland
September 2nd and 3rd, 2004

Sessions and themes of the Conference will be structured along the following topics:

Econometric modelling of energy demand
Electricity market modelling
General equilibrium modelling and energy policy analysis (Top-down)
Econometric modelling of cost functions
Input-Output models
Integrated energy system models (Bottom-up)

**** REGISTRATION ****

Deadline for the payment of the registration fee: June 15, 2004
(Opening of the online registration: April 30, 2004)

	Regular registration (Until June 15)	Late registration (After June 15)
IAEE Members	**500**	**600**
Non-IAEE Members	**600**	**700**
SAEE Members	**400**	**500**

CHF (Incl. VAT)

SAEE conference secretariat

Centre for Energy Policy and Economics (CEPE), Attn. Mrs. Jolanda Staufer
ETH Zentrum WEC C 12.1, CH-8092 Zurich
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Lester Hunt (University of Surrey), Mark Jaccard (Simon Fraser University),
Robert S. Pindyck (Massachusetts Institute of Technology)

More information about the conference and the registration formalities are available under
www.saee.ch/saee2004

Conference Proceedings on CD Rom
23rd North American Conference
Mexico City, Mexico, October 19-21, 2003

The Proceedings of the 23rd USAEE/IAEE North American Conference of the held in Mexico City, Mexico are available from IAEE Headquarters on CD Rom. Entitled **Integrating the Energy Markets in North America: Issues & Problems, Terms & Conditions**, the price is $100.00 for members and $150.00 for non members (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. Complete the form below and mail together with your check to Order Department, IAEE, 28790 Chagrin Blvd., Suite 350 Cleveland, OH 44122, USA.

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Publications

Encyclopedia of Energy. (2004) 5000 pages. Price: US$ 1950.00. Contact: Elsevier Order Fulfilment Department, 11830 Westline Industrial Dr., St. Louis, MO, 63146-9938, USA. Phone: 1-800-545-2522/314-453-7010. Fax: 1-800-535-9935/314-453-7095. Email: custserv.st@elsevier.com URL: www.elsevier.com/locate/encycofenergy

Water Resources Engineering Handbook of Essential Methods and Design. (2004) 348 Pages. Price: US$99.00. Contact: American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400, USA. Phone: 1-800-548-2723. Fax: 703-295-6211. Email: marketing@asce.org URL: www.pubs.asce.org

Prospects for Russian Oil Production: Waking the Bear. Julian Lee. (2004) 200 pages. Price: CD or Printed £1750.00. Contact: Marketing Department, Centre for Global Studies, 17 Knightsbridge, London, SW1X 7LY, UK. Phone: 44-20-7309-3610. Fax: 44-20-7235-4338. Email: marketing@cges.co.uk URL: ww.cges.co.uk

Sustainable Development of Energy, Water and Environment Systems. Naim H. Afgan, Zeljko Bogdan and Neven Duic, eds. (2004). 378 pages. Price: US$ 149.00. Contact: A.A. Balkema Publishers, P.O. Box 825, 2160 SZ Lisse, Netherlands. Phone: 31-252-435-111. Fax: 31-252-435-447. Email: orders@swets.nl URL: www.balkema.nl

Yearbook of Labour Statistics 2003 CD-ROM. Price: US$168.00. Contact: ILO Publications Center, PO Box 753 Ste STAT, Waldorf, MD 20604-0753, USA. Phone: 301-638-3152. Fax: 301-843-0159. Email: ilopubs@tasco1.com URL: www.us.ilo.org/bookstore

Oil Sands – Alberta 2004: Projects, Participants & Market Opportunities. Price: $495.00. Contact: Utilis Energy, 85 Eighth Avenue, Suite 6H, New York, NY 10011. Phone: 1-917-371-8161. Email: info@utilisenergy.com URL: www.utilisenergy.com

Annual Oil Market Forecast and Review 2004. Price: CD/Print: £650.00. Contact: Marketing Department, Centre for Global Studies, 17 Knightsbridge, London, SW1X 7LY, United Kingdom. Phone: 44-20-7309-3610. Fax: 44-20-7235-4338-5038. Email: marketing@cges.co.uk URL: www.cges.co.uk

Calendar

1-3 June 2004, Subsea Rio 2004 at Sheraton Rio Hotel. Contact: Sandra Gregory, Conference Coordinator, Quest Offshore Resources, Inc., 10701 Corporate Dr, Suite 188, Stafford (Houston), TX, 77477, USA. Phone: 1 281-491-5900. Fax: 1 281-491-5902 Email: sandra.gregory@questoffshore.com URL: www.SubseaRio.com

2-4 June 2004, BATTERIES 2004 at Hôtel Sofitel Forum Rive Gauche, Paris, France. Contact: sta@euroforum.fr, Euroforum, 35 rue Greneta, Paris, 75002, France. Phone: +33 (1) 44 88 14 65. Fax: +33 (1) 44 88 14 99 Email: abr@euroforum.fr URL: http://www.batteries2004.com/

6-8 June 2004, CERI 2004 Petrochemical Conference at Alberta, Canada. Contact: Dave Donald, Conference Division, Canadian Energy Research Institute, 150, 3512 - 33 St NW, Calgary, AB, T2L 2A6, Canada. Phone: 403-220-2380. Fax: 403-289-2344 Email: conference@ceri.ca URL: www.ceri.ca

7-11 June 2004, International Project Finance at New York City. Contact: Rachel Zagaro, Marketing manager, Euromoney Training-Americas, 225 Park Avenue South, 6th Floor, New York, NY, 10003-1604, United States. Phone: 212-843-5229. Fax: 212-361-3499 Email: rzagaro@euromoneyny.com URL: http://www.euromoneytraining.com/databasedriven/coursedetail.asp?busareaid=3&CourseID=160&LS=energyweb

8-9 June 2004, Energy Trading Central & Eastern Europe 2004 at Prague, Czech Republic. Contact: Ms. Sandra Langedijk, Project Manager, Synergy, PO Box 1021, Maarssen, 3600 BA, The Netherlands. Phone: +31 346 590 901. Fax: +31 346 590 601 Email: sandra@synergy-events.com URL: www.energytradingcee.com

15-16 June 2004, Global Deepwater Strategies 2004 at Houston Westchase & Towers, Houston, USA. Contact: Babette van Gessel, Group Mananging Director, Global Pacific & Partners International, 264 Groot Hertoginnelaan, The Hague, Netherlands. Phone: +31 70 324 6154. Fax: +31 70 324 1741 Email: info@glopac.com URL: www.petro21.com/events

17-17 June 2004, America Upstream 2004 at Houston Westchase & Towers, Houston, USA. Contact: Babette van Gessel, Group Mananging Director, Global Pacific & Partners International, 264 Groot Hertoginnelaan, The Hague, Netherlands. Phone: +31 70 324 6154. Fax: +31 70 324 1741 Email: info@glopac.com URL: www.petro21.com/events

17-19 June 2004, Hidroenergia 2004 at Falkenberg, Sweden. Contact: Anne-Marie Gorza, Assistant, European Small Hydropow-

(continued on page 32)

er Association, Renewable Energy House, 26 rue du Trone, B-1000 Brussels, Belgium. Phone: 32-2-546-1945. Fax: 32-2-546-1947 Email: esha@arcadis.be URL: www.esha.be

21-23 June 2004, Latin Oil Week 2004 at Rio Sheraton Hotel, Rio de Janeiro, Brazil. Contact: Babette van Gessel, Group Mananging Director, Global Pacific & Partners International, 264 Groot Hertoginnelaan, The Hague, Netherlands. Phone: +31 70 324 6154. Fax: +31 70 324 1741 Email: info@glopac.com URL: www.petro21.com/events

27-30 June 2004, 95th IDEA Annual Conference and Trade Show at Seattle, WA. Contact: Conference Organizor, USA. Phone: (508) 366-9339 Email: idea@districtenergy.org URL: www.districtenergy.org/calendar.htm

June 29, 2004 - July 3, 2004, Western Economic Association Intl's 79th Annual Conference at Vancouver, BC, Canada. Contact: Anil Puri, Executive Vice President, Western Economic Association Intl, 7400 Center Ave Ste 109, Huntington Beach, CA, 92647-3039, USA. Phone: 714-898-3222. Fax: 714-891-6715 Email: info@weainternational.org URL: www.weainternational.org

June 30, 2004 - July 2, 2004, Sand Control and Management for the African Oil and Gas Industry conference at Cape Town. Contact: Odette Briggs, Marketing Director, IQPC, Private Bag X174, Bryanston, Gauteng, 2021, South Africa. Phone: 27 11 707 9200. Fax: 27 11 707 9219 Email: odette.briggs@iqpc.co.za URL: www.iqpc.co.za

6-9 July 2004, MAREC 2004 3rd Intl Conference on Marine Renewable Energy at Blyth, UK. Contact: Eyda Moot, Conference Coordinator, The Inst of Marine Eng Sci and Tech, 80 Coleman St, London, EC2R 5BJ, United Kingdom. Phone: 44-0-20-7382-2620. Fax: 44-0-20-7382-2667 Email: eyda.moot@miarest.org URL: www.imarest.org

7-9 July 2004, 17th International Conference on Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy and Process Syst at Hotel Real de Minas, Guanajuato, México. Contact: Prof. Ricardo Rivero, Conference Chairman, Instituto mexicano del Petróleo, Eje Central Lázaro Cárdenas N° 152, Mexico City, 07730, MEXICO. Phone: +52(55) 30-03-84-27. Fax: +52(55) 30-03-69-35 Email: ecos2004@imp.mx URL: http://ecos2004.imp.mx

8-10 July 2004, 24th USAEE/IAEE Annual North American Conference - "Energy, Environment and Economics in a New Era" at Capital Hilton Hotel, Washington, DC. Contact: David Williams, Executive Director, USAEE/IAEE, 28790 Chagrin Blvd., Suite 350, Cleveland, OH, 44122, USA. Phone: 216-464-2785. Fax: 216-464-2768 Email: usaee@usaee.org URL: www.iaee.org/en/conferences

12-14 July 2004, 8th Asia Oil Week 2004 at Orchard Hotel, Singapore. Contact: Babette van Gessel, Group Mananging Director, Global Pacific & Partners International, 264 Groot Hertoginnelaan, The Hague, Netherlands. Phone: +31 70 324 6154. Fax: +31 70 324 1741 Email: info@glopac.com URL: www.petro21.com/events

19-21 July 2004, International Summer School on Thermodynamic Optimization and Constructal Design at Istanbul. Contact: Dr. Ugur KESGIN, Assoc.Prof., Yildiz Technical University, Mechanical Engineering Faculty, Besiktas, Istanbul, 34349, Turkey. Phone: +902122611999. Fax: +902122616659 Email: isat2004@yildiz.edu.tr URL: www.atc2005.net

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