Trading innovations

Energy exchanges must stay on top of innovation to keep new generations of traders in business, says EEX’s Peter Reitz

Mexico’s energy evolution
Market reform generates big opportunities for global investors

Breaking good
How BC Hydro is outsmarting power-stealing marijuana farmers
Diversity to drive transformation forward

Where will the P&U sector find the best new ideas and leadership to be fit for tomorrow?

The power and utilities (P&U) business continues to transform. This issue of Utilities Unbundled covers key elements of that transformation, including market reform, regulation, technology change and gender diversity. What’s striking is the contrasting pace of change across these varied strands.

Mexican national energy regulator Francisco Salazar is playing a leading role in restructuring the country’s electricity market (page 16). His ambitious program has thrust Mexico to center stage in the global P&U community, attracting considerable interest from global investors. Unbundling Mexico’s energy markets has certainly taken time – it was first mooted 20 years ago. But this has enabled the country to benefit from lessons learned elsewhere. In this case, taking it slow has had a positive result.

Conversely, in the space of a few years the global push for tighter trading regulation has created a marked shift to exchange-based trading of energy commodities. To date, this sounds like good news for Peter Reitz, CEO of the European Energy Exchange. On page 8, he outlines the changing role of exchanges in providing transparent, flexible trading options as the generation mix transforms. But come 2017, the new MiFID II/MiFIR financial rules may have a massive negative impact on overall trading market volumes. Exchanges must keep up the pressure to innovate, he concludes.

Elsewhere, European utility RWE npower (page 22) and Canada’s BC Hydro (page 4) discuss recent inspiring and unusual impacts of smart technology on their business. With smart meters becoming mainstream, data is already providing unique insights into consumer behavior. But the real revolutionary leap will come when smart grids start intelligently integrating the actions of all users to deliver sustainable, economic and secure electricity supplies. There is much more change to come.

These are just a few examples of how the P&U sector continues to transform. On this journey, utilities need to gather all possible economic advantages, find new business models that work and create long-lasting value. This will require a step-change in diversity of thinking, knowledge and experience. But where is all this new thinking going to come from?

One obvious source is better gender diversity. As things stand, women in the P&U sector tend to be concentrated in back-office functions, rather than helping to propel the business by running assets, or sitting on the board. Yet there are proven links between gender diversity on boards and better business performance. The pace of change here is glacial: EY’s latest research reveals that the appointment of women to P&U boards has stalled at disappointingly low levels (see page 24).

For utilities to reap the rewards of diversity, this situation has to change fast. We need the best new people to drive change in our sector now, not in 50 years’ time. Utility leaders need to treat the issue of diversity as seriously and urgently as any other major strategic or operational challenge.

As always, we welcome your views on all the topics covered here; contact details for EY authors are listed throughout.
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Breaking good

Canada’s BC Hydro had a problem. The British Columbian utility estimated that thieves were stealing at least US$80m of electricity a year – a sizable loss for a utility that turns a US$500m profit annually. The theft was costing each of BC Hydro’s customers nearly US$40 a year.

Company executives knew where most of that power was going: into the lighting and cooling systems of the province’s thriving marijuana industry. Generally located in homes that have been gutted and then outfitted with ventilation systems and fluorescent lighting, but sometimes also in outbuildings and even specially-built bunkers, the illegal “grow ops” can’t be easily identified from outside.

Nor could the stolen power be easily identified, as the marijuana growers tap into the grid illegally to avoid attracting the attention of the authorities. To make the challenge even greater, BC Hydro’s service area is bigger than the UK and France combined, which meant the company had a formidable task in identifying where theft was taking place.

But BC Hydro executives knew they had to find a way. “There was a high degree of motivation, not only for our company, but also for the Utility Commission, to address this issue and find a solution on behalf of our customers,” says Elizabeth Fletcher, Deputy Director of BC Hydro’s Smart Metering & Infrastructure Program.

And they found it: smart meters. The same technology that the utility industry is touting as an energy conservation tool could be used in British Columbia as a tool to stem the theft. A leading scholar at the University of the Fraser Valley has characterized the criminal enterprise of marijuana production as a highly organized US$4.2b industry – making it almost as large as BC Hydro itself, a Crown corporation¹ that generates US$4.3b in revenue each year.

¹. A Crown corporation is a state-owned enterprise within either the federal or provincial spheres.
Smart way to beat power thieves

Fletcher explains that the company’s solution is like a stool with three “legs” – meters, analytics and field investigators:

► **The hardware** – “Measurement devices on the grid allow us to compare the energy flowing into a feeder with the measured consumption of customers,” explains Fletcher.

► **The software** – “Energy analytics process the data from smart meters, examining things like tamper alarms, energy imbalances and unusual voltage patterns, to generate prioritized cases to investigate.”

► **Shoe leather** – “Field investigators troubleshoot areas of interest and locate where theft is taking place.”

The system is now in the late stages of rollout.

The distribution metering is nearing the end of field trials. “We are leveraging measurement data from supervisory control and data acquisition (SCADA)-enabled devices already installed on the grid, together with ‘check meters’ that can be moved easily to areas where system-level measurements are currently unavailable,” says Fletcher.

Analytics are further along. “We’ve already implemented two phases of energy analytics that have proven successful. Our advanced analytics focus on revenue loss detection and identification of data errors in the GIS topology model, together with improved graphical viewing of results. We’re now implementing the third phase of energy analytics, directed at energy balancing and creating a Hadoop data lake, which cheaply stores and provides access to the massive amounts of data generated by the smart meters and distribution system devices,” she explains.

In 2014, BC Hydro implemented a Connectivity Manager software application to identify errors in its geographic information system (GIS).
data and significantly reduce the time and effort required to correct them. This tool improves data quality by processing smart meter power down/power up events and uses advanced analytics to identify data errors. These errors are displayed geographically with recommended data-correction solutions for designers, field investigators and analytics teams.

Field investigators are already in place. At the moment, they are as busy as ever, acting on leads and shutting down illegal connections. And the job is now becoming increasingly data-driven, making the investigation process more efficient and effective than it has ever been.

**Further benefits beyond combating theft**

The system will offer other benefits beyond discouraging theft, according to Fletcher. “It’s an incredibly powerful tool. If something goes awry in the energy balances or they change from day to day, we will know there’s something wrong. And the energy analytics system alerts us to areas we need to investigate.”

Already, she says, the implementation of the Smart Meter Program has identified elements of the grid system that need attention: “As we began to implement smart meters, we certainly have seen our fair share of meter-tamper alerts, as well as under- and over-voltage conditions, which we’ve followed up from a safety and reliability perspective.

“The fact that almost every bit of energy consumption on our system is time-stamped provides us with a tremendously powerful and rich database that can greatly improve our performance in terms of reliability and cost effectiveness. We have provided customers access to their own consumption data to understand how much energy they are using and when they are using it. The end result is lower bills for many customers who take advantage of the information,” Fletcher explains.

In the short term, the US$750m project will cost customers money. Fletcher

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**Figure 1.** Recreated image of a BC Hydro data analytics screen. The yellow nodes represent normal operating conditions within BC Hydro’s service territory whereas the purple node indicates an abnormal condition that would trigger further analysis and investigation.

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**Layers**

- Substation
- Station breaker
- Primary conductors
- Secondary conductors
- Transformer
- Underground structure
- Customer meters
- CIM Map view dashboard
- Transformer meter
- Work orders
acknowledges there will be a rate impact: “The cost of the program will be recovered through rates, but the rate impact to customers will reduce over time as we begin to realize the benefits associated with the smart meter program. Ultimately, it will serve to lower customer rates as the benefits of all of the technologies implemented are fully realized.”

**Getting off the grid**

Although the final stages of the technology are still being rolled out, it already seems to be discouraging some power thieves. “Energy thieves know that we have begun to implement this technology. Our information indicates that theft has already dropped substantially from the levels calculated several years ago to the position today,” Fletcher says. It appears these growers are “beginning to use energy-efficient lighting, self-generate, leave the province or find legal avenues to produce their product.”

BC Hydro had estimated that at peak effectiveness, the theft deterrence program might decrease energy losses by 75%. Now, Fletcher says, “If our initial data is correct, we are having a much greater impact than we thought possible, especially at this stage of deployment.”

On the whole, Fletcher is optimistic that smart metering will be good not just for BC Hydro but for BC generally: “The results are quite encouraging, and over the long term this is going to be a great deal for the customers of BC Hydro.”

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**Elizabeth Fletcher**

Deputy Director of Smart Metering & Infrastructure Program, BC Hydro

Elizabeth Fletcher began work on BC Hydro’s Smart Metering & Infrastructure Program in 2007. Her involvement has included the creation of the program’s business case, overall financial and regulatory management, serving as energy analytics development lead and now as Deputy Director, overall program execution and completion. Elizabeth has over 35 years’ experience in business, including 15 years in the energy utility sector, 9 years with EY in Canada and 8 years in international shipping. Prior to joining BC Hydro in 2007, she served as Chief Financial Officer of a publicly traded, investor-owned natural gas utility headquartered in Vancouver, BC.
“We strongly believe hedging activity should not fall under financial market regulation, and if hedging is the main activity of the trader, then it should be exempt. We’ll continue to lobby strongly for appropriate and balanced exemptions under MiFID II.”

Peter Reitz, CEO of EEX
Innovation role for Europe’s energy exchanges

Sweeping changes to EU commodities markets and financial rules continue to transform energy trading. EEX’s CEO Peter Reitz explains the role energy exchanges are playing to provide increased transparency and more flexible trading options as Europe’s energy mix transforms.

Dynamic development continues in the energy trading sector, driven by two major factors: a heightened focus on financial and commodities regulation and the simultaneous transformation in our generation mix:

- Regulators have introduced a financial markets mindset and approach to energy trading. Applying European financial rules, including MiFID II, REMIT and EMIR to our sector (see box, page 10) has resulted in sweeping changes to energy commodities and derivatives trading, clearing and reporting.

- At the same time, there is huge investment around the world in increasing renewable power production. A bigger share of renewable power, created by smaller, decentralized producers, translates into a much more diverse set of players wanting to trade energy – shaking up existing ways of organizing the market.

There is a tension here. On the positive side, we all want a sounder, more transparent and responsible financial system, and updating the rules on trading will increase market integrity and transparency. After going through years of complex legislative processes with uncertain outcomes, we will benefit from legal certainty.

But the worry is that, cumulatively, the new rules make energy trading much more complex and difficult to access—particularly for the new influx of smaller traders. Trading costs rise, because the rules create a much heavier administrative burden for individual market participants and the market infrastructure – including exchanges and clearing houses. A heavy compliance burden, higher costs and greater complexity, creating barriers to entry and scaring entrants away, is clearly not what we want.

Supporting traders’ changing needs

EEX Group connects over 400 participants from all over Europe. It’s vitally important to us that our market stays vibrant, relevant and accessible to players of whatever size. This is a big driver of innovation for us, as the new rules add to complexity, and a changing trading universe creates a need for diverse solutions.

Lobbying for exemptions

As far as EEX Group is concerned, the impact of the new financial rules on trading is mixed. While EMIR has helped in part to attract higher trading volumes, MiFID II/MiFIR (as of 2017) may have a massive negative impact – on overall market volumes and on whether the playing field between different types of trading venue stays level.

MiFID deals purely with the regulation of financial markets. The vast majority of our clients don’t consider themselves to be financial market players: they’re hedging the production of power. MiFID allows certain exemptions for commodity market participants—power and gas markets in particular. One of these is the ancillary services exemption, which says that if trading is less than a certain percentage of your overall activity, your organization is not considered a financial player and it will escape MiFID regulation.

There is ongoing debate about what this threshold should be. At EEX, we believe hedging activity should not fall under financial market regulation, and if hedging is the main activity of the trader, then it
Over the past five years, new European regulations have been introduced with the overall goal of preventing another financial crisis. The regulations are interconnected and affect financial services firms and all those who trade commodities and commodity derivatives, including the energy sector. The new regulations bring a consistent approach across Europe, to be enforced with criminal penalties.

**European Market Infrastructure Regulation (EMIR)** entered into force in August 2012 with the aim of making over-the-counter (OTC) derivatives trading more transparent and secure. Effective since February 2014, all derivatives trades captured by EMIR have to be centrally cleared and reported to repositories.

**Regulation on Wholesale Energy Market Integrity and Transparency (REMIT)** entered into force in December 2011, with the aim of preventing insider trading and market manipulation in physical trading in EU gas and power markets. Firms affected by REMIT must publish their insider information, register themselves as market participants and start reporting on transactions in October 2015.

**Markets in Financial Instruments Directive II/ Regulation (MiFID II/MiFIR)** bring comprehensive changes to the original MiFID. The new rules aim to improve transparency and oversight of European financial markets by changing how stocks, bonds, derivatives and commodities are traded, cleared and reported. Previous exemptions for companies primarily trading in commodities and commodity derivatives will expire, and those in the power and gas markets may be required to comply. MiFID II/MiFIR entered into force in July 2014 and will apply from January 2017.
should be exempt. We’ll continue to lobby strongly for an appropriate and balanced ancillary activity exemption under MiFID II, as well as a proportionate definition of financial instruments.

**Relieving reporting burdens — breaking down barriers**

One key outcome of the new regulations has been to greatly increase reporting burdens. The potentially negative impacts on the market are that this will make trading more difficult and more costly, and restrict access for smaller players.

For example, from October 2015, REMIT will require market participants to report all energy transactions into a central regulator, the Agency for the Cooperation of Energy Regulations (ACER). Getting systems up and running for this requires a lot of work, and the high fixed costs of new infrastructure could drive some of the smaller participants out of trading. To relieve smaller traders in particular of much of this burden, EEX will be offering a service that allows members of our exchange to outsource their REMIT reporting obligations to us.

**Clearing services provide transparency and flexibility**

Our clearing house, European Commodity Clearing (ECC), acts as the central clearing house for eight European exchanges. It provides clearing and settlement services for energy, related products and commodities traded on an exchange or via trade registration. ECC continuously adapts to new market demands and requirements — for example, by expanding the range of securities it can accept as collateral.

The combined impact of EMIR and REMIT has been to induce utilities away from bilateral trading and toward exchange-based and standardized OTC trading because of the additional transparency it brings. At the same time, the fundamental change in the structure of the market that I have already described has greatly increased the importance of clearing services. Smaller players, in particular, don’t have the balance sheet of a big bank or a major utility and need someone to take the counterparty risk. The trend we’ve seen in the last couple of years toward a higher proportion of the market being cleared is mainly driven by these two forces.

Meanwhile, we have the distant prospect of mandatory clearing coming in under EMIR regulation. As things stand, even financial markets don’t have mandatory clearing although the path to it is becoming clearer, at least for some instruments. For commodity markets, I’m not sure it will ever play a role. What we have seen is that, because of the regulatory thresholds under EMIR, customers have been opting to use our voluntary clearing services to avoid falling into the mandatory clearing “bucket.” If they opt to conclude a trade at an exchange with our trade registration option, they get the benefit of standardized processes, hedging against payment and delivery defaults, and legal certainty. They also gain flexibility — all contracts registered at EEX and cleared via ECC are not taken into account in the calculation of the €3b EMIR threshold. Each trading company can decide when and which volume it wants to clear.

**More flexible options for short-term trading**

As a direct result of more renewables on the market, we’ve seen a big shift toward short-term trading. Wind and solar power are weather-dependent and unpredictable, and weather forecasts have a short-term orientation whereas trading in the futures markets has a long-term orientation up to six years in advance. This works for hedging conventional generation — such as that from coal-fired power plants — but is not suitable for renewables generation.

We’ve therefore seen tremendous growth in short-term trading, and this is where a lot of innovation is needed. At EEX we have responded with a number of new instruments: for example, in 2011, trading in 15-minute contracts was launched on the Intraday Market of our subsidiary EPEX SPOT. This has made it possible to integrate renewables into the short-term spot market much more effectively than before. In December 2014, EPEX launched a call auction for 15-minutes on the German Intraday market, to provide a reliable price signal on a quarter-hour basis. This 3:00 p.m. auction provides balance-responsible parties with a tool to fine-tune their portfolios on a 15-minute basis during production ramps and forecast deviations.
Later in 2015, we will be increasing the efficiency of the short-term Intraday Market by cutting the lead time between trading and delivery in physical power from the current 45 minutes down to 30 minutes. This will enable all market participants to continue trading until half an hour before delivery, allowing them to make even finer adjustments to changes in weather forecasts, production outages and so on.

In natural gas markets, we are currently designing new “prompt” products that fit into the niche between spot and futures markets. Other innovations include new trading functionalities, such as location spreads between major European power market areas. This is already available in OTC markets, but we’ve adapted it to exchange trading.

Cap Future insures against “dark calm”

EEX will be the first exchange to offer flexibility products for Germany’s energy turnaround with the launch of our new Cap Future product this year (see box, right).

Traders need flexible solutions to cope with the German situation, which involves drastic increases in generation of electricity from renewable energy. This can’t be accurately planned in advance, so market participants need tools to adjust their short-term positions at times of “dark calm” — when there’s a lack of wind or sun — and to avoid imbalances between generation and consumption.

The Cap Future is designed to provide an insurance against high prices in short-term trading of hourly contracts for buyers. It will integrate renewables into the market and offer an income stream for those who can provide flexibility on the production or demand side. We expect to launch the new product in mid-2015. Clearly, its success will depend on whether Germany can reach a clear political commitment to integrate renewables back into a balanced market. With producers participating and taking responsibility for some price risk, they will have an incentive to hedge their production in advance.

We’re at the leading edge in creating products like this. But we don’t innovate in an ivory tower — we develop solutions
in close consultation with our customers, trying to understand in detail what their problems are and how we can help.

**Push for innovation continues**

Energy trading markets continue to change so rapidly, and there’s something new to learn every day. Fifteen years after its foundation, EEX has transformed from a single energy exchange to a flexibly structured group of energy and commodity exchanges in different markets in Europe and beyond. By integrating the Singaporean exchange Cleartrade in 2014 and the French exchanges Powernext and EPEX SPOT in 2015, our group has expanded its offering to new commodities outside its origins in energy. In another recent move, the Anglo-Dutch power exchange APX was integrated into EPEX SPOT with effect from 4 May 2015 and became part of the group.

Our clients are also hugely diverse. The big utilities and the small Stadtwerke (municipal utilities) are all very different animals from the straight financial markets players. Managing the EEX Group’s business in all its diversity is a great and exciting challenge. The future success of our exchange will depend on our ability to continue identifying the added value that EEX can provide for this very diverse set of customers, to create new solutions that really work. There has been a sea change and it’s not over – today’s trading custom and practice will continue to be challenged.

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**Peter Reitz**  
CEO, European Energy Exchange (EEX)

Peter Reitz has been chairman of the EEX Management Board since 1 August 2011. He started his career as a product manager at Deutsche Börse AG in Frankfurt. From 2000 to 2001, he worked at Dow Jones Indexes in New York before becoming a member of the Eurex Management Board. From March 2007 to July 2011 he supported the development of the EEX as a member of the EEX Supervisory Board.
Can bundled services work?

Many utilities see strategic alliances with other service providers as a way forward in a tight market, but Grzegorz Lot, a marketing executive for one of Poland’s most innovative power companies, says they aren’t easy to get right.

Many utilities the world over face the same challenge: how do you keep your customers – and add new ones – in a competitive landscape of homogenous services with similar pricing?

Bundled offerings that include other services, such as telecom and cable, are a potential way forward. But establishing and running successful strategic alliances that create new value propositions presents a fresh set of major challenges.

In Poland, my local market, one reason for resistance to signing on to all-in-one multiple-product bundles may be that consumers still think of the proposition as a legacy of state-planned systems. They remain wary of relying too much on a single provider. However, this concern may reach west of Poland too: when I worked at the Swedish utility Vattenfall in Germany, my team asked customers if they would like to get all their bills on one invoice. Initially they said yes, but when the offering became available, only a small number of customers actually signed up.
“We have electricity” is not a sales pitch
There are other factors that make bundling services challenging. Getting people to switch electricity providers is a more difficult proposition than, say, getting them to switch telecoms or cable TV providers because the power company can’t really offer anything the consumer can see or touch, and often isn’t allowed to compete on price. This lack of a distinct value proposition can make for absurd sales pitches, which go something like:

“We can give you electricity.”
“This is crazy. I already have electricity.”
“But if you want to buy electricity, you can buy from us.”
“Why from you?”
“Because we have electricity.”

In addition to a far from compelling sales proposition, in Poland, the paperwork involved in switching also holds down adoption.

The choice of partner affects performance too. Different partners bring different advantages to the table. One advantage that telecom companies offer, for instance, is that they have stores. However, it can be difficult to get the telecom sales associates to give customers the support they need to make cross-selling energy work.

Finding a partner that wants to pursue the same target customer isn’t easy either. For best results, the other brand must be willing to share the limelight. We can talk about marketing strategy, but if, for example, the telecom or banking stakeholder wants to be on the front line and create the impression that “I’m the provider of everything,” and at the same time the partner says, “Okay, but I want to do that too,” it’s difficult to find the right atmosphere to make the business work harmoniously in the long run.

Finally, if the idea sounds good, your competitors may be quick to copy it. In Poland, for instance, most of the major power companies have alliances with telecom providers. This includes my company, Tauron, which recently experimented with T-Mobile on a joint offering to provide customers with a package of discounted phone services and power rates. Such all-in-one utility plans can extend to other areas, such as entertainment and banking.

Look for value
Don’t get me wrong: I am optimistic that all-in-one packages can work. But in the end, they need to make sense to the customer. Real value is not optional. To be successful, I have to be sure that I can provide our customers a real advantage.

In Poland, for instance, 80% of customers pay their bills in cash, so an alliance with a bank might be a natural option.

Time will tell how successful the bundled approach will be. But judging from the challenges bundling has faced so far, I don’t imagine the process will be easy. I can’t say with certainty that it will be a successful story with a happy ending. But if we don’t try new approaches now, we might miss out on big opportunities to bring real value to our customers in the future.

“I am optimistic that all-in-one packages can work. But in the end they need to make sense to the customer. Real value is not optional.”
Grzegorz Lot, Tauron Polska Energia Group

Grzegorz Lot joined Tauron in 2010 and leads the company’s marketing operations. He has 18 years of experience in the utility sector. Prior to taking up his current role, he held sales, marketing and customer service executive roles with Vattenfall in Poland and Germany, as well as business development and project management roles with Polish electricity distributor Górnośląski Zakład Elektroenergetyczny S.A.
Spotlight

Enterprise and regulation
Mexico’s energy evolution

More than 20 years in the making, Mexico’s energy reforms are generating significant interest from global investors. Matthew Rennie and Moisés Alcalde spoke to Francisco Salazar, President of Mexican energy regulator Comisión Reguladora de Energía (CRE) on the benefits of coming late to reform.
When it comes to energy reform—the process of restructuring incumbent monopolies, opening the market to competition and inviting new entrants—the advantages of being a first-mover are hotly debated. While it’s true that countries that move early to reform can capitalize on opportunities to attract investors and capital, too often we’ve seen that those first to move can also be the first to fail or, at least, may fail to realize the full potential of reform. Around the world, many countries that embarked upon reforming and unbundling their energy markets back in the 1990s are now having to face a second wave of reform, in a bid to put in place the type of energy markets that actually reduce prices, improve service and encourage sustainable investment.

**Mexico’s motivation**

Meanwhile, Mexico has paved a different path to reform. While tentative steps toward introducing competition were made in the early 1990s, the country’s latest reforms to break up the monopoly of the electricity company Federal Electricity Commission (CFE) and gas utility Petróleos Mexicanos (Pemex) were only passed into law by President Enrique Peña Nieto in August 2014. With Mexico expected to see some of the world’s largest electricity demand growth, the changes to the energy market aim to attract the investment needed to address projected electricity generation shortfalls, improve transmission and distribution infrastructure and move toward cleaner and less costly energy sources.

It’s bringing down these costs that is a crucial element of reform, says Francisco Salazar, who leads Mexico’s energy regulator. Mexico heavily subsidizes electricity for residential and agricultural users, but its industrial users literally pay the price, with electricity bills about 84% higher than those of their US competitors. These steep costs are causing Mexico to miss out on the manufacturing revival currently taking place north of the border.

“This is the main problem,” says Salazar. “Industry has not had access to competitive electricity rates, and Mexico was losing competitiveness.”

**Late-mover’s advantage**

Salazar is a patient man. Head of CRE since 2005, he admits that he—and Mexico—have been advocating energy reforms “for a long, long time.”

Like its regulator, Mexico’s energy reforms are also marked by a sense of patience and a value placed on research, analysis and testing. Yes, unbundling the energy markets has taken time, but this slower pace has advantages, says Salazar, who points out that letting other countries move first has allowed Mexico to benefit from lessons learned.

“You could say that Mexico arrived late to this kind of reform but, on the other hand, we have benefited from understanding the mistakes of previous reforms. So … we are taking pieces from here, pieces from there, based on the best practices, and things that experience has proved to work well. So I think we have the advantage of learning from others.”

Salazar says Mexico has analyzed reforms from just about everywhere but has paid special attention to those in Brazil and Chile, as well as in the states of Texas and New England in the US.

“Because we are planning a market with nodal pricing, which is something almost solely seen in the United States, we have also studied the experience of the PJM market,” he explains. “We’ve taken a varied view. We use different experiences based on what we have in place, and on what we thought could be useful in our case.”
What will the new energy market look like?

With such a broad wealth of experiences to draw on, it’s not surprising that the framework of Mexico’s planned reforms looks solid, with the right mix of ambition and caution (see inset box: Mexico’s reforms at a glance).

The law unbundles the functions of generation, transmission, distribution and marketing, which must each be carried out independently now, and with strict legal separation from the other functions. CFE will continue to participate across all industry activities, but through separate subsidiaries, which will be run as independent business units.

Reforms will also establish a new wholesale market for electricity to be operated by the National Center for Energy Control.

One feature of the reform that seems particularly wise is the decision to leave CFE as sole supplier to residential customers, at least in the short term. The move will spare CFE the enormous cost of preparing for the churn of residential customers.

Explains Salazar: “We considered the cost but also the fact that competition at the retail level takes a lot of time. See, for instance, what happened in Texas – Texas has a lot of competition in electricity retail,

Mexico’s reforms at a glance

Generation

A new market created through the independent grid operator, Centro Nacional de Control de Energía (CENACE), will provide an avenue for generators to sell load into the market on competitive terms.

Retail

The new market will see three types of electricity retailers:

1. Basic service providers, which will provide services to households – initially, only CFE will provide this service

2. Emergency retail service providers, which provide emergency power services to qualified or big users (i.e., those with annual demand equal to or above 3 MW. This threshold will drop to 2 MW in August 2015 and then 1 MW in August 2016)

3. Qualified retail service providers, which provide services to big users not registered with CENACE

“You could say that Mexico arrived late to reform, but we have benefited from understanding the mistakes of previous reforms.”

Francisco Salazar, CRE

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1. Locational Marginal Price (LMP) is often referred to as nodal pricing. LMP is the marginal cost of supplying the next increment of electric demand, at a specific location (or node). The nodal price is the LMP at a specific node.

2. The Pennsylvania-New Jersey-Maryland Interconnection (PJM) in the US is the world’s largest competitive wholesale electricity market.
but it took 10 years to get there. We thought it was better to concentrate our efforts in the very beginning on the more urgent thing, which is allowing competition for large users.”

Opportunities on multiple fronts

The reforms look set to offer opportunities to generators who seek the stability of long-term bilateral contracts and those who trade through the market, which may appeal particularly to those smaller, gas-fired producers who are looking to turn a quick profit on the spot market. We also expect much interest in Mexico’s huge untapped renewable energy segment – particularly generation via wind, solar and geothermal sources.

“Government targets mean that, by 2024, at least 35% of our generation must be based on non-fossil fuels, or what we call clean energies,” Salazar says. (It should be noted that Mexico’s definition of “clean energies” goes beyond renewable energy sources to include natural gas cogeneration and thermal electric plants with carbon capture.)

To meet clean energy targets, Mexico has introduced a market to trade clean energy certificates, which all market participants will have to purchase by auction each year.

Salazar explains: “The idea is that all the users understand they have to finance projects related to these clean energies. And in the case of the basic service supplier, CFE, which has a large number of small users, it will have to buy those certificates through an auction. These kinds of auctions will provide the stability and long-term contracts that renewable generators are looking for.”

Salazar says that renewables will have an important role to play in overcoming the challenges of bringing power to some parts of rural Mexico: “In Mexico, the electrification rate is currently more than 98%, so the marginal costs for supplying the rest of our consumers are very high. Renewable energy will be a cheaper alternative than expanding the grid, most of the time.”

Electricity and gas infrastructure projects – in partnership with CFE – are also attracting much interest, with several projects already underway, funded by investors both from Mexico and overseas.

Salazar’s advice for those new to the market is to make connections in-country: “A company that hasn’t been present in Mexico might find it useful to talk with companies that are already here. And I think that if they ask them their perception of the stability of energy regulation, they will have positive answers, even with the previous scheme. We don’t like to give surprises.”

Timeline of Mexican reforms

- August 2014
  - Mexico’s Electric Industry Law became effective
  - CFE files related to interconnection processes of power stations and connection of load centers provided to CENACE
- October–December 2014
  - Issuance of guidelines for clean energy certificates
  - Deadline for proposals to Senate for composition of CFE board of directors
  - CFE defines the zones in which it intends to continue pursuing geothermal projects
  - Appointment of head of CFE Internal Audit Department
- Q1 FY15
  - Decree issued to create CENACE
  - CFE boards of directors to approve plan for their new structure
  - Ministry of Energy or SENER to resolve the requests of CFE with respect to geothermal projects CFE wishes to develop; subsequently, bidding procedures to be carried out on zones not granted to CFE and others not requested by CFE
- Q2 FY15
  - CENACE to receive economic and material resources for control of the National Electric System
  - CRE to issue model contracts referred to in the Electric Industry Law
- Q4 FY15
  - CFE to be transformed into a state production company
Big challenges for regulator

Francisco Salazar says that while Mexico is “moving fast” toward reform, the process is, understandably, layered with complexities. A large part of CRE’s preparation has been concerned with “making sure we have the right regulation in place,” particularly around ensuring a level playing field for new entrants.

“In retail, while – in the short run – it will be basically CFE, the idea is that the electricity bought through these competitive processes is split between the different suppliers that want to participate in that market. The rates that suppliers will pay for transmission and distribution will be the same, so there won’t be any advantage for any particular supplier based on the cost of energy.

“The difference will rely on the kind of service or schemes that they can offer to users. For example, if they are creative, instead of offering an invoice that varies from month to month, they can offer a stable invoice by taking advantage of hedging schemes.

“The generation market will be very competitive because it won’t be regulated beyond making sure that every generator offers its variable costs. And that in itself provides a lot of competition, and guarantees a level field for all the players.”

Salazar admits that communicating the changes will be a big challenge for him and his team. “We have a lot of consumers that do not have any experience at all with this kind of competitive market,” he explains.

“Helping them understand the market rules is a very complex process. We have to educate consumers so they know that they have alternatives, and they know their rights. And we also have to educate the existing generators on the change of rules that we are putting in place.”

Some of these changes are yet to be determined, with CRE still considering the rules around issues such as access to the grid and how to allocate costs and determine rates of return. But again, this delay in finalizing market rules is driven by the conscious decision to take time to prepare, analyze and consider, says Salazar.

“We are basing our work on some rate studies that we did previously. Even though we didn’t have the power to regulate rates in the past, we performed at least a couple of studies where we analyzed cost structures and the costs of every single activity. So it’s not something that is entirely new.”

Three determinants of success

How do we determine the success of energy reforms? It’s a contentious topic with answers that vary depending on the experiences of different markets as well as how the world’s definition of successful energy markets evolves.

For Francisco Salazar, the success of Mexico’s energy reform will be judged on three factors: “First, if the pace of investment in generation continues, that will be an important measure of whether we are successful,” he says.

“Second, if we see an increase in the number of consumers that decide to switch providers, this will be another indicator of success in this new market.

“And third, I think it would be interesting to take a look at the evolution of relative prices compared to other regions where the generation bundle is similar to the one we have in place.

“Right now, when we compare ourselves to areas that have about the same kind of generation bundle, we see a very important difference in prices. So if we start measuring the behavior of those relative prices, and if we are successful in bringing competition, we should see a positive evolution of these relative prices.”

Francisco Salazar

President, Comisión Reguladora de Energía

Francisco Salazar was appointed Chairman of the Comisión Reguladora de Energía for the first time in 2005 and reappointed for a second five-year term in 2010. He is also Chair of the Ibero-American Energy Regulators Association (ARIAE) and the Mexican chapter of the World Energy Council.

Matthew Rennie

Global Leader, Energy Reform and Unbundling
Brisbane, Australia
+61 439 670 765
matthew.rennie@au.ey.com
@MattRennie_EY
au.linkedin.com/in/mattrennieEY

Moisés Alcalde

Advisory
Mexico City
+ 52 55 11018493
moises.alcaide@mx.ey.com
The potential of smart goes far beyond providing customers with more intelligent meters. **Steph Fox** from RWE npower shares her views on how smart offers the utility industry an opportunity to transform completely.

The challenges of preparing for smart are much broader than getting the technology right and ensuring rollout happens on time and on budget. As Head of Smart Business and Customer Readiness at RWE npower, I’ve seen firsthand how smart impacts every aspect of a utility’s operations. So instead of considering how to “adapt,” I think utilities should grasp this rare opportunity to transform the way we do business.

**Smart will change what we do — and how we do it**

As one of the UK’s “big six” energy retailers, RWE npower is mandated to install more than 5.3 million electricity and gas smart meters for our residential (and some B2B) customers by 2020, with this mass deployment due to kick off in the third quarter of 2016.

Of course, the logistics of such a deployment are staggering. But my challenge is to make sure RWE npower understands that the challenges of smart go beyond this massive rollout. We've managed significant changes within our industry and within our business before, but nothing as large as smart.

We will see a particularly significant impact on our residential business, where 70% of processes will have to be changed. We’ll also need to understand what smart
will mean from a regulatory perspective. There are new requirements, around security for example, where we need to demonstrate full compliance with wider industry regulations.

And with the last meter not due to be installed until 2020, the long-term nature of the rollout introduces more complexity. We’ll be running a dual business for a number of years. As we increase smart meter installations, we will ramp down traditional meters. But for five or six years we’ll be running the traditional business as well as the smart business, and we’ve got to be able to cope with that.

As well as changing what RWE npower does, smart will have a huge impact on how we work. Our organization is structured in segments – Domestic, B2B and Energy Services – but smart will bring us together, requiring close collaboration across the entire business.

Support staff to support customers

Smart offers so many immediate benefits to our customers – energy consumption is easier to track, bill accuracy is improved, and we hope that bill shock can be eliminated. Smart also drives RWE npower to be more innovative in our relationships with customers, particularly as we consider how best to bring them along on the smart journey.

Innovation can be defined in many ways. For us it’s not only about technology – it’s more about how we educate our customers so that they understand what smart is and the benefits it will bring. How do we make sure that installation is a positive experience and that subsequent queries are addressed correctly? And how do we know that we are using the right campaign strategies to connect with the different customer segments?

For us, the answers lie with our people. We are working to educate our people across the entire organization to ensure they see smart as an opportunity to provide a completely different level of service, as well as new products and plans. We know smart will drive customers to demand different things from their energy supplier: we want to take advantage of that early on so that we can become the supplier of choice.

Seize the opportunities

Discussions with utilities and companies in other industries (including telecoms) have been useful in helping us learn how to successfully execute major business transformation in the face of industry game-changers.

One key lesson learned is the importance of looking at our smart processes from end to end, to understand the impact of changes across all business units – and how this affects our ability to provide the best experience to our customers.

Another important lesson is that we must combine confidence in our approach with a willingness to modify it as we progress on the smart journey. Let’s get started on this new way of working – but put in place a mechanism to capture, react to and implement opportunities for improvement.

In my opinion, the critical factor is that utilities see the smart rollout as part of a bigger picture. Don’t treat this as a technical meter exchange program. Treat it as an industry and business transformation. Don’t underestimate the scale of change that it brings. And rather than focus on the things that you have to do, see past them to take advantage of all the opportunities offered by change.

This is what RWE npower is focusing on. As a mandated change, there’s a risk that smart could be seen by the organization as just “something we have to do.” Instead, we’re focusing on the positive business impact. We’re pitching this as an opportunity for the industry, and for RWE npower as an organization, to leverage the changes that smart presents to us. It’s my hope that we will use smart to completely transform the way we do business.

“For us, the answers lie with our people. We are working to educate our people across the entire organization to ensure they see smart as an opportunity to provide a completely different level of service, as well as new products and plans. We know smart will drive customers to demand different things from their energy supplier: we want to take advantage of that early on so that we can become the supplier of choice.”

Steph Fox, RWE npower

Steph has worked in the energy industry for over 20 years, primarily filling a wide range of roles focused on running and delivering improvements in retail back-office operations. Steph is currently part of RWE npower’s Smart Programme Leadership Team, with specific responsibilities for business and customer-readiness activities.
Diversity drag
What does a better working world look like?
What does a better performing power and utility business look like?

While we continue to explore the answers to these questions, here’s what we know for sure: greater gender diversity at senior leadership levels improves business performance.

Are we going backward? EY’s latest Women in Power and Utilities Index shows a disappointing slide in progress toward gender parity at senior leadership levels. What is this lack of diversity costing our industry?

Few signs of progress
EY’s second annual Talent at the table:

Table 1. Top 20 utilities for gender diversity

<table>
<thead>
<tr>
<th>2015 ranking</th>
<th>Utility (2014 ranking)</th>
<th>Country</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eskom (3)</td>
<td>South Africa</td>
<td>3.67</td>
</tr>
<tr>
<td>2</td>
<td>Duke Energy (1)</td>
<td>US</td>
<td>2.93</td>
</tr>
<tr>
<td>3</td>
<td>Sempra Energy (2)</td>
<td>US</td>
<td>2.80</td>
</tr>
<tr>
<td>4</td>
<td>ENGIE (formerly GDF Suez)</td>
<td>France</td>
<td>2.53</td>
</tr>
<tr>
<td>5=</td>
<td>Origin (9)</td>
<td>Australia</td>
<td>2.20</td>
</tr>
<tr>
<td>5=</td>
<td>Ameren Corporation (26)</td>
<td>US</td>
<td>2.20</td>
</tr>
<tr>
<td>7</td>
<td>Statkraft Markets (n/a)</td>
<td>Germany</td>
<td>2.07</td>
</tr>
<tr>
<td>8</td>
<td>YTL Corporation Berhad (n/a)</td>
<td>Malaysia</td>
<td>2.00</td>
</tr>
<tr>
<td>9=</td>
<td>BC Hydro (n/a)</td>
<td>Canada</td>
<td>1.93</td>
</tr>
<tr>
<td>9=</td>
<td>China Resources Power Holdings (6)</td>
<td>Hong Kong</td>
<td>1.93</td>
</tr>
<tr>
<td>11=</td>
<td>Gazprom (n/a)</td>
<td>Russia</td>
<td>1.87</td>
</tr>
<tr>
<td>11=</td>
<td>China Power International Development Ltd (n/a)</td>
<td>Hong Kong</td>
<td>1.87</td>
</tr>
<tr>
<td>13=</td>
<td>Hydro One Inc (n/a)</td>
<td>Canada</td>
<td>1.80</td>
</tr>
<tr>
<td>13=</td>
<td>Hydro-Quebec (10)</td>
<td>Canada</td>
<td>1.80</td>
</tr>
<tr>
<td>15</td>
<td>Empresas Públicas de Medellín (n/a)</td>
<td>Colombia</td>
<td>1.67</td>
</tr>
<tr>
<td>16</td>
<td>American Electric Power Co (27)</td>
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<tr>
<td>17=</td>
<td>Snam (n/a)</td>
<td>Italy</td>
<td>1.53</td>
</tr>
<tr>
<td>17=</td>
<td>EDF Energy Plc (n/a)</td>
<td>UK</td>
<td>1.53</td>
</tr>
<tr>
<td>19=</td>
<td>Dominion Resources, Inc (15)</td>
<td>US</td>
<td>1.47</td>
</tr>
<tr>
<td>19=</td>
<td>Vattenfall (34)</td>
<td>Sweden</td>
<td>1.47</td>
</tr>
</tbody>
</table>

Women in Power and Utilities Index makes for disappointing reading. The index, which tracks the number of women in the boardrooms of the world’s 200 largest utilities by revenue, shows that the number of women holding leadership positions actually decreased over the past year:

► At the end of 2014, women represented only 14% of board members at the world’s top 200 global utilities companies – down from 15% in 2013.

► The percentage of female non-executive directors has also dropped, from 18% to 17%.


Report by Alison Kay
Just when fresh ideas and new perspectives are needed most in the boardroom, it appears utilities are still dragging their feet and ignoring a huge potential pool of talent. Is it any wonder that the sector has a reputation for being slow to change?

There are some bright spots amid the results. We’ve seen a rise to 5% (from 4%) in the number of female board executives – positions that offer the opportunity to wield influence, set strategy and take responsibility for profit and loss. Twenty utilities in the top 200 now have at least one female board executive. Two notable utilities – China Power Resources and YTL Malaysia – have two.

It’s also heartening to see a rise (to 13%) in women in taking up roles within senior management teams (SMTs). The SMT is a training ground and pipeline for CEOs. More women there will arm a future generation of potential industry leaders with the skills they need to take P&U forward. Congratulations to Empresas Públicas de Medellín in Colombia, which leads the way with eight women on an 18-member SMT.

Regional variations
The index finds some interesting regional variations among the results. Africa is doing the best, with 14% female board executives – double Europe’s figure of 7%. This result reflects research that shows developing countries often have more women in management than developed ones.

South Africa’s Eskom is the most gender-diverse utility, with seven women on its 12-member board at the end of 2014.

And while North America makes a strong showing in the index – with eight utilities in the top 20 – two Europe-based companies have made impressive leaps up the rankings this year. ENGIE (formerly GDF Suez) moved from 17 to 4 after appointing Judith Hartmann as CFO and Isabelle Kocher as Deputy CEO. Vattenfall moved from 34 to 20 as a result of appointing two women (Jenny Lahrin and Åsa Söderström Jerring) to its board.

These developments are encouraging, but they also underline the precariously small numbers of women in P&U. With so few women in senior leadership, even minor changes make a big impact. All it takes is for a few utilities to lose one senior woman and fail to replace her with another woman, and the sector is in a net negative position.
More women = higher ROE

The index results point us back to the business case for gender diversity. While extensive research has long confirmed the link between diversity and economic success, further analysis of our 2015 results confirms the relationship between gender diversity in the boardroom and return on equity (ROE). We found that the global top 20 utilities for gender diversity, with a combined average ROE of 8.5%, significantly outperformed the lowest 20, with a combined average ROE of 7%.

Given the asset-heavy nature of this sector, a 1.5% difference in ROE can translate into millions. For example, a medium-sized utility with US$10b in assets would earn US$75m less profit after tax with a 7% return rather than an 8.5% return, assuming 50% of its funding requirements were met with shareholder equity.

These kinds of tangible benefits make diversity a priority for P&U. While some of the sector’s challenges are beyond the direct control of utilities, this lack of women is a self-limiting financial drag on P&U.
Figure 2. Geographical breakdown of women in strategic roles in top 200 utilities

Decisive action needed

The World Economic Forum estimates that, at a cross-industry level, it will take until 2095 to achieve gender parity — generally defined as equal access and participation in education and employment at equal pay. EY has set gender parity in the boardroom at 30% to 40% women, in line with most governments taking action on this issue.

However, given the current rate of progress highlighted in the index, it’s unlikely P&U will ever reach gender parity in the boardroom. For utilities to reap the rewards of more diversity in the boardroom, decisive action is needed. This is a challenge we must all take on.

At EY, we are committed to continuing our focus on diversity by investigating the highest-performing, gender-diverse P&U companies and exploring how the sector can attract, retain and promote high-potential women into leadership positions. We are currently conducting further research into the barriers and accelerators for change within P&U, which should conclude during the second half of 2015. This research is designed to help speed change in our sector by asking better questions about it — so that we can find better solutions for gender parity. To that end, we will be investigating:

► What do the most high-performing, gender-diverse P&U companies look like?
► What do they do to attract and retain women?
► What does it take for women to get to the top, and what barriers are they encountering?
► What can be done to remove the barriers to women building their careers in P&U?
► How can the industry build a strong pipeline of women leaders for the future?

What will you do?

I consider this push for greater gender diversity as a personal challenge — both as a woman, and as a leader in a sector that I passionately believe can overcome its current challenges and emerge stronger and better able to adapt to the opportunities of transformation. But it will take all the innovation, fresh ideas and new talent we can mobilize.

So what part will you play in our shared quest? What will you do personally to get more women on your board? What policies and practices will you put in place to support the women in your organization to become future leaders of our sector?

Alison Kay

Global Sector Leader
Power & Utilities
London, UK
+44 20 7951 1786
akay@uk.ey.com
@AlisonKayEY

Join the discussion

To read the index in full and share your own thoughts, please visit www.ey.com/womeninutilities
**Power Transactions and Trends Q1: 2015**

EY’s quarterly Power transactions and trends analyzes mergers and acquisitions (M&A) and key market trends in the global P&U sector. The latest edition reports on the first quarter of what looks set to be another robust year for M&A in P&U, with a three-year high for Q1 deals.

http://www.ey.com/ptt

**Customer Plug in**

Plug in is a monthly, easy-to-read update on the sector’s hottest issues and challenges. It includes insights from EY’s global network of professionals, who are working with the world’s biggest power companies. The latest issue focuses on why so many utilities are struggling to satisfy customers. We explore key lessons learned and how to chart a more effective path for the future. The bottom line: aligning innovation to purpose is the clearest path to success.

http://www.ey.com/plugin

**Talent at the table: Index of women in power and utilities 2015**

The proven links between gender diversity on boards and better business performance show that having more women in your boardroom makes good business sense. EY is tracking the number of women in the boardrooms of the top 200 global utilities by revenue.

Our second annual study shows a very small increase in the number of women at the top in executive board positions (5%, up from 4% last year). However, there is a lower percentage of total board membership overall; executive and non-executive directors totaled 14%, down from 15% last year. Change must accelerate for utilities to realize the financial benefits that diversity brings.

http://www.ey.com/womeninutilities

**Global Capital Confidence Barometer: Power & Utilities — Issue 12**

The Global Capital Confidence Barometer is a unique biannual study of corporate and boardroom confidence conducted for EY by the Economist Intelligence Unit (EIU). The latest P&U report reveals a steady increase in M&A appetite, with 45% of P&U executives saying they will actively pursue acquisitions in the next 12 months, compared with 23% two years ago.

http://www.ey.com/powerandutilities/CCB
Empowering energy customers: UK attitudes to supplier switching

EY’s new survey of UK energy customers found almost one-quarter (24%) had switched gas or electricity supplier in 2014, a trend likely to continue this year. The main triggers for switching included inaccurate bills, unfriendly service when calling the helpline (16%), and protracted complaints processes.


Holistic enterprise asset management for power and utilities

This report from EY’s 5 insights for executives series focuses on enterprise asset management (EAM). Historically, utilities have addressed asset life-cycle issues in a narrowly tailored way, often with budget constraints in mind. To maximize EAM’s value, utilities should think holistically, designing and implementing a comprehensive approach that encompasses not just the system, but the underlying processes and tools.


Four ways the cloud is changing the technology sector

Technology executives are now navigating an unprecedented period of disruption and innovation. The era of cloud computing and smart mobility is bringing about change faster, more continuously and from more directions than ever.


Reporting – Issue 09, April 2015

Big data, integrated reporting and new demands for audit committees are reshaping the reporting landscape. Read more in our Reporting magazine. http://www.ey.com/GL/en/Services/Assurance/ey-reporting-issue-9-overview

Reporting - Issue 09, April 2015
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The better the question. The better the answer. The better the world works.