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Issue 08 - December 2015

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EXPO: Toward Dubai

Milan is passing the baton to Dubai, host for the 2020 Expo

Managing the Energy Transition in US

An Interview with **Lisa Wood**, Vice President, The Edison Foundation

Power Sector (R)evolution in EU

A talk with **Hans Ten Berge**, Secretary General, Eurelectric

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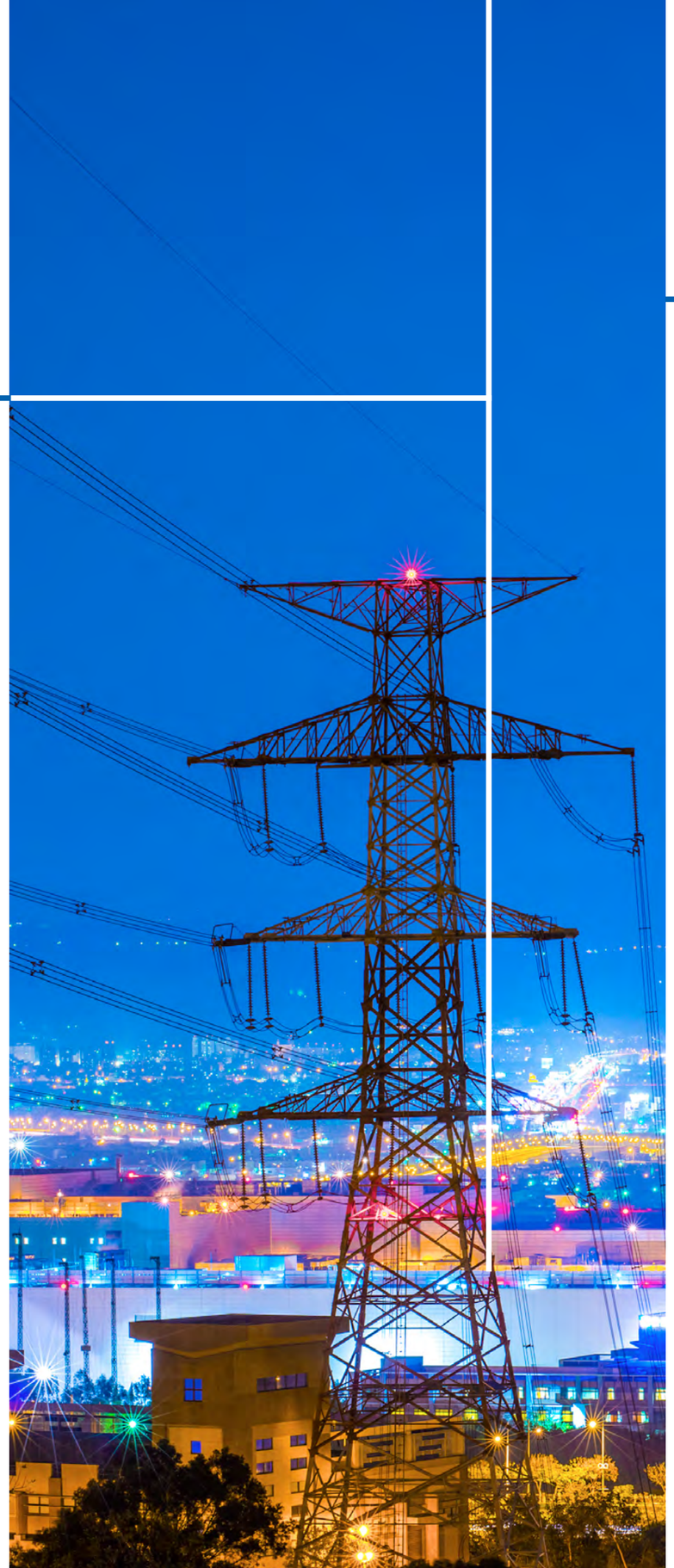

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Editorial

Salvatore Machì - Chairman, CESI
Matteo Codazzi - CEO, CESI

The client is always right...
The saying is so well known and widely-recognized it seems obvious. But it's not. Especially when it's applied to areas beyond quick commercialism, in other words to different kinds of services, other kinds of companies, those that have not yet come to terms with the rise of the contemporary client.
Today, this popular saying has become a key issue for utility companies as well.
The revolution the electric sector is experiencing, especially in Europe and in the United States, puts these clients and consumers front and center. Lisa Wood, Vice President of The Edison Foundation, is convinced of it, and so is Hans Ten Berge, Secretary General of Eurelectric. Berge in particular expresses himself in no uncertain terms on this topic in an interview published in this issue of EJ: "Regardless whether you like him (the customer), whether he lives his life the way you would or not, he's the one we're serving. If you don't like him and let that show, you might as well go out of business."

THE REVOLUTION THE ELECTRIC SECTOR IS EXPERIENCING PUTS CLIENTS AND CONSUMERS FRONT AND CENTER

Fulfilling clients' needs, meeting their expectations, responding appropriately to the desires they express in terms of flexibility of service and safety of supply, is a priority for power companies. Utilities need to be able to adapt to the new rules of the game, at least as long as they want to stay in the game.
Wood returns to this theme when she speaks of the ways in which the electric sector is changing in the United States, as well as how we need to drive things forward so that the regulatory environment can stay abreast of changes taking place within society; changes in the way we consume goods and services, and changes in technology.

In the electricity sector, technology is ready for the change, and it's both innovative and reliable. Smart grids, whether in terms of transmission or in terms of distribution, are now a reality extending well beyond their former sphere as concepts that are fascinating, spread out across the pages of our daily papers. They are now concrete applications, as CESI's Antonio Ardito explains in a piece that analyses the main technological aspects that enable these new networks to take best advantage of available energy while guaranteeing the highest levels of safety of service, as well as maximizing system efficiency.
Today independent laboratories, like the one CESI has created in Mannheim, are the protagonists of this new technological reality: within the wealth of offerings available on the global market, they're tasked with certifying the effective quality of instruments submitted to them for tests, testing laboratories are establishing themselves as fundamental partners for utilities.
We close this issue of EJ *with an article that addresses a delicate subject: nuclear safety. Nuclear facilities built during nuclear energy's growth spurt are now reaching the end of their life cycles; all over the world governments are evaluating whether to close them or extend their lifespans.*
Either way, it's an activity that must be managed with the utmost concern for safety.
In order to achieve this, governments need people with specific skills.
That's why nuclear energy remains a sector in which those countries, companies and research centers that have the most experience dealing with this delicate issue have a chance to put their leadership at the service of clients.

| TOP STORIES |

EXPO: Toward Dubai

Agnese Bertello

MILAN IS PASSING THE BATON TO DUBAI, HOST FOR THE 2020 EXPO. THE RECENTLY FINISHED EXPO IN ITALY HAS BEEN AN EXTREMELY IMPORTANT TEST CASE FOR THE ARAB EMIRATES AND OTHER MIDDLE EASTERN COUNTRIES, UNDERLINING THE CENTRALITY - ON A PLANETARY LEVEL - OF CHALLENGES ALL NATIONS ARE FACING IN THIS AREA.

Expo 2015 has closed its gates, successfully achieving its primary objective: between May and the end of October, more than twenty million people from all over the world came to visit the Universal Expo in Milan. The numbers slowly grew starting in late August, with daily visitors reaching peaks of 250,000 per day and spending hours in line outside the most popular pavilions. The pavilions of Japan, Brazil, the Arab Emirates, Kuwait, Italy and China drew the most visitors.

For Middle Eastern countries – the Arab Emirates, Bahrain, Kuwait, Qatar and Oman – this was a particularly important appointment. On one hand, the theme of this edition of the Expo – Feeding the planet.
Energy for life – was well suited to exploring the connection between technological innovation, environment, energy and food; an extremely delicate balance in the Middle East, while on the other the event constituted a significant litmus test: the next edition of the Expo, to be held in 2020, will take place in Dubai.

The public was drawn by the capability of representing identities and cultures in a visually sapient and highly compelling manner.

Not by chance, some of the most famous architects in the world were called on to contribute: the Norman Foster studio, which designed the City Hall and Millennium Bridge in London, created the Arab Emirates' pavilion, with sinuous forms that echo desert dunes; Italo Rota designed the Kuwait pavilion, which recalls dhows, that country's traditional seafaring vessels; and Anne Holtrop and Anouk Vogel designed the Bahrain pavilion, inspired by the gardens of Bahrain's longstanding botanical tradition, the only country in that area to boast significant fresh water springs.

FOR MIDDLE EASTERN COUNTRIES EXPO 2015 WAS A PARTICULARLY IMPORTANT APPOINTMENT. MILAN IS HANDING THE BATON TO DUBAI

The scarcity of water resources and arid climate has always driven people from these territories to champion refined strategies for using resources, developing an advanced culture and attention for these themes: today technology has joined with ancient knowledge, enabling people to create innovative technologies and systems that represent, at a time when climate change is causing desertification in increasingly large segments of the planet, extremely important opportunities for experimentation. This concept was reinforced by Qatar's ambassador to Italy, Abdulaziz Bin Ahmed Al Malki Al Jehani, who spoke at the Expo on the day dedicated to Qatar (4 October 2015): "Qatari men have had to prove they are worthy of the territory they have historically inhabited; they've had to deal with the difficulties connected to life in the desert by coming up with exemplary solutions." For example, and this was precisely the theme Qatar focused on for its pavilion, designing advanced desalinization systems for seawater.

DUBAI, WHICH HAS A POPULATION OF TWO MILLION, WILL HAVE TO WELCOME A TOTAL OF ROUGHLY 10 TIMES ITS POPULATION: AROUND 25 MILLION PEOPLE WILL TRAVEL THERE DURING THE SIX-MONTH EVENT

The Kuwaiti pavilion is also focused on this delicate theme, which plays a significant role in the energy consumption of Middle Eastern countries. In 1953 Kuwait built the world's first desalinization plant based on MSF (Multi-Stage Flash) technology, and today can boast seven separate facilities that produce 1.85 billion liters of fresh water per day.

The Bahrain and Arab Emirates pavilions will also enjoy a second life: the first will be reutilized as a botanical garden in Bahrain, while the second will be installed in Masdar City, a low carbon emission city in the United Arab Emirates, providing a tangible example of the principles of Masdar's sustainable ethics. This choice is clearly connected with themes of sustainability that lead back directly to the theme that will be the focus of the Dubai Expo.

The city in the Arab Emirates, the first in the Middle East to host an Expo in the event's 160-year history, won out over the competition – Ekaterinburg, in Russia; Smirne, in Turkey; and San Paolo, in Brazil – with the project "Connecting Minds, Creating the Future," focused on environmental and energy sustainability. The Dubai Expo wants to become the benchmark for sustainability for all major international events.

According to estimates the city, which has a population of two million, will have to welcome a total of roughly 10 times its population: around 25 million people will travel there during the six-month (October 2020 – April 2021) event. For this reason, the theme of sustainability within a very particular environmental context takes center stage. Over recent months the Dubai Supreme Council of Energy, in partnership with the United Nation Development Programme (UNDP) and the Dubai Carbon Centre for Excellence, presented a State of Energy Report: a document that focuses on best practices on an international level, clearly delineating the guiding principles that the Arab Emirates are following in what increasingly appears to be a moment of radical transformation from an energy point of view, and into which the Expo project fits perfectly.

Helal Al Marri, Director General of Department of Tourism and Commerce Marketing, CEO of Dubai World Trade Centre and a member of the Higher Committee for Dubai Expo 2020, stated: "Sustainability has informed every aspect of Dubai Expo 2020: from our overarching philosophy to the physical design of the site and infrastructure. We will deploy the most innovative solutions for environmental management and energy generation, as demonstrated by our aim of producing 50% of the Expo's operational energy requirements from renewable sources on site. Our contribution to this State of Energy report reflects our commitment to deliver an Expo that is environmentally sound, inspiring for all visitors, and sets new standards in the planning and execution of mega-events."

It is a considerable commitment, in part because the city will have to deal with growing demand for electricity independently of the event; demand it is trying to satisfy through nuclear and renewables, reserving its oil resources for export. In order to honor the commitment it is making, the program calls for the realization of solar plants for a total capacity of 50 Mw, requiring a corresponding investment of roughly 100 million dollars. In detail, the new buildings realized on the Expo site (438 hectares) call for integration of solar technologies on a large scale and the application of photovoltaic panels on all façades. Plans include an integrated design that relies on the use of recycled materials for construction (30%), water recovery, energy efficiency (both for new constructions and for pre-existing buildings), LED lighting for all public illumination, and smart grids to carefully manage consumption.

THE DUBAI EXPO 2020 WILL BE AN EVENT ENVIRONMENTALLY SOUND, INSPIRING FOR ALL VISITORS, AND IT WILL SET NEW STANDARDS IN THE PLANNING AND EXECUTION OF MEGA-EVENTS

In 2020, this project may well make Dubai one of the ten most sustainable cities in the world. But there's no time to lose. During public presentation of the project Mohamed Mashroom, General Project Director for the Dubai municipality, underlined the need for the city to start preparing itself for the event immediately by implementing energy efficiency and energy consumption management programs.

| INTERVIEW |

Power Sector (R)evolution in EU

A talk with Hans Ten Berge, Secretary General, EURELECTRIC

MOVING TO A CARBON-FREE WORLD AND THE CREATION OF A SINGLE EUROPEAN ENERGY MARKET ARE THE TWO FUNDAMENTAL GOALS FOR EUROPEAN UNION.
A REVOLUTION IS HAPPENING AND UTILITIES MUST JUMP ON IT!

Energy Journal: Last spring the European Union approved a new European Climate and Energy Framework. It includes a set of extremely ambitious objectives: on one hand efforts to favor energy transition, therefore the move from a system based on fossil fuels to one based on renewable energies; on the other creating a truly united European market. What do you believe are the first steps to take in order to achieve these goals as quickly as possible? What potential obstacles do you see blocking the way?

Hans Ten Berge: Achieving an integrated European electricity market and delivering on EU-wide emission reduction targets raises the need for an effective governance framework with strong enforcement mechanisms. The trajectory towards the 2020 and 2030 targets should be defined and monitored, so that timely measures can be taken at EU level to bridge any gaps to the targets.

The goal of a transition from fossil fuels to renewable energies is to achieve a carbon-free world, where "carbon-free" means eliminating as many CO_2 emissions as possible. The main obstacle to this is setting a proper standard on the ETS, the EU's Emission Trading System. But even with this standard, much work will remain: we will need to build up renewables and grids, save energy, ensure sufficient interconnectors and tailor services to the consumer.
By establishing new political and regulatory targets in all of these areas, regulators are making it difficult to achieve decarbonization at the lowest possible cost – and that's frustrating. What's probably blocking things right now is an explosion in costs caused by all types of regulation incentives for sub-targets. The primary target is to decarbonize, which must be facilitated in all aspects, from renewables to consumer relations.
The best way to manage the transition is to enforce strong ETS and decarbonization targets and foster a competitive environment for all market sub-targets.

EJ: Technology or regulation? Which of these two areas do you believe is currently the most difficult to deal with in order to support the creation of a single European market?

H.T.B.: Technology is an enabler. Technological developments give us new tools we can use; it gives both utilities and consumers a choice. Regulation should ideally be a facilitator, helping the industry use technology to the consumers' benefit.
Regulations, where regulators attempt to dictate which direction to move in with technology, defeat the purpose. Regulations must provide the framework within which technologies should compete, allowing the best technology to win.

TECHNOLOGY IS AN "ENABLER", AND REGULATIONS SHOULD BE A FACILITATOR, HELPING INDUSTRY USE TECHNOLOGY TO THE CONSUMERS' BENEFIT

EJ: In various different European countries, the situation regarding the development and operation of networks is anything but homogeneous. Will it be possible to achieve a homogeneity that truly permits electric energy to circulate freely between different states in the European Union?

H.T.B.: To put it simply, we need to act with a European mindset. And for this, three things need to change: TSOs need to work across borders, regulators need to work across borders and market operators and exchanges need to operate cross-border as well. We really don't need 28 national TSOs but one that can achieve things technically. TSOs should evolve from national to at least regional system operation. Achieving an integrated and competitive electricity market requires good governance structures, first and foremost.

EJ: Are utilities ready to face the (consumer) revolution? Do you believe it's necessary to create supranational supervisory organizations?

H.T.B.: No, utilities are not ready yet, but it's important that they become ready because the revolution is already underway and they have only two options: join in or be left out. We did not ask for this revolution. The consumers did. Technology and decarbonization are driving it, and we need to take this opportunity and provide relevant solutions.

Do we believe this requires supranational or supervising organizations? Yes, as stated previously, we need them on a European level, regulating European affairs. Today, we should at least create regions in which we have homogeneous TSOs as a transition toward a single European system. There should be regional regulations for regional level and national regulations for national level. Let me give you an example: we should have a European system for decarbonization. ETS is a difficult European system. However, when it comes to something like energy efficiency in buildings – how to insulate buildings – in Italy or Sweden, I would say that it should not be done from Brussels, but it should be supervised from national capitals. I believe that a supranational supervisory body is necessary in some areas, but there should still be room for national and regional supervisors.

RELATIONSHIPS WITH CUSTOMERS ARE DRIVING INCREASED FLEXIBILITY INTO THE SYSTEM; HELPING SPUR THE MOVE TO A MORE DYNAMIC, DE-POLARIZED REGULATORY SYSTEM

EJ: The United States is grappling with a system transition phase as well. In an interview we're featuring in this issue, Lisa Wood, Vice President of The Edison Foundation and Executive Director of the IEI (Institute for Electric Innovation), identifies the relationship with the consumer as one of the key points of this transition. Consumers in the US are increasingly demanding, requiring both flexibility of service and reliability. Do you feel European consumers are equally demanding?

H.T.B.: I think we have to listen to consumers and take them very seriously if we want to survive. The old adage is still true: the consumer is always right. The consumer is the person we are serving. As a customer myself, I would want flexibility of services and reliability. We have to respond to customers' desires, which means that we need a transition in our relationship with consumers. We should not be hampered by regulatory affairs, by rules imposing how many renewables there should be in the system, what efficiency they can achieve and which lines we should pay or not pay for. Consumers can choose to turn their backs on the electricity grid and utilities.
Solar cells and batteries may not be cost-effective today, but they will become cost-effective and widespread before long. This forces us to recognize that if we don't serve the "new" consumer, he or she might walk away. Today, it is easy to find solutions outside the system, solutions that give flexibility and reliability.

Given that our current way of working is not sustainable in the long term, we have to adapt. We have to start working with consumers to make sure they have the right solar panels, the right batteries, the right grid connections, the right backup power systems and the right flexibility. We have to make sure they are benefitting from low prices and they are protected from peak prices whenever possible.

Personally, I feel we are very proud of this role and we are happy to be a part of this transition. We are eager to serve our customers, and that is what I'm seeing in the US as well. Relationships with customers are driving increased flexibility in the system, helping spur the move to a more dynamic, de-polarized regulatory system. We are moving away from a monopolized, regulated system to one that provides what the consumer is asking for and in full respect to the environment. We are really looking forward to it, and we see a bright future ahead for our industry.

Hans Ten Berge

He was appointed Secretary General of the Union of the Electricity Industry - EURELECTRIC in 2007. The Union of the Electricity Industry - EURELECTRIC is the association representing the electricity industry at pan-European level, plus its affiliates and associates on several other continents.
Following posts in a number of international enterprises, including Exxon Chemie, he did serve as a Member of the Board of ENECO Energie (Major Dutch Utility Company)
Born in Eindhoven in 1951, Dutch citizen Hans Ten Berge holds a degree in Chemistry from the Rijksuniversiteit in Utrecht and also graduated from the University of Delft in business administration.

Clean, Safe Nuclear Energy

Agnese Bertello

THE ENERGY SCENARIO FOR 2040 CALLS FOR SIGNIFICANT GROWTH IN THE ELECTRIC SECTOR, FED BY RENEWABLE ENERGY SOURCES AND NUCLEAR ENERGY.
THIS GROWTH WILL BE PARTICULARLY SIGNIFICANT IN ASIAN COUNTRIES. NUCLEAR POWER PLANTS ARE HIGHLY TECHNOLOGICAL FACILITIES. EVERY PHASE OF A POWER PLANT'S LIFECYCLE – FROM CONSTRUCTION TO DECOMMISSIONING – REQUIRES UNCOMMON, HIGHLY SPECIFIC SKILLS. DECOMMISSIONING IN PARTICULAR IS AN ACTIVITY THAT ONLY A FEW COUNTRIES IN THE WORLD ARE CAPABLE OF MANAGING.

In the forecasts for 2040 outlined by World Energy Outlook IEA – alongside global growth in energy demand, expected to rise by +37% – another, extremely important data set emerges: growth in the electric sector. According to forecasts provided by the agency, electric energy is the final energy form that will demonstrate the highest level of growth.

IN ORDER TO SATISFY THIS RISING GLOBAL DEMAND FOR ELECTRICITY, ESTIMATES CALL FOR CONSTRUCTION OF NEW POWER PLANTS FOR A TOTAL CAPACITY OF 7,200 GW

In order to satisfy this rising global demand for electricity, estimates call for construction of new power plants for a total capacity of 7,200 GW, numbers that will drive a considerable push forward in the quota renewables supply (33%) within the electric generation mix at the global level. But alternative sources of energy – wind and solar first and foremost – will not be the only sources that see progressively increasing demand on their supply. They'll be joined, particularly in China, India, Russia and Korea, by nuclear power.

At the end of 2013 there were 434 nuclear power plants active around the world for a total production capacity of 392 GW. In 2040 that production is expected to increase to 624 GW, a total 60% more production; this despite the fact that almost 200 nuclear reactors are expected to be decommissioned over the same period of time.
The number of nuclear countries will rise from 31 to 36: China will account for 45% of the growth in electricity generated by nuclear power during the time period taken into consideration, while India, Korea and Russia will account for another 30%. At the same time, nuclear energy production will increase 16% in the United States, but drop by 10% within the European Union. In Japan, despite the Fukushima tragedy, nuclear energy production will continue to rise, though it is not expected to reach the production levels registered prior to the 2011 tragedy.
While this is the general scenario from the point of view of electric energy production, the perspective on nuclear energy becomes increasingly complex from an industrial and political point of view.

As everyone knows, nuclear power plants are extremely hi-tech, and require highly specialized know-how for the management of every step in the power plant's life cycle. From construction to safe management during the production phase to shutting down the reactors and decommissioning the plant, each moment and every detail requires a level of attention far higher than that necessary for other kinds of power plants.

BY 2040 ROUGHLY 200 NUCLEAR POWER PLANTS WILL REACH THE END OF THEIR LIFECYCLES AND NEED TO BE DECOMMISSIONED OVER THE UPCOMING DECADES, OPERATIONS EXPECTED TO COST MORE THAN 100 BILLION DOLLARS

The risks are considerable. The Fukushima tragedy still stands front and center in peoples' minds, and this accident, together with other concerns within the international political sphere, have led international agencies to make the safety parameters even more severe than they were previously, calling for multinational forms of governance, the adoption of increasingly trustworthy technology (today people talk of 3rd and 4th generation power plants) which limit the risk of human error and accidents to the barest of minimums. Safety concerns also extend to managing nuclear waste: today there is still no single site for the permanent storage of high-intensity radioactive waste, while some do exist (for example in France) for low- and medium-intensity radioactive waste.
As mentioned earlier, roughly 200 nuclear power plants will reach the end of their lifecycles and need to be decommissioned over the upcoming decades, operations expected to cost more than 100 billion dollars. At the same time, there will be roughly 700,000 tons of exhausted radioactive fuel to be disposed of in a fixed, stable, safe, and well-controlled situation.
From an industrial and technological point of view, decommissioning is a truly unique activity, and in reality not many countries have developed the specific skills necessary to conduct it safely. Italy, despite (or perhaps precisely because of) anti-nuclear choices the country made back in 1987 following the Chernobyl reactor incident, is among the few nations that can vaunt such skills. Italy's experience is part of the historical skillset it matured during the period of widespread global development in nuclear energy, when Italy was among the nations on the forefront of research in this sector. It should be noted that the choice to give up on nuclear energy as a power source for the country's needs has undoubtedly contributed to creating the level of energy dependency that is now a chronic problem for Italy, though this has not prevented Italian universities and research centers from conducting, together with other countries involved in these projects on an international level, advanced studies in fusion and nuclear fission.

| CESI's Experience |

Over the years CESI has developed and honed specific nuclear facility safety skills: CESI, in partnership with Ansaldo Nucleare and Thales Alenia Space, was entrusted to develop and build an automatic monitoring system for the Chernobyl shelter. The Integrated Automated Monitoring System, or IAMS, gathers and transmits information on the Shelter's structural status, as well as that of the entire nuclear facility area at Chernobyl. This information assures timely maintenance activities are conducted to maintain and improve the achieved safety level, as well as to carry out mitigation activities in event of an accident at the Shelter. These safety conditions make it possible to erect a new, second Shelter further outside that will provide greater environmental safety guarantees around the former power plant.

Today CESI is also committed, together with four project partner companies, to a number of different Italian national programs for setting up facilities to recover, move, treat, condition and store radioactive waste. CESI is also involved in preparatory activities for dismantling and decommissioning Italian nuclear sites (new electric systems, water supplies, etc.). CESI contributes to the operational development of these programs, providing services that guide different entities through the regulatory steps, supplying environmental permissions and multidisciplinary engineering for nuclear, mechanical, chemical, civil and electro-instrumental fields.

Safety

The accident at Fukushima raised the level of safety required at nuclear facilities. It's an extremely delicate issue, and needs to be managed at an international, multinational level because we now know that a serious nuclear accident has repercussions that extend far beyond the geographical limits of individual countries. The need for international governance, as well as an agency with clear powers (including, in extreme cases, the power to block power production in a facility not held to be sufficiently safe), are considered paramount.

DECOMMISSIONING ACTIVITIES' FINAL OBJECTIVE IS TO RETURN THE SITE WHERE THE FACILITY WAS LOCATED TO A "GREEN FIELD" STATE, IN OTHER WORDS TO GIVE THE LAND BACK ITS ORIGINAL, NATURAL INTEGRITY

At the same time, the development of these kinds of agencies is being held hostage by countries that can't stomach the idea of outside interference in this sphere. The World Energy Council, together with the International Atomic Energy Agency, has been pushing for the realization of these agencies for some time now. In 2011, the European Union asked member nations to conduct stress tests on all their nuclear facilities: each nation must be able to conduct independent evaluations on the safety and security of the nuclear power plants on sovereign territory.

What exactly do people mean when they talk of "decommissioning"?

Decommissioning refers to the last step in a nuclear power plant's lifecycle, and includes the operations necessary to maintain safety in the facility, remove exhausted radioactive fuel, decontamination, dismantle nuclear installations, as well as manage and safeguard radioactive waste. The final objective is to return the site where the facility was located to a "green field" state, in other words to give the land back its original, natural integrity, devoid of any unnatural radioactive traces. This means the land becomes an area where people can safely build new buildings for any kind of activity. The removal of exhausted nuclear fuel from the facility is one of the most complex steps. Reprocessing spent nuclear fuel makes it possible to divide the reusable material within the fuel from end waste, as well as stabilize the waste in a form that greatly reduces its volume and guarantees safe conservation over the long term while the waste slowly sheds its radioactivity.

Managing the Energy Transition in US

Interview with Lisa Wood, Vice President, The Edison Foundation
Executive Director, Institute for Electric Innovation

IN THE US, THE ELECTRIC POWER INDUSTRY IS TODAY IN THE MIDST OF A PROFOUND TRANSITION. THE POWER GRID IS EVOLVING AND CUSTOMERS TOO ARE EVOLVING. UTILITIES MUST CHANGE IN RESPONSE TO COMPETITIVE PRESSURES, CUSTOMER DESIRES, AND POLICY DIRECTIVES.

Energy Journal: The Institute for Electric Innovation's most recent publication, The Evolving Electric Power Industry, describes the transition phase the U.S. electric market is currently experiencing. The challenge of the 21st century will be to usher the system from a one-way grid model to one based on distributed production. For the utility companies involved in this transformation, this challenge plays out on three different levels: in their relationship with consumers; in their relationship with technology companies; and in their relationship with regulators. Which of these three relationships do you believe is the most compelling and decisive?

Lisa Wood: As in many other countries, in the U.S. utilities provide universal service. They provide reliable, safe and affordable service. That's the bottom line for utilities. In addition to safe, reliable and affordable service, we're providing increasingly clean electricity. Sometimes there are tradeoffs among these things. In the US, affordability of electricity is very important. Obviously we're providing increasingly clean electricity, but affordability remains a big component.

The basic relationship is with the customer, because we're serving our customers. The regulator's job is to set rates to ensure that service is responsive to customer's needs and that the prices customers pay cover the cost of operations and a sufficient return to attract capital. For example, in the U.S. we are seeing enormous interest in solar energy today. There are many policies in the U.S. driving the development of solar energy, so the relationship between what customers wants and what the regulator does is very much interconnected. Regulators have the ability to align policy goals, utility requirements, and customer needs.

EJ: Consumers have extremely high expectations: in a certain sense we've been "spoiled" by the transformations currently underway in other markets (telecommunications first and foremost). We expect high-quality service at accessible prices; most importantly, we expect flexibility. How do you see these factors combining with the concurrent need for extremely stable, efficient and reliable service?

L. W.: Electricity prices in the US are fairly low: the average bill for an American consumer is about 110 dollars a month. Consumers do have high expectations and part of the balancing act is to figure out how to balance customer expectations with affordability and service. Our customers want reliable service and increasingly clean electricity, but I believe that affordability remains very important to most Americans. Obviously there are tradeoffs. Solar power provides a very interesting example.

We develop large-scale solar farms; we have rooftop solar; and we have what we call "community solar." We know, for example, that large-scale solar, by which I mean utility solar farms, are about half the price of rooftop solar in the US in terms of dollars per watt to install, but yet we still provide and subsidize rooftop solar. We currently have a federal subsidy for large-scale solar in the U.S., but we provide far more subsidies for rooftop solar (federal, state, and regulatory subsidies), even though we know rooftop is more expensive than large-scale solar. This is an example of customers wanting something that is more expensive, and right now policies are in place to subsidize rooftop solar even though, from an economic perspective, we know it's not the cheapest way to provide solar energy. But again, this goes back to customers expressing certain wants and needs, and regulators trying to balance those wants and needs with what makes sense from a policy perspective. There aren't really any easy answers to this. In some cases, we're seeing things that don't make a lot of sense from an economic perspective. But economics is not the only perspective. So even if two options both provide 100 percent carbon-free electricity, sometimes we wind up subsidizing the higher cost option. Customers are interested in certain things. Regulators respond to that and utilities respond to that.

PART OF THE BALANCING ACT IS TO FIGURE OUT HOW TO BALANCE CUSTOMER EXPECTATIONS WITH AFFORDABILITY AND SERVICE

EJ: The regulatory sector has found it hardest to adapt. In your introduction, you focus clearly on the key issue: "Can the regulatory paradigm be redesigned to best support the power industry transition that's underway and can this be done collaboratively?" What would be your answer?

L. W.: In our latest book there is an essay, "Shaping the 21th century Energy System," written by Marvin McDaniel, in which he talks about the E21 initiative in Minnesota. That's a collaborative effort. I think we are seeing a lot of activity around the U.S. trying to collaborate and move things forward. Will it work? It's hard to say. The current regulatory process is extremely slow.

ACCELERATING CHANGE AND THE INTEGRATION OF NEW TECHNOLOGY IS HARD TO DO UNDER THE CURRENT REGULATORY PROCESS. SO WE HAVE TO FIGURE OUT A WAY TO EVOLVE REGULATION

Accelerating change and the integration of new technology is hard to do under the current regulatory process. So we have to figure out a way to evolve regulation; to align the changing role of utilities with this accelerating pace of technology and increasing customer expectations. I believe collaborations are starting to gain traction. They are very grassroots, coming up through voluntary efforts: people getting together, trying to explore ways to do things differently. Eventually I do believe our regulatory structures will change, but it's hard to say how long this will take.

EJ: The book details the case of Hawaii: "Hawaii's experience with rooftop solar PV and net energy metering is a postcard from the future." Do you see important differences between different states in the U.S. from this point of view?

L. W.: The states that are out front pushing for change are Hawaii, California, New York, Minnesota and Arizona – these are some examples. But if we take just three of them – California, New York and Minnesota – we see a lot of different things going on in all these states due to their individual policies. New York has what they call the REV, Reforming the Energy Vision process. In our book Robert Schimmenti, Senior Vice President of Consolidated Edison Company in New York, talks about some of the changes within New York, where there's a regulatory process driven from the top.
Many stakeholders are participating in this process, utilities are participating in it. It's almost the opposite of what's happening in Minnesota with the E21 initiative, which is a voluntary effort driven more from the bottom.

People got together and decided they needed to think about the energy future for the state of Minnesota. At the end of last year, the e21 initiative published its first report and is now continuing to work through what needs to change in terms of regulations and in other areas.
In California, there is a very aggressive renewal energy portfolio standard. It actually moved from 33% to 50% recently. California has always pushed very hard to be a national leader in the electricity sector in terms of both clean energy and energy efficiency.

Hawaii is an island state, so it has different constraints than other parts of the country. Historically, Hawaii has imported oil to produce its electricity, which is very expensive. In the rest of the U.S., we don't use oil to produce electricity. Hawaii pushed for renewables a lot sooner than other places, in part, because Hawaii had very high electricity prices due to the use of oil. Hawaii wanted clean electricity, but also wanted to try and liberate itself from dependency on oil.

However, the Hawaiian grid is not very large so integrating renewable energy in Hawaii is different than in other places in the U.S. and the essay by Michael Champley in the book discusses this.

We do have net energy metering policies in 48 states for rooftop solar. Right now we are seeing many states – both states that have a lot of rooftop solar and states that don't – starting to revisit and modify their net metering policies. Regulators recognize the need to change these policies because of the cost shift from distributed generation (DG) to non-DG customers that results from these policies.

EJ: In Europe, this transformation is still in its earliest phases. What lessons can Europeans learn from the U.S. experience? What advice can we give European utility companies, the protagonists of this sector?

Besides the US, the country I'm most familiar with is Germany. We can all learn from each other. Europe has really been out in front on a lot of the change that has been taking place. We have learned and are interested in learning more from Europe. In the US, a lot of change in the power sector has been driven at a state level.

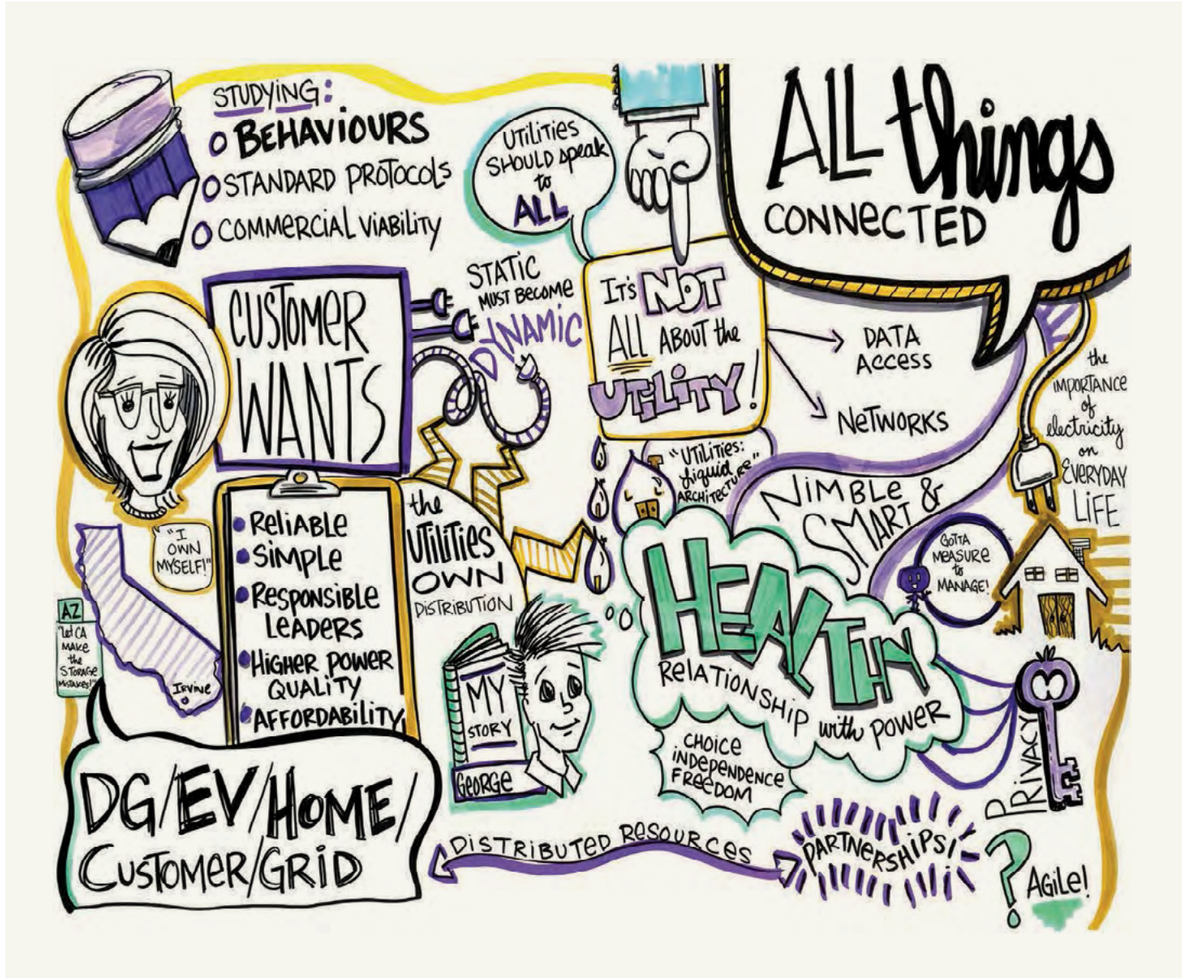


Illustration from The Evolving Electric Power Industry, *The Edison Foundation*

We don't really have a national policy pushing things forward. You can think of the 50 states as 50 different ways to move forward. There's wide interest among electric utilities in the U.S. and European utilities in learning from each other. In the U.S, the focus is reliable, affordable, and increasingly clean electricity. Again, I think that U.S. consumers care deeply about affordability.

In the U.S., we have moved toward much cleaner electricity generation due to investments in renewable energy and natural gas. We have already seen exponential growth in wind and we are now seeing exponential growth in solar energy. We have about 66 GW of wind and about 20 GW of solar in the U.S. today. Our forecasts are showing a lot of growth in solar energy in the U.S. over the next several years.

Much of this growth is driven by state renewable portfolio standards and, in part, by subsidies. We are also retiring coal plants and converting many of our coal plants to natural gas.

In the US, our electricity mix is getting cleaner but we don't have a national policy such as a carbon tax or a cap and trade policy driving the entire nation in one direction. However, our Environmental Protection Agency has just finalized the Clean Power Plan, which will drive increased

EUROPE HAS REALLY BEEN OUT IN FRONT ON A LOT OF THE CHANGE THAT HAS BEEN TAKING PLACE. UNITED STATES HAVE LEARNED AND ARE INTERESTED IN LEARNING MORE FROM EUROPE

deployment of renewable generation as a way to cut GHG emissions from the power sector. The Clean Power Plan is designed to reduce emissions from exiting generators by 32 percent over 2005 levels by 2030.

Many of the needed reductions will be achieved by switching from fossil fuel generation to lower- and zero-emitting resources, like wind and solar. There's also the potential for smaller, distributed resources to reduce emissions under the Clean Power Plan. The role of nuclear is complicated, however: we will need existing nuclear units to continue to operate to meet these goals, but the Clean Power Plan does not provide any incentives to keep those units running or to build new units.

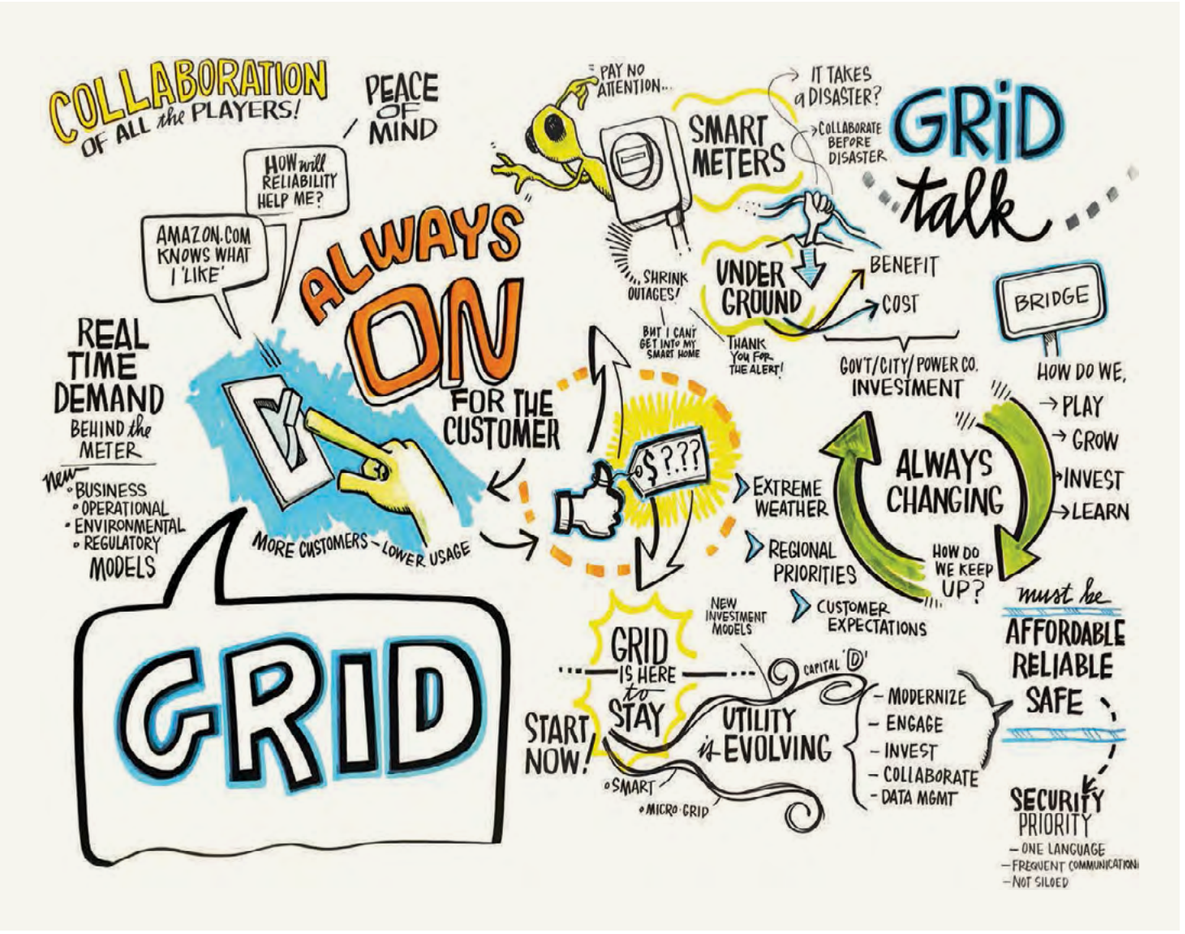
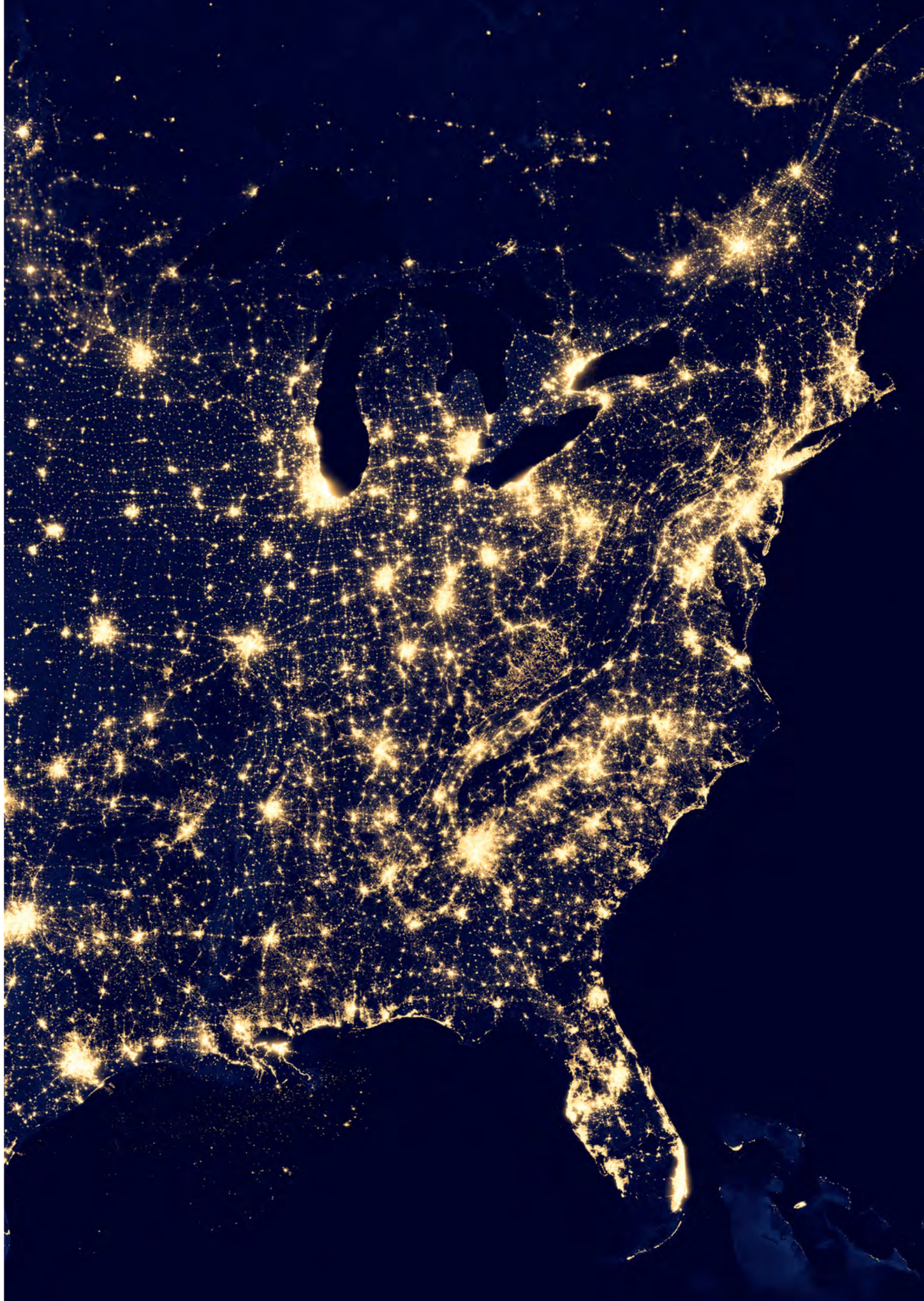


Illustration from The Evolving Electric Power Industry, *The Edison Foundation*

Lisa Wood

Lisa Wood is Vice President of The Edison Foundation and Executive Director of the Institute for Electric Innovation (IEI). She is currently an Adjunct Professor at Johns Hopkins University School of Advanced International Studies and is a Nonresident Senior Fellow in the Energy Security and Climate Initiative at The Brookings Institution.
Ms. Wood is an active member of both for-profit and not-for-profit boards. She previously served on the Executive Leadership Group for the State Energy Efficiency Action Network; the Advisory Board for Johnson Controls' Institute for Building Efficiency; the Advisory Board for American Efficient; and the Board of Directors of the Midwest Energy Efficiency Alliance. Wood is a member of the International Association for Energy Economics.



Understanding Smart Grids

Antonio Ardito, Chief Engineer Consulting, Solutions & Services Division, CESI

THE SMART GRID IS A CONCEPT AS FASCINATING AS IT IS GENERIC, AND IS MAKING WAVES IN THE MEDIA AS WELL. TODAY EVERYTHING IS "SMART," AND THE SMART GRID IS EVERYTHING. FEW PEOPLE KNOW HOW TO TRANSLATE THIS SLOGAN INTO CONCRETE, PRACTICAL EXAMPLES; INTO TECHNOLOGIES AND SYSTEMS; INTO RECOGNIZABLE OBJECTIVES, EFFICIENCIES AND SECURITY. THE TRANSMISSION NETWORK, FOR EXAMPLE, IS ALREADY INHERENTLY SMART. SO EXACTLY WHAT EVOLUTION ARE WE TALKING ABOUT? WHAT TECHNOLOGIES TRULY MAKE IT POSSIBLE FOR A TRANSMISSION TO QUALIFY AS SMART?

The Smart Grid is a concept that was essentially born in the electrical distribution network to address challenges such as the integration of distributed generators, energy efficiency, demand response, free market tariffs, near real-time pricing and reduction of non-technical losses.

Today, in many countries regulators and liberalization are forcing utilities to reduce costs and, among these, costs associated with the transmission infrastructure in terms of both CAPEX and OPEX. As a consequence, new methods based on new technologies to operate the power system have been conceived to get sustainable, secure and competitive energy supply.

THE MAIN FOCUS OF SMARTNESS APPLIED TO THE GRID IS ON AN INCREASED OBSERVABILITY AND CONTROLLABILITY OF THE POWER GRID INCLUDING ALL ITS PARTICIPATING ELEMENTS

The key drivers for Smart Grid evolution are:

- Increased usage of renewable energy resources, with their unpredictability
- Widespread dispersed generation, together with traditional large size concentrated generation
- Sustainability
- Competitive energy prices
- Security of supply
- Power quality
- Aging infrastructure and workforce

The main focus of Smartness applied to the Grid is on an increased observability and controllability of the power grid including all its participating elements.
The act of listing the characteristics of a Smart Grid illuminates the fact that the complex, highly meshed networks with many interconnections, such as the transmission networks in Europe and North America, have long since been equipped with the systems and functionality commonly associated with Smart Grids. Such functionality refers to the ability to absorb electrical energy

produced from any point; to transfer bi-directional power flows from surplus areas to deficit areas; to dynamically reconfigure network topology; to fulfil the diverse needs of loads and producers; to achieve technical and economic optimization through intelligent use of resources; and to make real-time adjustments by exploiting spread communication systems. At first these networks were already considered "smart," and refused the definition of subsequent improvements as "Smart Grids."

THE TERM SMART GRID REFERS TO THE ABILITY TO EXPLOIT AVAILABLE ENERGY IN THE MOST EFFICIENT MANNER AS WELL AS GUARANTEE ADEQUATE LEVELS OF SECURITY OF SERVICE, GOOD POWER QUALITY COMBINED WITH ENSURING LOW LOSSES WHILE MAXIMIZING ECONOMIC EFFICIENCIES

Nowadays, the situation has changed significantly and the concept Smart Grid has acquired a precise meaning within the context of power transmission systems. In today's mature networks, the term Smart Grid refers to the ability to exploit available energy in the most efficient manner as well as guarantee adequate levels of security of service, good power quality combined with ensuring low losses while maximizing economic efficiencies. All this is achieved in a highly dynamic environment where a large number of intermittent renewable power generation systems has to be integrated in the networks while ensuring bi-directional exchanges of power between the transmission network and the distribution network within the wider context of evolving market rules, competition and statutory regulations.

A large part of the power grid infrastructure in developed countries is reaching its expected end-of-life; a large portion of equipment was installed more than forty years ago. The deployment of Smart Grid technologies within the large, interconnected and meshed networks in Europe and North America has been triggered by a number of major outages causing transmission system operators to start thinking in terms of appropriate countermeasures based on new technologies and equipment. These include: Wide Area Monitoring; Special and Wide Area Protection; Advance Dispatching; and other equally effective and desirable Smart Grid applications.

Looking at developing nations, which are showing fast growth in consumption and a need for commensurate expansion and evolution of their energy transmission networks, the Smart Grid concept should be refined to include applications that relate to: State Estimation, Remote Control, Remote Management and Asset Monitoring and Asset Management.

Here is a look at the key elements for setting up such a Smart Grid in terms of sensors and devices for Smart Transmission Grids:

SENSORS AND DEVICES FOR SMART TRANSMISSION GRIDS

New technologies offer the ability to gather important real-time information from transmission networks. This data can be processed by a variety of different algorithms and provide crucial support in planning, operation and maintenance of electrical grids. In order to exploit all additional functionalities, a telecommunication infrastructure has to be installed and configured to facilitate the exchange of the vast amounts of data. Synchronization issues must also be adequately managed.

Phase Measurement Units (PMUs)

A Phase Measurement Unit (PMU) is a device or function incorporated into a protection relay or other system, which measures the electrical waveforms on an electricity grid using a common time source for synchronization (usually a GPS signal). The common time synchronization between several devices allows synchronized real-time measurements of multiple remote points on the grid.

The installation of a network of PMUs has been effectively demonstrated to be suitable for implementing different advanced applications.

Fault Locators / Recorder Equipment

Recording devices installed at substations and associated fault location algorithms, which make use of recorded data and accurate power system models, permits fault monitoring and analysis. The target is to locate and explain all faults occurring in the network.

Devices for Dynamic Line Rating

These are intelligent electronic devices whose functions include measuring and monitoring the electrical, thermal and mechanical parameters of high voltage overhead conductors. These components are usually installed on the most critical spans of the electrical lines to be monitored, though it is possible to assure safe conditions for the whole line.

Lightning Detection Systems

These sensors detect electromagnetic signals generated by lightning and are able to provide extremely accurate geo-location measurements of lightning parameters and classify lightning types. The real-time data produced can evaluate the risks lightning poses to electrical infrastructure as well as manage reclosure of transmission lines, warn field crews about approaching storm threats, and improve engineering and design with lightning analysis.

Sensors for On-line Transformer Monitoring

Large power transformers are among the most important elements in an electrical network infrastructure. They ensure the continuous power transfer between different transmission voltage levels, as well as between transmission and distribution grids.

On-line monitoring provides a continuous condition assessment against any incipient fault developing in the transformers. Key parameters are monitored.

NEW TECHNOLOGIES OFFER THE ABILITY TO GATHER IMPORTANT REAL-TIME INFORMATION FROM TRANSMISSION NETWORKS

Power Electronics

Power flows in traditional AC transmission systems are governed by branch impedances (lines and transformers), the inherent fixed values of which preclude the ability to dynamically change the performance of a passive grid. Recently power electronics have begun to play a significant role since they make it possible to dynamically modify the power flow in a network. Power electronics-based components are always equipped with a control system that allows them to be used in a smart way. For this reason they are usually classified as technologies for Smart Grids.

The equipment designed to make the AC transmission system flexible and to control,

to a certain extent, the power flow in both static and dynamic conditions is named FACTS (Flexible AC Transmission System), currently a mature but expensive technology.

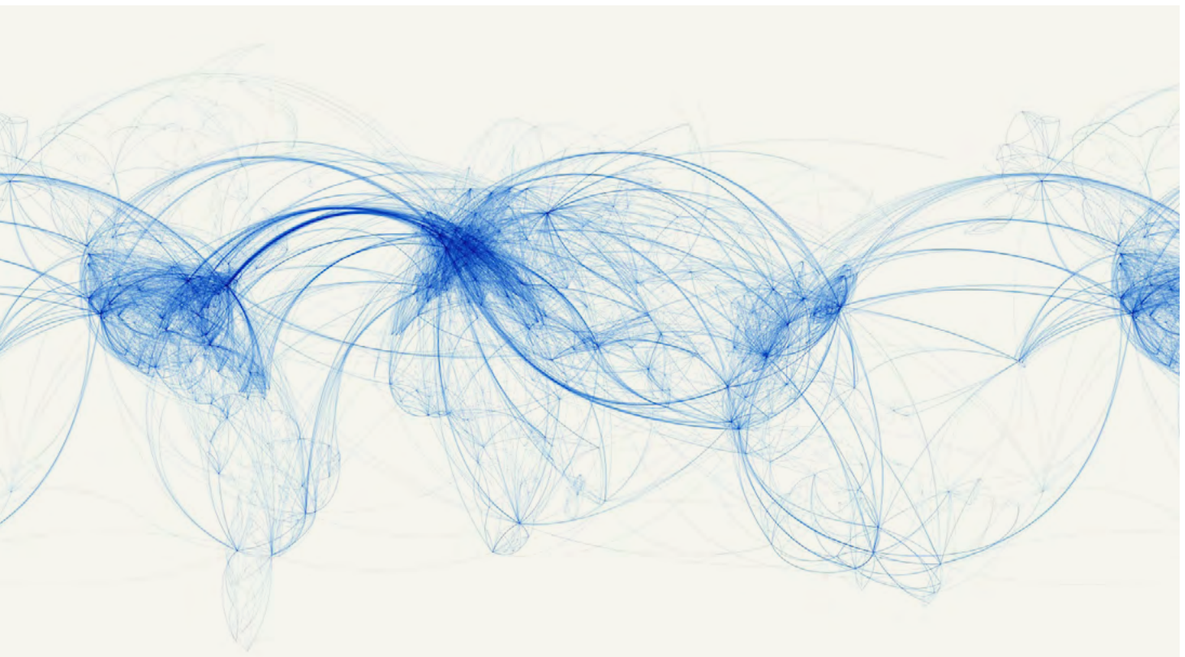
HVDC - VSC TECHNOLOGY IS PARTICULARLY SUITABLE FOR CONNECTING REMOTE ENERGY SOURCES TO THE TRANSMISSION NETWORK

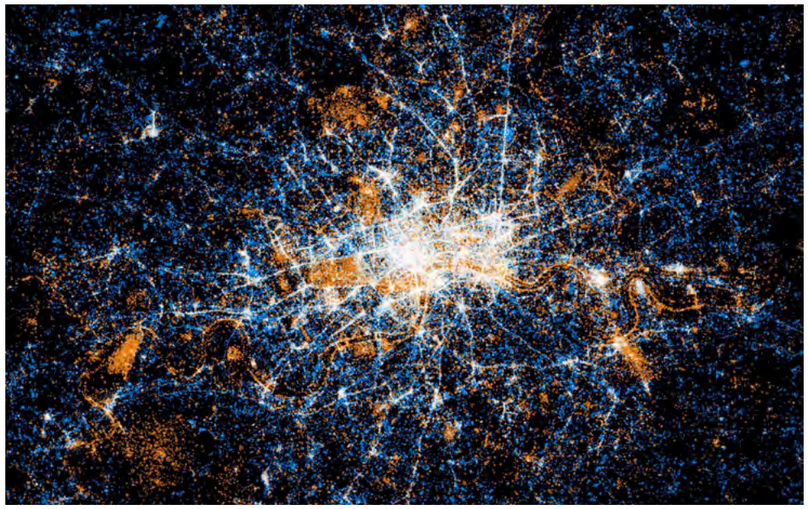
High Voltage Direct Current (HVDC) links

In recent years there has been an increasing application of Direct Current links (HVDC) in transmission networks. Since all loads and thus distribution networks and even transmission networks work in AC, such HVDC links are integrated in the traditional AC systems through converter stations placed at the ends of the DC lines, whether they are cable or aerial. For a long time these converters have made and still make use of thyristor valves (LCC – Line Commutated Converter). In addition to LCC a relatively new technology, based on other kinds of valves (typically IGBT), is often applied today and will be much more widely applied in the future; such converters are named Voltage Source Converters (VSC). In the recent past this solution has evolved significantly making it, for some applications, much more competitive than traditional LCC solutions from a system performance point of view.
HVDC-VSC has many interesting properties, including: the ability to work properly even with very low (and even null) short circuit power available from the AC network; the ability to enable frequent fast reversal of power flow through the associated cable links (if any); greater flexibility in the regulation of reactive power exchanged with the network; a smaller footprint; a black-start capability even in totally passive networks; less sensitivity to interferences and grid disturbances.
All of this combined makes VSC technology particularly suitable for connecting remote energy sources to the transmission network (particularly useful for wind generation parks).

Storage Systems

Electrochemical (battery) storage systems, connected to the network through suitable power electronic converters, appeared on the market some years ago. They have only recently become attractive due to the technological development of solutions and the use of advanced materials.





The flexibility of such systems makes them useful for tackling operational and network issues concerning steady state and dynamic transients, integration and co-operation with renewables for hybrid systems, management of islanded networks, peak-shaving, power balancing, congestion management, evolution of market design and regulatory mechanisms. However they remain costly, and the overall convenience of their application to the transmission network has yet to be demonstrated.

STRATEGIC APPROACH FOR SMART GRID IMPLEMENTATION

In order to define an integrated roadmap for smart grid implementation, it is important to choose an approach that considers all the technical, economic, regulatory, social and environmental aspects regarding the development of an electrical system.
Smart Grid initiatives, and Smart Transmission Grids in particular, must be tailored to fit the specific needs of the country in question. This has to be focused on the short-term (compatible with existing and approved on-going initiatives) and for the long-term, bearing in mind the best examples as well as new and emerging technologies and applications.

IT IS IMPORTANT TO CHOOSE AN APPROACH THAT CONSIDERS ALL THE TECHNICAL, ECONOMIC, REGULATORY, SOCIAL AND ENVIRONMENTAL ASPECTS REGARDING THE DEVELOPMENT OF AN ELECTRICAL SYSTEM

Successively a Cost Benefit Analysis (CBA) shall be made to choose the right initiatives to develop at the appropriate time, in order to design a staged roadmap mindful of the most relevant aspects regarding an electrical system's growth process. Finally, the regulatory issues and the most effective way to monitor the Smart Grid program implementation must be addressed as part of this planning process.

| IDEAS & VISIONS |

An Innovative Testing Philosophy for Safe System Operation

Paolo Miolo, Testing and Certification, Sales and Marketing Director, CESI

WHAT ARE THE SAFEST, MOST EFFECTIVE TESTING PRACTICES FOR THE INTERCONNECTED ELECTRICAL NETWORKS OF TODAY AND TOMORROW? TESTING FACILITIES MUST CONTINUOUSLY DEVELOP THEIR SKILLS, PROCEDURES AND EQUIPMENT IN ORDER TO RESPOND TO A RANGE OF NEW CHALLENGES BORN OF COMPLEX CONTEMPORARY ELECTRICAL SYSTEMS.

New solutions, components and systems are a fundamental part of the development of tomorrow's transmission and sub-transmission system grids. What are the safest, most effective testing practices for the interconnected electrical networks of today and tomorrow? Testing facilities must continuously develop their skills, procedures and equipment in order to respond to a range of new challenges born of complex innovative solutions.

THE IMPORTANCE OF TESTS AT EXTREME TECHNICAL CONDITIONS FOR COMPONENTS AND SYSTEMS BECOMES FUNDAMENTAL FOR "SAFE" NETWORK STABILITY

In the present century, interconnected electrical networks will be more relevant and determinant for growth and development than ever. Continuous improvements and upgrades are generating a strong need for reliability. For that reason the definition of technical requirements within defined limits is necessary in order to grant a safe technological evolution of the networks and a real mitigation of risks associated with new products and solutions.

Linked together in national and international working groups, energy field stakeholders, components and systems manufacturers, utilities, research institutes and associations are defining comprehensive standards that satisfy these requirements.
Global testing institutions state that more than 20% of components tested in laboratories don't achieve certification. The importance of tests at extreme technical conditions for components and systems becomes fundamental for "safe" network stability. This practice recovers the importance of the role of testing developer, where independent laboratories help components and systems manufacturers and utility companies find common ground for new products and solutions, guaranteeing the availability and reliability of future networks.
When network components fail to pass certification tests, the social costs can be measured in loss of revenue, power outages, safety issues and liabilities. Faults in equipment are a major cause of electrical power outages in several countries. According to estimates, these costs represent more than 600 US$ billion worldwide in annual economic damage.

Evaluation and definition of the procedures, limits and requirements is part of a long process of standardization. The time to market for "standards" does not always fit with the introduction of new solutions and products into the networks. Today, what the utilities and system and component manufacturers expect from labs is an ability to participate to the product qualification process, starting from the first stage of research and development. The roles of customers and suppliers of lab services is extremely tenuous, and the new model is a partnership that looks to the best testing solution for a specific product. All over the world, independent testing labs are considered an enabler for acceptance of new products and solutions.

The testing cathedral for every potential situation is an old concept. Several investors are replicating this concept in some countries (where huge investments for new labs are no longer a major obstacle) and reproducing

ALL OVER THE WORLD, INDEPENDENT TESTING LABS ARE CONSIDERED ENABLERS FOR ACCEPTANCE OF NEW PRODUCTS AND SOLUTIONS

immense laboratories that can boast important technical range, but not the real skills necessary to operate them, nor a clear perception of what the market expects from independent laboratories. The services offered by these labs, without know-how and experience, are not acceptable for utility and transmission operators.

CESI and other independent labs are looking at the market in order to adapt their facilities to the specific needs of utilities and product and systems manufacturers. These laboratories are investing in new services, anticipating the standard definition while at the same time contributing to their definition through the practice, measurement and skills of very high level engineers.

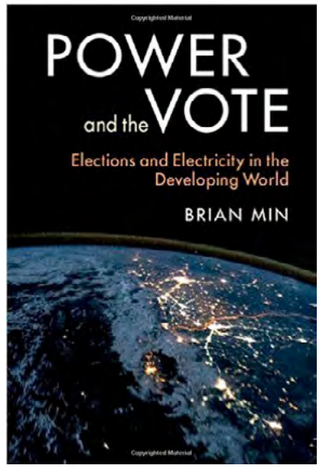
IN ORDER TO FOCUS ON NEW MARKET NEEDS, INDEPENDENT TESTING INSTITUTES HAVE TO IMPLEMENT NEW TEST PROTOCOLS AND CYCLES

Within this new, innovative context, independent labs anticipate technological trends and implement new test strategies directly in their facilities or on-site.
These practices include, among others, prequalification tests of high voltage cables (alternating or direct current). Over the past two decades, these tests have made it possible to qualify new cables and cable systems, enabling new materials, systems and technologies in solid cooperation with transmission operators and cable manufacturers.
Another interesting test technology that was developed in recent years is the partial discharge measurement of high voltage cables, which makes it possible to test cables laid down on-site (underground or submarine). This system has been further enhanced by the introduction of innovative sensors that facilitate identification or prevention of faults in cable systems online.
Finally, why not create a reminder to use power electronics in test practices that makes it possible to emulate voltage and current at very high ratings, allowing an opportunity to fine-tune frequencies? Full control of these parameters facilitates testing of motor systems, battery storage systems, inverters and so forth.
In order to focus on these new market needs, independent testing institutes have to implement new test protocols and cycles, making huge investments in the skillsets of their testing engineers and not only in new facilities. The target is to be much closer to utilities and TSOs than in the past, integrating test validations in the development process for new products and solutions. Testing should be more than a check phase in the construction and production of new equipment; more and more often, it should play a supporting role in making the right decisions for the development of new solutions that will be the fundamental for our enhanced and reliable grid systems of tomorrow.

| REVIEW |

Power and the vote: Election and Electricity in the Developing world

Brian Min
University of Michigan



Biography

Brian Min is Assistant Professor of Political Science at the University of Michigan. His dissertation received the 2011 Gabriel A. Almond Award for the best dissertation in comparative politics from the American Political Science Association. Min's articles have appeared in World Politics, American Sociological Review, and Annual Review of Political Science. He has received grants from the World Bank, the International Growth Center, and the National Science Foundation. Min received his PhD from the University of California, Los Angeles, MPP from Harvard's Kennedy School of Government, and BA from Cornell University.

Electricity provision is not a widely studied topic in political science. Yet the flow and distribution of electrical power provides an unusually clear window into how political institutions work. Electricity is the lifeblood of the modern economy. Yet more than a century after the introduction of electric power transmission, some 1.3 billion people – a fifth of the world's population – still live without electricity (IEA 2013). Predictably, most of those lacking access reside in poorer countries. Yet even in these states, access to electricity is uneven, marking a bright line separating those on the road to modernity from those mired in persistent poverty. The unevenness of electricity access in many countries indicates the severity of the challenge facing governments. Across most of the world, governments are the primary purveyor of electricity. Who gets electricity and why? How do governments decide who gets vital public goods such as access to electricity, clean drinking water, and education? Put simply, do democracies provide greater access to electricity than non democracies? And if so, do these benefits flow to the rural poor? (…)
These are important questions anywhere but absolutely critical ones in the developing world, where such services are key building blocks of development. This book seeks to explain how political institutions shape access to public goods, particularly among the poor. (…) Prevailing theory expects that democracies will deliver more public goods because of pressures induced by electoral competition under the gaze of a free press, an institutional apparatus that privileges the interests of the poorer median voter, or a normative preference toward equality. But a growing body of empirical evidence has cast doubt on this expectation.

(From the introduction of the book)

Ministry Mission in Latin America

Date > 22 - 28 October 2015
Venue > Santiago, Antofagasta, Lima, Bogotà, L'Avana

Matteo Codazzi, CESI CEO, participated at the Entrepreneurship Mission organized by Italy's Prime Minister together with the Foreign Affairs Ministry and Economic Development Ministry. The countries visited by the mission were Chile, Peru, Colombia and Cuba, where local stakeholders, Institutions and Companies met with key representatives from Italy aiming to create mutual synergies and business cooperation.

Cigré - IEC symposium

Date > 26 - 30 October 2015
Venue > Cape-Town, South Africa
www.cigre.org

CESI will participate with his professionals and with its own booth at CIGRE's international symposium about the Development of electricity infrastructures in Sub – Saharan Countries.

ASPEN European Strategy Group

Date > 31 November - 1 December 2015
Venue > Brussels, Belgium
www.aspeninstitute.org

CESI will participate at the international seminary themed "Energy Security as a Priority for Europe's Foreign Policy" hold by Aspen in collaboration with EUISS (European Union Institute for Security Studies) and CEPS.

Shaping a Better Energy Future

CESI is a leading global technical consulting and engineering company with 60 years of experience in several areas including: Transmission and Interconnections, Smart Grids, Power Distribution, Renewables, Testing, Certification and Quality Assurance. CESI also develops and manufactures advanced multi junction photovoltaic solar cells for both space and terrestrial (HCPV) applications.

With an annual turnover of more than €120 million, CESI operates in more than 40 countries around the world, with a total network of 1,000 professionals. The company's key clients include Governmental Institutions, Regulatory Authorities, major Utilities, Transmission System Operators (TSOs), Distribution System Operators (DSOs), Power Generation companies, Manufacturers, Financial institutions and International electromechanical and electronic manufacturers. CESI is a fully independent joint-stock company with main premises located in Milan, Berlin, Mannheim, Dubai, Abu Dhabi and Rio de Janeiro.

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