

IEA and G20: cooperation across the spectrum of energy challenges

The International Energy Authority has been working closely with the G20, not only on the core mission of fostering energy security, but also on tackling the key problems of price volatility and lack of access to modern energy services

By Maria van der Hoeven, executive director, International Energy Agency

Since the 2010 G20 Seoul Summit, the world has witnessed the Arab Spring, the Fukushima disaster in Japan and continued uncertainty in global financial markets. These events have had repercussions in the energy sector, underscoring the core mission of the International Energy Agency (IEA) – to foster energy security – but also highlighting other crucial energy challenges that can no longer be ignored.

Among these, two deserve special attention: continued price volatility in energy markets and inadequate access to modern energy services in many countries. The IEA has undertaken extensive work in both areas to identify the steps needed to overcome these challenges.

Tackling price volatility

Prices for oil, as those for many other commodities, are inherently volatile – and volatility itself varies over time. The oil market has recently been characterised by rising, and at times rapidly fluctuating, price levels. After relative stability in 2010, in the following 10 months crude oil prices have fluctuated from \$75 to \$125 per barrel. Natural gas and coal prices have also fluctuated widely. At the same time, the past decade has witnessed an explosive growth in the trading of financial derivatives of energy products, as well as financial investment in commodity indices – especially in oil, but increasingly in gas and coal as well.

The apparent increase in the volatility of oil prices in 2008-09, coupled with increasing financial participation, raises questions about what determines volatility in energy commodity markets. Since energy commodities generally have highly inelastic supply and demand curves, at least in the short run, neither supply nor demand initially responds much to price changes. Therefore, any shock will lead to large changes in energy prices. According to IEA analysis, industry-specific or macroeconomic shocks to supply-demand fundamentals drive price volatility.

The IEA has participated in the G20's efforts on oil, gas and coal market volatility. Work on volatility in commodity markets was submitted to the G20 in July 2011, and the report on gas and coal volatility will be submitted to the G20 in October. Furthermore, the IEA hosted a seminar last spring on the 'financialisation' of commodities and recent regulatory changes affecting over-the-counter energy markets. The second IEA-IEF-OPEC Symposium on Physical and Financial Markets is in Vienna in November

2011, organised under the IEA's joint programme with the International Energy Forum (IEF) and the Organization of Petroleum Exporting Countries (OPEC).

The workshop, dedicated to 'Functioning and Regulation of the Physical and Financial Energy Markets', will build on the insights gained from the programme's first workshop. It will examine the functioning of physical and financial energy markets, price reporting agencies, and the impact of physical and financial markets on petroleum prices and volatility. It will also explore future expectations on oil prices and volatility, assess the impact of new regulatory reforms on energy markets, and look at the role of physical and financial market data transparency. The final joint report on price-reporting agencies, with the additional participation of the International Organization of Securities Commissions (IOSCO), was submitted to the G20 finance ministers' meeting in October 2011.

In addition, the IEA has increased coverage of derivatives markets and the cross-linkages between financial and economic factors and oil prices, in its regular *Oil Market Report*.

Preliminary results suggest financial derivatives markets play a negligible role in fostering energy price volatility. On the contrary, transparent, well-regulated derivatives markets are beneficial in enabling risk transfer and efficient pricing.

Ensuring access to energy

Price volatility affects countries both rich and poor. But while many developed countries are concerned primarily with energy security or decarbonising their energy mix, many others still seek to secure enough energy to meet their citizens' basic human needs. More than 1.4 billion people (over 20 per cent of the global population) have no access to electricity, while 2.7 billion people (40 per cent of the global population) are without clean cooking facilities. More than 95 per cent of these people are in sub-Saharan Africa and developing Asia, and 85 per cent are in rural areas. This situation will change very little over the next 20 years. Indeed, it will deteriorate unless much greater action is taken.

Lack of access to modern forms of energy goes hand in hand with a lack of clean water, sanitation and healthcare. It also represents a major barrier to economic development and prosperity. Without electricity, it is difficult to participate in the modern world economic system.



Addressing these inequities depends upon international commitment to effect the necessary change by setting targets and indicators to monitor progress.

Through its *World Energy Outlook* publication, the IEA has focused on gaps in modern energy access for more than a decade, providing independent quantitative analysis. The 2011 edition tackles financing – a critical issue for delivering universal modern energy access.

“The public sector must provide a supportive investment climate by implementing strong regulatory reforms”

To provide universal energy access by 2030, an average investment of almost \$50 billion per year is needed – more than five times the level in 2009. While the relative increase in investment is large, it remains a small share of global annual investment in the power-generation sector, reaching only five per cent of the level projected by 2030. The resulting increase in energy demand and carbon dioxide emissions would be modest. In 2030, global energy demand would rise by just 1.2 per cent and carbon dioxide emissions would be only 0.8 per cent higher, compared with the IEA's baseline scenario.

The barriers to universal modern energy access are significant, but surmountable. Actions must confront

Guarding the petrol depot of a French oil refinery. Price volatility affects both rich and poor countries

specific issues, such as the need for detailed energy statistics on both supply and demand and the lack of funding; as well as broader factors, such as developing appropriate local conditions to provide investor confidence, including capacity-building and regulatory frameworks. The increase in financing required to achieve universal access is large relative to current levels, and requires additional funding from all major existing sources. The public sector must provide a supportive investment climate where private actors are willing to operate, by implementing strong governance and regulatory reforms. The public sector, including donors, must also use its tools to leverage private sector investment where the commercial case is marginal, such as through loan guarantees. Its own investment should concentrate on areas where the commercial case is weak, but the public case is clear.

Fortunately, momentum is increasing on both energy access and energy price volatility. Today's international agenda offers several opportunities to take further action. The declaration by the United Nations of 2012 as the 'International Year of Sustainable Energy for All' is an important opportunity that must not be missed. The Energy for All Conference in Norway in October 2011 provided a strategic platform to discuss the link between energy access and development. Both will be key issues at the United Nations Conference on Sustainable Development – Rio+20 – in Brazil in June 2012. As for commodity price volatility, the G20 Cannes Summit will highlight this issue, which is a major concern for developed countries seeking stable economic growth – but, indeed, also essential to stable, widespread access to such commodities in the least-developed economies.

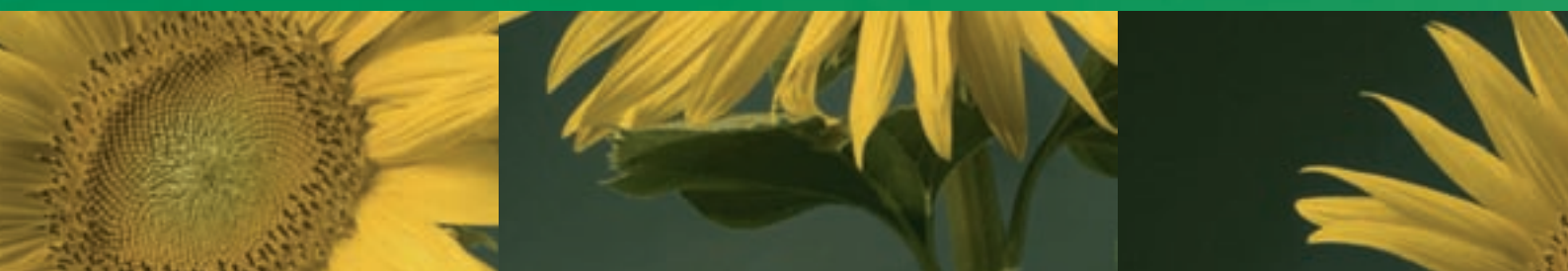
The IEA's work with the G20 thus spans the spectrum, from analysing price volatility as it plays out in major financial centres to ensuring the provision of most basic energy necessities to billions of poor around the world. It is a partnership that continues to yield widespread results. ♦



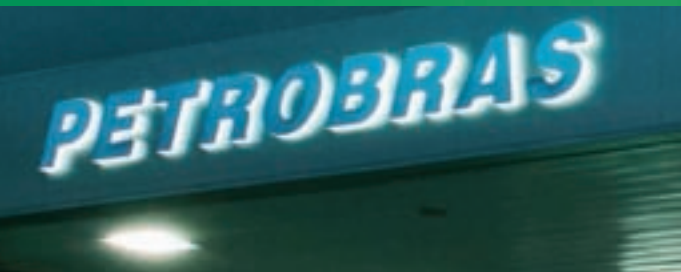
Petrobras is more than an oil company.



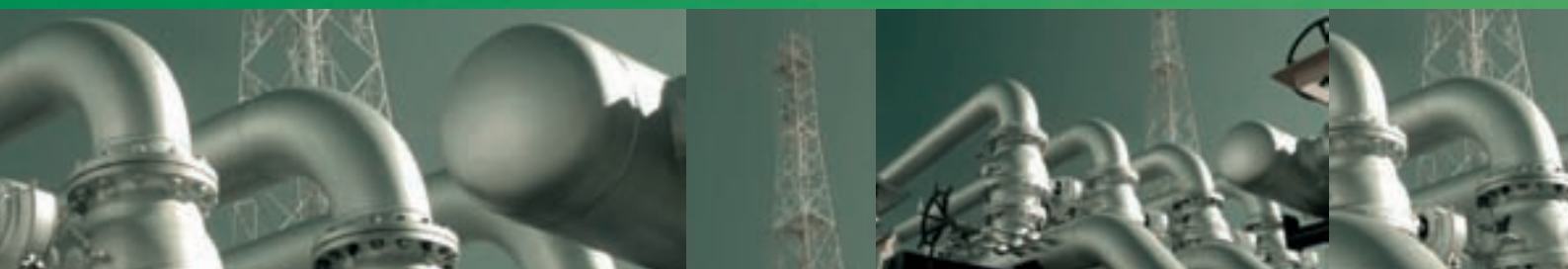
And if you think about it, it's more than an energy



Petrobras is renowned around the world for its technology and leadership in deep and ultra-deepwater exploration and production. It's also a pioneer in biofuels and invests in alternative energy sources. But, more importantly,



company too.



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CHALLENGE IS OUR ENERGY

A strategic approach towards sustainable development

Raízen, a recently created joint venture between Shell and Cosan, the world's largest sugarcane producer, strategically furthers the sustainability actions of its founders. The key element in this strategy is a Sustainable Development Compass that will minimise uncertainties along the way

Raízen was born in 2011, with the mission to offer solutions in sustainable energy and to provide a relevant contribution to society. With 24 sugar and ethanol mills, Raízen manages more than 700,000 hectares, has a distribution capacity of 21 billion litres per year and over 40,000 employees. It is the fifth largest Brazilian corporation and generates enough electricity to supply a city the size of Rio de Janeiro. With such figures, Raízen has the responsibility of being effective in its sustainable development strategy.

There is no question that sugarcane-based ethanol is an excellent fuel, because of both its environmental benefits and the way it requires only small adjustments to fit the current transportation system infrastructure. But, in itself, does producing an environmentally beneficial fuel through good practices make a company sustainable? Not necessarily.

The conditions for a healthy environment encompass preventing pollution, preventing the destruction of ecosystems, and respecting human rights and needs

Any sound sustainability strategy must inevitably deal with two major agendas: (1) the overall conditions for humanity to perpetually experience good quality of life, and (2) the particular conditions that will result in a long-lasting organisation placed within the larger environment. The challenge is merging the two while respecting each one's non-negotiable elements.

The first agenda demands compliance with a set of scientifically robust environmental and social principles. These overarching necessary conditions for a healthy natural and social environment encompass: preventing pollution in all its forms; preventing physical destruction of ecosystems; and respecting human rights and needs. Society can be sustainable only when it complies with these conditions.



The other agenda refers to the particular strategic conditions any company must design and implement in order to sustain itself within its environment. The non-negotiable factor here is profit: a private company must be profitable.

Regardless of how good its strategy is, an organisation can be long-lasting only if the larger environment remains so.

Over the long run, performing outstandingly in the second agenda,

but not in the first one, would be the

equivalent of building a solid construction on top of foundations made of clay. Profits cannot last if foundations collapse.

The strategic approach Raízen is implementing – and recommending – is to adopt long-term guidelines based on the first agenda. With this Sustainable Development Compass, every move impels the company towards compliance with overarching sustainability principles. And while moving forward, every step must be strategic businesswise, which in itself brings the whole value chain along.

We at Raízen are concerned with the state of the planet. At the same time, we have the goal of being profitable by contributing to society with sustainable energy and, in doing so, generating a better future.

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The time has come for a G20 energy task force

The current collection of institutions involved in coordinating energy governance around the world is outdated. The G20 can take the lead in developing a modern and coherent strategy for a sustainable energy future that benefits everybody

By Dries Lesage,
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for International
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In today's world, energy cooperation is characterised by a hodgepodge of overlapping institutions, weak international regimes and remaining governance gaps. Unlike other complex issue areas such as trade, financial stability or health – led by the World Trade Organization, the International Monetary Fund and the World Health Organisation, respectively – energy has no universal institution that can serve as *primus inter pares* for governance coordination and reliable statistics. True, the United Nations has created the inter-secretariat structure UN Energy to coordinate its own energy activities, but observers agree that this is a far cry from the idea of a genuine 'World Energy Organisation'.

Several energy issues are clearly beyond the competence of UN agencies. With its broader scope, huge expertise and outreach activities to emerging economies, the Paris-based International Energy Agency (IEA) comes closest. But it only accepts countries in the Organisation for Economic Co-operation and Development (OECD) as members, and has hardly any competence with regard to issues such as the development-energy nexus or nuclear energy, for which other institutions are better placed.

Interconnected energy issues

The current institutional fragmentation does not necessarily mean the end of the world. On the contrary, the existing variety of energy issues requires flexible and specialised institutional responses, rather than one new, big bureaucracy. However, Earth, with its integrated world economy and integrated eco-system, also faces an integrated energy problem. What is more, most energy issues are interconnected: they have important ramifications for other policy areas, such as development, climate, security, trade, finance and food. By consequence, a political body is needed to provide oversight, manage the interplay among relevant policy areas, resolve conflicts and detect governance gaps. That body should have the resources, authority and vision to develop a coherent strategy for a sustainable global energy future.

At its summits at Gleneagles in 2005 and St Petersburg in 2006, the G8 was the first high-level body to embark on such an effort. This resulted in some initiatives for energy efficiency, cleaner energy and technological collaboration, as well as a coherent set of 'Global Energy Security Principles' covering values such as transparency and market principles, the need to diversify the energy mix, environmental sustainability and development concerns. G8 summitry was also instrumental in boosting IEA activity on energy efficiency and cleaner energy, and in reaching out to key emerging economies.

The G8's energy work looked very promising at the outset, especially with regard to global coordination. Unfortunately, in later years, high-level attention for energy governance waned. Perhaps the G8, wrongly, thought that after delegating much of its agenda to the IEA, its coordination job was done. With the recent advent of G20 summitry, the question became to what extent the G8's energy agenda would migrate to this larger group, and whether the latter would adopt the former's energy *acquis*.

The G20 summit in Pittsburgh in September 2009 only "took note" of the G8's St Petersburg principles, and chose to focus on just a few new initiatives. Since then, the G20 has undertaken efforts to curb excessive volatility in oil prices and enhance transparency in oil markets, later to expand to the gas trade. A key element in this exercise is the improvement of the Joint Organisations Data Initiative (JODI Oil). Another important project is the phasing-out of fossil-fuel subsidies, which now contribute massively to global warming and cost the governments of developing countries' billions of dollars a year.

“The existing variety of energy issues requires flexible and specialised institutional responses, rather than one new, big bureaucracy”

Progress on this front would support both climate policy and fiscal consolidation. This, however, cannot go without “providing those in need with essential energy services, including through the use of targeted cash transfers and other appropriate mechanisms”, as the leaders declared at Pittsburgh. For the initiatives mentioned above, the G20 works with multilateral institutions such as the OECD, the IEA, the Organisation of Petroleum Exporting Countries and the International Organisation of Securities Commissions.

In 2010, following the oil spill in the Gulf of Mexico, Russia and others added global marine environment protection to the G20's energy agenda. Finally, a working group focuses on clean energy and energy efficiency.

*Mama Yahav
for eni*

collaboration

a word that allows us to grow together



we work in more than 70 countries to bring you energy





It is expected to work with the Clean Energy Ministerial, a multilateral US initiative that resulted from the Copenhagen climate conference in 2009 and will report to the G20 summit in Cannes.

The world can also hope that, after the Fukushima catastrophe in March 2011, the G20 will produce a political roadmap to strengthen international regulation and oversight for nuclear safety – an unacceptable weak spot in global governance. Given the gloomy prospects for the nuclear stress tests in Europe and safety assessments elsewhere, it should also refrain from promoting nuclear energy as a solution to climate change.

Although the ongoing initiatives are extremely valuable and address real governance weaknesses and gaps, the G20 does not act as a genuine political steering committee for the fragmented field of global energy governance in general. Still, it represents more than 75 per cent of the world's energy consumption and more than 80 per cent of all carbon dioxide emissions. With members such as Russia, Saudi Arabia and Canada, the G20 is also relevant for production, but the global sustainable energy agenda should be mainly consumer-driven. As energy is a very strategic issue, governments

Workers in China install a high-voltage electricity pylon. Better international cooperation on energy can bring greater efficiencies and aid efforts in tackling climate change

might prefer an informal country grouping, rather than an official multilateral institution for coordination. The G20 is sufficiently representative and flexible to assume leadership, provided that the least-developed countries are also directly involved.

Providing policy coherence

A G20 energy task force is now needed to do the overall strategic thinking on global energy governance. Nobody else will do it. The aim is not to substitute the good work already being done, or to undermine more inclusive, rules-based multilateralism, but to contribute to policy coherence and provide political stimuli on behalf of countries that bear a great responsibility for the world's energy problems.

Visionary energy experts from member countries could call on a wide array of international institutions for assistance, including the International Atomic Energy Agency, the International Renewable Energy Agency and the World Bank. One possibility is a standing, but flexible, network of officials from the G20 and multilateral institutions, comparable to the Financial Stability Board. Ambitious institutional innovation is badly needed, because the future of this planet and its people depend on it. ♦



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The role of electricity transmission systems in energy policy goals

Greater interconnectivity between cities and countries can provide the answer to reducing the cost and improving the reliability of electricity supplies, as well as bringing into the equation renewable energy sources in remote regions

By Daniel Dobbeni, CEO, Elia Group, and president, European Network of Transmission System Operators for Electricity (ENTSO-E), and Konstantin Staschus, secretary general, ENTSO-E

Energy has always been a prerequisite for human development and well-being. For electricity, the added value often far exceeds its cost (as with, for example, lighting, medical, communications systems and media).

Electricity is the most flexible form of energy that humans use. It can be generated from many different primary sources of energy, including coal, oil, gas, nuclear, hydro, biomass, sunshine, wind and geothermal. It can be used for almost all energy applications. Many of the examples used to illustrate how central energy is to human needs involve electricity. Even for heating and road transport, electricity is more efficient than fossil fuels, using heat pumps and electric or plug-in hybrid cars. Worldwide electricity demand is thus forecast to keep growing, at spectacular rates near 10 per cent per year in some emerging economies, and at up to five per cent per year in most members of the Organisation for Economic Co-operation and Development (OECD).

Economies of interconnection

Although electricity can be generated locally for local use, the economics and security of supply provide strong reasons for interconnecting cities and countries through high-capacity transmission lines. Savings come from market integration – always using the least expensive resource available to serve loads – and from savings in sharing reserve-generation capacities. A large, interconnected system needs proportionally much less reserve-generation capacity than a small island

Transmission capacity must expand in order to serve load growth reliably, especially in emerging economies

system, reducing cost and increasing reliability. A large interconnected system is critical to renewable energy sources such as hydro, wind and solar energy, which are often best available in remote regions. Their daily and seasonally fluctuating output also requires transmission lines to connect windy areas, sunny areas and mountainous areas where storage hydro plants are crucial for balancing generation with demand.

Transmission capacity therefore must grow rapidly all over the world. It must expand in order to serve load growth reliably, especially in emerging economies. It is needed to integrate large amounts of renewable energy sources into the power system and to bring power from new power plants to the cities via a reliable, meshed grid. It must also grow so electricity markets can be integrated on a continental scale to reduce costs and improve the security of supply.

Renewable energy integration

The integration of renewable energy sources has become a key driver worldwide. In Europe, the European Union's Renewable Energy Directive legislates rapid growth to enable renewable sources to supply 20 per cent of Europe's energy needs by 2020. The National Renewable Energy Action Plans of the EU's 27 members show that wind energy will grow by 150 per cent – from 85 gigawatts (GW) in 2010 to 213 GW in 2020 – and solar by 250 per cent – from 26 GW to 91 GW, compared to 809 GW installed capacity overall in 2010 in the EU.

But regardless of laws, renewable energy sources will grow worldwide because they help reduce greenhouse gas emissions and are poised to become competitive with other sources. Already onshore wind energy in good sites is almost competitive with traditional coal- or gas-fired generation. Photovoltaic panels (PV) have seen cost reductions of around 22 per cent each time worldwide production capacity has doubled over the last years, with technological and manufacturing efficiencies predicted to continue this downward trend. The European Photovoltaic Industry Association forecasts PV grid parity in southern Europe before 2015 and near competitiveness with conventional generation before 2020. With grid parity, investments by household and business depend less on government support. PV take-up could even grow into quantities difficult to balance with demand.

Nighttime in central Tokyo. Global electricity demand is rising by as much as 10 per cent per year in some countries



Empowering a Clean Energy Future Must Start Today

The energy crisis is no longer a national or a local problem; it afflicts all of us globally. Climate change is affecting our daily lives, and with a quarter of the world's population in developing countries lacking access to basic electricity, the problem cannot be a back-burner issue anymore.

UNDOUBTEDLY, MORE THAN EVER, WE NEED TO PROGRESS towards green energy and carbon reduction initiatives to alleviate the global energy crisis. And we must do it now.

The benefit of clean energy sources, such as solar, is that it can meet our energy demands without compromising the resources of future generations. Sunlight is the primary source of energy for almost all life sources on earth. It delivers enough energy in 60 minutes

to meet global energy needs for an entire year.

Through years of research, solar technology has now reached the point where it can be deployed in terms of scale and cost to fundamentally change the way we generate electricity. However, with less than 1% of the world's

energy production coming from solar, the challenge remains for the solar energy industry and G20 leaders to implement this technology globally.

It becomes imperative for the G20 leaders to formally acknowledge that shifting to a new model of economic growth—Green Growth—merits a central place in the agenda of international economic cooperation. By committing to make Green Growth a standing item on the G20 agenda for the next five years (and beyond), policymakers and multi-stakeholders will facilitate the building of a set of initiatives to progress green

growth-related investment, innovation and resource-efficient industrial processes.

According to a report by the Organization for Economic Co-operation and Development (OECD) published in May 2011, Green Growth policies can help create up to 20 million jobs worldwide by 2030, in the areas of renewable energy generation and distribution alone, and have a beneficial knock-on effect on the consumer market. Indeed, efforts to foster Green Growth on an international scale are clear from the EU's 2020 objectives to cut greenhouse gas emission by 20% and source 20% of its energy needs from renewable sources. Suntech supports both OECD's Towards Green Growth strategy and EU's 2020 objectives wholeheartedly.

For these reasons, it is vital for G20 leaders to support resource-efficient choices over the medium and long term, such as by ending wasteful consumption subsidies and managing the phasing out of targeted subsidies. In 2008, US\$ 557 billion was spent worldwide on fossil fuel subsidies, though G20 leaders have already committed to phase out this spending over the medium term. Effective enabling frameworks should be put in place by coordinating domestic regulatory frameworks and incentive programs.

G20 governments can stimulate momentum by working with the private sector in a structured manner to identify practical, replicable ways of attracting private capital into clean technology investment.

G20 leaders should promote innovation and creativity by increasing research and development spending to provide for the faster uptake of advanced

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technologies, leading to lower costs and increased efficiency. They should promote the shift to sustainable consumption by promoting education campaigns to raise consumer awareness about the transition towards a green economy; consumers themselves ultimately must demand a sustainable green economy.

The massive potential of the Green Growth model is evident in China, where ambitious, long-term national goals have helped to create a backdrop for a growing renewable energy industry. China is currently the world leader in clean energy investment, with policymakers recognizing that they cannot provide the energy or the foundation for public health that its population and economy needs by simply relying on fossil fuels.

In its latest Five Year Plan, hailed as the greenest Plan ever, Beijing outlined an ambitious strategy to build 235 gigawatts (GW) of power generation capacity from clean energy sources by 2015, of which 10GW will be solar. Considering that the average coal-fired power station has a 500-megawatt power generation capacity, by 2015, China can potentially replace 470 coal-fired power stations with clean energy sources! Internationally, China plans to build power projects in 40 African countries with the aim of cutting the continent's reliance on fossil fuels.

Suntech is doing its part too. In 2011, we plan to ship more than 2.2 GW of solar panels, with the aim to ship 10 GW by 2015. Suntech's illustrious leadership team, comprising solar scientists with more than 50 years combined experience in solar research and development, are focusing on achieving the highest levels of efficiency in the industry. All of Suntech's R&D programs have a clear goal—reduce the cost of harnessing solar energy and increase the performance of

solar cells and panels. Suntech has established collaborative relationships with the University of New South Wales and Swinburne University of Technology in Australia, as well as photovoltaic research institutions around the world.

Moreover, by promoting youth education, we can foster the next generation of social leaders, and solar engineers. For example, Suntech has donated solar modules to the Sega Girls School in Tanzania, where the clean electricity is helping to generate a more environmentally aware and self-sustaining generation of young women. We have helped provide solar panels to McNeil High School in Austin, Texas, where the school's new Green Club is informing the community about our planet's energy and environmental crisis. In addition, Suntech's Youth Innovation Competition has brought solar technology into thousands of classrooms across China, reaching tens of thousands of students. We will continue to make strategic investments to promote education and accelerate humanity's transition towards a more sustainable and responsible way of living.

However, Suntech acknowledges that the renewable energy industry and G20 leaders need to come together to make Green Growth a reality. Ultimately, Green Growth is a concept that needs to function in a self-sustaining way and be integrated into global markets, business balance sheets, management systems and practices. Solar energy provides a real solution to today's energy crisis, combating climate change, and providing access to basic electricity to a quarter of the world's population.

Suntech calls upon the G20 leaders and governments to join us in empowering a solar tomorrow. We can and will do it.

The energy needed to balance the fluctuating nature of renewable sources adds to costs. The work of transmission system operators (TSOs) is crucial for successful system integration. Many new and upgraded transmission lines are needed to transport renewable energy from where it is generated to where people need it. New lines are also needed for continent-wide integration of renewable energy sources, hydro and other generation to ensure that generation is balanced with demand reliably and efficiently.

Political support is required

Political support for the TSOs that build and operate the transmission lines, and solve the balancing challenge every day, is especially important now.

First, the procedures for acquiring permits for new lines are much too slow – best practices show that they can be sped up. Innovative compensation schemes are also needed for communities that are crossed by new lines.

Second, investment sums much higher than those needed for day-to-day business are required too. To be able to be financed with equity and loans, TSOs need stable and attractive regulatory treatment that is competitive with other businesses with a similar risk profile.

Third, public acceptance of large infrastructure is poor. Governments, regulators and TSOs must stand side by side, year after year, and explain with transparent arguments, as well as unflagging persistence, why each new line is needed.

Fourth, continental-scale markets and joint transmission planning are needed – for the economies, for customers and for the TSOs themselves.

Finally, demand response must be allowed to bid into continental-scale intraday and balancing markets through smart grids, based on clear market definitions and data-exchange standards. TSO research and development

are crucial to prepare for a future in which hydro and conventional resources may no longer be enough to balance all the fluctuations in renewable sources of energy.

Tangible progress in Europe

The European Network of TSOs for Electricity (ENTSO-E) unites 41 TSOs from 34 countries based on strong new mandates in European law. In 2010, ENTSO-E's first Ten-Year Network Development Plan identified 500 new transmission projects needed to achieve the European 2020 goals and how they support more competitiveness and market integration, sustainability and integration of renewable sources, and security of supply. The projects, with an aggregate length of 42,100km, represent an increase of transmission corridor length of about 14 percent, and roughly €100 billion investment over 10 years. Beyond 2020, electricity highways with a higher voltage and possibly with direct instead of alternating current – onshore and offshore – will be needed. Ensuring secure and reliable operations at all times and cost-effectively requires that future electricity highways are planned, operated and managed, taking into account the existing networks.

Already, for 2014 implementation, ENTSO-E and its members contribute to the electricity market integration in Europe, through setting up price-coupling mechanisms in order to allocate today's scarce transmission capacity efficiently.

ENTSO-E's cooperation with the EU and its new Commission for Energy Regulation has delivered its first products, confirming the crucial role of TSOs in achieving a clean, competitive and reliable power system for Europe.

Given the challenges ahead, TSOs need strong support from policy-makers and the public. Explicit support from the G20 for achieving the five goals above would clearly help to set the stage. ♦

High-voltage electrical transmission towers supplying Melbourne, Australia. More extensive networks offer solutions to meeting future supply levels



A young girl with blonde hair, wearing a pink headband and a pink halter top, is shown in profile on the left side of the image, looking towards the right. In the background, a row of white wind turbines stands in a golden field under a clear blue sky.

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Energy efficiency: a key enabler of the 'smart grid'



The grid is 'smartening'

There is a clear consensus that the grid needs to 'smarten up' to be able to cope with the increasing complexity of the electricity network: intermittent renewable energy sources, growing demand from users, environmental concerns, not to mention the future charging requirements of electric vehicles. Without a smarter energy infrastructure, the whole stability of the system is at risk. The good news is that smarter grids should help reduce by 13 per cent to 24 per cent the forecast peak demand increase, according to the 2010 Technology Roadmap of the International Energy Agency.

Overall, smart grid technologies provide an opportunity to optimise the performance of existing infrastructure through better monitoring.

For the grid to become 'smart', a combination of smarter supply, smarter demand and smarter services such as 'demand-response' is required

Smarter demand starts with energy efficiency in homes, buildings and industrial sites – making energy efficiency a key enabler of a smarter grid.

Energy efficiency saves energy and money and cuts carbon emissions, with a short payback, across all installations, through competitive solutions that are available today. Energy efficiency is therefore the cheapest, fastest and most effective way for governments, companies and citizens to address their energy issues.

In short, energy efficiency is a no-brainer, strongly supported by governments around the world who recognise that there can be no energy strategy today without energy efficiency.

Governments around the world recognise that there can be no energy strategy today without energy efficiency

Yet markets and regulations and public awareness do not support energy efficiency as they should.

Energy services, electricity pricing, demand-response policies, subsidies and incentives, training and information should be reviewed and improved to support the twin ambitions of energy efficiency and the smart grid.

It is high time to set up a new collaborative business model, involving governments, policy-makers and regulators, private companies and consumers, NGOs and academia.

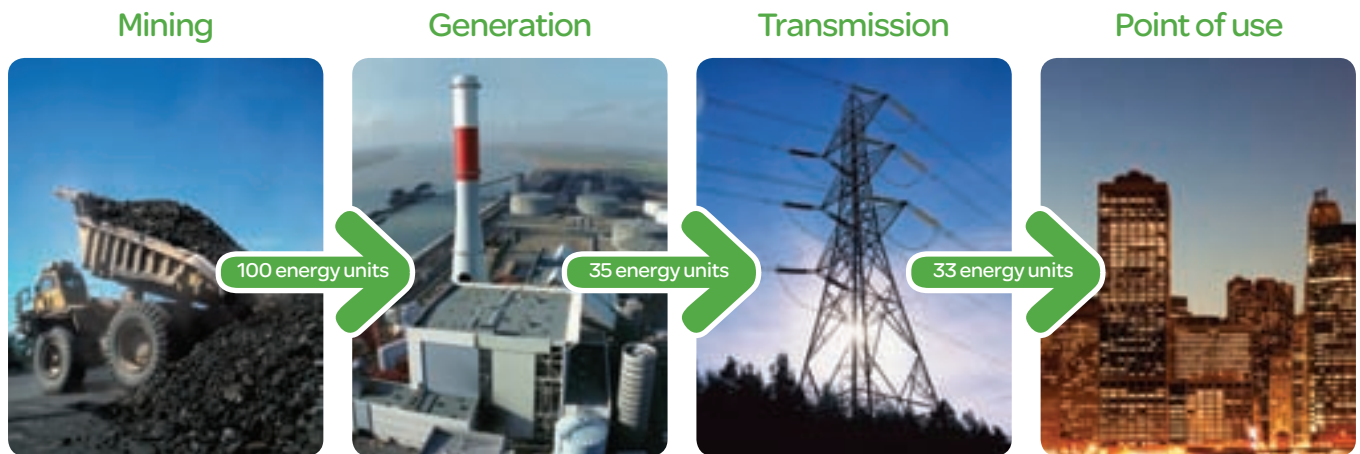
Improving energy efficiency is a quick, easy and practical way to help solve the world's energy challenge.

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What's a negawatt? The one you didn't use

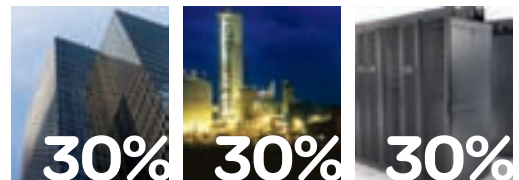
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*Source: World Energy Outlook 2009, IEA/OECD

NetOne: the network for rural communities

NetOne Cellular (Pvt) Ltd, the pioneering mobile network operator in Zimbabwe, has extensively expanded its network to rural communities and has always made strides in rural areas – in more ways than one. Since NetOne's formation in 1996, the various projects that it has pursued to connect the rural communities have been strategic and intentional and, to this day, NetOne remains the network most widely identified with rural communities in Zimbabwe. This is due to various expansion projects in terms of coverage, unique, tailor-made Value-Added Services (VAS) for the rural people, and exploration of renewable sources of energy to keep the rural communities connected to the global village.

Over the years, NetOne has pioneered network development, building a strong footprint of coverage in all provinces, major highways, towns, tourist resorts, growth points, township centres and farming areas, keeping the entire country's population – and, indeed, visitors to the country – connected. It is worthy of note that 70 per cent of Zimbabwe's population is located in rural areas, which had hitherto experienced limited development in telecommunication services.

NetOne saw fit to pioneer GSM mobile services to enable these previously disadvantaged communities to communicate with the outside world. The network has embarked on further expanding its coverage, which in the year 2010 alone saw more than 100 base stations commissioned, three-quarters of which were placed in mining, rural, township and growth-point locations. NetOne effectively expanded the already widest network coverage, and these communities are proud of NetOne as their preferred mobile network service.

Electricity supply is a big challenge to the growth of Zimbabwe's mobile communications industry. In areas where heavy equipment is operated, most companies have deployed generators as alternative sources of power. NetOne operates base stations that require a lot of power, so much that they end up being switched off for prolonged periods in the likely event of commercial electricity interruptions or load-shedding – a practice that is currently being employed, given the fact that electricity demand surpasses supply, causing power cuts. Rural communities in Zimbabwe largely do not have power, and NetOne took it upon itself to address this concern by installing solar-powered base stations in areas that are hard hit by power shortages, to ensure uninterrupted coverage to rural communities.

NetOne won a prize at the inaugural ICT Awards held in 2010 on the biggest project that impacted the public in rural communities through the solar chargers.

The above-mentioned power challenges also affect rural communities in terms of the inability to charge their mobile handsets. The typical scenario is that if someone wants to charge their phone they often have to travel 10km to reach the nearest shopping centre, where they could charge their mobile phones. NetOne developed solar chargers that were donated to chiefs, headmen and central school locations in areas that do not have power to help them charge their mobile handsets. Chiefs and headman are respected authorities in their local communities, and donating these solar chargers to them ensures that everyone in the community benefits. This solar charger



unit is free to the community, donated for the benefit of the subscribers who come to buy NetOne airtime.

There are communities that were hard hit by drought and related water shortages who approached NetOne for assistance to sink boreholes. NetOne has sunk a borehole in Mawabeni in the Matabeleland region. There is another borehole project that we are currently pursuing, to be sunk in the Buhera district at Chiurwi primary school in Manicaland.

In terms of product development, NetOne has increasingly enhanced mobile convenience for rural populations with the recently launched OneWallet mobile money transfer. This product provides rural people to use their mobile phones as a convenient way to make transactions.

Given the sparse population distribution in the rural areas, NetOne tends to target its base stations on high mountain sites to cover as much of the area as possible. These sites often have no access roads and no nearby electricity grid, thus escalating the cost of construction. Typical construction costs for a single base station located in such areas range from \$150,000 to \$200,000. Therefore, NetOne requires significant funding levels to take these noble rural telecommunications projects to their logical conclusion. Zimbabwe has the highest literacy rate in Africa, and bringing information and communications technologies to the reach of the entire population will inevitably increase the country's GDP and international trade, as well as bringing about socioeconomic development.

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