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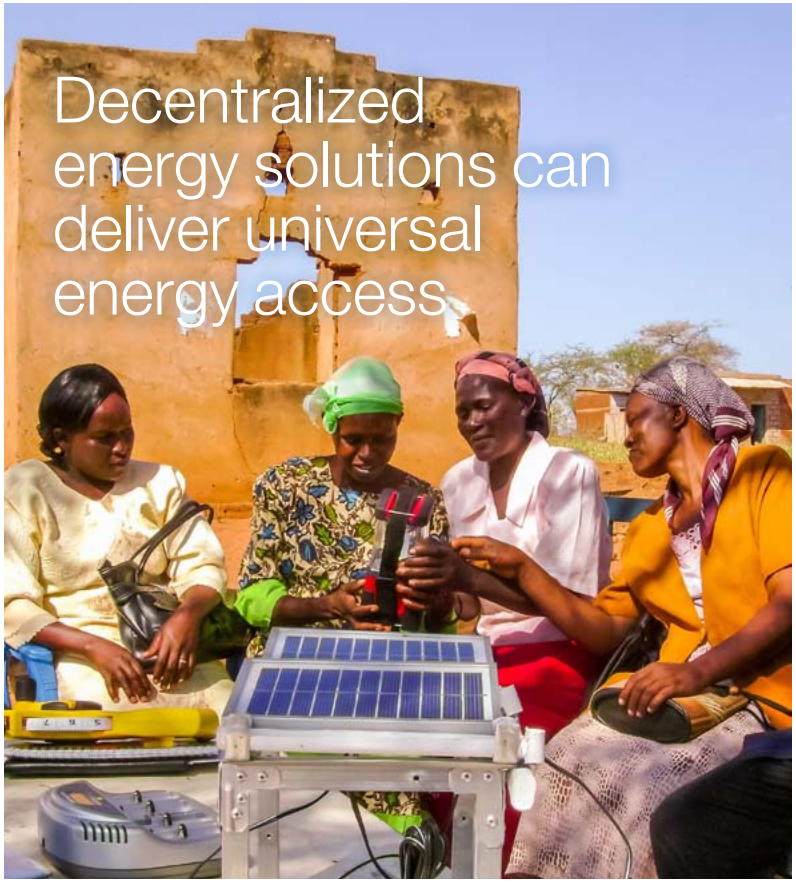
Decentralized energy solutions can deliver universal energy access



Villagers in Kitonyoni, a rural, off-grid, market village in Makueni County, Kenya Photo: Sustainable Energy Research Group & Energy for Development

The 21st century can be an African century – but only if energy access is enabled for the more than 620 million people living without electricity in sub-Saharan Africa. Decentralized energy is a faster and cheaper route than grid extension, according to Paul Smith Lomas and Aaron Leopold from international development charity Practical Action. A bottom-up approach to energy planning, including training, mapping and a tiered approach to energy access - instead of counting to the numbers of connections and megawatts available – can help ensure that Africa achieves universal energy access by 2030.

"It's clear that a 'business as usual' approach means that we will fail to meet our goals," says Aaron Leopold, Practical Action's Global Energy Representative. "It has repeatedly been shown that energy poverty in dozens of countries around the world is actually set to increase, not decrease, as we move towards 2030; and that in many other countries energy poverty will only be marginally reduced."

The International Energy Agency (IEA) has recently forecast that, due to population growth, energy poverty in Africa is set to only decrease from 620 million people today to 540 million by 2040 – ten years after the 2030 global target for universal energy access. The World Bank's Independent Evaluation Group (IEG) has subsequently found that, without significant improvements in energy access efforts, global population growth will actually lead to an increase in the absolute number of people lacking any form of modern energy services: from 1.1 billion today to 1.2 billion by 2030.

"The potential of distributed systems and renewables in sub-Saharan Africa is still not being taken seriously," says Leopold. "But the time it takes for the average donor-supported thermal plant to be built is 9 years, compared with a micro-grid which can be operational in 3 months, or a mini-grid in 6-9 months."

REDEFINING HOW PROGRESS IS MEASURED

Launched on 12 October, the 2016 Poor People's Energy Outlook (PPEO) published by Practical Action, evidences that much current national energy planning and international donor support is disjointed and focuses disproportionately on large infrastructure that is not aligned with the global 2030 timeline, does not make economic sense in most energy-poor contexts, and is out of touch with the needs of the energy-poor.

"The needs of people living in energy poverty, who mostly reside in rural areas, are quite different from what conventional energy systems are set up to deliver. Despite the recent radical technical evolution of renewables and systems management, energy planning and policies have evolved very little to date," says Paul Smith Lomas, Practical Action's International Director.

Redefining how progress should be measured is key to policy which enables energy access through decentralized solutions. Practical Action has worked closely with the World Bank and IEA to refine their multi-tier energy access indicators which are embedded in the Multi-tier Framework (MTF). > see page 2

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MTF redefines energy access from the traditional binary (access to electricity / no access) count to a multi-dimensional definition as "the ability to avail of energy that is adequate, available when needed, reliable, of good quality, convenient, affordable, legal, healthy and safe for all required energy services". Energy access is measured in the tiered-spectrum, from Tier 0 (no access) to Tier 5 (the highest level of access).

> "Supporting decentralized energy is better for everyone's bottom line."

As part of the consortium Power for All, Practical Action is pushing for national governments to adopt the tiered approach. "Power for All is making policymakers take decentralized energy seriously," says Leopold. "In Malawi, the concept is under discussion at national government level," says Smith Lomas. "Also, Kenya has adopted a tiered approach to energy access through the Sustainable Energy for All (SE4All) Action Agenda, which sets the national policy framework. Donors such as Renewable Energy and Energy Efficient Partnership (REEEP) and the UK's Department for International Development (DFID) are starting to use it in allocating resources," he adds.

CHALLENGES TO MARKET GROWTH

"Africa still lacks the workforce – there is a need for vocational, professional and business training. This is where the state has to step in: education is a public service and a public good. Otherwise, we are stuck in a chicken-and-egg situation – companies won't go where there isn't a viable workforce," says Smith Lomas.

Although comprehensive market information is lacking, the indicators are positive. Up to 15,000 new jobs have been created in sub-Saharan Africa through the distribution of off-grid lighting (UNEP, 2014). The market for quality-certified solar products has grown rapidly over the past five years, reaching almost 3.5 million units in 2014. This market grew by 165% between 2011 and 2012, and by 204% between 2012 and 2013.

Three countries – Kenya, Tanzania and Ethiopia – accounted for 78% of the sales in 2014, reaching a market penetration of 15-20% of off-grid households. These countries have a comparatively supportive policy environment for solar household solutions. For the region as a whole, market penetration is estimated to be around 3%.

There are five general business models: partnerships between companies and institutions; distributor-dealer channels; proprietary distribution; franchise models; and, rental or leasing systems. Business models and their financing are evolving in response to rapidly changing market conditions. The main current trend is the emergence of the pay-as-you-go (PAYG) model, under which ownership of the solar product is transferred to the consumer after a limited payment period. A recent survey found that 60% of PAYG companies use mobile payments to collect revenue.

Investment for the (quality-certified) off-grid lighting sector increased from $ 9 million to $ 22 million between 2010 and 2013, and to about $ 100 million in 2014. Most of the investment in 2014 went to PAYG businesses.

> "It's clear that a 'business as usual' approach means that we will fail to meet our goals."

"Tariff reform and independent power producer (IPP) reform are major issues. Through supportive policies, including energy access mapping, energy policymakers can give clarity and security to investors," says Smith Lomas.

FOLLOW THE MONEY

Current global investments are still less than one-third of the IEA estimate of the $45 billion annual funding requirement needed to meet the sustainable development goal of universal energy access by 2030. However, Practical Action challenges the IEA's estimate, noting that falling prices, more efficient appliances, and a rethink of the level of consumption needed to provide basic services and major development benefits could lower the cost of universal access by as much as 70-90%. Decentralized mini-grids were found to be cost-competitive or cheaper than grid extension in almost all of the case studies detailed in the 2016 PPEO report.

At present, neither the World Bank nor any other major development bank is investigating options to bring its energy investment portfolio in line with the recognized need to put a majority of financing into the decentralized energy space.

"There has to be a realization that supporting decentralized energy is better for everyone's bottom line," says Leopold, "A policy approach that is appropriate to location and context can underpin the business case."

"This is about first rung of the ladder energy access, which can enable the beginnings of a local industry to develop. It's turning the challenge into a sense of opportunity. The technology is already there – with supportive policy frameworks in place, universal energy access in Africa by 2030 becomes a realistic target," adds Smith Lomas.

A single solar panel at a fish-processing centre in Tengragri Chak, Bangladesh. Photo: Practical Action

Looking to the future, the 2017 edition of PPEO will focus on financing national energy access plans. "We won't be focused only on donor finance, but on how the private sector can deliver," says Leopold. "This will involve business incubators, and building up supply so that markets can develop sufficiently for finance to enter into this space." ●

Download the 2016 Poor People's Energy Outlook at https://t.co/mSeEwEptqe.

Paul Smith Lomas was also speaking on Day 4 of the World Energy Congress, focused on Africa. For the programme and session summaries please see http://www.wec2016istanbul.org.tr.

Energy Trilemma Index 2016:

'Global progress' on equity, security and environmental sustainability

Joan MacNaughton, Executive Chair of the World Energy Trilemma report

"The shift in energy priorities is bringing greater diversity to the global energy mix, helping to underpin security of supply while increasing sustainability."

Globally, there are signs that countries are building more sustainable energy systems by concurrently addressing energy security, energy equity and environmental sustainability challenges, according to the World Energy Council's 2016 Energy Trilemma Index. However, despite high rankings on the Index, Germany and the UK remain on the negative watch list – meaning that big drops in ranking are expected in the near future. In contrast, Latin America is on the rise, with Chile, Ecuador and Bolivia making the top three places of the positive watch list.

Published on 11 October, the 2016 Energy Trilemma Index reveals signs of global progress on all dimensions of the energy trilemma – security, equity and environmental sustainability. Energy sustainability depends upon balancing these three aspects constituting the trilemma and is the basis for prosperity and competitiveness of individual countries, according to the report.

The Energy Trilemma Index comparatively ranks 125 countries in terms of their ability to provide a secure, affordable, and environmentally sustainable energy system. In addition, countries are awarded a balance score that highlights how well the country manages the trade-offs between the three energy trilemma dimensions and identifies top performing countries with a triple-A score.

Thirteen of the 125 countries assessed achieved a triple-A score in this year's index, compared with just two out of 130 countries in 2015.

Joan MacNaughton, Executive Chair of the World Energy Trilemma report said: "Energy access and climate change have never been so high on the agenda as now, following the COP 21 Paris Agreement, the UN Sustainable Energy Goals, and the attention accorded these issues by the G20. This shift in energy priorities is bringing greater diversity to the global energy mix, helping to underpin security of supply while increasing sustainability. Together with the increase in access to modern energy services - 85% today now compared to 80% in 2000 - this demonstrates how, overall, energy policies are leading to a more sustainable energy world."

"But with only 13 of 125 countries achieving a triple A score for their progress on the Trilemma goals, our work continues to offer valuable lessons for policymakers on how to create the frameworks which will incentivise investment and innovation to deliver secure energy for all while meeting the climate challenge."

EUROPE LEADS ON TRIPLE-A RATINGS

Nine out of the top ten-ranked countries are European, with eight of the top ten achieving a triple-A score. According to the report, this result shows that it is a realistic goal to develop an energy system in which policies work well together to balance the trade-offs among energy security, energy equity, and environmental sustainability. In particular, the report cites Europe's long-term, balanced energy policy, particularly the European Union's energy and climate policies to 2020, as a key factor in contributing to the region's success on the trilemma.

However, there are challenges ahead for even the top-ranked countries. The Energy Trilemma's 'watch list' highlights countries that are likely to experience significant changes – positive or negative – in their Trilemma Index performance in the near future. A case in point is Germany: while it is placed fifth on the Index with a triple-A rating, it is also listed on the Council's negative watch list for the second year in a row.

The 'Energiewende' - the plan to transition Germany's energy system, which includes goals of increasing power generation from renewable sources, a reduction of primary energy usage and CO_2 emissions, as well as the phase-out of nuclear power by 2022 (14% of the electricity generation mix in 2014) – is facing critical challenges.

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Germany requires a total investment of US$58 billion until 2033 to ensure security of supply for conventional power generation and storage. Under current conditions, the utilities' market share in power generation capacity is projected to decline by one-third, to less than 50% by 2033 as households and businesses invest directly in their own renewables-based power generation capacity.

> "Overall, energy policies are leading to a more sustainable energy world."

Reform of the legislation for renewables support, to come into force in 2017, shifting from feed-in tariffs (FITs) to market-based support mechanisms, may impact the speed of the transition, according to the report. Further, Germany's energy equity performance has seen a decline over recent years as energy services became more expensive due to renewable energy subsidies being levied.

A second example is the UK, which ranked at 11 on the Index with a triple-A rating, is also on the negative watch list. Security of supply is an issue, as the country's recent decision to leave the EU and potentially exit from the single market could significantly increase the cost of its energy imports. This also puts into question plans to close the UK's remaining coal plants.

The UK government recently agreed to the planned construction of a nuclear reactor at Hinkley Point after a prolonged debate on cost and energy security concerns. However, investment uncertainty remains due to planned changes to the regulation of foreign ownership of critical infrastructure.

Moreover, the recent sharp decrease in FITs for wind and solar power may slow investments in these sectors, impacting the country's goal to further diversify its energy supply and improve environmental sustainability. It is hoped that the newly established Department for Business, Energy and Industrial Strategy, which replaces the Department of Energy and Climate Change, will provide more clarity for future energy investments.

LATIN AMERICA ON THE RISE

Newcomers to the positive watch list in 2016 include Chile, Ecuador and Bolivia - part of the LAC (Latin America and Caribbean) region. Environmental sustainability is LAC's strongest trilemma dimension, with the region as a whole accounting for only 9% of the world's greenhouse gas (GHG) emissions.

Chile (rank 38, BBB), the largest producer of renewable energy in South America, made the headlines in June this year, as oversupply of solar energy resulted in solar power being sold off to the grid for free. There are concerns that continued oversupply will be detrimental to investment; however, the real challenge faced by Chile is to expand the capacity of its infrastructure, such as connecting the northern and southern electricity grids of the country for more effective distribution. This is underway and expected to be completed by 2017.

> "Bolivia plans to triple energy supply and increase export capacity with the goal of becoming the 'Energy Heart of South America'."

In Ecuador (rank 50, BBC), where hydropower accounts for 93% of energy supply, eight new hydroelectric power plants will come online in the period 2015–2017. This development, if accompanied by a supportive fossil fuel infrastructure and improvements to the supply network, has the potential to significantly strengthen Ecuador's performance across all dimensions of the Trilemma, notes the report.

Ambitious plans are underway in Bolivia (rank 100, CCD), to triple energy supply and increase export capacity with the goal of becoming the 'Energy Heart of South America'. This will be achieved through stepping up exploration efforts, improving supply infrastructure, and attracting new investment. The Bolivian government estimates the country's potential gas reserves at approximately 62 trillion cubic feet (1.75 trillion cubic meters), the second largest natural gas reserves in South America after Venezuela. The report opines that this could add significantly to the equity of access and energy security dimensions of the trilemma in Bolivia, and across the entire region. ●

The World Energy Trilemma Index, prepared annually by the World Energy Council in partnership with global consultancy Oliver Wyman, is a comparative ranking of 125 countries' energy systems. It provides an assessment of a country's ability to balance the trade-offs between the three trilemma dimensions.

Access the complete Index results and use the interactive Trilemma Index tool and its pathway calculator to find out more about countries' trilemma performance and what it takes to build a sustainable energy system at *https://trilemma.worldenergy.org/#!/energy-index*.

The full Index report and Executive Summary are available for download on *www.worldenergy.org/publications*

ABOUT
WORLD ENERGY FOCUS

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Worldwide wind capacity to reach 500 GW mark by 2017

Global wind capacity will soon account for around 5% of global power demand, according to new data released this week by the World Wind Energy Association (WWEA).

The Association's bi-annual report reveals that worldwide wind capacity reached 456,486 MW by the end of June 2016 – an annual increase of 16.1%. By June 2016, enough wind turbines had been installed worldwide to generate 4.7% of the world's electricity demand, and a further 40 GW is expected to become operational over the final six months of the year.

"With the expected 500 GW installed wind capacity by end of this year, wind power will contribute 5% to the global power supply," says WWEA Secretary General, Stefan Gsänger. He warns, however, that an increased governmental use of energy auctions is squeezing smaller players out of the market; "It has already slowed down most of the European markets, so that Europe has already lost its long-term leadership to Asia."

Europe's share of wind energy accounted for only 33% of the world's installed capacity by the end of June 2016, showing continued reduction despite new installations in Germany, France and Italy. A record number of installations is expected in Germany this year, but the introduction of a new auctions system in 2017 is expected to lead to a slump in the German market.

"The particularly good news," says Gsänger, "is that we can now also see strong markets in Latin America and Africa." Brazil surpassed Italy to became the ninth largest market at the beginning of this year, with 1.1 GW installed in first half of 2016, showing a growth rate of 12.5%. Brazil is expected to continue as the lead market in the region and could reach the sixth position worldwide before 2018

Germany, India, Brazil, China, Spain and the US remain the major players in the global wind industry, accounting for 67% of global capacity, but this represents a drop from 73% in 2013.

The Asian market is still dominated by China and India. Although the Japanese and the Korean wind markets continue to grow slowly, China remains the largest single wind market by far, accounting for 46% of the world market for new wind turbines. China added 10 GW in six months, matching its growth last year and reaching an overall installed capacity of 158 GW by June 2016. India added a record 2.4 GW, almost the doubling its installations from last year. ●

European companies don't want tariffs on Chinese solar panels

Through industry association SolarPower Europe, 403 companies from across all 28 EU Member States have sent a letter to European Trade Commissioner, Cecilia Malmström, to end the current trade measures relating to Chinese solar equipment.

The European Commission must decide whether to remove or keep trade duties on Chinese solar modules and cells by March 2017. Photo Vincent Fournier

According to SolarPower Europe, the case "represents the largest ever trade dispute between the EU and China and seriously impacts the possibility for Europe to reach its climate objectives."

The measures were first instigated by complaints from EU-based solar equipment producers facing radically cheaper competition from China, and have been controversial since their inception in 2012 when the European Commission began an investigation into the importation of solar materials from China, leading to a tense dispute with China. Subsequently, the Commission initiated anti-subsidy proceedings regarding imports of modules and key components from China. In 2013, provisional anti-dumping duties on imports of Chinese solar panels, cells and wafers were announced.

The tariffs sparked a tit-for-tat response from China, who opened inquires on red wine and high-end automobile imports. Over half of the EU Member States openly objected to the tariffs.

In 2015 the Commission opened an investigation into how it should adapt the MIP to take account of price changes in the market. The review was closed this year, with no change to the MIP adaptation mechanism. However, an expiry review into trade duties placed on solar modules and cells from China is currently underway, and due to be completed by March 2017.

"We need the Commission to remove these measures to allow the sector to grow sustainably again," says Berry. "If Europe is serious about leading in renewables, then the solar sector must be allowed to grow again and the European Commission can support this with one easy action – removing the trade measures." ●

Tesla announces self-driving hardware for all vehicles

On 19 October, Tesla announced that all future vehicles will have the hardware needed for full self-driving capability "at a safety level substantially greater than that of a human driver".

The hardware includes eight surround cameras which provide 360-degree visibility around the car at up to 250 meters of range, twelve updated ultrasonic sensors allowing for detection of objects at nearly twice the distance of the prior system, and a forward-facing radar which provides additional data. The data is processed by a new onboard computer with more than 40 times the computing power of the previous generation. Tesla promises "a view of the world that a driver alone cannot access," and "on wavelengths that go far beyond the human senses."

Model S and Model X vehicles with this new hardware are already in production. ●

‘Blended finance’ to meet $51 billion gap for BRICS clean energy

New research from think tank IEEFA (Institute for Energy Economics and Financial Analysis) finds that the five BRICS countries (Brazil, Russia, India, China and South Africa), require significantly higher investments from public finance institutions to reach their clean energy targets.

The countries face a $51 billion annual funding shortfall to meet their own projected demand for new clean energy. Current lending plans of the New Development Bank (NDB) set up by BRICS governments will meet only 12% of this shortfall.

The BRICS plan to raise their total installed renewable capacity, including large hydropower, to 1251 gigawatts (GW), over varying time horizons to 2020-2030. Within the BRICS group, China targets to add 253 GW by 2020 and India to add 138 GW by 2022. The cumulative average required investment is US$ 177 billion annually. In 2015, renewable energy investment totalled US$ 126 billion.

The report recommends the use ‘blended finance’, or public money to leverage private investment, which would narrow the gap to about US$10 billion of public funds to catalyze private funds of around US$41Bn, to meet the annual investment required. ●

How Germany is bringing about an ‘Autowende’

In 2010, Chancellor Angela Merkel vowed to deploy one million electric vehicles (EVs) on German roads by 2020. By 2012, less than 3,000 electric vehicles were sold in Germany, while total automotive sales exceeded three million units. According to BMW CEO Norbert Reithofer, German ‘angst’ was holding the country back from EV adoption: “We like to engage in long and fearful discussions because we Germans tend to see more problems than opportunities, and it is no different with electro-mobility,” he declared.

Recent policy, finance and technology initiatives are aimed at overcoming the ‘angst’ and kick starting the ‘Autowende’. By the end of 2017, the German Charging Station Act will be amended to state that EV users must have access to all public charging stations, without entering into a long-term contract with a provider.

In April 2016, Merkel’s cabinet agreed to set aside €600 million to encourage the public to buy electric cars. The cost of the scheme is shared with the auto industry, which is putting up €600 million. The fund provides a €4,000 subsidy for buyers of purely electric cars, and €3,000 for hybrid cars. As a further incentive, electric cars are now exempt from motor tax for 10 years.

This month, the German Federal Ministry for Transport and Digital Infrastructure and the ‘Germany – Land of Ideas’ initiative presented the German Mobility Award for the first time. The prize focused on digital innovations for intelligent mobility. One of the winning businesses was Hubjert, for its system allowing EV drivers to digitally activate the charging process and pay using a smartphone, with or without a contract.

CEO of EnBW Frank Mastiaux and German Federal Chancellor Angela Merkel

Originated by energy suppliers EnBW, Hubject created a digital network of charging stations available on navigation systems and apps. With 99.85% accessibility and a choice of European languages, the e-Roaming platform makes it easier to travel by EV in Europe. There are already 40,000 charge points in 17 countries connected through the Hubject system, and companies such as BMW, Daimler and Renault are using it to provide their customers with easy access to charging stations. ●

Climate negotiations: what happens next

As explained by the World Resources Institute, the Paris Agreement provides that the first meeting of the Parties to the Paris Agreement (known as CMA1) will be held in conjunction with the next Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change. The next is COP-22, beginning 7 November in Marrakech, Morocco.

Once the Paris Agreement enters into force, the CMA (made up of countries that have ratified the agreement) becomes the Agreement’s governing body, with authority over all substantive, procedural, administrative and operational matters. Countries that have not yet joined the Paris Agreement can attend and participate in the CMA, but in principle only as observers. Observers can actively participate in discussions by making interventions and submissions but do not have decision-making power.

CMA1 is required by the Paris Agreement to make a number of decisions necessary to fully implement the Paris Agreement, notes WRI. This includes the work program established at COP21 to put in place various modalities, procedures and guidelines (MPGs) for the transparency regime, the information required in communicating nationally determined contributions, and the processes to take stock and raise ambition, facilitate implementation and promote compliance. ●

World Bank: Global carbon market cooperation could cut climate mitigation costs

A new World Bank report claims that greater cooperation through carbon trading could reduce the cost of climate change mitigation by 32% by 2030. The report State and Trends of Carbon Pricing 2016 provides an overview of current corporate carbon pricing initiatives and carbon pricing instruments around the world, including national and subnational initiatives.

Last year, the Paris Agreement set up a framework for global cooperation through carbon markets. Over 100 countries now consider carbon pricing initiatives as part of their nationally determined contributions. The report shows that momentum on carbon pricing has continued to grow, and claims that through emissions trading within or across borders, international crediting, carbon taxation and other measures, the carbon market has the potential to reduce global mitigation costs by more than 50% by 2050. ●

‘Zero-emission’ coal power project launched in India

Carbon Clean Solutions Limited has launched a carbon capture and utilisation (CCU) project that will capture 60,000 tonnes of CO_2 captured each year from a 10 MW coal-fired power station in Chennai, India. Post-start up, the power station is set to become a zero-emission plant. ●

Closing session of the 2016 World Energy Congress in Istanbul: Secretary General Christoph Frei and World Energy Council leaders discussing the 'new energy realities'

The new energy realities

Christoph Frei, Secretary General of the World Energy Council, set the tone for the 23rd World Energy Congress with this introduction to the World Energy Focus Annual, the event's official publication. According to Frei, the energy sector is facing unprecedented change. No more 'business as usual' – it's time for energy actors 'to innovate or die.'

We are now beyond the tipping point of a global energy transition. In the energy sector, unprecedented speed of change poses a wide range of challenges for producers, utilities, policy makers and the energy finance sector.

At the last World Energy Congress in 2013, hosted by the Republic of Korea, we highlighted that the energy sector was at a tipping point. We corrected misconceptions and faced reality: the challenge of delivering secure, equitable and environmentally sustainable energy for the greatest good of all.

Now, the sector is preparing for this new reality. Since the last Congress the energy transition has accelerated. The cost of renewable energy technology has continued to fall. Utilities are restructuring their operations and creating new business models.

Unconventional gas has reshaped global gas and LNG markets and investments in hydrocarbons have contracted on the back of falling prices. Investors are struggling to understand the future of energy over the 20 to 30-year timespan that underpins many investments - and many now look for more flexible and rapid payback solutions. The discussion of peak oil has moved to a discussion of peak demand and the fear of stranded private sector assets is shifting to a fear of stranded country-owned fossil resources.

The new reality for energy demand is slower growth coupled with faster underlying transformation. The global population is growing at a slower pace and its centre of gravity continues to shift eastwards. Electrification of the energy demand is accelerating, digitalization is empowering consumers, and investors and civil society are becoming more active energy players. The number of people without access to any form of modern energy has decreased to 1.1 billion and new business models deliver innovative solutions to rural households.

Climate change has become an overarching issue impacting on the future of energy and acting as a major driver of the energy transition. The energy sector is a major contributor to greenhouse gas emissions and many countries have national climate plans with significant implications for the production and use of energy. Energy has become a crucial issue at national level, in a context of more complex geopolitics.

Meanwhile, direct climate change effects are already posing a major challenge. Extreme weather events have increased by a factor of four over the past thirty years and the food-energy-water nexus is becoming a more pressing issue. Resilience of energy systems is now a major issue. Apart from natural risks, cyber threats keep energy leaders in Europe and North America awake at night.

The energy sector is facing continuously evolving frontiers. Changing market dynamics, constantly evolving innovation and technology options, new business models, shifting supply and demand centres, climate policy and resilience-preparedness all represent new frontiers to be embraced. It is clear from the research produced by the World Energy Council and the intense high-level dialogue taking place around the world that energy is undergoing a grand transition at unprecedented speed.

There is no such thing as business as usual. Companies that stand still fall back, countries that do not adapt to new realities put their prosperity at risk, and investors that take the wrong decisions will see their money disappear. The message is: innovate or die. More than anything in a world of great uncertainty, this World Energy Congress will offer global energy leaders a glimpse into the future, a deeper understanding of the new energy frontiers, and a stronger position for shaping the transition for the greatest good for the greatest number. ●

For more information on the past 2016 Congress, including session summaries and news releases, please see http://www.wec2016istanbul.org.tr and http://www.worldenergy.org
For the key highlights, please see http://bit.ly/2fhcyyT

22nd Conference of the Parties, COP 22

Marrakech, Morocco, until 18 November 2016

New energy realities: Building a resilient and low-carbon future

11 November, 11.30 - 13.00, COP22 UN blue zone, Arabian room

Addressing the new energy realities in a post COP21 context, the session will explore what it takes for companies, investors and governments to innovate and build tomorrow's sustainable energy future. This official UN side event is organised by the World Energy Council and the International Chamber of Commerce (ICC).

Breakfast Briefing: Energy crossroads - a new approach to climate resilient energy investments

15 November, 7.15 - 8.30, Hotel Le Meridien N'fis

To participate in this briefing organised by the World Energy Council, BDI (Germany) and ICC please contact Florence Mazzone, World Energy Council, *mazzone@worldenergy.org*.

Energy Efficiency Policies

17 November, 9.00 - 11.00, COP22 UN blue zone, Francophone pavillon

Join top level panelists in an expert conversation about how energy efficiency provides a straight path towards energy sustainability on the occasion of the launch of the latest World Energy Council report. The report 'Energy Efficiency: A straight path towards energy sustainbility', is published and launched in partnership with ADEME at this official UN side event. It will be presented by Francois Moisan, Executive Chair of the report, and Didier Sire, World Energy Council. Available for download on *www.worldenergy.org/publications*.

For more information on COP22 see *http://www.cop22.org/about/cop22*

REGIONAL EVENT

Africa Energy Indaba

Johannesburg, South Africa
21-22 February 2017

The Africa Energy Indaba (AEI) is the foremost African energy event for energy professionals from across the globe. The event gathers international and African experts to share their insights and solutions to Africa's energy crisis, while exploring the vast energy development and investment opportunities in Africa.

The AEI has been designated the World Energy Council's African regional event and is presented by the South African National Energy Association (SANEA), the Council's national committee. It is supported by the African Union Commission and the NEPAD Planning and Coordinating Agency.

Contact: Liz Hart (event including sponsorships)
E-mail: liz@energyindaba.co.za
Website: www.africaenergyindaba.com

MEMBER COMMITTEE EVENTS

Future of Energy Markets

Tallinn, Estonia - 15 November 2016

Will there be a capacity market or will the energy only market prevail? What should regulators do? What are the options suggested by market players? This conference organised by World Energy Council Estonia discusses the future of energy markets and especially the future of electricity markets. Speakers include Christoph Frei, Secretary Generalo of theWorld Energy Council, and Hando Sutter, CEO of Eesti Energia. The afternoon event will be held in English and Estonian, with translation into English available. Participation is free of charge, but prior registration via info@wec-estonia.ee is necessary.

Contact: Mihkel Härm
E-mail: info@wec-estonia.ee
Website: http://www.wec-estonia.ee

Political Economy and Sustainable Development

Madrid, Spain - 17 Nov 2016

The Spain Member Committee annual event focuses on two panels. In the first panel, 'Political economy of energy prices', speakers will analyse the interactions between political and economic drivers and their implications for both producers and consumers. The second panel 'Energy in the UN's sustainable development goals' assesses the implications of these on sustainability and energy policies at a global level as well as for traditional donors and for the Global South.

Participants will also evaluate the outcomes of the 23rd World Energy Congress and the results of the latest edition of the Spanish Energy Issues Monitor. Speakers include Fatima Al Foora Al Shamsi, Ministry of Energy of the UAE, plus Claudia Cronenbold, Vice Chair for the Latin American & Caribbean Region of the World Energy Council.

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Website: http://bit.ly/2ehvly7

25th Croatian Energy Day

18 Nov 2016 - Zagreb, Croatia

Discussions during this day entitled "A unique energy and climate policy in an open energy market – A year after COP21" will focus on the new approach towards energy management, as the CO_2 emission reduction goals set during COP21 have elevated the international community's responsibility for implementing measures for climate preservation and decreasing CO_2 emissions.Speakers will examine which energy and climate policy should remove all shortcomings from the previous period, and tightly connect the cost of CO_2 emissions, measures and technological development and base everything on an open energy market, without administrative influence and without a privileged position for any producer, technology or measure. English translation available.

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SEE MORE COUNCIL EVENTS AT www.worldenergy.org/events/future

ABOUT THE COUNCIL

The World Energy Council has been at the forefront of the energy debate for nearly a century, guiding thinking and driving action around the world to achieve sustainable and affordable energy for all. It is the UN-accredited energy body and principal impartial network, representing more than 3,000 organisations – public and private – in almost 100 countries.

Independent and inclusive, the Council's work covers all nations and the complete energy spectrum – from fossil fuels to renewable energy sources.

JOIN OUR NETWORK

Join the debate and help influence the energy agenda to promote affordable, stable and environmentally sensitive energy for all.
As the world's most influential energy network, the World Energy Council offers you and your organisation the opportunity to participate in the global energy leaders' dialogue.

Find out how you can:

- join a Member Committee;
- become a Project Partner, Patron or Global Partner;
- take part in annual industry surveys, study groups and knowledge networks;

by visiting our website and contacting our team on: http://www.worldenergy.org/wec-network

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