

# ENERGY ACCESS

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# FORUM REPORT

POWERING DEVELOPMENT  
IN THE ASIA PACIFIC  
25 OCTOBER 2016

Organised by



Part of



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## POWERING DEVELOPMENT IN THE ASIA PACIFIC

As our population continues to rise, demand for affordable energy increases. A global economy reliant on fossil fuels and the increase of greenhouse gas emissions is creating drastic changes to our climate system. As of 2011, efforts to encourage clean energy have resulted in more than 20 per cent of global power being generated by renewable sources. However, one in five people still lack access to electricity today.

The inaugural “Energy Access Forum – Powering Development in the Asia Pacific”, held on 25 October 2016 during the 9th Singapore International Energy Week (SIEW) at the Sands Expo & Convention Centre, Marina Bay Sands, Singapore, was aimed at addressing some of these issues.

Co-organised by the Energy Market Authority of Singapore (EMA) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), the Energy Access Forum complemented ongoing global efforts to address energy poverty, including those by the G20 and other multilateral platforms. The Forum was also held in partnership with the United States, under the US-ASEAN Connect initiative, and KPMG.

Singapore Minister for Trade and Industry (Industry), Mr S Iswaran, delivered the opening remarks and Under-Secretary-General of the United Nations and Executive Secretary of UNESCAP, Dr Shamshad Akhtar, gave the keynote address. Stakeholders from the public and private sectors led in-depth discussions on technological advancements, access to finance and investments, innovative business models and regulatory frameworks – key enablers to supporting the region’s efforts in enhancing energy access.

With growing emphasis on the importance of global collaboration to address the energy access challenge, the Forum provided insights and possible solutions for the Asia Pacific region.

# EXECUTIVE SUMMARY

Energy is fundamental to nearly every major opportunity and challenge the world faces today. The proportion of the global population with access to electricity has increased steadily, from 79 per cent in 2000 to 85 per cent in 2012. Yet, about 1.2 billion people around the world still have no access to electricity and the benefits it brings. Furthermore, nearly 3 billion people rely on traditional fuels such as wood and charcoal for cooking and heating their homes.

More than 700 million people, the majority of the world's energy poor, reside in the Asia Pacific region. Without access to electricity, they are denied basic services such as healthcare and education, which prevent them from reaching their full economic potential. Against this backdrop, the Energy Access Forum provided the ideal platform to discuss how to shape a sustainable energy future for all.

The Forum convened about 300 participants from more than 20 countries and international organisations. It enabled various stakeholders to come together to discuss how to progress towards the Sustainable Development Goal 7 of ensuring access to affordable, reliable, sustainable, and modern energy for all.

This report highlights the key outcomes of the Energy Access Forum, including insights into the energy access challenge and its potential solutions.

## HIGHLIGHTS

### New technologies

Technological advancements have the potential to address the issue of energy access in Asia Pacific within this generation. About US\$160 billion has been spent in the region on renewables with Southeast Asia being the global centre for deployment. However, with high infrastructure costs involved, a long-term approach is needed and more emphasis should be placed on developing viable alternatives such as off-grid, micro-grids, renewable energy and decentralised power stations. Potential options include rooftop solar and renewable energy micro-grids which are already powering 100 million people worldwide. Businesses must transition to these new energy technologies and develop innovative business models to manage risks.

### Improving collaboration

Cooperation between government and non-government organisations is needed to unlock the energy access options so as to develop technological solutions, sustainable business models, and increase access to financing and investments. Greater coordination is also required to encourage more investments from private investors. In addition, organisations should share their expertise and resources to create a bigger impact to the community. Governments are encouraged to play a more active role in connecting business leaders and investors. This facilitates partnerships for better outcomes while avoiding duplication of efforts.

### Building enabling regulatory frameworks

Governments can help create a conducive regulatory environment. This facilitates private sector investment in energy access and enables scalable business models to emerge while providing support for the associated risks. They can also play a transformative role through the establishment of reasonable tariffs, climate finance and green bonds, amongst others.

The Forum also raised the possibility of replicating successful models on a broader scale with the help of the private sector and development organisations to enhance energy access in affected regions. It concluded with the consensus that a long-term, comprehensive and collaborative approach is needed to address the Asia Pacific's energy poverty challenge.





Mr S Iswaran, Minister for Trade and Industry (Industry), Singapore addressing the audience at the opening of the Energy Access Forum

# HIGHLIGHTS OF OPENING REMARKS BY MR S ISWARAN, MINISTER FOR TRADE AND INDUSTRY (INDUSTRY), SINGAPORE

## Powering development in the Asia Pacific

Ensuring affordable, sustainable and reliable energy access has been a critical challenge for countries in the Asia Pacific region. Although some progress has been made, more can be done. Currently, around 455 million people in the region do not have access to electricity. Of these, 130 million are in Southeast Asia. In addition, more than 2.7 billion people worldwide, or nearly 40 per cent of the world's population, do not have access to clean cooking facilities. It is expected that by 2030, 55 per cent of Asia's population will be living in urban areas, thus driving the demand for urban energy solutions that are clean and smart.

## Singapore as a regional financial hub

Due to rapid urbanisation, the power sector in the Asia Pacific region will require a significant increase in generation capacity and grid infrastructure. According to the UN Economic and Social Commission for Asia and the Pacific (UNESCAP), the region is expected to account for over 40 per cent of cumulative energy investments until 2040, which amounts to more than US\$25 trillion.

To ensure that the region can fulfil its economic potential, the need for secure and reliable energy access should be addressed in a comprehensive manner – starting with developing sustainable bankable energy infrastructure projects in the region and profiling them to investors. Singapore serves as a collaborative platform where energy infrastructure developers, consultants, governments, financial institutions – including Multilateral Development Banks – and institutional investors can come together to create a vibrant and multi-faceted ecosystem.

Examples of developments which could contribute to energy access solutions in the region include ENGIE Lab Singapore, established in July 2016, which serves as an Asia Pacific Centre of Excellence for low carbon and distributed energy resources; Sun Electric, a Singapore-based technology company focusing on urban solar solutions; and Nanyang Technological University of Singapore, which is leading the Renewable Energy Integration Demonstrator-Singapore initiative to address the challenges of integrating different renewables into a micro-grid.

## International cooperation

Given the global nature of the energy access challenge, public and private sectors need to share their experiences and create awareness of the options available. International cooperation is critical to promoting innovative technological solutions, developing sustainable business models and securing financing and investments. Hence, Singapore is working closely with partners to create a platform for interaction and sharing, with the goal of building relationships and exploring business opportunities.

To this end, the G20 Energy Ministers have adopted action plans for the Sub-Saharan Africa and the Asia Pacific region. Singapore is supportive of the G20's initiative to focus on energy access, and its leading role in facilitating international cooperation to address this global challenge.

# HIGHLIGHTS OF KEYNOTE ADDRESS BY DR SHAMSHAD AKHTAR, UNDER-SECRETARY-GENERAL OF THE UNITED NATIONS AND EXECUTIVE SECRETARY OF THE UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC (UNESCAP)

## Challenges and opportunities

Although remarkable progress has been made to improve energy access in recent years, close to half a billion people living in the Asia Pacific region still lack access to electricity, thus denying them fundamental needs such as education, lighting, communications and healthcare. An estimated 350 million are concentrated in South Asia alone, further entrenching the poverty cycle. However, new ideas, technological advancements and innovative market-driven financing solutions have demonstrated that universal energy access is achievable within this generation.

Asia Pacific is driving the global shift to renewable energy. It is a key developer of the world's renewable energy technology and the global centre for the deployment of renewables.

## New technologies

The increasing cost competitiveness of solar and its widespread applicability have introduced new energy solutions such as solar lanterns, solar home systems and micro-grids. This year, three large-scale solar projects in the Middle East and South America have contracted their solar generated output for US\$0.03 per kWh, cheaper than other sources of electricity. Other technologies that have been developed include energy storage, mini grids, biogas, hybrid systems and micro hydro power.

Technological advances have increased the viability of decentralised powered options and in many cases, the solutions are cheaper than grid extensions for remote locations. However, tapping on these new solutions will require a change in mindset on long-term infrastructure planning and developing countries will need to leapfrog to more efficient models of providing energy access. Hence, it is important to establish partnerships to take advantage of these trends and to scale up efforts.

The International Energy Agency (IEA) has estimated that additional investments for achieving universal energy access by 2030 will reach US\$640 billion globally and more than US\$240 billion will need to be spent in Asia. The diversion of fossil fuel subsidies to energy access initiatives can play a transformative role. Besides domestic resource mobilisation, other important channels to harness finance include climate finance, official development assistance, impact investing and green bonds.

## Collaboration and scalability

Though the potential of private investment in promoting energy access is immense, such efforts have currently been limited with the private sector accounting for only 18 per cent of total investment. Developing countries hence need to find ways to realise private sector investment in energy access and enable scalable business models to emerge. This requires the right enabling and supportive policy environment to reduce the associated risks of investing in these countries. In this aspect, many pioneering private sector firms have developed low-cost energy systems and are rolling out business models with product, process and distribution innovations.

Governments could accelerate progress in energy access through a comprehensive approach such as incorporating energy access objectives into national development plans, dedicating financial resources, and providing supportive policy frameworks for the private investor and local communities. These also include tax incentives, encouraging financial institutions to play a greater role in financing energy access, direct provision of finance at preferential rates, developing innovative private-public partnerships, enhancing technical and entrepreneurial skill sets, and encouraging productivity energy uses that can generate local income.



Dr Shamshad Akhtar, Under-Secretary-General of the United Nations and Executive Secretary United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) giving the keynote address at the inaugural Energy Access Forum



(From left) Shri Gireesh B. Pradhan, Dr Fatih Birol, Datuk Seri Panglima Dr Maximus Johnity Ongkili, Rachel Kyte, Hon. Simon Bridges, and Wong Kim Yin discussing the challenges and opportunities of energy access

## PLENARY SESSION: ENERGY ACCESS – CHALLENGES & OPPORTUNITIES

### Panellists:

- **Datuk Seri Panglima Dr Maximus Johnity Ongkili**, Minister of Energy, Green Technology and Water, Malaysia
- **Hon. Simon Bridges**, Minister of Energy and Resources, New Zealand
- **Dr Fatih Birol**, Executive Director, International Energy Agency (IEA)
- **Shri Gireesh B. Pradhan**, Chairperson, Central Electricity Regulatory Commission (CERC), India
- **Wong Kim Yin**, Group Chief Executive Officer, Singapore Power Ltd

### Moderator:

**Rachel Kyte**, Chief Executive Officer and Special Representative of the United Nations Secretary-General, Sustainable Energy for All (SE4All)

### Enablers

Panellists noted that Sustainable Development Goal 7, a target under the United Nations 2030 Sustainable Development Agenda, which entails ensuring universal access to affordable, reliable and modern energy services, is achievable.

The necessary factors to enable this achievement include increased collaboration among countries, greater access to funds, innovative financing mechanisms, accurate data in order to track progress and efficacy of solutions, international forums to discuss and design pathways, and a level playing field through the removal of fossil fuel subsidies that distort the market.

The definition of electrification has evolved, from understanding energy access simply as the connection of a transmission line to a single point in a village, to now every house in the village being connected. Sporadic access is no longer adequate. Power needs to be reliable and constant for consumers to benefit from the full range of economic benefits associated with access to energy services. The panellists recommended that regulators consider how they could support this move towards universal access with reliable, affordable and modern energy services.

Developing countries may choose short term solutions to increase access to energy services, as enhancing energy access takes priority over sustainability. The imperative for developing countries is to provide electricity for its people, and for the international community to provide solutions to developing countries and help them choose more sustainable solutions while ensuring access.

Within the scope of access to modern energy services, the focus is mainly on electricity. However, countries should also

address the lack of access to clean cooking fuels, as 2.6 billion people rely on wood and animal waste for cooking, which leads to indoor pollution and health issues that disproportionately affect women and children. The cost of time lost collecting fuel for cooking must also be considered in the efforts to provide energy access.

When potential energy consumers lack access, they also lose the ability to be selective in terms of quality and cost of power since they have no alternatives. As consumers gain access to energy sources, they begin to demand higher quality power at more competitive prices, as seen in some cities in India. Within the broader context of energy access, consumers are mainly interested in improving their quality of life. Thus, energy producers and regulators need to focus on the needs of consumers while empowering them to have their voices heard. This includes ensuring the sustainability of power generation whenever possible and including consumers in the decision-making processes.

## Challenges

Many factors impede the goal of achieving universal access to energy services. These include cost of connection and generation, establishment of facilitating regulatory frameworks; choices between whether to pursue grid extension/connection or off-grid solutions, market-distorting fossil fuel subsidies, and lack of political will. In addition to the infrastructural costs needed to provide access to unserved or underserved populations, affordability of electricity and consumers' ability to pay over the long-term are serious challenges that must be addressed. Distributed energy generators in isolated communities must be given the opportunity to sell power they generate back to the grid when grid connections become a reality. This mitigates the risk portfolio of such investments and encourages distributed renewable energy generation in the short-term.

As part of this push for distributed generation, renewable energy plays an essential role, whether it is solar photovoltaic or mini-hydropower generation. With regard to small island nations with isolated populations, bringing diesel as a fuel source accounts for a large share of imports. This leads to severe balance of payment implications as limited funds are used to purchase expensive sources of fuel. Distributed renewable energy generation could aid in the alleviation of these concerns, as self-sufficiency would reduce import reliance and exposure to global fuel price fluctuations.

## Opportunities

According to the International Energy Agency (IEA), over 500 million people in the Asia Pacific lack access to modern energy services, presenting enormous opportunities to close this gap. India and China are positive examples, with the latter having provided access to 500 million<sup>1</sup> people within a short period. Energy access has been the most crucial goal for India as it represents the cornerstone of energy security. Governments are encouraged to facilitate action by providing funding and developing effective policies to enhance energy access.

Incumbent power generators often view distributed renewable energy generation as a threat to traditional business models. With many consumers relying on rooftop solar for the bulk of their electricity, the costs of maintaining

the grid may fall increasingly on fewer consumers. Hybrid solutions, which include several generating technologies as well as on and off-grid solutions, can play a part moving forward. To turn such challenges into opportunities and improve access to energy services, these issues must be dealt with appropriately through effective regulatory frameworks that encourage competition.

Carbon pricing is another issue that requires effective regulatory frameworks. While it is a feasible mechanism to reduce emissions, it may not be very productive in the short- and medium-term due to the difficulty in implementing a global carbon pricing mechanism.

## Conclusion

Potential solutions to the challenges associated with universal access to energy services include collaboration on targeted assistance for developing countries and multi-level support for access. For the Pacific Islands, funding for access initiatives should be raised to help these island-nations transition from fossil fuel-based generation to renewable-based generation. Indonesia has made good progress within this scope and should be involved in future discussions regarding electrification of isolated islands.

Innovations in high-voltage direct-current (HVDC) enable the generation of electricity near fuel sources by transmitting the electricity produced over long distances to demand centres, without substantial losses. While HVDC is a viable option, off-grid solutions have increasingly become the quickest and most cost-effective way to provide access to energy services to rural consumers. This applies not only to developing, but developed countries too. Through the use of energy storage, the main challenge of renewable off-grid generation (the inherent intermittency) can be dealt with effectively.

Besides innovative storage solutions and an increasing focus on energy efficiency, technology allows for the effective matching of energy supply and demand, empowering consumers in the process. Enabling policy and regulatory frameworks are essential to accelerating the current energy transition taking place.

While the G20 has goals and recommendations within the scope of energy access which address many of the concerns raised, momentum needs to be turned into real action by relevant stakeholders. Without implementation, targets will not become reality.

*This article is contributed by the United Nations Economic and Social Commission for Asia and the Pacific*

<sup>1</sup> <http://www.worldenergyoutlook.org/resources/energydevelopment/energyaccessdatabase/>

# PANEL 1: ENERGY ACCESS IN ASEAN

## Highlights of Opening Remarks by H.E Dr. Ith Praing, Secretary of State, Ministry of Mines and Energy, Cambodia

Cambodia is working towards raising its access levels for its population to 80 per cent by 2020 and to provide grid quality power to 80 per cent of domestic households by 2030. A key strategy to achieving these goals and accelerating progress is to merge the efforts of local authorities with the private sector. Cambodia is undertaking a range of domestic measures to meet its objectives through the installation of solar home systems, a “power to the poor” initiative, and the development of a subsidy scheme for grid connections to incentivise the promotion of its rural electrification programme. The UN’s Sustainable Development Goals also provides a valuable framework on approaching energy access.



H.E Dr. Ith Praing delivering his speech at the Forum

### Panellists:

- **Peter du Pont**, Senior Climate Change Advisor, USAID Asia
- **Hiroyuki Hayashi**, Senior Advisor to the Director General (Energy) Industrial Development and Public Policy Department, Japan International Cooperation Agency
- **Didar Islam**, Founder, Solaric Global
- **David Hutagalung**, Country Director, GE Power Indonesia

### Moderator:

**Dr Sanjayan Velautham**, Executive Director, ASEAN Centre for Energy



(from left) Didar Islam, Peter du Pont, Dr Sanjayan Velautham, Hiroyuki Hayashi, and David Hutagalung exploring the role of regional integration and capacity building in enhancing energy access

## ASEAN Plan of Action on Energy Cooperation

The ASEAN Plan of Action on Energy Cooperation (APAEC) covering the years 2016-2025, is founded on a central theme that captures the importance of expanding energy access to the region: “Enhancing Energy Connectivity and Market Integration in ASEAN to Achieve Energy Security, Accessibility, Affordability and Sustainability for All”. The theme also reflects the elements of connectivity and energy security captured in the Nay Pyi Taw Declaration on the ASEAN Community’s Post 2015 Vision adopted by the ASEAN Leaders at the 25th ASEAN Summit in Nay Pyi Taw, Myanmar, on 12 November 2014. The APAEC’s signature initiatives, notably the Trans-ASEAN Gas Pipeline and the ASEAN Power Grid, also seek to increase access through enhanced connectivity. However, the political will to implement the APAEC and improve access levels in ASEAN must be channelled to meet shared goals.

### Initiatives

US-ASEAN Connect – an economic initiative established by President Barack Obama at the historic US-ASEAN Leaders Summit in Sunnylands California in February 2016 – can be utilised as a platform to expand energy access. Energy Connect, one of four pillars of the initiative, emphasises that access to reliable, quality, and affordable energy is a key factor to economic growth. The goal of Energy Connect is to drive economic growth through innovation, entrepreneurship and the promotion of sustainable power for the region. The United States has formed Connect Centres in Singapore, Jakarta, and Bangkok to liaise with regional governments, businesses, and the financial community to help promote enabling environments in order to bring sustainable infrastructure investment into the region.

Through an energy efficiency capacity building programme, the United States is sharing best practices in efficiency deployment in the buildings sector and how to establish viable financing models to encourage greater implementation of efficiency measures. In the appliances sector, Energy Connect is establishing a programme to assist with the harmonisation of air conditioning standards. Setting and enforcing high efficiency standards help manage peak electricity demand that stresses grids. USAID and US government programmes target energy access expansion regionally and bilaterally through assistance and programming such as the Indonesia Clean Energy Development programme, the Millennium Challenge Corporation’s Green Prosperity project in Indonesia, the Vietnam Low-Emissions Development Strategy, and the Private Financing Advisory Network, which has provided US\$700 million in financing resources to small and medium enterprises, including organisations that are working to expand regional energy access.

Japan adopts an approach in which technical experts from the power sector are dispatched to each ASEAN country to bolster capacity and provide direct engagement. These experts are deployed to focus on grid extension strategies and power generation assets that are well-suited to expanding energy access in ASEAN member states. In practice, the Japan International Cooperation Agency (JICA) has found that solar systems, mini-grids and micro-grid solutions are effective tools to expand access. Another key element of JICA’s approach has been to provide funding and

support to feasibility studies on the areas in which grid extension can effectively bring affordable electricity to communities that lack access.

### Considerations

Often, mobilising finance is more important than the technology itself in creating viable and sustainable business solutions that do not require subsidies. Increasingly, off-grid solutions supplemented with battery storage technologies are proving to be an effective combination to expand access. Solaric’s operating experience (active in 10 countries, 5 in Asia, 5 in Africa) has shown that pre-paid, mobile phone systems supporting off-grid solutions that deploy solar energy technologies are the most affordable mechanism to quickly expanding electricity access, particularly when compared against grid extensions. Through deployment, these technologies and configurations have proven to be able to provide quality and reliable power.

Indonesia currently has an electrification rate of 89 per cent, but hopes to improve this to 99 per cent through the implementation of its programme to install 35 gigawatts (GW) of additional electricity generation capacity. General Electric (GE) Power Indonesia is supporting Indonesia’s programme with a suite of diverse technology solutions including fast, mobile power units. GE’s mobile power programme is working with Indonesian utility PLN to install units in 8 locations around the country in order to quickly and efficiently provide power in areas that lack access or reliability. In GE’s experience, there remains substantial work to be done to assist governments in improving capacity at the local level to accommodate technological advances and off grid solutions, particularly with respect to government procurement programmes and mechanisms.

### Conclusion

ASEAN’s objectives to enhance interconnectivity will require additional work to advance multilateral trading schemes to move excess or untapped electricity generation potential to countries with lower access levels.

Other factors to bear in mind in enhancing energy access in ASEAN include leveraging on solar energy technology solutions, which can play a more important role; using mobile apps as an effective payment mechanism; defining the role of development partners and multilateral institutions in commercially viable solutions and ensuring engagement at an early phase of the project development cycle; and recognition of when and how to best transition to a completely private sector-driven model. Deregulation can also have substantial impact on addressing low energy access levels.

*This article is contributed by the Bureau of Energy Resources, US Department of State*

Part of:





(from left) Allard Nooy, Jan Flachet, Mark Gainsborough, Dr Mathew Peloso, Arun Sen discussing technology and investments

## PANEL 2: ENERGY ACCESS IN FOCUS – TECHNOLOGY & INVESTMENTS



Gordon Lawson moderating panel 2 discussions

### Panellists:

- **Arun Sen**, Chief Executive Officer and Founder Coromandel Advisors and President of Zoetic Energy
- **Jan Flachet**, Chief Executive Officer, ENGIE Asia Pacific
- **Allard Nooy**, Chief Executive Officer, InfraCo Asia
- **Mark Gainsborough**, Executive Vice President, New Energies, Royal Dutch Shell
- **Dr Matthew Peloso**, Founder and Chief Executive Officer, Sun Electric

### Moderator:

**Gordon Lawson**, Head of Energy & Natural Resources sector, Partner International Tax, KPMG Singapore

## Background

Though there are programmes to procure power across Southeast Asia, like Indonesia's 35GW programme, electrification rates remain low across many countries. This lack of access and shortage of power hinders economic growth. Hence, more focus is required to provide energy access to the poorer and more remote parts of the continent.

In recent years, the cost of deploying renewables has reduced considerably and is becoming cost competitive with conventional power projects. The time required to construct and bring projects to market based on renewable and hybrid schemes such as gas, solar, wind and storage, can be significantly shorter than that of larger scale utility-sized power projects.

Lower funding and technical requirements have led to non-traditional players joining the market in ever increasing numbers. However, challenges remain when developing innovative power projects including the provision of enabling infrastructure, such as front-end fuel access and off-take transmission adequacy. A lack of consistent government policy to enable sustained investments is often a challenge.

## Policy

Feed-in tariffs and other incentives such as tax for power generation projects are options to address low electrification rates. However, there is room for improvement in Asia for implementing and improving private-public partnership (PPP) frameworks. This hinders not only key demographic factors such as health, education and welfare, but also the multiplier growth opportunities which universal energy access brings.

Enabling legislations for clean and renewable energy such as feed-in tariffs coupled with the downward trajectory of capital costs, will serve to make renewables more competitive as compared to conventional sources.

As mindsets are changing across the private sector, multilateral agencies are broadly shifting away from coal and seeking solar solutions combined with storage to replace relatively expensive and inefficient diesel generation for outlying communities. Larger energy companies are transitioning new energies into their mainstream businesses, and organisations are not just considering provision of more energy, but also cleaner energy. Policy development should allow markets to find the right answers to replacing expensive diesel generation across the region.

Deregulation is opening up more opportunities for solar from small-scale phone charging with solar and battery combinations for less than US\$50, to high-impact refrigeration for food and medicine via micro-grids installed across communities. Whilst we have seen success in the telecommunications sector, cooperation between public and private sector is needed to leapfrog old energy mechanisms into distributed generation and micro-grids.

## Technology

Wind and solar PV have made huge strides forward, with new technologies enabling significant cost reductions to compete with base-load coal price levels. However, solar uptake in Asia remains low with less than one per cent share of the energy mix in many countries.

National renewable energy policies increasingly feature solar which can play a big role in rural electrification where diesel is expensive. Micro-grids, which reduce wastage through transmission with short wires, can be linked with renewable sources, traditional fuel back-up systems and storage. These solutions are enabling new ecosystems, combined with mobile prepaid metering, thus reducing credit risk.

Being pragmatic about the type of energy solution – wind, solar, hydro, pump storage, tidal or storage will allow communities to reduce the energy access cost faster.

Hydrogen solutions and fuel cells are providing power to a 5MW project, biomass and waste to power are all being developed. However, there are currently limited commercial applications due to higher cost points.

## Investments

Due to the projected higher costs of renewables and storage solutions, fossil fuels are forecast to remain in place for the next 20-30 years. As a result, given the abundance of coal reserves, significant utility-scale coal capacity has been added into the energy system. The challenge, post-COP21/22, is ensuring these assets do not become stranded. In this regard, gas, which emits less emissions than coal, can play an important role. Gas has the flexibility to generate electricity alongside new energies while small-scale LNG models could also complement renewables. However, in order for gas to act as a bridging fuel, infrastructure development must be effective and cost-efficient.

Financing of new infrastructure is prohibitive for small scale projects. Projects need to be packaged together to provide bankable projects and engaging returns for investors. Despite the opportunities available, investments into the energy sector is still nascent and this may be attributed to unfamiliarity with the sector. Asian markets are small and fragmented, and assessing risk and its allocation remains a tough ask. There are few funds willing to invest the overall two to 10 per cent of total capital costs in the project development phase.

## Conclusion

In summary, new energy business models are still evolving for capacity build-out and are capable of providing energy access. Southeast Asia offers huge prospects for investors, while more demonstration projects are required to build interest amongst the investor base. There is no shortage of capital - the issue is a lack of good bankable projects. To mitigate this, policy makers need to come together with the industry to support the deployment of technology and investments.

*This article is contributed by KPMG*

Presented by:





(from left) Pål Rasmussen, Dr Sun Xiansheng, Tony Wood, Sakari Oksanen, Akash Gupta and Liu Hongpeng discussing collaboration on energy access

## PANEL 3: UNLOCKING OPTIONS – COLLABORATION ON ENERGY ACCESS

### Panellists:

- **Pål Rasmussen**, Secretary-General, International Gas Union
- **Akash Gupta**, Under Secretary, Investments Technology Promotion and Energy Security Division, Ministry of External Affairs, India
- **Liu Hongpeng**, Chief, Energy Section, United Nations Economic and Social Commission for Asia and the Pacific
- **Dr Sun Xiansheng**, Secretary-General, International Energy Forum
- **Sakari Oksanen**, Deputy Director-General, International Renewable Energy Agency

### Moderator:

**Tony Wood**, Energy Program Director, Grattan Institute

### Recommendations

An estimated 3.7 million people die each year due to poor urban air quality, according to the World Health Organisation (WHO). The sharing of urban air quality reports, conversion of energy sources to gas, and other measures can help improve this figure. But, there is still a long way to go.

The road to climate change and energy efficiency is supported by energy access. There are many success stories from countries like Thailand, Vietnam, Costa Rica and Africa - even sub-Saharan African countries like Kenya, Rwanda and Ghana are increasing their energy access efforts. Mongolia has already electrified about 300 households in a short time despite the long distances in the country.

The panel recommended that governments commit to providing energy access to the people in the form of a rural electrification plan. Prioritising renewable and sustainable energy also needs to be factored into these plans. As solar and wind are already considered mainstream energy sources, off-grid solutions can be an interim solution before grid extensions make their way to rural areas.



## Coordination and implementation

In implementing these efforts, the panellists urged government agencies to consider streamlining efforts, as consistent coordination and thoughtful implementation are central to helping to resolve worldwide challenges such as energy access. This includes engaging the renewables and gas industries who could share their expertise and resources for greater impact. Three examples of such collaborative efforts in India were raised during the discussions.

The first is a capability building programme known as Barefoot College, which was started by an Indian entrepreneur. At Barefoot College, people living in rural areas are trained to install and maintain solar installations in their homes. To date, the trainees of Barefoot College span across 1,300 villages in almost 80 countries in the world, resulting in 500,000 more people now having lights in their homes.

Secondly, the Indian government requested for volunteers to give up their cooking gas subsidies. This led to savings of almost US\$500 million per year, funds that were redirected to energy access initiatives serving rural households.

Thirdly, the light-emitting diode (LED) revolution in India, which is a government-led movement to distribute 700 million LED bulbs to households by the end of 2017 – is aimed at lowering electricity bills of households.

Affordability and reliability are major factors in enhancing energy access in both urban and rural areas. Private sector funds should be matched to locations that require energy access the most. However, most private companies are concerned with the profitability and risks involved in providing energy access particularly to rural areas.

## Private-Public Partnership

With increased urbanisation, adjustments need to be made to meet our future needs and the private sector should play a more active role. Governments need to consider the necessary policies to stimulate private sector investment, as Private-Public Partnerships (PPP) are imperative to supporting local communities and joint ventures.

The international community is ready to support strengthening PPPs. However, the private sector and smaller players need to be given the right regulatory and financial environment to provide solutions – either through regulation or deregulation.

## Conclusion

Energy collaboration between governments and industry is key to enhancing energy access. Greater advances can be made to address energy access through measures that promote synergies and the establishment of support programmes for sustainable energy services.



## About the Energy Market Authority of Singapore

The Energy Market Authority of Singapore (EMA) is a statutory board under the Ministry of Trade and Industry. Our main goals are to ensure a reliable and secure energy supply, promote effective competition in the energy market and develop a dynamic energy sector in Singapore. Through our work, we seek to forge a progressive energy landscape for sustained growth. Please visit our website <http://www.ema.gov.sg> for more information.

## About the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)



The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) is the regional development arm of the United Nations for the Asia Pacific region. Made up of 53 Member States and 9 Associate Members, UNESCAP covers 4.1 billion people, or two thirds of the world's population. This makes UNESCAP the most comprehensive of the United Nations' five regional commissions and the largest United Nations body servicing the Asia Pacific region.

UNESCAP is committed to a resilient Asia and the Pacific founded on shared prosperity, social equity and sustainability. Its vision is to be the most comprehensive multilateral platform for promoting cooperation among Member States to achieve inclusive and sustainable economic and social development in Asia and the Pacific. Please visit <http://www.unescap.org> for more information.

## About the Singapore International Energy Week (SIEW)



The Singapore International Energy Week (SIEW) is an annual week-long platform for energy professionals, policymakers and commentators to discuss and share best practices and solutions within the global energy space.

SIEW aims to facilitate the exchange of ideas and discussions on pertinent energy-related issues, while simultaneously meeting the strategic objectives of Singapore's commitment to becoming a global leading energy hub and "living lab". At the same time, opportunities are set up for networking and deal-making among energy companies converging on the event, as well as to provide a platform to showcase innovative products and solutions in the energy marketplace. Please visit <http://www.siew.sg> for more information.

## About the US-ASEAN Connect Initiative



US-ASEAN Connect is a new strategic, unifying framework to deepen the United States' growing economic cooperation with ASEAN. President Obama announced Connect on February 15, 2016, at the US-ASEAN Leaders' Summit in Sunnylands, CA. Connect will support regional integration efforts of the new ASEAN Economic Community and build upon the positive economic ties between the US and ASEAN. As one of four pillars under US-ASEAN Connect, Energy Connect will promote and support the development of power sectors built around clean, sustainable, efficient, and innovative technologies. Emphasising increased integration and harmonisation in the energy sector, the energy pillar establishes the next phase of the US-Asia Pacific Comprehensive Energy Partnership (USACEP); extends and expands upon the existing Asia Pacific Clean Energy Programme (ACEP) launched under USACEP; and facilitates implementation of the 2016-2020 US-ASEAN Energy Cooperation Workplan.

## About KPMG



KPMG in Singapore serves Energy and Natural Resources clients across the value chain including those in the Oil & Gas, Mining, Chemicals, Agri, Commodity Trading and Power & Utilities industries. Our sector professionals based in Singapore's vibrant energy hub provide clients with access to valuable thought leadership, studies, events and webcasts around key industry topics.

In 2016 we are celebrating our 75th anniversary here in Singapore. KPMG in Singapore is part of a global network of professional services firms providing Audit, Tax and Advisory services. The KPMG network operates in 155 countries, with more than 174,000 people working in member firms around the world. In the ASEAN region, member firms operate across all 10 countries of this regional grouping providing professional services supporting the growth, compliance and performance objectives of our clients.

The independent member firms of the KPMG network are affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. Each KPMG firm is a legally distinct and separate entity and describes itself as such.

# TRANSCRIPT OF SPEECHES

## Opening Remarks by Mr S Iswaran, Minister For Trade and Industry (Industry), Singapore

Dr Shamshad Akhtar,  
Executive Secretary of the United Nations Economic and Social Commission for Asia and the Pacific,  
Distinguished Guests,  
Ladies and Gentlemen,

### Welcome

A very good morning to all. It gives me great pleasure to welcome you to the first Energy Access Forum held in conjunction with the Singapore International Energy Week. I am heartened to see many participants from both the private and public sectors gathered here to discuss the critical issue of energy access in the Asia Pacific region.

This Forum marks the first time that Singapore is collaborating with the United Nations Economic and Social Commission for Asia and the Pacific, UNESCAP, on energy access. UNESCAP plays an important role in the region by supporting countries in their efforts to address energy poverty through capacity-building workshops and conferences. UNESCAP also contributes actively to energy access discussions at the G20 Energy Ministers Meeting.

### Energy Access – Powering Development in the Asia Pacific

Ensuring affordable, sustainable and reliable energy access remains a critical challenge for countries in the Asia Pacific region. While some progress has been made, more can and must be done. Around 455 million people in the region still do not have access to electricity, 130 million of whom are within Southeast Asia. In addition, more than 2.7 billion people worldwide, or nearly 40 per cent of the world's population, do not have access to clean cooking facilities. Furthermore, Asia is urbanising rapidly. It is expected that by 2030, 55 per cent of Asia's population will be living in urban areas. This will also drive demand for urban energy solutions that are clean and smart.

Access to reliable energy services underpins development, growth and ultimately a better quality of life. To ensure that the region is able to fulfill Asia's economic potential, and promise to its people, the need for secure and reliable energy access has to be addressed in a comprehensive manner.

### Singapore as a regional financial hub for long-term bankable energy projects

One area of focus is the development of energy infrastructure projects that can catalyse private sector funding. This will help to ensure the sustainability of energy access solutions for the long term.

The development of bankable projects and the mobilisation of private sector funding are issues that have been raised during the industry consultations and discussions of Singapore's Committee on the Future Economy. Some of those who participated said that Singapore can play a constructive role in this area, and we agree. The power sector in the Asia Pacific region will require a significant increase in generation capacity and grid infrastructure. In fact, the region is expected to account for over 40 per cent of cumulative energy investments until 2040, according to UNESCAP. This amounts to more than US\$25 trillion. The need and opportunity are therefore clear and present. The question is how we can help to originate more bankable energy infrastructure projects in the region and profile them to investors.

Our aim is for Singapore to serve as a collaborative platform where energy infrastructure developers, consultants, governments, financial institutions – including Multilateral Development Banks – and institutional investors come together in a vibrant and multi-faceted ecosystem. Working together, we will be able to activate and mobilise the essential expertise, capital, and insights, to help meet the energy needs of the region.

As a regional financial hub, Singapore is already home to a strong network of well-established financial institutions, both local and international, including the World Bank and the International Finance Corporation. IE Singapore has also worked with the Asian Development Bank on the Asia Infrastructure Centre of Excellence, which helps to create bankable infrastructure projects in the region. Singapore has a strong base of professionals who understand Asia, in areas such as law, commercial transactions and engineering consultancy, and whose expertise is needed to structure, and develop infrastructure projects.

There are also a growing number of energy and utility companies that have established a base in Singapore, tapping on regional and global networks as well as leveraging on the conducive environment for innovation and R&D. One such company is ENGIE. In July this year, the ENGIE Lab Singapore was established to serve as an Asia-Pacific Centre of Excellence for low carbon and

distributed energy resources. Another is Sun Electric, a Singapore-based technology company focusing on urban solar solutions. I understand that both companies will be sharing their perspectives at today's Forum.

In addition, our research institutions are at the forefront of driving innovation in related technologies. For example, the Nanyang Technological University of Singapore is leading Singapore's Renewable Energy Integration Demonstrator, or REIDS, initiative on Semakau Landfill. REIDS focuses on the challenges of integrating different renewables into a micro-grid. The technologies and solutions demonstrated here will contribute to energy access solutions in the region.

## **International cooperation key to unlocking energy access options**

Given the global nature of the energy access challenge, it is also important for us to continue to enhance international cooperation, and ensure that the public and private sectors share their experiences and create awareness on the options available to increase energy access.

Energy access was a key issue discussed at the G20 Energy Ministers Meeting in June this year. Action plans have been adopted by the G20 Energy Ministers focusing on Sub-Saharan Africa and the Asia Pacific region. These provide options for countries to adopt policies and strategies according to their national circumstances. Singapore is supportive of the G20's initiative to focus on energy access, and its leading role in facilitating international cooperation to address this global challenge.

International cooperation is critical to promote innovative technological solutions, develop sustainable business models and increase access to financing and investments.

These outcomes are in line with the main objective of today's Forum and the Singapore International Energy Week as a whole. We seek to create a platform for interaction and sharing, with the goal of building relationships and exploring business opportunities.

We are pleased to have close partners supporting us in this effort. In particular, the US will be leading a panel on energy access in ASEAN at this Forum, under the US-ASEAN Connect Initiative. Singapore and the US have been working closely on initiatives during SIEW and this is a new area of collaboration for us. KPMG will also lead a panel focusing on technology and investments which are important enablers in enhancing energy access.

## **Conclusion**

Energy access is a shared challenge that we urgently need to address. This Forum is timely, and through it we hope to identify not only the challenges, but also the opportunities and innovative solutions to address them. I wish all of you a fruitful discussion.

# TRANSCRIPT OF SPEECHES

## Keynote Address by Dr. Shamshad Akhtar, Under-Secretary-General of The United Nations & Executive Secretary United Nations Economic and Social Commission for Asia and The Pacific

Your Excellency Minister for Trade and Industry Mr S Iswaran,  
Excellencies,  
Distinguished Delegates,  
Ladies and Gentlemen,

The partnership between the Energy Market Authority of Singapore and United Nations Economic and Social Commission for Asia and the Pacific for this Energy Access Forum is invaluable. New ideas, technological advancements and innovative market-driven financing solutions are instilling confidence that universal energy access is achievable within this generation.

The 2030 Agenda for Sustainable Development embodies a core promise to “leave no-one behind”, hence it underscores universal energy access, through electricity and clean cooking fuels as a prerequisite for economic development; and essential for basic human wellbeing, equity and dignity. Remarkable progress has improved energy access in recent years. Close to half a billion of Asia Pacific’s citizens, however lack access to electricity, with 350 million of these in South Asia<sup>2</sup>. Lack of modern energy denies fundamental needs such as education, lighting, communications and healthcare, further entrenching the poverty cycle. Renewable energy offers a major solution to energy access.

Asia Pacific is driving the global shift to renewable energy. It is the producer of most of the world’s renewable energy technology and the global centre for deployment of renewable generation capacity as it invested close to US\$160 billion, or over half of the global renewable energy investment last year. Solar power with its low cost, modular nature and flexibility is poised to reshape energy access with applications such as solar lanterns, solar home systems and solar-powered mini-grids. The falling cost of solar has enabled it to become more competitive than gas and coal-fired electricity in regions with strong solar resources. In the grid-connect market, three large-scale solar projects<sup>3</sup> this year have contracted output for less than US three cents per kilowatt hour, cheaper than any other source of electricity. Energy storage technology is undergoing rapid cost reductions, which will benefit remote power initiatives.

Other technologies also poised to make an impact for energy access include mini-grids, hybrid systems, biogas and micro hydro power. Technological shifts have increased the viability of decentralized power options, in many cases offering lower costs than grid-extensions to remote locations. This requires a change in mindset for long term infrastructure planning, allowing developing countries to leapfrog to more efficient models of energy provision, just as mobile communications have overtaken fixed line services.

To ensure that universal energy access is achieved, we must take advantage of these trends and scale up our efforts. Finance is an area of high priority. The International Energy Agency (IEA) estimates that the additional investment for achieving universal energy access by 2030 could reach US\$640 billion globally, of which over US\$240 billion would need to be spent in Asia<sup>4</sup>. Fossil fuel subsidies in the Asia Pacific for just one year amount to US\$244 billion, equivalent to the entire cost of achieving universal energy access<sup>5</sup>. The diversion of even a portion of these subsidies in each country to energy access could play a transformative role. Climate finance, official development assistance (ODA), impact investing and green bonds are other important channels of finance that can be harnessed.

The private sector must play its role by bringing capital, technology and expertise to the energy access challenge. The current role of the private sector in energy access is marginal, according to recent estimates accounting for only 18 per cent of total investment<sup>6</sup>. One major policy challenge for developing countries is how to mobilize private sector investment in energy access and enable scalable business models to emerge. The potential in the energy access sector for private investment should not be underestimated although supportive public policy and enabling environments are critical to reduce risks.

Energy users at the “bottom of the pyramid” currently spend US\$37 billion on energy services<sup>7</sup> such as kerosene, batteries or candles. These are often inefficient and costlier than clean alternatives. Many pioneering private sector firms have developed low-cost energy systems such as solar lanterns, biogas or micro hydro systems and are rolling out business models with product, process and distribution innovations. Local energy can have a catalytic effect, leading to economic growth and increased demand for other products and services, leading to growing business opportunities<sup>8</sup>.

Governments can accelerate progress by taking a comprehensive approach to mainstreaming energy access objectives into national development plans, dedicating financial resources and providing the supportive policy frameworks for the private sector and communities. This can include tax incentives, developing innovative private-public partnerships, enhancing the technical and entrepreneurial skill base and encouraging productive energy uses that generate local incomes. Governments can create fiscal space by encouraging banks to play a greater role in financing energy access, or by the direct provision of finance at preferential rates.

Innovative approaches are evident across the Asia Pacific. Malaysia’s electricity access in rural areas increased from 92 per cent in 2010 to over 98 per cent in 2015. The improvements were recorded in the productivity and efficiency of electricity supply services.

Countries like China and Thailand have been successful in providing reliable access to electricity through grid extension, while distributed generation through mini-grids and stand-alone systems has played a role in more remote areas. Viet Nam has focused on providing electricity for irrigation, industry and transport in agricultural areas, which has enabled rural economic development. Viet Nam rapidly expanded its rural electrification to more than 80 million people over three decades, from 2.5 per cent in 1975 to 99 per cent of its population in 2012.

The recent adoption by G20 Ministers of the *Action Plan for Enhancing Energy Access in Asia and the Pacific* will assist countries in the Asia Pacific to identify solutions to enhance energy access and develop better policies to scale-up private sector investments. The prospect of achieving affordable, reliable, sustainable and modern energy access for all in Asia and the Pacific by 2030 is within reach. This will allow us to deliver on the promise of the 2030 Agenda and give all of the people in our region the opportunities that energy brings.

I thank you.

<sup>2</sup> ESMAP, World Bank data <https://www.esmap.org/node/56568>

<sup>3</sup> In April 2016, in Dubai a consortium led by Masdar won a renewable energy auction with a bid of 2.99 cents/kWh over 20 years. In September 2016 Marubeni and Jinko Solar won a solar auction in Abu Dhabi at 2.42 cents per kWh. This broke the previous record set in Chile in August 2016 of 2.91 cents per kWh.

<sup>4</sup> IEA, World Energy Outlook 2011, [http://www.worldenergyoutlook.org/media/weowebiste/energydevelopment/weo2011\\_energy\\_for\\_all.pdf](http://www.worldenergyoutlook.org/media/weowebiste/energydevelopment/weo2011_energy_for_all.pdf)

<sup>5</sup> International Energy Agency, Fossil Fuel Subsidy Database  
<http://www.worldenergyoutlook.org/resources/energysubsidies/fossilfuelsubsidydatabase/>

<sup>6</sup> Ibid

<sup>7</sup> International Finance Corporation, From Gap to Opportunity: Business Models for Scaling Up Energy Access, <http://www.ifc.org/wps/wcm/connect/b7ce4c804b5d10c58d90cfbbd578891b/ExecutiveSummary.pdf?MOD=AJPERES>

<sup>8</sup> World Economic Forum / PriceWaterhouseCoopers, Scaling Up Energy Access through Cross-sector Partnerships, [https://www.pwc.com/gx/en/sustainability/publications/assets/pwc-wef-scaling-up-energy-access-through-cross-sector\\_partnerships.pdf](https://www.pwc.com/gx/en/sustainability/publications/assets/pwc-wef-scaling-up-energy-access-through-cross-sector_partnerships.pdf)

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