

**CEM 8 Roundtable 1:
Digitalisation of the Energy Sector to Enhance Energy Productivity & Renewables
Integration**

Background

This roundtable focused on the implications of digitalisation which will radically change the energy sector in all countries, offering significant opportunities for increasing energy productivity, managing load, integrating higher shares of renewables, and deploying electric vehicles; as well as creating new challenges related to cybersecurity, privacy and increased consumer participation in energy supply and demand. Big data and internet-connected electronic appliances and equipment will influence the energy sector in ways that analysts are only just starting to comprehend. Digitalisation offers the opportunity for a step-change in the way that energy is used in all sectors, however realising the full value proposition will be challenging and requires substantial action from policymakers and the private sector.

Moderator

- Dr. Christoph Frei, Secretary General & CEO, World Energy Council

Government Representatives

- Mr. Rupert Ainley, Head of Energy and Resource Security, British Embassy Beijing, United Kingdom
- Mr. Abdulla Mohamad Alkemeiri, Abu Dhabi Water and Electricity Authority
- Mr. Riku Huttunen, Director General, Energy Department of the Ministry, Finland
- Mr. Dominique Ristori, Director General for Energy, European Commission

Private Sector and Civil Society Representatives

- Mr. Blair Chalmers, Director, Asia Pacific Risk Center – Marsh & McLennan Companies
- Mr. Andrew Chung, Founder and Managing Partner, 1955 Capital
- Mr Jon Creyts, Managing Director, Rocky Mountain Institute
- Mr. Michael Ding, Global Executive Director, Envision Energy
- Ms. Pia Erkinheimo, Chief Digital Officer, SOLVED – The Cleantech Company
- Mr. Jacob Østergaard, Professor, Technical University of Denmark
- Mr. Jonah Goldman, Senior Advisor, Breakthrough Energy Ventures
- Mr. Tobin Richardson, President and Chief Executive Officer, ZigBee Alliance
- Mr. David Turk, Head of Energy Environment Division, International Energy Agency
- Ms. Dymphna van der Lans, Senior Director, World Wildlife Fund
- Mr. Harry Verhaar, Head of Global Public & Government Affairs, Philips Lighting
- Mr. Sean Wang, Chief Executive Officer, ENN Energy
- Mr. Yinmin Wang, GEIDCO
- Mr. Robert Weisenmiller, Chair, California Energy Commission



- Mr. ZHANG Lei, Chief Executive Officer, Envision Energy
- Mr. ZHONGMIN, Ming Yang Smart Energy Group Ltd
- Mr. ZHU Gongshand, Chief Executive Officer GCL-Poly

Overview

This roundtable discussion allowed CEM government officials, private sector executives, and civil society leaders to explore ways that policymakers can support innovative market solutions to ensure both productivity gains and optimised distributed, renewable energy integration are achieved.

The discussion focused on four different topic areas of energy sector digitalisation and the various policy elements that can help realize their potential. The four topic areas have unique opportunities and barriers from an energy policy perspective:

1. *Big data and machine learning* for system analytics to enable applications such as automated demand response and predictive variable renewable energy supply chain management.
2. *Connected devices making up the Internet of Things* potentially enabled by blockchains to ensure secure cross-sector operation for optimized energy productivity systems and smart grids.
3. *Platform solutions* to enable customers as they become distributed energy producers (for example through solar roofs) and to aid them in implementing energy management systems (for example through connected devices within their dwellings).
4. *Innovative market solutions* that properly capture the opportunities presented by energy sector digitalization.

Identified Barriers

A number of barriers were identified in relation to each of the digitalisation topics listed above. Underpinning all of the barriers and proposed solutions is the need for a sense of urgency from policy makers. Policy makers and private sector participants alike expressed concern that many governments around the world are not yet aware of the need for urgency on energy sector digitalisation matters. Investors noted they need to see the potential for near-term value creation - this can be difficult as many countries are not expected to have integrated digital energy sector policy frameworks designed or implemented for a few decades. A number of technical and financial barriers were discussed along with potential related risks:

- **Lack of capacity and expertise:** Government energy agencies are often not qualified, prepared, or focused on digitalisation concerns. This includes the expertise to properly manage the increasing amount of data relevant to the energy sector as well as privacy and cyber-security concerns related to connected devices.
- **Rigid markets:** The proliferation of newly networked technologies and systems make market predictability difficult and typical 5-10 year planning cycles are no longer appropriate. The accurate and timely prediction of decentralised variable renewable energy sources is complex, so electricity markets need to have maximum flexibility to accommodate the integration of rapidly changing available power generation. Further, any potential for a truly open and

scalable electricity market trading scheme for decentralised sources is lost if pricing variability does not exist.

- **Absence of standards, automation, and true platform solutions:** Standards will be necessary to enable electricity market applications such as automated demand response capabilities as well as automated and aggregated transactions in a decentralised system. Having different standards and regulations in different jurisdictions increases costs for connected device manufacturers and system integrators. While many platform solutions in the energy sector claim to be fully open and interoperable, simple connectivity is still a challenge with software applications not always interoperable.
- **Management of vampire loads:** The standby energy use required to ensure hundreds of billions of new networked devices stay connected is potentially massive. While intelligent efficiency can manage energy usage and lead to substantial energy savings, governments in most cases are not implementing actions to ensure these devices are not increasing the energy used to stay connected.
- **Failure to understand the cost and complexity of connectivity:** A complete understanding of the physical/technical connectivity costs is essential to help catalyse new business models. There is a risk of underinvestment in energy-related digital technologies if investors have uncertainty in planning due to poor understanding of true costs. Related to this is the human element of the energy sector. The human behavioural aspects of electricity use may not be understood well enough to enable consumers to take advantage of energy sector digitalisation.

Potential Solutions

Roundtable participants considered potential solutions to address some of the barriers identified above.

- **Consider whole system issues and support aggregation:** With digitalisation, there is an opportunity to enable existing networks and related infrastructure to enable aggregation and democratisation of energy consumers. The aggregation of the electricity savings from individual connected devices as well as the free trade of consumers' decentralised power generation can be exploited to catalyse new business models by considering the system as a whole. Reducing overall risk levels through the consolidation of demand can be accelerated through the use of connected devices within buildings or smart cities. Further, the integration of policies for both the grid and building energy management needs to be optimized – it is estimated that when treated optimally as a system, worldwide electricity consumption could be reduced by nearly a third.
- **Develop grid regulations and forward-looking standards:** Many barriers can be overcome if all energy grids are regulated and third party access is granted to data aggregators and analysts so that operators can take full advantage of real-time data. Common standards can enable aggregated and automated real-time transactions; automated demand response capabilities; and, harmonized technology communication to ensure interoperability and cross-border interactions.

- **Use Blockchains:** Deploying blockchain technologies will help solve many of the issues surrounding network security and determining the costs of network transactions, for example through automatically verified smart-contracts. While there are clear advantages to using blockchains from a network perspective, many of the same issues around interoperability, technological need, and communications standards need to be addressed while considering broad deployment.
- **Encourage pilot projects for system experimentation:** Governments can help identify pilot schemes in well-defined geographical zones over certain periods of time to experiment with different policy and technology combinations in order to better understand the various impacts of energy sector digitalisation.
- **Enable conveners:** Policymakers can help create truly open source solutions and technological harmonisation by encouraging and enabling open collaboration. Connectivity between different platforms such as smart phone applications can be enhanced through open collaboration and promotion with governments.

Roundtable Findings and Recommendations

While roundtable participants provided a strong endorsement of the potential benefits of digitalisation, they highlighted a number of key recommendations to ensure opportunities enabled by digitalisation are not missed:

- A much stronger sense of urgency is needed from policy makers to prepare for the digitalisation of the energy sector and utilise the data needed to properly manage decentralised electricity production and system-wide intelligent efficiency;
- Policy makers must ensure policy frameworks encouraging flexible markets to catalyse innovate business models and enable appropriate investment in digital energy sector technologies;
- Standards must be developed to ensure vampire loads don't overcome the potential benefits of intelligent efficiency, to enable aggregation as well as automated transactions, and to ensure harmonisation for true interoperability; and,
- The security and privacy concerns associated with network connectivity must be addressed with potential solutions being found in blockchain technologies.

CEM 8 Roundtable 2: Optimising the Impact of Our Renewable Energy and Energy Efficiency Policies

Background

Renewables and energy efficiency contribute to many countries energy access, affordability, security and decarbonisation goals. To date these policies have been developed and implemented separately. However as the scale and pace of deployment grows such an approach risks suboptimal or more expensive outcomes. Technology development, most notably digitisation, is changing how the energy system operates, increasing the interaction between supply and demand side options and opening up opportunities for smarter, more integrated energy services.

The objective of the round table was to:

- exchange and understand countries' experience of separate energy efficiency and renewable energy policy making, particularly in light of technology, digitisation and energy market developments;
- discuss and exchange how our analysis and models of policy making, governance, market design and regulation need to adapt to ensure that our energy efficiency and renewable energy policies deliver overall energy system outcomes as cost effectively as possible;
- identify shared elements around which countries may wish to continue to exchange and develop analysis, including how the CEM and IEA may support countries develop optimal pathways.

Moderator

- Joan MacNaughton, Chair of the Board, The Climate Group

Government Representatives

- Mr. Luiz Barroso, Chief Executive Officer, EPE, Ministry of Mines and Energy, Brazil
- Ms. Helen Bennett, Assistant Secretary, Energy Security Office, Department of Environment and Energy, Australia
- Mr. Edmund Gerald Brown, Jr., Governor, State of California
- Mr. Thorsten Herdan, Director General for Energy Policy, Federal Ministry of Economics and Technology (BMWi), Germany
- Ibu Maritje Hutapea, Director Renewables, Ministry of Energy and Mineral Resources, Indonesia
- Mr. Lars Christian Lilleholt, Minister, Ministry of Energy, Utilities and Climate, Denmark
- Mr. Dominique Ristori, Director General of Energy, European Commission
- Mr. Per Anders Widell, Deputy Director, Energy Division, Ministry of the Environment and Energy, Sweden

Private Sector and Civil Society Representatives

- Mr. Peder Andreasen, President and Chief Executive Officer, Energinet.dk, and President, ENTSO-E
- Dr. Douglas Arent, Executive Director, Joint Institute for Strategic Energy Analysis, National Renewable Energy Laboratory
- Mr. Jules Kortenhorst, Chief Executive Officer, Rocky Mountain Institute

- Ms. Nataliya Kulichenko, Senior Energy Specialist, World Bank
- Sir Phillip Lowe, Executive Chair, World Energy Trilemma
- Dr. Brian Motherway, Head of Energy Efficiency Division, International Energy Agency
- Dr Paolo Frankl, Head of the Renewable Energy Division, International Energy Agency
- Mrs. Charlotte Roule, Chief Executive Officer, ENGIE China
- Mr. Kjeld Stærk, President, Danfoss China
- Mr Haibo Wang, President Gold Wind
- Ms. Karin Widegren, Chair, International Smart Grid Action Network
- Dr. Arthouros Zervos, Chair, REN21, Professor, National Technical University of Athens

Overview

The discussion opened with a context-setting intervention from Danish Minister Lilleholt, who highlighted Denmark's long track record in prioritising clean, secure energy, and also emphasised the importance of integrated scenarios and analysis to help guide policy making.

The moderator then asked for contributions on the question of how countries were viewing the alignment of efficiency and renewable policies in their country, and what were the 'rubbing points' in terms of their misalignment. This led to a discussion on the role of targets, where the general view was that they are necessary, but of course need to be well designed, and much depends on the specific context. It was also argued that there should be a focus on implementation. A common point was the need for integrated thinking across sectors and between supply and demand. The roundtable also addressed the interplay of technology and policy, showing different positions of businesses vs. policy-makers.

The second part of the discussion focused on the issues of market design and on how to manage the transition taking into account existing assets and legacy infrastructure. The possible implications of emerging trends such as increased distributed generation, storage and demand side measures, and digitalization was also discussed. Many countries underlined the need to develop new market designs that foster competition, create a level playing field, and enable innovation. The need to focus more on customer needs, and an emerging trend towards energy services thinking was debated as well.

Identified Barriers and Potential Solutions

- **Targets:** There was consensus that targets are necessary to express a clear long-term vision and have been very useful in the past to kick-off both renewables and energy efficiency. Both government and business need a long term vision as well as short term steps on the pathway. However, too many and too detailed targets can create problems. For example, state/province level targets can lead to issues at federal level; targets on capacities can lead to renewables curtailment; too technology-specific targets can lead to system-level issues. National targets may not drive the most valuable renewable or energy efficiency investments in terms of overall impact on the energy system. In the future, more consistency between CO₂, energy efficiency and renewable energy targets are needed and a right level of disaggregation must be found according to specific context. Targets also need to be monitored and updated regularly to take into account technology progress, overall system impacts and market evolution.

- **EE-RE complex interplay:** Most speakers expressed the need for an integrated approach, emphasising that prioritising energy efficiency is a must in order to reduce costs of the clean energy transition. However, the interaction can be complex, e.g. fostering further energy efficiency savings during renewables curtailment is not cost-effective. In the future, use of advanced modelling and analysis tools capable to capture such complex, time-dependent dynamics will be key to achieve effective integrated approaches optimizing resource efficiency.
- **Sector coupling:** To date, policies have focused too much on the power sector. In the future more cross-sectoral approaches addressing heat, industry and transport will be needed. Sector coupling and increased electrification of final uses will play a major role. However, planning right timing and sequencing will be crucial: electric vehicles and greening electricity supply must go in parallel to effectively reduce emissions; grids need to be expanded and reinforced at the same time of renewables deployment.
- **Policies vs technology:** Technological innovation is bringing prices down for renewables and efficiency, and digitalisation is also developing new possibilities. But there is a perceived gap between the thinking of technology companies and policy makers. The former tend to think of policy makers as behind the pace of innovation, whereas policy makers are wary of overpromise from technology, and sometimes suspicious about over claims from industry. This in turn can lead to a lack of confidence in the potential long-term transition and to technology and infrastructure lock-in effects. In order to break this vicious cycle, delegates emphasized the importance of developing more sophisticated modeling and analytical tools as well as of strong institutional capacities.
- **Starting point constraints:** There was a lot of discussion on the importance of strategic thinking that acknowledges countries' specific starting points, opportunities and constraints. This includes issues such as existing infrastructure, or lack of infrastructure, local resources, presence or lack of competitive markets and political contexts. There was discussion of the need for political buy-in and the value of consensus, particular for setting a longer term trajectory.
- **Different priorities:** Considering different starting points also means taking into account different priorities. In developing countries energy access, reliable energy and affordability of energy are a top-priority. In developed countries, the issue is more about legacy infrastructure and optimising costs during the transition.
- **Market Design:** There was strong consensus about the centrality of market solutions. However, a transition based on energy efficiency and renewables implies moving to a zero-marginal-cost industry; wholesale energy markets were not designed for such a context. Several delegates called for new market design(s) and stressed the importance of a level playing field, including passing through externality prices to consumers. The parallel with IT industry was made, where flat rates are currently the norm, arguing that restructuring of the value chain and change of pricings could be a solution in the energy sector. It was noted that taxes and levies can be a barrier; therefore finance ministries should be involved in future market design discussions.
- **Moving to service thinking:** Several delegates emphasised the importance of focusing market design around final customers (one calling for a “deep dive in [understanding] customer needs”)

and the services they request. Some companies are already engaged in this shift towards selling services, mainly in business to business (B2B). How this could work at larger scale and how policy can encourage this trend remain a future area of investigation. Digital tracking will be important for trading green electricity.

- **New technologies and distributed solutions:** The roundtable also discussed the emerging technology trends in digitalisation, distributed generation, storage, and demand-side measures and the great opportunities that they can bring to both EE and RE. However, it was noted that significant investment in the “grids of the future” will be needed in order to exploit potential. The role of local administrations (cities, provinces) to enable integrated solutions through new technologies and organisational change (e.g. combining housing and transport), was noted.
- **Flexibility and technology openness:** There was large consensus that more flexible systems will be required to integrate large shares of renewables and empower energy efficiency. Several participants emphasised the need for [flexibility] markets to ensure a level playing field (e.g. between storage, demand-side), to keep all technology options open and foster innovation. The New York’s state Reforming the Energy Vision (REV) was cited as best-in-class in this respect.

Roundtable Findings and Recommendations

- The roundtable expressed strong agreement that both EE and RE are centrally important for all future energy systems and therefore it is essential to broaden thinking on how they interact and how policies need to be better aligned to deliver best outcomes.
- While many countries are already starting to think more holistically and considering approaches that are more cross sectoral covering electricity, transport and heat, the roundtable underlined that this is new territory [for policy analysis], and that to date no clear best practices can be applied to different contexts. The importance of appropriate analytical tools and of strong institutional capacities was emphasised as well.
- While they broadly agree on the long-term issues, businesses and policy-makers may sometimes express different opinions on solutions, allocation of responsibilities and timing (who should do what, by when). The roundtable therefore urged CEM to further enhance communication and foster the right dialogue between the public and private sectors, aiming at including a large set of stakeholders (e.g. industry and businesses, system operators but also cities, consumer associations, etc.).
- Overall, there was agreement that this is an area that merits further work by the CEM Secretariat and IEA and should be an element of discussion for CEM 9. Recognising that potential work areas encompass a large list of topics and multi-dimensional issues; the roundtable suggested that the CEM Secretariat should first settle the set of options/themes to be analysed and then in consultation with CEM and IEA member countries prioritise a more restricted number of topics to be discussed in the short term.

CEM8 Roundtable 3: Electric Vehicle Deployment Policies for the Next Decade: From the Second Million to Mass Market Adoption

Background

This Roundtable took place against a backdrop of the increasingly successful deployment of electric vehicles (EVs). After approximately five years of broad commercial availability, over 2 million consumer EVs were in circulation at the end of 2016. However, despite this success, EVs make up less than 1% of passenger car sales worldwide. Inputs from the roundtable will guide work to be undertaken in the new EV30@30 campaign, aiming to achieve a 30% market share for electric vehicles by 2030, recommending strategies for its implementation.

Moderator

- Dr. Fatih Birol, Executive Director, International Energy Agency

Government Representatives

- Mr. Wan Gang, Minister of Science and Technology, People's Republic of China
- Ms. Jimena Jara, Undersecretary of Energy, Ministry of Energy, Chile
- Mr. Henk Kamp, Minister of Economic Affairs, Netherlands

Private Sector and Civil Society Representatives

- Mr. Klaus Bonhoff, Managing Director, National Organisation Hydrogen and Fuel Cell Technology
- Mr. Onoph Caron, Director, ElaadNL
- Ms. Jenny Chu, Head of Energy Productivity Initiatives and Interim Director of China, The Climate Group
- Mr. Cornie Huizenga, Secretary General, Partnership on Sustainable, Low Carbon Transport
- Mr. Jan Haugen Ihle, Country Manager, Fortum Charge & Drive, Norway
- Mr. Niu Jincang, Deputy General Manager, State Grid Electric Vehicle Co., Ltd.
- Mr. Drew Kodjak, Executive Director, International Council on Clean Transportation
- Ms. Patricia Monahan, Transportation Program Director, Energy Foundation
- Mr. David Sandalow, Inaugural Fellow, Center on Global Energy Policy, Columbia University
- Mr. Juha Stenberg, President, Ensto Solutions, Ensto Group
- Mr. Alain P. Steven, Secretary General, GO15
- Mr. Rong Wenwei, Chairman and Chief Executive Officer, Shanghai International Automobile City Group Co., Ltd.
- Mr. Jinhua Zhang, Executive Vice President and Secretary General, Society of Automotive Engineers of China
- Mr. Yang Zhang, Vice President of Industry Development, NIO, and Head of Operations & Strategy Planning, XPT

Overview

In the last decade, governments have enacted a broad range of policies to encourage electric-drive technologies; these policies include financial incentives for EV purchase, EV deployment or fleet adoption mandates, long-term fuel economy standards, direct government research and development (R&D) efforts as well as direct financial support for auto manufacturers and suppliers such as vehicle production subsidies. Non-financial incentives have included providing access to otherwise restricted traffic lanes, free use of parking facilities, or exemptions from permitting or inspection processes. Some or all of these policy mechanisms have been widely implemented by many of the governments that are seeking to lead expanded EV adoption.

At the same time, international, national and local governments and industry have worked to expand the global network of vehicle charging infrastructure. Policies and programmes used to promote the deployment of charging infrastructure include income tax-credits, rebates, or grants for the installation of chargers, inclusion of charging infrastructure in carbon pricing schemes, incentives and/or cost recovery mechanisms for electric utilities, city-scale targeted charger deployment schemes and interoperability mandates. These efforts have translated to measurable results. Initial EV offerings and sales have proven that the technology is practical at scale and that consumer demand is strong across a variety of vehicle sizes and market applications.

Despite the successes outlined above, EVs make up less than 1% of passenger car sales worldwide. Hence, robust, innovative and aggressive EV adoption policies that build on the policies that led to the first two million EVs sold and enable the transition to mass market adoption are critical. Policymakers should consider a number of trends and market developments when designing policies for mass market adoption.

- Battery costs have dropped by 75% since 2009 and are expected to keep decreasing;
- There is increasing private sector and electric utility participation in charging infrastructure deployment; and
- The new generation of mid-level full battery electric vehicle models has ranges that exceed 300 km.

Further, new technologies such as vehicle connectivity and automation and emerging business models that provide “mobility-as-a-service” could be supportive of even greater levels of transport electrification if coupled with the right policies. Policymakers around the world need to take into consideration these trends while they leverage related opportunities to reduce transportation-related greenhouse gas emissions.

Identified Barriers

Battery Costs and Lifetime: Despite major improvements, participants agreed that battery costs and durability remain two of the main challenges currently faced by EVs for major market adoption.

- **Consumer Behaviour:** There was consensus that behavioural changes associated with EV charging habits (vs. refuelling for conventional vehicles) need to be addressed to enable a large scale transition to electric mobility.

- **Supply Side Constraints:** Participants stressed the need to coordinate action on EV deployment and the development of capacity to produce energy carriers with low carbon intensities, in order to address climate challenges requiring the mitigation of greenhouse gas emissions.

Potential Solutions

- **RD&D and Deployment Incentives:** Continued investments in RD&D and the policies aiming to increase sales volumes, such as performance-based and technology-neutral financial incentives and regulatory measures – including mandates for zero or ultra-low emission technologies and restrictions for conventional vehicles, were identified as measures having major importance to drive costs downwards. Fleets were also considered as a priority area for strengthening early EV deployment.
- **Charging and Refuelling Infrastructure:** Investment to support the early deployment of charging and refuelling infrastructure needs to complement RD&D and the policies aiming to increase sales volumes. There was consensus on the consideration that charging infrastructure for battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) needs to match changes in consumer behaviour, suggesting that priority should be given to slow charging at home and at the workplace. Fast charging should ensure the viability of long distanced trips. For this purpose, players focusing in the deployment of electric vehicle supply equipment called for a basis of support provided by public funds to ensure a minimum service, enabling businesses to build on it, expanding the availability and capacity of supply equipment as the vehicle market grows. Sharing good practices were also underlined as a good way to minimise costs while ensuring the access and availability of energy supply.
- **Standards:** Participants identified global agreements on standardisation of charging infrastructure to enable the interoperability of chargers and outlets across countries, including the adoption of open and royalty-free protocol for the communication between vehicles, chargers and the distribution system operators (to avoid unnecessary extra costs for charging), as one of the priority areas for short term public intervention.
- **Battery Markets and Vehicle to Grid:** The development of a second hand market for batteries was mentioned as a solution that would reduce costs for EV owners, thanks to the possibility to recover costs from batteries that, despite losses in performances, still have major energy storage capacity and could be used in stationary applications. Participants also stressed the importance of demand side management and vehicle to grid services, calling for action aiming at ensuring that batteries, vehicles and charging infrastructures are ready to enable them. These solutions generate revenues streams for EV owners while benefiting utilities, TSOs and DSOs through the provision of grid services and enhance the integration of variable renewable energy sources in the power generation mix thanks to the a closer match between electricity demand and supply.

- **Cities:** Urban environments were identified as laboratories allowing stronger deployment because of the multiple benefits delivered by EVs in cities, especially reduced air pollution and noise, the possibility for EVs to fully cover urban mobility needs, given that the great majority of movements in metropolitan areas take the form of relatively short trips.
- **Shared, Connected and Autonomous Vehicles:** Participants agreed that connectivity and automation, as well as emerging business models that provide “mobility-as-a-service”, increasing the market relevance of shared mobility via car sharing or ride sharing, are well suited to stimulate transport electrification because of the changes they induce in vehicle utilisation profiles.

Roundtable Findings and Recommendations

Roundtable participants were optimistic about growth prospects for EVs, driven by cost reductions, performance improvements, significant efforts on research and development, sizeable investments and increasing commitment from all stakeholders to scale up electric mobility.

- Policy research can help to optimise policies enabling the increase in EV market uptake in the near term. Having acknowledged that the transition to a self-sustained market will pose significant policy challenges, participants agreed that policy research will remain relevant also in the longer term, in order to manage the transition from a framework focused on the support for zero and ultra-low emission technologies to a system allowing to raise revenues from them. Policy research will need to identify and develop solutions – such as road pricing – that are well suited to handle this transition, also helping to manage the decline of governmental revenues from fuel taxation due to the increased reliance on low-carbon energy sources.
- International cooperation is important to scale up market penetration and improve the understanding of effective policies. The dissemination of information through capacity building initiatives was identified as one of the actions that could help speed up the transition to EVs at global scale.

CEM8 Roundtable 4: Leveraging City-Scale Building Efficiency Action

Background

This roundtable focused on how national governments, local governments, and the private sector can work together to increase the efficiency of buildings. Globally, buildings represent more than one third of final energy use and 20% of total GHG emissions. While the challenge of climate change is global and many goals are national, building efficiency action must happen at the local level to trigger change. The discussion aimed to enhance understanding of key initiatives and opportunities for national and city governments to participate, and share best practice examples of how national governments can support city and business engagement in building efficiency.

Moderator

- Mr. Philippe Joubert, Chair, Prince of Wales' Corporate Leaders Group on Climate Change, and Senior Advisor and Special Envoy for Energy and Climate, WBCSD

Government Representatives

- His Excellency Suhail Mohamed Al Mazrouei, Minister of Energy, United Arab Emirates
- Mr. Odón de Buen, Director General, CONUEE, Mexico
- Mr. Saurabh Kumar, Managing Director, Energy Efficiency Services Ltd, India
- Mr. Laurent Michel, Director General, Energy and Climate Change, Ministry of Environment, Energy and Marine Affairs, France
- Mr. Mike Enskat, Head of Section for Energy, Water and Mobility in the Department for Sectoral and Global Programmes, GIZ
- Ms. Jin Huilian, Deputy Director of the District Commerce Commission, Shanghai Hongkou District People's Government
- Mr. Matt Petersen, Chief Sustainability Officer, City of Los Angeles, California
- Ms. Mechthild Wörsdörfer, Director for Energy Policy, DG Energy, European Commission

Private Sector and Civil Society Representatives

- Ms. Jennifer Layke, Director, Global Energy Program, World Resources Institute
- Mr. Benoit Lebot, Executive Director, International Partnership for Energy Efficiency Cooperation
- Mr. Clay Nesler, Vice President, Global Sustainability & Industry Initiatives, Building Technologies & Solutions, Johnson Controls
- Ms. Sangeeta Prasad, Chief Executive Officer, Integrated Cities and Industrial Clusters, Mahindra Lifespace Developers Ltd., and Member of the Group Executive Board, Mahindra Group
- Mr. Mark Radka, Head, Energy and Climate Branch, Economy Division, UN Environment
- Mr. Mahesh Ramanujam, President and Chief Executive Officer, U.S. Green Building Council, and President and Chief Executive Officer, Green Business Certification Inc.



- Mr. William Sisson, Senior Director for Sustainability, United Technologies Research Center
- Mr. Josué Tanaka, Managing Director, Operational Strategy and Planning, Energy Efficiency and Climate Change, European Bank for Reconstruction and Development
- Mr. Mark Watts, Executive Director, C40
- Mr. Frederick Wong, Chief Engineer, Arup International Consultants Co., Ltd.
- Mr. Shu Zhu, Regional Director and China Representative, ICLEI East Asia Secretariat

Overview

The roundtable highlighted the opportunity and necessity for national governments to leverage building energy efficiency in order to make significant progress on national energy and climate goals. Participants discussed the role of national and subnational governments and the private sector in improving building efficiency. With these roles in mind, representatives provided best practice building efficiency examples demonstrating leadership from national governments, local governments, and international multi-stakeholder partnerships including the SEforALL Building Efficiency Accelerator (led by World Resources Institute) and WBCSD's EEB Amplify.

To synthesise the lessons from these leading examples, the roundtable concluded with a discussion of how to improve coordination and engagement among national governments, local governments, and business. The discussion included both challenges and solutions to improving the energy efficiency of buildings worldwide.

Identified Barriers

There are multiple barriers to energy efficiency in buildings:

- **Lack of data:** Most building owners and tenants, whether public or private, commercial or residential, do not know how much energy their buildings consume.
- **Misaligned incentives:** The price of energy is generally quite low, which does not provide a lot of incentive for energy conservation. In addition, split incentives slow action on building efficiency action, because the benefits of lower energy costs often go to a different stakeholder (occupant) than the one who would need to make the initial energy efficiency investment (owner).
- **Low awareness:** The benefits of more energy-efficient buildings are often not well understood, such as better indoor comfort, fewer illness-related absences among employees, and reduced air pollution in countries where energy production is fossil fuel based.
- **Fragmented supply chain:** The building sector is highly fragmented and competitive, which means that technical skills are generally not well developed to build and operate buildings efficiently.

Potential Solutions

Roundtable participants discussed what actions national governments, local governments, and businesses could take to advance building energy efficiency.

These included:

- **Long-term targets or commitments:** National governments can provide a long-term policy framework with specific targets to set a clear direction for the long-term investments needed in building efficiency. In addition, an implementation framework is critical to guide sub-national governments and the private sector on how to implement key programs and policies such as on data transparency, building codes, and financial and non-financial incentives.
- **Capacity building:** More capacity building is needed at the city level and in the private sector. This includes the development of needed technical skills and know-how regarding best practices and technologies, along with capacity to develop policies, programs, project preparation and standardisation.
- **Finance support:** Building energy efficiency needs dedicated and long-term financial support, as well as more coordinated action to provide this support at critical moments (such as building up local implementation capacity to prepare implementation for a new regulation).
- **Improved coordination:** All actors can better articulate and coordinate needed actions at the local, national, and international levels.
- **Facilitate and empower local action:** Local governments often have the jurisdiction to provide incentives and enforce mandates through the permitting process. They can also lead by example through public procurement (aligned with national rules) and encourage transparency (such as through energy disclosure ordinances).
- **Enhance private sector engagement:** The interests and resources of the private sector should be used more frequently and effectively to bring projects to scale.
- **Aggregate and standardise projects:** Because the building efficiency market is fragmented, an individual project is typically too small to interest commercial investors. Aggregation of projects is necessary, along with standardization of measurement and verification processes. Performance contracting can yield strong results with the right ambition level and time horizon.

Roundtable Findings and Recommendations

- Roundtable participants called for more national leadership to provide clear long-term targets and implementation frameworks to support building efficiency.
- An increase in finance for capacity building at the local level is needed, including dedicated support and long-term finance options. Climate finance should be examined as one option for this needed support.
- Current trends towards “connected” and “smart” buildings, all relying on digitalisation, provide a time-critical opportunity to enhance transparency of building energy performance through data collection and monitoring and verification.
- Countries should examine existing financial structures, such as tariff structures for electricity, to determine whether these incentivise the actions governments intend. In addition, governments should build in non-financial incentives, such as accelerated permitting or additional floor area allowances, to encourage building efficiency.
- Use of existing partnerships and regular evidence-based dialogue among national governments, local governments, businesses, and civil society is critical to avoid duplication across initiatives and accelerate the implementation of best practices on building efficiency.