CLEAN ENERGY MINISTERIAL

A guide to

THE CLEAN ENERGY MINISTERIAL

Advancing Clean Energy Together

Updated in September 2019

CLEAN ENERGY MINISTERIAL
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What is the CEM?

THE CLEAN ENERGY MINISTERIAL ENABLES CHANGE BY HELPING KEY COUNTRIES AROUND THE GLOBE ADOPT CLEAN ENERGY POLICIES THAT TRANSFORM HOW WE MAKE AND USE ENERGY.

Who are the members?

Created in 2010, the Clean Energy Ministerial (CEM) is a global forum where major economies and forward leaning countries work together to share best practices and promote policies and programmes that encourage and facilitate the transition to a global clean energy economy.

The CEM's 26 Members account for about 75% of global greenhouse gas emissions and 90% of global clean energy investments.

Innovative solutions

The CEM also fully recognises the essential role of the **private sector** and seeks to leverage its expertise, influence, and capital. The private sector partners - chosen for their visionary work, innovative solutions and ambitious approaches - are encouraged to provide high-level policy input as well as practical expertise and to participate directly in the technical work of the CEM.

Several of the world's best technical expert organisations lend their technical assistance and advice to support the work of the CEM.

> CO_2 emissions do not recognise any borders, so this has to be about cooperation across nations and across global institutions. This is really the strength of the CEM. It is a collaborative effort.

Elder Sætre
President and CEO, Equinor (Norway)

What are the strategic objectives of the CEM?

Accelerating the development and deployment of clean energy solutions is essential to meeting growing global energy needs, reducing emissions, improving energy security, and sustaining economic growth.

To achieve these objectives, the CEM pairs the high-level political engagement of energy ministers with sustained initiatives and high-visibility campaigns to provide a powerful combination for accelerating clean energy policies and technology deployment.

> It is very important for energy decision makers to work together in order to share experiences around best practices. CEM provides that platform.

Dr Divya Datt
Director, The Energy and Resources Institute (India)

What are the areas of focus of the CEM?

The CEM's Initiatives and Campaigns focus on three key areas:

- Energy supply and system integration
- Energy demand
- Crosscutting issues

The CEM Members work with a **distributed leadership model** that allows more flexibility and creativity than consensus-based processes. This means that any government can put forward new ideas and create additional work streams. However, there is no expectation that governments have to join every single one of them, allowing CEM Members to focus their efforts where it is most relevant and impactful for them, in line with their domestic context and in support of their national clean energy goals.

How does it work?

The CEM's annual meeting is the only high-level political engagement where energy ministers gather to establish clean energy priorities, consider new approaches, put forward innovative policies, and adopt concreate measure to accelerate the deployment of clean solutions and the successful transition to a clean energy future.

The CEM also works through year-round, action-driven and transformative clean energy initiatives and campaigns that enable low-cost, high-impact technical work and facilitate international coordination that amplifies each government's clean energy deployment efforts. They seek to catalyse public and private actions towards ambitious but realistic targets.

Public-private engagement is key to scale up clean energy around the globe. The CEM convenes the right partners from the private sector, international organisations and civil society to have the biggest impact in advancing solutions to the clean energy challenge.

> The Clean Energy Ministerial is the main government mechanism that promotes the transformation of clean energy in the world and contributes to coping with climate change. The joint action of large developing countries and major developed countries is of great significance to the global clean energy transition.

Dr Wan Gang
Vice Chairman of the Chinese People's Political Consultative Conference; former Minister of Science and Technology (China)

CEM by numbers

25 **countries and the European Commission**

are part of the Clean Energy Ministerial, a global forum where major and emerging economies work together to accelerate the transition to a clean energy future by adopting the best policies and regulations.

14

long-term Initiatives

to accelerate the wide-scale adoption of clean energy solutions and technologies.

Over

100

private sector companies

have taken part in the CEM Campaigns.

10

Clean Energy Ministerial meetings

have been held since 2010. The next one will be in Chile in 2020.

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8

short term Campaigns

to catalyse public and private efforts to achieve high impact results.

3.3 **billion people** live in CEM countries, or **43%** of the world's population.

75%

of global greenhouse gas

is emitted by the 26 Members of the Clean Energy Ministerial.

90% **of global clean energy investments** are made by the Clean Energy Ministerial Members.

12 **expert organisations**

work with us to provide technical support to the CEM's Initiatives and Campaigns.

8 **Observer Organisations** participate in our annual Ministerial meetings.

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CEM Initiatives and Campaigns

ACHIEVING CONCRETE RESULTS THROUGH SMART POLICIES, FOCUSED ACTIONS AND REAL COMMITMENTS.

CEM Initiatives are designed to be low-cost, high-impact work to facilitate the exchange of best practices, policies, and innovative solutions and promote wide-scale adoption of clean energy technology. They primarily target governmental participation, although at times also include private sector participation.

CEM Campaigns are short-term efforts to raise ambition, increase visibility, and target resources to areas that have particular potential for impact. Campaigns typically sit within a CEM initiative and invite the participation of the private sector, civil society and non-government agencies.

Energy Supply and Systems Integration

The goal of these workstreams is to help governments identify and adopt the best policies to produce clean, cost effective, and sustainable energy and energy systems.

Initiatives:

- 21st Century Power Partnership
- Multilateral Solar and Wind Working Group
- International Smart Grid Action Network
- Nuclear Innovation: Clean Energy Future
- Regional and Global Energy Interconnections Initiative

Campaigns:

- Power System Flexibility Campaign
- Long-term Energy Scenarios for the Clean Energy Transition
- Accelerating the Adoption of Distributed Generation in Strategic Regions
- Flexible Nuclear Campaign (launched at CEM10)

Energy Demand

These workstreams increase efficiency across energy end use sectors such as equipment, appliances, industry, buildings and transport.

Initiatives:

- Electric Vehicles Initiative
- Super-efficient Equipment and Appliance Deployment
- Energy Management Working Group
- Sustainable Cities and Eco-Towns Initiative
- Carbon Capture, Utilisation and Storage Initiative
- Hydrogen Initiative (launched at CEM10)

Campaigns:

- EV30@30 Campaign
- Advanced Cooling Challenge
- Energy Management Campaign

Crosscutting Support

These workstreams look at issues that touch both the energy production and energy consumption spectrum.

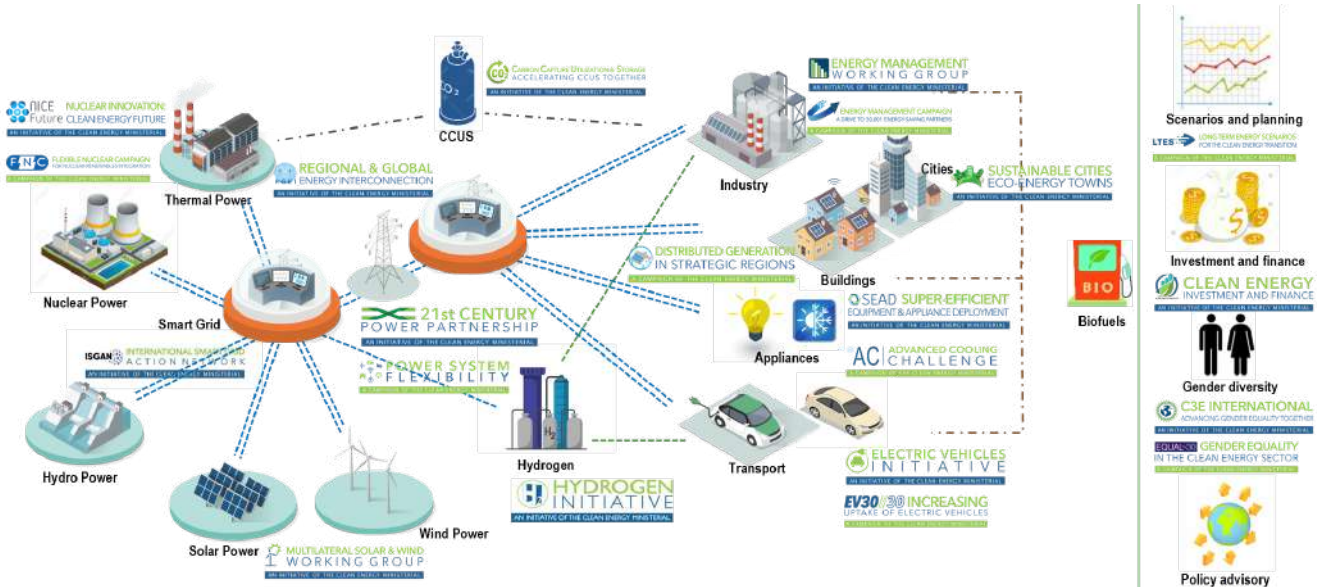
Initiatives:

- Clean Energy Investment and Finance Initiative
- Clean Energy Education and Empowerment Initiative
- Clean Energy Solutions Center

Campaigns:

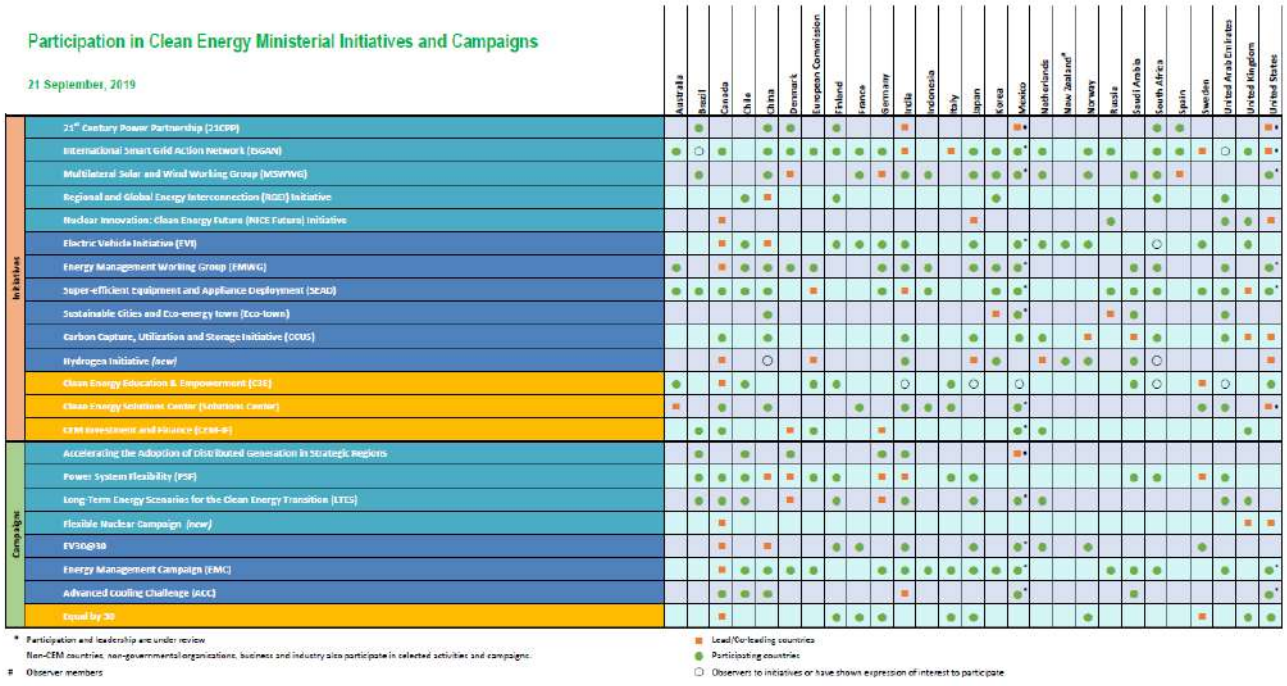
- Equal by 30

The diagram below seeks to capture the various issues addressed by the current CEM workstreams within **a fast changing and increasingly integrated energy system**.



Source: CEM Secretariat, adapted from IEA (2017) Digitalization and Energy

The matrix reflects the current status of CEM Member participation in CEM workstreams*.



ENERGY SUPPLY AND SYSTEMS INTEGRATION

Current Initiatives and Campaigns



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21st CENTURY POWER PARTNERSHIP
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

21st Century Power Partnership (21CPP)

The 21st Century Power Partnership (21CPP) initiative's objective is to accelerate the transformation of the global power sector and put in place systems that deliver clean, affordable and reliable solutions.

21CPP helps countries achieve these goals by facilitating collaborative research, information sharing, and capacity building and by promoting integrated policy, regulatory, financial, and technical solutions for the deployment of clean energy.

Key actions:

- **Throught leadership studies** that highlight global cutting edge power system transformation topics.
- **In-country technical cooperation**, focusing on policy, regulatory, and technological progress, and grid integration studies and recommendations for 21CPP members.
- **Knowledge transfer** through information exchange, capacity-building, fellowship programs, and other exercises to share lessons learned among 21CPP members.

Success stories

21CPP collaborated with the Children's Investment Fund Foundation (CIFF) to support energy reforms in Mexico through workshops, inputs to technical studies and advice to the Mexican government.

21CPP has helped Mexico shape its clean energy management framework, implement the deployment of renewable energy, smart grids, and distributed generation.

21CPP worked with the World Bank and the U.S. Agency for International Development to support India's Greening the Grid project and help India prepare to achieve its renewable energy deployment targets.

Lead CEM Members: India, Mexico*, United States*

CEM Member participants: Brazil, China, Denmark, Finland, South Africa, Spain

Operating agent/coordinator: National Renewable Energy Laboratory (NREL)

> "Globally, power plants need to be rehabilitated and modernised to improve efficiency and flexibility to allow for carbon reduction in the power generation sector."

Dr Andrea Feldmüller
Director, Siemens AG

*Participation and Leadership are under review

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ISGAN INTERNATIONAL SMART GRID ACTION NETWORK
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

International Smart Grid Action Network (ISGAN)

The International Smart Grid Action Network's (ISGAN) objective is to accelerate the development and deployment of smarter, cleaner and more flexible electricity grids around the world. Smart grids enable increased demand response and energy efficiency.

ISGAN leverages high-level government leadership and industry technology innovation to support greater national ambition in developing and deploying smart grids in ISGAN member country markets and regions.

Key actions:

- **haring knowledge:** ISGAN is the only global government-to-government initiative for sharing information, best practices, and competence on smart grid.
- **Technical cooperation** to evaluate and improve smart grid technology development, testing and systems integration, regulatory structures and policy planning.
- **Project coordination** to help policy makers orchestrate a sustainable transition to smarter grids.

Success stories

ISGAN works across CEM's initiatives and campaigns to educate on the importance of smart grids in the development of sustainable power systems. For example, ISGAN and the 21st Century Power Partnership (21CPP) are joining efforts to unite key Mexican national stakeholders around a common vision and roadmap for smart grid development.

The ISGAN Academy on Smart Grids offers continuous training to engineers and policy experts through a set of e-learning modules. It brings together participants to engage in in-depth discussions and share best practices on specific aspects of smart grid development.

Lead CEM Members: India, Italy, Sweden, United States*

CEM Member participants: Australia, Canada, China, Denmark, European Commission, Finland, France, Germany, Japan, Korea, Mexico*, Netherlands, Norway, Russia, South Africa, Spain, United Kingdom

Non-CEM Member participants: Austria, Belgium, Ireland, Singapore, Switzerland

Observers: United Arab Emirates, Brazil, Malaysia**, Turkey**

Operating agents/coordinators: Austrian Institute of Technology, with the Korea Smart Grid Institute as a co-secretariat

AWARD OF EXCELLENCE

ISGAN recognises excellence in smart grid projects, policies and programmes around the world. Since 2014,20 distinguished smart grid projects that demonstrated the greatest innovation, potential impact, economic rationale, potential for replication and adaptation have been recognised.

Energy supply and systems integration

*Participation and Leadership are under review
**Non-CEM Members

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MULTILATERAL SOLAR & WIND WORKING GROUP
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Multilateral Solar and Wind Working Group (MSWWG)

The Multilateral Solar and Wind Working Group's (MSWWG) objective is to promote the deployment of low-cost wind and solar energy in all regions of the world.

By facilitating the global deployment of wind and solar technologies, the MSWWG contributes to reducing emissions, promoting a secure and affordable energy supply, and driving the transition to a clean and sustainable future.

Key actions:

- **Global dialogue** between technical experts and CEM Ministers to put in place the right policies and technologies to increase the use of low-cost wind and solar energy.
- **Analytical work** to provide policy recommendations on solar and wind energy technology development and deployment as well as on system and market integration.
- **Increasing awareness** of the potential of solar and wind energy, their socioeconomic benefits, and cost-efficient policy options to support their deployment.

Lead CEM Members: Denmark, Germany, Spain

CEM Member participants: Brazil, China, France, India, Indonesia, Japan, Korea, Mexico*, Netherlands, Norway, Saudi Arabia, South Africa, United States

Operating agents/coordinators: International Renewable Energy Agency (IRENA), International Energy Agency (IEA)

Success stories

Renewable Energy Auctions: A Guide to Design
Between 2005 and 2015, the number of countries relying on auctions to advance their renewable energy deployment has increased by tenfold, from just six to more than 60. This guide helps countries prepare for renewable energy auctions and presents best practices and discusses options and trade-offs in auction design decisions.

Public-private partnerships
The MSWWG works with companies such as ChargePoint, GE, Carlsberg, EKOenergy, Microsoft, Google, Facebook, and IKEA. It has also leveraged the power of coalition and technical partnerships from non-governmental organisations and business associations, including RE100, GIZ, Agora Energiewende, and the Danish Energy Agency.

RENEWABLE ENERGY

Renewable energy needs to be scaled up at least six times faster for the world to meet the decarbonisation and climate mitigation goals set out in the Paris Agreement. The total share of renewable energy must rise from around 18% of total final energy consumption (in 2015) to around two-thirds by 2050.

Global Energy Transformation: A Roadmap to 2050, IRENA, 2018

*Participation and Leadership are under review

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REGIONAL & GLOBAL ENERGY INTERCONNECTION
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Regional and Global Energy Interconnection Initiative

The Regional and Global Energy Interconnection Initiative's objective is to accelerate the regional electricity grid and power market integration to maximise the use of cost-efficient clean energy sources available at the country level and regionally.

It will facilitate the development of sustainable, secure and affordable regional electricity systems, while contributing to economic growth, climate change mitigation and decarbonisation of energy systems.

Key actions:

- **Facilitating high-level policy and regulatory discussions** among CEM members on regional integration opportunities and challenges.
- **Providing technical support** to help CEM countries identify policy recommendations, regional roadmaps, and suitable technology options for stronger neighbour jurisdictional alignment on electricity systems integration.
- **Establishing a cooperation platform** to share best practices and policy achievements as well as providing capacity building, professional training and seminars.

ENHANCED INTERCONNECTIONS

Significant reinforcement of long-distance transmission capacity within systems and enhanced interconnection between systems will be necessary to achieve the climate, security and affordability objectives of delivering electricity in the 21st century.

Large Scale Electricity Interconnection. Technology and prospects for cross-regional networks, IEA , 2016

Lead CEM Member: China

CEM Member participants: Chile, Finland, Korea, South Africa, United Arab Emirates

Operating agent/coordinator: Global Energy Interconnection Development Cooperation Organisation (GEIDCO)

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NICE Future NUCLEAR INNOVATION: CLEAN ENERGY
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Nuclear Innovation: Clean Energy Future (NICE Future)

The NICE Future initiative envisions clean energy systems that take advantage of emission-free nuclear in new and innovative ways. Nuclear energy can be integrated with other clean energy technologies in many ways to create a thriving, emission-free economy.

NICE Future fosters new collaborations and helps policy makers understand the technology options that could be available to them, from today's large light water reactors to the small modular reactors (SMRs) and other novel designs that will soon reach commercial markets. The initiative offers information on technical feasibility, economics and financing, and perspectives from various communities and stakeholders that will be helpful for governments considering the roles that nuclear energy can play in their clean energy futures.

Key actions:

- **Establish a dialogue** on the roles nuclear energy can play in clean energy systems of the future. Engage nuclear and non-nuclear experts and policy makers in a discussion on how nuclear energy supports broader clean energy goals via webinars, workshops, and coordination with other CEM initiatives.
- **Develop and disseminate resources** to inform policies and planning. Develop tools, analysis and reports to provide plain-language briefings for policy makers on the roles that innovative nuclear can play in the clean energy mix.
- **Build partnerships** amongst experts and diverse stakeholder groups. Work with non-governmental actors, including youth and women in clean energy, to share information with the public.

Nuclear ENERGY technology integrated with solar photovoltaics and wind turbines to power a modern data center, illustrations courtesy of Third Way: https://advancednuclearenergy.org/blog/nuclear-reimagined

> This initiative will bring the wisdom of the world on nuclear innovation together, and contribute to policy making for realising clean energy systems that solve challenges in each country.
>
> **Masaki Ogushi**
> *Japanese Parliamentary Vice-Minister of Economy, Trade and Industry*

Lead CEM Members: Canada, Japan, United States

CEM Member participants: Russia, United Arab Emirates, United Kingdom

Non-CEM Member participants: Argentina, Poland, Romania

Operation agent/coordinator: National Renewable Energy Laboratory (NREL)

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POWER SYSTEM FLEXIBILITY
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Power System Flexibility Campaign

Associated with the 21CPP and MSWWG initiatives

The Power System Flexibility Campaign's objective is to help governments and industries make power generation more flexible, while meeting customers' demand for a highly reliable and cost-efficient energy supply.

The Power System Flexibility Campaign, launched in 2018, is the continuation of the Advanced Power Plant Flexibility Campaign and builds on its strong foundation of government and industry commitments by widening the scope to include smart electricity grids, storage and demand-side management.

Campaign aim:

Organise high-level policy forums and technical workshops to help governments and industry identify strategies to unlock flexibility across the whole power system, exchange experiences and develop concrete actions for flexibility.

INCREASED FLEXIBILITY

Significant new capital investments are not necessarily required to operate power plants that are more flexible. Low-cost improvements can easily be achieved by changes to operational practices, like better monitoring and control equipment. A range of retrofit options or state-of-the-art technologies can also improve the flexibility of power plants.

Status of Power Plant Transformation 2018, IEA

Lead CEM Members: China, Denmark, Germany, India, Sweden

CEM Member participants: Brazil, Canada, Chile, European Commission, Finland, Italy, Japan, Saudi Arabia, South Africa, United Arab Emirates

Operating agent/coordinator: International Energy Agency (IEA)

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LTES LONG-TERM SCENARIOS FOR THE ENERGY TRANSITION
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Long-term Energy Scenarios for the Clean Energy Transition

Associated with MSWWG and 21CPP

The Long-term Energy Scenarios for the Clean Energy Transition Campaign's objective is to promote wider adoption and improved use of energy planning models and scenarios to help countries accelerate their transition to clean energy.

Long-term energy scenarios and modelling are important tools that can identify options, assess risks, evaluate roles of different energy technologies in energy systems, and help governments adopt the best policies for a cost effective and sustainable transition.

Campaign aim:

Sharing best practices and experiences in the use of energy scenarios for national and regional policy planning.

Showcasing innovative tools and methods for energy scenario modelling that consider the challenges of integrating variable renewable energy sources like solar and wind energy.

Building capacity for clean energy transition planning in countries with limited experience.

RENEWABLES

Renewables provided 23% of power generation worldwide by 2014. Scenarios show that with the rapid adoption of more ambitious plans and policies, this could reach 45% by 2030.

IRENA, Planning for the renewable Future, 2017

Lead CEM Members: Denmark, Germany

CEM Member participants: Brazil, Canada, Chile, Finland, India, Japan, Mexico, Netherlands, United Arab Emirates, United Kingdom

Operating agent/coordinator: International Renewable Energy Agency (IRENA)

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FLEXIBLE NUCLEAR CAMPAIGN
FOR NUCLEAR-RENEWABLES INTEGRATION
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Flexible Nuclear Campaign

Associated with the Nuclear Innovation: Clean Energy Future

The objective of this campaign is to provide an understanding of the economic benefits of advanced nuclear to a wide spectrum of participating countries, including the qualitative and quantitative benefits (e.g. $/MW and $/MWh) of nuclear reactors with highly-flexible power output across a range of select power markets.

The key focus is to model the revenue opportunities for flexible nuclear power stations in various parts of the world and communicate the cost and technical performance requirements back to government stakeholders, as well as to design teams responsible for developing advanced generation IV reactors.

Campaign aim:

Advanced nuclear has the potential to accelerate cost-effective emissions reductions through high-performance hybrid energy systems.
Using future market scenarios to inform the design process of innovative nuclear technologies can insure that they are cost-competitive once market ready.

INCREASED FLEXIBILITY

Developing clean energy economies at a rapid pace and low cost will require a wide variety of energy resources. Nuclear energy in the future can be more flexible with greater capacity to support energy markets' evolving needs and requirements as well as provide new types of value to grids.

Lead CEM Members: Canada, United Kingdom, United States

Operating agent/coordinator: National Renewable Energy Lab (NREL)

NGO partners: Energy for Humanity, Energy Options Network, Third Way

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DISTRIBUTED GENERATION IN STRATEGIC REGIONS
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Accelerating the Adoption of Distributed Generation in Strategic Regions

Associated with the 21CPP, ISGAN, EVI, and CESC

Accelerating the Adoption of Distributed Generation in Strategic Regions Campaign's objective is to increase the deployment of small-scale and on-site clean energy technologies, such as solar panels and wind, that can produce clean electricity close to where it will be used.

Campaign aim:

Support efforts to provide clean, reliable and affordable electricity while also helping countries reach their national clean energy goals and reduce greenhouse gas emissions.

Put in place DG systems facilitates the electrification of rural and remote communities, brings important regional economic benefits and creates local businesses and jobs.

Provide regional workshops and webinars to encourage peer-to-peer exchange on advanced technologies, public policies and regulatory solutions.

DISTRIBUTED GENERATION

In Mexico, distributed generation has increased from 3 kW in 2007 to 62 MW in 2014, and has the potential to increase to 2.2GW by 2028 with solar PV, wind and small hydro being the main sources.

Energy Secretariat of Mexico, 2015

Lead CEM Member: Mexico*

CEM Members participants: Brazil, Chile, Denmark, Germany, India

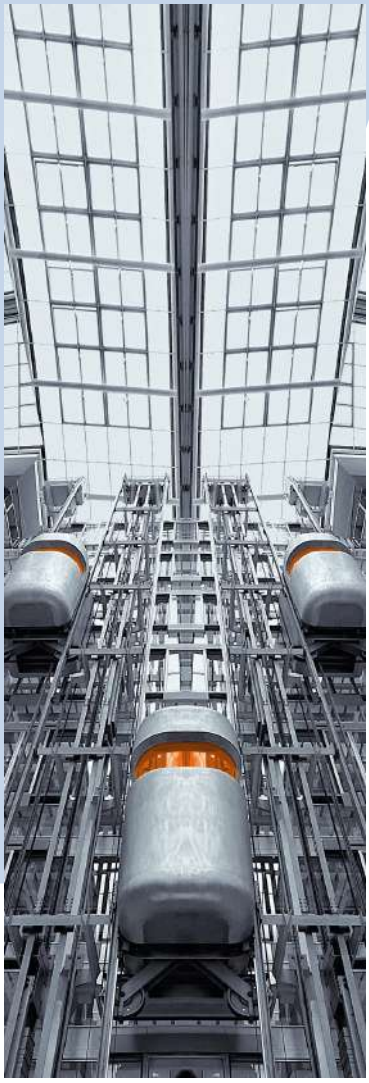
Operating agent/coordinator: National Renewable Energy Lab (NREL)

*Participation and Leadership are under review

ENERGY DEMAND

Current Initiatives and Campaigns


240V~
110V~

FUJITSU


Electric Vehicles Initiative (EVI)

The Electric Vehicles Initiative's (EVI) objective is to accelerate the use of electric vehicles worldwide. EVI provides a forum where governments work collaboratively to design and implement the best policies and programs to support rapid deployment of electric vehicles.

Electric vehicles are one of the most energy efficient and clean forms of transportation. EVI's ambition is to put 20 million electric passanger vehicles on the road worldwide by 2020.

Key actions:

- **Leading a network** of cities to share experiences and lessons learned from early EV deployment through the EVI Pilot Cities Programme.
- **Sharing information** to ensure the most crucial global gaps in vehicle technology development are being addressed.
- **Engaging private sector stakeholders** to better align expectations, discuss the respective roles of industry and government, and focus on the benefits of continued investment in electric vehicles.

Lead CEM Members: Canada, China,

CEM Member participants: Chile, Finland, France, Germany, India, Japan, Mexico*, Netherlands, Norway, Sweden, United Kingdom

Observers: South Africa

Non-CEM Member participants: Portugal, New Zealand**

Operating agent/coordinator: International Energy Agency (IEA)

Success stories

Countries who are part of the EVI are leading by example through ambitious EV policies and programmes:

- **China** reached over **150,000 electric buses** and **200 million electric two-wheelers.**
- **Germany** boosted EV incentives by over **€1 billion.**
- **India** announced a **goal for a 100% electric fleet** by 2030.
- In **Norway** and the **Netherlands**, **all passenger vehicles** purchased from 2025 **will be electric.**

A NEW RECORD

Over one million electric cars were sold in 2017 – a new record – with more than half of global sales in China. The total number of electric cars on the road surpassed three million worldwide, an increase of over 50% from 2016.

Global EV Outlook 2018, IEA

*Participation and Leadership are under review
** New Zealand is a CEM Observer country

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ENERGY MANAGEMENT WORKING GROUP
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Energy Management Working Group (EMWG)

The Energy Management Working Group's (EMWG) objective is to increase the energy efficiency of the industrial and commercial building sectors worldwide by accelerating the broad use of energy management tools, such as the ISO 50001 international standard, to help them make the best efficiency decisions possible.

EMWG is improving energy efficiency by demonstrating the business value of implementing energy management systems.

Key actions:

- **Recognising** private sector leaders who successfully use energy management systems and highlight the business case for it.
- **Developing resources** to provide key information and analysis as well as guidance to help businesses and industry adopt energy management systems.
- **Advocacy** to demonstrate energy management is a key energy efficiency strategy to optimise energy use in the industrial and commercial buildings sectors.

Lead CEM Members: Canada

CEM Member participants: Australia, Chile, China, Denmark, European Commission, Germany, India, Indonesia, Japan, Korea, Mexico*, Saudi Arabia, South Africa, United Arab Emirates, United States*

Operating agent/coordinator: United Nations Industrial Development Organization (UNIDO)

Success stories

EMWG's Energy Management Leadership Awards recognised 37 organisations with sites across 21 countries and 19 sectors in 2017, and 35 organisations across 20 countries and 23 sectors in 2016. Such awards push organisations to improve and showcase their efforts on energy management.

EMWG's pilot programmes and case studies are demonstrating the business value of implementing energy management systems. Facilities in the United States, Australia, and Canada have shown energy performance improvements of 10% or more.

ENHANCED ENERGY SAVINGS

While the culture change needed for ISO 50001 to succeed ultimately depends on individual organisations, enabling public policies can make implementation more effective and help ensure energy savings are achieved and sustained over time.

Predicting the Quantifiable Impact of ISO 50001 on Climate Change Mitigation, Lawrence Berkeley National Laboratory, 2017

*Participation and Leadership are under review

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SEAD SUPER-EFFICIENT EQUIPMENT & APPLIANCE DEPLOYMENT
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Super-efficient Equipment and Appliance Deployment (SEAD)

The Super-efficient Equipment and Appliance Deployment (SEAD) initiative's objective is to save energy by encouraging the production and use of energy efficient equipment and appliances, and by helping governments adopt the right policies and programs to do so.

SEAD contributes to reducing energy demand and carbon emissions while lowering energy costs for consumers and businesses worldwide.

Key actions:

- **Technical expertise and training** to test and identify products that will save energy as well as develop workshops and webinars on program design, implementation, and evaluation.
- **Dialogue and collaboration** amongst government, industry, and civil society to share best practices and transform this knowledge into concrete actions, such as expanding standards and labelling programs.
- **Research and analysis** to provide knowledge on products and markets and help formulate impactful policies.

Success stories

SEAD delivered a training workshop in Canada to facilitate the potential acquisition of more than 100,000 high quality and affordable light-emitting diode (LED) street lighting products.

SEAD developed a mobile app to allow consumers to compare labelled products and make more energy-efficient purchases in collaboration with **India**'s Bureau of Energy Efficiency (BEE).

As a direct result of cooperative work through SEAD, **India** became the first country in the world to adopt quality and performance standards for LEDs. This could avoid 254 million metric tonnes of CO_2 emissions between 2015 and 2030, which is the equivalent of removing 90 coal-fired power plants.

USING LESS ENERGY

With stronger policies in place, in 2018 the world could have saved more than 2.2 million barrels of oil per day if all countries had adopted the best passenger fuel economy standards and $20 billion if everyone had purchased the top 10% most efficient refrigerators.

International Energy Agency
https://www.iea.org/efficiency2018/

Lead CEM Members: European Commission, India, United Kingdom

CEM Member participants: Australia, Brazil, Canada, Chile, China, Germany, Indonesia, Korea, Mexico*, Russia, Saudi Arabia, South Africa, Sweden, United Arab Emirates, United States

Non-CEM Member participant: Argentina

Operating agents/coordinators: International Energy Agency (IEA)

*Participation and Leadership are under review

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SUSTAINABLE CITIES ECO-ENERGY TOWNS
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Sustainable Cities and Eco-energy towns Initiative

The Sustainable Cities and Eco-energy towns Initiative's objective is to transform towns, cities and rural areas into greener, energy efficient and sustainable communities, where everyone has access to reliable and affordable energy.

To achieve this, global action and increased cooperation between national and local governments is essential, as is identifying collaboration opportunities with global organisations such as the C40 Cities Climate Leadership Group.

The Sustainable Cities and Eco-energy towns Initiative provides a platform to facilitate this dialogue as well as the exchange of knowledge, experience and best practices among cities and towns.

Key actions:

- **Benchmarking and identification of best practices** related to the issue of sustainable development of cities from all over the world.
- **Engaging stakeholders** through workshops and international forums.
- **Targeted promotion** to increase awareness of sustainable cities development and the Eco-energy Town model.

Success stories

Th initiative, in collaboration with UN Environment, is studying how the Eco-energy Town model can stimulate local economies, and protect the air and water, all while using waste-to-energy technology. This study will contribute to the development of step-by-step guidelines to help local government set up eco-towns in their countries.

Since 2017, **Korea** has shared its Eco-energy Town model and expertise to help put in place eco-energy projects in Mongolia and Ethiopia.

Lead CEM Members: Korea, Russia

CEM Member participants: China, Mexico*, Saudi Arabia, United Arab Emirates

Operating agent/coordinator: Korea Energy Economics Institute (interim)

CITIES' LEADERSHIP ROLE

In terms of size, cities occupy only two percent of the world's landmass but they leave an enormous footprint in terms of climate impact. Cities consume over two-thirds of the world's energy and account for more than 70% of global CO_2 emissions. As part of the climate change problem, cities have the opportunity to be an integral part of its solution.

C40 Cities, www.c40.org/why_cities , 2018

*Participation and Leadership are under review

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CARBON CAPTURE, UTILIZATION & STORAGE
ACCELERATING CCUS TOGETHER
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Carbon Capture, Utilization, and Storage Initiative (CCUS)

The Carbon Capture, Utilization, and Storage Initiative's (CCUS) objective is to accelerate the deployment of technologies that can capture CO_2 to either reuse or store it so it will not enter the atmosphere.

By adopting the right policies and fostering greater international collaboration, the CCUS initiative will help reduce greenhouse gas emissions from fossil-fuelled power plants and heavy industry, contribute to energy security, and play an important role in the transition to a clean energy future.

Key actions:

- Focus on **strengthening collaborative partnerships** between the public and private sectors, and creating the right conditions so investments in CCUS could increase.
- Consider ways to **accelerate the global deployment of CCUS**, lowering its cost, increasing the commercialisation of products derived from the captured CO_2, and making CCUS more competitive.

CCUS'S UNTAPPED POTENTIAL

With only two large-scale CCUS power projects in operation at the end of 2017, with a combined capture capacity of 2.4 million tonnes of CO_2 per year, CCUS remains well off track to reach the SDS target of 350 million tonnes per year by 2030.

Tracking Clean Energy Progress – CCUS in Power, http://www.iea.org/tcep/power/ccs/ , IEA, 2018

Lead CEM Members: Norway, Saudi Arabia, United Kingdom, United States

CEM Member participants: Canada, China, India, Japan, Mexico, Netherlands, South Africa, United Arab Emirates

Operating agent/coordinator: IEA Greenhouse Gas R&D Programme (IEAGHG), Mr Juho Lipponen

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HYDROGEN INITIATIVE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Hydrogen initiative

The Hydrogen initiative's objective is to advance commercial scale hydrogen and fuel cell related deployment globally, across all sectors of the economy, via policies, programmes and projects.

It will aim to address barriers and identify opportunities for hydrogen in the global transformation to a clean, affordable and reliable energy sector looking at the global supply chains of this new energy vector.

Key actions:

- Establishment of global targets for clean hydrogen production and use.
- Focused working groups led by member countries to coordinate global action on themes such as: clean hydrogen production and distribution, transportation, industry and finance.
- Explore the role of hydrogen in meeting the energy needs of communities.
- Analysis and global review on the progress of hydrogen deployment and development of global supply chains.

Led by member governments, the initiative aims to enable strategic global cooperation among key global partnerships on hydrogen. While the Mission Innovation Challenge and the IEA TCPs focus on R&D and IPHE on regulations, codes and standards, the CEM Hydrogen initiative focuses on policies, programmes and projects to enable full commercialisation of hydrogen.

Lead CEM Members: Canada, European Commission, Japan, Netherlands, United States

CEM Member participants: India, Korea, Norway, Saudi Arabia, New Zealand

Expressions of interest: China, South Africa

Non-CEM Member participants: Austria, Costa Rica

Operating agent/coordinator: International Energy Agency

HYDROGEN'S POTENTIAL

Hydrogen can help tackle various critical energy challenges, including storing the variable output from renewables like solar PV and wind to better match demand. It also offers ways to decarbonise a range of sectors (long-haul transport, chemicals, iron and steel).

The Future of Hydrogen report, IEA, June 2019

EV30@30 Campaign

Associated with EVI

The EV30@30 campaign's objective is to speed up the deployment of electric vehicles with a target of at least 30% new electric vehicles collective new sales by 2030 in participating countries.

The campaign supports the market deployment of electric passenger cars, light commercial vans, buses and trucks (including battery-electric, plug-in hybrid, and fuel cell vehicle types). It also works toward the deployment of charging infrastructure to supply sufficient power to the vehicles deployed.

Campaign aim:

The EV30@30 campaign promotes a shift to electric mobility to lower greenhouse gas emissions, achieve climate goals and reduce air pollution, especially in urban areas where air pollution is becoming a major public health concern.

The governments and businesses participating in the campaign commit to the electrification of their vehicle fleets, building on the progress reached with the EVI Government Fleet Declaration.

It also seeks to expand research on the scale up of EV deployment, including such topics as policy efficacy, barriers to adoption, electrification of public transportation, grid integration and load management, and synergies with automated, connected and shared vehicles.

It will also establish a Global EV Pilot City programme to reach 100 electric vehicle-friendly cities around the world over five years.

RECORD SALES

Over one million electric cars were sold in 2017 – a new record – with more than half of global sales in China. The total number of electric cars on the road surpassed three million worldwide, an expansion of over 50% from 2016.

Global EV Outlook 2018 – IEA, 2018

Lead CEM Members: Canada, China

CEM Member participants: Finland, France, India, Japan, Mexico, Netherlands, Norway, Sweden

Operating agents/coordinators: International Energy Agency (IEA), Shanghai International Automobile City Group

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AC ADVANCED COOLING CHALLENGE
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Advanced Cooling Challenge (ACC)

Associated with SEAD

The Advanced Cooling Challenge's (ACC) objective is to urge governments, industry and civil society to make, sell, promote and install super-efficient, climate friendly and affordable cooling technologies.

Campaign aim:

Install high efficiency, smart, and climate friendly cooling equipment.

Implement policies to stimulate demand such as energy efficiency labelling and promotion efforts.

Support capacity-building programs to put in place policies to transform air conditioning markets.

Research and develop next-generation super-efficient cooling technologies and rapidly make them available worldwide at affordable prices.

Invest in research for breakthrough cooling solutions and participate in an AC prize design competition.

Contribute to the development of a Global AC Market Tracking Tool.

Become a member of the Advanced Cooling Buyer's Club to demonstrate market demand for super-efficient cooling technologies.

> Setting higher efficiency standards for cooling is one of the easiest steps governments can take to reduce the need for new power plants, cut emissions and reduce costs at the same time.

Dr Fatih Birol
Executive Director,
International Energy Agency.

Lead CEM Members: India

CEM Member participants: Canada, Chile, China, Mexico, Saudi Arabia, United States

Operating agents/coordinators: CLASP, Lawrence Berkeley National Laboratory (technical support), International Energy Agency (technical support)

Energy demand

*Participation and Leadership are under review

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ENERGY MANAGEMENT CAMPAIGN
A DRIVE TO 50,001 ENERGY-SAVING PARTNERS
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Energy Management Campaign

Associated with EMWG

The Energy Management Campaign's objective is to promote the ISO 50001 international energy management system standard and reach 50,001 global certifications by 2020.

The Energy Management Campaign's goal is to accelerate the clean energy transformation through increased international adoption and implementation of ISO 50001. By adhering to the ISO 50001 standard, both public and private sector organisations enhance their energy efficiency, reduce environmental impact and improve competitiveness.

Campaign aim:

Governments, companies, and development organisations can join the campaign by:

- Edorsing key principles for quality implementation of ISO 50001 standards;
- Pledging concrete actions to promote uptake of the standard and principles
- Committing to international technical exchange
- Recognising leadership through the CEM Energy Management Leadership Awards
- Tracking and sharing progress on uptake of the standard

CONCRETE MEASUREMENTS

The latest ISO survey (2016) reports a total of 20,216 valid certificates for ISO 50001 worldwide, up 69% from the previous year.

ISO Survey of Management System Standard Certifications 2016, International Organization for Standardization, 2017

Lead CEM Members: Canada

CEM Member participants: Chile, China, Denmark, European Commission, Germany, India, Indonesia, Italy, Japan, Korea, Mexico*, Russia, Saudi Arabia, South Africa, United Arab Emirates, United States

Operating agent/coordinator: United Nations Industrial Development Organisation (UNIDO)

*Participation and Leadership are under review

CROSSCUTTING SUPPORT

Current Initiatives and Campaigns


INVOICE

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CLEAN ENERGY INVESTMENT AND FINANCE
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Clean Energy Investment and Finance Initiative (CEM IF)

The Clean Energy Investment and Finance Initiative's objective is to help energy ministers of CEM countries develop energy policies and enable regulatory frameworks conducive to mobilising investments and financing in the clean energy sector at scale, particularly from private sources.

It aims to create a unique partnership, bringing together energy ministries, other government agencies, the private sector, public and commercial financial institutions, and investors committed to accelerating the transition to a clean energy future.

Key actions:

- **Creating a forum for peer-to-peer exchange** of best practices across the clean energy investment and finance value chain and providing opportunities for policy makers, public financial institutions and state-owned enterprises to engage with investors and the private sector on integrating clean energy goals.
- **Providing analysis** of investment and financing trends in the clean energy sector and creating benchmarks and tools to support policy design and investment facilitation.
- **Providing technical cooperation** and helping CEM countries get support from a broad range of partners for policy design, technical assistance and capacity building.

ENERGY POLICIES THAT INFLUENCE INVESTMENT IN CLEAN ENERGY

Government policies are playing a growing role in driving private spending. Across all power sector investments, more than 95% is now based on regulation or contracts for remuneration.

World Energy Investments 2018, IEA

Lead CEM Members: Denmark, Germany

CEM Member participants: Brazil, Canada, European Commission, Mexico*, Netherlands, United Kingdom

Operating agent/coordinator: International Energy Agency (IEA)

*Participation and Leadership are under review

CEM Initiative

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C3E INTERNATIONAL
ADVANCING GENDER EQUALITY TOGETHER
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Clean Energy Education and Empowerment (C3E)

The Clean Energy Education and Empowerment (C3E) initiative's objective is to increase gender diversity in the energy sector, recognising that the ideas and talents of all members of society are essential to meeting our future clean energy challenges.

C3E aims to use the CEM's Ministerial platform and annual activities to help close the gender gap in the energy sector, create opportunities to increase women's participation in clean energy professions, and bring fresh perspectives to the clean energy arena.

Key actions:

- **Awards and recognition:** celebrates women who have demonstrated outstanding leadership and accomplishments in clean energy**.**
- **Data and benchmarking**: working with participants to collect consistent, reliable data and develop indicators to measure progress.
- **Career development and mentorship**: promotes learning opportunities for women in the clean energy sector to prepare them for leadership positions.
- **International collaboration and dialogue**: brings together governments from around the globe to support women in clean energy.

Success stories

International Ambassador Corps: C3E has established a global group of over 60 women in the energy sector who have demonstrated an exceptional commitment to the energy sector. The purpose of the ambassador corps is to mentor other women, demonstrate the advantages of gender balance in the clean energy sector, build partnerships and promote the initiative.

THRIVING ECONOMIES AND SOCIETIES

Gender parity is fundamental to whether and how economies and societies thrive. Ensuring the healthy development and appropriate use of half of the world's total talent pool has a vast bearing on the growth, competitiveness and future-readiness of economies and businesses worldwide.

Global Gender Gap Report 2017, World Economic Forum, 2017

Lead CEM Members: Canada, Sweden

CEM Member participants: Australia, Chile, European Commission, Finland, Italy,Saudi Arabia, United States

Expressions of interest: India, Japan, Mexico,South Africa, United Arab Emirates

Non-CEM Member participants: Austria, Czech Republic

Operating agent/coordinator: International Energy Agency (IEA)

Crosscutting support

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CLEAN ENERGY SOLUTIONS CENTER
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Clean Energy Solutions Center (CESC)

The Clean Energy Solutions Center's (CESC) objective is to provide policy makers with free resources and advice on clean energy policies, regulation, and financing mechanisms.

By improving the design of policy and regulatory frameworks, CESC can help governments reach their clean energy and development objectives more quickly and cost-effectively.

It also provides a prominent international platform for CEM members to share their experiences, best practices and lessons learned with each other and with other governments and regions.

Key actions:

- **Expert assistance** – CESC includes a successful Ask-an-Expert service which policy makers can use to request reliable and unbiased advice from a global network of energy experts.
- **Web-based training and peer learning** – CESC offers high-quality webinars and training on clean energy issues, tools, technologies and finance instruments, all at no cost to participants.
- **Resource library** – CESC features an extensive online library of over 3000 clean energy resources.

Success stories

CESC helped the Municipality of eThekwini in South Africa evaluate the cost effectiveness of different options – such as stand-alone solar home systems and mini-grids – to provide electrical service to approximately 500,000 inhabitants in the surrounding communities that remain unconnected to the city's electricity and water infrastructure.

OVER 430 REQUESTS

CESC has responded to over 430 requests related to energy efficiency, grid integration, renewable energy, finance, energy access, and clean transport from over 90 countries and organisations.

www.cleanerngysolutions.org , 2018

Lead CEM Members: Australia, United States*

CEM Member participants: Canada, China, France, India, Indonesia, Italy, Mexico*, Sweden, United Arab Emirates

Operating agent/coordinator: National Renewable Energy Laboratory (NREL)

*Participation and Leadership are under review

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EQUAL by 30 GENDER EQUALITY IN THE CLEAN ENERGY SECTOR
A CAMPAIGN OF THE CLEAN ENERGY MINISTERIAL

Equal By 30 Campaign

Associated with the C3E initiative

The Equal by 30 campaign is aiming to close the gender gap in the energy sector by encouraging public and private sector organisations to work towards equal pay, equal leadership and equal opportunities for women in the energy sector by 2030.

This CEM campaign contributes to the UN Sustainable Development Goal 5, under which world leaders pledged to achieve gender equality and empower women and girls by 2030, and puts gender equality at the heart of the transition towards a clean energy future.

Campaign aim:

To generate momentum for gender equality by asking governments and companies to endorse a common set of principles and take concrete action to accelerate the participation of women in the clean energy sector.

To ensure Equal by 30 has global reach and bring examples of best practices and actions taken to the attention of Ministers at the annual CEM ministerial meetings.

> Without doubt, a greater predominance of women in the sector requires a structured, long-term plan, with education at its heart. We have to encourage women to build their careers in the STEM disciplines, fighting off the prejudices they face. Only through a cultural and educational shift will we be able to achieve equal rights, not only in the energy sector, but across the whole economy and society.

Patrizia Grieco
Chairman of ENEL

Lead CEM Members: Canada, Sweden

Participating CEM Members: Finland, France, Germany, Italy, Japan, Norway, United Kingdom, United States

Operating agent/coordinator: Ms Annette Hollas from Natural Resources Canada (NRCan)

CEM by results

7 All seven countries from the G7 (Group of 7) have signed up to the Equalby30 Campaign, aiming for equal pay, equal leadership and equal opportunities for women in the clean energy sector by 2030

25 billion metric tonnes is the potential savings of CO_2 if all air conditioners sold in 2030 had a 30% increase in efficiency compared with today's models (through the Advanced Cooling Challenge).

130 companies have committed to switching to 100% of renewable energy when they joined the CEM's Corporate Sourcing of Renewables Campaign and its partners' initiatives. Through this campaign, led by IRENA, 75 countries sourced clean energy from renewable sources.

60 women in the clean energy sector make up the CEM's International Ambassador Corps to mentor women and promote the C3E initiative.

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50 international experts are available at the Clean Energy Solutions Center, ready to provide no-cost advice and share policy knowledge.

6,500 million tonnes of CO_2 is the potential savings of CO_2 emissions if 50% of global industrial and service sectors implemented the ISO50001 standard in energy management by 2030 (through the EMWG).

14 billion of cumulative sales of high-efficiency, high quality and affordable lighting products means we have surpassed our objective by four billion and counting.

1,000 terrawat hours per year is the savings that could be achieved by appliance efficiency standards by 2030 (through SEAD).

Over **1.4** billion of investment commitments have been raised by the Advance Cooling Challenge towards developing and deploying energy-efficient air conditioners that use low global warming potential refrigerants.

CEM Secretariat

How to get involved

To learn more about the work of the CEM or to join a specific Initiative or Campaign, please contact the **Secretariat@CEMSecretariat.org**.

CEM Secretariat

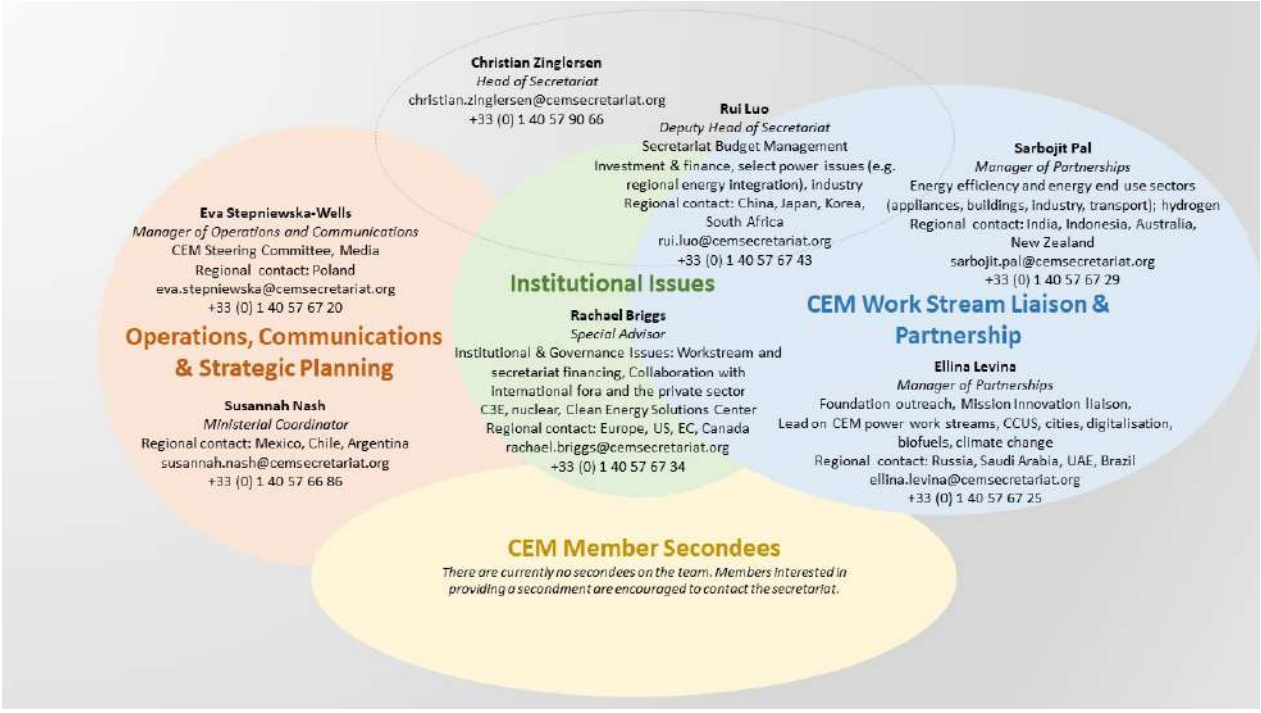
At the sixth Ministerial meeting in 2015, the decision was made to move towards the creation of a Secretariat to support and facilitate the work of the CEM. The Secretariat started its operations in 2017 and is housed by the International Energy Agency in Paris, France.

The Secretariat

- Increasing the impact of CEM Initiatives and Campaigns.
- Ensuring CEM Members benefit from CEM's collaborative model.
- Facilitating diversified funding sources and new technical partnerships for workstreams.
- Managing the institutional requirements of the CEM.
- Communicating CEM's collective results.
- Supporting Ministerial and operational activities of the CEM.

The Secretariat works closely with the CEM's Sherpas Group as well as with the Steering Committee, which provides year-round guidance on the activities of the CEM's initiatives and campaigns.

The CEM Secretariat includes a range of nationalities: British, Chinese, Danish, Indian, Polish, and Russian/American, reflecting the diverse membership of the CEM.



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