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International
Energy Agency

Clean Energy Transitions Programme

Annual report 2019

Abstract

Since the launch of the Clean Energy Transitions Programme (CETP) in November 2017, the IEA has significantly expanded its work to help accelerate energy transitions in major emerging economies. The CETP has played a critical role in both helping to build global momentum for clean energy transitions and in further strengthening the IEA family.

The CETP Annual Report 2019 summarises the programme's activities in 2019, highlighting major achievements, successes and outcomes, as well as identifying opportunities for further collaboration with partners and potential partners. It also highlights activities planned for 2020.

The report reflects on the first two years of the CETP and highlights ideas and techniques to achieve even greater progress. The report initially provides an overview of the CETP's activities, including working methods and results, then presents activities and achievements for each priority country (Brazil, the People's Republic of China, India, Indonesia, Mexico and South Africa); priority regions (Africa, Latin America and Southeast Asia); and globally.

Message from the Executive Director

2020 is the “Year of Clean Energy Transitions” at the IEA.

While there is no single or simple solution to accelerating clean energy transitions and solving our shared climate challenge, we are seeing some signs of progress. Global energy-related CO₂ emissions flattened in 2019, showing that clean energy transitions are bearing fruit. And the benefits of transitions are not only in reducing climate and air pollution, but transitions – done based on solid data and rigorous analysis – can also help provide more affordable and secure energy for all the world’s citizens.

We now need to redouble all our efforts to make sure that 2019 is remembered as a definitive peak in global emissions and not just another temporary pause. With its credible, independent approach and on-the-ground impact in key emerging economies, the CETP is a critical part of IEA’s overall transition efforts.

Most recently, the impact of the coronavirus is turning into an unprecedented international crisis and dominating global attention. As governments respond to the interlinked crises of climate change and the coronavirus, including with robust stimulus packages, the CETP can further help to ensure that the essential task of building a secure and sustainable energy future is only strengthened further.

Here are just a few of the CETP’s 2019 successes. We supported cutting-edge analysis to integrate higher shares of renewables in the People’s Republic of China – a power system currently accounting for one-fifth of all global carbon emissions. We outlined a series of policy interventions that can reduce regional energy use for cooling by half in Southeast Asia. We are helping the Brazilian government to better track and promote clean energy innovations. We trained key government officials from around the world – including in Africa – to better leverage efficiency opportunities. And we supported the Indian government in developing an integrated approach to climate change, energy access and air pollution. These concrete results – and many more – are detailed in full in this report.

After two years of the CETP, the trust and relationships with our partner countries have grown substantially. Leveraging world-class expertise from across the IEA, the CETP is helping our partner countries to tackle their most challenging energy transitions obstacles – providing actionable, practical solutions and steering away from “one-size-fits-all” remedies. And with global energy demand set to rise by 1.3% each year to 2040, independent cutting-edge support to governments whose energy policies will significantly influence the ambition and pace of global transitions will become even more vital.

There are also a wide range of benefits of the CETP for all IEA family members, notably through improved availability of global energy data and statistics, deepened multilateral relationships with all the world's leading countries, and greater sharing of lessons on a global scale. Our partner countries are leveraging the IEA's expertise while simultaneously learning from each other and from all our member countries. 2019 has exemplified the community of trust and mutual benefit built through the IEA family, which now encompasses 75% of global energy demand.

The [communiqué](#) from the [2019 IEA Ministerial Meeting](#) underlined the role of “energy transitions as crucial for a secure, affordable and sustainable energy future”. It acknowledged that “gaps remain between stated national ambitions and real-world trends” and looked to the IEA to play “a central role in providing policy-relevant analysis to help countries build sustainable energy systems”. Our ministers welcomed the success of the first two years of the CETP and instructed the Secretariat “to further strengthen its work in this area to support decision-makers on how to accelerate low-emission solutions and promote clean, sustainable, affordable, resilient and safe energy technologies for reaching both near- and long-term objectives”.

As part of IEA efforts to bridge the gap between climate goals and energy realities, we are planning to host a Clean Energy Transitions Summit on 9 July 2020 in Paris. This ministerial-level event will bring together key actors (including ministers, CEOs and investors) with a specific focus on concrete actions to reverse the growth in emissions of the last decade. The CETP will be a critical part of helping us to build an ambitious, real-world “grand coalition” of all actors committed to tackling climate change.

My deep thanks and gratitude go to the United Kingdom, Italy, Sweden, the European Commission, Denmark, the Netherlands, the Agence Française de Développement (AFD), Germany, Switzerland, Canada, Japan, Finland, New Zealand and Australia for their trust, support and continually ambitious steer on the CETP. I would also like to express my appreciation to David Turk, the Acting Deputy Executive Director of the IEA, for his enthusiastic leadership that has transformed the CETP from an initial idea into the reality it is today.

Finally, as much success as the CETP has had in its first two years, it has even greater potential going forward. In this critical year of 2020 and beyond, we look forward to the CETP helping our priority countries to achieve their own clean energy transition goals, to ensure the benefits of the CETP reach all of the IEA family, and to take full advantage of the “Year of Clean Energy Transitions” at the IEA.

Dr Fatih Birol

Executive Director

International Energy Agency

Acknowledgements, contributors and credits

The CETP is made possible by the collaboration and partnership of our priority countries and regions, as well as the support and leadership of IEA member governments and other partners – the United Kingdom, Italy, Sweden, the European Commission, Denmark, the Netherlands, the Agence Française de Développement (AFD), Germany, Switzerland, Canada, Japan, Finland, New Zealand and Australia. Our gratitude to them for their support and belief in the CETP.

The CETP Annual Report 2019 was prepared by the programme's co-ordination team (César Arreola, Emi Bertoli, Blandine Barreau and Jane Barbière) within the Strategic Initiatives Office, led by Dave Turk. Inputs were provided by colleagues throughout the IEA; the CETP co-ordination team would like to thank all work stream heads and their respective teams for their leadership: Nick Johnstone and Mafalda Silva (data and statistics); Brian Motherway and Mel Slade (energy efficiency); Paolo Frankl and Edwin Haesen (electricity); Laura Cozzi and Sara Moarif (policy advice and modelling); Timur Gül (sectoral work); Simone Landolina and Simon Bennett (innovation); Brian Motherway and Kathleen Gaffney (digitalisation); and Rebecca Gaghen and Masatoshi Sugiura (global relations).

The IEA's leadership continues to guide and support the CETP – Fatih Birol (Executive Director); Paul Simons (former Deputy Executive Director); Keisuke Sadamori (Director of Energy Security and Markets); Mechthild Worsdorfer (Director of Sustainability, Technology and Outlooks); and Claire Bouteille (Chief Management Officer). Special thanks are also due to colleagues in IEA Corporate Services who have provided invaluable support to the CETP, notably, Jeremy Lagelee (Office of the Legal Counsel), Yvonne Ozoux (Financial Administration), Fleur Grimaud (Human Resources) and Donna-Jean Nicholson (Communications and Digital Office).

Thanks also go to Astrid Dumond, Therese Walsh, and Clara Vallois of the IEA Communication and Digital Office for their help in producing the report. Justin French-Brooks carried editorial responsibility.

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Executive summary

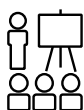
2019 CETP Highlights



41% Proportion of global CO₂ emissions from fuel combustion emitted by CETP priority countries



36 Exchanges with ministers and high-level officials
96 Technical exchanges in CETP priority countries



15 Capacity-building events
1 709 Participants trained



41 Reports produced or enhanced



7.2 CETP 2019 budget (in EUR millions)¹

CETP progress in 2019

In our second year, we significantly expanded support to key decision-makers in major emerging countries

The first two years of the Clean Energy Transitions Programme (CETP) have enabled the IEA to serve its mission more effectively than ever – working with major emerging economies to tackle their greatest obstacles to a clean energy future. 2019 saw us intensify our activities across our priority countries and regions, and in each of our six work streams (including the creation of a seventh).

As a result of the CETP's activities during the year, we held 36 in-person discussions with government ministers and high-level officials on important energy topics. This enables us to influence the direction and speed of energy transitions in the most significant emerging economies.

¹ These figures are estimated projections and are provided for information purposes only. Formal financial reports will continue to be provided in established and agreed formats to member countries via the Committee on Budget and Expenditure and to individual donors via financial reports.



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High-level engagements during the 2019 IEA Ministerial Meeting

As most clean energy transitions require harnessing a mix of already available technologies, we recognise that it is essential to share our knowledge and expertise as widely as possible. In 2019 we held 15 capacity-building events across the world, through projects co-ordinated by the CETP and led by IEA teams. Our combination of events and online resources trained over 1 709 participants in key aspects of successful energy transitions.



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Selected high-level meetings and exchanges during 2019

We cannot be successful unless we listen to and learn from our partner countries. To ensure creative and successful collaboration, we actively engage in deep and sustained partnerships with representatives from governments, regional bodies and other decision makers. This information enhances IEA reports – 41 published or contributed to in 2019 alone. Moreover, our seven co-ordinators on the ground in target countries ensure that our engagement is as beneficial as possible to everyone involved.



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Selected IEA analysis produced with priority countries and regions in 2019

It is our remit to bridge the gap between policy makers' ambitions for sustainable energy systems and the current reality. We are doing this by bringing ever closer together the IEA's world-leading energy experts and key decision-makers in our partner countries. This is how the CETP will continue to drive progress towards a clean energy future.

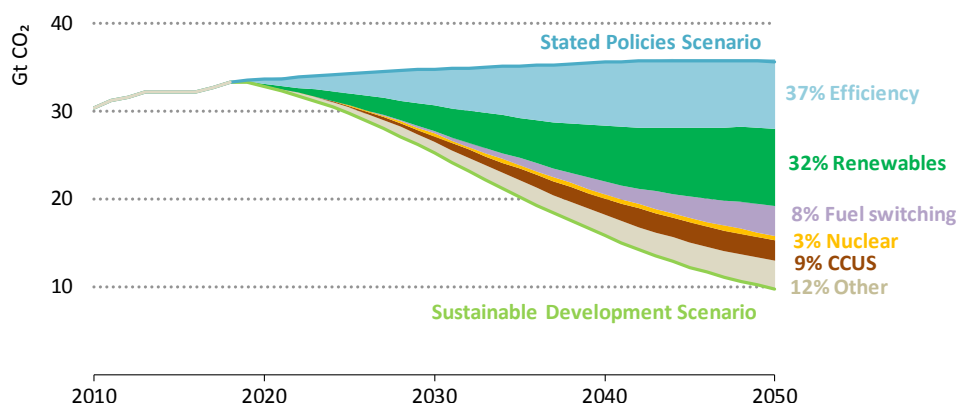
Origin of the CETP

Our mission is to accelerate the transition to clean energy in major emerging economies

The CETP was launched at the IEA Ministerial Meeting in 2017 to provide independent and cutting-edge technical support to governments whose energy policies will significantly influence the global transition towards a sustainable energy future.

The CETP's priority countries are Brazil, the People's Republic of China (hereafter, "China"), India, Indonesia, Mexico and South Africa – economies that collectively accounted for 41% of CO₂ emissions from fuel combustion in 2018 and two-thirds of emissions from developing economies. Our target regions are Africa, Latin America and Southeast Asia.

CO₂ emission reductions in the Sustainable Development Scenario relative to the Stated Policies Scenario and related technologies



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Source: IEA (2019), *World Energy Outlook 2019*.

These are the countries and regions where the programme can have the greatest impact on progress towards achieving globally-relevant outcomes: reducing energy-related carbon emissions and air pollution, while promoting affordable and secure access to energy services.

The CETP achieved many on-the-ground successes in each of its six work streams in 2019:

- data and statistics
- energy efficiency
- electricity
- policy advice and modelling
- sectoral work
- innovation.

We have a robust programme of planned work for 2020 in all six work streams as well as a new seventh work stream – digitalisation.

The CETP works across the entire IEA organisation, co-ordinating a number of interrelated projects and cross-sectoral initiatives that are then led by different IEA divisions and units with our target countries.

Under the CETP, our engagements are established on well-founded partnerships with governments, regional organisations and other key actors. We also rely on our close relationship with other organisations to achieve our goals, in particular in-kind support from partner institutions and local agencies when organising training events, workshops and discussions with stakeholders.

In the following paragraphs we present a cross-section of our successes during 2019.

Brazil

Co-operation with Brazil on energy efficiency reached new levels in 2019

Our activities with Brazil were broader and deeper than ever in 2019. In particular, work on data and statistics, energy efficiency and energy innovation took off.

Reliable, accurate and timely data are essential to developing meaningful energy policy. The IEA continued working with Brazil to improve and consolidate the country's energy data and statistics. Working with Brazilian officials, our focus has been to further understand their current data collection and reporting methodologies and support the development of energy efficiency indicators.

2019 was a year of firsts for co-operation on energy efficiency with Brazil.

Notably, Brazil became the first country in South America to fill out the IEA's energy efficiency data questionnaire. As a consequence, the IEA included Brazil in the annual energy efficiency statistical report for the first time.

Our sustained work led to us co-authoring an international benchmarking exercise on energy efficiency in Brazil, published in January 2020. We also launched the IEA online course on energy efficiency indicators in Portuguese, enabling it to reach a wider audience in Brazil.



EPE/IEA 2019.

Atlas of Energy Efficiency Brazil 2019

We also deepened our analytical co-operation with Brazil. Under the Energy Big Push project, we worked with the country to improve public R&D spending data collection and map the country's energy innovation landscape, to stimulate innovation activities and investment in low-carbon energy sources.

As well as spending time on the ground in Brazil, we also welcomed representatives from a range of Brazilian institutions to events at the IEA in Paris, including the annual energy efficiency policy training week and the workshop on benchmarking energy efficiency indicators.

China

Cutting-edge analysis is helping to integrate higher shares of renewables in China

The IEA's relationship with China went from strength to strength in 2019, with CETP projects making a significant contribution. We shared global insights on the energy transition with policy makers from China's key ministries, and gained a better appreciation of the systemic sustainability considerations China faces. We were then able to jointly tackle the challenges of successfully upgrading and optimising China's energy system, including power market reform.

The IEA China Power System Transformation report was an important achievement in 2019. It summarises the state of play of power system transformation in China and internationally, and presents tailored analytical output using the findings of a detailed power sector modelling exercise for China. We presented the report to high-level representatives at the China Power System Transformation Workshop in Beijing.



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China Power System Transformation (in Chinese and English): Assessing the Benefit of Optimised Operations and Advanced Flexibility Options

This publication has sparked new initiatives to support China's clean energy transition. We were invited to collaborate on analysis for the 14th Five-Year Plan (2021-2025), and to support pioneering reform pilot zones in their policy formulation.

At the Electricity Market Design Workshop in Beijing we brought together Chinese officials and experts from Latin America and the IEA, who passed

on valid experiences from other emerging economies in implementing wholesale electricity markets.

We built on these successes by organising follow-up meetings with officials in Beijing to discuss the formation of a national power market in China and lessons from global experience.

India

The first Energy Policy Review of India provides concrete recommendations for clean energy transitions

Engagement with India under the CETP was strengthened in 2019 across all six work streams. A highlight of the 2019 activities was the IEA in-depth review of India's energy policies, entitled India 2020 Energy Policy Review, which highlights their achievements and provides concrete recommendations for the clean energy transition. The report highlights the high priority of continuing work to ensure India's energy security, given the country's demand for energy is set to double by 2040 and electricity demand may triple.



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Launch of India 2020 Energy Policy Review

In 2019 the energy innovation sector was one of our focal points in India. As part of our in-depth review process, we examined India's energy innovation landscape and formulated policy recommendations which we presented to the Indian government.

Some of our recommendations, such as enhancing institutional co-ordination between innovation stakeholders, align well with recent policy discussions and activities in India: the government recently proposed setting up a National Research Foundation, which would pool the country's R&D resources to ensure effective collaboration across all ministries.

In November we published our discussion paper "Accelerating Innovation beyond 2020 – Focus on India", which builds on our extensive collaboration and exchanges with Indian officials throughout the year, as well as findings from the India 2020 Energy Policy Review.

The paper draws on recent analysis of the clean energy innovation landscape in India for insights into how to successfully engage with other emerging economies. It provides an overview of the IEA's work on innovation as part of the clean energy transition, drawing from India's experiences and success stories to suggest ways forward for policy and decision makers.

Indonesia

Our work with Indonesia is yielding tangible results as it enhances the quality and coverage of energy data

The IEA strengthened its partnerships with a number of Indonesian data and statistics institutions in 2019. This is further refining the quality and coverage of Indonesia's energy data, and builds on several years of work with the energy data and information administration.

In 2019 we focused our activities on supporting the review of data on a number of topics, including biofuels, electricity and renewable energy. We also addressed the International Recommendations for Energy Statistics (IRES), data validation and balances, and challenges in data collection. Our work has been supported not only by IEA missions and exchanges in Jakarta, but also with the support of local co-ordinators in Indonesia.



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Hands-on capacity building and data work with MEMR and APERC in Jakarta, Indonesia

We jointly delivered a training event in Jakarta organised by Indonesia's Data and Information Technology Centre and the Asia Pacific Energy Research Centre, strengthening mutual links and clearly defining methodological issues with Indonesia's energy statistics.

The result has been tangible improvements in energy data and statistics across demand and supply. Our extensive outreach and consultation with data authorities in 2019 is leading to more timely submission and publication of Indonesian energy data: in 2020 the IEA expects to be able to publish Indonesia's basic energy statistics and balances six months earlier (in February instead of August).

ASEAN

The IEA and ASEAN have further strengthened collaborations

2019 was a highly successful year for the IEA's engagement with ASEAN, which collectively constitutes the fourth largest economy in the world.

At the ASEAN Minister of Energy Meeting (AMEM) in Singapore in 2018, ministers called for "stronger institutional ties between the IEA and ASEAN" and set out an ambitious joint programme of work to be delivered in 2019 covering regional power trade, cooling efficiency and renewables integration, to support Thailand's 2019 ASEAN chairmanship (Thailand is one of eight IEA association countries).

This extensive body of work was delivered by the IEA Executive Director to ASEAN ministers at the AMEM in September 2019 in Bangkok, where ministers designated the IEA as a "strategic partner to ASEAN". Key recommendations made by the IEA were adopted as regional plans, particularly relating to power trade, and ministers called for additional support from the IEA in the areas mentioned above in 2020 to support Viet Nam's chairmanship.



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The 37th ASEAN Ministers of Energy Meeting in Bangkok

Through in-depth analysis and participation in IEA-led and ASEAN forums, we provided the following:

- An assessment of current cooling-related energy demand in ASEAN, and the definition of a pathway to more sustainable cooling based on no-cost policy interventions, as set out in the report *The Future of Cooling in Southeast Asia*.
- Analysis of the potential for ASEAN renewables integration, based on assessment of the capacity of regional power system integration to accommodate a growing share of variable renewables.
- A comprehensive report on establishing multilateral power trade in ASEAN, setting out clear guidelines on how this might be pursued and the building blocks required to achieve it.

In addition, the IEA published the biennial Southeast Asia Energy Outlook in October 2019, which was also presented to ASEAN ministers of energy. The outlook provides a comprehensive picture of Southeast Asia's energy future, featuring reports on cooling, power trade and investment.

Sharing experiences

We are seeing global benefits as emerging economic giants share cutting-edge best practices

Our partner countries have much to gain from sharing their experiences with one another, in addition to engaging directly with the IEA. Demonstrating this, in 2019 we brought Chinese and Indian officials together to discuss policy on space cooling.

The focus of this initiative was the international workshop on Energy Efficient Cooling in New Delhi, where we facilitated the participation of representatives from various Chinese expert institutions. The workshop was jointly organised by the IEA, the Indian Bureau of Energy Efficiency and the Super-efficient Equipment and Appliance Deployment (SEAD) initiative under the Clean Energy Ministerial.

Delegates shared updates on progress with cooling action plans, new policies and research, and discussed the steps needed to accelerate more efficient space cooling and cold chains.

Officials from China and India also shared policy experience on cooling at IEA Energy Efficiency Policy in Emerging Economies Training Weeks.

This exchange of experience has been particularly valuable for developing and implementing national cooling action plans.

Training

The transfer of knowledge and best practices is central to successful energy transitions

In 2019 the IEA delivered training to 1 709 people through CETP-related activities. Training is central to the programme, transferring state-of-the-art knowledge and techniques so that priority countries have the practical means to implement energy transitions.

Among the many training events, the IEA held its first ever training week on energy efficiency policy in sub-Saharan Africa in Pretoria, South Africa. Our course brought together about 150 policy makers from 33 countries to equip them with the knowledge and skills to deliver effective energy efficiency initiatives in their respective countries. The next training week is expected to take place in Viet Nam in 2020, as part of their role as 2020 ASEAN Chair.



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Policy training: Energy Efficiency in Emerging Economies

We also organised four webinars to assist South Africa in the development of its new energy performance certificate programme. In each of the webinars, delegates from four IEA member countries – Australia, Estonia, Portugal and Spain – presented their experiences and shared best practice examples. This proved to be very successful as a knowledge-sharing exercise.

In Latin America the IEA continued work to reach policy makers and statisticians by producing ten statistics videos in Spanish, which provide in-depth knowledge on energy statistics. This activity encourages countries in the region to improve their methodologies, in turn enhancing global energy statistics.

With the significant contribution of the IEA's energy efficiency contractor in Mexico, we developed a massive open online course (MOOC) on Energy Efficiency in Buildings in 2019 together with CAF. The 40-hour course is dedicated to training students and professionals in the efficiency and sustainability of buildings. Launched in English, the course is due to be launched in Spanish and Portuguese in 2020.



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Logo for the MOOC on Energy Efficiency in Buildings

Finally, the IEA also partnered with the ASEAN Centre for Energy in 2019 to develop the ASEAN–IEA Webinar Series. The webinars focus on the multiple benefits that energy efficiency can deliver to households, businesses and to the energy system as a whole.

Support for the CETP

The CETP is supported by 13 IEA member governments and other partners: the United Kingdom (GBP 9 million; ~EUR 10 million); Italy (EUR 6.5 million plus a secondment to the IEA); Sweden (SEK 50 million; ~EUR 5.2 million); the European Commission (EUR 3.5 million); Denmark (DKK 25 million; ~EUR 3.4 million up to 2020); the Netherlands (EUR 2.6 million); the Agence Française de Développement (EUR 1.4 million); Germany (EUR 1.38 million); Switzerland (CHF 1 million; ~EUR 850 000); Canada (CAD 1.219 million; ~EUR 820 000); Japan (EUR 480 000 in 2018); Finland (EUR 45 000); New Zealand (EUR 10 000); and Australia.

Benefits to the entire IEA family

The CETP will continue producing tangible benefits to the entire IEA family

Through the CETP, the IEA has been able to help key governments around the world advance towards their clean energy goals, thus creating benefits for all. The IEA family as a whole has benefited from:

- Improved global data and statistics.
- The IEA's strengthened role as a global hub on a full range of clean energy technologies.
- Deepened relationships between an array of influential partners.
- The greater sharing of lessons from around the world.

Looking ahead

We will continue to tackle directly the most critical clean energy challenges our partners face

Even if the latest data show that global energy-related CO₂ emissions flatlined in 2019, much remains to be done. For example, as explored in our Market Report on Energy Efficiency 2019, progress on energy efficiency has recently decelerated.

There is no single or simple solution to tackling climate change. If we are to realise the CETP's mission of finding implementable solutions, we will need an ambitious grand coalition spanning governments, investors, companies and everyone else committed to tackling climate change. This is what the CETP is creating.

The CETP will continue to tackle the challenges identified by our partners, using the outstanding resources available to us within the IEA Secretariat and beyond. In 2020 we will build on the extensive work done in the past two years and launch new activities to accelerate the transition to clean energy.



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“Clean Energy Transitions” side event during the IEA 2019 Ministerial Meeting

Overview of the CETP

Set-up and progress since 2017

At the IEA Ministerial Meeting in November 2017, the United Kingdom, Italy, Sweden, Denmark, Germany, the European Commission, the Netherlands, Switzerland, Canada, Japan, Finland, New Zealand and Australia joined forces to launch the CETP. The programme provides independent, cutting-edge technical support to governments whose energy policies will significantly influence prospects for, and the speed of, a global transition towards more sustainable energy production and use.

The CETP seeks to support countries' pathways to a clean energy transition by encouraging reductions in GHG emissions in line with the Paris Agreement and their own targets, enhancing energy access, reducing air pollution and accelerating clean energy innovation.

Our priority countries include Brazil, China, India, Indonesia, Mexico and South Africa, other IEA association countries, and regions more widely – such as Africa, Latin America and Southeast Asia – where the programme can have high impact and use local partners' capabilities for wider benefit.

To ensure that the CETP's resources are directed as effectively as possible, we identified six work streams on which to focus:

- data and statistics
- energy efficiency
- electricity
- policy advice and modelling
- sectoral work
- innovation.

From 2020 onwards we have added a further work stream:

- digitalisation.

The CETP is supported by 13 IEA member governments and other partners – the United Kingdom (GBP 9 million; ~EUR 10 million, including GBP 1 million from the Foreign and Commonwealth Office); Italy (EUR 6.5 million plus a two-year junior professional officer working at the IEA); Sweden (SEK 50 million; ~EUR 5.2 million); the European Commission (EUR 3.5 million); Denmark (DKK 25 million; ~EUR 3.4 million up to 2020); the Netherlands (EUR 2.6 million); the Agence Française de Développement (EUR 1.4 million), Germany (EUR 1.38 million); Switzerland (CHF 1 million; ~EUR 850 000); Canada (CAD 1.219; ~EUR 820 000); Japan (EUR 480 000 in 2018); Finland (EUR 45 000); New Zealand (EUR 10 000); and Australia.

CETP work stream highlights in 2019 and efforts in 2020 and beyond

The CETP achieved many on-the-ground successes in each of its six work streams in 2019, and has a programme of planned work for 2020 in these and the new seventh work stream. The following provides a selection of highlights.

1. Data and statistics

- Supporting Brazil to enhance and consolidate the country's energy data and statistics, focusing on the development and first release of [energy efficiency indicators](#) and methodological frameworks to collect RD&D data.
- Co-operating with Indonesia to continue improving energy data quality, coverage and timeliness.
- Working closely with India to increase the alignment of their official statistics and balances with international recommendations.
- Continuing to enhance the availability and timeliness of energy data from emerging economies with an early energy statistics and balances release.
- Developing new energy transition indicators.
- Supporting the participation of officials from key regions in IEA's Energy Statistics Courses.
- Continuing to produce multimedia tools and manuals in different languages to share in-depth knowledge on several energy statistics topics.

In 2020, this work stream will continue its focus on working with priority countries to improve the comprehensiveness and quality of data and energy statistics, while leveraging maximising opportunities to expand data collection to new topics beyond basic energy statistics. We will continue developing experimental progress indicators on clean energy transitions and applying new methods to improve the timeliness of estimates for some key energy outcomes. Work will continue to develop relevant training materials and expand the areas targeted, and country coverage will expand to new energy producers (such as Guyana).



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18th Energy Statistics Course

2. Energy efficiency

- Creating opportunities for sharing best practices and learning, such as through an international workshop on energy efficient cooling in Delhi.
- Deepening analytical co-operation with Brazil, producing the first-ever international benchmarking chapter in the [Atlas of Energy Efficiency](#) with EPE (the Brazilian Energy Research Office) to compare energy efficiency in industry, households and transport and identify opportunities for savings.
- Developing three Regional Roadmaps for Buildings and Construction with the input of approximately 700 experts and other relevant officials, to identify the key actions and timelines towards decarbonising buildings and construction between now and 2050. This process has enabled buildings sector stakeholders in Africa, Asia and Latin America to learn from each other, share ideas and raise ambition for the sector.
- Support for policy development using a combination of analytical work, data and skills to focus on the day-to-day needs of officials responsible for delivering energy efficiency policies.
- Launching a [Massive Open Online Course](#) on energy efficiency in buildings for Latin America.
- Organising three Energy Efficiency Policy in Emerging Economies Training Weeks in three continents (in Paris, Bangkok and Pretoria) with almost 400 energy efficiency professionals from government institutions, industry, academia and supporting organisations from emerging economies. During each of these four-day events, experts from the IEA guided participants through an interactive agenda, with lectures, discussions, practical exercises and group activities to equip the participants with the indispensable policy tools to ensure that the multiple benefits of energy efficiency are captured.



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Participants at the Energy Efficiency Policy Training Week in Paris

During 2020 we will continue to hold Energy Efficiency Policy in Emerging Economies Training Weeks to expand the community of practice, supported by events or online activities with a global, Southeast Asian and sub-Saharan African focus. Work on energy efficiency indicators in energy-intensive industry sectors attracted a great deal of interest among the E4 Programme countries. The next step will be to extend this initiative to the less energy-intensive sectors that are strategically important for their employment, economic development and energy cost savings.

Opportunities also exist to advance the development of national roadmaps for buildings and construction, following on from the work undertaken in 2019 with the GlobalABC on regional roadmaps. This is an example of how the CETP enables the IEA to work closely with partner countries to build upon the analytical work underway in other programmes.

We also plan to support countries to design and implement electric mobility programmes. This will include activities such as developing a land-based transport roadmap for Indonesia, producing a case study on electric bus adoption in Kolkata and undertaking analysis on cross-cutting themes, including vehicle fuel economy and two wheelers.

3. Electricity

- Working with Brazil on its market and regulatory framework reform, and sharing best practice related to demand response and digitalisation.
- Supporting China's power system transformation and market reform work.
- Assessing India's clean energy investment trends and analysing how perceived risks shape financing costs.

- Assessing Southeast Asia's energy outlook, including a deep dive on current investment and financing trends and investment gaps.
- Developing new work on system integration of renewables at the state level in India.
- Providing extensive support to ASEAN on regional and renewable energy integration.
- Sharing best practices on distributed generation with key stakeholders in Latin America.
- Continuing support for work under the Clean Energy Ministerial, including the Power System Flexibility (PSF) campaign.



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Global Ministerial Conference on System Integration of Renewables

In 2020 we will focus on enhancing the capability of emerging economies to develop and implement strategies for the reliable and cost-effective integration of variable renewable energy in a secure and affordable way. We will also seek to advance policy, market and regulatory frameworks to accelerate the deployment of renewable energy.

We will support priority countries' own work on the design of electricity markets, support the regional integration of power systems, and develop frameworks to improve understanding of the drivers of the cost of capital and the risk environment for clean energy investments.

4. Policy advice and modelling

- Supporting China on the design of its national emissions trading scheme (ETS) and its interactions with the country's power sector.
- Producing a [review of India's energy policies](#) and developing new efforts on energy policy packages to deliver climate change, air pollution and energy access objectives.
- Working to better understand relevant gender-balance issues in India's rooftop solar sector.

- Supporting in-house capacity to enhance air pollution and energy analysis.
- Launching new work to enhance the assessment of climate impacts on energy transitions.
- Supporting the participation of energy modellers from emerging economies at the [38th International Energy Workshop](#).



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Launch of the India 2020 Energy Policy Review in New Delhi

Our 2020 activities will seek to assess the climate vulnerability and resilience of the hydropower sector, and establish indicators to better understand and assess the resilience of the energy sector to climate impacts. We will continue to contribute to developing China's ETS by providing technical inputs on its interactions with other policies, focusing on the implications for the power sector in 2020. Our support in India will seek to analyse how to maximise the climate co-benefits of energy sector-related air pollution and energy access policies.

In addition, new analytical work will evaluate the interaction and impact of South Africa's carbon tax with other low-carbon energy and energy transition policies. In the ASEAN region, new analytical work will examine carbon pricing challenges and opportunities for the power sector in Thailand.

More generally, we plan to develop country- and region-specific tools to facilitate analytically rigorous energy policy planning, and provide countries with the tools to undertake robust energy modelling. An IEA-wide outreach and engagement programme will support the Saudi G20 Presidency in 2020.

5. Sectoral work

- Exploring trends and challenges related to cooling in China and Southeast Asia.

- Analysing technologies and strategies necessary for the iron and steel sector to pursue a sustainable pathway, particularly in India.
- Developing a [landmark report](#) to analyse the current state of play for hydrogen.
- Working towards launching a global programme on electro-mobility and obtaining the approval of the Global Environment Facility (GEF) Council for this new work.
- Expanding work and international collaboration on bioenergy after assuming the role of the facilitator of the Biofuture Platform.



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Bioenergy event at the 10th Clean Energy Ministerial meeting

Our intentions for 2020 are to analyse sustainable pathways for the iron and steel sector in India and deliver a roadmap of stakeholder actions to implement such a transition. We also aim to help deliver the global programme on electro-mobility under the Global Environment Facility (GEF), and build knowledge and data in CETP priority countries on gender-related energy challenges.

In the bioenergy field, we will develop our analysis and engagement activities and provide technical and policy guidance with a special focus on advanced biofuels. Work will continue on supporting IEA's role as facilitator of the Biofuture Platform and its transformation to an initiative under the Clean Energy Ministerial (CEM).

6. Innovation

- Mapping India's energy innovation landscape and key policy drivers, assessing the country's strengths and areas where there may be room

for improvement, and formulating priority policy recommendations through the IEA's official energy policy review process and the discussion paper: [Clean energy transitions: Accelerating innovation beyond 2020](#).

- Deepening analytical co-operation with Brazil under the Energy Big Push project to improve public R&D spending data collection and map the country's energy innovation landscape, with a view to stimulating innovation activities and investment in low-carbon energy sources.
- Supporting China's efforts to track spending on energy R&D.
- Facilitating CETP priority countries' multilateral collaboration under the IEA Technology Collaboration Programme, Mission Innovation and other innovation partnerships for global energy transitions.

During 2020 we will continue our work to enhance the tracking of energy technology innovation metrics such as expenditure, with the ambition of including Brazil in the official IEA datasets for public R&D spending and refining available data on China and India.

As a follow-up to the Energy Big Push project in Brazil, the IEA will seek to directly support the new governance structure for energy innovation in Brazil, such as via the proposed best practice exchange with international policy experts. Work under the CETP will also aim to further strengthen relationships with significant innovation stakeholders.



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Participation at Mission Innovation meetings in India in November

Learning from the in-depth review process for India in 2019, we plan to conduct an in-depth analysis of the energy innovation ecosystem in China (e.g. important stakeholders, policies, priorities, activities and R&D projects, possible opportunities, and innovation outputs), for review by Chinese counterparts and to inform discussions ahead of the 14th Five-Year Plan.

Finally, we will also direct our efforts towards promoting the participation of CETP priority countries in energy innovation partnerships. This follows the 2019 survey of the IEA's Technology Collaboration Programmes (TCPs), which highlighted that TCPs have identified emerging economies

as potential strategic partners. We will aim to inform strategic discussions about future priority areas for joint working under Mission Innovation.

7. Digitalisation

This new work stream will build on the IEA's past digitalisation, energy efficiency and cross-sectoral efforts. We aim to develop tools and guidance on the policy, regulatory and investment context needed to mobilise the grid infrastructure for the clean energy transition. This is to ensure efficiency, reliability and resilience across the entire energy system.

Other themes

In addition to the work streams presented above, last year also saw the launch of new cross-IEA initiatives to achieve clean energy transitions. These will continue into 2020 and beyond, and include:

- IEA-wide work in Africa focusing on accelerating the achievement of UN Sustainable Development Goal 7 (SDG 7) and producing up-to-date knowledge and cutting-edge analysis of clean energy transitions in selected African economies and regions. Activities launched include high-level policy engagement and technical papers to enhance knowledge and evidence for policy-making. Our 2020 work will focus on producing a first report with our findings on the costs and benefits of clean energy transitions, and we plan to hold a high-level event to increase the impact of our analytical work.
- Continued efforts to address both short- and longer-term opportunities for China's energy transition strategies. In particular, work will focus on continuing support for the design of its national ETS, power sector reform and long-term low carbon policy package.
- New work to support energy transition goals as expressed in India's nationally determined contribution (NDC), aiming to promote development objectives while addressing climate change. Our co-ordinated efforts will focus on energy efficiency, system integration of renewables at the state level and an integrated energy policy response to climate change, air pollution and energy access challenges.

Governance

The CETP works across the IEA Secretariat, co-ordinating a number of inter-related projects and cross-sectoral initiatives led by different IEA divisions and units. IEA senior management and the CETP Steering Group, which includes Division Heads from across the IEA, guide the work conducted by the CETP. The Steering Group provides strategic guidance to the programme activities. Senior management, using the advice of the Steering Group, decides allocations for the different work streams under the CETP.

A central co-ordination team leads CETP work and is located in the IEA Strategic Initiatives Office. It is responsible for overall quality control,

strategic management, fundraising, disseminating key messages, information exchange, co-ordination and reporting. The team is supported by the Office of the Legal Counsel, the Communications and Digital Office, Human Resources and the Financial Administration team. The CETP co-ordination team can be reached at IEA.CETP@iea.org.

CETP activities are also supported by country desk officers located in the Office of Global Energy Relations, and by: in-country contractors in Brazil, India and Indonesia; energy efficiency co-ordinators in Indonesia, Mexico and India; and the IEA liaison office in China. The work of in-country experts as local consultants has greatly advanced the CETP's work, helped co-ordinate activities on the ground (including with other initiatives) and improved knowledge of local contexts.

The CETP's strategy is also supported by bilateral discussions with supporters and by the Programme Funders Strategy Group. This group allows supporters to engage in strategic conversations about the CETP's development and implementation, and to ensure that IEA efforts are complementary to other bilateral and multilateral collaborations.

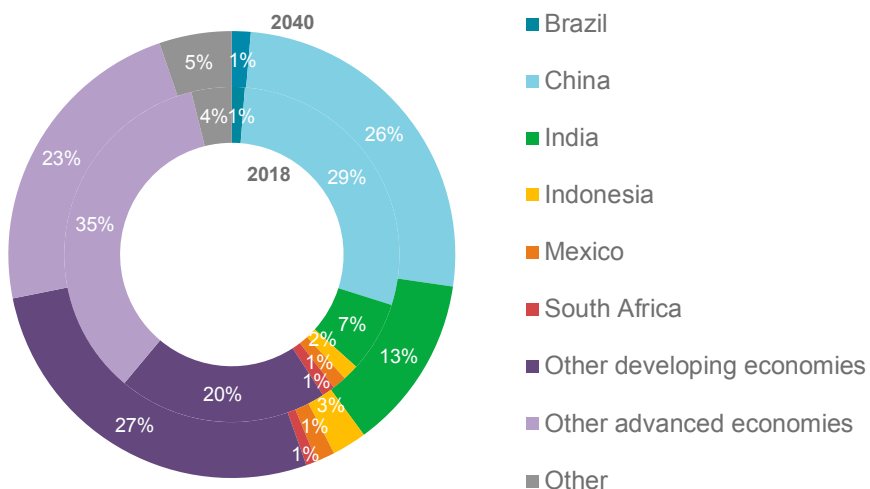
Work with major emerging economies

Under the CETP, the IEA's engagement with countries and regions is established through deep and sustained partnerships with governments and regional organisations. Our projects include analytical work, technical co-operation, training and joint learning exchanges, strategic engagement and tailored just-in-time support based on the requests of key government stakeholders.

As shown in the figure below, CETP priority countries represented 41% of CO₂ emissions from fuel combustion in 2018 (developing economies' overall share was 61%). Under the IEA's [Stated Policies Scenario \(STEPS\)](#) – which reflects the impact of existing policy frameworks and announced policy intentions – priority countries could account for roughly 45% of global emissions by 2040. Thus, working with the CETP's priority countries is vital if we are to achieve a successful and timely global energy transition.

It is important to note that per-capita emissions in many of these priority countries are still quite small compared to those in developed economies. This calls for the CETP to also consider overall development objectives and to ensure our activities are based on the interests expressed by the priority countries themselves.

CO₂ emissions from fuel combustion under the STEP: 2018 versus 2040



IEA 2019. All rights reserved.

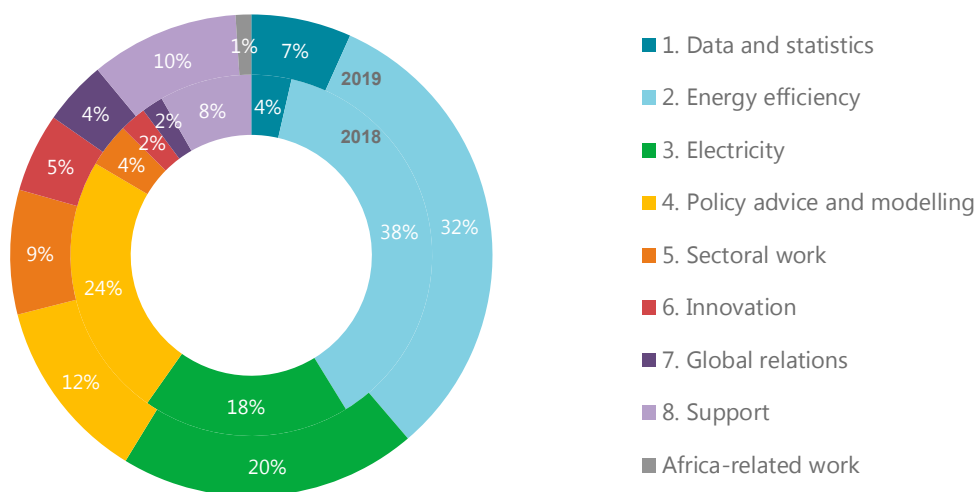
In 2019 CETP activities expanded in all work streams.

Energy efficiency continued to account for the largest share of our work, followed by electricity and policy advice, and modelling. Activity under the data and statistics and the innovation work streams also took off – this is a sign of priority countries’ interest in tapping into the IEA’s expertise in these areas, which are essential for developing sustainable energy systems in the coming years.

As was the case in 2018, the CETP also worked closely with other organisations, receiving in-kind support from partner institutions and local agencies when organising training events, workshops and discussions with stakeholders. This approach allows us to work more efficiently, reducing costs, increasing our effectiveness and securing buy-in from important partners.

In 2020 our work will continue to focus on the sectors highlighted above, while also considering the feedback received during the IEA Ministerial side event (further details below).

CETP activities in 2018-19 by work stream

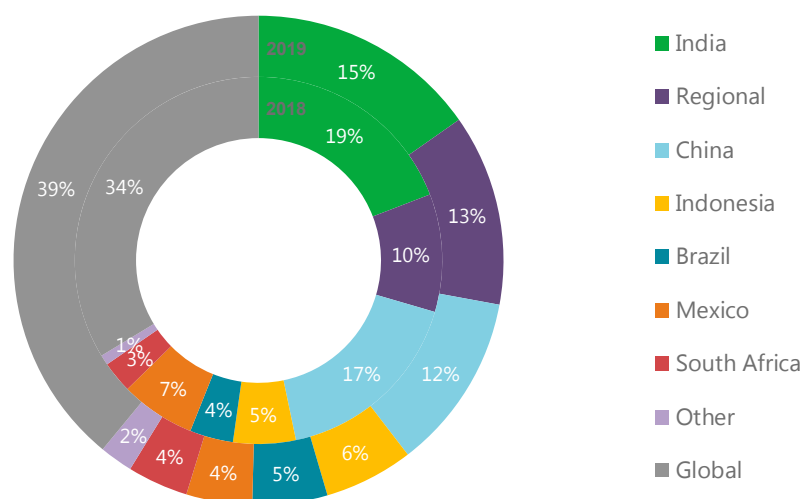


IEA 2019. All rights reserved.

Note: These figures are estimated projections and are provided for information purposes only. Formal financial reports will continue to be provided in established and agreed formats to member countries via the Committee on Budget and Expenditure and to individual donors via financial reports.

In 2019 CETP activities supported 10 countries and involved over 40 additional institutions. Benefiting from the influence and capabilities of other organisations, the IEA also greatly increased the amount of regional work in Africa, Latin America and Southeast Asia.

CETP activities in 2018-19 by country/region



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Note: These figures are estimated projections and are provided for information purposes only. Formal financial reports will continue to be provided in established and agreed formats to member countries via the Committee on Budget and Expenditure and to individual donors via financial reports.

CETP pillars

Throughout 2019 the CETP intensified its work with priority countries on clean energy transitions in four key pillars:

- high-level engagement and collaboration
- supporting joint learning and knowledge exchanges to formulate and implement policies
- enhancing knowledge and evidence for policy making and implementation
- solutions-oriented multilateral engagement.

The IEA's major achievements in these four broad categories are presented below.

High-level engagement and collaboration

In line with CETP objectives, the IEA Secretariat continued making contact with emerging economies and meeting with key decision makers from the public and private sectors in 2019. 36 ministerial and high-level meetings were organised in the second year of the programme with Brazil, China, India, Mexico, South Africa and Thailand, among others. Dr Fatih Birol, Executive Director of the IEA, notably met with ministers from Argentina, Brazil, Colombia, Chile, China, India, Indonesia, Morocco, South Africa and Thailand to continue driving CETP work at a national and regional level. The IEA Deputy Executive Director and other high-level officials from the Secretariat also directly met with high-level officials from emerging economies throughout 2019.

Discussions with supporters and collaborating with key ministries and institutions in priority countries remain critical aspects of our operations across all work streams. To achieve the objectives of the CETP, the IEA Secretariat also organised six discussions with donors during 2019, including three Funders Strategy Group meetings in Paris and three Funders Roundtables in priority countries (Brazil, China and South Africa). These frequent high-level all-partner gatherings consistently enabled us to co-ordinate activities on the ground and strategic decisions on the overall CETP approach.

Throughout the year the Secretariat also organised 96 technical exchanges in CETP priority countries across a range of themes, including advancing efficiency indicators and data in Brazil, modernising hydropower to support a cleaner energy mix and holding consultation workshops in preparation for ASEAN meetings on energy. The IEA is grateful for the co-operation and support of priority countries, who often contributed their own financial and human resources to make these exchanges and events a success.

The CETP also heralded wider engagement in partner countries and supported further contributions from the IEA to domestic debates and policy development.

In India, 2019 saw the regular participation of the IEA at meetings of the eight cross-ministerial working groups on statistics, which aim to identify

data gaps, propose recommendations to bridge them and facilitate data sharing between government agencies. Our co-operation with expert think tank the Energy and Resources Institute (TERI) was also an important feature of 2019, with the launch of work on data collection and estimation of solid biofuels production and consumption on the basis of a new memorandum of understanding.

In China, discussions with the Shanxi provincial government led to the exchange of a statement of intent, thus adding a new dimension to the strong co-operation we have with a wide range of national actors – from the National Development and Reform Commission, to the ministries in charge of science, technology, ecology and the environment or the Tsinghua University.



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High-level engagements during the 2019 IEA Ministerial Meeting

As in the previous year, the IEA also benefited from numerous human resource exchanges with Brazil, China, Colombia, India and South Africa, reaching 15 exchanges in 2019. We will continue these as much as possible in the current situation in 2020 as they are crucial tools for understanding the specific energy contexts of emerging economies and maintaining close relationships.

Joint learning and knowledge exchanges

In 2019 the IEA delivered training to more than 1 709 people through CETP-related activities. Training is an instrumental activity within the programme, focusing on topics relevant to each country's priorities and circumstances, with the aim of efficiently transferring state-of-the-art knowledge and sharing experiences. Notably, since 2015 we provided energy efficiency policy training to over 1 500 policy makers from 120 countries, among them South Africa, where over 140 government officials from 33 African countries attended the sessions. Overall, we held 36 training events or workshops under the CETP, covering four work streams. Participants have expressed a satisfaction rate of over 90% with these activities when feedback forms were completed or feedback was provided.



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Participants at the 18th Energy Statistics Course

Our close co-operation with CETP priority country governments also brought deeper exchanges of knowledge, occasionally in new areas. For example, for the first time in 2019, Brazil was included in the yearly [IEA Energy Efficiency Indicators](#) statistical report, building on the country's participation in the IEA Energy Efficiency Data questionnaire, a unique contribution in the South America region.

Enhancing knowledge and evidence

In 2019 41 IEA reports were produced or enhanced using data and insights derived from the CETP, developing global knowledge of transition-related aspects in emerging countries. In line with the overall goal and founding principles of the programme, all were produced in close co-operation with and for emerging economies, such as those shown below and throughout this report. Furthermore, existing IEA analysis also benefited from greater knowledge of major emerging economies. A list of relevant IEA work can be found in the sections below.



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Selected IEA analysis produced with priority countries and regions in 2019

CETP activities in 2019 also included a number of contributions to publications by expert institutions in priority countries. Our sustained work with EPE, the Brazilian Energy Research Office, notably translated into the introduction of a new international benchmark on energy efficiency in the 2019 Atlas of Energy Efficiency, published in January 2020.

Solutions-oriented multilateral engagement

The stepping-up of CETP activities in 2019 enabled unprecedented lesson-sharing, among CETP partners and more broadly at the regional level.

In Africa, the IEA and the African Union Commission (AUC) co-hosted a [ministerial summit](#) to discuss the development of Africa's energy sector. In Latin America, the IEA and GIZ organised [a regional conference](#) to discuss drivers and challenges for clean energy transitions in the region. In Southeast Asia, the IEA and the ASEAN Secretariat consolidated their [strategic partnership](#) and strong collaboration at the 37th ASEAN Ministers of Energy Meeting.

The policy engagement between China and India on cooling plans also reached a new level in 2019 during the international workshop on Energy Efficient Cooling that was jointly organised by the IEA, the Indian Bureau of Energy Efficiency and the SEAD Initiative under the Clean Energy Ministerial in New Delhi, in December 2019. In line with the CETP ambition to increase multilateral engagement, we facilitated the participation of representatives from various Chinese expert institutions at the workshop.

In June 2019 the 3rd IEA [Universal Meeting of Technology Collaboration Programmes](#) (TCPs) convened decision makers and professionals from governments, international organisations, the private sector and research institutions worldwide to discuss ways to further strengthen co-operation under the IEA innovation network. The meeting was organised at the direction of the IEA Committee on Energy Research and Technology (CERT) and the IEA Standing Group on Long-Term Co-operation (SLT). It provided a timely opportunity to advance solutions-oriented multilateral engagement on technology co-operation in the IEA family, underpinned by IEA's latest analysis of [energy technology innovation partnerships](#).



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The IEA Executive Director and Chairs of relevant IEA committees presiding over the 3rd TCP Universal Meeting

In addition, a [Clean Energy Transitions](#) side event – held on the margins of the IEA Ministerial Meeting – enabled IEA member countries, emerging economies, partners and supporters to share lessons learnt in their local contexts and sectors.

Participants from across the IEA family discussed a broad range of successes, opportunities and challenges from their own countries, including those supported under the CETP. They also highlighted domestic priorities for the energy transition, while recognising the IEA's role in collecting timely and comprehensive data and producing robust analysis to support clean energy technologies and inform policy making through the CETP.

2019 IEA Ministerial: Clean Energy Transitions side event

On 5 December 2019, 25 countries and 4 organisations from the IEA family came together during the [Clean Energy Transitions side event](#) at the 2019 IEA Ministerial Meeting. The event was chaired by H E Sanjeev Nandan Sahai, Secretary, Ministry of Power, India, and Dr Anders Hoffmann, Deputy Permanent Secretary, Ministry for Climate, Energy and Utilities, Denmark. High-level government officials, energy industry CEOs and other important stakeholders shared lessons from clean energy transitions around the world and discussed a broad range of successes, opportunities and challenges. They highlighted priorities in their countries, agreeing that much remains to be done to accelerate energy transitions.



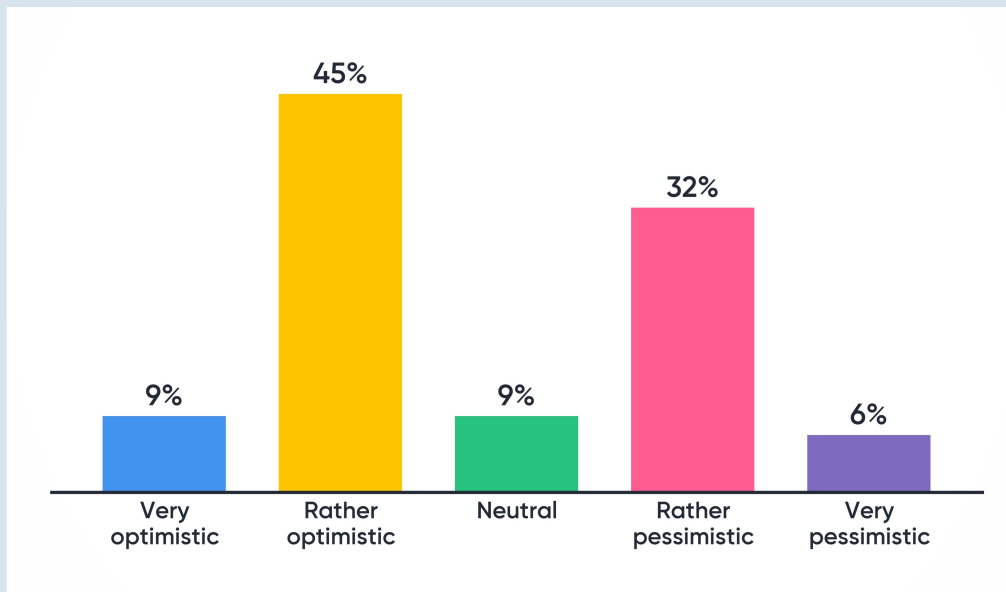
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The IEA Executive Director presiding over the Clean Energy Transitions side event

The event allowed participants to underscore their appreciation of IEA efforts, which are helping governments around the world to provide clean, sustainable, efficient, affordable and secure energy for their populations. The IEA family of countries also emphasised how the CETP was facilitating their support for each other to accelerate clean energy transitions. They shared encouraging successes achieved under the programme, such as improving energy data and statistics collection, providing cutting-edge analysis to better integrate power systems and higher shares of renewables, improving the tracking and promotion of clean energy innovations, formulating tailored policy recommendations and providing training to policy makers from around the world.

During the event, participants also had an opportunity to share their concerns and expectations for the state of world energy transitions. An anonymous poll revealed that stakeholders at the table were optimistic about the speed and ultimate success of clean energy transitions globally.

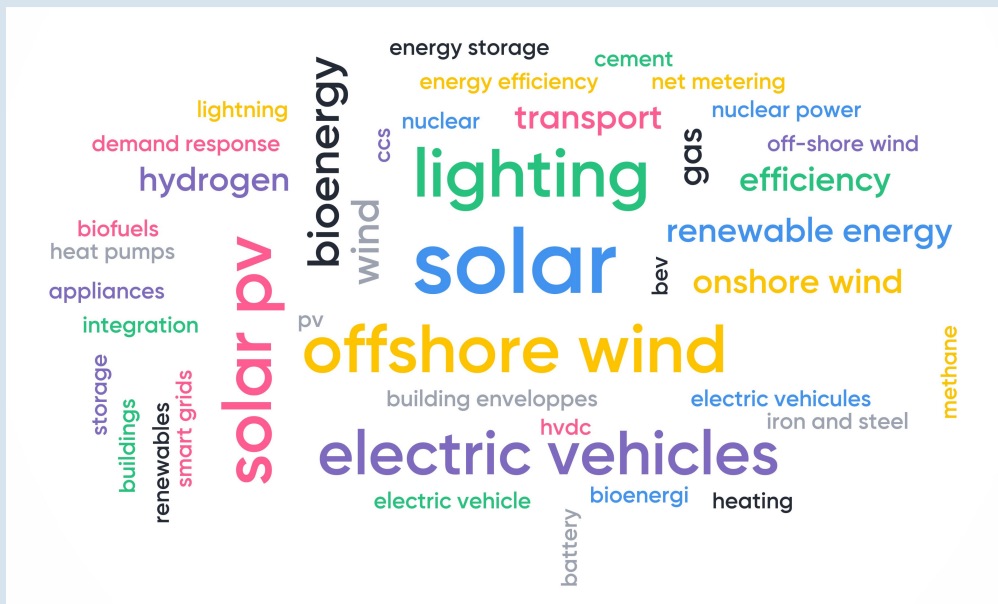
“How optimistic or pessimistic do you feel about the speed and ultimate success of clean energy transitions globally?”



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Participants revealed which sectors and technologies they considered to have achieved the most progress in their respective countries over the past two years (48% mentioned renewable energy) and the areas that need priority focus to accelerate energy transitions (energy efficiency was most mentioned).

“Which sectors and technologies have achieved the most progress in your country over the past couple of years?”



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delivered specific high-level input at early stages of policy development, notably in China, Indonesia and India. Partner governments and public organisations subsequently sought our further involvement when investigating the design of future regulations and incentives. We were proud to meet requests for technical analysis from organisations such as Thailand's power utility, EGAT, on challenges linked to renewable grid integration, or from the Brazilian Ministry of Mines and Energy on the anticipated power market reforms.

Finally, the expertise and relationships gained through the CETP's activities enrich and strengthen the IEA's platform for sharing best practices and lessons from around the world, to the benefit of all countries in the IEA family. We are continuously fostering technical co-operation between CETP priority countries and IEA members through the programme. This is demonstrated, for example, by IEA support for the South African National Energy Development Institute in the creation of its new Energy Performance Certificate Programme, when we convened four webinars to share best practice from Portugal, Spain, Australia and Estonia.

Additional IEA resources

Several major IEA publications have benefited from improved data, analysis and collaboration from priority countries and other emerging economies. A few of these analytical outputs, developed through the CETP and beyond and now helping the transition to clean energy systems, include the following:

- [World Energy Outlook 2019](#)
- [Tracking Clean Energy Progress](#)
- [Renewables 2019](#)
- [Energy Efficiency 2019](#)
- [World Energy Investment 2019](#)
- [Global CO₂ Emissions in 2019](#)
- [Africa Energy Outlook 2019](#)
- [Status of Power System Transformation 2019](#)
- [Offshore Wind Outlook 2019](#)
- [Clean Energy Investment Trends 2019](#)
- [The Future of Rail](#)
- [The Future of Cooling in Southeast Asia](#)
- [Southeast Asia Energy Outlook 2019](#)
- [ASEAN Renewable Energy Integration Analysis](#)
- [Establishing Multilateral Power Trade in ASEAN](#)
- [Putting CO₂ to Use](#)
- [Global EV Outlook 2019](#)
- [Multiple Benefits of Energy Efficiency](#)
- [Energy Efficiency Indicators 2019](#)
- [SDG7: Data and Projections](#)
- [Energy Transitions Indicators](#)

- [The Oil and Gas Industry in Energy Transitions](#)
- [Global Status Report for Buildings and Construction 2019](#)
- [The Critical Role of Buildings](#)
- [Material Efficiency in Clean Energy Transitions](#)
- [Women Working in the Rooftop Solar Sector](#)
- [Seven Women Entrepreneurs of Solar Energy](#)
- [Innovation Gaps](#)
- [Clean Energy Transitions: Accelerating innovation beyond 2020](#)
- [Energy Technology Innovation Partnerships](#)
- [Energy Technology RD&D Budgets 2019](#)

2019 Activities in Brazil

Highlights of 2019 CETP activities in Brazil



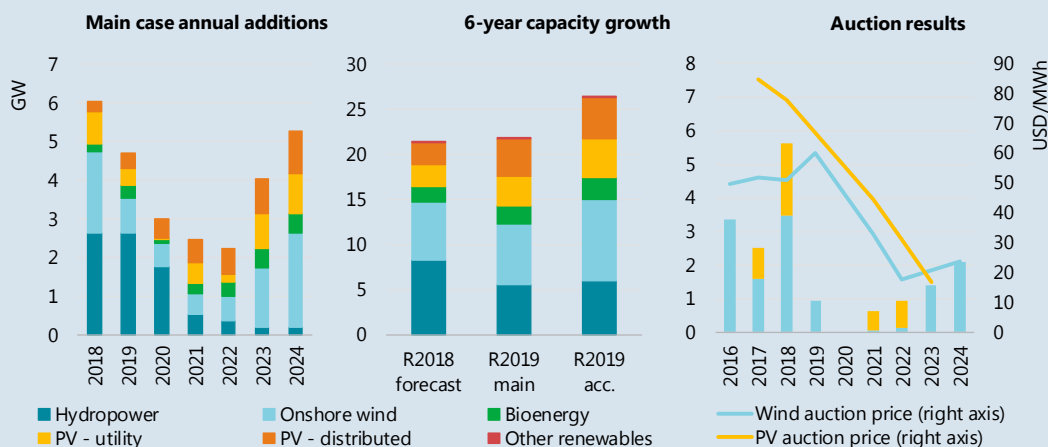
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Mr Bento Albuquerque, Minister of Mines and Energy, and Dr Fatih Birol, IEA Executive Director

- The IEA began providing technical support on Brazil's power market reforms at the request of the Ministry of Mines and Energy (MME), drawing on inputs from different CETP work streams (electricity, energy efficiency and energy technology innovation).
- Brazil became the first country in South America to fill out the IEA's Energy Efficiency Data questionnaire, enabling indicators for Brazil to be included in the IEA [Energy Efficiency Indicators 2019](#) highlights.
- The November 2019 regional "Energy Transitions in Latin America: Drivers, Opportunities and Challenges" (ETLA) conference brought together 115 participants and speakers from 8 countries for 3 days of exchange on solar PV, energy efficiency and energy technology innovation.
- The Energy Research Office (EPE) and the IEA co-authored an international comparison benchmarking energy efficiency in industry, households and transport, as part of the [Atlas of Energy Efficiency](#) in Brazil 2019 (published in January 2020).
- The IEA launched its [online course on energy efficiency indicators](#) in Portuguese.

- Brazil and the IEA broadened and deepened their co-operation with a new two-year work programme, a sign of strong high-level support for bilateral co-operation under the CETP and beyond.

Brazil: Renewable forecast summary and auction results by commissioning date



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Source: IEA (2019), *Renewables 2019*.

Broader Brazil–IEA context

- The IEA has been working closely with Brazil since 2006, with a significant ramp-up in activity during 2019.
- Key joint achievements prior to the CETP included the joint publication of the [Technology Roadmap – Hydropower](#) and the [World Energy Outlook 2013](#). Brazil participates in five IEA [Technology Collaboration Programmes](#).
- Brazil activated association status with the IEA in October 2017.
- The IEA and Brazil signed a two-year work programme in December 2019.

Data and statistics

Joint work on energy data will allow Brazil to improve its benchmarking

The IEA continued working with Brazil to enhance and consolidate the country’s energy data and statistics. Our focus with EPE and MME has been to further understand their current data collection and reporting methodologies and support the development of energy efficiency indicators. We have also helped them design methodological frameworks to collect [RD&D data](#) across all energy technologies.

This work has allowed local officials to consolidate their understanding of energy balances and develop energy efficiency indicators following international methodologies – useful for benchmarking work. As a result Brazil was included in the IEA [Energy Efficiency Indicators 2019](#) highlights for the first time. We provided the support through several exchanges with Brazilian officials, including discussions and workshops in Paris (May) and Rio de Janeiro (July), as well as through the launch of the IEA [online course on energy efficiency indicators](#) in Portuguese and with the support of a recently hired local co-ordinator.

In late 2019 the IEA and MME began an initiative to improve reporting of oil products in Brazil's energy systems. We are also continuing our underlying work to align Brazil's basic energy statistics and balances with international recommendations and OECD requirements.

Energy efficiency

Co-operation with Brazil on energy efficiency reached new levels in 2019

2019 marked a year of firsts for co-operation on energy efficiency with Brazil.

For the first time the IEA joined EPE in publishing an international benchmarking chapter on energy efficiency. The 40-page analysis in the Atlas of Energy Efficiency in Brazil 2019 explores trends and opportunities for energy efficiency in industry, households, and transport. Brazil also hosted the first Energy Transitions in Latin America (ETLA) conference, organised with a number of national and international organisations. This is discussed in more detail in the section on Latin America. The IEA translated its online course on energy efficiency indicators into Portuguese, enabling it to reach a wider audience in Brazil. We launched it at a workshop co-organised with EPE and the IEA's Energy Data Centre.

These milestones are the result of our close co-operation with MME and EPE. This interaction improves understanding of the Brazilian context, allows the exchange of Brazilian and international best practices, and frames data so it can be compared with other countries.

Work on energy efficiency indicators with Brazil



EPE/IEA 2019.

Atlas of Energy Efficiency Brazil 2019

In 2019 the IEA co-authored a chapter on international benchmarking with EPE as part of the [Atlas of Energy Efficiency in Brazil – Indicators Report](#), which analyses progress on energy efficiency in key sectors of Brazil’s economy. The chapter tracks energy efficiency indicators in heavy industry, households and transport. It also provides insights into factors affecting consumption levels and patterns in each sector, offering a deeper understanding of how to advance energy efficiency in Brazil and other countries.

The analysis is the result of close co-operation between the IEA and EPE, reflecting the value of detailed technical exchanges to help inform decision making. In 2019 Brazil became the first country in Latin America that is not a member of the IEA to complete the IEA’s efficiency indicators questionnaire. This enabled the IEA to include Brazil in its [annual publication](#) of energy efficiency indicator highlights and the related database.

Our ongoing engagement with MME, EPE and ANEEL (the Electricity Regulatory Agency) has enabled us to organise high-visibility events and various technical exchanges. These included a workshop on data and indicators in June, three webinars (on space cooling, demand response, and energy efficiency as part of the World Energy Outlook in Latin America), and the launch of the Atlas of Energy Efficiency in Brazil. In addition to the events in Brazil, we welcomed representatives from MME, EPE, ANEEL and other institutions to events at the IEA in Paris, including the annual Energy Efficiency Policy in Emerging Economies Training Week and the workshop on benchmarking energy efficiency indicators.

The IEA also hosted a secondee from ANEEL in Paris, who provided support on energy efficiency, the system integration of renewables and power market reform. 2019's activities and analytical outputs create a firm basis for engaging in more detail in 2020 on energy efficiency in all major sectors.

Electricity

Sharing experiences of electricity market reform allows valuable learning

At the request of MME, the IEA is also supporting Brazil's efforts to reform its power sector market and regulatory frameworks. We are particularly doing this through the working group for electricity sector modernisation created by the National Council for Energy Policy.

At the invitation of MME and EPE, we engaged with key power sector stakeholders at an event in Brasilia, which started the process of producing specific market reform proposals. Through this mechanism, the IEA is providing guidance on the reform process and how to undertake engagement with stakeholders. We also supported MME in organising an international workshop to move this process forward and share international experiences.

Later in the year we further supported these efforts through discussions in Brasilia with MME, the regulator, the TSO and consumption/production organisations; we also participated in a technical workshop to share international experiences relevant to Brazil.

The IEA Secretariat jointly organised with EPE a technical workshop on demand response and digitalisation at the ETLA conference (further details below). Over 70 participants shared approaches for estimating the availability of demand response as a resource for the power system and explored opportunities to advance it through digital technologies. The workshop resulted in further interactions with ANEEL, which has expressed interest in learning from Europe's experience on compensating demand response and possibly on decoupling DSO revenues from sales.

We will support this process by sharing international experience via a diverse set of activities, including technical exchanges between Brazilian stakeholders and relevant power sector experts from IEA member countries.

Innovation

The Energy Big Push will set Brazil on a path to nimbler energy innovation

During 2019 the IEA embarked on further energy innovation work under Brazil's [Energy Big Push](#) project.

This project aims to kick-start discussions about R&D data tracking, pull together existing data from relevant innovation stakeholders and build a first-of-its-kind dataset of Brazil's public spending on energy R&D, built according to the IEA classification and methodology. The Energy Big Push will also identify ways to accelerate investment in sustainable energy innovation through targeted policy action, notably by examining international approaches featured in IEA country in-depth reviews and by using IEA methodologies.

With sustained engagement throughout 2019, we informed discussions at the project's advisory board and took an active part in all four working groups. By working closely with Brazilian counterparts, the IEA strengthened relationships with important innovation stakeholders such as the Centre for Management and Strategic Studies (CGEE), which co-ordinates the project, the UN Economic Commission for Latin America and the Caribbean (ECLAC), EPE and the Ministry of Foreign Affairs, as well as officials from MME, the Ministry of Science, Technology, Innovation and Communication (MCTIC), ANEEL and the Funding Authority for Studies and Projects (FINEP).

The project's working groups are supporting Brazilian government efforts to deliver national objectives for innovation in low-carbon energy. Specific priorities are: for ministries and agencies to co-ordinate better on energy innovation priorities and activities (notably MME and MCTIC); to improve tracking of public R&D spending to inform policy making; and to increase understanding of energy innovation systems, Brazil's position and policy options to address pressing challenges.



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Energy Big Push workshop in Brazil

The IEA jointly organised a workshop to discuss preliminary results from the four Energy Big Push working groups. With about 50 participants from key Brazilian public institutions, we were able to inform discussions and provide technical support on energy RD&D data tracking and innovation policy making. We welcomed insights from international data experts and partners, and created connections between them and Brazilian officials. The workshop strengthened and expanded collaboration with strategic Brazilian institutions and prepared the ground for the CETP's work with Brazil in 2020.

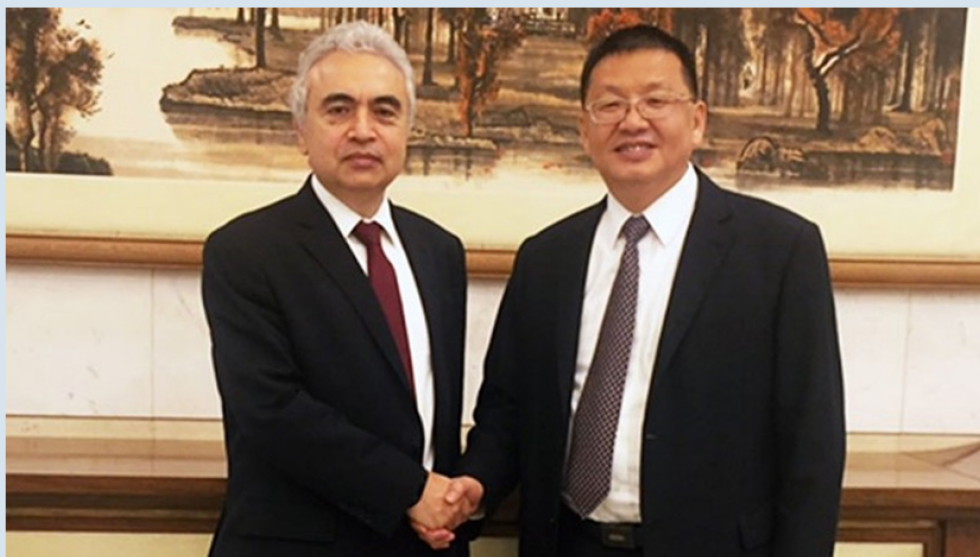
As a key project partner, the IEA jointly organised the days focusing on innovation at the ETLA conference (November 2019), presenting ongoing activities and moderating discussions. The IEA and the European Union jointly organised a side event to showcase the results of the Energy Big Push, held during COP25 in Madrid (December 2019). Presenting the

work being done with Brazil, it was entitled Energy Big Push – Accelerating investments in sustainable energy innovation in Brazil.

Overall, our activities in 2019 have increased the level of understanding of Brazil's energy innovation ecosystem, strengthened the connections between the IEA and local innovation stakeholders, and as such guide the programme of work for 2020-21.

2019 Activities in China

Highlights of 2019 CETP activities in China

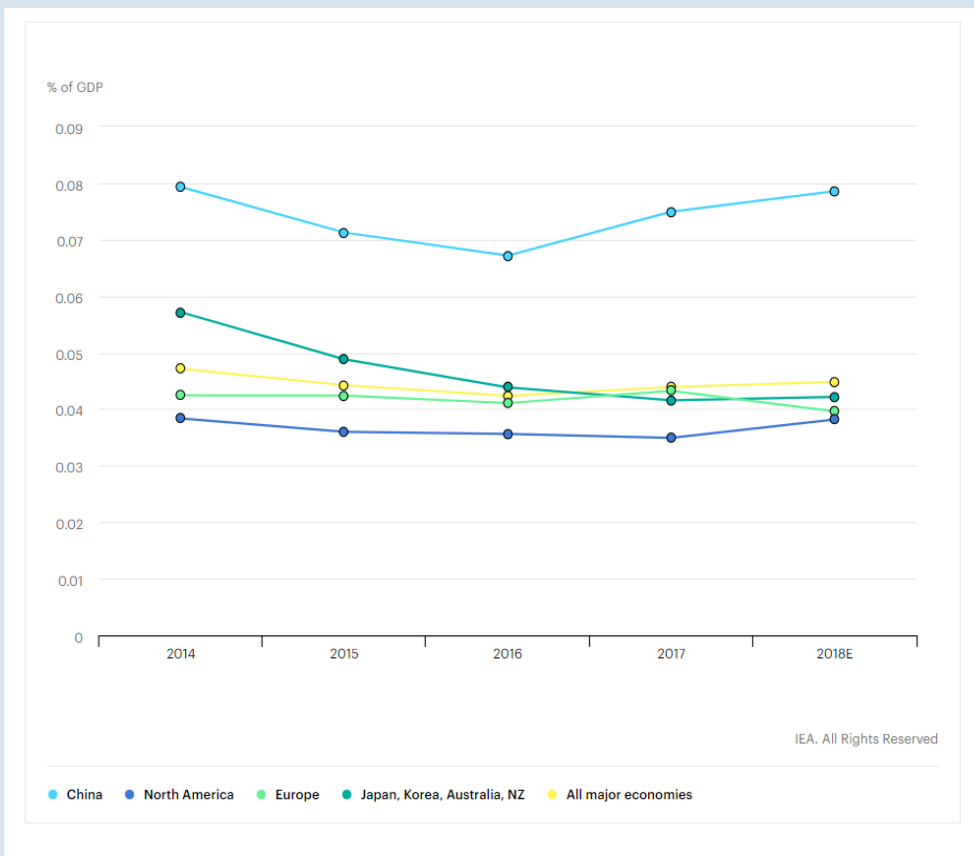


IEA. All rights reserved.

Mr Zhang Jianhua, Director of the National Energy Administration, and Dr Fatih Birol, IEA Executive Director

- The IEA's relationship with China went from strength to strength in 2019 and CETP projects made a significant contribution. We shared global insights on the energy transition with policy makers in China's key ministries. IEA analysts and member countries gained a better appreciation of the energy transition challenges China faces. And we convened partners to work together on power market reform.
- In February 2019 the IEA launched the [China Power System Transformation](#) report, written in collaboration with the Electric Power Planning and Engineering Institute (EPPEI) and China Electricity Council (CEC), among other Chinese partners. The report summarises the state of play of power system transformation in China, discusses global power system transformation, and makes short- and long-term policy recommendations.
- The IEA continues to support China on the design of its national emissions trading scheme (ETS), power sector reform and the long-term low-carbon policy package.
- In June 2019 the IEA and Tsinghua University jointly launched [The Future of Cooling in China](#) report. We then held a workshop on cooling in September, organised with the Building Energy Research Centre.
- The IEA is mapping the Chinese energy innovation ecosystem with the help of a colleague seconded from Agenda 21/Ministry of Science and Technology (MOST). China is in the process of joining the Bioenergy TCP and plans to join two more in the first half 2020.

Spending on energy RD&D as a share of GDP in selected countries, 2014-18



IEA 2019. All rights reserved

Source: IEA (2019), World Energy Investment Report 2019.

Broader China–IEA context

- In 2015 China became one of the first countries to activate association status with the IEA. China participates in 24 IEA [Technology Collaboration Programmes](#) (TCPs).
- Following the opening of the IEA China Liaison Office in Beijing in 2017, we have further strengthened co-operation. For example, the [World Energy Outlook 2017](#) special report focused on China.
- China and the IEA signed a second three-year work programme at the IEA Ministerial in December 2019.
- During 2019 Dr Fatih Birol, IEA Executive Director, met with China’s Energy Minister, Zhang Jianhua, former Minister of Science and Technology, Wan Gang, Vice-Minister of Environment and Ecology, Zhao Yingmin, and Deputy Director of the National Energy Administration (NEA), Lin Shanqing. Deputy Minister Lin participated in the 2019 IEA Ministerial.

Data and statistics

High-level discussions strengthened our connections with China on data

The IEA and China held high-level discussions on data and statistics, strengthening their relations on this topic. The IEA Chief Statistician met

with his Chinese counterparts at the NEA, the National Bureau of Statistics (NBS) Energy Department, CEC, and researchers at the Chinese Academy of Sciences. They discussed topics such as improving the timeliness and the quality of data, and ways to enhance co-operation.

The NBS expressed appreciation for IEA training initiatives on energy data, and proposed that both sides work towards a joint event in 2020 or 2021.



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Dr Shen Weichun, Deputy Secretary General, China Electricity Council, and Dr Nick Johnstone, Chief Statistician, IEA

Energy efficiency

Global benefits result from emerging economy giants sharing insights in this critical area

Cooling has been a key focus of our work in 2019, reflecting the policy priorities set out by the National Development and Reform Commission (NDRC). The IEA has worked closely with Chinese partners to share policy experience on cooling in other countries, especially other emerging economies. We have fostered policy engagement between China and India with workshops and Energy Efficiency Policy in Emerging Economies Training Weeks. The exchange of experience has been particularly valuable for developing and implementing national cooling action plans.

As part of our long-standing partnership with the Tsinghua University Building Energy Research Centre, in September we co-hosted a workshop on cooling in China. While previous workshops focused on technology and policy options to increase the efficiency of space cooling appliances and equipment, the September workshop focused on cooling and its interaction with the energy system more broadly. This included discussions exploring the demand response potential of cooling in residential buildings and implications for policy.

The workshop brought together key stakeholders from government, industry and research, including the NDRC, the China National Institute of

Standardization (CNIS), Energy Foundation China, the State Grid Energy Research Institute (SGERI) and Gree Electrical Appliances, amongst others.

We also facilitated the participation of representatives from CNIS, Tsinghua University and Gree in the international workshop on Energy Efficient Cooling, held in Delhi on 12-13 December 2019. The workshop was organised by the IEA, the Indian Bureau of Energy Efficiency and the Super-efficient Equipment and Appliance Deployment (SEAD) initiative under the Clean Energy Ministerial. Delegates shared updates on progress with cooling action plans, new policies and research, and discussed the steps needed to accelerate more efficient space cooling and cold chains.

Electricity

“Power system flexibility is the most important cornerstone of a fundamentally transformed Chinese power system which achieves the goals of the Paris Agreement.”

IEA (2019), *China Power System Transformation*

The China Power System Transformation report has spurred further co-operation

An important achievement in 2019 was the IEA [China Power System Transformation report](#), which contains tailored analytical output and has also been published in [Chinese](#). It summarises the state of play of power system transformation in China and internationally, and presents the findings of a detailed power sector modelling exercise for China.

We presented the report to key stakeholders at the China Power System Transformation Workshop in Beijing. At the event Chinese officials highlighted that power system market reform was at the core of China’s energy transition.



IEA 2019. All rights reserved.

China Power System Transformation (in Chinese and English): Assessing the benefit of optimised operations and advanced flexibility options

This publication has created new connections between the IEA, its members and China's energy planners. The report has helped to create an enduring exchange as the new Five Year Plan (2021-2025) is framed.

The NEA invited the IEA to convene an International Electricity Market Design workshop in Beijing. Experts from Latin America and the IEA Secretariat shared experiences from other emerging economies in implementing wholesale electricity markets.

Later in the year we built on these efforts by organising follow-up meetings with the NEA in Beijing to discuss how global experience could aid and inform the development of a national power market in China. An expert on SIEPAC (Central American Electrical Interconnection System) joined the discussion to share Latin American experiences.

Our work with the NEA on distributed energy included how to integrate cleaner sources of generation into smarter energy systems. This then led to meetings between the IEA and key energy and macroeconomy planners to discuss power system optimisation.

As part of our high-level engagement work with China, we met with officials from the Ministry of Finance, State Grid Corporation of China and the Energy Research Institute to discuss ongoing work in Paris. And finally, the IEA also participated in the Hainan Clean Energy Transitions workshop to discuss transition to a clean energy system.

Policy advice and modelling

The IEA and China are working closely to design an effective ETS

During 2019 the IEA Secretariat continued working on the full range of opportunities for China's energy transition. In particular, we continued our support for China on the design of its national ETS, on the reform of its power sector and on its long-term low-carbon policy package.

On the ETS initiative the IEA began partnering with the Institute of Energy, Environment and Economy at Tsinghua University on a joint research project to analyse China's ETS and its interactions with the country's energy system and policies at national and provincial levels.

Tsinghua's Institute has been mandated by the MEE to lead the national research on ETS design, making the project directly useful to policy makers. The work will initially analyse the potential regional impacts of China's carbon pricing policy on energy and CO₂ emissions. The project launch prompted further consultation and discussion with key partners and stakeholders on power sector transformation and climate policies (including from the National Centre for Climate Change Strategy and International Co-operation [NCSC], CEC, EPPEI, and CNREC).

The analytical approach being used with China will also serve as a basis for future engagement in the ASEAN region.

In addition, the IEA plans to publish a report in 2020 presenting international experiences of ETS in different jurisdictions around the world, particularly addressing certain commonly faced challenges, from power sector structures to industrial competitiveness. The report aims to support countries interested in establishing an ETS navigate major

issues and questions, share lessons and highlight technical issues warranting further examination.

The IEA also hosted the [19th Annual IEA-IETA-EPRI Workshop on Greenhouse Gas Emission Trading](#) in Paris during October. Delegates from government, the private sector, non-governmental organisations and academia gathered to discuss the latest updates on and prospects for GHG emissions trading around the world. The event provided valuable knowledge for the China ETS project and was attended by key partners from China, including Tsinghua University.

The previous day the IEA brought together a range of experts to discuss China's ETS, delving into the technicalities of ETS design and the power sector, covering issues such as benchmarks, free allocation or auctioning, and price floors and ceilings. Selected participants also held more technical discussions to assess the challenges of China's national ETS. In 2020, the IEA – in collaboration with Tsinghua University – will publish a report assessing the impacts of the ETS allowance allocation on the power sector and organise a workshop with Chinese policymakers and stakeholders to discuss key findings and policy recommendations.



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IEA-Tsinghua project meeting

Our work on the ETS and with China more widely has also been enhanced by several engagements. In May, the IEA organised the workshop China–Europe: Sharing Experiences on Emissions Trading Schemes, with a Chinese delegation of industrial sectors (steel and building materials) joined by relevant French officials, the European Steel Association and EcoAct. We also jointly organised with the Energy Foundation China (EFC) a consultation workshop on China's carbon pricing design and participated in a World Bank event on the China ETS, as well as several other events to continue building relationships and developing our ETS work.

Sectoral work

“China’s track record with energy efficiency standards and building energy codes shows that such policy action works: multiple increases in equipment minimum energy performance standards and building codes have delivered large and cost-effective energy savings in the past two decades.”

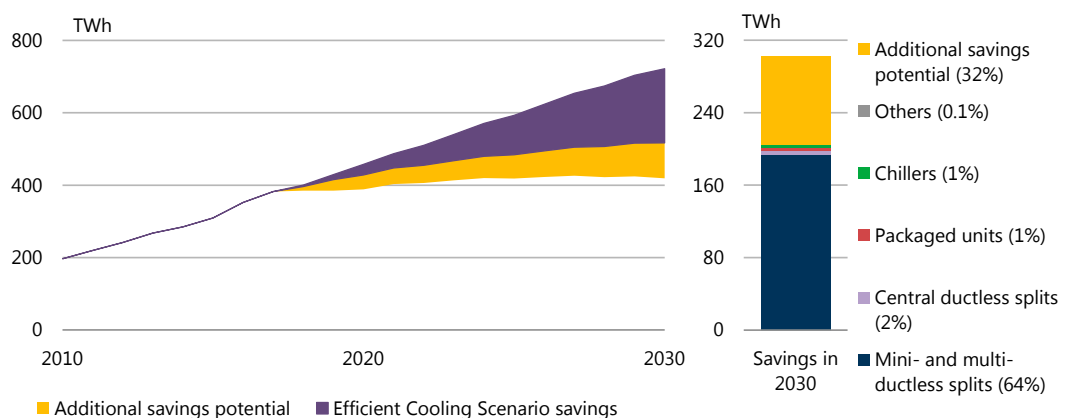
IEA (2019), *The Future of Cooling in China*

The Future of Cooling in China tackles the challenge of space cooling in a carbon-constrained world

Another significant production for the IEA during 2019 was [The Future of Cooling in China](#) report. We launched it at the International Cooling Efficiency Conference in Beijing in June, where over 300 participants gathered from the cooling policy and industry communities. The report explores the principal trends and challenges relating to this rapidly growing sector, and looks into market developments, policies, technology choices and occupant behaviour in buildings in China. It shows how cooling demand in buildings might evolve over the next decade and towards 2030 and considers what China can do to ensure greater cooling comfort without parallel growth in energy consumption and related emissions.

The analysis for this report (including associated research and a technical engagement workshop) ran in parallel with a live policy process – the NDRC, with other government institutions, was developing its Green and High-Efficiency Cooling Action Plan, to which the IEA contributed analytical insights. The Tsinghua University Building Energy Research Centre acted as research partner, while CNIS provided data and EFC was our event launch partner.

Electricity savings for cooling services in buildings to 2030 in the Efficient Cooling Scenario



IEA 2019. All rights reserved.

Source: IEA (2019), *The Future of Cooling in China*.

As part of the IEA's overall work on bioenergy, we also supported the organisation of the Biomass Innovation Technology Conference and Exhibition in Beijing, organised by the Bioenergy Industry Promotion Association. This was the IEA's biggest event in China so far, with over 1 000 policy, academic and industry participants and three sub-forums over two days. IEA staff also held technical exchanges with Chinese authorities to share their insights.

We attended the Workshop on Renewable Energy for Industry and Fuels in Beijing to share international perspectives on electricity and hydrogen in the energy transition and on ammonia production from renewables in China.

Innovation

Sharing data on China's energy R&D spend is a big step forward

In 2019 the IEA's support on clean energy innovation in China resulted in the country sharing with us, for the first time ever, its energy R&D spending data. This enhances global energy data and signals pathways towards further fruitful co-operation. It was a direct result of consistent sharing of joint work, a human resource exchange with MOST and an IEA-hosted webinar in April with MOST and CAS (Chinese Academy of Science) to discuss co-operation on clean energy innovation and energy R&D data reporting. We were able to share the methodology for tracking government spending on energy R&D and possible approaches to estimating private-sector spending. This was a valuable exchange that supported China's reporting to [Mission Innovation](#).



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TCP China Annual Co-ordination Meeting

With a view to strengthening these efforts in 2020-21 and to inform discussions about the country's 14th Five-Year Plan, the IEA team also started mapping the Chinese energy innovation ecosystem. Starting this work has been possible thanks to sustained engagement with MOST,

which seconded an official from ACCA21 to the CETP in the latter half of 2019. This collaboration was also conducive to IEA's active participation in the annual co-ordination meeting of Chinese participants in TCPs in January 2020.

2019 Activities in India

Highlights of 2019 CETP activities in India

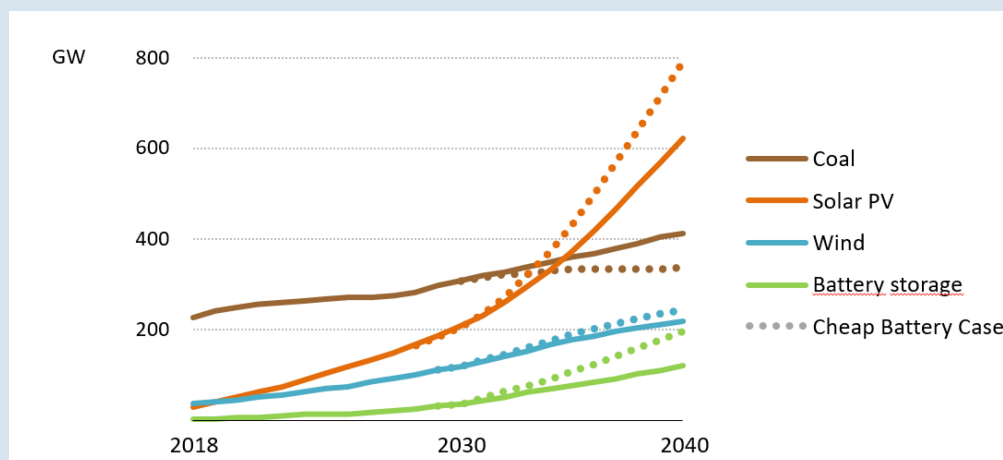


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Launch of India 2020 Energy Policy Review

- The IEA co-ordinated a range of new initiatives in India focusing on energy efficiency, system integration of renewables at the state level, an integrated energy policy response to climate change and challenges relating to air pollution and energy access.
- We undertook the [Energy Policy Review of India](#), which provides insights into the rise of India in the global energy market, comprehensive analysis of the country's energy sector and recommendations for strengthening its energy policies.
- Our extensive work with the Bureau of Energy Efficiency (BEE) focused on an energy efficiency roadmap for residential buildings, work on cooling and facilitating the deployment of EVs in India. It saw domestic and international experts discuss best practices, lessons learned and how to create favourable frameworks.
- The IEA continued partnering with CEEW to provide an update on clean energy investment trends, focusing on utility-scale solar PV and wind investments.
- We published our ground-breaking report [Women Working in the Rooftop Solar Sector](#) jointly with CEEW. It identifies current barriers to women's participation in the sector and opportunities for better gender balance, and makes a number of recommendations.

Installed capacity by source in India in the STEPS and Cheap Battery Case



IEA 2019. All rights reserved

Source; Pavarini, C. (2020), "India is going to need more battery storage than any other country for its ambitious renewables push".

Broader India-IEA context

- The IEA and India have been co-operating since as early as 1998, with the signing of the Declaration of Co-operation covering issues related to energy security and statistics.
- The strong relationship resulted in a special report on India in the [World Energy Outlook 2015](#), and the [Energy Efficiency Outlook for India: Sizing up the Opportunity](#) in 2016, while the [World Energy Outlook 2018](#) included a deep dive into the Indian electricity system.
- India joined the IEA as an association country in March 2017 and participates in 11 IEA [Technology Collaboration Programmes](#) (TCPs).
- In early 2020 the IEA launched the [India 2020 Energy Policy Review](#), the first comprehensive review of the country's energy policies.
- The IEA and India have agreed upon a joint work programme, valid for three years (from 2018 to 2020), identifying a number of priority areas including energy security and energy efficiency. We have also signed MoUs with the Ministry of Petroleum and Natural Gas, and the International Solar Alliance (headquartered in New Delhi). In 2019 we signed an MoU with one of the most prominent energy think tanks in India – The Energy Research Institute (TERI).
- The IEA has also established formal working relationships with NITI Aayog (the government's official think tank), as well as a number of other important partners such as the Council on Energy, Environment and Water (CEEW).

During 2019, Dr Fatih Birol, IEA Executive Director, undertook two missions to India and met with a number of high-level officials, including cabinet ministers of the key energy ministries such as the Ministry of Power, the Ministry of Petroleum and Natural Gas, and the Ministry of New and Renewable Energy (MNRE).

Data and statistics

Working together should allow India to develop a complete energy balance and more complex indicators

Improving energy data has been a cornerstone of CETP work in India. In 2019, as part of an initiative led by NITI Aayog, the IEA continued to participate, either remotely or through our local contractors, in many meetings of the eight cross-ministerial working groups on energy statistics, four focused on the supply side and four on the demand side. This activity facilitates data sharing between various government agencies and helps identify the main gaps and potential ways forward. We also contributed to shaping the reports and recommendations of these working groups.

This co-operation has created a stronger relationship with India, and as a result in 2020 we expect to be able to access and publish India's energy data earlier in the year (in April instead of August).

The IEA launched a new project on biofuel data in co-operation with TERI, to improve data collection, including estimates of bagasse, biogas, animal waste and liquid biofuels volumes, and to drive efforts to automate data collection. The CETP is also funding a study that focuses on automating monthly data harvesting and methodological work to estimate a calendar year energy balance for India.

Energy efficiency

Close co-operation with BEE led to major events on efficient cooling and EVs

In 2019 the IEA continued to strengthen its co-operation with BEE. In March we participated in the International Energy Services Conclave, organised by BEE and the Alliance for an Energy Efficient Economy (AEEE). We facilitated China's participation in the event, which provided a rare opportunity for these two major economies to exchange approaches to boosting the energy service market.

We also joined forces with BEE to organise an initial stakeholder consultation on developing an energy efficiency roadmap for residential buildings.

In December, the IEA, BEE and the Super-efficient Equipment and Appliance Deployment (SEAD) initiative under the Clean Energy Ministerial, jointly organised an international workshop on energy-efficient cooling. Inaugurated by the Secretary of the Ministry of Power, Mr Sanjiv Sahai, the workshop brought together 150 representatives from governments, energy utilities and manufacturers, as well as leading international and domestic experts, to discuss how to accelerate energy efficiency.

BEE is also India's nodal agency for EV charging infrastructure and has the mandate to develop national and subnational policies for the deployment of EVs in India. In November the IEA, BEE and the Electric Vehicle Initiative (EVI) under the Clean Energy Ministerial organised an [international workshop](#) on policies for EV charging infrastructure. The workshop brought together 300 leading domestic and international experts, who discussed best practices, lessons learned and how to create a framework conducive to accelerating deployment of charging infrastructure.



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Mr Abhay Bakre, Director General, BEE, speaks to the press following his participation in the workshop on promoting EV charging infrastructure

Electricity

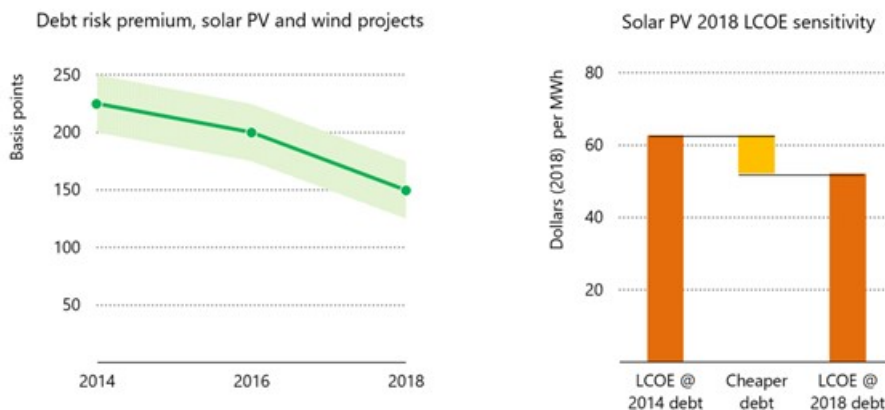
Our research shows the link between perceived risk and making clean energy affordable in India

The IEA continued to foster its partnership with CEEW, one of India's foremost think tanks, producing the report [Clean Energy Investment Trends 2019: Evolving Risk Perceptions for India's Grid-Connected Renewable Power Projects](#).

The report, supported by CETP funds, builds on tailored analytical work prepared in 2018. Launched in July at [CEEW's Energy Horizons conference](#) in New Delhi with an opening address from Dr Fatih Birol, it provides an update on the renewables landscape, trends in investment and financing terms, and enabling regulatory factors for investment in India's power sector. The focus is on utility-scale solar PV and wind investments, but analysis of the thermal power sector acts as a benchmark.

The report also analyses the risk perceptions of debt financiers of utility-scale solar PV and wind projects sanctioned under competitive auction schemes between 2014 and 2018. The report provides critical insights into the evolution of clean energy in India, highlighting how integral lower financing costs have been to scaling up renewables investment. The combination of a maturing market with lower risk perceptions and enhanced bankability for renewables has contributed to better availability and pricing of project debt finance over time, allowing lower-cost investment and smaller levelised costs of electricity (LCOE).

Debt risk premium for renewables and LCOE sensitivity for solar PV



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Source: IEA (2019), *Clean Energy Investment Trends*.

In 2019 the IEA team held a series of bilateral meetings to prepare the work programme on system integration of renewables at the state level – an area we will develop further during 2020.

We participated in the Large-Scale Grid Integration of Renewable Energy conference held in New Delhi in September, and on the margins organised a series of targeted meetings with Indian stakeholders and international organisations. These enabled the team to develop critical relationships and gather updates on the current trends in the Indian power sector.



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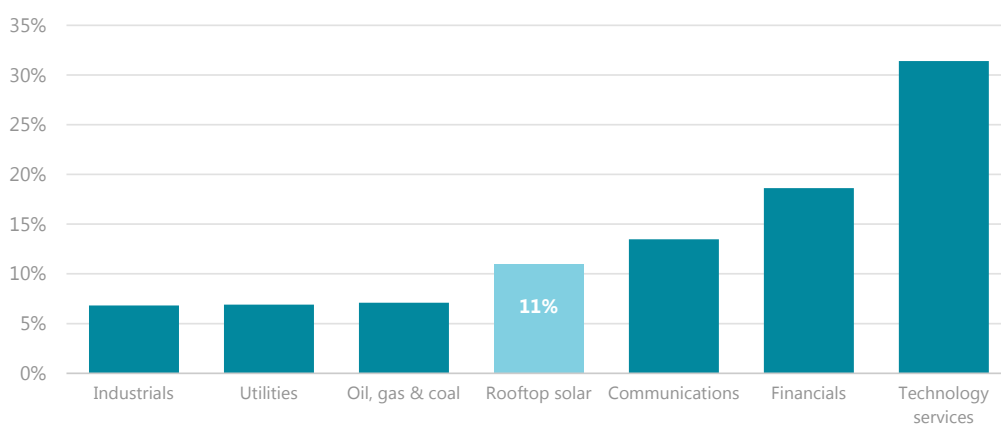
Dr Fatih Birol, IEA Executive Director, at the CEEW Energy Horizons conference

We also continued our work on these activities by participating in European Utility Week and the India Smart Grid Forum, where we presented our latest analysis of storage in electricity markets and met with Gujarat Electricity Regulatory Commission Chairman Kumar to discuss our ongoing project, which will be finalised in 2020.

The CETP also supported important work to improve understanding of gender balance issues in the energy sector. In February we launched a report entitled [Women Working in the Rooftop Solar Sector: A look at India's transition to clean energy](#), jointly produced with CEEW.

Based on a survey of rooftop solar companies and qualitative interviews, the report identifies barriers to women's participation in the sector and opportunities for better gender balance. It also makes recommendations for government policies to scale up the rooftop solar market. CETP funds will continue to support this work in 2020 as an important area related to data and gender.

The ratio of female employees in selected sectors in India



IEA 2019. All rights reserved.

Source: IEA (2019), *Women Working in the Rooftop Solar Sector: A look at India's transition to clean energy*, p. 9

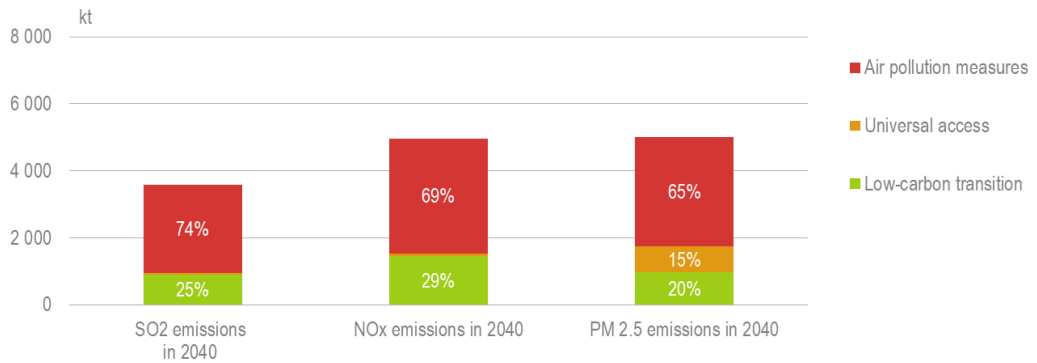
Policy advice and modelling

India 2020 is a landmark report for understanding and advancing energy policy in India

In January 2020 the IEA and the Indian government launched the [India 2020 Energy Policy Review](#) – the result of an extensive process of engagement and discussion, made possible by support from the highest levels of the Indian government.

Dr Fatih Birol [presented](#) the key findings in New Delhi in the presence of several cabinet-level ministers, including Mr Pralhad Joshi (Minister of Coal), Mr Dharmendra Pradhan (Minister of Petroleum and Natural Gas and Minister of Steel), Mr R K Singh (Minister for Power and Renewable Energy), Dr Rajiv Kumar (Vice Chairman, NITI Aayog), Mr Amitabh Kant (CEO of NITI Aayog), energy secretaries, ambassadors, think tanks and the media.

Contribution of sustainable development policies towards air pollutant emissions reductions in India



IEA 2019. All rights reserved.

Note: kt = thousand tonnes.

Source: IEA (2020), India 2020 Energy Policy Review.

“With an impressive track record of expanding access to electricity and clean cooking for its citizens and swiftly deploying renewable energy technologies, India offers an inspiring example for many countries around the world.”

IEA (2020), *India 2020 Energy Policy Review*

In this review, the IEA provides insights into the rise of India in the global energy market and a comprehensive analysis of the country’s energy sector. We make recommendations for strengthening energy policies in numerous areas, including: advancing energy market reforms, notably in power and gas markets; strengthening energy security; integrating higher shares of variable renewables; addressing air and water quality; and reducing vulnerability to the impacts of climate change.



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Launch of the India 2020 Energy Policy Review in New Delhi

In 2019, supported by CETP funds, the IEA launched a new project on integrating energy-related policies on climate change, air pollution and energy access with the Ministry of Environment, Forest and Climate Change (MoEFCC). Discussions in February and September 2019 with relevant authorities, think tanks, other international organisations and potential research partners helped draft and launch this joint project.

Sectoral work

Our work with Indian industry will enhance the Global Iron and Steel Roadmap

The CETP supported India-related work undertaken in 2018 for [The Future of Rail](#) report. The global [launch](#) of the report took place in New Delhi in January 2019, where the Indian Minister of Railways, the Chairman of the Indian Railway Board and Dr Fatih Birol gave speeches.



IEA. All rights reserved.

Mr Piyush Goyal, Minister of Railways, and Dr Fatih Birol, IEA Executive Director

In 2019 the IEA analysed India's iron and steel sector in depth, as part of broader work to produce a global Iron and Steel Roadmap. The impacts of iron and steel manufacturing are highly relevant to energy transitions in CETP priority countries.

We held technical exchanges with over 30 participants at the IEA-led India Steel Experts' Dialogue in New Delhi in February 2019, which we organised in collaboration with the Federation of Indian Chambers of Commerce and Industry (FICCI). We introduced the analysis for the global roadmap, co-ordinated with Indian stakeholders for our country-level work and gained further support from FICCI, who subsequently attended a workshop in Paris in May 2019.

The roadmap – due to be published in 2020 – will explore the technologies and strategies needed for the iron and steel sector to achieve substantial CO₂ emission reductions. It will conclude with priority actions, policies and milestones for stakeholders such as producers, governments, financiers and researchers to accelerate decarbonisation of the iron and steel sector.

Innovation

India's successful approach to energy innovation has a positive message for others

Building on work done in 2018 – including a cross-ministerial roundtable hosted by the IEA and the MST – in 2019 we held several important discussions with key stakeholders in the energy innovation sector.

Our extensive in-country work with India allowed us to prepare several pieces of analysis for the [India 2020 Energy Policy Review](#), particularly with the MST and the Department of Biotechnology, which hosts India's Mission Innovation (MI) unit. The review features a full chapter on energy technology innovation.

As part of our in-depth review process, we examined India's energy innovation landscape (key stakeholders, driving policies, major R&D programmes, success stories and areas for possible improvement), and formulated policy recommendations which we presented to the Indian government.

Some of our recommendations, such as enhancing institutional co-ordination between innovation stakeholders, align well with recent policy discussions and activities in India. The government recently proposed setting up a National Research Foundation, which would pool the country's R&D resources to ensure effective collaboration across all ministries.



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Participation at MI meetings in India in November

In 2019 the IEA participated in several events under MI, a global partnership that is a high priority for India's multilateral engagement on clean energy R&D and innovation.

IEA's work was centre stage, as it offered strategic advice on future pathways for MI beyond 2020. We also had the opportunity to engage with

representatives from several line agencies (Ministry of Science and Technology [MST], MNRE, BEE and Niti Aayog), as well as CETP funders and private-sector players.

At the annual meeting of MI's Analysis and Joint Research group in November 2019 in Delhi, we presented our discussion paper [Clean energy transitions: Accelerating innovation beyond 2020 – Focus on India](#). This builds on extensive IEA–MST collaboration and exchanges throughout the year, as well as findings from the [India 2020 Energy Policy Review](#).

The paper draws on recent analysis of the clean energy innovation landscape in India for insights into how to successfully engage with key emerging economies. It provides an overview of IEA's work on innovation as part of the clean energy transition, tapping into India's experiences and success stories. Its coverage is also relevant to multilateral innovation partnerships such as TCPs, suggesting ways forward for policy and decision makers beyond 2020.

As part of this mission, the IEA team was invited for an on-site visit to the MI-backed Clean Energy International Incubation Centre, allowing us to have conversations with energy entrepreneurs. Activities in 2019 have significantly increased our understanding of Indian energy innovation ecosystem, thereby setting up plans and projects for 2020.

2019 Activities in Indonesia

Highlights of 2019 CETP activities in Indonesia



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Mr Agus Cahyono Adi, Head of PUSDATIN, MEMR, and Dr Fatih Birol, IEA Executive Director

- The IEA has been working with PUSDATIN, Indonesia's energy data and information centre, on developing the country's energy statistics for several years. This has led to tangible improvements in energy data and statistics across demand and supply. Our extensive outreach and consultation with data authorities in 2019 is leading to more timely submission and publication of Indonesian energy data.
- The IEA has provided day-to-day support for energy efficiency policy development in Indonesia, including input into the revision of the flagship energy efficiency regulation.
- Senior management at the Ministry of Energy and Mineral Resources (MEMR) asked the IEA for assistance with developing power sector priorities for the new Indonesian government, including Indonesia's new renewables procurement policy.

Broader Indonesia–IEA context

- In 2013 Indonesia and the IEA stepped up their relationship by undertaking a review of Indonesia's fossil fuel subsidies.
- Indonesia activated association status with the IEA in 2015, and participates in one IEA [Technology Collaboration Programme](#).
- The IEA and Indonesia have completed two in-depth reviews of Indonesia's energy policies, in 2008 and 2015.
- Indonesia and the IEA signed an ambitious two-year joint work programme in December 2019, following several previous successful programmes.

Data and statistics

Our work with Indonesia is yielding results – the earlier release of energy statistics

To continue improving energy data quality and coverage, the IEA has built on its strong partnerships with Indonesian institutions, including PUSDATIN, directorates at MEMR, the Indonesian Biofuel Producers Association (APROBI), the National Energy Council, the state electricity company (PLN) and Indonesian Bureau of Statistics (BPS).

In 2019 we focused our activities on supporting the review of data on a number of topics, such as biofuels (reviewing assumptions and sources), electricity (including additional topics such as off-grid data and prices) and renewable energy (including targets). We also addressed the compliance of official energy statistics and balances with International Recommendations for Energy Statistics (IRES), data validation and challenges in data collection. Our work has been supported not only by IEA missions and exchanges in Jakarta (in August and November), but also by regular conversations with and the support of local co-ordinators in Indonesia.

The IEA Secretariat also jointly delivered a training event in Jakarta organised by PUSDATIN and the Asia Pacific Energy Research Centre (APEREC) with its Expert Group on Energy Data and Analysis in November. This event strengthened links with APEREC and clearly defined methodological issues with Indonesia's energy statistics.

Improving Indonesia energy statistics and balances is ongoing work that is already achieving success, as in 2020 the IEA will be able to publish Indonesia's basic statistics and balances six months earlier (in February instead of August).



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Hands-on capacity building and data work with MEMR and APERC in Jakarta, Indonesia

Energy efficiency

Advances in energy efficiency data and reporting were a particular highlight of 2019

The IEA's work on energy efficiency in 2019 has focused on policy reform, improving data collection methods and reporting. MEMR is currently revising the main energy conservation regulation (regulation 70:2009). We provided detailed guidelines on best practice for energy efficiency policy and are working closely with the ministry to provide inputs where requested.

On industrial energy efficiency, and in addition to the work on energy-intensive sectors across G20 countries, the IEA has been working with MEMR to review and redesign its current industry energy management reporting system and to develop a website with best practice energy efficiency information for industry. The review and recommendations were completed in 2019; both the revised reporting system and website are due to be released in June 2020.

As part of the IEA's broader work on cooling in Southeast Asia, we partnered with two organisations to trial innovative data collection methodologies.

Big2Great ApS (big2great.dk) collected market data on air conditioners and refrigerators from online retailers in Indonesia using a web scraping tool. A report on this work is currently being finalised.

We are also working with Premise (premise.com), who is using crowdsourcing to conduct a retailer survey of air conditioners and refrigerators in stores across Indonesia, Thailand and Viet Nam. If successful, the new and low-cost methods of data collection should greatly enhance the IEA's ability to provide specific policy advice underpinned by high-quality analysis.

Electricity

Progress continues on guiding Indonesia's push for renewables

The IEA analysed the financial sustainability of PLN as part of the [Southeast Asia Energy Outlook 2019](#), assessing the implications for government subsidies under different power system investment cases.

During the year we continued our work to assess renewables costs in Indonesia. Our overall objective is to provide guidance on how they can be reduced.

Finally, the IEA also participated in the 2nd Indonesia Energy Transition Dialogue, organised by the Institute for Essential Service Reform (IESR) in Jakarta. We presented an overview on the global energy transition and contributed to the technical workshops focusing on the energy systems of the future.

In late 2019 Mr Arifin Tasrif was named new Minister of Energy and Mineral Resources in President Joko Widodo's cabinet for his second presidential term. Since then, senior officials in MEMR have requested extensive assistance on power issues, including analytical support for the development of Indonesia's ambitious revised scheme for renewable energy procurement and remuneration, which is a key priority for the Widodo government.

2019 Activities in Mexico

Highlights of 2019 CETP activities in Mexico



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Dr Alberto Montoya, Deputy Secretary of Energy, and Dr Fatih Birol, IEA Executive Director

- The IEA has continued to work with officials in Mexico on energy data and statistics as part of our data collection exercises, while Mexican delegates have been participating in IEA webinars and online courses.
- We also continued our extensive research and analysis on Mexico as an important case study for energy efficiency in buildings, as part of wider work on a greatly improved regional ABC roadmap for Latin America.

Broader Mexico–IEA context

- Mexico officially became the 30th IEA member country on 17 February 2018, and the first member in Latin America.
- As with all member countries, the IEA Secretariat is working with Mexico to provide technical support on data collection systems. Mexico participates in nine IEA [Technology Collaboration Programmes](#).
- Since taking office on 1 December 2018, the administration of President Andrés Manuel Lopez Obrador has been developing its new Sectoral Programme for Energy as well as a new Energy Transitions Strategy. The IEA and the Ministry of Energy (SENER) agreed to explore new bilateral activities once these documents are finalised in early 2020.

- In the meantime, engagement with Mexico consisted of continued dialogue on energy data and statistics as part of IEA data collection, the participation of Mexican delegates in IEA online training and webinars, and liaison with the Global Alliance for Buildings and Construction (ABC) in Mexico on developing a regional roadmap for buildings and construction.

Energy efficiency

Mexico is highly active in buildings energy efficiency at the local level

Throughout 2019 the IEA kept an open line of communication with the new administration in SENER to ensure continued dialogue. At the same time, we continued to update policy data for Mexico in the IEA online international policies and measures database.

Our activities in 2019 included work on buildings and new engagement at the subnational level. Mexico was the most active country to engage in the GlobalABC Regional Roadmap for Buildings and Construction in Latin America. This co-operation was made possible with the help of the IEA's longstanding engagement in Mexico on building roadmaps (including the roadmap for buildings and construction we developed for Mexico in 2017). As part of the work on the regional roadmap, we engaged with diverse stakeholders at the state and municipal level.

Finally, with the significant contribution of the IEA's energy efficiency contractor in Mexico, we developed a [massive open online course \(MOOC\) on Energy Efficiency in Buildings](#) in 2019 together with CAF. The work to design this MOOC included preparing case studies from Mexico and other countries in the region. The local contractor also appeared as one of the course instructors in the audio and video recordings.



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Logo for the MOOC on Energy Efficiency in Buildings

2019 Activities in South Africa

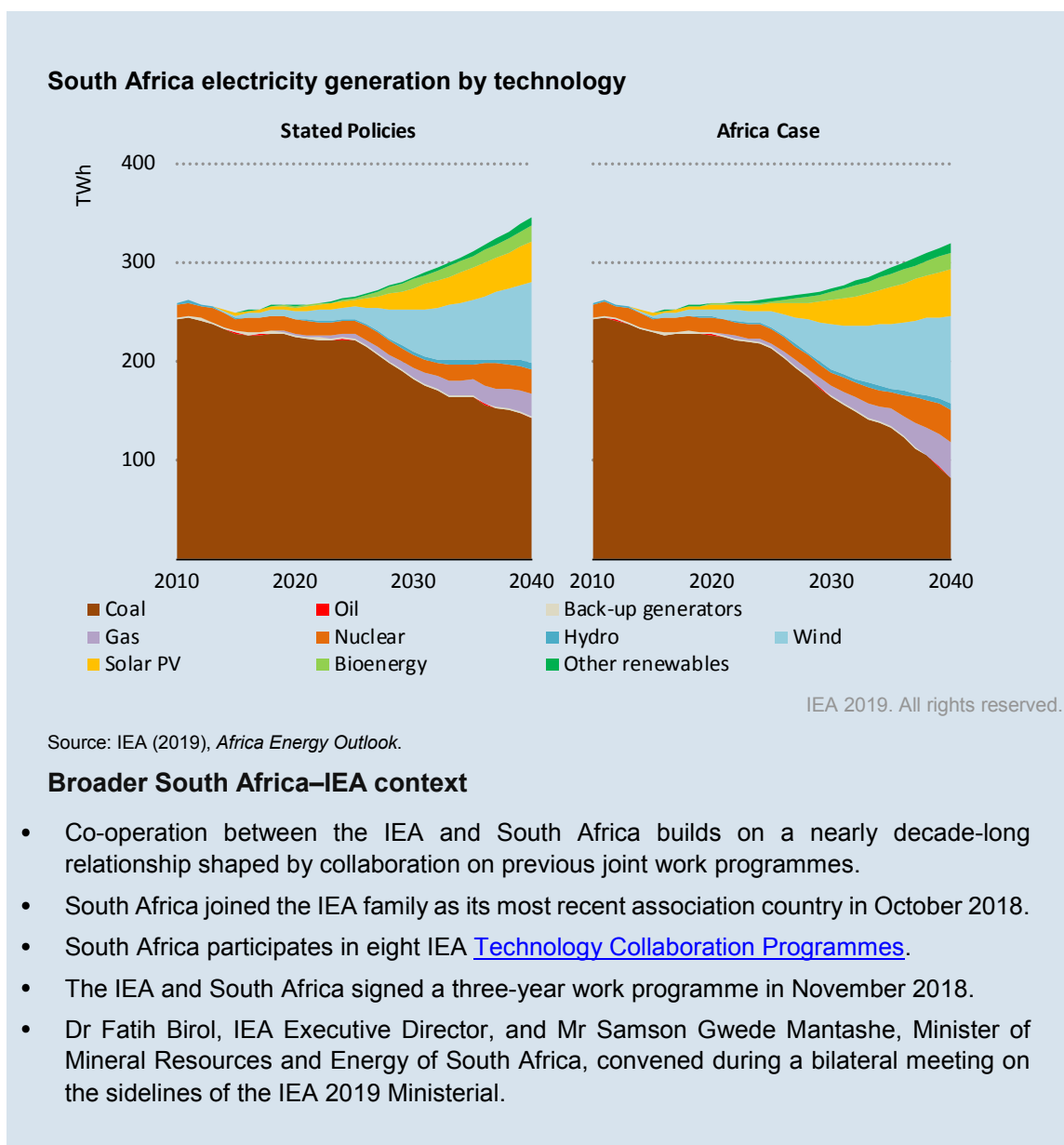
Highlights of 2019 CETP activities in South Africa



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Mr Samson Gwede Mantashe, Minister of Mineral Resources and Energy, and Dr Fatih Birol, IEA Executive Director

- The IEA held its first ever [training week](#) on energy efficiency policy in sub-Saharan Africa from 14 to 17 October 2019 in Pretoria, South Africa. The event brought together about 150 policy makers from 33 countries in sub-Saharan Africa, to equip them with the knowledge and skills to deliver effective energy efficiency initiatives in their respective countries.
- We provided ongoing assistance on energy efficiency policy throughout the year to the Department of Energy (DoE) and the South African National Energy Development Institute (SANEDI), including four webinars with four member countries (Australia, Estonia, Portugal and Spain).



Data and statistics

Closer relations with South African institutions aim to speed up the release of energy data

In the context of the Energy Efficiency Policy In Emerging Economies Training Week (see below), the IEA held a number of bilateral discussions to better understand sub-sectoral data collection across South African institutions, its availability and timelines. We did this with a view to promoting new collaboration on energy efficiency indicators as well as underline the need for good basic energy statistics and balances, in order to develop more detailed indicators.

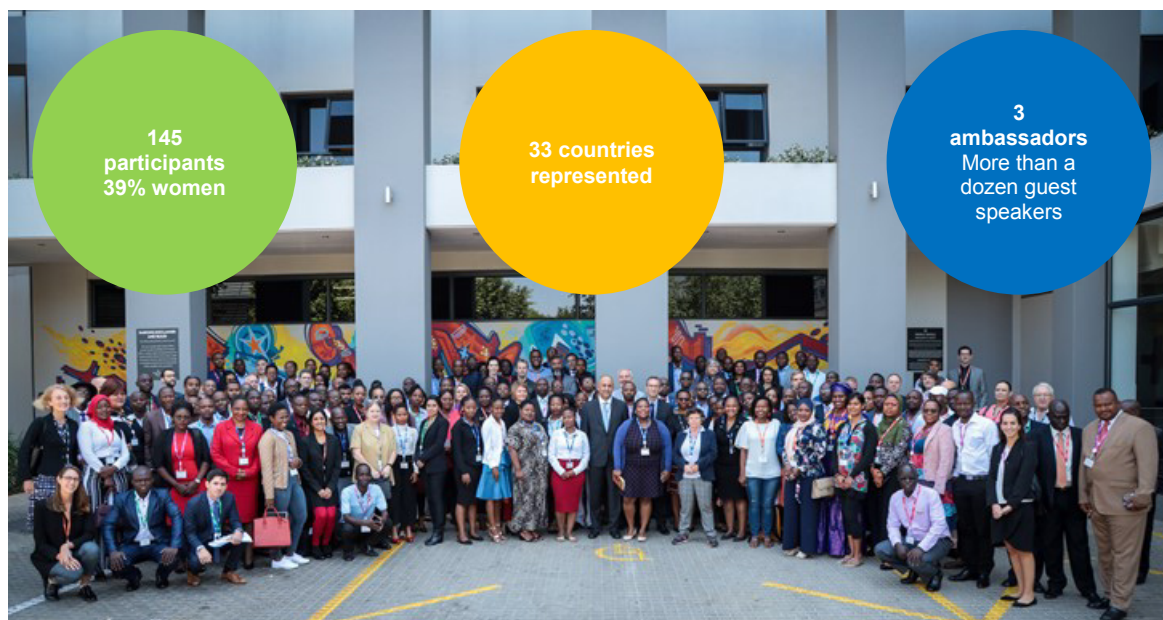
The IEA Secretariat has continued working with South African authorities on issues related to data and statistics through initiatives beyond the CETP. These include the Joint Organisations Data Initiative (JODI) Energy Data Transparency Workshop for a Sustainable Future for African Countries in April and a training event we ran with the African Energy Commission (AFREC) in Johannesburg in October. The Johannesburg

event allowed us to improve our energy estimations and promote the IEA energy balance builder – this will help us produce better data in coming years. Our expectations are that improved communication and closer co-operation could allow the IEA to publish South African energy statistics and balances in April, along with OECD countries, instead of later in August (four months ahead).

Energy efficiency

The IEA–DoE joint training event drew delegates from across sub-Saharan Africa

The IEA's ongoing collaboration with the DoE reached a high point with their co-hosting a very successful [Energy Efficiency Policy in Emerging Economies Training Week](#) in October 2019, the first event of this type in sub-Saharan Africa. In particular, representatives from the East Africa Centre for Excellence for Renewable Energy and Efficiency (EACREEE), ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) were able to attend, reinforcing the IEA's presence and influence in the region.



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Energy Efficiency Policy in Emerging Economies Training Week for sub-Saharan Africa

The IEA's work in South Africa on energy efficiency in 2019 focused on improving data reporting and developing industry indicators. Complementing the work done on energy-intensive sectors across G20 countries, we extended it to less energy-intensive sectors such as the automotive industry, which are of strategic importance to the government of South Africa because of their role in economic development and job creation.

We organised four webinars to assist SANEDI in the development of their new Energy Performance Certificate programme. In each of the webinars, counterparts from four IEA member countries – Australia, Estonia,

Portugal and Spain – presented their experiences and shared best practices. This was very successful in creating a community of practice.

Electricity

Working towards furthering relationships with South Africa's power sector

To begin establishing relationships with South Africa on electricity transitions, the IEA Secretariat attended the Electricity Market Design Seminar in Oslo. Organised by the Oslo Centre for Research on Environmentally Friendly Energy, the event included a session on the MENSA project – the Minerals and Energy Law Cooperation with South Africa. Joining this event allowed the IEA to share experiences on improving electricity market design and regional system integration.

2019 Global activities

Highlights of global CETP activities in 2019

- Supporting the participation of officials from key regions in IEA's Energy Statistics Courses and continuing to produce multimedia tools and manuals in different languages to share in-depth knowledge on several energy statistics topics.
- Assisting energy efficiency policy development using a combination of analytical work, data and skills to focus on the day-to-day needs of officials responsible for delivering energy efficiency policies.
- Continuing support for several initiatives and campaigns under the Clean Energy Ministerial, including the Electric Vehicle Initiative (EVI), the Power System Flexibility (PSF) Campaign, the Super-efficient Equipment and Appliance Deployment Initiative (SEAD) and the Clean Energy Ministerial Investment and Finance Initiative (CEM IF).
- Supporting in-house capacity to enhance air pollution and energy analysis.
- Supporting the participation of energy modellers from emerging economies at the 38th International Energy Workshop.
- Working towards launching a global programme on electro-mobility and obtaining the approval of the Global Environment Facility (GEF) Council for this new work.
- Expanding work and international collaboration on bioenergy after assuming the role of facilitator of the Biofuture Platform.
- Facilitating CETP priority countries' multilateral collaboration under the IEA Technology Collaboration Programme, Mission Innovation and other innovation partnerships for global energy transitions.

In 2019 the CETP has continued supporting work with a global focus and reach. We have carried out our activities to generate outcomes in line with the key pillars of the programme:

- high-level engagement and collaboration
- joint learning and knowledge exchange to formulate and implement policies
- enhancing knowledge and evidence for policy making and implementation
- strengthening the IEA family.

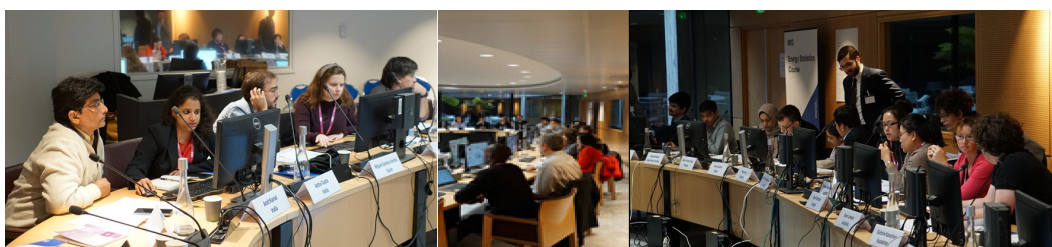
Data and statistics

Our support led to officials from Africa, Asia and Latin America participating in the IEA Energy Statistics Course

As was the case in 2018, joint learning, knowledge exchange and technical collaboration have been central to advancing the CETP's objectives on data and statistics. Sharing best practice enables participating countries to develop and improve the quality of their data and thus their national energy statistics.

CETP support under this work stream enabled officials from priority regions, including Africa, Asia and Latin America, to participate in the 17th IEA Energy Statistics Course in March and the 18th course in October. These events trained participants from over 20 countries on the internationally recognised IEA methodology, as well as the tools for collecting and organising national-level energy data by different fuels and sectors of the economy.

Enhancing the quality and reliability of energy data in targeted countries in some cases allows the IEA to begin co-operation. This leads to the inclusion of new countries in IEA energy statistics and the balances database. For example, the IEA included Uganda, Equatorial Guinea, the Palestinian Authority and Lao PDR in 2019. The courses also continued to be well-attended by other key emerging economies such as China, India and Indonesia.



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18th IEA Energy Statistics Course

The CETP also supports knowledge sharing and capacity building to improve energy data and statistics. In 2019 the IEA continued work to reach Latin American policy makers and statisticians by producing 10 statistics videos in Spanish, which provide more in-depth knowledge on energy statistics. This activity encourages countries in the region to improve their methodologies, in turn enhancing global energy statistics.

Similarly, the IEA translated the UN IRES (International Recommendations for Energy Statistics) into French, allowing countries in sub-Saharan Africa to improve their understanding of energy data collection methodologies, definitions and co-ordination. Similarly the IEA is translating IRES into Chinese and Russian; all translations should be available by the end of the first quarter of 2020.

We are also reaching more statisticians by producing Energy Statistics Manuals in [French](#), [Spanish](#), [Chinese](#), [Indonesian](#) and [Arabic](#), which will facilitate future activities. We produced a series of online training videos in Arabic, covering three modules: data reporting, analysis and energy prices. This will allow the IEA to reach an increasing number of statisticians from the Middle East and North Africa.

Our work during 2019 has also allowed the IEA to:

- Expand the geographical coverage of the prices and RD&D databases.

- Expand the coverage of monthly electricity data from emerging economies.
- Create a global and comprehensive set of indicators to track country-by-country transitions.
- Publish energy statistics and balances for five association countries ahead of time.
- Support other countries on energy statistics and balances (such as Mongolia and Papua New Guinea).

The IEA has continued supporting JODI work, including in Africa and Asia, through the 17th APEC-JODI Workshop on Energy Statistics held in Japan. And finally, priority countries have also benefited from work under the G20 Energy End-Use Data and Energy Efficiency Metrics, jointly led by the IEA and France (through the Agence de l'Environnement et de la Maîtrise de l'Énergie [ADEME]), which included a workshop entitled Uncovering the Role of Digitalisation for Energy Efficiency Indicators, held at the IEA in November.

Energy efficiency

Roughly 400 participants completed the IEA training weeks for emerging economies in 2019

Capacity building and technical collaboration continued to represent a cornerstone of IEA work with emerging economies in 2019, in particular providing the opportunity to learn how to develop and improve national energy efficiency policies and enhancing the exchange of best practice among policy makers.



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Policy training: Energy Efficiency in Emerging Economies

Under this framework, the CETP enabled representatives of emerging economies to take part in IEA training courses and international conferences, namely the [Energy Efficiency in Emerging Economies Training Week](#) held in Paris on 20-24 May 2019 and the [4th Global Conference on Energy Efficiency](#) on 24-25 June 2019, when the Energy Efficiency in Emerging Economies (E4 Programme) roundtable also took place.



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The 4th Global Conference on Energy Efficiency

The Energy Efficiency Policy in Emerging Economies Training Week has become a flagship event of the IEA E4 Programme. The Paris training week in 2019 was the 11th energy efficiency policy training event organised since its inception in 2015. Over 110 participants from 35 countries completed the training, bringing the total number of participants in this series of training weeks to over 1 500.

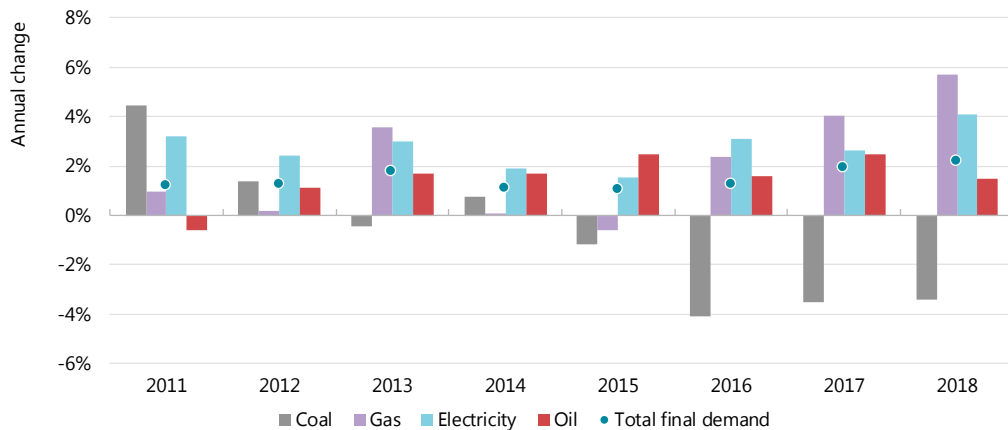
The five-day training programme, including plenary sessions and five parallel sectoral streams (appliances and equipment, buildings, industry, cities, indicators and evaluation) has been designed to strengthen the knowledge base and hone the skills of energy efficiency policy makers. Each year, representatives from E4 partner institutions take part in the training, strengthening relationships with the IEA and becoming part of an international energy efficiency community.

In 2019 we extended the Energy Efficiency Policy in Emerging Economies Training Week to cover sub-Saharan Africa for the first time, with training held in Pretoria during October 2019. We also held the training week for the third time in Southeast Asia, in Bangkok during April 2019.

To reach a wider audience of policy makers, in 2018 the IEA launched two self-paced [online courses](#) on energy efficiency indicators. They are Energy Efficiency Indicators: Fundamentals on Statistics, and Essentials for Policy Making. In 2019 we translated them into Portuguese and Indonesian Bahasa.

Finally, to enhance the evidence base for policy makers and other stakeholders, the IEA developed the most comprehensive analysis of current and future energy efficiency trends to date in [Market Report: Energy Efficiency 2019](#). This report examines in detail the reasons for the recent deceleration in efficiency progress and includes a special focus on the ways in which digitalisation is transforming energy efficiency and increasing its value.

Change in global final demand, by fuel, 2011-18



IEA 2019. All rights reserved.

Source: IEA (2019), *Energy Efficiency 2019*, p. 17.

The [Global Commission for Urgent Action on Energy Efficiency](#) is examining how progress on energy efficiency can be rapidly accelerated through new and stronger policy action by governments across the globe. The commission comprises national leaders, current and former ministers, top business executives and global thought leaders, and was established at the IEA’s 4th Global Conference on Energy Efficiency. The IEA hosted its first meeting in Paris in December 2019, when members worked towards a list of actionable recommendations for governments. The list is due to be released in July 2020, during the IEA’s 5th Global Conference on Energy Efficiency.



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Members of the Global Commission for Urgent Action on Energy Efficiency gather in Paris on 4 December 2019

Electricity

System integration of renewables

We co-hosted a high-level international conference, attended by over 200 delegates

Our activities to continue supporting electricity transitions around the globe included the [Global Ministerial Conference on System Integration of Renewables](#) in Berlin during October, jointly organised by the German Federal Ministry for Economic Affairs and Energy and the IEA.

Speakers and delegates assessed how the world can master [the challenges of system integration](#) and fully take advantage of the opportunities provided by renewable energy. We brought together ministers, deputy ministers and state secretaries from Japan, Morocco, Poland, Sweden, Switzerland, Thailand and the United States, as well as several CEOs of large companies and senior officials from national governments and international organisations. In total over 200 participants attended the event.



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Global Ministerial Conference on System Integration of Renewables

The IEA has also continued to engage in high-level and technical forums to ensure we disseminate important findings and knowledge, and promote the trove of analysis we produce on clean energy transitions. Amongst others, we participated in:

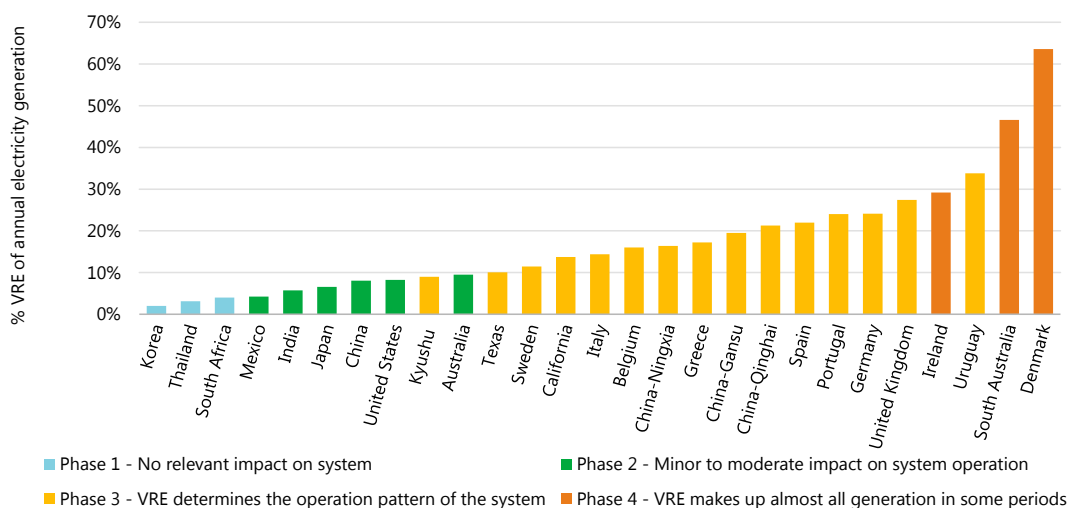
- The Global Forum on Energy Transitions organised by the Florence School of Regulation.
- The World Hydropower Congress held in Paris.
- The 24th World Energy Council.
- The 18th International Workshop on Large-Scale Integration of Wind Power into Power Systems and on Transmission Networks for Offshore Wind Power Plants in Dublin.
- The E-Mobility Power System Integration workshop.

Power System Flexibility Campaign

The IEA contributed in many ways to the successful CEM10 session on power system flexibility

With support from the CETP, the IEA continued to co-ordinate the work of the Power System Flexibility Campaign under the Clean Energy Ministerial (CEM) throughout 2019. This Campaign is co-led and sponsored by both IEA members (Denmark, Germany and Sweden) and association countries (China and India). During the [10th Clean Energy Ministerial \(CEM10\)](#) meeting in Vancouver in May, we provided data, organised events and shared or launched relevant analyses. For example, we jointly organised the Enabling Clean Electricity roundtable with Natural Resources Canada (NRCan) to draw on expertise from various CEM work streams on system flexibility, interconnection and long-term scenarios and planning, while linking them to tangible policy options.

Annual variable renewable energy share and corresponding system integration phase in selected countries/regions, 2018



IEA 2019. All rights reserved.

Source: IEA (2019), *Status of Power System Transformation 2019*, p. 5.

During the side event entitled Market Design for Flexibility: State of Play and Ways Forward, which we co-organised with NRCan, the IEA also launched the [Status of Power System Transformation 2019](#) report. The discussion highlighted the experiences of several stakeholders and priority areas to address power system transformation, including strategies available to utilities, synergies with power market reform, the introduction of new flexibility products and potential for sector coupling.

This report, and indeed our engagement with the CEM members (especially key emerging economies such as China, Brazil, India and South Africa), were the result of extensive groundwork, including CEM's Preparatory Meeting in Santiago during January, the [Power System Flexibility Expert Workshop](#) hosted by the IEA in Paris during February, the Grid Integration of Variable Renewables (GIVAR) advisory group meeting in Paris, also during February, the 17th Executive Committee of the International Smart Grid Action Network in Stockholm and different sessions and workshops at the [Berlin Energy Transition Dialogue in April](#).

IEA involvement at these events and gatherings allowed us to ensure the work on power system flexibility addressed the critical issues and included all relevant stakeholders.

Clean energy financing

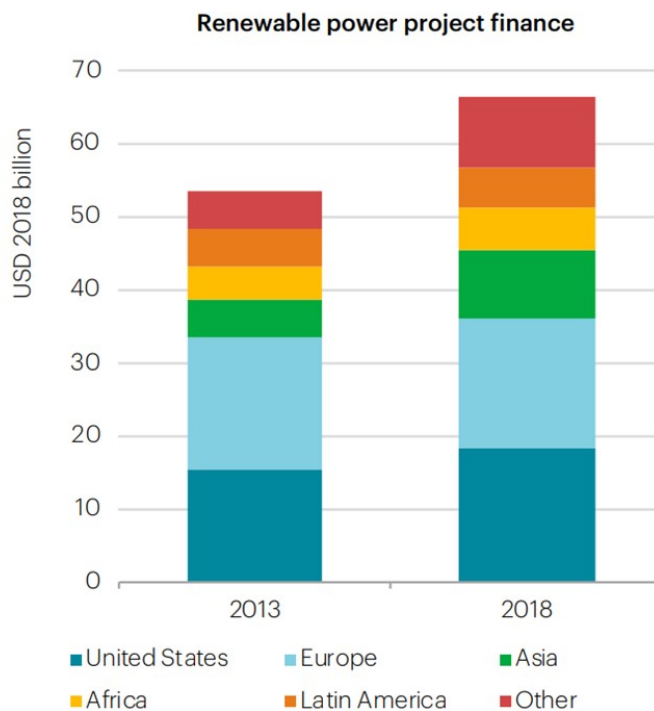
The IEA’s focus continues to be on opportunities to reduce financing costs for clean energy

During December’s 25th Conference of the Parties (COP25) in Madrid, and now with a global audience, the IEA continued sharing knowledge and best practice to improve policy frameworks for electricity finance.

At a roundtable on Policy and Market Drivers for Clean Energy Investment, the IEA facilitated discussions on the recent trends in global energy investment. Participants focused on reliable, affordable and sustainable transitions, and explored the issues that need to be addressed in sub-Saharan Africa to reduce financing costs and attract more investment in clean energy, especially in South Africa.

At COP25, and in collaboration with Denmark and Germany (joint leaders of the Clean Energy Ministerial Investment and Finance Initiative [CEM IF]), the IEA organised a webinar entitled Clean Energy Investment in Emerging Economies: Progress, Risks and Opportunities. The discussion focused on persistent risks and current opportunities to reduce financing costs and further attract capital for clean energy in priority countries. The event built on insights from the recent Energy Outlooks on Southeast Asia and Africa, and other work on clean energy investment and financing in India.

Renewable power project finance



IEA 2019. All rights reserved.

Source: IEA (2019), *World Energy Investment 2019*, p. 133.

During CEM10, the IEA also organised with NRCan a roundtable on Mobilising Investment and Financing, focusing on the interaction of capital, policies and risks for clean energy. Participants identified a need for greater focus on areas such as regulation, financial de-risking, balancing supply and demand, and communications. This roundtable also informed IEA's work under the CEM IF.

The IEA is also seeking to partner with other institutions to continue and expand its work on policy frameworks for financing electricity. The IEA participated in the Climate Investment Funds (CIF) Network Partnership launch event in London and became a partner. This will allow us to further collaborate and co-ordinate with members of the network as well as with the CIF in general.

Policy advice and modelling

The IEA received wide support for further CETP work on climate resilience and electricity security in 2020

In 2019 the CETP supported enhancement of the IEA's capabilities to assess air pollution and new IEA work to improve assessment of climate impacts on energy transitions.

The IEA held a workshop in Paris during October as a platform to exchange technical expertise on climate change impacts and resilience in the energy sector. The workshop also provided a venue to identify opportunities for experts and organisations to collaborate on this topic.

Participants discussed climate change impacts on the energy sector, and focused on how to systematically capture and assess the climate resilience of energy systems. They also shared information on newly available guidelines to enhance the climate resilience of the energy sector, and their application to real projects, and discussed electricity security in the context of the growing risks of climate change.

Over 20 participants from several countries and institutions such as the World Bank, OECD and EBRD provided positive feedback and welcomed the IEA's plan for the CETP to support further work on climate resilience and electricity security in 2020.

Our efforts to develop local modelling capacity during 2019 included the CETP's support for 20 energy modellers from emerging and developing economies to attend June's [38th International Energy Workshop](#) in Paris. The event included three plenary sessions and more than 100 presentations in parallel sessions focusing on a wide array of topics, including environmental and climate policy, renewable and innovative energy technologies, and economics in the energy transition context. Overall, more than 250 delegates from over 40 countries participated.



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Professor William Nordhaus delivers his opening keynote address at IEW 2019

Sectoral work

Buildings

Producing regional roadmaps greatly broadened the IEA's network of actors in the buildings and construction value chain

The IEA produced the [2019 Global Status Report for Buildings and Construction](#) in collaboration with the GlobalABC and its members. The report shows the key trends for energy consumption and carbon emissions in the buildings and construction sector. It also contains case studies and policy updates collected from GlobalABC members.

The IEA produced Regional Roadmaps for Buildings and Construction for Latin America, Asia and Africa, as well as a Global Roadmap. We developed these roadmaps in collaboration with the GlobalABC and engaged approximately 700 people in total, across a variety of stakeholder groups, in the form of webinars, online surveys, in-person workshops and training.

Producing these roadmaps greatly broadened the IEA's network of actors in the buildings and construction value chain across these regions (including urban planning, materials, clean energy and capacity building). The four stakeholder-driven roadmaps describe the critical actions required to decarbonise the buildings and construction sector, and are due to be published in March 2020. More details on the individual regional documents can be found under Regional Activities.

The IEA also produced new analysis on [Material Efficiency in Clean Energy Transitions](#) to assess the potential for material efficiency and the resulting energy and emissions impact for critical energy-intensive materials. Our global analysis is highly relevant to emerging economies. We presented it in Berlin at a workshop attended by around 40 participants from industrial associations, NGOs and German federal ministries.

In April the IEA published the report [Perspectives for the Clean Energy Transition: The Critical Role of Buildings](#), the third report in a series launched in support of the German presidency of the G20 in 2017. With this report, the IEA provided further insights into the fundamental role of energy efficiency to achieve the energy transition and the critical role buildings can play in meeting climate change ambitions, using a portfolio of clean energy solutions that exist today. The analysis considers the investment needs and strategies to enable the buildings sector transition, and the multiple benefits the transformation would deliver, including improving the quality and affordability of energy services in buildings for billions of people.

In 2019 the IEA also produced the report [Heating and Cooling Strategies in the Clean Energy Transition: Outlook and lessons from Canada's provinces and territories](#), which is of value to clean energy transitions globally. Our analysis aims to improve understanding of heating and cooling services in buildings as they relate to energy policies and energy demand patterns, pulling from the wealth of Canadian provincial data. The study provides useful insights for other countries looking to curb energy demand and the environmental footprint of the buildings sector, as they chart a path towards a low-carbon economy future.

Bioenergy

In 2019 the IEA took on the role of facilitator of the Biofuture Platform, a partnership of 20 countries

CETP work on bioenergy expanded during 2019, especially as in February the [IEA took over](#) from Brazil the role of the facilitator of the [Biofuture Platform](#). It is a global partnership of 20 countries that aims to strengthen international engagement among policy and decision makers on scaling up sustainable bioenergy worldwide, addressing the benefits, opportunities and priorities, and accelerating the transition to bioeconomy worldwide.

The 20 countries participating in the Biofuture Platform include CETP focus countries (Brazil, China, India and Indonesia), several IEA members and other developing economies (Argentina, Canada, Denmark, Egypt, Finland, France, Italy, Morocco, Mozambique, the Netherlands, Paraguay, Philippines, Sweden, the United Kingdom, the United States and Uruguay).

At the direction of the platform's Core Group (led by Brazil and including Canada, India, the Netherlands, the United Kingdom and United States), the IEA organised several events throughout the year to strengthen co-operation and country ownership of the mechanism. These included a workshop on innovation in sustainable bioenergy as part of [the IEA Renewable Energy Industry Advisory Board](#) in Paris during April.

In May the CETP also supported a workshop on bioenergy sustainability governance in Utrecht, organised by the IEA Technology Collaboration Programme on Bioenergy with the Global Bioenergy Partnership (GBEP), the Food and Agriculture Organization of the United Nations (FAO), the Biofuture Platform, the International Renewable Energy Agency (IRENA) and below50, hosted by the Netherlands Enterprise Agency (RvO).



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Workshop on Bioenergy Sustainability Governance in Utrecht, with the Biofuture Platform, the IEA Bioenergy TCP and other global partnerships

As part of the work of the Biofuture Platform and collaboration with the Clean Energy Ministerial, the IEA joined the government of Brazil in organising a high-level exchange during CEM10 in May. Entitled Sustainable Bioenergy and Biofuels: The Road to Low-Carbon Transitions, the side event provided an opportunity to consider how a possible new work stream on bioenergy could advance the CEM mission, including through synergies with other multilateral endeavours such as the Biofuture Platform, Mission Innovation and the IEA's work.

The event encouraged exchanges between the governments of Brazil, Canada, China, Denmark, Finland, France, India, Indonesia, Italy, the Netherlands, Sweden, the United Kingdom and the United States, and was also attended by selected representatives from private-sector, international and non-governmental organisations.

The IEA also participated in the 2019 Bioenergy Week held by GBEP in Manila during June, as well as the Biomass Innovation Technology Conference and Exhibition in Beijing during November. In the second half of 2019, under the Biofuture Platform the IEA has been working to establish a basic analytical framework for characterising and mapping the impact of policy instruments to promote and support bioenergy technologies on the maturity of markets.

Hydrogen

The Future of Hydrogen report was a landmark publication that should increase insight

At the request of the government of Japan under its G20 presidency, the IEA launched [The Future of Hydrogen](#) landmark report in June 2019. It analyses the current state of play for hydrogen and offers guidance on its future development. The study is of great relevance to priority countries and stakeholders as it provides an extensive and independent assessment of hydrogen that lays out where things stand now, the ways

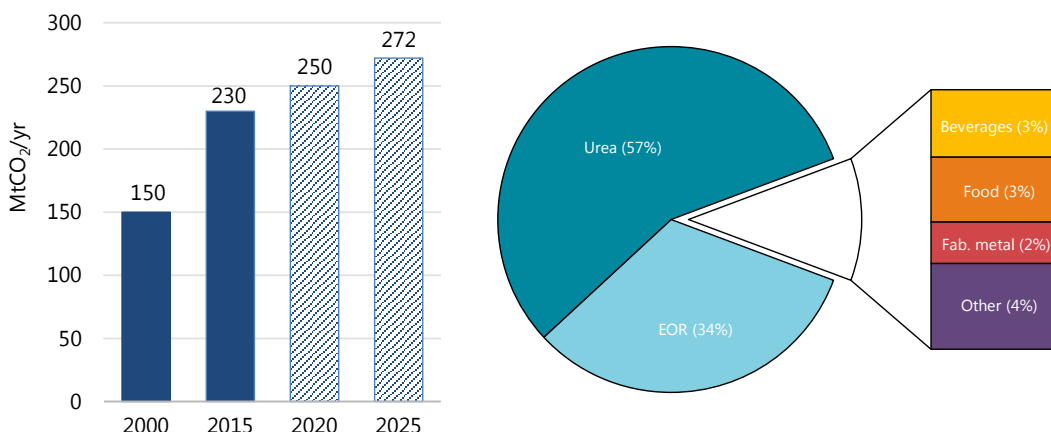
in which hydrogen can help to achieve a clean, secure and affordable energy future, and how we can go about realising its potential.

Taking advantage of the report’s findings and to further increase understanding among key decision makers of hydrogen’s potential roles and challenges, the IEA also engaged in technical exchanges such as the Poland High-level Roundtable on Hydrogen in June and the EPRG & MIT-CEEPR International Energy Policy Conference in September.

Carbon capture, use and storage (CCUS)

The [Putting CO₂ to Use: Creating Value from Emissions](#) report is another example of relevant analysis produced by the IEA in 2019 for clean energy transitions. The analysis considers the near-term market potential for five key categories of CO₂-derived products and services (fuels, chemicals, building materials from minerals, building materials from waste, and CO₂ use to enhance the yields of biological processes). Our analysis will be of particular relevance as new opportunities to use CO₂ attract the attention of governments, industry and the investment community across the world.

Growth in global demand for CO₂ (left) and breakdown of demand in 2015 (right)



IEA 2019. All rights reserved.

Source: IEA (2019), *Putting CO₂ to Use: Creating Value from Emissions*, p. 6.

CCUS legal and regulatory database

We are enhancing our CCUS database to share best practice and simplify deployment

The IEA is enhancing its existing CCUS legal and regulatory database with the goal of sharing best practices and facilitating deployment of CCUS. The CCUS Unit and the Office of the Legal Counsel are leading the project, with support from students at the Sciences Po Law School Clinic.

The database maps legal instruments related to CCUS in a number of relevant jurisdictions, with a view to providing regulators and policy makers with an overview of available legal frameworks, in particular in CETP priority countries that may be considering adopting CCUS-related laws. The project also includes research on related legal issues such as

the transboundary transport of CO₂ under the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention).

Our aim is for this project to contribute to meeting energy and climate goals worldwide by sharing experience and best practices in the development of legal and regulatory frameworks for CCUS.

Additional analysis on energy transitions

“Overall, the case studies in this report show that the contribution of gas to energy transitions varies widely across regions, between sectors and over time. They also highlight the limits of this contribution: gas cannot, of course, do it all. It can bring environmental benefits, but it remains a source of emissions in its own right and new gas infrastructure can lock in these emissions for the future”.

IEA (2019), *The Role of Gas in Today's Energy Transitions*

In 2019 the IEA produced an analysis of [The Role of Gas in Today's Energy Transitions](#). Of relevance to clean energy transitions in priority countries and globally, this World Energy Outlook special report examines the role of fuel switching, primarily from coal to natural gas, to reduce CO₂ emissions and air pollutants. Our analysis includes four case studies (covering China, the European Union, India and the United States) which reveal the opportunities, hurdles and limits of fuel switching as a way to address environmental challenges.

Innovation

We aim to inform discussions on how to improve co-operation and information sharing on innovation

As part of our global work on innovation, the [3rd IEA Universal Meeting of Technology Collaboration Programmes](#) (TCPs) was held in Paris during June to promote co-operation between experts from across the world.

During this high-level event, we dedicated a special session to engaging with emerging economies on technology and innovation. The CETP gave a scene-setting presentation to promote the programme's work on this topic among the over 140 participants, including those from 29 IEA member countries, plus Argentina, Brazil, India and the Russian Federation.

We also launched a report on [Energy Technology Innovation Partnerships](#), a broader IEA report relevant to energy transition for CETP priority and other countries. The report finds that limited information is available on the full range of multilateral initiatives and how they interact, despite the recent proliferation of collaborative mechanisms relevant to energy technology innovation and its central role in global energy transitions.

The study aims to:

- Inform discussions on how to support efficient co-operation and information sharing across various mechanisms.
- Compare the structure and activities of four selected mechanisms: TCPs, Mission Innovation (MI), the Clean Energy Ministerial (CEM), and the European Technology and Innovation Platforms (ETIPs).
- Lay out opportunities for future work.

An important trend for international partnerships on innovation is the increasing participation of emerging economies, such as China (currently a member of 24 TCPs), India (11), Mexico (10), South Africa (8) and Brazil (5).



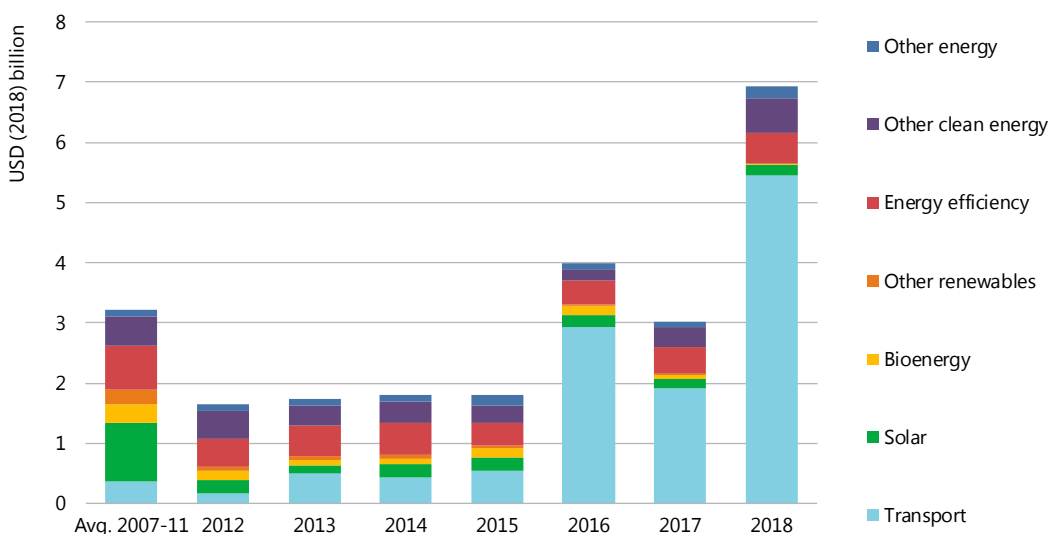
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3rd Universal Meeting of IEA TCPs, 18-19 June 2019

Work on innovation under the CETP has fed into broader IEA analytical pieces, such as the production of world-leading statistics on energy innovation investment (e.g. public and private spending on energy R&D, venture capital deals). Thanks to submissions from counterparts in Brazil, China and India, coverage of CETP countries has been better than ever and we expect it to further improve in 2020.

These analyses provided inputs for the IEA report [World Energy Investment 2019](#), a web article and two data releases during 2019, as well as for Mission Innovation under the public R&D tracking work stream. We trialled a broader approach to energy policy reviews as part of the [India 2020 Energy Policy Review](#) and the Energy Big Push project with Brazil, and this may be suited to other CETP and IEA family countries in the future.

Global venture capital investments in energy technology start-ups



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Source: IEA (2019), *Energy Technology Innovation Partnerships*, p. 9.

As part of global work on innovation as a key driver for clean energy transitions, our enhanced [innovation web portal](#) brings together the IEA’s innovation efforts, data and partnerships across all technologies, serving as an essential and up-to-date resource for government and private-sector decision makers.

The IEA is engaged in efforts to increase the information available on critical long-term priorities for advancing energy technology. The IEA’s [Innovation Gaps](#) framework identifies long-term technology challenges for research, development and demonstration that need to be met to achieve long-term clean energy transition goals.

We have also been working towards an innovation framework to support governments to better understand and enhance innovation mechanisms. While innovation policy has traditionally focused on funding for R&D, many other components underpin successful innovation systems, including knowledge management and market structure analysis.

2019 Activities in Africa

Highlights of CETP activities in Africa during 2019

- The IEA held its first ever training week on energy efficiency policy in sub-Saharan Africa in Pretoria, South Africa, bringing together about 150 policy makers from 33 countries to equip them with the knowledge and skills to deliver effective energy efficiency initiatives in their respective countries.
- We developed a Regional Roadmap for Buildings and Construction, which identifies the key actions and timelines towards decarbonising buildings and construction between now and 2050.
- IEA-wide work in Africa focused on accelerating the achievement of UN Sustainable Development Goal 7 (SDG 7) and producing up-to-date knowledge and cutting-edge analysis of clean energy transitions in selected African economies and regions.

Data and statistics

Our collaboration with AFREC continues on a range of statistics

The IEA Secretariat has continued collaborating with the African Energy Commission (AFREC) to consolidate capacity on basic energy statistics and energy balances and to expand work on additional topics, such as energy efficiency indicators and prices. Our partnership with AFREC covers both regional capacity-building initiatives and technical support for the design of questionnaires. These activities, although not funded by the CETP, have included priority countries and the continent as a whole given Africa's important role in achieving global clean energy transitions.

Energy efficiency

The first ever training week in sub-Saharan Africa was widely supported

The IEA held its first ever [Energy Efficiency Policy in Emerging Economies Training Week](#) in sub-Saharan Africa from 14 to 17 October 2019 in Pretoria, South Africa. The event brought together more than 140 policy makers from 33 countries in sub-Saharan Africa, to equip them with the knowledge and skills to deliver effective energy efficiency initiatives in their respective countries.

Representatives from the East Africa Centre for Excellence for Renewable Energy and Efficiency (EACREEE), ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) attended, reinforcing the IEA's presence and relations in the region. Following several requests, we are now in discussions about organising the next Energy Efficiency Policy Training Week in Africa for 2020.



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Participants at the Energy Efficiency Policy Training Week in South Africa

Policy advice and modelling

“Africa has the opportunity to pursue a much less carbon-intensive model of development than seen in many other parts of the world. [...] With the appropriate policies to support a strong expansion of clean technologies and sufficient emphasis on energy efficiency improvements, Africa could be the first continent to achieve a significant level of economic and industrial growth with cleaner energy sources playing a prominent role than other economies in the past.”

IEA (2019), *Africa Energy Outlook 2019*

Our new initiative seeks to stimulate progress towards SDG 7 in Africa

Our growing work with Africa includes the launch of a new IEA-wide initiative to accelerate energy transitions that stimulate progress towards UN Sustainable Development Goal 7 (SDG 7) in targeted African emerging economies. This is additional to existing IEA work and complementary to our other proposed Africa-related projects. The new initiative seeks to foster high-level political engagement to accelerate the achievement of SDG 7 in the targeted economies, and will produce up-to-date knowledge and cutting-edge analysis on the costs and benefits of clean energy transitions to support evidence-based policy making.

All this work was supported by and will build on several technical and high-level gatherings, including the [1st African Union Commission \(AUC\)–IEA Ministerial Forum](#), held in Addis Ababa in June, and the 2019 [IEA Africa Roundtable: Energy for a Continent of Two Billion: What Opportunities for Africa and the World?](#) organised during the IEA Ministerial in December.

In 2019 we also engaged in several discussions to ensure buy-in for the activities to disseminate the key findings of the [Africa Energy Outlook 2019](#). These included launching and presenting the report at the Africa Investment Forum 2019 in Johannesburg in November, and presentations during COP25 at the Francophonie pavilion and at several other energy events across Africa.

Africa Energy Outlook 2019



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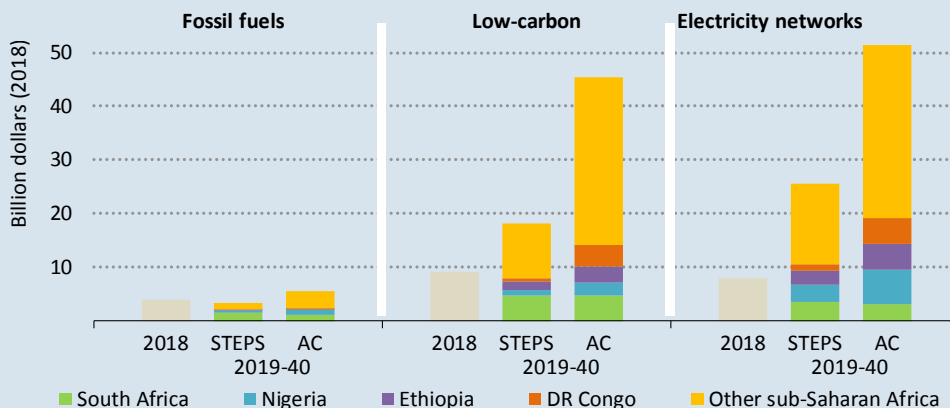
Launched at the Africa Investment Forum 2019 in Johannesburg in November, the [Africa Energy Outlook 2019](#) comes five years after the World Energy Outlook first special report on Africa. For this edition, the IEA has updated and expanded its outlook for the continent based on in-depth, data-rich and country-specific analysis. This new analysis provides important policy insights to help African energy stakeholders achieve the continent's growth ambitions in a sustainable and inclusive manner.

The Africa Energy Outlook is our most comprehensive and detailed work to date on energy across the African continent. It has a particular emphasis on sub-Saharan Africa and includes detailed energy profiles of 11 countries, which represent three-quarters of the region's GDP and energy demand. Further details and tailored outlooks for the [Democratic Republic of the Congo](#), [Ethiopia](#), [Kenya](#), [Nigeria](#), [Senegal](#), [South Africa](#) and other countries can be found on the [analysis web page](#).

The analysis makes a clear case for the achievability of investment mobilisation in the region: when compared to other historical investment cases at a global level, the fourfold

increase needed to achieve the ambitious clean energy transition goals for Africa by 2040 is in line with that achieved in the last two decades by other global major players.

Annual average power sector investment by scenario in sub-Saharan Africa



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Note: AC = Africa Case.

Source: IEA (2019), Africa Energy Outlook 2019.

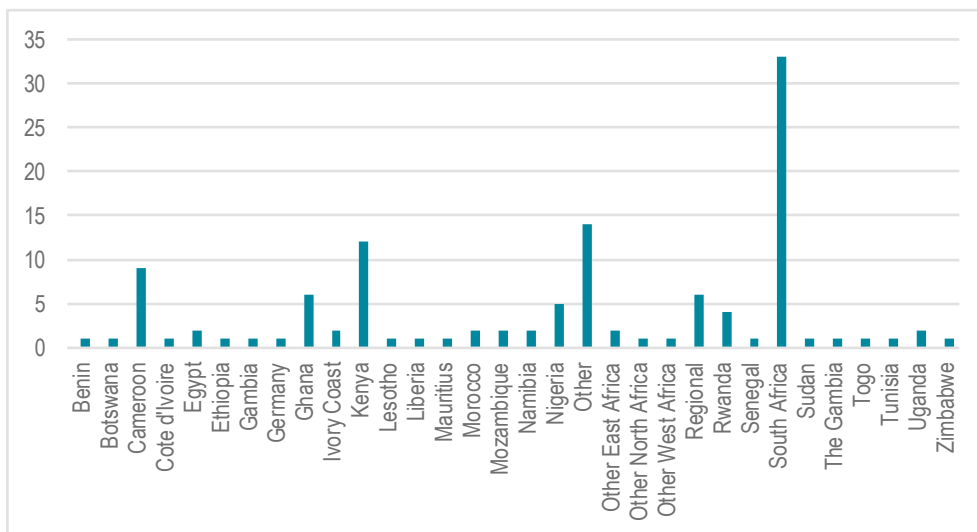
Sectoral work

The GlobalABC Africa Roadmap benefited from wide participation

The GlobalABC Africa Roadmap for Buildings and Construction, due to be published in March 2020, includes contributions from 23 countries across the region. In total, approximately 120 stakeholders participated in the process, representing a broad range of sectors, including academia, the private sector, finance, the public sector and civil society. They participated through in-person workshops, training events, webinars, document reviews and online questionnaires.

Find more details on the GlobalABC Regional Roadmaps in the Global Activities' sectoral work chapter. Stakeholders have welcomed the initiative, appreciating the structure and development process.

Participants in the engagement process for the GlobalABC Africa Roadmap for Buildings and Construction



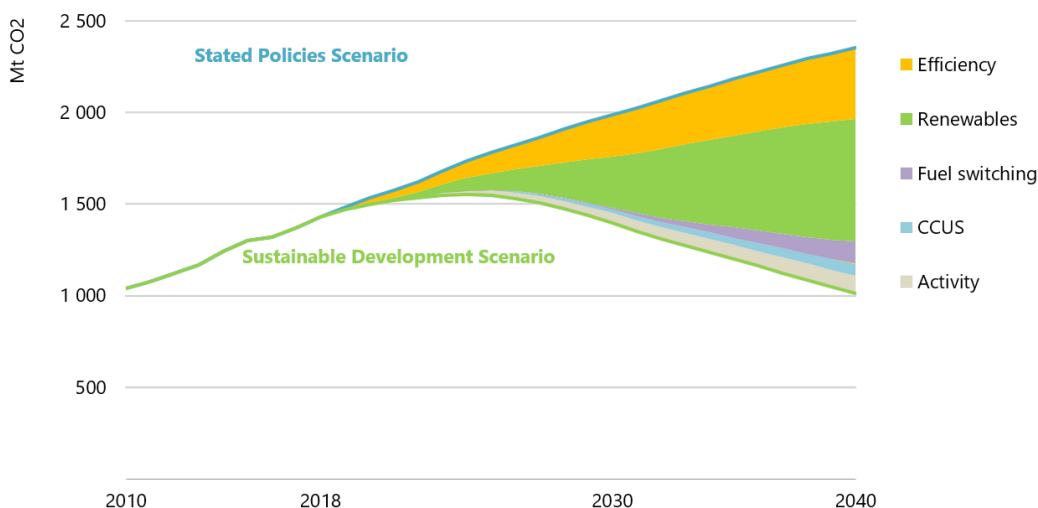
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2019 Activities in Southeast Asia

Highlights of CETP activities in Southeast Asia during 2019

- The efforts of the IEA and the ASEAN Secretariat to consolidate our [strategic partnership](#) and the strong collaboration at the 37th ASEAN Ministers of Energy Meeting.
- The IEA analysis of ASEAN renewables integration, where we assess the capacity of regional power system integration to accommodate a growing share of variable renewables.
- The IEA report on establishing multilateral power trade in ASEAN, which sets out clear recommendations to achieve it.
- Assessing Southeast Asia’s energy outlook, including a deep dive on current investment and financing trends and investment gaps.
- Exploring trends and challenges related to cooling in Southeast Asia.

CO₂ emission reductions in the Sustainable Development Scenario relative to the Stated Policies Scenario and related technologies in Southeast Asia



IEA 2019. All rights reserved.

Source: IEA (2019), *Southeast Asia Energy Outlook 2019*.

2019 was a busy and highly productive year for engagement with ASEAN

At the ASEAN Ministers of Energy Meeting (AMEM) in Singapore in 2018, ministers called for “[stronger institutional ties](#)” between the IEA and ASEAN. They set out a number of mandates for IEA support of ASEAN energy priorities in the areas of cooling efficiency, renewables integration and regional power trade.

2019 was a busy and highly productive year for engagement with ASEAN, which was chaired by Thailand, an IEA association country. We completed an [ambitious work](#) programme, discussed further below, in which we led three out of Thailand's eight 2019 ASEAN priorities.

As a result, at the 2019 AMEM in Bangkok ASEAN ministers uniquely designated the IEA a [key strategic partner](#) and called for the IEA to provide additional support to Viet Nam's chairmanship in 2020 and for the continuation of work in 2020 on energy efficiency, renewables integration and, notably, regional power trade – for which ministers set out an ambitious roadmap based on IEA analysis and recommendations in 2019.

Data and statistics

The IEA has been working with Singapore on a range of data-related matters

The IEA liaised with officials from Singaporean institutions to continue improving energy data quality and coverage, including a constructive conference call with the Singapore Energy Market Authority (EMA) in late 2019 and follow-up exchanges. The primary topics included data gaps, timeliness, discrepancies in the oil balance, and confidentiality. EMA provided insights into their data collection system and was open to exploring ways of increasing data transparency. They also requested our guidance on dealing with outliers in coal trade data, reporting on natural gas as feedstock and oil products classification. We have since been working with EMA to resolve the issues.

At the third [Energy Efficiency Policy in Emerging Economies Training Week for Southeast Asia](#) in Bangkok, we included for the first time a stream on efficiency indicators and evaluation. Our aim was to increase policy makers' understanding of the value of evidence in policy work and to highlight the use of data and indicators for policy evaluation.

Energy efficiency

“More efficient air conditioners are not always more expensive or necessarily imported, but the average efficiency of air conditioners sold today is well below the efficiency of the best-performing models in each market.”

IEA (2019), *Future of Cooling in Southeast Asia*

Our analysis demonstrates the case for stronger policy action in the market for air conditioners

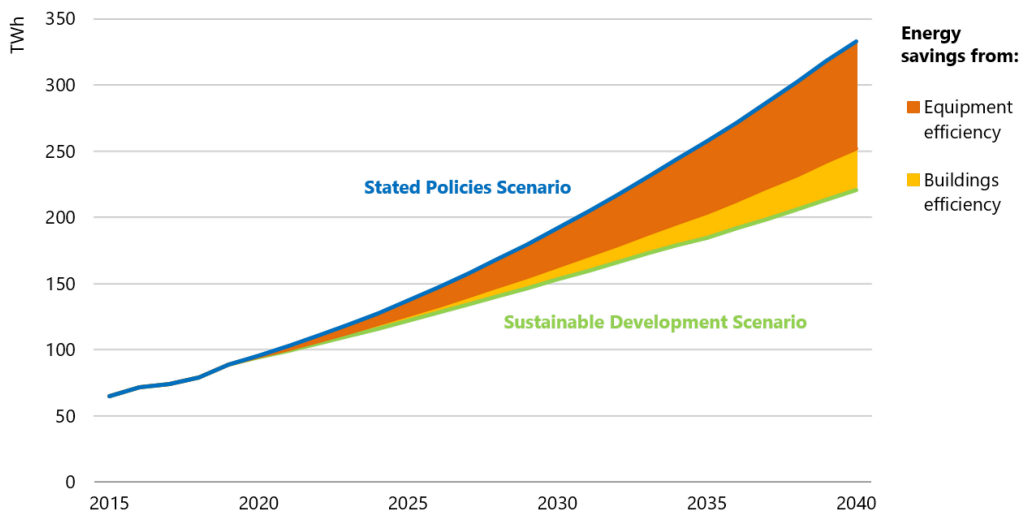
The IEA has been working closely with ASEAN member states and the ASEAN Centre for Energy on activities under the ASEAN-IEA Joint Programme of Work.

In 2019 the ASEAN-IEA Cooling Partnership was formed as part of Thailand's 2019 ASEAN Presidency, culminating in [The Future of Cooling in Southeast Asia: Increasing Energy Efficiency through Stronger Policy Action](#). The report explores the expected rise in energy consumption, peak electricity demand and CO₂ emissions by 2040, and sets out an alternative scenario in which policy drives industry transformation to produce more efficient air conditioners.

The report shows the rapid growth in demand for cooling equipment in Southeast Asia, driven by increases in purchasing power. Market analysis has shown that affordable and efficient air conditioners, which are available on the market, are not taken up by consumers, suggesting scope for stronger policy action.

The report was launched alongside the [Southeast Asia Energy Outlook 2019](#) and the [ASEAN Renewable Energy Integration Analysis](#) at the 3rd Singapore-IEA Forum, part of Singapore International Energy Week.

Reduction in cooling energy demand in the SDS compared to the STEPS, Southeast Asia, 2015-40



IEA 2019. All rights reserved.

Source: IEA (2019), *The Future of Cooling in Southeast Asia*, p. 16.

In April 2019 the IEA, in partnership with Thailand’s Ministry of Energy, co-hosted the third [Energy Efficiency Policy in Emerging Economies Training Week for Southeast Asia](#) in Bangkok. More than 140 energy efficiency professionals attended from government institutions, industry, academia and supporting organisations across the region. The IEA also partnered with the ASEAN Centre for Energy in 2019 to develop the ASEAN-IEA Webinar Series; this partnership will be carried forward in 2020.



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Participants at the 3rd Energy Efficiency Policy Training Week for Southeast Asia

Energy efficiency and renewable energy integration

In 2019 we started mapping out energy policies as they relate to buildings and urban planning

From the perspective of the clean energy transition, Southeast Asia is an important region due to the twin trends of:

- Rapid urbanisation and strong growth in ownership of home appliances, air conditioning and electric vehicles.
- The boom in distributed solar PV – with huge potential for residential rooftop PV in ASEAN cities – combined with vast untapped energy efficiency and demand-side resources.

The pace of urbanisation in the ten ASEAN countries has been faster than in any other region globally, and will continue to be so in the near future. Despite this, the urban share of the total population in six of the ten ASEAN countries is currently below the global urban average of 54%. Southeast Asian cities also feature much higher population densities than cities elsewhere in the world. As they rapidly grow, cities in the region have a crucial opportunity to meet their energy demand with least-cost and low-carbon solutions.

Developing the right clean energy policies, and embedding them into the local conditions and priorities of Southeast Asian cities, requires a comprehensive approach to urban energy challenges.

In 2019 the IEA started mapping out energy efficiency and renewable energy policies as they relate to buildings, and more broadly to urban planning, with a view to identifying gaps and opportunities where renewables and energy efficiency can work in synergy. The aim of this project, which continues through 2020, is to develop a rationale and a pathway showing how renewables and energy efficiency can underpin least-cost paths for a clean energy transition in Southeast Asia.

We will offer a set of capacity-building events (a suite of Energy Efficiency Policy for Emerging Economies Training Weeks) and targeted analytical outputs, creating two or three archetypes of energy efficiency and

renewable energy integration for different city profiles in Southeast Asia, in line with local conditions and priorities.

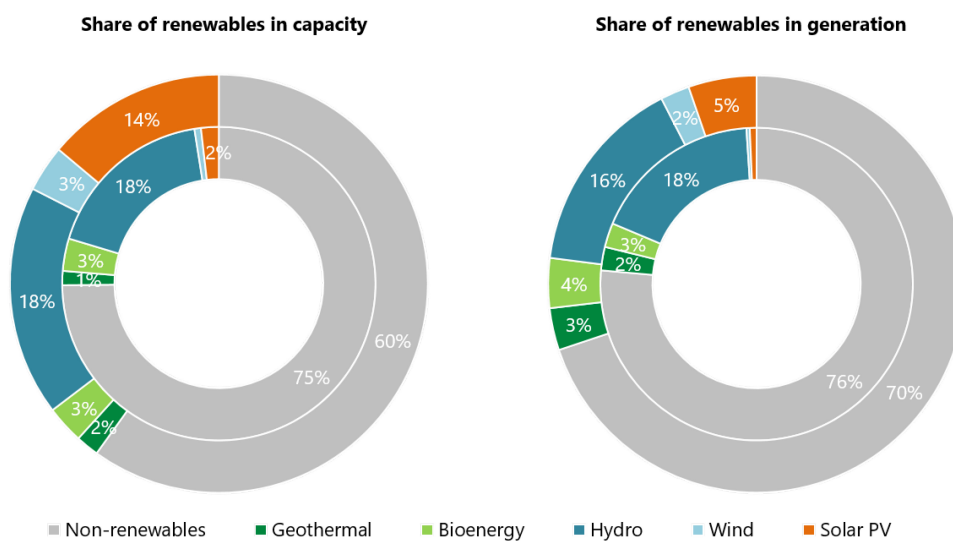
Electricity

Our report on establishing multilateral power trade in ASEAN formed the basis for wide-ranging discussion

As part of the IEA’s extensive work with ASEAN, we participated in several discussions during 2019, particularly to support ASEAN on regional and renewable energy integration – key deliverables from the AMEM.

We participated in the ASEAN Renewable Energy Subsector Network meeting in Da Nang, the consultation workshop on the ASEAN renewable energy integration project and the ASEAN Senior Officials Meeting on Energy (SOME) in Bangkok. The latter allowed us to present progress made and obtain feedback from ASEAN member countries. Work resulting from these engagements includes the [ASEAN Renewable Energy Integration Analysis](#), which assesses the capacity of regional power system integration to accommodate a growing share of variable renewables; and the [Establishing Multilateral Power Trade in ASEAN](#), a tailored analytical output.

Share of renewables in installed capacity and generation in Southeast Asia in the SPS, 2018 and 2040



IEA 2019. All rights reserved.

Source: IEA (2019), *Southeast Asia Energy Outlook 2019*.

Launched at AMEM 2019 in Bangkok in September, our report on [Establishing Multilateral Power Trade in ASEAN](#) – requested by ASEAN member states in 2018 – sets out clear recommendations on establishing multilateral power trade in ASEAN.

The analysis outlines the minimum requirements that ASEAN member states need to implement before they can move forward with multilateral power trade and suggests trading models relevant for the region, considering a range of case studies.

The IEA also attended the ASEAN Energy Business Forum (AEBF), held in conjunction with the AMEM in September, to further engage with policy makers and private-sector organisations on issues related to electricity transitions.

“A number of political, technical and institutional minimum requirements must be met in order to establish multilateral trading in ASEAN. There are, however, no fundamental obstacles to meeting these requirements.”

IEA (2019), *Establishing Multilateral Power Trade in ASEAN*

In October we presented our analysis to the Heads of ASEAN Power Utilities/Authorities (HAPUA) Council at the ASEAN Secretariat in Singapore, with the participation of over 30 officials. This resulted in the IEA being invited to the ASEAN regulatory network to further discuss the role regulators have in developing multilateral power trade in the region.

Later in the year at a three-day meeting in Siem Reap, the IEA supported the strengthening of the ASEAN Energy Regulators Network (AERN) in order to bring forward the minimum requirements set for multilateral trade, following the IEA’s recommendations to ASEAN. We presented on topics ranging from multilateral power trade to renewables integration to over 20 participants.

Finally, as part of the support to ASEAN, the IEA also participated in the ASEAN Interconnector Masterplan (AIMS III) technical committee group, which held the 1st meeting in Bangkok in December, to continue sharing our findings and knowledge. This technical exchange opened further discussions with the ASEAN Centre for Energy (ACE).



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The 37th ASEAN Ministers of Energy Meeting in Bangkok

The IEA has also continued its work with other institutions, leveraging their local capacity to increase knowledge sharing across Southeast Asia. This

included presenting our latest work on system flexibility during the Asia Clean Energy Forum in Manila, with a focus on recent examples from both operational and policy perspectives.

Through our participation at the USAID event, Energy Storage: What, When, Why, Where and How?, in Bangkok, we were able to highlight country-specific case studies to representatives utilities, system operators and policymakers from 10 countries in Southern and Southeast Asia.

Our work with ASEAN included technical exchanges to present and discuss electricity transitions and renewable energy deployment in the region. While participating at the Indonesia Energy Transition Dialogue in Jakarta, we shared key findings from IEA reports: Energy Systems of the Future; the State of Energy Transition in G20 Countries; and Integrating VRE in Islanded Systems: Challenges and Solutions.

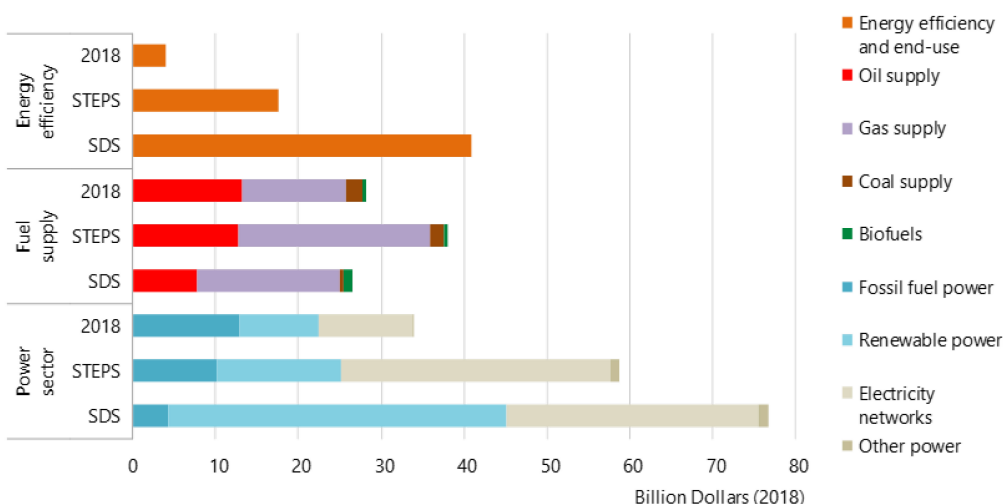
We presented the IEA Southeast Asia Energy Outlook 2019 at the 3rd Singapore-IEA Forum

The IEA was also pleased to produce the [Southeast Asia Energy Outlook 2019](#), which was presented at the 3rd Singapore-IEA Forum during the Singapore International Energy Week in October. The report reflects the priorities of senior energy leaders in Southeast Asia and derives from the call by ASEAN energy ministers for “stronger institutional ties” between ASEAN and the IEA.

“There are encouraging indications in many areas, but also some warning signs. Rising fuel demand, especially for oil, has far outpaced production from within the region. Southeast Asia as a whole is now on the verge of becoming a net importer of fossil fuels for the first time.”

IEA (2019), *Southeast Asia Energy Outlook 2019*

Current annual energy investment in Southeast Asia by sector compared with the SPS and SDS



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Source: IEA (2019), *Southeast Asia Energy Outlook 2019*, p. 169.

The IEA prepared an analysis of investment in reliable, sustainable and affordable power in Southeast Asia, included as one of the three deep-dive sections of the Southeast Asia Outlook 2019. It presents the current investment and financing trends and investment gaps in the region, and identifies four priority areas that need to be addressed to reduce investment risks and encourage financing in line with the goals of the SDS.

Building on insights from this deep-dive on investment, and the 2019 [World Energy Investment report](#), the IEA jointly organised a roundtable with over 100 participants at the Singapore International Energy Week in November to explore how to enhance regional capabilities to attract investment in clean energy and develop sustainable financing models.

We shared findings on the risks, policies and investment opportunities for renewables in Southeast Asia, and addressed market and investment environments to transform the power sector in the region. The roundtable discussion included representatives from different countries in the region and an array of perspectives – including the public sector (utility), private developers, financiers, lawyers and think tanks.

Sectoral work

Specialised training on Green Buildings was provided to delegates from across the region

In July 2019 the IEA and the EMA conducted a specialised training programme on [Green Buildings](#) under the Singapore-IEA Regional Training Hub. Following the Global Alliance for Buildings and Construction (GlobalABC) methodology for the development of buildings sector roadmaps, the training explored timelines and target setting, policy and technology approaches, investment and capacity building. The feedback received from participants was used to develop the IEA Roadmap for Buildings and Construction in Asia, which is currently being finalised.

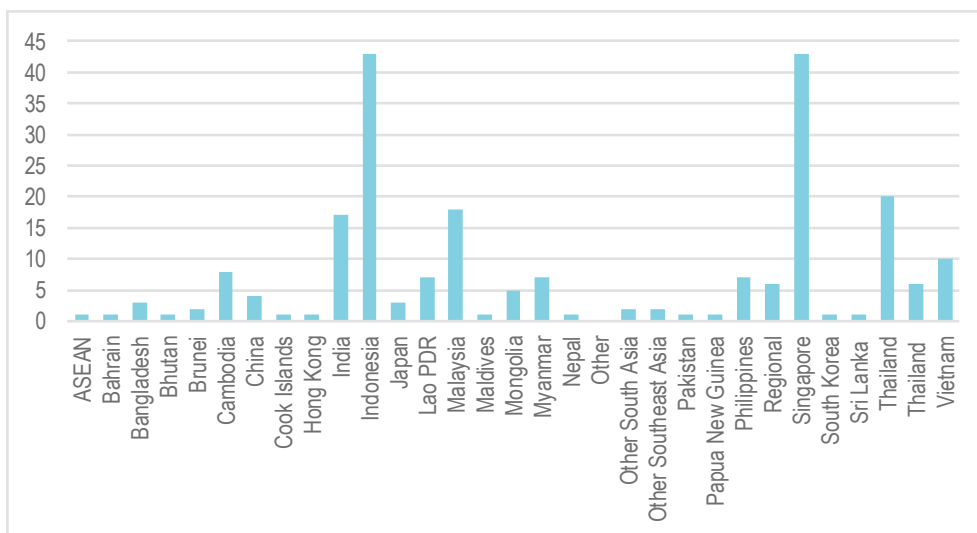


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Participants at the Regional Training Programme on Green Buildings

The GlobalABC Asia Roadmap for Buildings and Construction, published in March 2020, includes contributions from 28 countries across the region, with most coming from China, India and ASEAN countries. Over 200 stakeholders engaged in the project from a broad range of sectors, and participated through in-person workshops, webinars, document reviews and online questionnaires. More details on the GlobalABC Regional Roadmaps are provided in the Global activities Sectoral work chapter.

Participants in the engagement process for the GlobalABC Asia Roadmap for Buildings and Construction



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Thailand

Our wide-ranging work with Thailand focused on development of the country's power sector

By partnering with regional institutions, the IEA can increase the impact of its activities and leverage partners' resources and local knowledge. In 2019 our work included sharing knowledge and evidence for the further development of Thailand's energy sector. We were a partner at the Energy 4.0 Conference: Designing the Future of Thailand's Power Sector, held in Bangkok in January and organised by the Ministry of Energy and Asian Development Bank.

The IEA co-chaired both the energy efficiency and renewable energy tracks. Over 300 participants were able to share experiences, best practices and perspectives with a focus on Thailand and the Asia-Pacific region, and IEA staff encouraged dynamic discussion on the design and development of Thailand's power sector.

Our work with Thailand also included providing expert training and advice in Bangkok to over 40 officials from the Ministry of Energy (Department of Alternative Energy Development and Efficiency) on variable renewable energy integration, as part of a broader training programme. In addition, the IEA Secretariat followed up on work to assess Thailand's renewable grid integration, conducted in 2018, to look more closely into long-term contracts and system-wide flexibility. This followed a request from EGAT, Thailand's power utility.

Thailand's Minister of Energy was also a keynote speaker at the Systems Integration of Renewable Ministerial Meeting in Germany, further showing the country's interest in partnering with the IEA on the development of clean energy solutions.

2019 Activities in Latin America

Highlights of CETP activities in Latin America during 2019

- Organising with GIZ [a regional conference](#) to discuss drivers and challenges for clean energy transitions in the region.
- Launching a [massive open online course on energy efficiency in buildings](#) for Latin America.
- Sharing best practices on distributed generation with key stakeholders in Latin America.
- Supporting policy makers and statisticians by producing ten statistics videos in Spanish, which provide in-depth knowledge on energy statistics.

The ETLA conference marked a stepping-up of IEA activities in the region

The IEA greatly increased and enhanced its regional activities in 2019. Our main activity in Latin America was the November conference in Rio de Janeiro, Energy Transitions in Latin America: Drivers, Opportunities and Challenges (ETLA), organised jointly with GIZ. Supported by the Federal Ministries of Economic Affairs and Energy and Mining, the Energy Research Office (EPE), the UN Economic Commission for Latin America and the Caribbean (ECLAC) and the Centre for Management and Strategic Studies (CGEE), the conference gathered officials from several Latin American countries (Argentina, Brazil, Chile, Mexico and Uruguay) to discuss issues affecting Latin America's clean energy transition and the way forward.

The event was subdivided into sessions/workshops to allow all aspects of the clean energy transition to be discussed, from current ambitions to policy drivers and regulatory needs. Topics such as energy efficiency, distributed generation and innovation were covered. The overall programme was aligned to, and in support of, Brazil's [Energy Big Push](#) project. Further details on the specific workshops are provided below.

Data and statistics

We agreed to expand our co-operation with OLADE on data and statistics

The IEA Secretariat has continued collaborating with the Latin American Energy Organization (OLADE) on data and statistics. The IEA and OLADE agreed to expand their co-operation, potentially to include energy efficiency indicators, investment and energy price data. IEA participation in technical exchanges (e.g. Quito in June – not covered by CETP funds) also allowed data needs to be discussed with different countries, including Colombia and Costa Rica.

CETP support for this track of work enabled three officials from countries in this priority region (Brazil, Costa Rica and Colombia) to participate in events in Lima jointly organised by OLADE, the UN, the IEA, the Ministry of Energy of Peru and the World Bank. The two events on energy statistics

were held on 11-12 November 2019 in the context of the IV Energy Week in Lima, Peru.

The event on Monitoring Progress towards the Energy Transition in Latin America and the Caribbean – The Role of Energy Statistics and Indicators took place on 11 November, followed by a workshop on the International Recommendations for Energy Statistics (IRES) on 12 November. The IEA was a keynote speaker in the plenary session and ran a session on energy balances. We also held a number of bilateral meetings with key counterparts.

Energy efficiency

We launched a MOOC on energy efficiency in buildings with CAF – Spanish and Portuguese versions are imminent

The energy efficiency programme deepened engagement in the region through several activities. [Together with CAF](#), the IEA developed and launched a [Massive Open Online Course on Energy Efficiency in Buildings](#). This is a 40-hour course dedicated to training students and professionals in the A to Z of efficiency and sustainability in buildings. The course was launched in English and is due to be launched in Spanish and Portuguese in 2020.

One full day of the ETLA conference was dedicated to discussions on energy efficiency. Officials at both national and subnational levels gave presentations and participated in discussions, including attendees from Argentina, Brazil, Chile and Mexico. One session was dedicated to energy efficiency action at the subnational level, with the cities of Buenos Aires, Porto Alegre, Rio de Janeiro and the state of Puebla Mexico participating.

Co-operation with Argentina also advanced, with collaboration on energy efficiency policies and data in Buenos Aires and with officials from Argentina engaging with us in Paris.

We organised a number of regional webinars, including one on energy efficiency in the region based on findings from the World Energy Outlook in Latin America. Our networks in the region were central to the organisation of these webinars and in soliciting feedback from the region for the GlobalABC Regional Roadmap for Buildings and Construction.

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Indicadores de Eficiência Energética: Fundamentos de Estatística

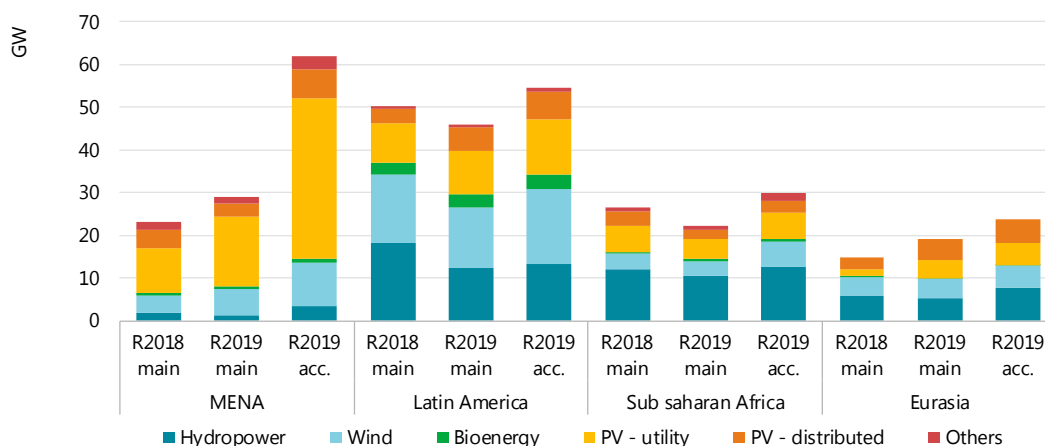
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Online course on energy efficiency indicators

Electricity

At the ETLA conference the IEA organised a day of sessions focused on distributed generation, with the participation of relevant officials and stakeholders from Argentina, Brazil, Chile and Mexico, amongst other countries. The sessions assessed the topic from multiple perspectives: policy makers, regulators, suppliers and generators, and distribution grid companies. The sessions addressed the challenges to accelerating distributed generation in Latin America, from policy drivers and regulatory aspects, to impacts on the grid and business models.

MENA, Latin America, sub-Saharan Africa and Eurasia: Renewable capacity forecast summary



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Source: IEA (2019), *Renewables 2019*, p. 23.

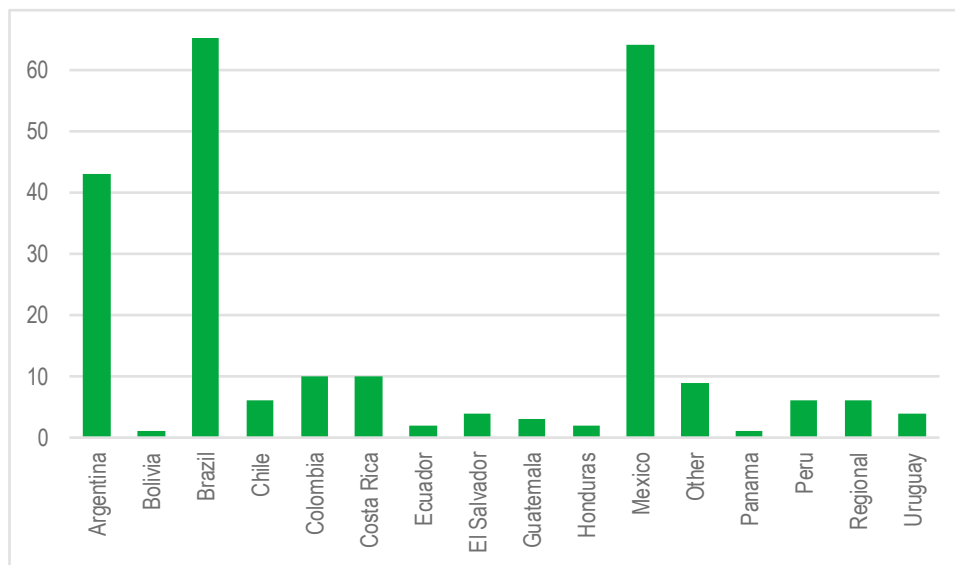
Sectoral work

Almost 300 stakeholders took part in the Latin America Roadmap for Buildings and Construction

The GlobalABC Latin America Roadmap for Buildings and Construction, due to be published in March 2020, included contributions from 19 countries across the region, with most coming from Mexico, Brazil and Argentina. Almost 300 stakeholders took part from a broad range of sectors, including academia, the private sector, finance, the public sector and civil society, and participated through in-person workshops, webinars, document reviews and online questionnaires. More details on the GlobalABC Regional Roadmaps are provided in the Global activities Sectoral work chapter.

Participants from Latin America showed the highest levels of engagement with the process of any region, providing positive feedback on the results so far.

Participants in the engagement process for the GlobalABC Latin America Roadmap for Buildings and Construction



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Innovation

The IEA deepened its co-operation on energy innovation with countries in the region by organising a dedicated day at the ETLA conference. Officials from Brazil, Uruguay and ECLAC presented on panels and participated in discussions. One session was dedicated to tracking and supporting clean energy innovation, with a focus on policy objectives and monitoring tools. A second session was dedicated to enhancing finance for clean energy innovation, with presentations from local start-ups on their funding journeys from the lab to market. Discussions continued with ECLAC, GIZ and the United Kingdom on ensuring complementarity of efforts in the region.

Work with other countries

The IEA also participated in the Asia-Pacific Economic Cooperation (APEC) energy conference in Santiago in October, organised by the Ministry of Energy of Chile. We provided opening presentations at the workshop on power system flexibility, the workshop on distributed energy resources and the meeting of the working group on the Energy Ministry’s Flexibility Strategy Taskforce. This work allowed for further interactions with Chilean authorities, which could result in our providing further support to the country’s power system flexibility work in the future.



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Mr Juan Carlos Jobet, Minister of Energy, and Dr Fatih Birol, IEA Executive Director

References

- IEA (2020), *India 2020 Energy Policy Review*, IEA, Paris, <https://www.iea.org/reports/india-2020>.
- IEA (2019), *Africa Energy Outlook 2019*, IEA, Paris, <https://www.iea.org/reports/africa-energy-outlook-2019>.
- IEA (2019), *ASEAN Renewable Energy Integration Analysis*, IEA, Paris, <https://www.iea.org/reports/asean-renewable-energy-integration-analysis>.
- IEA (2019), *China Power System Transformation*, IEA, Paris, <https://www.iea.org/reports/china-power-system-transformation>.
- IEA (2019), *Clean Energy Investment Trends 2019*, IEA, Paris, <https://www.iea.org/reports/clean-energy-investment-trends-2019>.
- IEA (2019), *Clean Energy Transitions: Accelerating innovation beyond 2020*, IEA, Paris, <https://www.iea.org/reports/clean-energy-transitions-accelerating-innovation-beyond-2020>.
- IEA (2019), *Energy Efficiency 2019*, IEA, Paris, <https://www.iea.org/reports/energy-efficiency-2019>.
- IEA (2019), *Energy Efficiency Indicators 2019*, IEA, Paris, <https://www.iea.org/reports/energy-efficiency-indicators-2019>.
- IEA (2019), *Energy Technology Innovation Partnerships*, IEA, Paris, <https://www.iea.org/reports/energy-technology-innovation-partnerships>.
- IEA (2019), *Establishing multilateral power trade in ASEAN*, IEA, Paris, <https://www.iea.org/reports/establishing-multilateral-power-trade-in-asean>.
- IEA (2019), *Global Status Report for Buildings and Construction 2019*, IEA, Paris, <https://www.iea.org/reports/global-status-report-for-buildings-and-construction-2019>.
- IEA (2019), *Heating and Cooling Strategies in the Clean Energy Transition*, IEA, Paris, <https://www.iea.org/reports/heating-and-cooling-strategies-in-the-clean-energy-transition>.
- IEA (2019), *Innovation Gaps*, IEA, Paris, <https://www.iea.org/reports/innovation-gaps>.
- IEA (2019), *Material Efficiency in Clean Energy Transitions*, IEA, Paris, <https://www.iea.org/reports/material-efficiency-in-clean-energy-transitions>.
- IEA (2019), *Putting CO₂ to Use*, IEA, Paris, <https://www.iea.org/reports/putting-co2-to-use>.
- IEA (2019), *Southeast Asia Energy Outlook 2019*, IEA, Paris, <https://www.iea.org/reports/southeast-asia-energy-outlook-2019>.
- IEA (2019), *Status of Power System Transformation 2019*, IEA, Paris, <https://www.iea.org/reports/status-of-power-system-transformation-2019>.
- IEA (2019), *The Critical Role of Buildings*, IEA, Paris, <https://www.iea.org/reports/the-critical-role-of-buildings>.
- IEA (2019), *The Future of Cooling in China*, IEA, Paris, <https://www.iea.org/reports/the-future-of-cooling-in-china>.
- IEA (2019), *The Future of Cooling in Southeast Asia*, IEA, Paris, <https://www.iea.org/reports/the-future-of-cooling-in-southeast-asia>.
- IEA (2019), *The Future of Hydrogen*, IEA, Paris, <https://www.iea.org/reports/the-future-of-hydrogen>.
- IEA (2019), *The Future of Rail*, IEA, Paris, <https://www.iea.org/reports/the-future-of-rail>.

- IEA (2019), *The Role of Gas in Today's Energy Transitions*, IEA, Paris, <https://www.iea.org/reports/the-role-of-gas-in-todays-energy-transitions>.
- IEA (2019), *World Energy Outlook 2019*, IEA, Paris, <https://www.iea.org/reports/world-energy-outlook-2019>.
- IEA (2019), *World Energy Investment 2019*, IEA, Paris, <https://www.iea.org/reports/world-energy-investment-2019>.
- IEA (2019), *World Energy Model*, IEA, Paris, <https://www.iea.org/reports/world-energy-model>.
- IEA and CEEW (2019), *Women Working in the Rooftop Solar Sector*, IEA, Paris, <https://www.iea.org/reports/women-working-in-the-rooftop-solar-sector>.
- IEA (2018), *World Energy Outlook 2018*, IEA, Paris, <https://www.iea.org/reports/world-energy-outlook-2018>.
- IEA (2017), *Energy Efficiency Outlook for India: Sizing up the opportunity*, IEA, Paris, <https://www.iea.org/reports/energy-efficiency-outlook-for-india-sizing-up-the-opportunity>.
- IEA (2017), *Energy Policies Beyond IEA Countries: Mexico 2017*, IEA, Paris, <https://www.iea.org/reports/energy-policies-beyond-iea-countries-mexico-2017>.
- IEA (2017), *World Energy Outlook 2017: China*, IEA, Paris, <https://www.iea.org/reports/world-energy-outlook-2017-china>.
- IEA (2016), *Mexico Energy Outlook 2016*, IEA, Paris, <https://www.iea.org/reports/mexico-energy-outlook-2016>.
- IEA (2015), *World Energy Outlook 2015*, IEA, Paris, <https://www.iea.org/reports/world-energy-outlook-2015>.
- IEA (2013), *World Energy Outlook 2013*, IEA, Paris, <https://www.iea.org/reports/world-energy-outlook-2013>.
- IEA (2012), *Technology Roadmap - Hydropower*, IEA, Paris, <https://www.iea.org/reports/technology-roadmap-hydropower>.

Abbreviations and acronyms

AC	Africa Case
ABC	Alliance for Buildings and Construction
ACCA21	Administrative Centre for China's Agenda 21
ACE	ASEAN Centre for Energy (ACE)
ADB	Asian Development Bank
ADEME	Agence de l'Environnement et de la Maîtrise de l'Énergie
AEBF	ASEAN Energy Business Forum
AEEE	Alliance for an Energy Efficient Economy (India)
AEO	Africa Energy Outlook
AERN	ASEAN Energy Regulators Network
AFD	Agence Française de Développement
AFREC	African Energy Commission
AIMS III	ASEAN Interconnector Masterplan
AMEM	ASEAN Ministers of Energy Meeting
ANEEL	Electricity Regulatory Agency (Brazil)
APEC	Asia-Pacific Economic Cooperation
APERC	Asia Pacific Energy Research Centre
APROBI	Biofuel Producers Association (Indonesia)
ASEAN	Association of Southeast Asian Nations
AUC	African Union Commission
BEE	Bureau of Energy Efficiency (India)
BPS	Bureau of Statistics (Indonesia)
CAF	Development Bank of Latin America
CAS	Chinese Academy of Science
CCUS	carbon capture, utilisation and storage
CEC	China Electricity Council
CEEW	Council on Energy, Environment and Water (India)
CEM	Clean Energy Ministerial
CEM10	10th Clean Energy Ministerial meeting
CEM IF	Clean Energy Ministerial Investment and Finance Initiative
CEO	chief executive officer
CERT	Committee on Energy Research and Technology
CETP	Clean Energy Transitions Programme
CGE	General Electricity Company (Chile)
CGEE	Centre for Management and Strategic Studies (Brazil)
CIF	Climate Investment Funds
CNIS	China National Institute for Standardisation
CNREC	China National Renewable Energy Center
CO ₂	carbon dioxide
COP25	25th Conference of the Parties
DoE	Department of Energy (South Africa)
DSO	distribution system operator
E4	Energy Efficiency in Emerging Economies Programme
EACREEE	East Africa Centre for Excellence for Renewable Energy and Efficiency
EBRD	European Bank for Reconstruction and Development
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
ECOWAS	Centre for Renewable Energy and Energy Efficiency
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EFC	Energy Foundation China
EGAT	Thailand's power utility
EMA	Singapore Energy Market Authority
EPE	Energy Research Office (Brazil)

EPPEI	China Electric Power Planning and Engineering Institute
EPRG	Energy Policy Research Group
EPRI	Electric Power Research Institute
ERI	NDRC Energy Research Institute
ETIPs	European Technology and Innovation Platforms
ETLA	Energy Transitions in Latin America Drivers, opportunities and challenges” (ETLA)
ETS	emissions trading scheme
EU	European Union
EV	electric vehicle
EVI	Electric Vehicle Initiative
FAO	Food and Agriculture Organization of the United Nations
FICCI	Federation of Indian Chambers of Commerce and Industry
FINEP	Funding Authority for Studies and Projects (Brazil)
G20	Group of Twenty
GBEP	Global Bioenergy Partnership
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GIVAR	Grid Integration of Variable Renewables Programme
GIZ	German Corporation for International Co- operation
GlobalABC	Global Alliance for Buildings and Construction
Gol	Government of India
GWEC	Global Wind Energy Council
HAPUA	Heads of ASEAN Power Utilities/Authorities
ICAP	International Carbon Action Partnership
IDR	in-depth review
IEA	International Energy Agency
IESR	Indonesian Institute for Essential Service Reform
IETA	International Emissions Trading Association
IHA	International Hydropower Association
IRENA	International Renewable Energy Agency
IRES	International Recommendations for Energy Statistics
JODI	Joint Organisations Data Initiative
MCTIC	Ministry of Science, Technology, Innovation and Communication (Brazil)
MEE	Ministry of Ecology and Environment (China)
MEMR	Ministry of Energy and Mineral Resources (Indonesia)
MENSA	Minerals and energy law cooperation with South Africa project
MEPS	minimum energy performance standard
MI	Mission Innovation
MIT-CEEPR	MIT Center for Energy and Environmental Policy Research
MME	Ministry of Mining and Energy (Brazil)
MNRE	Ministry of New and Renewable Energy (India)
MoEFCC	Ministry of Environment, Forest and Climate Change (India)
MOOC	Massive Open Online Course
MOST	Ministry of Science and Technology (China)
MoU	Memorandum of Understanding
MST	Ministry of Science and Technology (India)
NBS	National Bureau of Statistics (China)
NCSC	National Centre for Climate Change Strategy and International Co- operation (China)
NDC	nationally determined contribution
NDRC	National Development and Reform Commission (China)
NEA	National Energy Administration (China)
NGOs	non-governmental organisations
NITI Aayog	National Institution for the Transformation of India
NRCan	Natural Resources Canada
OECD	Organisation for Economic Co-operation and Development
OLADE	Latin-American Energy Organization
PEEB	Programme for Energy Efficiency in Buildings

PJM	Pennsylvania-Jersey-Maryland (PJM) Interconnection / regional transmission organization
PLN	state electricity company (Indonesia)
PSF	Power System Flexibility campaign
PUSDATIN	Data and Information Centre at MEMR (Indonesia)
PV	photovoltaic
R&D	research and development
RD&D	research, development and demonstration
RvO	Netherlands Enterprise Agency
SACREEE	SADC Centre for Renewable Energy and Energy Efficiency
SADC	Southern African Development Community
SANEDI	South African National Energy Development Institute
SAPP	Southern African Power Pool
SDG	Sustainable Development Goal
SDS	Sustainable Development Scenario
SEAD	Super-efficient Equipment and Appliance Deployment initiative
SEAO	Southeast Asia Energy Outlook
SENER	Ministry of Energy (Mexico)
SGERI	State Grid Energy Research Institute
SIEPAC	Central American Electrical Interconnection System
SLT	Standing Group on Long-Term Co-operation
SOME	ASEAN Senior Officials Meeting on Energy
STEPS	Stated Policies Scenario
TCPs	Technology Collaboration Programmes
TERI	The Energy and Resources Institute (India)
TGO	Thailand GHG Management Organization
TSO	Transmission System Operator
TWA	Thailand Wind Association
UEGCL	Uganda Electricity Generation Company Limited
UN	United Nations
USAID	United States Agency for International Development
VRE	variable renewable energy
WEO	World Energy Outlook
WMO	World Meteorological Organization
WRI	World Resources Institute

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Typeset in France by IEA - March 2020

Cover design: IEA

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