



RENEWABLES KEY TO “SOLUTIONS AGENDA” AT PARIS TALKS

Photo: Shutterstock

Climate negotiations have traditionally focused on limiting greenhouse gas emissions, mobilising finance for mitigation actions and addressing the impact of climate change.

Over the last year, the focus has shifted to a “solutions agenda”, driven by economic considerations and aimed at securing sustainable development. This has opened up new opportunities to showcase the role of renewable energy in addressing climate change.

In December 2015 in Paris, the Parties to the United

Nations Framework Convention on Climate Change (UNFCCC) will gather for a global conference. The talks aim to limit damage resulting from climate change and ensure a sustainable future for our planet and our species.

The increase in frequency and severity of climate-related disasters underlines the threat that climate change poses: to economic and social development; to ecosystems; to the livelihoods of citizens; and even to the existence of entire nations. Climate change, adding to the pressures of population growth and economic aspirations, could become the source of a global crisis if not addressed urgently and effectively.

A [report](#) from the third working group of the Intergovernmental Panel on Climate Change found that more than two-thirds of total greenhouse gas emissions come from the energy sector.* This is largely due to the combustion of fossil fuels. Rapid de-carbonisation of energy systems has become increasingly urgent, particularly in order to keep the

Climate change
could become the
source of a global
crisis if not addressed
urgently and
effectively

increase in average global temperatures below two degrees Celsius (2°C), the globally recognised limit above which climate change will have catastrophic consequences.

Renewable energy, together with greater energy efficiency, can place the world on a path to stay within the 2°C limit. About half of the necessary carbon-dioxide (CO₂) emission reductions can be achieved by accelerating the deployment of renewables, with much of the rest coming through vigorously promoting energy efficiency. In addition to steadily decreasing costs, renewables offer a large number of non-energy benefits, such as increased employment, local value creation, improved balance of payments, and health benefits from reduced air pollution.

Several country groupings are taking action. The G7 has positioned renewables prominently as part of its de-carbonisation agenda. **G20 countries** have also agreed to embark on a work programme on renewable energy.

In the Paris climate proceedings, the International Renewable Energy Agency (IRENA) will focus on informing policy makers and planners about de-carbonisation potential, as well as how renewable energy can contribute to greater climate resilience.

Growing experience with renewable energy solutions has helped shift the perspective of many policy makers from seeing only constraints to realising the opportunities. Support and cooperation initiatives are available to countries opting to deploy renewables as part of climate-change mitigation strategies.

While renewables provide an increasing share of the world's energy, they are not growing fast enough. Renewables can be a pivotal component of the climate-change solutions agenda. But further policy action is required to accelerate investments in the sector in countries of every size and economic type.

Strong policy resolve from the Paris conference, will be critical to make full use of renewables in the fight against climate change.

*Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), Chapter 4 on Energy Supply, 2007; http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch4.html

This year's **UN climate conference** will, for the first time ever, showcase renewable energy solutions. A series of high-profile events highlights renewables as the fastest, cleanest, most reliable and most economically beneficial way to meet climate goals.

The renewable energy track takes place **4-7 December, 2015**.

COP21 RENEWABLE ENERGY TRACK AT A GLANCE:

- » **4 Dec:** Series of eight workshops identifying opportunities and benefits offered by renewable energy
- » **5 Dec:** High-level action showcase, followed by a concert featuring global musical talent
- » **6 Dec:** World-renowned speakers share their visions for a future powered by renewable energy at the event: Renewable Energy: Energizing the Future
- » **7 Dec:** Renewable Energy Day at COP21, featuring major announcements on new commitments, action plans, coalitions, innovations, etc.

MORE DETAILS TO FOLLOW. HOPE TO SEE YOU THERE!





Climate Action Costs Less As Renewables Take Hold

As climate negotiators converge on Paris in December, they need to be “in the know” about how cost-effective renewable energy can be. Over the last five years, renewable energy technologies have not only become less expensive, they have become the least-cost energy option in a growing range of situations.

Hydropower, biomass and geothermal technologies are mature and long able to provide low-cost electricity where untapped economically viable resources exist. Newer solar and wind technologies have also fallen in price thanks to support policies that have accelerated deployment, improved performance and lowered equipment costs.

Solar photovoltaic module prices have fallen by around 80% since the end of 2009

Onshore wind now offers some of the cheapest new electricity capacity available with projects consistently delivering electricity in the USD 0.04-0.05 per kilowatt-hour (/kWh) range. This is cheaper than gas-fired generation even in the so-called “golden age” of gas and it is true where good wind regimes and competitive cost structures exist,

from the midwestern United States, to Brazil, China and Egypt.

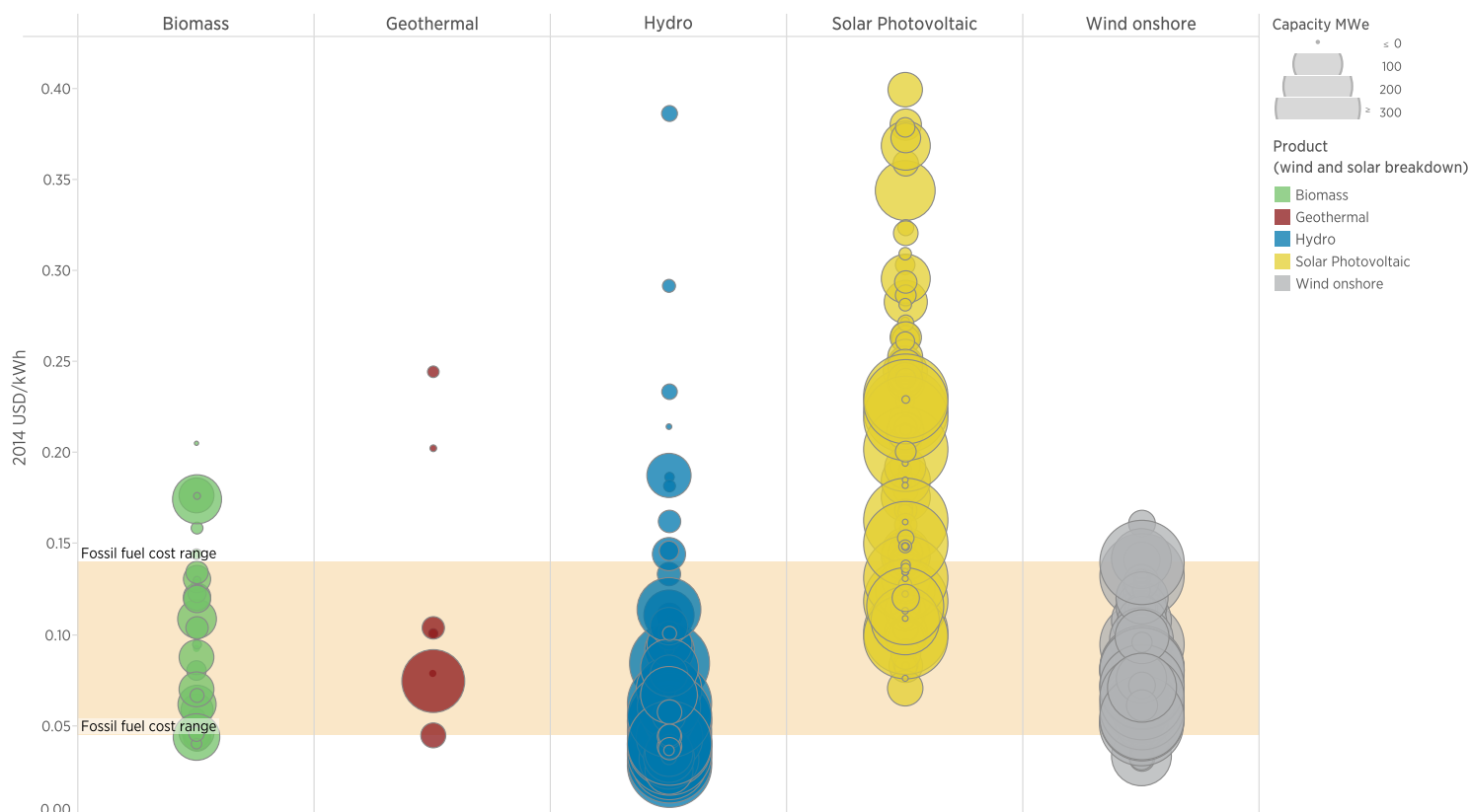
Solar photovoltaic (PV) module prices have fallen by around 80% since the end of 2009. Installed costs for utility-scale solar PV have also fallen, meaning electricity from large-scale solar PV plants in 2014 costs half what it did in 2010 and now competes with fossil-fuel fired electricity costs (see figure).

Future electricity demand growth will come predominantly from emerging economies, which also happen to lie overwhelmingly in the global sunbelt. With the right regulatory framework, access to low-cost finance and expectations of a growing market, solar PV can now often offer utility-scale electricity cheaper (global average around USD 0.09/kWh) than fossil fuels.

In Chile, commercial solar plants are being built to feed directly into the wholesale market; Brazil's solar auctions are contracting for solar PV at around USD 0.08/kWh; while in Jordan, recent tenders resulted in bids in the range of USD 0.06-0.08/kWh. In the United Arab Emirates, the Dubai Electricity and Water Authority has tendered for the lowest-cost electricity yet, just under USD 0.06/kWh.

Sharing regulatory and policy approaches, cooperating regionally to grow markets, and investing together to scale up deployment can all help to drive down costs to competitive levels.

Figure: Levelised cost of electricity from renewable power generation technologies commissioned in 2014



The size of the diameter of the circle represents the size of the project. The centre of each circle is the value for the cost of each project on the Y axis. Real weighted average cost of capital is 7.5% in OECD countries and China: 10% in the rest of the world.

Source: IRENA Renewable Costing Database

Note: Assumes a 7.5% real weighted average cost of capital in the Organisation for Economic Co-operation and Development (OECD) countries and China and 10% elsewhere. Data is for individual projects and circle size represents capacity.

Countries like Brazil and South Africa are reaping the benefits of these approaches by locking in low-cost renewable electricity to meet the needs of their growing economies.

In the **power sector**, renewables are now often the cheapest source of new capacity, even without financial support. Regional cooperation, along with reducing overall electricity system costs, will allow renewable power generation technologies to insulate consumers from volatile fossil-fuel prices for decades to come. The transition will create local jobs, cut local pollution in turn reducing health costs and help “bend the curve” of dangerous carbon emissions growth into a decline.

The findings from the IRENA Renewable Costing Database are available on the IRENA website:

<http://costing.irena.org/>



The **21st Conference Of Parties** to the UNFCCC, taking place in Paris from 30 November to 11 December, will shape the world's response to the threat of catastrophic climate change.

Renewable energy technologies can deliver half of the emission reductions needed to keep the global temperature rise within 2°C.

Renewables will be part of any viable climate solution.

Keep on **REthinking Energy**





Island States Collaborate on Climate Change

The world's smallest states are also those most at risk amid the rising oceans and changing weather patterns. But because of their scale and isolation, Small Island Developing States (SIDS) need to band together. Their emissions may not be significant in the global context, but SIDS are committed to fighting climate change and reducing their greenhouse gas emissions as part of a legally binding international agreement in December 2015.

Climate change exacerbates the vulnerabilities of practically all SIDS, with key sectors such as agriculture, fisheries and tourism particularly at risk. In response, 27 SIDS from the Atlantic, Pacific and Indian oceans and the Caribbean, Mediterranean and South China seas, have joined forces with international organisations and development agencies to advance renewable energy deployment on islands.

Through the [SIDS Lighthouses initiative](#), island governments are working, to date, with 19 multilateral, public, private and non-profit partners, to share knowledge, tools and services to facilitate renewable energy planning and implementation.

The initiative launched at the Climate Summit in New York in 2014, provides an enabling platform for the strategic deployment of renewable energy on islands.

In preparation for the December 2015 Paris Climate Conference, also known as "COP21", SIDS partners have submitted Intended Nationally Determined Contributions (INDCs). Barbados, Belize, Cabo Verde, Grenada, Kiribati, Mauritius, the Maldives, the Republic of the Marshall Islands, Samoa, Sao Tome & Principe, the Seychelles, the Solomon Islands, Trinidad & Tobago, and Vanuatu have all submitted INDCs, which include data and frameworks for anthropogenic greenhouse gas emissions.

Many SIDS have developed and communicated strategies, plans and actions for lowering greenhouse

gas emissions. For most island states, this involves transforming predominantly fossil-based power sectors into ones using mainly renewable energy.

Within the SIDS Lighthouses initiative, partners and stakeholders pledged to work together to ensure more than 120 megawatts (MW) of new renewable energy deployment by 2020. This would include new solar photovoltaic, wind, geothermal, and other renewable energy technology projects. All participating SIDS, furthermore, are committed to developing renewable energy roadmaps. IRENA, which led the formation of the initiative, will hold talks aimed at raising funds to support the implementation of these roadmaps.

Islands can become pioneers in demonstrating the possibilities that renewable energy solutions offer to address socio-economic development needs, while reducing vulnerability to environmental change and global resource constraints. A low-carbon development path would bring significant socio-economic benefits for SIDS.

Ahead of COP21, IRENA has held workshops with SIDS partners and stakeholders in Martinique, Honolulu, Kuala Lumpur and Cape Town. These workshops identified the support SIDS need in terms of planning, policy and regulatory frameworks, implementation, and financing to achieve country targets, as well as collective commitments on scaling-up renewables.

The results of these workshops will be translated into a detailed implementation plan. During COP21, the partners of the SIDS Lighthouses Initiative will host a side-event involving government ministers and high-level decision makers from SIDS partners.

For more about IRENA's island engagement:
<http://irena.org/martinique/landing.aspx>



Photo: Chavez/IRENA

Olkaria Geothermal Complex and Power Station – Kenya

Underground Heat Can Be Mobilised Against Global Warming

Geothermal energy provides some of the world's cheapest electricity. Its emissions are low, making it well suited for displacing fossil fuels as a source of both power and heat. Amid global efforts to mitigate climate change, geothermal technologies provide electricity as cheap as USD 0.05 per kilowatt-hour (kWh), as well as supporting direct heat use.

The technology is proven, and the resource – heat from under the earth – could potentially be tapped in almost 90 countries, according to the World Bank's [Energy Sector Management Assistance Program \(ESMAP\)](#). Yet less than one third of those produce geothermal power or heat today.

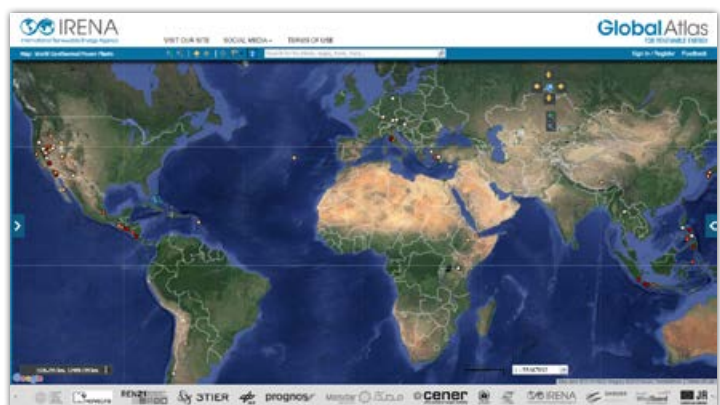
Deployment remains modest in most countries, and geothermal power is only growing at the modest pace of 3%-4% per year – slower than other types of renewable energy. Upfront investment costs and regulatory complexity – discouraging to newcomers in the market – have kept the benefits of this game-changing energy source on hold in many countries.

Some successful examples stand out, however. Geothermal power represents over 20% of El Salvador's total power generation. Increasingly, countries in Latin America and the Caribbean, as well as Africa, Southeast Asia and the Pacific, are exploring their geothermal potential.

Geothermal energy merits greater visibility in global, regional and national climate debates, where coordinated outreach and awareness raising efforts can achieve more.

The Global Geothermal Alliance brings together partners to increase the geothermal share in the world's energy mix through both power generation and direct heat.

Countries with experience in the field can share their knowledge to encourage an accurate understanding of the investment risks associated with geothermal development. Through tailor-made finance and de-risking tools, customised support to markets with potential, and the exchange of insights along the value chain, the alliance aims to foster an enabling environment to attract investments.



For more information, please visit: <http://irena.masdar.ac.ae>

High-resolution Atlas Improves Wind Prospecting



Martinique wind data on the Pocket interface

In countries without a highly developed energy sector, decisions on renewables – such as how or where to deploy each power-generation technology – can appear daunting.

Renewable energy is always location dependent, with the associated resources being more abundant in some areas than in others. Measuring such resources is expensive and time-consuming, and in the absence of adequate data, investors will see greater uncertainties while governments struggle to select the right support policy.

A new “Global Wind Atlas” dataset offers an unprecedented glimpse at potential sites for wind development, with a higher resolution than ever before in publicly available worldwide wind resource maps. Since 21 October, the new data has been freely available through IRENA’s online map-based platform, the [Global Atlas for Renewable Energy](#).

The Global Atlas helps countries evaluate their renewable energy potential, starting with free online resource maps. For countries with limited funds for renewable energy development, such information can be invaluable.

The latest enhancement to IRENA’s Global Atlas can further help national policy makers and energy planners start deciding where wind farms can or should actually be built. A joint project of the IRENA and the Technical University of Denmark (DTU), the Global Wind Atlas dataset depicts wind resources at 1-kilometre (1 km) resolution for every location on the globe.

Previously, wind data from weather satellites was only available, at resolutions of 30-50 km, necessitating extensive measurement and analysis to identify the best wind-resource sites.

The Global Atlas first introduced wind speed data from research partners at a resolution of 5 km, improving the decision-making that could be achieved using freely available data and tools.

IRENA’s Global Atlas provides a geographical information system (GIS) interface with clear maps showing resource availability for major types of renewable energy, including wind, solar, geothermal, bioenergy and marine energy. Planners and analysts can visualise renewable resource data and map its proximity to the electric grid, major roads and population centres.

Renewable energy prospectors can also retrieve such data on the go. The recently released mobile version, Global Atlas Pocket, is available for Android, BlackBerry, iPhone and Windows platforms.

The new Global Wind Atlas dataset is available on the IRENA website, through this link:

<http://irena.masdar.ac.ae/?map=103>

to access the new toolset:

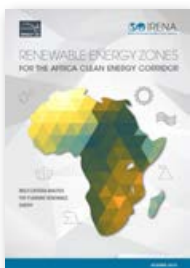
<http://irena.masdar.ac.ae/?&tool=dtu:gwa&map=103>

Recent publications



Africa 2030: Roadmap for a Renewable Energy Future

This report – part of IRENA's global REmap analysis – provides a comprehensive roadmap for Africa's energy transition. The report identifies options amounting to nearly 10 exajoules – the equivalent of more than 341 million tonnes of coal – for sustainable development through renewable energy. Roughly half of this would come through biomass-based heat applications, which will progressively displace unsustainable and unhealthy traditional biomass combustion.



Renewable Energy Zones for the Africa Clean Energy Corridor

A ground-breaking study from the IRENA and the US-based Lawrence Berkeley National Laboratory, identifies zones for cost-effective, equitable and environmentally sustainable energy development with wind, solar photovoltaic, and concentrating solar power in the countries of the Eastern and Southern African power pools.



The Age of Renewable Power: Designing National Roadmaps for a Successful Transformation

This report provides a framework for developing a national roadmap to guide each country's power sector transformation. The transformation of power grids towards reliance on mainly renewable energy sources has begun. But the course of this transition is sure to vary depending on local conditions.



Renewables Readiness Assessment: Mauritania

Mauritania possesses significant renewable energy resources, which could be developed to strengthen the economy and improve access to energy. Solar and wind energy technologies are well suited for integration into the country's existing network of mini-grids, according to this Renewables Readiness Assessment (RRA) report released by IRENA in association with the United Nations Development Programme (UNDP).

www.irena.org/publications

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international cooperation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

Copyright © IRENA 2015

Unless otherwise stated, this publication and its content are the property of IRENA and may be freely used, shared, copied, reproduced, or reprinted, so long as IRENA is acknowledged as the source. Material attributed to third parties may be subject to third-party copyright and separate terms of use and restrictions.

Disclaimer

This publication and its content are provided "as is". Neither IRENA nor any of its officials, agents, data or other third-party content providers provides any warranty, including as to accuracy, completeness, or fitness for a particular purpose or use, or regarding the non-infringement of third-party rights, and they accept no responsibility or liability with regard to the use of this publication and its content. The information herein does not necessarily represent the views of the Members of IRENA, nor is it an endorsement of any project, product or service provider. The presentation and designations employed do not imply the expression of any opinion on the part of IRENA concerning the legal status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

Subscribe to the IRENA Quarterly

www.irena.org