

# SOLAR LABS COLLABORATE TO TACKLE DUST AND HUMIDITY



Photo: Shutterstock / Solar Panels in the desert

## The oil-rich countries of the Gulf region have committed to the roll-out of solar power generation capacity

The countries of the Gulf Cooperation Council (GCC) possess enormous potential for solar energy development. Unleashing this clean, indigenous renewable energy resource would strengthen energy security and help to diversify the regional economy.

The performance, predictability and bankability of photovoltaic (PV) systems, however, is affected by local geographical and climatic challenges, including high temperature, humidity and soiling. To counter

A transition to a mixed energy economy can create high-value jobs and support the establishment of renewable energy value chains

these issues, short- and long-term testing is being conducted to optimise solar panel performance in the desert. State-of-the-art solar testing laboratories have sprouted up across the GCC region, including at Saudi Arabia's King Abdullah University of Science and Technology, the Kuwait Institute of Scientific Research, the Masdar Institute in Abu Dhabi, in the United Arab Emirates and the Qatar Solar and Technology Park.

But for test findings to be meaningful, these centres should all conform to regionally and internationally harmonised evaluation procedures. Their common data could then be employed by manufacturers, engineering contractors, financial institutions and research institutions to support technology deployment in the region. In the long-term, the network of solar laboratories would develop regionally applicable standards and certification systems for solar PV technologies.

In Western Europe and North America, such solar laboratory networks have been extremely effective at sharing knowledge and resources, developing

common testing methodologies and research agendas, linking with external entities such as manufacturers, vendors and contractors, and providing advisory support to the public sector.

For now, the Gulf lacks such a network. To prevent laboratories simply working as isolated “silos”, the International Renewable Energy Agency (IRENA) has proposed a “GCC Regional Solar Photovoltaic Testing Centres Network” to link the region’s leading PV testing facilities.

The network would aim for focused cooperation, to transform GCC solar laboratories into strong market players that can boost sector development. The transition to a mixed energy economy would create new high-value jobs. Since October 2014, the region’s

The network would aim for focused cooperation to transform Gulf solar laboratories into strong market players

main solar laboratories have been in discussions with IRENA about establishing the proposed network. When the challenges of dust and humidity are addressed, the region will be well positioned to balance its energy mix.

## IRENA *newsroom*

# REAL IDEAS, REAL ACTION, RENEWABLE ENERGY

The IRENA Newsroom was launched in December 2014 to cover renewable energy news and IRENA’s ongoing activities around the world.

See the latest updates from the fast-growing renewables sector, and learn more about IRENA’s work.

[www.irena.org/newsroom](http://www.irena.org/newsroom)

## Off-grid Renewables: The key to enlarging energy access



Hand in hand with combating climate change, the international community has called for providing clean and sustainable energy services for the more than 1.3 billion people, mostly in Asia and Africa, who lack electricity, and the 2.4 billion who still rely on coal and firewood for cooking. However, if today's energy development policies continue, over a billion will still lack electricity access in 2030. Changing this will be impossible without a major shift to off-grid systems, using renewable power generated from the sun, wind, water and biomass.

"It is not just a question of supplying electricity, but of stimulating rural economies by catering to the energy needs of agriculture, industry and local businesses," said Ernesto Macías, President of the Alliance for Rural Electrification, based in Europe.

The United Nations Secretary-General launched the Sustainable Energy for All initiative in 2010, calling for the expansion of renewable energy and improving energy efficiency, as well as ensuring universal access to modern energy services by 2030. But at present rates, these goals cannot be met. In fact, energy access needs to expand at double the current rate.

Accelerating the pace of electricity expansion requires a combination of centralised and decentralised approaches. Nearly 60% of the additional generation necessary to achieve universal electricity access will have to come from off-grid solutions, including stand-alone systems and mini-grids. Renewable energy technologies provide the ideal off-grid power solution, well suited to the energy needs of rural communities and bringing substantial socio-economic benefits. Plummeting technology costs in recent years make renewables the most cost-competitive option for electrification in most rural areas.

"The growth of renewables, advances in technologies and renewed focus on ending energy poverty are

all aligned to make off-grid solutions the next major area that government and the private sector will be looking. It presents an exciting prospect," said Wencai Zhang, Vice President of the Asian Development Bank.

Off-grid investment offers the chance to leapfrog conventional energy systems and centralised infrastructure. But tapping into the opportunity requires the combined effort of governments, the private sector, non-governmental organisations, international agencies, development banks and other stakeholders.

One of the key challenges for governments is to create an enabling environment, unlocking local entrepreneurial capacities to deliver energy services to rural communities. Successful off-grid renewable power deployment hinges on effective policy and regulatory frameworks, access to affordable financing, customised business and financing models, suitable technologies and sufficient capacity. The International Off-grid Renewable Energy Conference (IOREC), organised by IRENA in partnership with off-grid and regional organisations every two years, facilitates exchanges of best practices and engagement between the public and private sector.

The second IOREC took place in Manila, the Philippines, in 2014 in cooperation with the Asian Development Bank and the Alliance for Rural Electrification. Conference participants highlighted the need to change mindsets, so the market propels off-grid renewable energy investment without any need for grants. Governments will have a role in helping to achieve this paradigm shift.

"The business case for deploying off-grid renewables in rural areas has never been stronger, and innovative business models are emerging to underlie growth in the sector," said IRENA's Director-General, Adnan Z. Amin.

*The findings from IOREC 2014 are available on IRENA website: [www.irena.org/Publications](http://www.irena.org/Publications)*



## Climate Change: Renewables rising on the global agenda

At this year's Climate Change Conference in Lima, Peru, renewable energy took centre stage as one of the most promising and realistic ways to mitigate global warming. Public and private sectors alike have zeroed in on energy efficiency and renewable energy as ways to make a real difference.

According to the Nazca Climate Action portal launched during the conference, 319 cities, 69 subnational regions and 261 companies are taking action on climate change. Of 913 total actions recorded so far, 402 relate to energy efficiency and 242 relate to renewable energy. Numerous private sector initiatives, like RE100 and the Global Investor Statement on Climate Change, have also emerged to encourage businesses and investors to phase out, or divest from, fossil fuels in favour of renewables.

National governments have made commitments as well. More than 140 countries now have renewable energy targets, 50 countries support a total phase-out of carbon emissions by 2050, and 100 countries support a zero-emissions society by 2100. This action, and the hope it generates for an attainable solution to climate change, is being fuelled by the increasingly strong business case for renewable energy.

Renewable energy is now the most cost-competitive source of power in many parts of the world. In recent energy auctions in the United Arab Emirates and Brazil, for example, solar-generated electricity reached record-low prices, even cheaper than gas and coal.

IRENA research shows that a doubling of the share of renewables in the world's energy mix by 2030 — from around 18% in 2010 to 36% — would help avoid the worst effects of climate change. Even better, doubling renewables would be cheaper than other options, including continuing

business as usual. When the costs of ill health and environmental damage due to pollution are factored in, switching to renewable energy could save up to USD 740 billion per year by 2030.

Renewable energy improves public health and security, creates jobs, and boosts economic growth. IRENA research finds that renewable energy jobs reached 6.5 million globally in 2013 and could top 16 million by 2030 if steps are taken to double the share of renewables.

An emissions-free future is now formally part of climate change negotiations, a mandatory phase-out of fossil fuels is one of the options in the draft negotiating text. But more must be done to fuel the agenda on climate action and spur a rapid transition to a low-carbon, climate-sensitive future.

## More must be done to spur a rapid transition to a low-carbon future

A global climate deal, if agreed next year in Paris, could ensure this.

To accelerate the scale-up of renewables enough to avoid the worst effects of climate change, policy makers, business leaders and others will have to take urgent, bold steps, including standing up for the solutions to replace business as usual.

*For more about how renewables can help to ensure a sustainable future, see the first edition of IRENA's flagship publication, **REthinking Energy**.*

[www.irena.org/rethinking](http://www.irena.org/rethinking)

# RESOURCE

YOUR SOURCE FOR RENEWABLE ENERGY INFORMATION

## Renewable Energy Knowledge: New portal sheds light on the fast-growing sector

Access to knowledge is the key to any successful industry. But renewable energy information remains fragmented and widely scattered. Consequently, data on renewables is often perceived as insufficiently detailed and less accessible or accurate than information on conventional technologies. Inadequate transparency and consistency can create uncertainties for investors, while allowing doubts about the benefits of renewables to persist in public opinion. Accelerating the deployment of renewable energy technologies requires improved decision-making, as well as greater awareness and confidence in new technologies.

From the end-user perspective, the power sector is increasingly well documented, with more transparent information on, for example, capacities and costs. However, high-quality data is still lacking for newer technologies, especially for decentralised or off-grid renewables. Accurate up-to-date energy balances for off-grid systems, and detailed bioenergy flows, need to be developed; so do trade and labour statistics and ways of accounting for the socio-economic impact of renewables. All of this would feed into a more comprehensive picture of renewable energy, allowing for better comparisons with conventional energy.

Yet even as data flow improves, the rapid growth of the renewable energy industry still outpaces the

information available. A decade ago, few foresaw the key role renewables would play by now. The availability of accurate information over the next decade will depend on the ability to anticipate growth paths and put in place the right monitoring instruments to capture this growth today.

Moreover, since the early days of renewable energy deployment, international attention has largely focused on electricity, rather than on end-use sectors. As a result, most efforts in collecting renewable energy information have captured only a fraction of final energy use. Future deployment is likely to include breakthroughs in heating, cooling and transport.

IRENA has developed REsource, a freely accessible online knowledge platform, to capture and illustrate all aspects of renewable energy growth. REsource provides renewable energy market statistics, along with information on resource potential, policies, finance, costs, benefits, innovations, education and other topics. The platform aims to improve decision-making, increase awareness, strengthen investor confidence, and accelerate the overall deployment of renewable energy technologies.

[www.irena.org/REsource](http://www.irena.org/REsource)

## Renewable Energy Costs: Decline and fall of the learning curve

With equipment costs down sharply in the last five years, renewable power generation technologies are increasingly competitive. But this remains a nuanced success, as the cost of electricity depends on a range of site specific-factors. Resource quality, technology choices, local cost structures, global and domestic market maturity, the experience of project developers, the cost of finance, and other factors all come into play.

### New analysis will fill a significant knowledge gap on cost-reduction potential

Although costs for solar photovoltaic (PV) modules, wind turbines and other equipment can be expected to decline further, the reductions are going to be smaller, in absolute terms, than in the past. The balance of project costs, resource quality and finance costs will play an increasingly important part in shaping future cost-reduction potential.

This has important policy implications. Regulators and policy makers (just like the industry) will need to focus on how to reduce every aspect of renewable energy costs. However, the entire value chain — a much wider and larger audience — needs to be engaged to address balance-of-costs. Cross-border economies of scale can be hard to achieve.

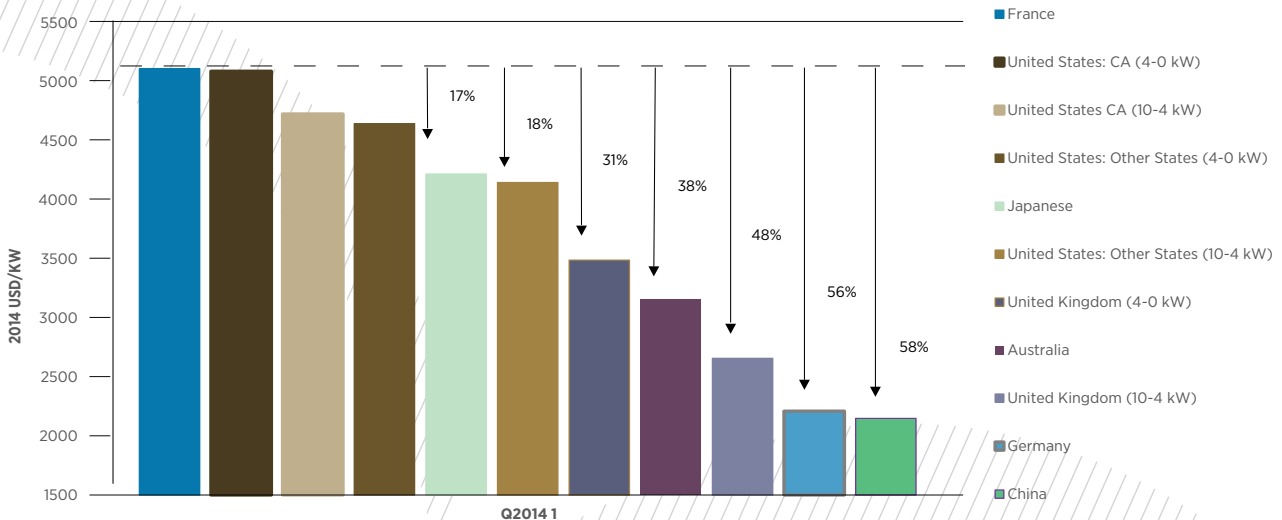
With solar photovoltaics (PV), more than any other renewable power-generation technology, balance-of-system (including soft costs) differences may represent the largest cost-reduction opportunity. The gap between the most and least competitive residential solar PV markets is wide (see figure).

Learning rates — the way rising deployment accelerates cost reductions for any technology — are crucial. The learning rates for wind power are used extensively by the industry, along with energy and climate modellers and policy makers as the basis for market analysis for all renewables. Unfortunately, most of the analysis to date either relies on outdated data or is not globally comprehensive.

The latest costing report analysis from IRENA will cover 11 countries that account for 85% of cumulative installed wind capacity, providing the most comprehensive and up-to-date view of cost reduction trends so far. This will fill a significant knowledge gap, given that previous analyses missed the period of rising wind-turbine prices. The new analysis also considers the levelised cost of energy (LCOE) of wind for the first time, looking at separate drivers of cost reduction, like wind-turbine prices, resource quality, technology improvements, operation and maintenance costs and balance of project costs.

This wind analysis will help feed a larger project supported by the Government of Germany to

Residential solar photovoltaic markets around the world



examine future cost-reduction opportunities for solar PV, concentrated solar power (CSP) and wind (both onshore and offshore). Looking at future cost reductions at a global and local level, the analysis will focus on the major equipment and balance-of-project costs that drive total installed costs. This, combined with trends in technology improvement, should provide a complete picture of future LCOE reductions for all these technologies.

IRENA is also reviewing the impact on electricity tariffs and how to help countries guide their local markets to efficient cost levels. The Government of Tonga, for example, is interested in tariff reduction with a higher share of renewable energy on the

power grid. IRENA has continued stepping up its engagement with government and industry since the launch of the IRENA Renewable Costing Alliance in January 2014.

*IRENA PV Parity Indicators*, going live in 2015, will provide further insights on solar PV. These indicators will track convergence with grid prices, show where additional research is required to explain cost differences, and highlight cost-reduction opportunities.

*IRENA's **Costs, Technologies and Markets** portal examines cost-reduction potential in greater depth.*  
[www.irena.org/costs](http://www.irena.org/costs)

## Fifth IRENA Assembly: Over 1,000 delegates gather to speed global energy transition

Officials from 150 countries and 115 international organisations gathered in Abu Dhabi on 17-18 January for the fifth annual session of the IRENA Assembly. Discussions centred on how renewables can help to address global challenges including climate change, energy access and energy security.

Presided over by the Japanese government, the session featured guest speakers including Kandeh Yumkella, Special Representative of the United Nations Secretary-General and Chief Executive of the Sustainable Energy for All (SE4ALL) initiative; Maria van der Hoeven, Executive Director of the International Energy Agency (IEA); Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change; Christian Bach, Executive Secretary for the United Nations Economic Commission for Europe; Shamshad Akhtar, Executive Secretary of the United Nations Economic and Social Commission for Asia and the Pacific; and Fernando Ferreira, Executive Secretary of the Latin American Energy Organization (OLADE).

"I strongly hope that IRENA will play a central role in leading the world to leverage the full potential of renewable energy and thus help the world balance economic growth and the mitigation of climate change," said H.E. Yoichi Miyazawa, Japanese Minister of Economy, Trade and Industry and Co-President of the Assembly. "The IRENA Assembly offers an unmatched international platform to discuss the challenges and solutions of global adoption of renewable energy."

The decision-making body, composed of IRENA's members and countries in accession, discussed the strategic direction and long-term vision of the four-year-old intergovernmental agency for promoting renewable energy, as well as examining issues for countries in the transition.

*IRENA fifth Assembly documents:* [www.irena.org/Assembly/5thAssembly.aspx](http://www.irena.org/Assembly/5thAssembly.aspx)

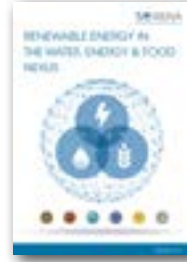
*Full Assembly coverage:* [www.irena.org/newsroom](http://www.irena.org/newsroom)

## Recent publications



### **Africa Power Sector: Planning and Prospects for Renewable Energy**

IRENA has conducted quantitative assessments of the prospects for renewable energy deployment for the five African regional power pools. This synthesis report presents summaries of five regional studies, together with the consolidated outlook for the whole continent.



### **Renewable Energy in the Water, Energy and Food Nexus**

Renewable energy technologies can address trade-offs between water, energy and food, bringing substantial benefits in all three key sectors. This report examines how energy services could be less resource-intensive with less reliance on conventional technologies. For example, energy systems with substantial shares of renewable energy would be less water-intensive than those dependent on fossil fuels.



### **Battery Storage for Renewables: Market Status and Technology Outlook**

This report shows that battery storage technologies for renewables are already cost-competitive for island and rural applications. Furthermore, the market for battery storage systems coupled with rooftop solar panels has started to grow.



### **Renewable Power Generation Costs in 2014**

The competitiveness of renewable power generation technologies continued improving in 2013 and 2014. The report aims to reduce uncertainty about the true costs of renewable power generation technologies to support informed, effective policy-making.

[www.irena.org/publications](http://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.

### Disclaimer

While this publication promotes the adoption and use of renewable energy, the International Renewable Energy Agency does not endorse any particular project, product or service provider.

The designations employed and the presentation of materials herein do not imply the expression of any opinion whatsoever on the part of the International Renewable Energy Agency concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.