
INTERNATIONAL RENEWABLE ENERGY AGENCY

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**Annual report of the Director-General
on the Implementation of the Work Programme and Budget for 2014-2015**

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INTRODUCTION

1. This report takes stock of achievements made in the course of 2014-2015 and provides an account of external and internal developments that have shaped IRENA's activities. With the completion of the first biennial programmatic cycle, it is evident that this framework allowed the Agency to have a more strategic approach to responding to changing needs. The two-year period included a number of external developments that had a profound impact on the energy sector, renewables in particular, which, by extension, affected the programme's implementation. The dynamic nature of the renewable energy sector in the changing global landscape, coupled with internal developments, such as strategic discussions on the future of IRENA and the first external evaluation of its impact, have provided momentum.

Transformation is underway

2. The energy sector is undergoing one of the most transformative changes in its history. A convergence of factors, including the evolving energy policy and climate agenda, business model modifications driven by shifting preferences and expectations, and accelerated technology changes, provide unprecedented challenges and important opportunities for the energy sector. Renewable energy technologies have moved from the margins to the centre stage. In particular, in the last two years, renewable energy has attained a prominent role in sustainable development, in decarbonising economies, and regarding the long-term solutions it offers.

3. The global focus on finding practical solutions to climate change has added prominence to the renewable energy sector. IRENA's REmap 2030, a global roadmap for doubling the share of renewable energy in the global energy mix by 2030, shows that this doubling can only be achieved by three interlinked objectives of significantly higher renewable energy uptake, greater access to modern energy services, and improvements in energy efficiency. Importantly, achieving this doubling would result in setting the world on a pathway

to keep global warming under 2°C. REmap 2030 also noted that this could be done in a cost-effective manner that stimulates economic activity and that has a positive effect on the health and wellbeing of millions that result in billions of external cost savings.

4. For IRENA, this recognition has had a direct impact. IRENA has been called upon to take the lead in catalysing renewable energy action in support of the global effort to stabilise the climate system. In 2014, the centrality of renewable energy to addressing the climate change was highlighted at the UN Secretary-General's Climate Summit, as well as at COP20 in Lima, Peru. The action for climate culminated at COP21 in Paris, France, where IRENA was present and active throughout the two weeks of negotiations, highlighting success stories in the ongoing transition to renewable energy, and the benefits inherent in accelerating its deployment. Among other things, IRENA led two major events. On Sunday 6 December, some 1,000 participants joined live and via webcast the RE-Energising the Future high-level event featuring renewable energy solutions, innovations and actions. On Monday 7 December, together with France and SE4ALL, IRENA organized the Lima-Paris Action Agenda Energy Day, a full-day programme featuring announcements on initiatives, targets and alliances to further the energy transition.

It is an exciting time to be in energy. If we can open more eyes to the moment at hand, and give a sense of magnitude of the transformation, we will have succeeded.

IRENA Director-General



5. With the backdrop of the UN Secretary-General’s Climate Summit and COP20 in Lima, Peru, in 2014, and COP21 in Paris, France, in 2015, IRENA has focused its programmatic work on showcasing that renewable energy is a readily available, economically attractive solution to the climate challenge. This is increasingly evident for a wide number of countries, the private sector, and civil society groups, who are voicing support for a clear, long-term goal of shifting from fossil fuels to clean energy. COP21 is a critical milestone for IRENA’s work in the current programmatic cycle. It also marks a new beginning, as the world moves the climate action agenda forward with renewable energy at the heart of the effort.

6. 2015 brought another notable change with the UN General Assembly adoption of the Sustainable Development Goals (SDG). The work undertaken since 2012 under the umbrella of the decade for Sustainable Energy for All (SE4ALL) has been consolidated into SDG7 on energy. SDG7 calls for a substantial increase in the share of renewables, doubling the global rate of energy efficiency and universal access to modern, affordable and reliable energy. These three interconnected elements of SDG7 bring global recognition to the

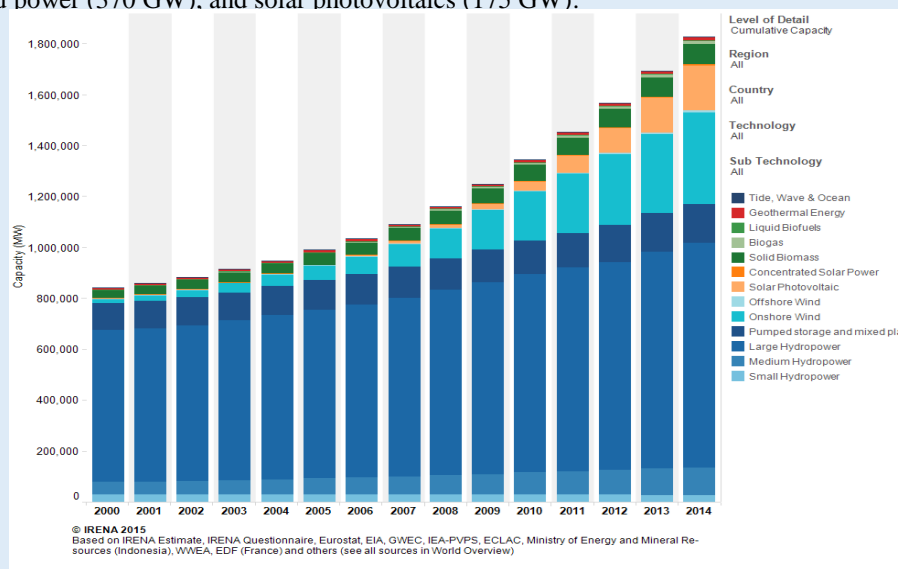
Highlight: The IEA/IRENA Joint Database had 1,700 entries from 110 countries in 2014. Today, the database features 1,900 policies from 124 countries and is consulted by more than 67,000 users.

transformation toward more sustainable energy systems. IRENA, the SE4ALL Renewable Energy Hub, remains engaged in the efforts to translate the ambition of SDG7 into measurable, concrete steps that will help realise this goal by 2030.

7. As the focus on renewable energy increases, so does the need for international cooperation, which is reflected in IRENA’s steady membership growth. Since January 2014, 20 new countries have joined the Agency, with membership totalling 145 as of December 2015, with over 30 in the different stages of the accession process. With its growing membership, IRENA has become the main platform for international cooperation and a strong voice for renewable energy. IRENA will continue to play an important role in the global effort to decarbonise energy, find new paths to energy security and provide universal access to help lift millions out of poverty.

IN FOCUS: INSTALLED RENEWABLE POWER CAPACITY

Renewable power generation capacity accounted for 1,828 gigawatts (GW) in 2014, compared to around 1,500 GW from gas-fired power stations and 1,880 GW from coal-fired power stations globally. The majority of power generation comes from hydropower (1,172 GW), followed by wind power (370 GW), and solar photovoltaics (175 GW).



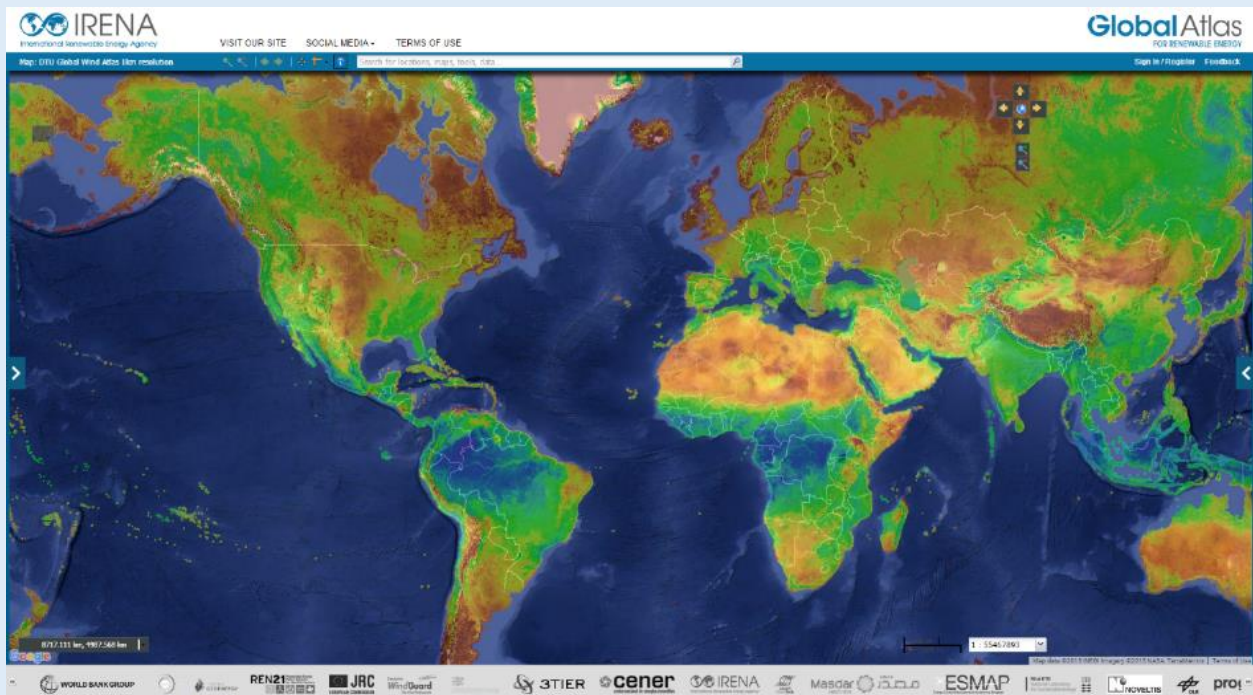
Renewable energy has moved from the margins into mainstream

8. Worldwide, renewable energy power capacity has grown 85% over the past 10 years, constituting 30% of all installed power capacity, the largest share of any source. This trend, together with rapid innovation in renewable energy and enabling technologies, shows that the development and deployment of renewable energy technologies are accelerating. While

remarkable progress has been made in the power sector, the potential of renewables is yet to be fully reached. This is particularly true for end-use sectors, and the next phase will focus on tapping into these vast potentials, designing an optimal mix of all sources of renewable energy, and developing enabling technologies and infrastructure.

IN FOCUS: GLOBAL ATLAS FOR RENEWABLE ENERGY

IRENA's Global Atlas for Renewable Energy, the world's largest database on renewable energy potential, hosts more than 1,500 datasets with over 95,000 viewers worldwide. Global Atlas partners include 67 countries, 8 multilateral initiatives and 50 technical institutes, companies and organisations.



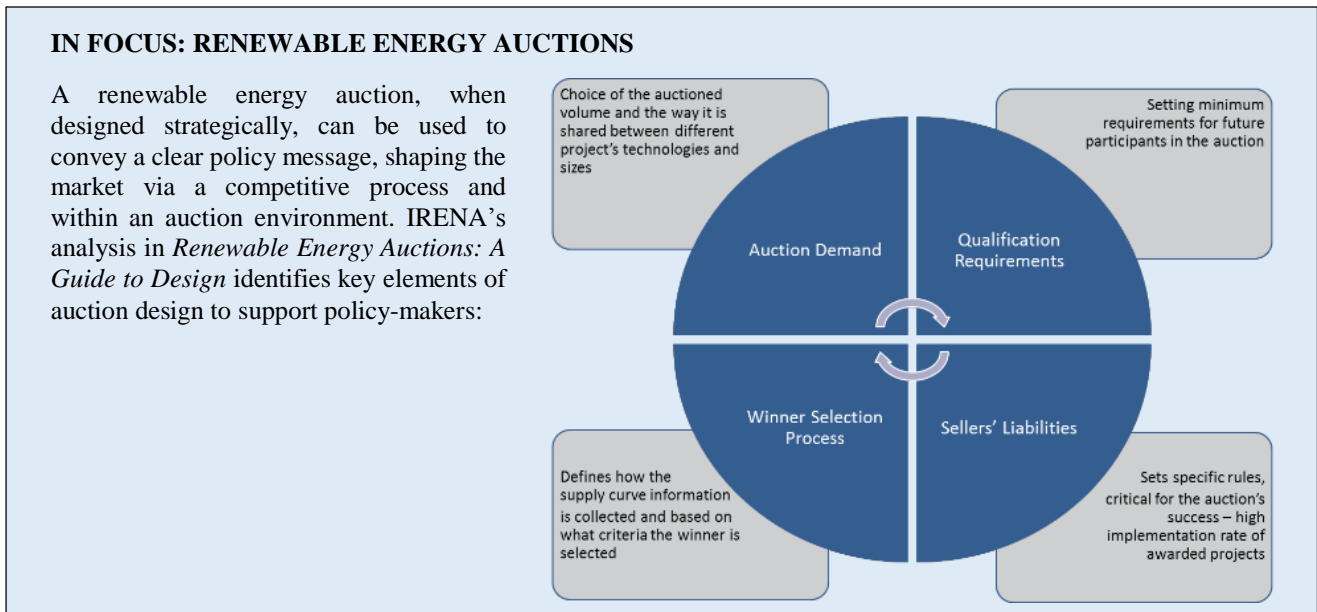
Policy frameworks and market conditions are enabling investment and growth

9. In 2014, over 270 billion US dollars (USD) was invested in renewable energy deployment, an increase of more than 15% from 2013 and more than five times higher than a decade ago. Falling costs are making renewable energy increasingly cost-competitive, and early estimates for 2015 indicate record growth worldwide. For instance, Chile’s investment in renewables increased more than eightfold from USD 180 million in the third quarter of 2014 to USD 1.6 billion a year later, while the United States invested over USD 13 billion, an increase of 25%.¹

10. IRENA analyses demonstrate a sustained decline of the cost of renewable energy technologies, which now provide electricity competitively at the utility scale compared to conventional alternatives. Mature technologies such as biomass, hydropower and geothermal are already competitive. Other technologies are becoming increasingly competitive.

11. Onshore wind, already deployed in more than 100 countries, is now one of the most competitive sources available, with some projects around the world delivering electricity for as low as 0.04 USD/kWh without financial support. There are similar trends for solar PV, with a landmark tendering of 100 MW in Dubai, United Arab Emirates, resulting in a price of less than 0.06 USD/kWh.

12. As of early 2015, 164 countries had adopted at least one type of national renewable energy target, with developing and emerging economies accounting for 131 of these. Reaching these targets requires designing and implementing innovative policies. IRENA focused its work in 2014-2015 on renewable energy target formulation to help countries refine and improve their targets. With the emergence of auctions in many markets, IRENA also focused on providing guidelines and best practices on their design and implementation.



¹ Bloomberg New Energy Finance

13. There is also growing evidence that renewable energy has a positive ripple effect throughout society, simultaneously advancing economic, social and environmental goals. It can decouple energy sector expansion from emissions growth and water use, as well as reduce losses in the system through distributed generation. IRENA's *GCC Renewable Energy Market Analysis* indicates that meeting stated renewable energy targets and plans results in savings of more than three billion barrels of oil – a 9% reduction in the GCC (Gulf Cooperation Council) carbon footprint per capita. Reaching national targets would also reduce power sector water withdrawal by 20 trillion litres annually, equivalent to a 22% reduction, and create roughly 170,000 direct jobs per year from now until 2030.

14. Renewable energy benefits are best understood as part of a holistic strategy to promote economic prosperity, well-being and a healthy environment. IRENA's recent analysis in a report entitled "Renewable Energy Benefits: Measuring the Economics" demonstrates that doubling the share of renewables by 2030 leads to positive impacts

on GDP, welfare, trade and jobs. IRENA's annual review of renewable energy and jobs highlights that the renewable energy sector has already become a major employer, which is growing rapidly. The 2014 review showed 6.5 million jobs, a 14% growth compared to 2013. The 2015 review showed a further increase of 18%, amounting to approximately 7.7 million jobs globally, and a total of approximately 9.2 million jobs when including large hydro.

Highlight:

Renewable Energy and Jobs – Annual Review received over 2.5 million social media impressions in the first week after its launch.

A first global estimate of the large hydropower industry revealed that it employs 1.5 million people.

15. Support for renewables, through enabling policy frameworks, legislation, standards and quality infrastructure, is required even as renewables’ competitiveness increases. The first edition of IRENA’s institutional publication, *REthinking Energy 2014*, highlighted that increased renewables uptake requires:

- Long-term commitment to the creation of an energy system that is diverse, resilient and environmentally sustainable;
- A system-level approach to renewable energy deployment that considers developments in costs and technologies as well as the interests of different stakeholders in the energy sector;
- Creation of an enabling environment by addressing other market-related aspects such as access to finance, permits, grid connection, energy pricing structures and capacity building; and
- Support for the effective and efficient integration of renewables through targeted measures such as timely planning for grid infrastructure, RD&D, and close coordination with different stakeholders.



16. Creating a framework that delivers secure, affordable and sustainable energy to underpin the economic and social development is one of the most important challenges facing many governments today. Renewables are increasingly the preferred solution. Renewable energy is abundant and scalable, and every country has indigenous renewable resources that can be harnessed and integrated into the domestic energy mix.

IN FOCUS: INTERNATIONAL ENERGY WORKSHOP

On 3-5 June, 2015 IRENA hosted the 34th Annual International Energy Workshop (IEW) in Abu Dhabi. Convening some 200 modellers, energy scholars and researchers, the IEW saw over 100 papers presented on topics of energy supply and price forecasts, energy savings and efficiency, renewable and innovative energy technologies, environmental and climate policy, and the intersection between energy analysis, economics, and the natural sciences.



FINANCING RENEWABLES IS GETTING CHEAPER & EASIER

Project developers, venture capital, government grants

Commercial banks, multi-lateral institutions

Institutional investors

New Players

17. IRENA continues to assist countries in their efforts to increase the share of renewables in the energy mix, including through the Renewables Readiness Assessment (RRA) to create an enabling framework. To date, 26 countries have undertaken the RRA process and, looking at the recommendations that emerge from these processes, the majority are related to policy and

strategy, planning, and legal and regulatory frameworks. A number of countries have already implemented select RRA recommendations and are integrating them into their long term energy strategies. Many RRAs also highlight the economic and strategic benefits of cross-border trade and regional integration.

IN FOCUS: IRENA'S CONTRIBUTION TO THE DEVELOPMENT OF THE FORTHCOMING 25-YEAR ENERGY MASTER PLAN OF OMAN

In October 2015, IRENA participated in the *Oman Energy Forum* in Muscat to discuss, draft and shortlist critical recommendations to be included in the forthcoming 25-year Energy Master Plan of Oman. Organised under the auspices and guidance of the Omani Ministry of Oil and Gas, the forum gathered more than 100 national and international experts to formulate recommendations in sessions focusing on energy demand, energy supply, research and development, human capital and the water, energy and food nexus.



Drawing on various IRENA projects such as the *Renewables Readiness Assessment: Oman*; *Regional Market Analysis: GCC* and the *Renewable Energy in the Water, Energy and Food Nexus*, IRENA highlighted that renewable energy provides a sustainable and cost-effective solution to the challenges posed by rising demand of energy and water in Oman. The delegates of the forum concluded that Oman needs to devise a long-term strategy to diversify its energy mix and add alternative power generation sources such as renewable energies, while also enhancing energy efficiency and improving demand-side management both on an individual and industrial level.

18. Advancing pragmatic and sustainable global development requires meaningful consideration of economic, social, and sustainability issues. Renewable energy solutions need to be aligned with broader development strategies, so that they are not limited by existing infrastructure. IRENA has worked with the countries of the Eastern and Southern Africa Power Pools to find new technology and market solutions that would support their development agendas through the provision of clean, indigenous, cost-effective renewable power. The Africa Clean Energy

Corridor (ACEC) aims to transform the continent's energy mix by enabling countries to make more use of their abundant renewable energy resources. ACEC is proving to be an effective model that could be replicated in other regions, and IRENA is partnering with stakeholders in West Africa, Central America, countries of the Association of South East Asian Nations (ASEAN) and the Maghreb region to explore potential for the development of other regional clean energy corridors.

IN FOCUS: AFRICA CLEAN ENERGY CORRIDOR

The ACEC Communiqué calls for action in five key areas, namely zoning and resource assessment, country and regional planning, enabling frameworks for investment, capacity building, and public information. IRENA prioritised its activities in ACEC on zoning and resource assessment, enabling regulatory environments and capacity building. In collaboration with the Lawrence Berkeley National Laboratory (LBNL), IRENA developed a renewable energy zoning methodology which was validated by stakeholders from utilities, governments, regulatory bodies, Power Pools and academia from within the region.

Renewable Energy Zones for the Africa Clean Energy Corridor includes interactive maps with information on levelised cost of electricity, generation potential, and proximity to existing infrastructure. The publication was launched at the South African International Renewable Energy Conference in October 2015. The maps are available on the Global Atlas website, as well as the mapre.lbl.gov website. Training on the zoning methodology development and on how to input data was conducted in September 2015 to ensure that country stakeholders are able to maintain, update and refine zoning assessments.



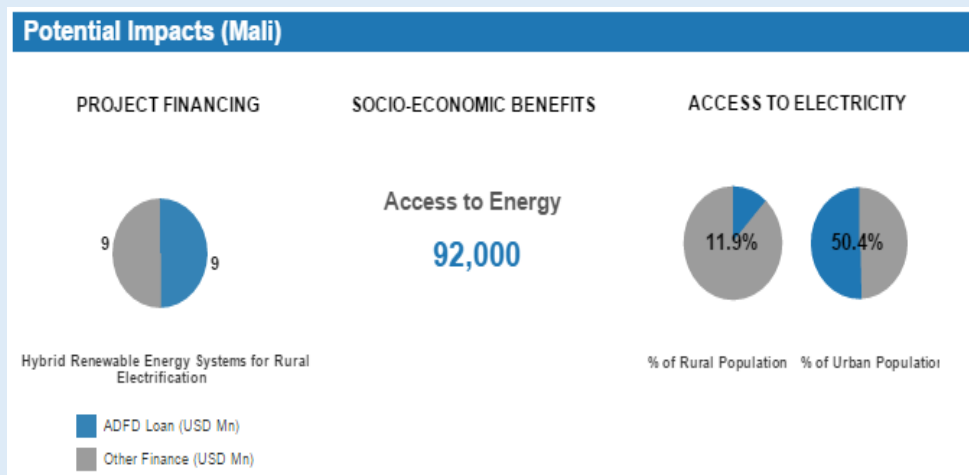
Chairperson of the African Union Commission, H.E. Dr. Zuma, launched the Africa Clean Energy Corridor at the 2014 Climate Summit

19. Indigenous renewable options also open new possibilities for meeting the needs of the poorest people currently without access to energy. Decentralised solutions promote productive uses, spur education, allow access to modern communication, transform lives and offer a host of new economic opportunities. IRENA's International Off-grid Renewable Energy Conference (IOREC), held in June 2014 in the Philippines, convened over 400 stakeholders to

discuss how best to tap into the vast potential that renewable energy systems offer in rural settings. IOREC emphasised that off-grid and mini-grid renewable energy systems are now the most cost-effective solution for electrification in the majority of rural areas. Among the key messages that emerged from the two-day deliberations was the urgent need to change mind-sets and strategies from a grant-driven approach towards a market-based entrepreneurial approach.

IN FOCUS: HYBRID RENEWABLE ENERGY SYSTEMS FOR RURAL ELECTRIFICATION

'Hybrid Renewable Energy Systems for Rural Electrification' in Mali was selected in the first IRENA/ADFD project cycle. Led by the Agence Malienne pour le Développement de l'Énergie Domestique et de l'Électrification Rurale (AMADER) the project affects a total of 92,000 people, reduces energy costs, generates 2,078 jobs (120 direct jobs and 1,950 indirect jobs) and mitigates 5,260 tCO₂.



20. Small Island Developing States (SIDS) have been early advocates for the uptake of renewable energy. Most are rich in renewable energy resources and have already adopted ambitious strategies and targets that can transform their economies and societies. SIDS are also the most vulnerable to changing climate patterns, and the incursion of rising sea levels can damage natural habitats, intrude on natural resources, disrupt economies, and negatively impact livelihoods. To

support the strategic deployment of renewables in SIDS, and to enable targeted action, IRENA developed the SIDS Lighthouses Initiative. A joint effort by SIDS and development partners, this framework for action assists transformation of SIDS energy systems. Further, these experiences can help address the needs of the 1.1 billion of people worldwide without access to modern energy services.

IN FOCUS: SIDS Lighthouses

The SIDS Lighthouses Initiative is now a joint effort of 27 SIDS and 14 other partners to support the strategic deployment of renewable energy in SIDS and to enable targeted action.

An important milestone in advancing the Initiative was the Third International SIDS Conference that took place in Samoa in September 2014. In preparation for the Conference, IRENA, together with the Governments of Samoa and New Zealand, hosted a Renewable Energy Forum, which confirmed the pivotal role that renewable energy plays in the SIDS' sustainable development and climate change efforts. The Conference outcome document, the SAMOA Pathway, calls on IRENA to play a leading role in accelerating the deployment of renewables in SIDS.



System of the future

21. While there is widespread agreement that the share of renewables will continue to rise, the ideal future electricity system design is still not apparent. Grid and storage technology solutions are critical for the successful integration of high shares of variable renewables and the creation of the new energy system. Rapid technology progress in this field, such as the concept of smart grids, has opened new opportunities. The new energy systems must consider all the potentials countries have at their disposal: from mature technologies such as biomass, hydropower and geothermal, through

22. The widespread ambition for the deployment

Highlight:

Technology briefs represent the second largest source for downloads from the IRENA website.

increasingly cost-competitive wind and solar, to emerging marine options. IRENA continues to provide objective, timely and policy-relevant information on each of these technologies, and provides a platform for cooperation on specific issues.

instruments that facilitate renewable projects,

IN FOCUS: Global Geothermal Alliance

In support of greater geothermal deployment, IRENA supported the creation and growth of the Global Geothermal Alliance (GGA), a partnership for action to better address the challenges countries face when seeking to exploit their geothermal potential. The GGA offers a platform for dialogue, cooperation and coordination to governments, development partners and industry.



A multi-stakeholders gathering took place in Nairobi in June 2015 to discuss the strategic orientations of the GGA. Participants included representatives from the African Union Commission; the Eastern Africa Power Pool; ENEL Green Power; the European Investment Bank; the Geothermal Energy Association; the International Geothermal Association; the International Finance Cooperation, the Japan International Cooperation Agency, the New Partnership for Africa's Development; Regional Electricity Regulators Association of Southern Africa; Reykjavik Geothermal; the Secretariat of the Pacific Community and the United Nations Environment Programme (UNEP). The GGA was once more discussed during a high-level side event then formally launched during the COP21 on 7 December 2015 in Paris in the presence of the President of Iceland, French Minister of Ecology, Kenyan Minister of Environment and New Zealand's Minister of Energy.

of renewable energy requires mobilising concomitant investments. Analysis of case studies in Africa, Asia and Latin America has shown that an innovative use of public funds can have a multiplier effect and can leverage private funds. Most investment will come from the private sector which, increasingly, supports renewable energy projects. The real and perceived risks that inflate financing costs continue to pose an obstacle to the deployment of renewables even where resources are plentiful. IRENA's contribution in this context is focused and practical, bringing effective tools and

enable private sector investment, and increase transparency for countries on options available.

Highlight:

The electricity storage roadmap found that for islands and grids in remote areas, electricity storage systems are already a cost-effective solution to facilitate the transition from diesel generators to renewable power generation. In larger systems, pumped hydro stations (PHS) are the most important electricity storage technology to support the integration of variable renewables into the grid



Google

Google has invested over \$2 billion in wind and solar because it generates “attractive financial returns”

www.irena.org/REthinking

23. IRENA developed the Sustainable Energy Marketplace to facilitate investment in projects in developing countries, starting from Africa, Latin America and Caribbean. The Marketplace convenes stakeholders including project developers and owners; public and private financing entities, advisors, service and technology providers and governments. The Marketplace makes projects, financing instruments, as well as service and technology providers, visible and easily identifiable. The platform also provides links to IRENA’s existing tools and databases of high relevance for project development and implementation, notably the Project Navigator, REsource, Global Atlas and

IEA/IRENA Joint Policies and Measures Database.

24. The Marketplace covering Africa Clean Energy Corridor (ACEC) countries was announced at the SAIREC conference in South Africa in October. In November and December the Marketplace was expanded to cover all African countries. And in December a dedicated portal for the Caribbean, as a pilot for the SIDS part of the platform, and another portal for Latin America were finalised. The Marketplace was officially launched at COP21 in Paris on 7 December 2015.

IN FOCUS: Since the RE100 campaign was launched at Climate Week NYC in 2014, more than 35 major companies have joined the campaign and committed to source 100% of their electricity from renewables. In the context of its efforts to reach out to private sector constituencies, IRENA is partnering with this momentous global campaign as it continues to roll out across industrial sectors and countries around the world.

If the political will and enabling environment for investment is there, there are enough resources around the world for the transition to a low carbon economy based on sustainable energy. Not in the future, but today.

*IRENA Director-General,
Sustainable Development Summit,
New York, September 2015*

Taking stock: IRENA 2014-2015 Work Programme Implementation and Impact

25. Through its studies, workshops, training, and technical support to countries described in this report, IRENA seeks to generate and share knowledge that will lead to investments in energy services, improved livelihoods and economic transition worldwide. Reaching its fifth year of existence, IRENA has undertaken an independent review of the Agency's work to date to assess both the impact made and to obtain an external perspective on how to best continue to deliver its mandate. The six-week evaluation consisted of a range of activities including surveys, interviews and desk review of a variety of internal and external products.

26. A membership-wide survey resulted in 46 responses from a diverse mix of Members. The survey provided an excellent overview of Members' views on IRENA's effectiveness and impact, and indicated the areas that could be analysed in more detail. This survey has been complemented with in-depth interviews of 25 individuals comprising Members, private sector and other stakeholders. The evaluators also undertook an internal survey of IRENA staff, as well as a range of interviews across functions and levels. The process included a thorough analysis of IRENA publications and outputs and their impact in the broader energy landscape.

27. The overall qualitative evolution of the impact to date has been positive. The majority of those contributing to the evaluation process stressed that IRENA has made remarkable progress in establishing itself as a credible, modern Agency that responds to the needs of its membership. Despite its short tenure, IRENA is deemed to have delivered significant and tangible achievements, is considered a source of authoritative information and advice, and has increasingly sought-after products.

28. The evaluation also reconfirmed some of the key points that have been discussed in the course of preparation of the Work Programme and Budget 2016-2017, and the strategic discussion on the future financing of the Agency. The evaluation results noted that, to ensure that the Agency's limited resources deliver the greatest impact, prioritisation of efforts and strategic and systematic formulation of partnerships will be key for the future. The survey results also emphasised that IRENA's work to date has provided a solid foundation for the Agency to enter a new phase. Detailed findings of the evaluation are being made available to Members.

29. To ensure effective management and administration of programmatic activities, the 2014-2015 Work Programme has been structured along 31 projects, covering 123 deliverables, including deliverables that were subject to additional voluntary contributions. To date, 101 deliverables are or will be completed by the end of 2015, 11 are in progress, and 11 are closed as additional resources have not been identified. The matrix annexed to this report contains a detailed account of the implementation status for the 2014-2015 biennium.

30. The progress to date has been greatly facilitated by the timely receipt of Members' contributions. To date, 99.5% has been received of assessed contributions for 2014, and 94.5% for 2015. In addition, USD 9.2 million was received from Germany and USD 14.8 million from the UAE, as part of budgeted core non-assessed contributions. Over USD 15 million was pledged in additional voluntary contributions from Belgium, France, Germany, Iceland, Japan, New Zealand, Norway, Sweden and Switzerland, with USD 8.3 million received to date.

Thematic Programme Areas

I. Planning for the global energy transition

31. Planning for the global energy transition has been an instrumental element of IRENA's work in the biennium. Focus has been placed on supporting the development and dissemination of cutting-edge information, analysis, and required tools and services, to mainstream renewable energy options and strategies in national and regional energy plans. IRENA's partnerships, such as with SE4ALL in its role in the SE4ALL Renewables Hub, and its analyses - such as REmap 2030, work on cities, the water, energy and land nexus, transforming power grid infrastructure, innovative planning tools, RRAs and advisory services – have provided a strong base for policy- and decision-makers to make the next step towards transforming their energy systems.

Sustainable Energy for All Renewables Hub

32. Over the course of the biennium, IRENA has worked with SE4ALL in its role as the Renewable Energy Hub through participation in the Advisory Board, contributions to the Global Tracking Report (led by the World Bank and the International Energy Agency (IEA)), and through collaboration with the World Bank in the Readiness for Investment in Sustainable Energy (RISE). IRENA has also worked to further strengthen its collaboration with the SE4ALL thematic and regional hubs, to help ensure that renewable energy is represented in all facets of the SE4ALL Initiative's work, and to benefit from synergies among stakeholders. In this context, IRENA has participated in the meetings of the access and finance hubs, as well as the Africa regional hub led by the African Development Bank, and has initiated cooperation with the Inter-American Development Bank as it advances its work in the Latin America and Caribbean (LAC) region.

REmap 2030

33. IRENA's global roadmap for renewable energy, REmap 2030 is demonstrating options and identifying priority actions needed to double the share of renewable energy in the global energy mix. Having released the first global REmap analysis in 2014, IRENA focused on translating results into action by working closely with its network of over 100 national and country experts and by expanding the scope of REmap countries from 26 to 40 countries. REmap also increased individual country engagement by releasing eight in-depth country reports. These REmap country reports have been released for China, Germany, India (early 2016), Mexico, the United Arab Emirates and the United States of America (USA), as well as working papers for Poland and Ukraine. Preparation of country reports are on-going with Russia, South Africa and Turkey and REmap country-level work is ongoing with the new countries that joined REmap in 2014/15 which include Argentina, Belgium, Colombia, Cyprus, the Dominican Republic, Egypt, Ethiopia, Iran, Kazakhstan, Kenya, Kuwait Sweden, and Uruguay. IRENA has also released a regional REmap report for Africa. Through this work, IRENA is offering new perspectives to countries that can help raise their renewable energy ambitions. In this process, IRENA is increasing knowledge, identifying best practices and sharing experiences among countries to empower policy-makers to advance their renewable energy plans and strategies.

34. To encourage a greater, cross-sectoral engagement of industry, private sector and intergovernmental stakeholders, REmap created action teams on renewable energy and energy efficiency and transport. Action teams work with stakeholders to exchange information, analysis and ideas among leading world experts, to avoid duplication of work, and ultimately to disseminate options and action to double the share of renewables in the global energy mix. The renewable energy and energy efficiency action team, in cooperation with the Copenhagen Centre for Energy Efficiency (C2E2), released a working paper on synergies that showcased how

combined efficiency and renewable energy deployment can strengthen energy policies. The transport action team, leveraging a network of some 200 experts aimed at sharing information, data and best practice, also organized online webinars, developed a transport sector roadmap working paper with a particular focus on electric mobility, advanced biofuels, and systems thinking. The Roadmap findings highlight the optimal use of scarce biomass feedstock for biofuel production, opportunities to use renewable power for transportation applications and interlinking the power sector with the transport sector, and the use of car batteries to deal with variability and electricity storage. Expansion of REmap work was made possible with in-kind support by Members, and through voluntary contributions from Germany and Japan.

35. Technology briefs are complementing REmap work through increased understanding of the characteristics of renewable technologies. Eleven technologies briefs were issued in the course of the biennium, including a package of technology briefs on: ocean energy; wind power; hydropower; biomass for heat and power; renewable energy grid integration; solar heat and cooling for buildings and for industry; and renewable energy solutions for shipping. Technology briefs represent the second-largest number of downloads from IRENA's website, with findings used in industry events and in key reports including for the United States Congress, Climate Wire, The Economist Group and the Massachusetts Institute of Technology (MIT).

36. Sectors specific roadmaps are also fulfilling an information need. In February 2015, IRENA released a manufacturing industry renewable energy roadmap and supporting working paper entitled *Renewable Energy in Manufacturing*. This roadmap fills an important knowledge gap in the assessment of the renewable energy potential for the manufacturing industry and identifies six priority areas for policy-makers and industrial stakeholders - namely, 1) energy-intensive sectors, 2) small and medium size enterprises (SMEs), 3) biomass, 4) solar thermal systems, 5) electrification and 6) regional aspects. IRENA has presented findings of this roadmap in webinars, at IEA meetings, and during a dedicated event on the topic of renewable energy in manufacturing. REmap roadmaps for industry and transportation, addressing the deployment in end-use sectors, were also released.

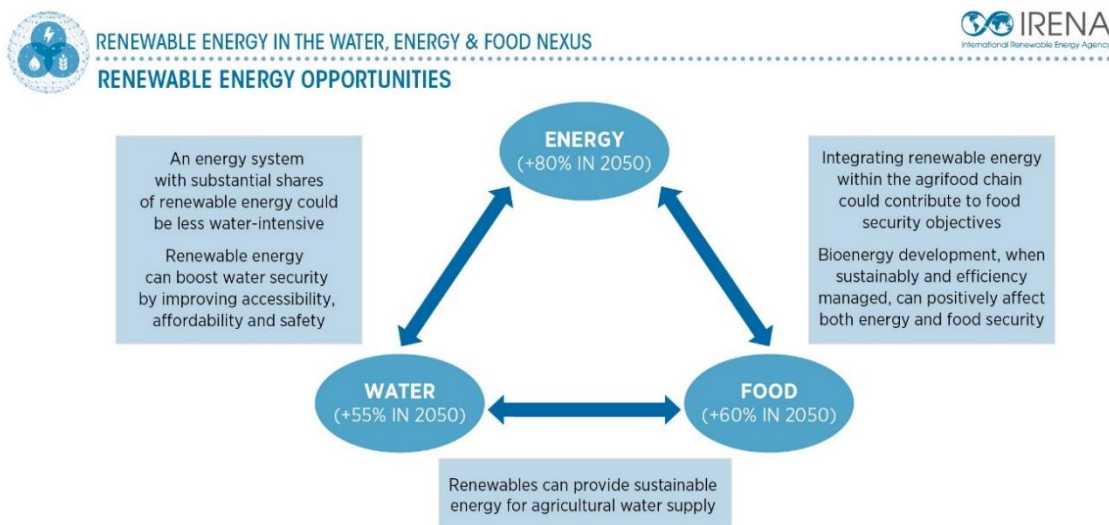
37. REmap findings have also resulted in a deepened insight on the importance of bioenergy for renewable energy prospects through analysis completed in cooperation with Planbureau voor de Leefomgeving (PBL - Netherlands Environmental Assessment Agency). In addition to a bioenergy working paper on demand and supply, costs, sustainability and policy issues, IRENA organised two bioenergy deployment workshops for Asia, the first in cooperation with the Food and Agriculture Organisation (FAO) and IEA, and the second in cooperation with the UN Asia Pacific Center for Transfer of Technology and the Government of Thailand. A third workshop was organised at the end of 2015 in Egypt with New and Renewable Energy Egypt (NREA).

38. The impact of REmap work is emerging in different parts of the world. Various REmap countries have utilised REmap country report recommendations, with some requesting additional analysis in support of decision-making. The China REmap 2030 analysis resulted in broader cooperation with the China National Renewable Energy Centre (CNREC) to cover scenario analysis, costing and renewable energy policy analysis, as well as follow-up work in the area of standards and quality control. The Asia-Pacific Economic Cooperation (APEC) identified the doubling of renewable energy as an objective, with ensuing discussions on how to achieve this target. REmap analysis is also feeding into the G20 process: through an assessment of renewable energy options, it has informed the established Cambridge Economics Models, resulting in improved models for macroeconomic impact analysis. It is also informing the climate debate on the role of renewables in the Ad-Hoc Durban Platform and other meetings of the United Nations Framework Convention on Climate Change (UNFCCC).

REpowering cities

39. Faced with growing populations, cities are increasingly in need of sustainable solutions to meet energy needs. Population growth and urbanisation trends predict that two-thirds of the world's population will be living in cities by 2050, with a majority based in Asia and Africa due to new and rapidly evolving cities. In this regard, IRENA has focused biennial support on assisting municipalities with viable business models featuring mutually beneficial public-private partnerships. To support public and private stakeholders in seizing such opportunities, IRENA organised a side event in the margins of the World Future Energy Summit in 2014 in Abu Dhabi to showcase viable business models for specific renewable energy technologies in the areas of 1) waste to energy; 2) solar thermal, photovoltaic and building integrated photovoltaic applications; and 3) outdoor lighting. Participating stakeholders, including mayors and city representatives, recommended that IRENA highlight the sharing of experiences and best practices through capacity-building initiatives. In response to this request, IRENA developed *A Practitioners' Guide to Wind Energy*, released early in 2015 to increase knowledge of the various approaches to the deployment of wind energy.

40. With a regional focus, IRENA, in cooperation with the government of Israel, organised a workshop and study tour on renewable energy deployment in Sub-Saharan African Cities for 21 participants from 12 Sub-Saharan African countries in January 2015. The initiative shared strategic thinking and a variety of tools for the implementation of new policies and applications of renewable energy. It also featured on-site observation of renewable energy deployment practices.



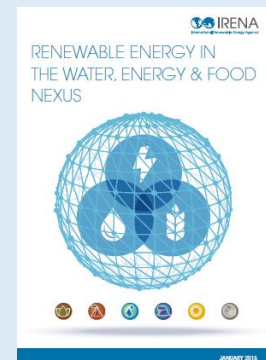
Water, Energy and Land Nexus

41. The benefits of renewable energy, across all sectors, strengthen the business case for renewables. Renewable energy can offer a cost-effective, secure and environmentally-sustainable supply of energy to improve water and food security, while reducing the development constraints imposed by the water, energy and food nexus. In response to these challenges and in an effort to reduce knowledge gaps, IRENA launched the *Renewable Energy in the Water, Energy and Food Nexus* report in January 2015. The comprehensive report provides qualitative and quantitative evidence on the opportunities for renewables adoption across the water, energy and food sectors, and highlights potential risks that need to be managed for rapid renewables deployment. Since its launch, the report has been widely cited in the global discourse on the nexus, with over 60 media articles identified within the first week alone and 300,000 downloads since the launch. IRENA has been invited to present report findings at various global and regional forums including the International Water Summit, 6th World Water Forum, the United Nations Economic and Social Commission for Western Asia (UNESCWA), the Arab League Expert Group Meeting on Water, Energy and Food Security Nexus in the Arab region, the Food and Agriculture Organization (FAO) technical workshop on solar irrigation pumping, SE4ALL Forum 2015 and the Stockholm World Water Week.

IN FOCUS: RENEWABLE ENERGY BENEFITS FOR THE WATER AND AGRICULTURE SECTOR (NEXUS)

Substantial renewable energy opportunities exist in the water and agriculture sectors. In fact, nearly 30% of global energy consumption can be attributed to the agriculture sector. Achieving a complete energy sector transformation will, therefore, require targeted efforts to tap into deployment opportunities in these sectors. IRENA's work on the water, energy and food nexus is oriented towards this objective by focusing on:

- 1. Strengthening the business case for renewable uptake in different end-use sectors.** IRENA's *Renewable Energy in the Water, Energy and Food Nexus* report identified options for integrating renewables along different segments of the food and water supply chain. Report findings note that growing adoption of renewables, in particular wind and solar PV, can reduce stresses on limited water resources, since they consume up to 200 times less water compared to conventional energy sources. Through the report and dissemination activities, IRENA is contributing to improving awareness of these benefits, evidenced through mention of its work across several cross-sectoral publications and platforms such as the World Water Forum and Stockholm Water Week.
- 2. Developing empirical evidence on the benefits offered by renewable energy deployment in the water and agriculture sector.** IRENA has been conducting quantitative analysis of the water-saving potential of renewables at a regional and national level. A preliminary analysis on select REmap 2030 countries found that a substantial scale-up in renewables deployment could reduce water withdrawals in 2030 by nearly 50% in the United Kingdom, by more than 25% each in the United States, Germany and Australia, and by over 10% in India. In partnership with national institutions, analysis is being expanded to include additional countries where water conservation is, and can be, a strong driver for renewable energy adoption.
- 3. Integrating the nexus approach in IRENA's existing advisory programmes including IRENA's Renewables Readiness Assessments (RRA).** The integration of the nexus approach into advisory programmes promotes applications that offer substantial socio-economic benefits in the agriculture and water sectors. In the case of Zimbabwe, for instance, a nexus approach yielded substantial potential for deployment of solar pumping solutions for irrigation. Existing pilot programmes have shown that such solutions can enhance productivity, increase incomes, reduce repetitive manual tasks and improve food security. Programme results also showed farmer household income increase by almost threefold. As an integral part of the RRA process, IRENA is working closely with stakeholders to identify policy and regulatory requirements to ensure a sustainable scale-up of solar pumping solutions that can maximise development impacts of deployment. A case study focusing on these solutions will be published in January 2016.



42. Building on the report, IRENA is developing in-depth analysis on specific renewable energy applications, solar pumping for irrigation and solar water heating. The analysis looks at the synergies between the three sectors and the substantial benefits they offer. In addition, IRENA is integrating the nexus perspective into other country assessments as well as in REmap 2030 country reports. Under this work stream, IRENA continues to develop cross-sectoral partnerships with a diverse set of institutions, including the Stockholm International Water Institute, the World Bank and the FAO, to jointly develop nexus analysis that can inform decision making towards meeting sustainable development objectives.

Transforming Power Grid Infrastructure

43. Faced with the imperative of managing climate change, countries are increasingly looking to transition to higher shares of renewable energy. Focus to date has been placed on the power sector, with growing recognition of the need to transition end-use sectors. In support of countries' energy transitions, IRENA has established a programme on power system transition to renewables that includes a set of guidelines featuring in-depth technology studies, insights on associated costs and investment needs, and recommendations on the way forward. Through this body of work, IRENA has become a trusted source of information on grid and storage technologies for renewables deployment, with a growing number of countries and institutions requesting IRENA's contribution, including the G7, G20, Clean Energy Ministerial, SE4ALL and UNFCCC. IRENA has provided direct country support in the development of national policies on energy storage for: Cameroon, Egypt, India, and South Africa, with input on the European Commission's new policy framework for energy storage. Further country technical support has been provided, with specialised grid stability assessment software, utilised to date by the governments of Antigua and Barbuda, Samoa in addition to the Cook Islands. Advice on grid integration was also provided to Barbados and Kiribati, in collaboration with the University of the South Pacific and the Pacific Power Association (PPA).

44. IRENA has conducted analysis on the role of renewable energy in transitioning grid infrastructure for rural access to electricity. A global overview of off-grid renewable energy systems was published and has since formed the basis for the progress report of the SE4ALL Initiative on decentralised renewable energy solutions. Furthermore, IRENA has provided data and analysis, including a detailed breakdown of the renewable power generation costs for distributed systems, for the UNFCCC Technology Executive Committee (TEC) in the preparation of their TEC brief entitled *Facilitating Technology Deployment in Distributed Renewable Electricity Generation*.

45. The technology roadmap *Renewables and Electricity Storage*, released in June 2015, identified 14 action items across a number of priority areas where governments and industry can work together to facilitate the development of policies on electricity storage for renewables, namely 1) electricity storage for islands and remote areas, 2) consumer-located storage for self-consumption in countries with high shares of rooftop solar PV systems, 3) generator and grid-located storage for countries with grid infrastructure constraints, and 4) system analysis tools for countries preparing to transition their power sector.

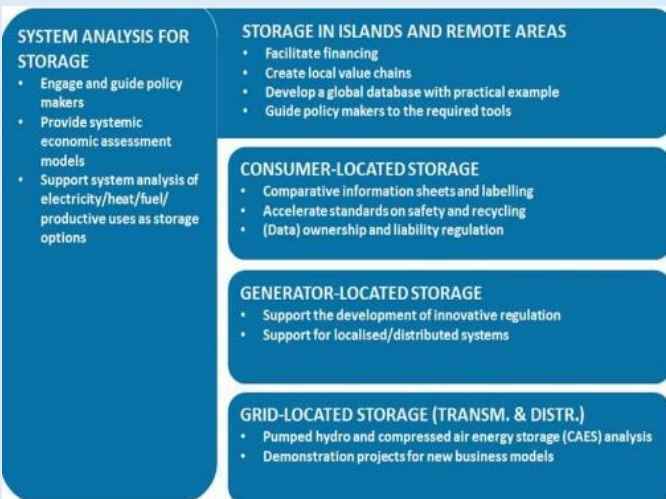
46. As the share of variable renewables increases, there is a need to better understand infrastructure and technology requirements for further growth. *The Age of Renewables: Designing National Roadmaps for a Successful Transformation*, released at the Innovation for Cool Earth Forum (ICEF) in October 2015, compiles the key activities required to support this growth. The roadmap includes information on the features, costs and benefits of smart grid technologies for integration of variable renewables, an overview of demonstration projects, and a new methodology and case study assessment on the impact of renewables on grid investment streams. In total, 20 different measures were identified for the integration of variable renewable energy, with country case studies highlighting lessons learned from 14 of these measures. A number of methodology reports and assessment tools complement the framework and have been applied to a number of countries including

Jamaica, Kazakhstan, Morocco, and South Africa. Preliminary results were discussed in a roundtable on a regional strategy for smart grids and renewables in the Association of South East Asian Nations (ASEAN) region and informed a Ministerial Roundtable during the fifth session of the IRENA Assembly in January 2015.

47. To disseminate results and collect input, IRENA has organised a series of technical workshops. A series of four electricity storage workshops and two grid integration workshops were organised with a wide range of private and public sector participants. In total, more than 200 participants from 50 countries participated in the prioritisation process on key activities for electricity storage and integration measures for variable renewable energy. Technical workshops for utility engineers and expert stakeholders on grid operation planning with high shares of variable renewable energy were held in Antigua and Barbuda and Samoa, resulting in increased awareness of the changes, challenges and available measures and solutions. In response to the request of the utilities' association of the Caribbean (CARILEC), IRENA also organised two webinar sessions on the role of electricity storage for islands. Analysis has also been presented in various technical events focused on grid planning in islands, including a dedicated workshop on electricity storage during the Aruba Learning Event. IRENA has subsequently received requests from utilities, project developers and finance institutions to provide inputs on respective activities. The topic has also received increased media attention such as through the Energy Storage Journal, The Guardian (UK), The Age, Sydney Morning Herald (Australia), The Economist Group (UK), PV Tech, Metering & Smart Energy, Hydroworld, Edie.net, World Energy Focus, The National (UAE), and Eco Watch.

FOCUS: ELECTRICITY STORAGE TECHNOLOGY ROADMAP

IRENA's technology roadmap on electricity storage focuses on the role of electricity storage for accelerating the deployment of renewable power generation. A series of expert workshops in Dusseldorf, New Delhi and Tokyo attracted more than 150 experts from 50 countries. The roadmap identified 14 action items, presented case studies, and identified stakeholders in five priority areas. It concludes that electricity storage systems are not always a prerequisite for a continued growth of renewable power generation. In larger systems, pumped hydro stations (PHS) are the most important electricity storage technology to support the integration of variable renewables into the grid. The report also highlights that, for islands and grids in remote areas, electricity storage systems are already a cost-effective solution to facilitate the transition from diesel generators.

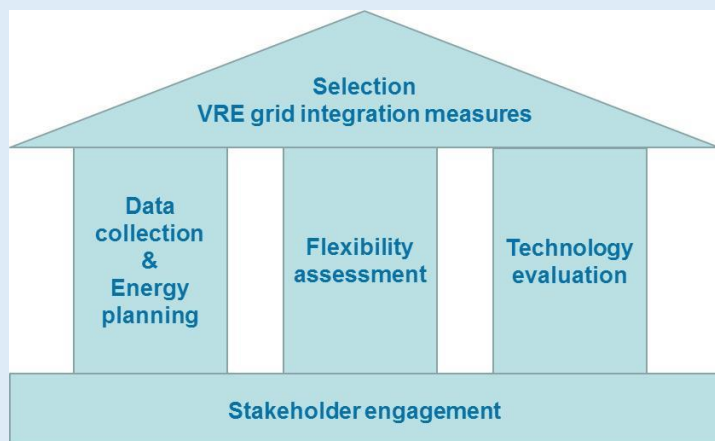


In the next 5-10 years, the declining costs of rooftop solar PV systems, combined with advanced electricity storage systems, can enable consumers to produce and consume their own electricity more cheaply than by buying electricity from the grid. Although this would not diminish the importance of transmission and distribution grid infrastructure, it affects utilities' business models. Policy-makers and regulators need to start today to create regulatory frameworks that ensure electricity storage systems for self-consumption to support the grid. Such a regulatory framework will require procedures that allow for aggregation, support for technology development for control systems and software, and procedures to deal with data ownership.

Following the release of the roadmap, IRENA organised a dedicated event during the Aruba Learning Event and a webinars for the Caribbean Electric Utility Services Corporation (CARILEC) to disseminate information on the use of storage technologies to support and accelerate renewable energy deployment in the Caribbean.

IN FOCUS: IRENA'S RENEWABLE ENERGY GRID INTEGRATION ROADMAP

IRENA's technology roadmap on renewable grid integration highlights different measures for integrating and transitioning towards renewable power generation. Based on the lessons learned from recent studies in this area, the roadmap provides practical guidance on the steps needed to select appropriate measures.



Steps include the assessment of current and future system flexibility, data collection methods to inform and facilitate decision making, and an evaluation of smart grid and storage technologies available within the region. Based on these inputs, grid integration measures and appropriate stakeholders are identified. The analysis shows that smart grid investments make economic sense, as they contribute to the reduction of non-technical losses and black-outs. Smart inverters and smart meters are only marginally more expensive than conventional technologies, and have short payback times due to reduced operational and maintenance expenditure.

Each step and measure is augmented with practical examples from IRENA's technical studies on renewable energy grid integration and 14 country case studies.

Planning with Renewables

48. To plan for the global energy transition, governments require tools to assess resource potential, security of supply, energy access, affordability, and environmental and financial constraints. IRENA has continued to support the development of these tools and their use at the national and regional levels. Planning work in Africa was presented in the margins of the fifth session of the IRENA Assembly at an event entitled *Planning Renewable Energy Strategies: Africa Power Sector*, and was attended by more than 70 delegates. Members welcomed IRENA's work, underscoring the lack of adaptable, realistic energy plans for the African continent, the need for more substantive data in the power sector, as well as the need for greater coordination between government and industry.

49. Bridging the gap between the scientific modelling community and government energy planners, IRENA held three workshops to gather input on the modelling of renewables for policy making. Attended by over 150 experts from around the world, workshop output formed the basis for an assessment of current long-term planning methodologies for the integration of renewable energy into national and regional power systems called *Addressing Variable Renewables in Long-term Energy Planning (AVRIL)*.

50. Following the development of AVRIL, IRENA hosted the 34th International Energy Workshop (IEW) in June 2015 in Abu Dhabi, a conference for the international energy modelling community. The IEW gathered over 200 experts to compare quantitative energy projections, to understand diverging views of future energy developments, and to observe new trends in global energy production and consumption. The conference increased understanding of planning uncertainties and how to deal with these in renewable energy policy strategy development.

51. Investment decisions made today on power plants and transmission grids can shape the energy system for decades. Long-term infrastructure planning is required to support cost-effective renewable energy system integration. Least-cost energy system modelling is a tool that helps policy-makers explore investment decisions for an optimal energy mix and transition pathway. In this context, IRENA has completed the development System Planning Test (SPLAT) models for five African power pools, including user manuals. Analysis is summarised in the publication *Africa Power Sector: Planning and Prospects for Renewable Energy*, published in January 2015. Using the same tool, IRENA has also quantified CO₂ mitigation impacts of the Clean Africa Energy Corridor initiative.

52. To further understanding and use of SPLAT tools in the development of power sector scenarios, IRENA and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) initiated the IRENA-ECREEE Energy Planning Capacity Building Programme in October 2015. The programme selected 10 ECOWAS countries, and 25 designated energy planning officers from these countries work with IRENA, ECREEE, International Atomic Energy Agency (IAEA), and United Nations Framework Convention on Climate Change (UNFCCC) for 6 month to develop national renewable energy scenarios, while enhancing the planning capacity within the government institutions. These scenarios will inform the development, implementation and monitoring of the National Renewable Energy Action Plans, National Energy Efficiency Action Plans, and the SE4ALL Action Agenda to ensure attainment of regional targets by 2020 and 2030. The SPLAT modelling tool developed by IRENA will be used as a tool for developing these scenarios. IRENA and the government of Swaziland are launching a capacity building programme for energy planning in Swaziland, as a post RRA-follow up. The program will be for a duration of 10 month and will be organised on a cost-sharing bases with the host country. It is a first pilot case for IRENA's post RRA advisory service on energy planning. The programme will benefit from the collaboration with IAEA and African Development Bank.

IN FOCUS: SYSTEM PLANNING TEST MODELS

SPLAT models are generation expansion planning models, which IRENA developed as long-term power sector planning tools to be made available for interested Members in Africa. It is part of IRENA’s capacity building effort in the region to help masterplan development with the latest renewable energy data and renewable energy assessment methodologies. SPLAT models may be used by individual countries (continental countries only) for their own energy planning needs, and may also be used regionally to assess regional interconnections and trade within each power pool. To date, a SPLAT model has been completed for North Africa, West Africa, Southern Africa, East Africa and Central Africa.

IRENA’s SPLAT models are built on IRENA’s generation potential assessment database from the Global Atlas project and renewable energy technology costing database, in addition to regional power infrastructure databases. The models calculate the least-cost generation expansion plans for the next 20-40 years, taking into account various operational constraints. IRENA’s SPLAT models also allow policy-makers to assess least-cost investment options in light of a specific policy goal, for example a renewable energy penetration target, import dependency, affordability, CO₂ targets, or assess investment in international transmission lines on renewable energy



Renewables Readiness Assessment and Advisory Services

53. IRENA has continued to engage at the national and regional level through RRAs to facilitate consultation among national stakeholders in shaping policy, technology and regulatory choices, consistent with national priorities. IRENA's RRA engagement has strengthened cooperation at the country and regional level, and enabled the Agency to engage with relevant entities to catalyse action. RRA experiences have also highlighted the benefit of regional market integration, a lesson embraced by many nations as they seek to further define benefits from regional initiatives and the role that they can play in them.

54. Since 2011, IRENA has supported the RRA process in 26 countries. RRA process was completed for Djibouti, Fiji, Gambia, Ghana, Grenada, Kiribati, Marshall Islands, Mauritania, Mongolia, Mozambique, Nicaragua, Niger, Oman, the Philippines, Peru, Senegal, Swaziland, Vanuatu, and Zambia. The process is progressing in Antigua and Barbuda, Bahamas, Egypt, Pakistan, Tunisia, the United Republic of Tanzania, and Zimbabwe. Beginning in 2015, RRA reports have been launched in each partner country and feature technical sessions on report topics, such as statistics and finance, and planning and resource assessment to help enable early engagement of countries and development partners in the implementation of the RRA recommendations. Consultative workshops have also been held in Antigua and Barbuda, Pakistan, Tunisia, and Zimbabwe to identify priority actions required for facilitating countries' transitions to renewable energy. The feedback and information gathered from the workshops and from key stakeholders will be consolidated into action plans in respective RRAs. RRA preparatory work has also been initiated in Egypt and the United Republic of Tanzania.

55. RRAs are enabling change. The RRA report for Djibouti, released in May 2015, outlines that Djibouti can meet 100% of its energy demand through renewables by 2020, sourced mainly from geothermal, wind, and solar resources and through strengthening of the existing interconnection with the Ethiopian grid. Increased integration of renewables will help Djibouti address energy access, energy security and employment concerns. Based on the RRA recommendations, Djibouti will pay attention to strengthening resources assessment and energy statistics capacities.

56. The RRA report for Ghana highlights the need to promote continuous and systematic building of stakeholder and institutional capacities for effective management of the renewables sector. A set of recommendations to improve access to modern energy based on renewables, including for cooking and heating, includes the development of a bioenergy policy, the formulation of end-user financing mechanisms in rural areas, and the delineation of off-grid areas for rural electrification to provide clear directions to private investors.

57. The RRA reports for three Pacific Island countries highlight that, among other things, renewables in SIDS could benefit from dedicated institutional capacity. The Fiji RRA called for closer coordination among government ministries and donors through a national energy committee, particularly to accelerate energy access through off-grid renewable energy technologies. The RRA for the Marshall Islands recommended, among other things, the formation of a national energy agency and a renewable energy coordination committee to support the integration of solar PV systems into the grid. The Vanuatu RRA emphasised the need for a grid-assessment study to prepare for large-scale integration of renewables, along with the adoption of standard designs for off-grid solar home systems to reach areas lacking grid connection. Following the devastating cyclone Pam, RRA recommendations have been considered an integral part of the post-storm recovery plan as the government seeks to develop a climate-resilient energy system. In November, IRENA hosted a regional RRA launching workshop in November in Suva, Fiji, to discuss the implementation of the recommended actions not only for each individual RRA country but also at a regional level with greater synergies.

58. The RRA report for Mauritania, the first RRA undertaken in the North Africa region, was launched in Nouakchott in September 2015 in cooperation with the United Nations Development Programme (UNDP) under the SE4ALL Initiative. The RRA report for Nicaragua points to the need to strengthen the legal and

regulatory framework for renewable energy to provide more favourable conditions for wind, solar and biomass deployment and the need to update the geothermal master plan and preparation for grid operation with high shares of variable renewables.

59. In the Philippines, the RRA multi-stakeholder consultation process enabled consensus on the development and implementation of the National Renewable Energy Program, currently under review by the country's National Renewable Energy Board. Since the release of the assessment, two RRA recommendations were considered under the Philippines' 2015 annual work programme. As a follow up, IRENA is conducting a country study on mini-grids taking into account the country's rural electrification program and the aim to develop a climate-resilient energy system. The ongoing Pakistan RRA aims at addressing the worst energy crisis that the country has ever had by improving the enabling environment for the investors and developers to scale up the installations of renewable electricity generation capacity.

60. As part of advisory services, IRENA organised a workshop in January 2015 in the margins of the World Future Energy Summit (WFES) to discuss preliminary findings of the joint IRENA/European Investment Bank study on renewable energy manufacturing potential in Egypt, Morocco and Tunisia. The workshop explored opportunities for cooperation between IRENA and key regional actors in support of resource mobilisation for manufacturing potential in these countries. Pilot country participants expressed interest in national workshops to engage industry representatives and the formation of a more detailed mapping of stakeholder relations, exploring the possibility of manufacturing solar and wind components in the region, and comparing the feasibility of industry development with import policy alternatives. Participants underlined the importance of technology transfer and capacity building; research and development (R&D); development of trade agreements in the region; improved competitiveness of local products; the need for financial instruments, and the role of micro-finance institutions (MFIs). A report on findings will be released at the end of 2015.

IN FOCUS: SWAZILAND RRA



The Swaziland RRA was launched by the Honourable Minister Jubulile Mashwama, Minister for Natural Resources and Energy of Swaziland in March 2015 with the participation of a large group of stakeholders including government, utilities, regulators, private sector, and development partners. The report recommended various measures to support the implementation of renewable energy, with particular focus on resource assessment and improvement of enabling conditions for bagasse-based power generation and solar resources.

As a follow up, IRENA facilitated participation of Swazi government officials in an expert consultation workshop on bioenergy data collection in Abu Dhabi in April 2015. Furthermore, a capacity building session on statistics was held in Swaziland for the Southern African region, and a capacity building session on energy planning is to be conducted by the end of 2015. Pursuant to the RRA action plan, Swaziland has already developed an Independent Power Producer Framework and a Grid Code with support from the USAID Southern African Trade Hub. A standardised power purchase agreement (PPA) for various renewable energy technologies has led to the signing of four PPAs.

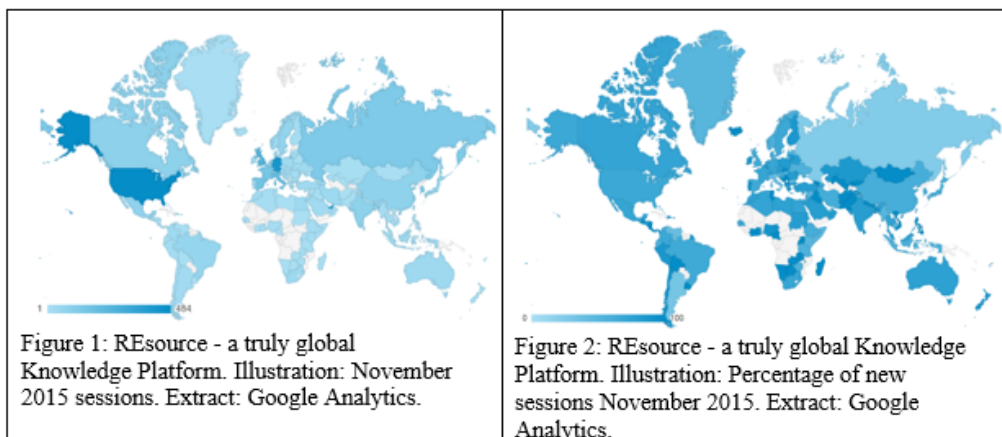
II. Gateway to knowledge on renewable energy

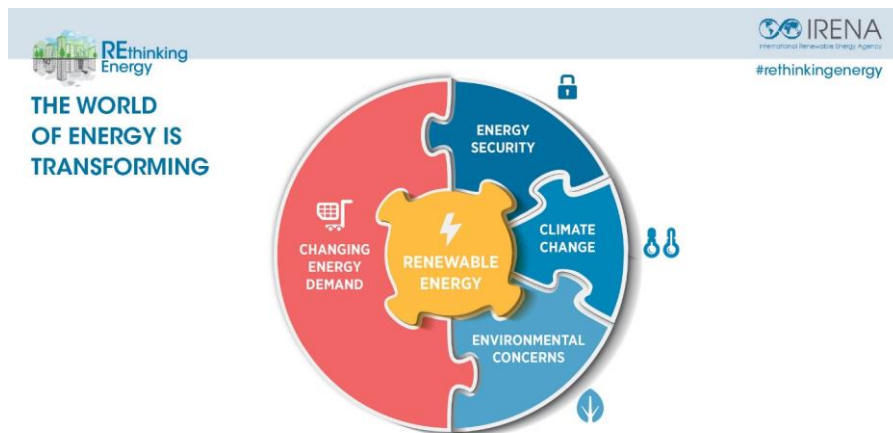
61. A significant barrier to deployment of renewable energy is the lack of accurate, objective and reliable data and information. Through data collection, analysis and the formation of strategic partnerships, IRENA has worked over the course of the biennium to be the centre of excellence for global renewable energy information to increase awareness and inform stakeholders of the state of play in markets, policies, financing, and technology options, including their costs and benefits.

Knowledge Gateway Platform

62. IRENA's Knowledge Gateway platform, REsource, was launched at IRENA's fifth session of the Assembly in January 2015 and has since had over 100,000 users. REsource enables free public access to all IRENA renewable energy information and data through an intelligent search engine. Enabling rapid access to country-specific data with customisable charts and graphs, REsource covers over 170 countries for metrics such as renewable energy use and deployment, renewable energy market statistics, costs and benefits, resource potentials, policies and finance, innovation and education. Supported in part by a voluntary contribution from the Governments of Germany and Norway, significant progress has been made to integrate data and information from partners, including the IEA, REN21 and the Frankfurt School of Economics. Special efforts have been made for outreach, presenting REsource to governments, companies, IGOs and NGOs, in order to link or embed the system to their portals. IRENA organised and disseminated a series of online webinars – REsource for analysts, for educators, for parliamentarians and concluded an agreement with the online magazine REcharge for publishing thematic data dashboards.

63. In collaboration with REEEP, work was initiated on a Renewable Energy Tagger to offer a common basis for renewable energy terminology across the international community. Subsequently, the thesaurus would be translated to allow for multilingual search in REsource





REthinking Energy

64. Since the release of the first edition in September 2014, IRENA's flagship series, *REthinking Energy*, has received international recognition as a source of authoritative, accurate and impartial knowledge on renewable energy. It has been acknowledged for its assessments of the progress of renewable energy deployment and forward-looking analyses to inform policy-makers. The second edition of the series, *REthinking Energy: Renewable Energy and Climate Change* was launched in November 2015 in the lead up to COP21 in Paris. The report presented compelling evidence of the centrality of renewables in any solution to address the climate change challenge. It highlighted that renewable energy, together with energy efficiency, could deliver the emission reductions needed to put the world on track towards meeting its climate change objectives.

Renewable Energy Statistics

65. To improve availability of data and information about trends and developments in renewable energy, IRENA continues to work with countries through an annual renewable energy statistics questionnaire and through statistical capacity building with national, regional and global institutions. Data received from the first annual renewable energy statistics questionnaire in 2014 have been analysed; a second and third round were initiated in July 2014 and July 2015 respectively. The number of countries returning the questionnaire has increased from 40 in 2014 to 78 in 2015. Combined with secondary data collected, an updated time series for generation capacity covering 170 countries and territories for the period from 2000-2014 was released in June 2015. At present, this dataset is accessed approximately 6,200 times per month.

66. IRENA continues to collaborate with regional and global institutions to improve the reliability and availability of renewable energy statistics. Technical support was provided to the African Energy Commission (AFREC), the Asia-Pacific Economic Cooperation (APEC), the Secretariat of the Pacific Community (SPC) and United Nations Economic Commission for Africa (UNECA) and IRENA's renewable energy data has been shared with IEA and REN21. Training in renewable energy statistics was also given in Djibouti and Swaziland as post-RRA follow-up, as well as in the United Arab Emirates. A sub-regional workshop for countries in Southern Arica was also held in Swaziland in December 2015, where 24 statisticians from energy departments and national statistical offices in nine countries were trained in the collection of renewable energy data and construction of energy balances. Data on renewable energy production and consumption in this region is expected to improve as a result of this. A glossary of renewable energy terms and definitions was produced in November 2015 to facilitate the collection of consistent and globally comparable renewable energy statistics. Production of a manual on bioenergy statistics is in progress, with parts of this manual used as training materials for capacity building in renewable energy statistics.

Global Atlas for Renewable Energy

67. IRENA's Global Atlas remains the world's largest database on renewable energy potentials and has substantially contributed to increasing global awareness of renewable opportunities. In 2015, IRENA focused on outreach activities and segmenting its service portfolio to include upstream (training, data hosting and publishing) and downstream services (suitability analyses, online tools) (Figures 2-6). IRENA will further specialise its services and tailor its communication by segment, including behavioural and geographic segmentation. This translates into a higher efficiency for the investments put into the Global Atlas with technical developments and communication plans differentiated by use, geography and media.

68. In November, IRENA released the Global Wind Atlas (GWA), a contribution of the Technical University of Denmark (DTU), which includes 1-km wind atlas for the globe at several heights and a tool to extract wind statistics. The GWA is the most detailed global wind dataset made available in the public domain to date. In partnership with the World Bank's ESMAP programme, IRENA has also released solar and wind atlases for Malawi, the Maldives, Pakistan, the United Republic of Tanzania, Vietnam and Zambia.

IN FOCUS: GLOBAL ATLAS FACTS

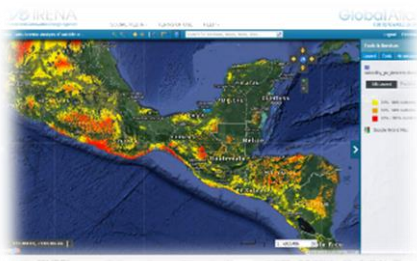
- Over 120,000 viewers worldwide
- Hosts more than 1,500 datasets, from a consortium of 67 countries, 8 multilateral initiatives and 50 partner technical institutes, companies and organisations
- Daily baseload traffic year-to-year increase of 100% since release of 2.0 version and the DTU Global Wind Atlas.
- Worldwide use ranges from more than 4800 users in the USA, 2719 in Poland, 1172 in India, 243 in Laos, 171 in Pakistan, and 40 in Guyana.
- The Global Atlas Pocket video is available [at this link](#).



Global Atlas free online prospector - DTU Global Wind Atlas - global 1km wind map and wind statistics for download. Zoom on Djibouti. The higher level of details allow to investigate areas which were unforeseen with previous models. IRENA publishes maps of public institutes, international organisations and companies.



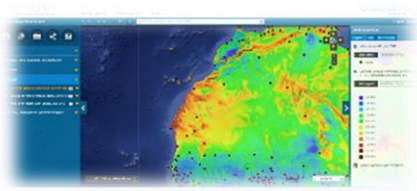
Global Atlas training - Session in Peru. Programme supported by voluntary contributions of the Flemish government, Germany, Japan, Brussels Capital region.



Global Atlas internal analysis - Suitability analysis for off-grid solar PV for communities further than 75km from the nearest power grid (under review). The suitability factors account for the solar irradiation, distance to the grid, protected areas, landcover and topography.



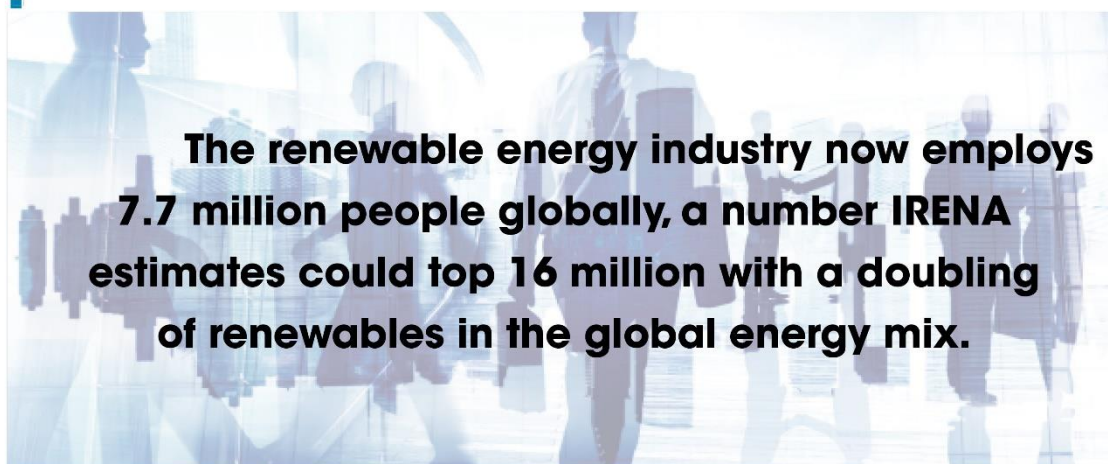
Global Atlas simulators - IRENA hosts online tools from reputable organisations. Simulation of PV system production in India using PVWatt (NREL).



Global Atlas support to RRAs. Country maps of e.g. Djibouti, Mauritania, and Senegal. Illustration of Mauritania.



Global Atlas pocket. For regions with low internet access. The mobile version of the Global Atlas allows spontaneous prospection and dissemination.



IRENA Renewable Energy Learning Partnership

69. IRENA's Learning Platform (previously called Renewable Energy Learning Partnership, *IRELP*) was created in May 2012 to increase awareness of, and broaden access to educational opportunities and resources. REmap 2030 estimates that 17 million people will need to be employed in a matter of 15 years for the renewable energy sector to meet the expected increase in demand. The Learning Platform today offers access to four global databases with more than 3,500 courses, degree programmes, webinars, training guides, internships and resources for educators. In 2015, the Platform increased its coverage for Asia, Africa and Latin America and is examining education gaps that could hinder renewable energy deployment in these regions. The IRENA Learning Platform also developed a webinar series, hosting 25 webinars to date, attended virtually by over 6,500 participants. Webinar recordings are archived in the renewable energy education database, on the IRENA homepage and on IRENA's YouTube channel, and they provide free training and information to the public.

70. As part of the Platform, the *IRENA Community* offers discussion forums on a wide range of topics from finance, economics, technology and policy to education, careers, and sustainability. The IRENA Community engages more than 4,000 members and serves as a social media tool to showcase IRENA projects, and knowledge products, launch reports, and gauge public perceptions topics related to renewables.

IN FOCUS: MODEL IRENA

In recognition of the importance of the role of youth, IRENA held the first 'Model IRENA' in 2015 gathering 50 UAE-based students and young professionals in the simulation of an IRENA Council meeting where participants assumed the role of delegations, representing an IRENA Member country. The simulation raised awareness about pressing energy challenges and IRENA's work among students and young professionals. IRENA has started preparations for the second edition of Model IRENA and is looking to expand it internationally.

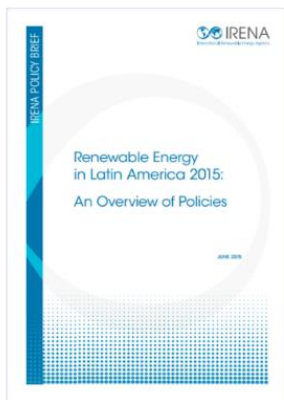


Renewable Energy Policy and Best Practice: Status and Trends

71. IRENA is working in partnership with the IEA to reinforce and promote the Joint Global Renewable Energy Policies and Measures Database featuring 1,900 policies from 124 countries. Since the start of 2014, some 115 new policies have been added and over 30 policies have been revised. More than 67,000 users consulted the database, indicating a high level of interest. To address the increasing demand from policy-makers, researchers and the general public for accurate, timely, and accessible information on renewable energy policies and measures, IRENA has developed policy briefs for 20 Latin American countries² providing country-validated, comprehensive and up-to-date summaries of renewable energy policies.

72. Building on the policy briefs, IRENA published *Renewable Energy in Latin America: An Overview of Policies* in June 2015. The report analyses current policy status and trends, including over 300 renewable energy support schemes across four sectors: electricity, heat, transport and energy access, as well as some cross-cutting policies. Analysis undertaken provides in-depth and comprehensive information for the IEA/IRENA Policies and Measures Database and will inform IRENA's forthcoming report on *Latin America Renewable Energy Market Analysis*.

Renewable Energy
in Latin America 2015:
An Overview of Policies



Renewable Energy in Latin America 2015:
20 Country Policy Briefs



² Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay, and Venezuela.

Renewables: The True Costs

73. IRENA's cost data and analysis is increasingly being used as the main source of renewable cost data around the world informing policy making, shaping national and global debates and providing clear recommendations and tools to accelerate deployment of renewables.

74. The release of the *Renewable Power Generation Costs in 2014* in January 2015 contains the most up-to-date analysis of renewable power generation costs and has received widespread media and industry coverage. IRENA's database of real project costs of some 15,000 utility-scale projects, and over 750,000 small-scale solar PV systems allows costing analysis to be both deep and comprehensive. Analysis is attracting increasing interest and IRENA's Renewable Costing Alliance has already grown to 20 members since its launch in January 2014 with discussions underway with approximately 50 private and public organisations who have expressed interest in joining the initiative.

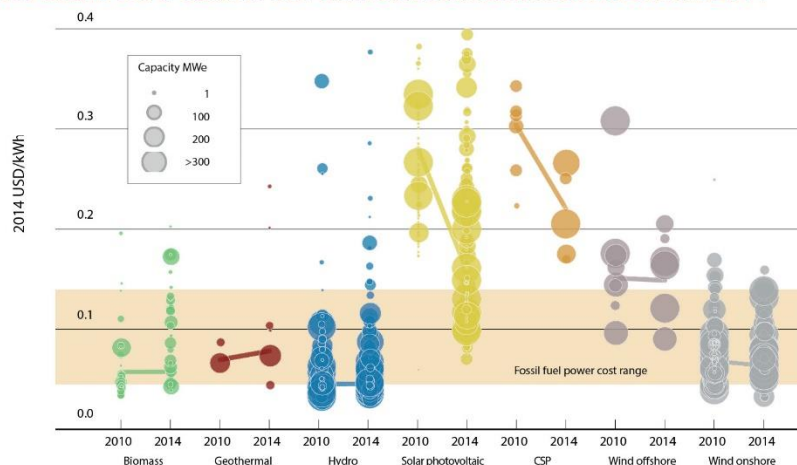
IN FOCUS: COSTS FAST FACTS

- 20 Members have joined the Costing Alliance since its launch in 2014.
- The Renewable Costing Database has almost doubled in size from 8,000 to 15,000 utility-scale projects, adding 750,000 small-scale solar PV system data points.
- A framework for collection and analysis of cost data and PV parity analysis was developed and applied for the United States and will be expanded in 2016.
- Presentations and report dissemination was conducted in over 20 countries.
- An online platform was established with global reach and annual downloads of 300,000+ (excluding REsource)
- IRENA's cost data and analysis increasingly sought by energy sector stakeholders (e.g. G20, Intergovernmental Panel on Climate Change (IPCC), REN21 Global Status Report, WEO, etc.) and widely cited by leading media and energy sector organisations (e.g. Financial Times, Huffington Post, La Stampa, CSP Today, IPCC).

75. Cost data have also provided the basis for the IRENA analysis funded by Germany on *Solar PV in Africa: Current Costs and Cost Reduction Outlook*, which surveys the actual project costs for utility-scale, mini-grid and solar home systems, increasing understanding of cost ranges and cost reduction potentials in this critical stage of market development in Africa. In addition, IRENA's analysis of the impact of recent reductions in renewable energy costs, notably solar PV, and the impact of higher deployment of renewables in Tonga's electricity systems, *Renewable Power Generation's Contribution to Reducing Electricity Tariffs on Islands: The Potential in Tonga*, highlights the potential to accelerate renewables and the likely impact under different scenarios on electricity tariffs.



FIGURE 2.1: THE LEVELISED COST OF ELECTRICITY FROM UTILITY-SCALE RENEWABLE TECHNOLOGIES, 2010 AND 2014



76. Analysis on the role of renewables in improving energy security and on cost reduction opportunities for solar PV, concentrated solar power, and onshore and offshore wind is underway with the support of the Government of Germany. IRENA’s cost analysis will soon cover all sectors, as ongoing analysis of the costs and performance of renewable technologies and fuel for use in the industry, services and residential sectors will be concluded in the first half of 2016.

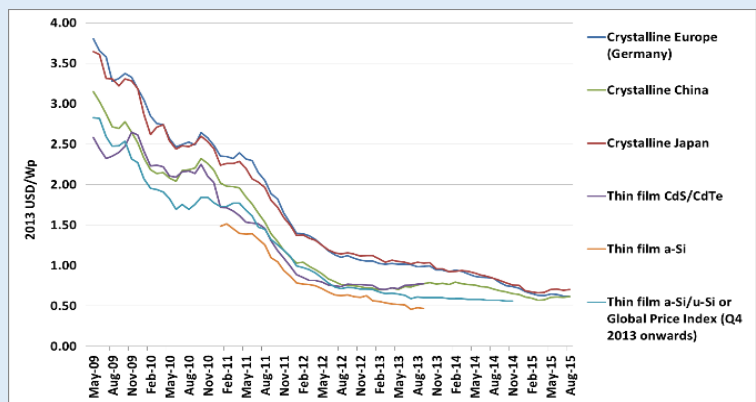
77. Interest in IRENA’s costing work has led to closer engagement with a wide variety of government and private sector organisations, providing data and analysis to support their communications, research and analysis and policy- and decision-making. For instance, IRENA has been asked by the G20 to help analyse renewable cost reduction potentials. Other examples include the use of IRENA costing data by the United States Energy Information Administration, the Government of Denmark, the Ontario Office of the Auditor General, the New Climate Economy report of The Global Commission on the Economy and Climate, the UN Secretary General’s New and Renewable Energy report and the Intergovernmental Panel on Climate Change (IPCC) Working Group III Mitigation of Climate Change report. IRENA’s cost data and analysis have also been provided to organisations such as the World Bank (RISE indicators); the SE4ALL process (Global Tracking Report); REN21 (Global Status Report); European Climate Foundation; the Political Economy Research Institute (PERI); the Australian Bureau of Resources and Energy Economics; Citigroup Bank (Global Markets) Inc.; the Cadmus Group Inc.; IKEA Group; CleanTechnica, and others.

IN FOCUS: THE FUTURE OF COST COMPETITIVENESS: COST REDUCTIONS FOR SOLAR AND WIND

Renewable power generation technologies have achieved remarkable improvements in their competitiveness, but more needs to be done to achieve universal competitiveness. IRENA is examining the future cost reduction potentials for solar PV, concentrated solar power (CSP), and onshore and offshore wind.

In an era of low equipment costs – particularly for solar PV and, to a lesser extent, wind – future cost reduction opportunities are changing, and balance of project, operations and maintenance, and financing costs could potentially provide the largest cost reduction opportunities. At the same time, there remains a wide range of costs, both within countries and between countries. Understanding what represents best practice in different markets can help identify reasonable expectations for efficient cost levels in different stages of maturity. IRENA’s analysis of actual solar PV costs in Africa is the first product to translate this into policy insights.

Future cost reduction opportunities will be critical to adapting policy to anticipate coming challenges in an era where most cost reduction opportunities will come from balance of system, financing and operation and maintenance cost reductions. These savings will be challenging to unlock, given they cover a wider range of stakeholders, but in many cases they are in areas where good policy can have rapid benefits.



Solar PV module price trends, 2009 to 2015

Global Investment Dynamics

78. The work on Global Renewable Energy Investment Dynamics provides reliable and freely accessible information on trends in renewable energy investment and financial flows. This authoritative collection and verification of investment statistics is ongoing and includes data collection, methodology development and also the dissemination of information from trusted sources. In June 2015 IRENA launched two finance dashboards online on REsource: The first, International financial flows in renewable energy projects by selected financial institutions visualises and gives access to IRENA's database on public financial institutions. The second dashboard was designed in collaboration with Frankfurt School and provides an interactive summary of Frankfurt School UNEP Collaboration Centre and BNEF's reference report "Global trends in renewable energy investment 2015". The data collection from public finance institutions is ongoing and most recently included the annual update, and the inclusion of several Latin American Financial Institutions (BNDES, CABEI and CAF), and AFD and the Nordic Investment Bank. The newly added institutions will be accompanied by renewable energy profiles, short briefing documents to provide the backdrop for their operations.

79. The investment database, other data collection and supporting verification efforts build a solid foundation for future analysis, e.g. on the role of public finance for expanding renewable energy markets. Analysis conducted in the second half of 2015 focused the RE investment needs to achieve the REmap options and related climate benefits in the period up to 2020. This work elaborated a possible strategy for closing the investment gap between current and required investments using risk mitigation instruments and structured finance approaches. The assessment was used for Rethinking Energy 2015 and will be published as a working paper in 2016

Coalition for Action

80. Since January 2014, a Coalition for Action of the world's leading renewable energy players has collaborated to bolster public support for renewable energy. The Coalition, comprising approximately 50 members, consolidates existing efforts to communicate the latest renewable energy facts. Facilitated by IRENA, the Coalition operates as an independent body with its steering group as the main decision-making body. Its members include 17 members from civil society, 13 industry associations, nine companies, four international entities, including IRENA, and one public-private partnership. In addition to being a permanent member in the Coalition steering group, IRENA also acts as facilitator of the Coalition and is part of several of its task forces.

81. As part of its mandate to communicate renewable energy facts, Coalition members collaborated at three major events in 2015 in Rome, New York and most recently in Cape Town on topics ranging from dispelling myths and misconceptions to promoting renewable energy as a major solution for energy access and sustainability. The Coalition's communications network, which can reach over 3.8 million followers on social media, was activated to increase the coverage and reach of IRENA's annual jobs report update, which exceeded 2.5 million social media impressions in the first week and over 5.5 million impressions overall. The Coalition was involved in various activities in the lead-up to COP21 in Paris in December 2015, to position renewable energy in the forefront of solutions for climate change mitigation. These included a webinar with researchers and the private sector over the topic: "Are we deploying renewables fast enough to keep global warming below 2 degrees?"

82. In further promotion of the authoritative, consistent and unified messaging of renewable energy, the Coalition is developing a Renewables Made (REmade) labelling scheme aimed to be the leading label for products produced with renewable energy. The task force of Coalition members, including IRENA, working on this initiative adopted a comprehensive business plan for the development of the REMade label and are targeting a label launch during the first quarter of 2016.

III. Enabling investment and growth

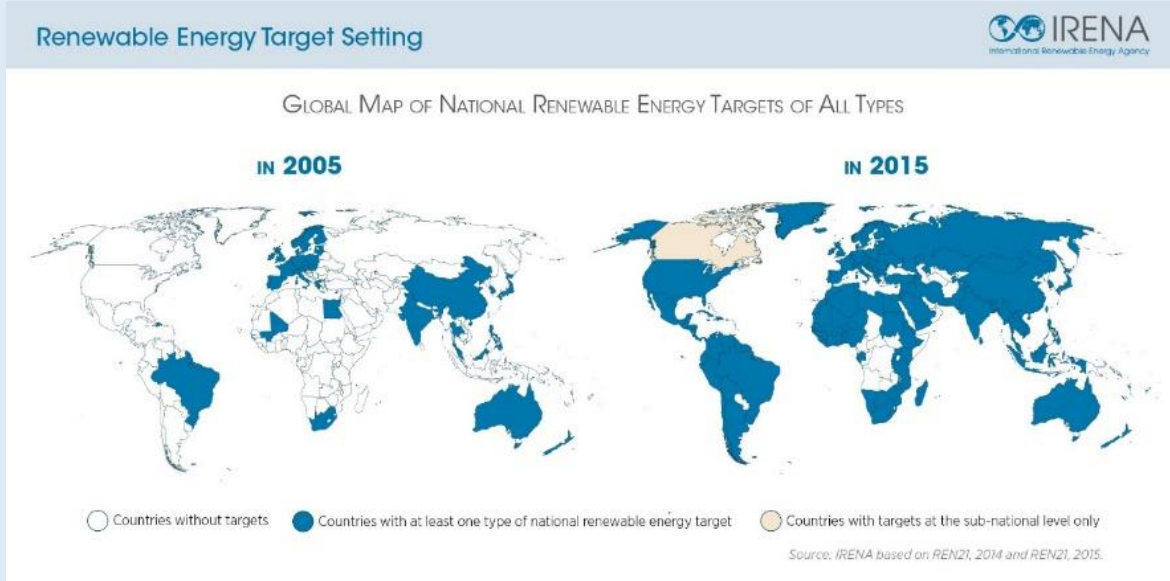
83. Throughout the biennium, IRENA activities have focused in large part on filling knowledge gaps to further encourage investment in renewable energy and economic growth. The increasing depth and scope of the work in these areas has more effectively guided the global policy discourse on renewable energy deployment.

Policy assessment

84. With experience in policy design acquired over the past four years, IRENA continues to support governments in designing and implementing innovative policies to address prevalent barriers to renewable energy deployment. The study, *Adapting Renewable Energy Policies to Dynamic Market Conditions*, presented during IRENA’s 7th Council meeting, was showcased at a side event on *Next Generation of Policies* at the World Future Energy Summit 2015 in Abu Dhabi. The publication served as a basis for enriching discussions on the appropriate policies that can help adapt to the changing landscape of renewable energy on policy assessment. In this context, IRENA has expanded this body of work and focused analysis on renewable energy target, auctions and ownership structures.

IN FOCUS: TARGETS

Renewable energy targets have become a defining feature of the global energy landscape. IRENA’s report *Renewable Energy Target Setting* presents a global overview of the diversity of renewable energy targets and brings together policy design insights from a wide range of countries. It highlights the critical importance of definitions and specific design features suited to different objectives, and lays out a comprehensive framework, which can inform policy-makers as they embark on the task of designing – or revising – their respective national or local renewable energy targets. While underscoring the importance of establishing renewable energy targets, the report notes that targets alone are not enough. In order to be seen as credible by investors and to provide a clear trajectory for the future evolution of the energy mix, targets need to be accompanied by a clear strategy and backed by specific policies and measures.



85. Results of this analysis shows that as of early 2015, 164 countries had adopted at least one type of national renewable energy target, up almost fourfold from 43 countries in 2005. Developing and emerging economies took a leading role during the decade, accounting for 131 of the 164 countries with targets in place. Since the majority of countries now have a minimum of one renewable energy target in place, more attention needs to be given to how policy-makers can revise and improve upon them. To support policy-makers define and design renewable energy targets, IRENA prepared a study on *Renewable Energy Target Setting*, presenting a global overview of the diversity of renewable energy targets and bringing together insights from a wide range of countries. The report was launched during the Policy Day in June 2015, ahead of the 9th IRENA Council meeting and was discussed in a webinar attended by over 100 participants.

86. Auctions have been gaining popularity as effective policy instruments in both mature and developing electricity markets. The number of countries adopting renewable energy auctions has increased from six in 2005 to more than 60 as of early 2015. With support from voluntary contributions from Germany, IRENA conducted a study on *Renewable Energy Auctions: A Guide to Design*, launched at the third IRENA Policy Day on the margins of the 9th IRENA Council meeting. The study presents a comprehensive guidebook for policy-makers and practitioners on the design of renewable energy auctions, based on best practices and lessons learnt. Since its release, several Members have sought specific advice from IRENA on the design of auctions and IRENA has been invited to present findings in key international events including the European Union Sustainable Energy Week 2015 in Brussels, the EWEA Annual Conference in Paris, the ECOWAS Policy and Investment Forum in Abidjan, Côte d'Ivoire, the South-East Asia Regional Training Programme on Renewable Energy Resource Assessment and Mapping in Davao, Republic of Korea, and the Biomass Workshop in Cairo, Egypt.

IN FOCUS: RENEWABLE ENERGY AUCTIONS: A GUIDE TO DESIGN



Renewable Energy Auctions: A Guide to Design illustrates the main trade-offs involved in auction design decisions and offers recommendations to support optimal decision-making.

Through a set of six volumes, policy makers are presented with a synthesis of main design elements of auctions and recommendations for successful auction design (Volume 1). Auctions are analysed within the larger realm of renewable energy support schemes. An outlook on recent international trends in renewable energy policies is provided with the role of auctions in electricity markets highlighted. An overview of the main strengths and weaknesses of energy auctions complements the analysis (Volume 2).



The four categories of design elements address auction demand, qualification requirements, winner selection and sellers' liabilities. It comprises key decisions on what will be purchased and under what conditions (Volume 3), which suppliers are eligible to participate in an auction and the conditions they must comply with (Volume 4), the winners' selection process (Volume 5) and the seller's responsibilities and obligations (Volume 6).



Regional Market Analysis

87. IRENA has completed the report *Renewable Energy Market Analysis: The GCC Region* that explores the energy sector dynamics and broader socioeconomic conditions. The report analyses renewable energy trends and key drivers for deployment. It explores opportunities and barriers, identifies best practices and draws policy recommendations for the greater integration of renewables in the regional energy mix. It also includes an in-depth analysis of existing economics and potential future market opportunities for renewables-based

desalination in the region. The report benefits from comprehensive stakeholder engagement including surveys, expert interviews and workshops in the region. The first of these workshops was organised alongside the World Future Energy Summit 2015 and brought together policy-makers and experts from all GCC countries to discuss different aspects of renewable energy deployment including policies and regulation, financing, socio-economic benefits, water-energy nexus and regional cooperation. In addition, GCC renewable energy market analysis has been presented at several regional events such as the Middle East and North Africa Solar Industry event of 2015 (MENASOL 2015), Middle East Economic Digest (MEED) Dubai Clean Energy Forum and the Renewable Industry Advisory Board (RIAB) World Future Energy Summit 2015.

88. Latin American innovative renewable energy developments and policies bring valuable insights for other energy markets around the world. IRENA completed a *Renewable Energy Market Analysis: Latin America* with a view to capture the wealth of knowledge and experience embedded in the region and emerging renewable energy trends at the intersection of public policy and market development. The report provides an overview of the status of renewable energy deployment in the broader energy sector context. It presents the most up-to-date analysis of renewable energy policies, institutional structures as well as investment frameworks. The policy and financing landscape highlights the challenges faced by the region, but also provides lessons learnt from innovative policies. In this context, issues specific to the region are addressed in greater depth. Focus on the benefits from the complementarity between hydro and other renewable energy technologies as well as on heating applications in the industrial sector will bring valuable insights for other energy markets around the world. Preliminary findings from the report were discussed in an expert workshop organised in collaboration with the United Nations Economic Commission for Latin America (ECLAC) which gathered about 30 renewable energy experts from the region. The report also benefited from an extensive peer review process, with contributions from a range of regional organisations, think tanks and academia. The report will be published in both Spanish and English and will be launched in early 2016 in Latin America.

IN FOCUS: GCC MARKET ANALYSIS

Preliminary results from the GCC *Renewable Energy Market Analysis* indicate that meeting all stated renewable energy targets and plans would save 4 billion barrels of oil and reduce emissions by 1.3 gigatonnes CO₂ equivalent between now and 2030. This translates to a 25% reduction in annual fossil fuel consumption in the power and water sector in 2030, and a 9% reduction in the per capita GCC carbon footprint. Analysis also shows that because renewables, in particular solar PV, can be less water-intensive than fossil fuel technologies, reaching national targets would reduce power sector water withdrawal by 21 trillion litres annually, equivalent to a 22% reduction, and create roughly 170,000 direct jobs per year from now until 2030.





RE Benefits: social, economic and environmental impacts

89. Over the past biennium, IRENA has focused on creating knowledge on socio-economic and environmental impacts to empower policy-makers and increase public awareness of these issues. Building on IRENA's earlier reports, the Agency continues to support the business case for renewable energy deployment through the analysis of the socio-economic benefits of renewable energy and how they can be maximised in different settings. The report, *Renewable Energy Benefits: Measuring the Economics*, provides empirical evidence on the socio-economic impacts of renewable energy deployment on gross domestic product (GDP), jobs, welfare and trade, and considers the economic interactions between sectors. Preliminary findings were discussed in a side event at the IRENA 10th Council meeting in November 2015, and the final report will be launched at the IRENA Assembly in January 2016. Some of the findings of the study *Renewable Energy Benefits: Leveraging Local Industries* were also presented during the same event. The study analyses the activities required to create a domestic renewable energy sector that can enable new opportunities in solar and wind. It analyses the tasks needed to carry out those activities and their requirements in terms of manufacturing capacities, skills, availability of raw material, access to financing and the presence of an enabling environment that supports the development of the sector. This helps policy makers assess the local services and components that are needed to implement projects and the strategic drivers to develop renewable energy industries locally. At the local level, IRENA is finalising case studies that illustrate the impacts of off-grid technologies on individuals and small enterprises in the agriculture sector.

90. The second edition of *Renewable Energy and Jobs – Annual Review 2015* was launched in May 2015 in New York during the SE4ALL Forum. The review estimated that renewable energy, excluding large-hydro power, employs 7.7 million people worldwide. Furthermore, according to the first global estimate carried out by IRENA for the industry, large hydropower employs an additional 1.5 million jobs. The results of the annual review have been widely reported in more than 140,000 media articles with more than 400,000 report downloads. The findings went viral on social media with more than 4,000 tweets for a second consecutive year through the “7.7 Million” campaign. Effective dissemination of the report and its key findings was enhanced by coordinated participation of IRENA Members and stakeholders who acted as multipliers in the outreach campaign. Following its successful launch, the *Annual Review* was disseminated at various events including the 9th IRENA Council meeting in June 2015, the SE4Jobs Joint Regional Stakeholders Workshop, organised by the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) and GIZ in September 2015, and the European Union Sustainable Energy Week 2015.



#rethinkingenergy

In 2014, green bonds totaled over \$36 billion to finance renewable energy projects



www.irena.org/REthinking

RE Finance

91. Enhanced understanding of risks and innovative mitigation options and tools has been a priority area in IRENA's work in the last two years. To encourage the scale-up of renewable energy investments and to strengthen policy advice, IRENA explored risks and barriers to renewable energy through analysis, expert meetings and advisory assignments on the topic. In January 2015, IRENA held an expert meeting on renewable energy finance, *Financial Instruments and Approaches to Address the Risks and Barriers of Investing in Renewable Energy - Practical Ways toward Implementation*, on the margins of the World Future Energy Summit in Abu Dhabi. The meeting presented findings on risks and barriers of investing in renewable energy and the effective utilisation of risk mitigation instruments and participants stressed the importance of close ties between IRENA and the private sector, the challenge of scaling-up risk mitigation instruments, and the need to reconcile cultural differences between investors and developers.

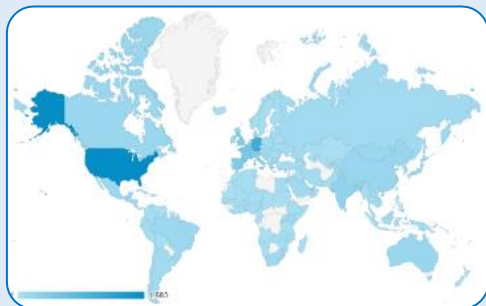
92. Following the World Future Energy Summit 2015, IRENA sponsored events at the RE-Invest conference organised by the Government of India in February 2015. RE-Invest brought together public and private stakeholders to discuss policy and financial approaches to lower the high cost of capital for renewable energy projects. Discussions revealed that high cost of debt for renewable energy projects in India can be alleviated by adjusting policy measures to incentivise renewable energy investment, streamlining and simplifying regulatory hurdles, enhancing liquidity in the market, and mitigating currency risk and power off-taker risk. Participants stressed the need to adjust banking sector regulations to target renewable energy and to create a large pool of capital through aggregation and securitisation. There was broad agreement that financial options and policy measures targeted at renewable energy are more effective in creating a level playing field for renewable energy to compete with conventional energy, rather than direct subsidies (e.g. for loans or hedging costs).

93. A second event on renewable energy, *Financing for Small and Medium-Scale Renewable Energy Projects – Approaches for the Private Sector*, highlighted the need for diverse financial instruments and business models as well as appropriate policy frameworks to incentivise private sector investment in small-scale renewable energy projects in India. This event was attended by some 200 participants and identified financing challenges for small-scale renewable energy projects in India, including the lack of incentives and policies, lack of investor interest, banks' limited awareness of renewable energy, and lack of sustainable business models. Analysis and

stakeholder feedback has highlighted the need for practical activities to support renewable energy investment. In response, IRENA is working with financial institutions, both public and private, to address risk mitigation needs and possible financial instruments in the renewable energy sector. The results of this work will be pulled together in a report *Unlocking Renewable Energy Investment: The Role of Risk Mitigation and Structured Finance* to be released in early 2016. This report identifies the main tools that policy-makers can avail themselves in mobilising private investment as they want to bring renewable energy investment to scale. Building on the analysis of a number of case studies from various regions, the report makes the case for instruments, structures and facilities dedicated to renewable energy deployment. These can be used to support project pipeline development, mitigate specific risks, such as off-taker or currency risk, and aggregate smaller projects to bundles that can also attract larger investors. Recommendations include the call for a dedicated risk mitigation facility using public climate finance to take this agenda forward in a way that supports the deployment of renewable energy in the developing world.

94. To support the development of bankable project proposals, IRENA launched the Project Navigator in 2014. The Navigator helps develop and implement renewable energy projects through on-line technical guidelines. Technical guidelines currently exist or are in development for on-shore wind, utility-scale PV plants, mini/micro-grid applications, solar home systems, plug and play applications, bioenergy, and geothermal. In collaboration with the Japan International Cooperation Agency (JICA), IRENA is also creating technical guidelines for small-hydro projects and other technologies based on JICA's Guidelines and Manuals for project development.

IN FOCUS: PROJECT NAVIGATOR STATISTICS (21 APRIL 2015 – 28 SEPTEMBER 2015)



6,903 unique users - 2,436 returning visitors - 1,460 registered users

43,492 page views - 53% bounce rate

Accessed from 170 countries;

Top 5 country visits: France, Germany, Spain, UK, USA

95. Project Navigator workshops have been held in Cabo Verde, Malaysia, Mauritania and Mongolia. These events highlighted local challenges and opportunities, and trained project developers on the use and functionality of the Project Navigator to help improve the bankability of renewable energy projects. Project Navigator workshop participants have included policy-makers, project developers, investors and finance institutions. Requests for Project Navigator workshops have come from Azerbaijan, Egypt, the Dominican Republic, Namibia, and Mexico, among others. To reach a wider audience, IRENA hosted a webinar convening over 100 participants.

96. With the support of the United Arab Emirates, the Navigator is being employed to strengthen project proposals for the UAE Pacific Fund. In cooperation with the Carbon War Room, the Navigator will provide regional and local content to facilitate project financing in the Caribbean. Other partnerships are under development, including with SE4ALL, ECREEE, the EU Energy Initiative Partnership Dialogue Facility (EUEI-PDF) and Africa-EU Renewable Energy Cooperation Programme, the German Energy Agency (DENA), the World Wind Energy Association, and the Caribbean Policy Research Institute (CaPRI). The Project

Navigator has been featured in various media including CleanTechnica, Recharge News, Biomass Magazine, BusinessGreen, Hydroworld.com, Energiezukunft and Energypress.

97. IRENA developed the Sustainable Energy Marketplace to facilitate investment in projects in developing countries. The Marketplace convenes stakeholders including project developers and owners; public and private financing entities, service and technology providers, and governments. The Marketplace provides transparency to renewable energy project market in developing countries by making projects, financing instruments, as well as service and technology providers visible and easily identifiable. The platform also provides links to IRENA's existing tools and databases of high relevance for project development and implementation, notably the Project Navigator, REsource, Global Atlas and IEA/IRENA Policies and Measures Database.

98. The Marketplace for the Africa Clean Energy Corridor (ACEC) countries was announced at SAIREC conference in South Africa in October. In November the Marketplace was expanded to cover all African countries, and in December portals for the Caribbean region and for Latin America were added. The marketplace was officially launched at COP21 in Paris in December 2015. Several partners are collaborating on the Marketplace: An MoU has been signed with President Obama's Power Africa Initiative. The Caribbean and the Latin American portals are jointly operated with the Inter-American Development Bank. Furthermore, close cooperation on project sourcing and development is ongoing with the Private Finance Advisory Network (PFAN) and the Energy and Environment Partnership (EEP).

Cooperation with the Abu Dhabi Fund for Development

99. IRENA's mission to scale up renewable energy globally is actively supported through the IRENA/Abu Dhabi Fund for Development (ADFD) Project Facility. Through this facility, USD 350 million in concessional loans will be allocated by ADFD to projects in developing countries as recommended by IRENA. These funds are disbursed over seven cycles, leveraging the equivalent or more from other sources. The Facility's focus is on innovative projects with transformative results that enhance learning, are easily replicated or scaled up and advance deployment of energy and sustainable development.

100. Following the first cycle, which resulted in the allocation of USD 41 million and an additional USD 42 million leveraged in January 2014, the second cycle allocated USD 57 million in concessional loans to five projects in January 2015, leveraging an additional USD 86 million. The second cycle will see a combined total capacity of 35 MW installed and bring reliable and sustainable power to more than 280,000 people in rural communities that currently lack access to modern energy services. Cycle projects are located in Asia, Africa, Latin America and Small Island Developing States, and cover a broad range of technologies. The increased diversity and growth in requested and allocated loan amounts, and increased power capacity, demonstrate progress for the future of the IRENA/ADFD Project Facility and its ability to reach a wide range of countries and promote the widespread use of renewable energy.

101. The third cycle is currently at the final selection stage. 87 project proposals amounting to a total cost of USD 2.5 billion were received and reviewed. 22 of the 74 eligible proposals were shortlisted, and seven of them recommended to the ADFD for funding. Final project selection will be announced at the Assembly in January 2016.

102. A major announcement was made by ADFD in early November 2014 on the further softening of loan terms applicable to the IRENA/ADFD facility with rates of 1% and 2%, a 20-year term and 5-year grace period. These new terms are also applicable to projects approved under first and second cycles. The IRENA/ADFD Project Facility continues to benefit from the work of the Advisory Committee and its experts to improve the application and selection process and to set up a project feedback framework.

Table 1: Outcomes of the first and second cycle of the IRENA/ADFD project facility

Outcome	First cycle	Second cycle	Totals
Loan allocated (USD m)	41	57	98
Co-finance (USD m)	42	86	128
New capacity online (MW)	21	35	56
Number of people benefiting	300,000	280,000	580,000
Loan rates	1-2% over 20 years, 5 year grace period		

Table 2: Projects selected for funding in the second cycle

Country	Technology	Power (MW)	Loan (USDM)
Argentina	Hydro	4	15
Cuba	Solar	10	15
Iran	Geothermal	5	6
Mauritania	Hybrid (wind, solar, hydro)	1	6
Saint Vincent and the Grenadines	Geothermal	15	15

Quality Assurance and Standardisation

103. Quality assurance and standardisation are key enablers for healthy and robust renewable energy markets. However, developing and implementing sound quality assurance frameworks, including standards, testing and certification, requires concerted effort and resources from different market actors. Perceived technical risks to non-conventional energy technologies influence public acceptance and investment decisions in the energy sector. A key tool for technical risk mitigation is the implementation of quality assurance frameworks based on international standards. Although it is already common for commercial banks and other funding sources to require the use of certified equipment according to international standards for renewable energy systems, few countries have developed the quality infrastructure to enable this. IRENA provides advice to countries, in cooperation with partner organisations, on how to implement international standards and national quality control measures for renewable energy technologies. In support of the development and implementation of sound quality control mechanisms for renewable energy technologies, IRENA has released guidelines for solar water heaters (SWH) and small wind turbines (SWT) and finalised work on guidelines for grid connection codes based on international standards and practices.

In cooperation with relevant partners, IRENA is implementing this analytical work by, *inter alia*, supporting the development of quality assurance frameworks for SWH in Latin America and the Caribbean. IRENA recommendations have been incorporated in the regional initiative on *Quality Infrastructure for Renewable Energy and Energy Efficiency in Latin America and the Caribbean* (LAC). This initiative, supported by the German Metrology Institute (PTB), the Pan-American Standardization Organization (COPANT), the Organization of American States (OAS), the Latin America Energy Organization (OLADE) among others, have used IRENA's analytical work on quality infrastructure for solar thermal technologies as a basis for cooperation in the region on harmonisation of standards. The Agency is also advising the Asian Small Wind Turbine Test and Training Centre, based in China, in the establishment of a Centre's Advisory Board to develop, evaluate and guide its long term strategy of making its services and products relevant and of high-impact. China has also taken account of IRENA's work in the field to strengthen the national standards for renewable energy

IN FOCUS: Forum on International Experiences in Developing Regional Quality Assurance Schemes for Solar Water Heating in Latin America and the Caribbean

The forum International Experiences in Developing Regional Quality Assurance Schemes for Solar Water Heating in Latin America and the Caribbean was held in San Jose, Costa Rica, on 29-30 June 2015. The Forum brought together international experts and more than 50 participants from national standardisation, testing, certification and regulatory bodies from 14 countries. Participants defined strategies for the implementation of quality assurance frameworks for solar water heaters in LAC, shared best practices, and created collaborative networks in the region. The Forum was organised by IRENA, the German Metrology Institute (PTB), the Latin American Energy Organization (OLADE), the Electricity Institute of Costa Rica (ICE) and the National Standardization Body of Costa Rica (INTECO).

The Vice-Minister of Energy of Costa Rica, H.E. Irene Cañas, opened the Forum highlighting that solar thermal technologies are now a feasible option for the residential sector in Costa Rica, based on cost competitiveness against conventional energy technologies and assured quality. The participants in the Forum requested IRENA and its partners to continue support in this field through the: 1) consolidation of the regional experiences and lessons learnt; and 2) the establishment of a technical committee to run an inter-laboratories proficiency test for solar water heaters.

“Thanks to the experience of the many organizations involved in this forum, both Costa Rica and the LAC region will have the opportunity to develop strong quality assurance methods based on best international practice to increase our deployment and use of sustainable solar thermal energy.”

- Luis Pacheco Morgan, Electricity Sector Manager Costa Rican Electricity Institute (ICE).

technologies in line with the country's energy plan for the next five year. International organisations, such as the United Nations Industrial Development Organization (UNIDO) and the World Trade Organization (WTO), have used IRENA's work in their initiatives to promote quality control and harmonised standardisation globally.

104. In July 2015, IRENA launched the information web platform for International Standards and Patents in Renewable Energy – INSPIRE. A unique web tool, INSPIRE facilitates access to the largest consolidated collection of international renewable energy standards and patents in the world. INSPIRE includes learning modules on standards and patents and how to use them, an interactive database with more than 400 international standards and 2 million patents for renewable energy technologies, and networking tools to connect standards developers and users. Since its launch in July 2015, INSPIRE has welcomed more than 3,500 users, representing more than 10,250 visits. Expert organisations such as the International Electrotechnical Commission (IEC) and the European Patent Office (EPO) have strengthened their partnership with IRENA under this initiative in view of its high impact and have commended IRENA on the benefits for policy-makers and other stakeholder of having such an innovative tool to enabling easy access and analysis of standards and patent information for renewable energy technologies.

105. Identified shortage of qualified solar PV installers and maintenance technicians in West Africa in conjunction with recommendations from country consultations conducted in cooperation with the West African Economic and Monetary Union (UEMOA) has led IRENA to design a regional certification scheme for solar PV installers with the aim of increasing regional renewable energy deployment and employment opportunities. To initiate the work, a strategy to assist countries of the Economic Community of West African States (ECOWAS) implement harmonised certifications for solar PV installers was developed by building on

IN FOCUS: INSPIRE – THE INTERNATIONAL STANDARDS AND PATENTS FOR RENEWABLE ENERGY PLATFORM

INSPIRE facilitates global information access on vital aspects of renewable energy technology (RET) deployment. The interactive platform provides:

- A comprehensive one-stop shop for data and information on RET patents and standards in markets around the world.
- A state-of-the-art search tool for RET patent and standards data, allowing users to generate live reports and perform metadata analysis on technology trends.
- A direct point of contact with RET standard developers and patent institutions worldwide.
- Mechanisms to support engagement by developing countries in the international standards and patents process.
- Guidance on how to use patents and standards to strengthen RET projects.



IRENA’s experience in promoting a Sustainable Market for PV Systems (ProSPER) programme in the ECOWAS region. The programme, launched in April 2015, will create harmonised technical guidelines for solar PV installers and strengthen local capacities of policy-makers, regulators and utilities, financial institutions, educational and research institutions, and renewable energy entrepreneurs and technicians. Work has been conducted in partnership with the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) under the guidance of a regional technical committee established within the framework of the project. The wide endorsement of the program by the region has triggered ECREEE’s commitment to become the Regional Certification Provider that will manage the entire certification scheme.



Flow of information during the design and remote review process of the regionally harmonized technical guidelines

Innovation and Research, Development and Demonstration (RD&D)

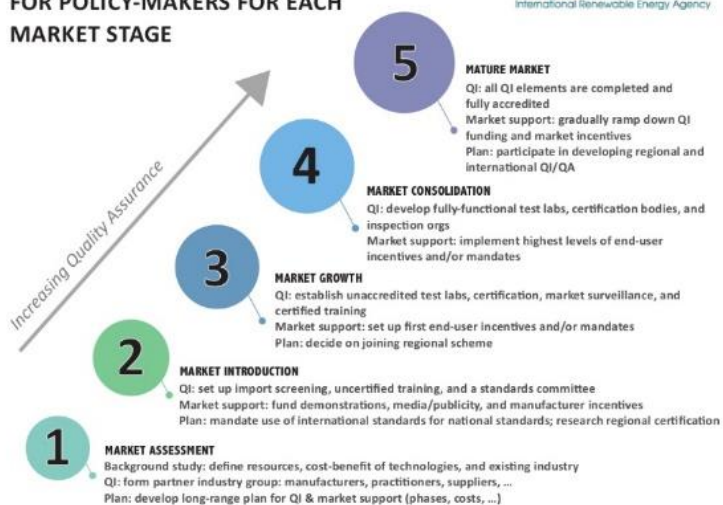
106. In an effort to enhance innovation through cooperation and to help policy makers streamline national research, development and deployment (RD&D) plans, IRENA has conducted technology outlook studies, produced new guidelines for RD&D planning, and provided advice on innovation planning. Findings from studies on *Guidance to Implement National Innovation Policies*, *Cooperative RD&D for Renewable Energy Technologies in Latin America*, and on technology development for advanced biofuels, mini-grids and offshore wind power have been used by a wide range of stakeholders, including the UNFCCC Technology Executive Committee (TEC). IRENA has also developed recommendations for policy-makers on issues including knowledge development and diffusion, promotion of entrepreneurial activities and market formation for new technologies. To facilitate regional deployment and uptake of recommendations, IRENA is transforming recommendations into priority areas such as smart micro-grids, advanced biofuels or coordination of technology centres in the LAC region and is translating the analysis into Spanish for greater dissemination. In November 2015, IRENA co-organised with the National Energy Research Centre of Ecuador (INER) a workshop on innovation for advanced biofuels production for the transport sector in LAC. The Agency has finalised its analysis on technology transfer for bio-ethanol production from Brazil to Africa. Further dialogue with countries in the Central Asia region on RET development has commenced. As a first step, IRENA has identified technology needs and potentials for renewable energy deployment in conjunction with national plans. Countries involved in the analysis to date include Kazakhstan, the Russian Federation and Ukraine.

IN FOCUS: QI STUDIES - DEVELOPING QUALITY INFRASTRUCTURE FOR SOLAR WATER HEATERS AND SMALL WIND TURBINES

Technical standards are integrated into quality assurance mechanisms through testing and certifying mechanisms. This process requires the development of infrastructure including test laboratories, certification and accreditation bodies. IRENA's work in this field shows how implementing such quality infrastructure is dependent on the national context and the status of the market for a specific renewable energy technology, illustrated by in-depth analysis for the case of solar thermal and wind power technologies.



SUMMARY RECOMMENDATIONS FOR POLICY-MAKERS FOR EACH MARKET STAGE



Incremental approach to develop national quality infrastructure for renewable energy technologies

IN FOCUS – ADVANCED BIOFUELS PROVIDING INNOVATIVE SOLUTIONS FOR THE TRANSPORT SECTOR IN LAC

The workshop “Innovating Liquid Biofuels for the Transport Sector”, co-organised by IRENA and INER, provided a platform for a regional discussion on current and projected market trends, as well as research and development (R&D) resulting in the latest breakthroughs and potential of advanced biofuels in Latin America and the Caribbean (LAC). IRENA presented the preliminary findings from the ongoing ‘IRENA’s Innovation Technology Outlook for Advanced Biofuels’, a global technology outlook for advanced liquid biofuels for transport from 2015 to 2045, which focuses on the role of innovation on advanced production pathways which have not yet reached large scale commercialization. Several institutions, including the United Nations Conference on Trade and Development (UNCTAD), the U.S. Department of Energy’s National Renewable Energy Laboratory (NREL), the Brazilian Agricultural Research Corporation (EMBRAPA) and the Latin American Energy Organisation (OLADE), amongst others, participated in the workshop giving international lectures. More than 270 regional experts benefited from the workshop, which also counted with ministerial participation.

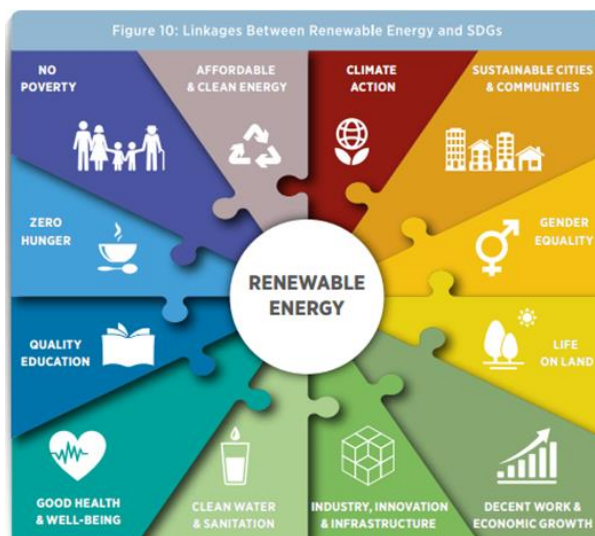
During the Congress, IRENA also presented the findings from its study on Cooperative RD&D for the LAC region. In the side-lines of the event, an initiative to create a cooperative network of R&D centres in the LAC region was discussed and next steps in the process were agreed. Overall, 23 lecturers from 11 different nationalities participated in the International Congress of Sustainability and Scientific Fair, which was estimated to have visited by 2500 guests



Courtesy of INER. Mr. Andres Arauz. Minister of Knowledge and Human of Ecuador

IV. Renewable energy access for sustainable livelihoods

107. With proven solutions, declining technology costs, successful business models and available financing, renewable energy can have an immediate and transformative impact on the quality of life of millions of people worldwide. In fact, renewable energy solutions can help meet multiple sustainable development goals in addition to the one related to energy. Access to reliable, cost-effective and environmentally sustainable modern energy services can have a multiplier development impact in terms of reduced health effects, improved livelihoods, poverty alleviation, job creation, gender equality and enhanced access to water and food. Over the course of the biennium, IRENA has worked to increase access to renewable energy through its International Off-Grid Renewable Energy Conference (IOREC), work on mini-grid and off-grid applications, and capacity building.



International Off-Grid Renewable Energy Conference platform

108. Off-grid renewable energy systems are now the most cost-effective solution for electrification in most rural areas. Tapping into this vast potential requires enabling effective policy and regulatory frameworks, tailored business and financing models and technologies adapted to the rural context. IOREC convened sector stakeholders to collectively identify pathways to scale-up off-grid renewable energy deployment. IOREC 2014, a joint effort by IRENA, the Asian Development Bank and the Alliance for Rural Electrification, was held in June 2014 in the Philippines. It convened over 400 stakeholders from the off-grid renewable energy value chain, including representatives from rural electrification agencies, ministries in charge of renewable energy development, the private sector, academia, financing institutions and international organisations.

109. One message that emerged from the meeting was the urgent need to change mind-set from a ‘grant-driven’ approach to a ‘market-based’ approach that reflects the cost-competitiveness of off-grid renewable energy technologies and the untapped market of off-grid communities. Discussions also emphasised the need to engage local communities in the design and implementation of rural electrification programmes and initiatives, and to build local technical and managerial capacities to ensure the long-term sustainability of projects and local value retention. Findings of the conference, including stakeholder survey results, are summarised in the conference outcome paper, *Accelerating Off-grid Renewable Energy Deployment: Key Findings and Recommendations from IOREC 2014*, available [on the IOREC website](#), and have been widely disseminated across global and regional fora. As a follow-up to the conference and the outcome paper, IRENA is analysing policies and regulatory frameworks to enable private sector involvement in mini-grid development. The forthcoming study

assesses which policies and regulations can be effective in promoting different private sector-driven delivery models, and help inform policy making for the sector.

IN FOCUS: ACCELERATING OFF-GRID RENEWABLE ENERGY DEPLOYMENT

Off-grid renewable energy solutions play a central role in meeting the objective of universal energy access. Accelerating their adoption requires an ecosystem that fosters the development of small-scale enterprises to deliver energy solutions to unconnected and rural areas. Decades of experience exists in developing such an ecosystem with emerging innovative policies and regulations, business and financing models, and technology. The IOREC platform brings together the experience of different stakeholders and facilitates cross-regional exchange. Key findings from the two editions of IOREC (2012 in Africa and 2014 in South East Asia) point towards the following areas where action is immediately needed to accelerate deployment:

1. The target of universal electricity access by 2030 cannot be achieved unless a market-based approach to off-grid renewable energy deployment is adopted.
2. Countries' rural electrification strategies need to assess and integrate off-grid renewable energy technologies as a cost-effective tool to expand electricity access in rural areas. Successful implementation will require dedicated policies that are tailored to local contexts and support long-term sustainable market development.
3. There is a need to rethink delivery mechanisms through which financing can be made more accessible to enterprises and end-users, and be administered in a time bound and efficient manner. Dedicated financing instruments need to be established to cater to the off-grid renewable energy market and bridge the existing financing gaps.
4. A paradigm shift is necessary from viewing electricity access as being limited to lighting alone towards delivering power that is compatible with the aspirations of the end-users. An integrated approach to programme design that considers energy demands from all sectors central to development, such as health, education, agriculture, small industries and water, can improve project viability and maximise development impacts.
5. Capacity building efforts need to be directed at all stakeholders, including public agencies, financing institutions, entrepreneurs and regulators, for them to better understand the peculiarities of the off-grid sector.
6. More comprehensive frameworks to bridge the information deficit on technology costs, socio-economic impacts, resource availability, etc. are needed to guide effective decision making.



Mini Grids

110. The United Nations Environment Programme (UNEP), Siemens and IRENA have concluded work on the economic and financial viability of hybridising isolated diesel mini-grids with renewable energy. A report entitled *Renewable Energy in Hybrid Mini- and Isolated Grids: Economic Benefits and Business Cases* was based on private sector financing terms and the US Energy Information Administration (EIA) mid-case scenario for oil prices. Analysis was conducted in three physical islands - Bequia, Saint Vincent and the Grenadines; Nusa Penida, Indonesia; and Busuanga, Philippines - and four virtual islands - Puerto Leguizamo, Colombia; Las Terrenas, Dominican Republic; Hola, Kenya; and Basse Santa Su, The Gambia. Report findings show hybridisation is a feasible option, primarily influenced by plant size, diesel costs and renewable energy resource availability. Findings highlight that hybridisation can reduce average generation costs at five of seven sites examined and that cost reductions exist even when PV generation at sites would provide just 31-40% of total electricity needs.

111. To get further insights into the mini-grid deployment, IRENA has engaged with a number of countries and regions. As part of RRA follow-up in the Philippines, a study is being undertaken on the potential of hybrid and clean energy mini-grids for off-grid electrification of island states and remote sites in the country. The Philippines is comprised of 7,107 islands, and its government has expressed interest in expanding off-grid programmes to provide universal energy access. The study evaluates existing policy frameworks, programmes and schemes, and explores how these incentivise the private sector. It also examines how renewables may hybridise existing plants and build new green mini-grids. Recommendations will help the government to address key barriers and gaps for deployment of mini-grids and also revisit its long-term strategy for creating a market for mini-grid deployment.

112. In partnership with ECREEE, a scoping of capacity needs assessment is conducted for the ECOWAS region to enable the deployment of renewable energy mini-grids for off-grid electrification. The study is the first step for expansion of the ProSPER capacity building programme, which initially focused on off-grid PV systems, to include clean energy mini-grids with a link to the ECOWAS Rural Electrification Program. The study builds on and complements the existing work conducted for the assessment of training needs as well as capacity building activities. IRENA has also undertaken a scoping study in Burkina Faso and Mali on the potential of biomass power generation for off-grid power, as a follow up to RRA findings. A draft report, currently under review, determines the potential of rice husk and agro residues for power generation through gasification. Capacity assessments of existing small and medium manufacturing entities show that suitable technology transfer and training in operations and maintenance will help sustain operations.

113. IRENA has engaged with entrepreneurs within the African region in an effort to build capacity, share knowledge and improve project bankability. In April 2015, IRENA and ECREEE set up an ECOWAS Renewable Energy Entrepreneurship Support Facility housed at the International Institute for Water and Environmental Engineering (2iE) in Ouagadougou, Burkina Faso. The Facility benefits from a wide range of expertise from its Advisory Board comprising development partners, commercial banks, renewable energy centres as well as a wider network of experts in enterprise development. ECOWAS-based entrepreneurs are able to submit requests for assistance with the Facility, which, to date, has received over pre-screened 70 requests. Eligible requests were evaluated at the first Technical Committee Meeting held in June 2015. Based on the common issues emerging from these requests, capacity building workshops are being organised. The first took place in September 2015 and the second technical workshop on solar PV system sizing, system installation and product adaptation in rural areas will be held in December 2015 in Cabo Verde.

114. To facilitate cross-regional information exchange, IRENA initiated a knowledge transfer programme between South Asia and Sub-Saharan Africa to support entrepreneurs in providing energy access through decentralised renewable energy technologies. IRENA is partnering with two of India's premium business

incubators for energy access - the SELCO Incubation Centre and Centre for Innovation Incubation and Entrepreneurship (CIIE) and, with additional support from UK Aid, Department for International Development (DFID), India's Knowledge Partnership Programme (KPP). Business incubators, entrepreneurs and national renewable energy association representatives from Asia and Africa came together for the first workshop in Manila, as a pre-IOREC event, attended by 43 participants from 35 organisations. A further workshop was organised in Bangalore that facilitated the exchange of best practices between different incubation centres and their incubatees.

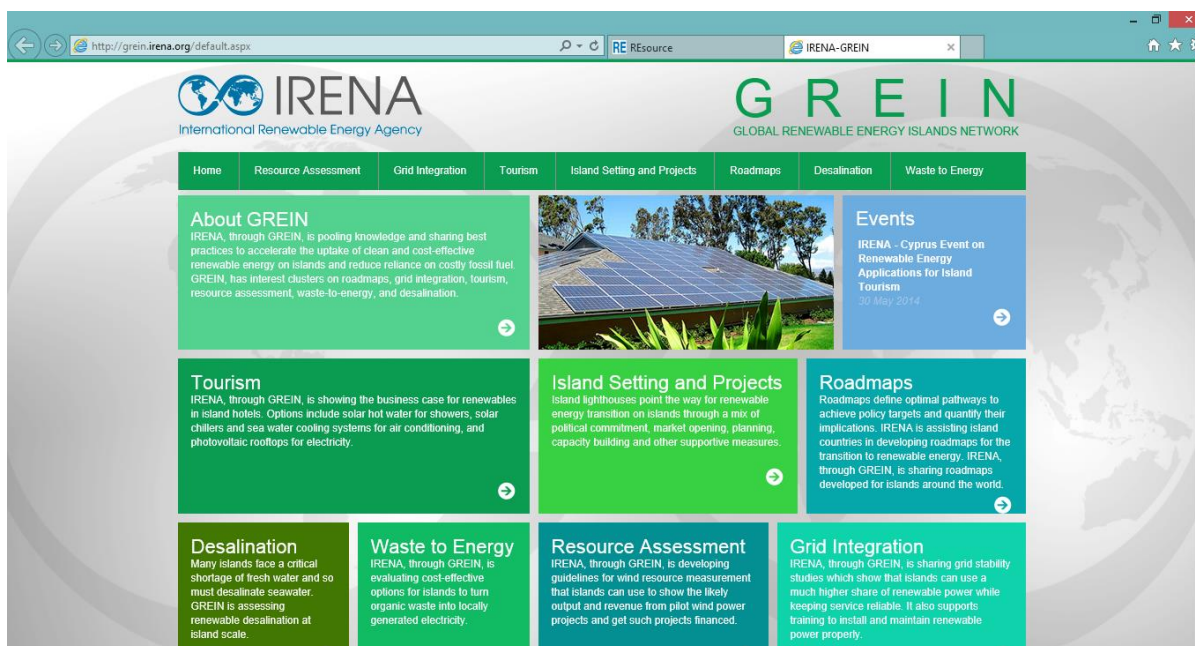
V. Islands: Lighthouses for renewable energy deployment

115. Islands have and continue to represent a unique opportunity to showcase transformative impact of renewable energy technologies and their associated socio-economic impacts. In the course of biennium, IRENA consolidated its work with SIDS under the Lighthouses Initiative umbrella to amplify its efforts through collaboration of governments, the private sector and development partners.

Global Renewable Energy Islands Network (GREIN)

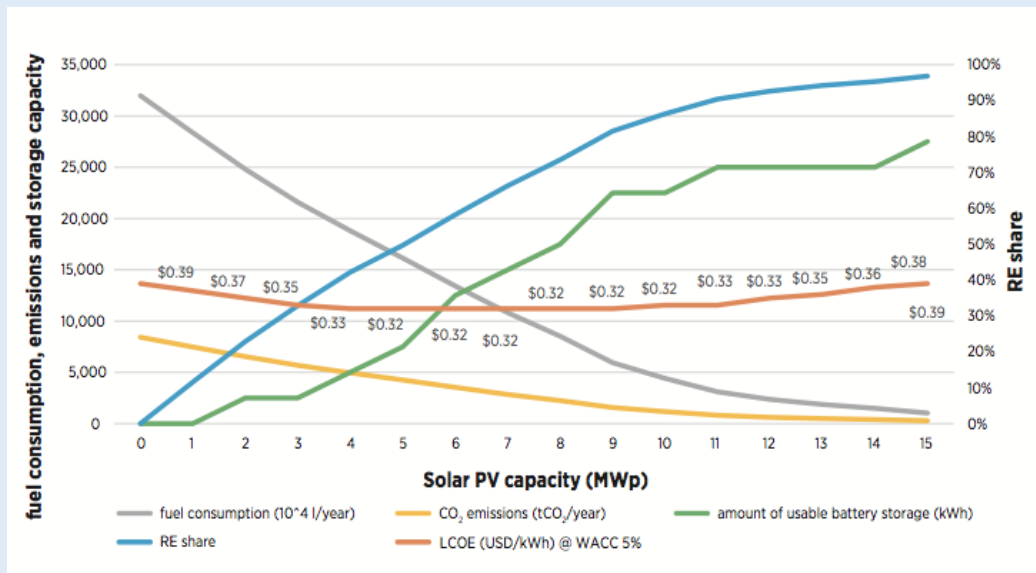
116. Global Renewable Energy Islands Network (GREIN), initiated at the Malta Global Island Conference in 2012, is a platform for pooling knowledge, exchanging of ideas, sharing best practices and lessons learned and seeking innovative solutions to accelerate the uptake of clean and cost-effective renewable energy technologies on islands. GREIN identified, established and operationalised six thematic clusters highly-relevant to islands including tourism, roadmaps, desalination, waste-to-energy, resource assessment and grid integration. Reports on best practices, case studies, resource maps, analysis, grid stability, and roadmaps have been shared to facilitate access to knowledge and spur collaboration.

117. For instance, in May of 2014, IRENA and the Government of Cyprus held a workshop to discuss renewable energy opportunities for island tourism, and provide inputs for the IRENA report released in August 2014. Building on the report *Renewable Energy Opportunities for Island Tourism*, IRENA hosted a joint event with the Government of Germany at the ITB Berlin Convention in March 2015, which brought together government, private sector and international organisations to devise strategies for further engagement and to accelerate the deployment of renewable energy in islands' tourism sectors. Report results showed that solar water heating and air conditioning, sea water air conditioning (SWAC) and solar PV are some practical and cost effective technologies for island hotels.



IN FOCUS: RENEWABLE ENERGY ROADMAP FOR THE REPUBLIC OF THE MALDIVES

The renewable energy roadmap for the Republic of the Maldives was officially launched at a workshop in the Maldives in September 2015. The roadmap identifies key barriers to the deployment of renewables in the Maldives and makes specific recommendations to overcome these barriers. The workshop served as a critical opportunity for the key stakeholders to discuss and identify clear actions that can be taken to support renewables in the Maldives. The Maldives Government has indicated that the roadmap, including the additional recommendations that emerged during the workshop, will be submitted to the Cabinet for official endorsement.

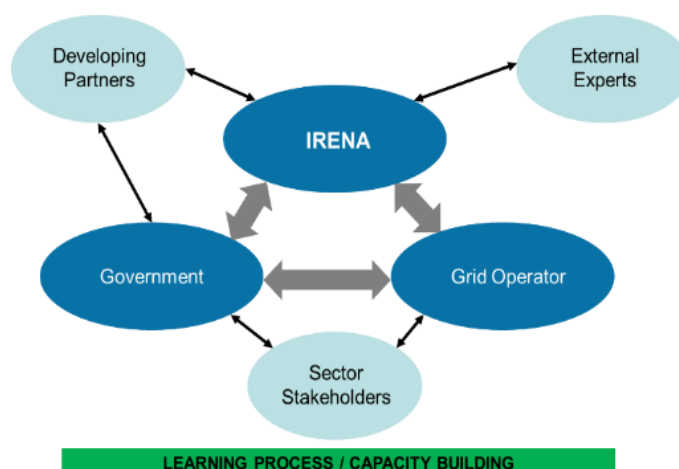


IRENA analysis from Maldives roadmap showing effects of increasing renewable energy share

118. IRENA, in cooperation with governments and other partners, has also assisted with the development and implementation of a number of roadmaps for islands including Cabo Verde, Cyprus, Kiribati, the Maldives, Mauritius, Nauru and Vanuatu. Findings for the Cyprus roadmap, launched in January 2015, provided key inputs for Cyprus’ European Union reporting obligations, the electricity market design and the study on grid integration of variable renewables from the EU Joint Research Centre. It also set the framework for the review of the national energy policy and the national renewable energy action plan, with some of the recommendations being incorporated in the policy review.

119. Grid stability studies conducted by IRENA are strengthening the coordination between long-term, policy-driven renewable energy integration targets and their actual deployment in the power systems operated by utilities in SIDS. Through these specialised technical assessments, policy-makers can evaluate and plan in a more accurate way the resources required to meet their renewable energy integration targets. Power utilities can also identify technical measures required to host planned renewable energy shares while maintaining reliability of electricity supply. Strengthened coordination increases the confidence of stakeholders in the positive impact of renewable energy. Further support was provided to countries in the application of grid study results to identify integration options. Grid stability assessments have been completed or are at present being undertaken in Antigua and Barbuda, Barbados, Samoa, the Cook Islands, in addition to Kiribati where IRENA is cooperating with the Pacific Power Association and the University of South Pacific.

120. The grid stability study for Samoa provided recommendations on how to operate a power system with a planned 14 MW of solar PV and 0.5 MW of wind power in the country's main island, Upolu. Since then, a second study was requested on technical measures to achieve 100% renewable energy by 2017. The grid stability study for Aitutaki is being used by the Cook Islands Renewable Energy Department in their roadmap for the implementation of renewable energy projects to achieve 100% renewable energy by 2020 while the grid stability study for Antigua provided the public utility APUA with the technical elements and awareness to plan the operation of their system with expected 9 MW of solar PV and 18 MW of wind power. Awareness among local experts about the importance of planning for renewable energy integration was increased and communication among stakeholders facilitated. As a consequence a new request from Antigua was received to facilitate a long term planning process.



121. To further disseminate results, IRENA has organised technical workshops for utility engineers and expert stakeholders on grid operation planning with high shares of variable renewable energy in Antigua and Barbuda and Samoa, and has shared its work in technical events such as at the PPA annual conferences 2014 and 2015, Power System for Islands Connect 2015, Intersolar 2015, Solar Integration Workshop 2015. In collaboration with the University of South Pacific and PPA, IRENA's methodology has been used to assess the impacts of planned solar PV projects in the operation of the electricity grid in South Tarawa, within Kiribati's *Integrated Renewable Energy Roadmap*.

122. Finally, IRENA developed wind measurement guidelines for islands. It is anticipated that development partners would support measurement campaigns using these guidelines on selected islands for which the Global Atlas shows to have excellent, yet unexploited wind resources.

Partnerships for Action in SIDS

123. In response to the global commitment at the Third International Conference on Small Island Developing States in Samoa to support SIDS in their transition to a renewable energy future, IRENA launched the SIDS Lighthouses Initiative during the UN Secretary-General's Climate Summit in September 2014. The SIDS Lighthouses Initiative has been growing rapidly, in size and scope, in preparation for the upcoming COP21, with membership consisting of 27 SIDS and 19 other partners as of October 2015. As a first step in the Initiative, IRENA is working with partners to develop a comprehensive overview of knowledge and information on the SIDS power sector, best practices on renewable energy development and deployment, and energy sector transformation issues. This overview has started to bridge the gap between studies and concrete action to accelerate deployment. A number of SIDS have made specific requests for technical and other support and IRENA - enabled by voluntary contributions from Germany, New Zealand and Norway - has been able to respond to these requests. IRENA is also working with a number of other partners to advance the initiative.

"The Lighthouses Initiative provides us with the essential planning tools to accelerate the deployment of renewable energy in our islands"

Minister Kenred Dorsett, Bahamas

124. The first SIDS Lighthouses Event was held in Martinique in June 2015 with the support of the Government of France, where a number of priority action points were identified among SIDS, private sector and development partner participants. A number of Lighthouses partners, in cooperation with IRENA, organised additional events to address key issues for the deployment of renewable energy in SIDS. This includes workshops in Honolulu with the support of the Government of the United States, and in Kuala Lumpur with the support of the Government of Japan in August 2015, and Cape Town with the support of the Government of Germany in October 2015.

VI. Regional action agenda

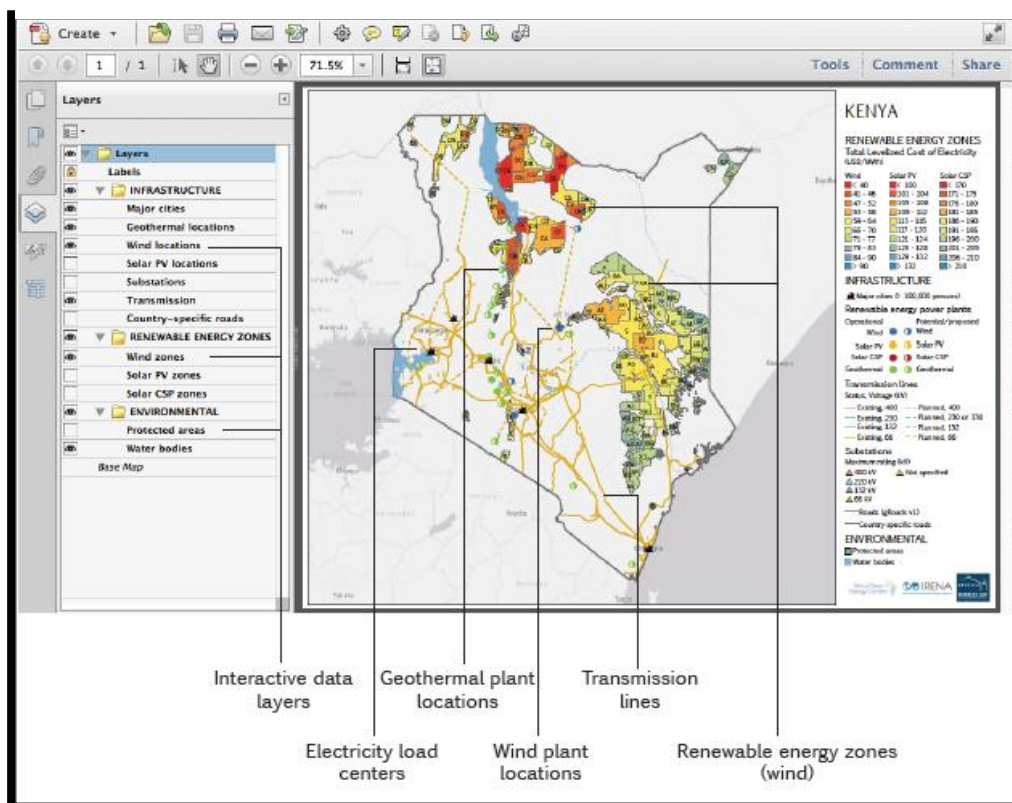
125. IRENA has leveraged its convening power and expertise to catalyse action by regional stakeholders and accelerate the introduction of renewable power options at the regional level, drawing upon the knowledge and experience of electric utilities, transmission companies, independent power producers, regulators, power pools, regional political and economic bodies, multilateral financial institutions and development partners.

Africa Clean Energy Corridor (ACEC)

126. The Africa Clean Energy Corridor (ACEC) promotes a regional approach to the development and deployment of renewable energy on the African continent, beginning with countries that make up the Eastern Africa Power Pool (EAPP) and Southern African Power Pool (SAPP). At the 4th session of the IRENA Assembly in January 2014, an action agenda on the implementation of Africa Clean Energy Corridor was endorsed through a Ministerial Communiqué. Power Pool and regional regulator engagement in Eastern and Southern Africa was further strengthened in the ACEC through a coordination meeting held in Abu Dhabi in June 2014.

127. The ACEC was a key initiative announced at the UN Secretary-General's Climate Summit in September 2014. During the Summit, Heads of African States, the Chairperson of the African Union Commission, and the UN Secretary-General noted the importance of the ACEC. The UN Secretary-General also stressed ACEC's critical role in reducing carbon emissions and dependence on imported fossil fuels for a more sustainable and climate resilient economic growth.

Example of an interactive zones map for wind in Kenya (Source: IRENA and LBNL)



128. The ACEC Communiqué calls for action in five key areas, namely: 1) zoning and resource assessment, 2) country and regional planning, 3) enabling frameworks for investment, 4) capacity building, and 5) public information. IRENA completed the *Analysis of Infrastructure for Renewable Power in Eastern and Southern Africa*, which outlined the state of the electricity sector and existing infrastructure and gaps to be addressed. As a result of the study, IRENA prioritised its activities in ACEC on zoning and resource assessment, enabling regulatory environments and capacity building. In collaboration with the Lawrence Berkeley National Laboratory (LBNL), IRENA developed a renewable energy zoning methodology which was validated by stakeholders from utilities, government, regulatory bodies, power pools and academia from within the region. The methodology was used to identify high resource potential zones for solar and wind technologies for the generation of effective power. The outputs of the zoning assessment, including a detailed report on *Renewable Energy Zones for the Africa Clean Energy Corridor* and interactive maps that include information on levelised cost of electricity, generation potential, and proximity to existing infrastructure, were launched at the South African International Renewable Energy Conference in October 2015. The maps are available on the Global Atlas website, as well as the mapre.lbl.gov website. Training on the zoning methodology development and on how to input data was conducted in September 2015 to ensure that country stakeholders are able to maintain, update and refine zoning assessments.

129. IRENA held a Renewable Energy Training Week (RETW) designed to support regulatory decision-making for the development and integration of renewable generation resources into national and regional power systems. Held in Abu Dhabi in January 2015, RETW attracted participants from senior and mid-level management from nine ministries, eight regulatory authorities, four associations, three sustainable energy development authorities, one utility and a regional facility from Africa, Asia, Central and Latin America and the Middle East. The Africa RETW was implemented upon request by the Regional Electricity Regulatory Authority of Southern Africa (RERA) and the Energy and Water Utilities Regulatory Authority of Tanzania (EWURA), where 33 experts from ministries, regulators and utilities were trained on the requirements of good regulatory practices and decision making for renewable energy development. Final evaluations are pending, but preliminary feedback suggested a high level of relevance to the participants' daily work tasks with follow up requests received by Namibia, the United Republic of Tanzania and Zambia to support regulatory decision making and observers such as GIZ have expressed interest in future collaboration.

130. IRENA continues to work, upon request, with individual countries in support of the ACEC development. To facilitate regular information sharing, engagement and collaboration, the first meeting of the ACEC Consultative Forum was organised in the margins of SAIREC in October 2015. The event was attended by around 50 participants including 5 Ministers and Deputy Ministers in charge of renewable energy from ACEC region, senior officials from Ministries from participating countries, regional Organizations including the African Union Commission (AUC), and the New Partnership for Africa's Development (NEPAD), the Regional Electricity Regulators Association of Southern Africa (RERA), the ECOWAS Regional Center for Renewable Energy and Energy Efficiency (ECREEE) as well as representatives of partner countries, civil society and other key stakeholders. The event provided participants the opportunity to obtain up-to-date information on the implementation status of the ACEC and exchange views on the key outcomes of the initiative for announcement at the COP 21 in Paris. The participating Ministers acknowledged IRENA's efforts and technical support in the implementation of the ACEC and urged the regional bodies to strengthen the collaboration with IRENA in order to embed these activities in the existing regional initiatives and replicate them in non ACEC countries in the long term.

131. In response to growing interest from the rest of Africa, IRENA has initiated preparatory work to expand the ACEC initiative to West Africa. A consultative meeting was organised by IRENA in Abidjan in September 2015 during the ECOWAS Sustainable Energy Policy and Investment High-Level Forum to begin discussions with governments, utilities, regulatory bodies, private sector and civil society from all ECOWAS countries.

Based on feedback provided, IRENA is working with regional partners to identify priority actions that will constitute the main elements of the ACEC implementation plan in West Africa.

Clean Energy Corridor of Central America

132. In 2014, IRENA conducted a technical consultation mission followed by stakeholder workshops in 2015 to identify areas for renewable energy deployment where IRENA could add value in collaboration with national and regional stakeholders, including the Central American Integration System (SICA), the Central America Regional Grid Operator (EOR), the Regional Regulator (CRIE) and the national operators and regulators among others. The consultations led to the development of an implementation strategy for the Clean Energy Corridor of Central America (CECCA), composed of five pillars to support the systemic transition of the region's electricity system. The implementation of the targeted activities identified will contribute to the necessary technical, structural and regulatory preconditions in order to reliably and cost-effectively achieve the envisaged renewable energy targets in the region. A training course was conducted in October 2015 on best practices and the use of tools for the operation of power systems with medium to high penetration of variable renewable energy. This training is expected to support system operators in the operation of power systems with high shares of variable renewable energy. The course focused on increasing awareness on barriers, best practices, possibilities and needs, to facilitate the reliable integration of connections of solar PV and wind projects to the Central American regional grid. During the last SICA Energy Ministerial held in San Salvador (El Salvador) in early December 2015, the CECCA's strategy was unanimously officially endorsed by the Ministers of all eight SICA countries (Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama), which will be implemented in partnership with regional partners.



Technical and political stakeholder consultation workshops, San Salvador, El Salvador. Feb. 2015

IN FOCUS: ABU DHABI COMMUNIQUÉ ON ACCELERATING RENEWABLE ENERGY UPTAKE IN LATIN AMERICA

In January 2015, Vice-Ministers and senior government representatives from 12 Latin American countries and high level representatives from regional organisations participated in the *Executive Strategy Group Meeting on Renewable Energy in Latin America: Challenges and Opportunities*. Discussion on the agenda for IRENA to further engage with the countries of the region resulted in a Communiqué on areas for collaboration. Opportunities included renewable energy resource potential assessment; energy planning; system reliability with high shares of renewables; assessment of policy mechanisms to promote renewable energy deployment; evaluation of the social and territorial impacts of large projects; energy integration through market integration; energy access through off-grid photovoltaic and wind solutions; and capacity needs assessments.

Emerging Regional Clean Energy Corridors

133. In 2014, IRENA collaborated with the League of Arab States (LAS) and other regional organisations to identify the actions needed to attract investments for larger deployment of clean and indigenous renewable energy resources in the Arab region. Development continues on the idea of an integrated power grid to cover the entire Arab region and allow for renewables-based power exchanges. An analysis of the Maghreb region is also underway to ascertain the current status of renewable power and associated infrastructure and supply chains, zoning and resource assessment capabilities, country and regional planning processes, market and financial frameworks for investment, human capacities and knowledge sharing.

134. Consultation meetings on the Pan Arab Clean Energy (PACE) initiative have been organised in collaboration with the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) in Algeria, Morocco and Tunisia. The objective of these meetings was to inform key stakeholders about the development status of renewable power plants and associated transmission infrastructure and the opportunities to accelerate deployment of renewable power supply in the region. Meeting conclusions noted the need for a regional “power pool” to act as a regional regulator; harmonised policies and regulations among Maghreb countries; reinforced infrastructure; the development of local content and supply chains; and boosted zoning, planning and capacity building activities. IRENA is following up on some of these findings, including by consolidating available information in the Maghreb region to include information on the current status of renewable power and associated infrastructure and supply chains, zoning and resource assessment capabilities, country and regional planning processes, and market and financial frameworks for investment.

135. IRENA has also intensified its engagement with the ASEAN. Initial consultation on an option to advance the clean energy corridor concept took place in August 2015 with the participation of the ASEAN Secretariat, Heads of ASEAN Power Utilities/Authorities (HAPUA); the ASEAN Center for Energy; the Ministry of Energy, Green Technology and Water of Malaysia (ASEAN Presidency); and the Ministry of Energy of Thailand, among other regional organisations. In October 2015, following the invitation by the ASEAN Secretary, IRENA presented the corridor concept at the Senior Officials Meeting on Energy (SOME) and at the ASEAN Meeting of Energy Ministers (AMEM), which is a decision-making platform for ASEAN on energy matters. The interconnections of the power grids at a regional level was profiled as a cost-effective way to enhance regional energy security, if planned well and early enough. The concept was well received and has led IRENA to further detail the action agenda that can be implemented in the years to come. A joint consultative workshop, co-organised with Heads of ASEAN Power Utilities/Authorities and ASEAN Center for Energy, took place in November 2015 and identified strategic considerations, and policy and technical priorities for the implementation of a clean energy corridor initiative customised to the ASEAN context.

136. In 2015, IRENA began its work on the assessment of the long-term potential for cost-effective deployment of hydropower, wind, solar and biomass resources in South East Europe. A particular consideration is given to contribution of photovoltaic systems (both large-scale and decentralised rooftop systems) which have declined in cost by a factor of three since the region prepared their National Renewable Energy Action Plans (NREAPs). Assessment reports will enable identification of regional priority actions areas to achieve renewable energy targets by 2020 and ensure an adequate role of renewables in the energy development strategies through 2030 and 2050. This work is supported through a voluntary contribution from Germany.

Empowering through partnerships

137. To catalyse multilateral cooperation on capacity building, IRENA has partnered with a wide range of stakeholders over the course of the biennium on topics and activities from specific geothermal deployment support, through power requirements for health centres to training on designing and implementing renewable energy targets.

138. IRENA supported the Global Geothermal Alliance (GGA), a coalition for action founded in September 2014 to increase the share of geothermal energy in the global energy mix. A platform for dialogue and knowledge sharing, the GGA currently has over 30 partners³. The Alliance met for the first time in Nairobi in June 2015 where 70 high-level representatives discussed its activities and plans for the future. Participants of the meeting included representatives from African Union Commission; Eastern Africa Power Pool; ENEL Green Power; European Investment Bank; Geothermal Energy Association; International Geothermal Association; International Finance Cooperation; JICA; New Partnership for Africa's Development; Regional Electricity Regulators Association of Southern Africa; Reykjavik Geothermal; Secretariat of the Pacific Community and UNEP. The GGA was formally launched during COP21 in Paris.

139. Further geothermal support in Andean countries has been provided in partnership with the Latin America Energy Organization (OLADE) and the International Geothermal Association (IGA). Through workshops in Santiago de Chile, Chile, and Bogotá, Columbia, the GGA initiative identified financing barriers and risk mitigation options. Best practices and innovative project financing models were presented and shared among workshop participants from Bolivia, Chile, Colombia, Ecuador and Peru, with participation from private sector representatives, insurance companies and development partners from El Salvador, Germany, Iceland, Kenya, Mexico and New Zealand, among others. Workshops will continue under the umbrella of the GGA initiative.

140. IRENA has also developed strategic partnerships with active centres of excellence and capacity building providers to deliver joint training programmes. This included a joint Japan-IRENA training on designing and implementing renewable energy targets for participants from Africa and the Pacific. Conducted with the support of the Japanese Ministry of Foreign Affairs and the Ministry of Environment, training was based on RRA results and covered a wide range of topics such as the pre-requisites and methodology for target design and its implementation through policy mechanisms. In partnership with the United Nations Foundation (UNF) and the World Health Organization (WHO), IRENA supported initiatives taken up under SE4ALL on 'Energy for Health', focused on decentralised energy solutions for primary health centres and health clinics in rural settings, with the initial focus on Sub-Saharan Africa. Finally, Specialised training on small-scale biogas household applications for rural areas and large scale applications for urban areas with on-site observation of biogas power plants was also provided for experts from Bangladesh, Ecuador, Fiji, Jordan, Nepal, Rwanda and Samoa in the 8th *International Biogas Compact Workshop on Mass Dissemination of Domestic Bio Digesters in Developing Countries* in partnership with the University of Oldenburg, Germany.

³ Partner Countries: Comoros, Bolivia, Burundi, Colombia, Costa Rica, Djibouti, Ecuador, Egypt, El Salvador, Fiji, France, Guatemala, Honduras, Iceland, Indonesia, Kenya, Malaysia, Mexico, New Zealand, Nicaragua, Pakistan, Peru, the Philippines, St. Vincent and the Grenadines, Tonga, Turkey, Uganda and the United States of America

Partner Institutions: IRENA, African Development Bank, African Union Commission, Andean Geothermal Center of Excellence, Eastern Africa Power Pool, European Geothermal Energy Council, Inter-American Development Bank, and World Bank - ESMAP

VII. Member Relations, Communications and Outreach

Member communication

141. The Agency's greatest asset lies in its membership and IRENA increased its efforts throughout the biennium to actively communicate and engage with Members, both globally as well as with the community of Permanent Representatives to IRENA (PRs) based in Abu Dhabi.

142. As a central repository of information and communication, IRENA developed the e-platform REmember in December 2013. Remember provides information tailored to Members' needs and interests including governing body meetings and sessional documents, key internal documents, and contact information of Members and the Secretariat that is not publicly available. REmember also contains a calendar of IRENA activities and is the central repository of messages from the Secretariat to the membership. Remember currently has 600 users from 132 countries.



PRs listen to presentations at the first "IRENA Talks" meeting in Abu Dhabi in September 2015

143. Further expanding its communication efforts with Members, IRENA developed 'In Focus Briefs', summary documents issued on a regular basis and tailored specifically to the interests of the membership. Briefs provide deeper coverage and context on key issues and detailed updates on IRENA's work. Briefs complement the IRENA Bulletin, which provides Members with a snapshot of recent programmatic activities and events and which looks ahead to the Agency's upcoming engagements and publications. To bring renewable energy news directly to IRENA Members, IRENA now also issues a daily 'media brief' covering the day's renewable energy headlines and IRENA media coverage. These efforts keep Members updated of IRENA's activities, opportunities for involvement and of developments in the renewable energy sector. Members are also being encouraged to share IRENA information with the public through dissemination of press releases, social media posts, and other key messages. Engagement is having an impact. Also thanks to the concerted efforts of Members, the media campaign for *Renewable Energy and Jobs – Annual Review 2015* called "I am one of the 7.7 million" was seized by social media users and demonstrated the power of the strong message.

144. Building stronger connections with IRENA Members, IRENA developed Protocol Guidelines for Permanent Representation to IRENA in October 2013. Since the establishment of this system, 37 countries have accredited PRs and additional countries are in the process of accreditation. Through increased communication and outreach, such as through 'IRENA Talks', the Permanent Representation system is increasing communication between Members and the Secretariat. As the PR community grows it is anticipated that participation in local IRENA workshops and events will become a vital means of information. Such increased information and communication may complement existing communication with Members and serve as an important tool for the creation of a renewable energy community at the Agency's headquarters.

145. IRENA has also maintained regular interaction with representatives of governments and regional groups, with a particular focus on those without a presence in Abu Dhabi. In the context of the Agency's outreach activities, special emphasis has been placed on countries that have yet to complete their membership process. Further, in view of the concentration of countries and organisations present in New York, the New York Liaison Office has played an important role in disseminating and increasing awareness of IRENA's programmatic activities and knowledge products, helping in return to shape a better understanding of the global context in which the Agency operates.

146. IRENA has also started to engage more actively with particular groups, such as with Parliamentarians. In many countries, Parliamentarians play a significant role in the decision-making process that shape both energy and related policies. With the support of IRENA focal points, a global network of close to 450 legislators with an interest in renewable energy was established in 2015. IRENA continues to explore possibilities of partnering with relevant parliamentary assemblies and other relevant organisations. To this end, the Agency is disseminating up-to-date and tailored information through the Review for Parliamentarians. This periodic publication is being distributed in a digital format to legislators, parliamentary libraries and parliamentary assemblies. A first webinar presentation introducing the knowledge tool REsource to legislators and other parliamentary stakeholders has been held in November 2015. Finally, preparations for a meeting of legislators on the day prior to the sixth session of the Assembly in 2016 have been initiated. Through expert presentations as well as peer-to-peer interactions, legislators will be invited to examine and discuss current renewable energy topics and trends that are of specific relevance to them.

147. Throughout the biennium, the Secretariat continued to engage with Members to take required actions to grant privileges and immunities to IRENA. At the time of the writing of this report, four Member States, namely Egypt, Germany, Poland and Spain, are Party to the Agreement on Privileges and Immunities for IRENA contained in A/3/13, and the United States issued an Executive Order to extend certain privileges and immunities to the Agency.

148. The Secretariat also continued to liaise with its Host Country to address specific aspects relating to the implementation of the Headquarters Agreement, in particular in the context of the move of IRENA to its permanent Headquarters in Masdar City in March 2015.

Communications and Media Relations

149. As the deployment and visibility of renewable energy grows worldwide, the need to communicate IRENA's work in a way that makes a lasting impact and maintains momentum in the global shift towards renewable energy has never been more important. During the course of the 2014-2015 biennium, expanded communications capacity has enabled the Agency to increase the visibility of its publications, tools, events as well as the initiatives stemming from the Work Programme. Increased communications activity underpin the Agency's goal of becoming the authoritative global voice for renewable energy, along with the strategic objectives of providing a centre of excellence, advisory resource and network hub. As such, the dissemination of key messages remains central to IRENA's over-arching communications strategy, highlighting the transformative potential of renewable energy, the global energy transition, the strong business case for renewable energy, and their social, economic and environmental benefits.

IRENA IN THE MEDIA 2014-2015

- Total number of articles mentioning IRENA in 2014: 6,300+
- Total number of articles mentioning IRENA in 2015 (As of 30 November): 7,700+
- Total number of countries with coverage of IRENA in 2014-15: 136
- Countries with the most IRENA coverage (in order): the United States, the United Arab Emirates, China, the United Kingdom, Australia, Jordan, Germany, India

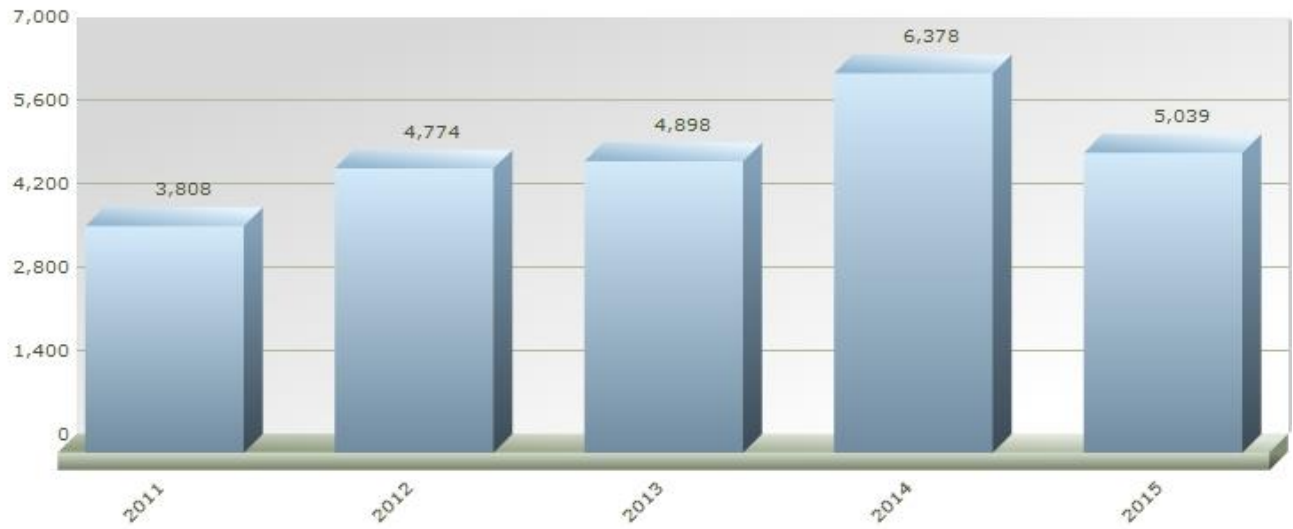
150. One of the most important vehicles for communicating these messages is the media. In this regard, IRENA has intensified its international media relations efforts to support programmatic activities and to reach key audiences. One of the crucial media relations activities for the Agency is the regular production and dissemination of news releases, combined with direct pitching to journalists. In the 2014-2015 biennium to date (30 November 2015), 82 releases were published, representing an increase of more than 75% in media outreach compared to the previous two-year period. To expand reach and media coverage in targeted international media

outlets, IRENA has also increased the multilingual development and distribution of press releases, publishing 48 press releases in more than one language during the biennium. The launch of the *Renewable Energy and Jobs – Annual Review 2015* for instance had press releases disseminated in five languages.

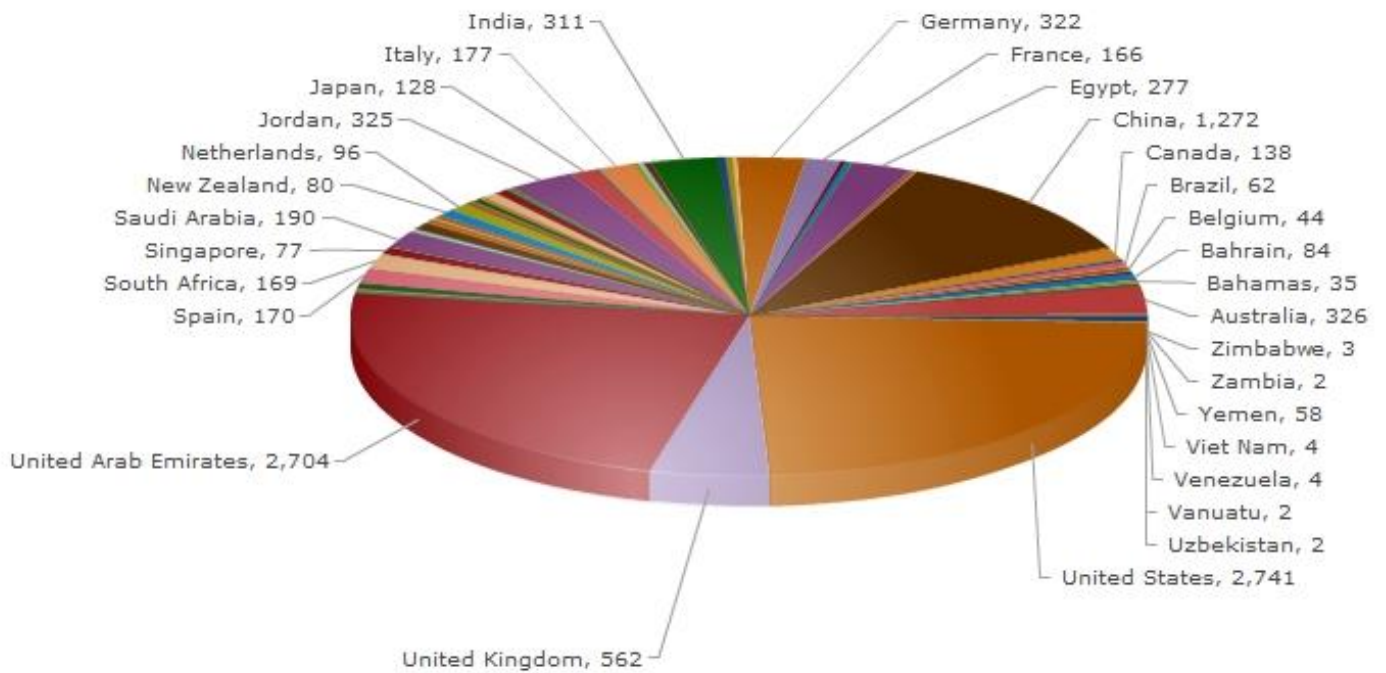
151. Strengthening the quality of relationships with key journalists and outlets around the world has delivered immediate but also ‘long-tail’ returns. Presence by invitation of key media influencers for direct engagements at international events has increased awareness of IRENA, its work and its mandate. Media engagements included those at the IRENA Assembly and the World Future Energy Summit in Abu Dhabi, the SE4ALL Forum and the launch of the *Renewable Energy and Jobs – Annual Review 2015* in New York City, the second *International Off-Grid Renewable Energy Conference* in Manila, a SIDS Lighthouses event in Martinique and launch events for *REthinking Energy* in Abu Dhabi, Beijing, Paris and Tokyo, and the COP21 Climate Change Conference in Paris. These events helped to raise media awareness of IRENA as the leading source of renewable energy knowledge and information. Other high-profile stakeholder engagements have included regional and in-country launches of REmap reports and working papers, which took place in Abu Dhabi; Beijing; Berlin; Cape Town; Warsaw, Merida and Washington, DC; along with *Renewables Readiness Assessment* launches in Djibouti, Mauritania, Nicaragua, Oman and Swaziland. Targeted report launches strengthened IRENA’s engagement with local stakeholders and have also proven to be effective opportunities for collaborative communications efforts with Members.

152. As a direct result of intensified media relations activities, IRENA’s coverage in the international media has increased steadily since 2011. Over the course of the biennium, IRENA has been covered by media in 140 countries and gained over 14,000 mentions in global media, representing an increase of more than 40% in media coverage over the previous two-year period. The concerted effort to target, reach and inform decision-makers and policy leaders has paid dividends, with coverage from high-profile outlets including *Associated Press*, *Bloomberg*, *CNN*, *BBC*, *Le Monde*, *The Los Angeles Times*, *The New York Times*, *The Guardian* (UK), *The Wall Street Journal*, *The Atlantic*, ABC (Australia), *Deutsche Welle*, *Economic Times*, *Financial Times*, *The Globe and Mail* (Canada), *O Globo*, *RT*, *Reuters*, *Sydney Morning Herald*, *Xinhua*, *Sky News Arabia*, *Al Arabia* and *Al Jazeera*.

IRENA media coverage by year (through October 10)



2014/2015 coverage by country:



153. As the global shift to digital and online media has intensified, IRENA has dedicated increased resources to be actively engaged in the new media landscape. Over the past two years, IRENA has substantially strengthened its use of social media, maintaining an active presence on social media platforms. This includes the establishment of a well-regarded Twitter page (prompting The Guardian to name IRENA one of the ‘Top Tweeters on Renewable Energy’) and developing and publishing YouTube videos to promote strategically selected projects and events.

154. Key messages from publications and reports are highlighted across IRENA platforms daily to ensure maximum outreach. This has been further strengthened with the expanded use of vibrant infographics, including informative graphs, maps, photos and videos. As a result of this expanded focus, IRENA has increased ‘followers’ across its social media platforms to more than 330,000 and is adding more than 100 new followers every day. To illustrate the power of such campaigns to engage audiences, the campaign in support of *Renewable Energy and Jobs – Annual Review 2015* (encouraging people to post photos of themselves holding signs claiming “I am one of the 7.7 million” in reference to total employed in the sector worldwide) was estimated to have reached over 2.5 million social media users in the first week alone. Later in the year, a contest to promote Global Atlas Pocket, IRENA’s new mobile application for renewable energy prospecting (built on the Global Atlas platform) among technical experts, drew participants from more than 25 countries.

IRENA ON THE WEB 2014-2015

- 800,000 visitors
- 3.5 million page views
- 3.3 million report downloads
- 6,000 websites linking to IRENA.org
- 200,000 inbound links
- 60,000 inbound links from government websites
- Visitors from over 190 countries

155. Throughout 2014-2015, websites continued to be one of the Agency’s principal vehicles for communications and outreach. To date in the biennium, IRENA websites have attracted over 800,000 visits and 3.5 million page-views, growing by over 1 million page-views over the previous two-year period. In addition, the creation of the [IRENA Newsroom](#) has allowed for a new mechanism for the delivery of news items, thought-leadership pieces, videos and other digital products to support the Agency’s overall communications strategy. Since its launch in December 2014, the IRENA newsroom has attracted readers from over 190 countries.

156. IRENA continued to grow as a recognised source of reliable renewable energy information for stakeholders. IRENA publications and knowledge products were downloaded 3.3 million times over the course of the biennium. To date, nearly 6,000 websites globally link to IRENA.org for a total of over 200,000 links, 60,000 of which are links from government websites.

157. The 2014-15 biennium also witnessed the beginning of the strategic re-organisation of IRENA’s web properties. The REsource platform launched in 2015 as the Agency’s digital centre for statistics and content aggregation. As a ‘one-stop-shop’ for renewable energy knowledge, REsource aims to improve decision-making, increase awareness and investor confidence, and accelerate the overall deployment of renewable energy technologies worldwide. Building upon the digital knowledge backbone provided by REsource, the transition to a new web infrastructure completed phase one in late 2015 with a public rollout expected to start by the first quarter of 2016. The reconstructed website will streamline the user experience for Members and all stakeholders, thus speeding access to key enabling tools and knowledge products.

158. Reports and papers are an essential element in IRENA’s work to promote renewable energy worldwide. In the 2014-2015 biennium, publications, along with related promotional materials, has become increasingly synchronised with strategic communications goals and IRENA’s online presence. IRENA’s programmes and projects during 2014-2015 (from 01 January 2014 to 30 November 2015) have produced 79 report releases in English, with an additional 23 translations of reports or summaries into other languages (mostly Arabic, Chinese, French and Spanish) to ensure a wider reach. Notable publications during the biennium included the first edition of *REthinking Energy*; the first global *REmap 2030* summary report; the first two editions of

Renewable Energy and Jobs – Annual Review; various analytical reports in support of IRENA’s *Africa Clean Energy Corridor* initiative; a joint brochure with SIDS Lighthouses partners; and a *Power Sector Transformation* package. IRENA’s publications have been anchored in Work Programme commitments as well as building on specific engagement opportunities with countries, regions, partner institutions or specialist stakeholders. Editorial and technical review processes have been refined to ensure clarity and cohesion throughout all of IRENA’s publications and communications efforts. Key findings in IRENA’s publications have continually enriched the Agency’s external communications and outreach.

159. IRENA continuously strives to maximise outreach and impact by making key publications available in various languages. Governing body as well as numerous programmatic meetings and workshops benefited from the provision of interpretation at meetings. IRENA has streamlined the planning and processing of translation work and is compiling a roster of experts and institutions offering support to IRENA with reviewing and proof-reading text, in particular documents containing technical terminology, in order to ensure high quality and standard of translated work. In addition, outreach to international media has been expanded through feeding information to media in different languages.

160. Throughout 2014-2015, the management of IRENA’s programmatic meetings has been consolidated and streamlined to facilitate efficient organisational delivery in implementation of the Work Programme as well as the process of meeting planning and organising. There have been around 130 IRENA meetings and workshops held by IRENA at Headquarters and around the globe, with support provided to organisers and participants alike. The meeting planning and implementation process focuses on the most efficient and cost-effective use of available resources. A regularly updated global renewable energy events calendar is being maintained, comprising meetings hosted by IRENA as well as events hosted by other organisations.

Governing body meetings

161. The Assembly and Council meetings, through their plenary discussions, thematic side-meetings and critical opportunities for high-level, Ministerial interaction, are important platforms to keep the membership abreast of plans for and progress in the various initiatives and activities undertaken. Importantly, these meetings are also an occasion for Members to provide strategic input and guidance on the ongoing and future work of the Agency and on issues of specific importance to them. With time, IRENA’s intergovernmental meetings have become an international platform for decision-makers, including Ministers and other government officials, business leaders and civil society representatives, to discuss matters high on the global renewable energy agenda.

162. Over the past two years, the Secretariat organised two Assembly sessions, four Council meetings with related committee meetings, and is currently preparing for the 6th session of the Assembly. Around 1,000 participants representing the IRENA membership, international institutions and other entities active in the field of renewable energy attend Assembly sessions. Council meetings are attended by approximately 300 country delegates.

163. The Fund for Developing Country Representatives (FDCR) was established by the Assembly at its second session in 2012 to enable, subject to available funds, participation of delegates from Least Developed Countries (LDCs) and Small Island Developing States (SIDS) in IRENA governing body meetings. In 2014 and 2015, the FDCR supported participation of 157 delegates in the fourth and fifth sessions of the Assembly, the seventh to tenth Council meetings, as well as preceding committee meetings. In order to ensure a high level of inclusiveness and participation of all IRENA Members in the Agency’s governing body meetings, it is essential that the FDCR, which is exclusively based on voluntary contributions, continues to be replenished, as the fund frequently faces shortfalls which compromise broad participation of eligible delegates at the governing body meetings of the Agency.

VIII. Administration and Management Services

164. The Administration and Management Services (AMS) Division is dedicated to providing reliable support services to the Agency: by meeting the operational needs of Agency towards the implementation of the work programme.

165. A major activity of the Division in the last several months is the implementation of the Enterprise Resource Planning (ERP) system, which is scheduled to go live during the fourth quarter of 2015 with the Finance and Procurement modules. The ERP, when fully implemented, should lead to increased efficiency with the Agency business processes.

166. The external and internal audits carried out during the year have provided important input and feedback that AMS has incorporated in its ongoing drive to serve the Agency in more efficient ways, with more effective solutions. This has led to the review and updating of policies in the areas of Human Resources Management, Travel, Procurement, Budget and Finance, and Information and Communication Technology. All functions and services will continue to be reviewed and streamlined in order to find more cost effective ways to support the work of the Agency.

Human resources

167. Timely recruitment of staff through a competitive and transparent process remains a priority.

168. Over 13,500 applications were received in response to vacancies announced during 2014 and 2015, with the average number of applicants per vacancy continuing to increase compared to previous years, demonstrating increasing interest in employment with the Agency. The Agency will continue find ways to attract the best candidates for the vacant positions.

169. In addition to the Junior Professional Associate and Internship programmes that enable young professionals to gain experience in the various fields related to renewable energy and other fields supporting the work of IRENA, seven individuals from three countries are serving the Agency under loan and Junior Professional Officer arrangements.

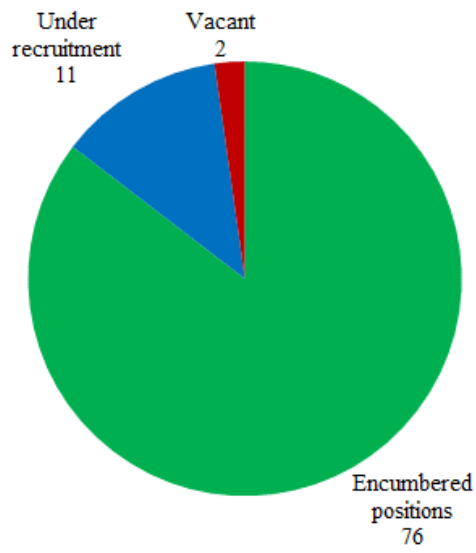
Approved and filled/under recruitment posts by level as of 1 October 2015:

170. Between 1 January 2014 and 1 October 2015, 63 vacancies for Fixed Term and Temporary Appointments and Junior Professional Associates were advertised and more than 13,500 applications were received. Out of 89 core posts, 87 were filled or under recruitment (76 filled and 11 under active recruitment) and two were vacant. The 76 staff under fixed-term appointments are from 41 nationalities, of which 50% are female and 50% are male.

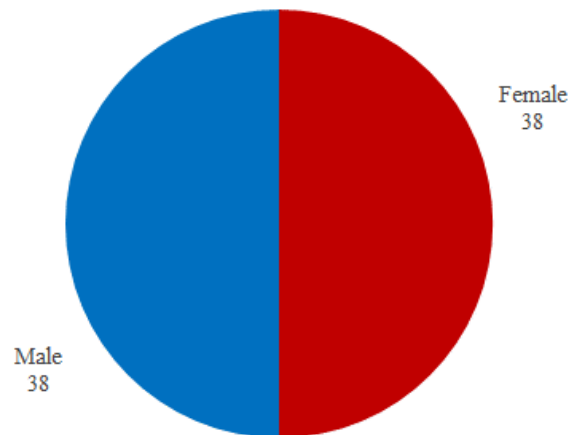
Table 1: Approved and filled/under recruitment posts by level as of 1 October 2015

Level	Approved	Filled or Under Recruitment
ASG	1	1
D-2	1	1
D-1	5	5
P-5	18	16
P-4	15	15
P-3	22	22
P-2/1	3	3
Sub-total Professional and above	65	63
General Services	24	24
Total	89	87

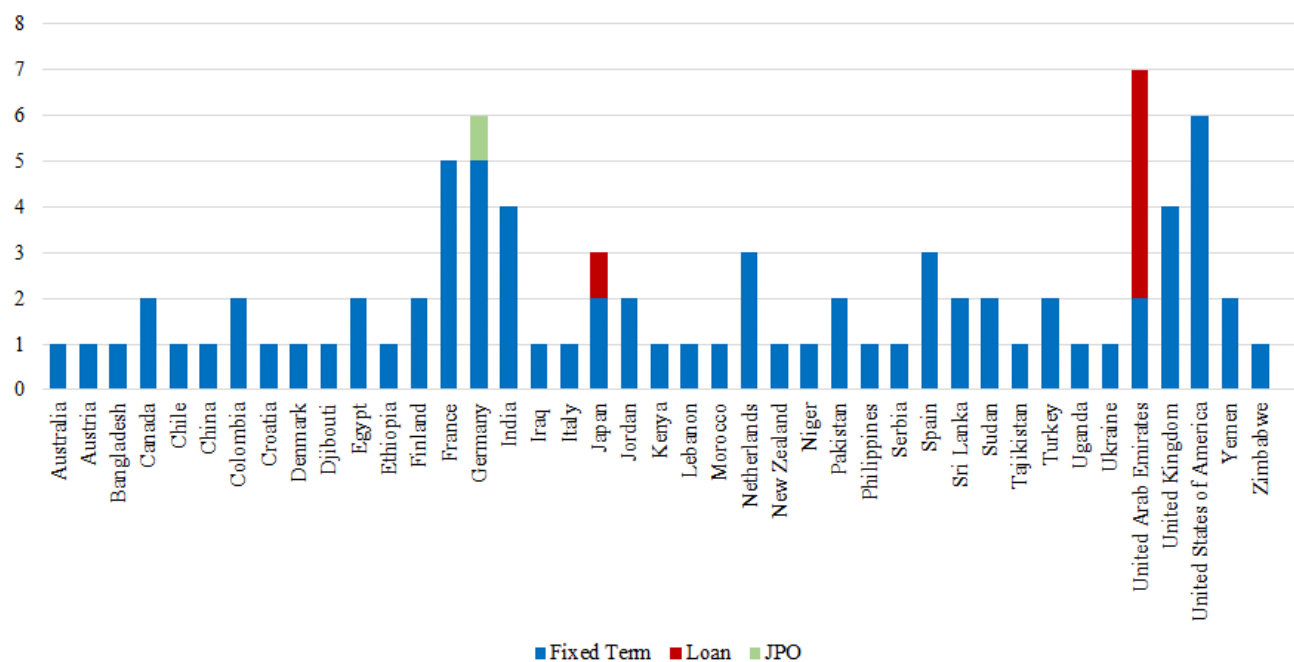
Staffing Status as of 1 October 2015



Gender Balance (based on filled posts) as of 1 October 2015



IRENA Staff Nationalities (based on filled posts) as of 1 October 2015



Junior Professional Officers (JPO) and Loaned Staff

Divisio	Title	Loaned from	JPO
SMED	Liaison and Protocol Officer	UAE	
IITC	Bioenergy Analyst	Japan	
IITC	Programme Officer	UAE	
IITC	Programme Officer	UAE	
AMS	Human Resources Officer	UAE	
KPFC	Programme Officer	UAE	
KPFC	Associate Programme Officer, Data and Information (JPO)		Germany
KPFC	Associate Programme Officer, Policy (JPO)	Under recruitment	Germany

Finance and Budget

171. The Finance Section, comprising the Finance and Budget Units, continued to provide its support services to Members, staff and other internal and external stakeholders. Services include regular follow up with Members for the collection of outstanding contributions, financially supporting the process of registering and allotting Members' voluntary contributions, on-time settlement of vendors and suppliers invoices, and providing regular internal support services including payroll, budget utilisation updates and general advice and support to management in relation to the sound financial management of the Agency.

172. Both the Finance and Budget teams cooperated and collaborated extensively with the Enterprise Resource Planning (ERP) system team for user acceptance testing, data extraction, validation and testing to be migrated into the new ERP system. The expectation is that once the ERP system goes live, coordinated and enhanced financial and budgetary information shall be provided to all users, as appropriate, throughout the Agency, streamlining and harmonising many of the previously manually processed activities and transactions.

173. Following the finalisation of the Agency's financial statements prepared in accordance with the International Public Sector Accounting Standards (IPSAS) for the year ended on 31 December 2014, IRENA received a clean and unqualified audit opinion from the external auditors, which was presented to the ninth meeting of the Council (C/9/6). The external auditor's recommendations were duly acted on: these status updates are being presented to the sixth session of the Assembly (A/6/7).

174. The Finance Section, through the Budget Team, presented continuous support and coordination for the collation, presentation and finalisation of the financial information and data being presented to the sixth session of the Assembly within the Proposed Work Programme and Budget 2016-2017 (A/6/L.4).

Table 1: 2014-2015 Biennium budget utilisation by funding sources (in USD thousands)

	2014-2015 Biennium Approved Budget	Utilisation as at 30 September 2015	
		Commitments and Expenses	Proportion of 2014-2015 Budget
Assessed Contributions (Core Budget)	40,000	38,780	97%
Voluntary Contributions from the UAE:			
Operations	5,800	5,291	91%
Research	5,800	5,266	91%
Governing Body Meetings	3,200	3,050	95%
Sub-total UAE Contributions	14,800	13,607	92%
Voluntary Contributions from Germany:			
Innovation and Technology	9,200	8,594	93%
Sub-total Germany Contributions	9,200	8,594	93%
Total Voluntary Contributions	24,000	22,201	93%
Grand Total	64,000	60,981	95%

Table 2: 2014-2015 Biennium budget utilisation by Thematic Areas (in USD thousands)

Division/Thematic Area	Combined Core and Voluntary Contributions		Budget Utilisation as at 30 September 2015	
	Amount (USD)	Proportion of Total	Amount (USD)	Proportion of Biennium Budget
A. Strategic Management and Executive Direction	12,270	19%	11,625	95%
Governing Body Meetings	3,200	5%	3,050	95%
Subtotal	15,470	24%	14,675	95%
B. Thematic Programme Area				
Planning for the global energy transition	10,816	17%	10,125	94%
Gateway to knowledge on renewable energy	7,624	12%	7,272	95%
Enabling investment and growth	8,252	13%	7,979	97%
Renewable energy access for sustainable	3,393	5%	3,098	91%
Islands: lighthouses for renewable energy	2,972	5%	2,747	92%
Regional action agenda	4,244	7%	4,037	95%
Subtotal	37,301	59%	35,258	95%
C. Administration and Management Services	11,229	17%	11,049	98%
Total Estimated Requirements	64,000	100%	60,981	95%

Procurement

175. The Agency continues to implement its procurement plan in coordination with divisions in order to ensure cost-effective sourcing of goods and services. As of October 2015, approximately 700 contracts and purchase orders, including 37 project agreements, were successfully processed for the amount of USD 15 million. To ensure transparency and competitiveness, procurement opportunities are being posted on IRENA's website and, where appropriate, 11 Long-term Agreements for various services were entered into as of the date of this report. Additionally, the Procurement Policy Manual has been updated and shared with all staff.

Information and Communications Technology

176. IRENA's Information and Communication Technology (ICT) Section provided a broad range of centralised solutions and services to IRENA offices. In addition to core ICT services like email and connectivity, ICT support all Divisions of IRENA in capturing and disseminating data, information and knowledge in support of their work programs through external and internal portals. Further, ICT continues to support internal business processes of all Divisions through custom developed applications and support and also help in external and internal communications and collaborations through IT-enabled solutions.

177. With ICT becoming a business critical resource for the organisation, in order to enhance the availability and resilience of ICT services, IRENA has adopted cloud-based infrastructure and services. IRENA's email system has already been moved to the cloud-based Office 365 platform and the external information management portals were moved to Microsoft Azure Cloud Infrastructure. These two moves are expected to provide the added benefits of improved performance and scalability along with cost savings. Cloud infrastructure provides increased operational flexibility with no major capital investments needed for ICT infrastructure.

178. The Enterprise Resource Planning system (ERP) implementation efforts are advancing to automate the processes and procedures of Finance, Human Resources, Procurement and Travel. User Acceptance Testing for Finance and Procurement has been completed. It is envisaged that the ERP's Finance and Procurement modules would go live during the 4th quarter of 2015, with other modules soon to follow.

Travel and General Services

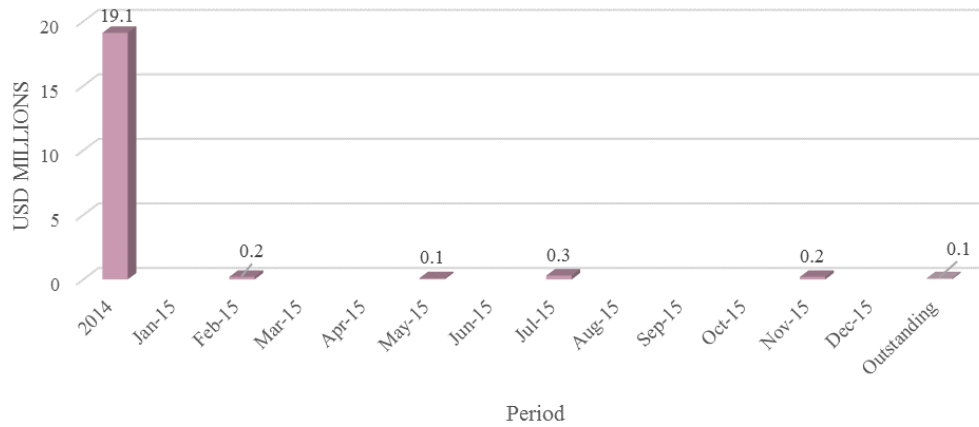
179. Through the Agency's Abu Dhabi and Bonn Offices, the Travel and General Services Section facilitates the travel of staff, delegates, participants of conferences and workshops all over the world. 3,646 various travel services transactions, accommodation and workshops arrangements have been made from January 2015 to end of September 2015

180. The Agency's move to its permanent Headquarters provided by the host country in Masdar City was successfully completed with no interruptions to the implementation of the programme of work and support functions. Facility Management services and procedures will continue to undergo continuous review in order to find ways to improve services.

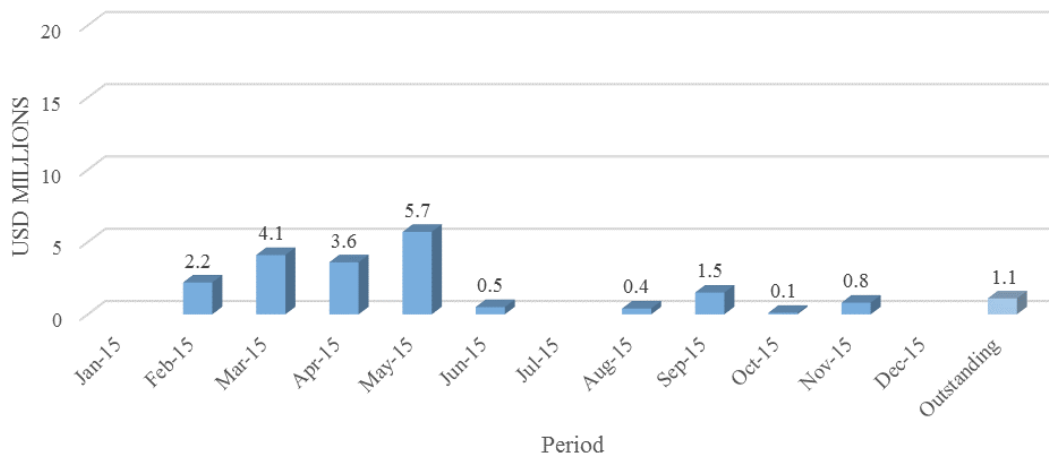
Voluntary Contributions Budgeted, Received and Pledged to date (as of 30 November 2015)

Voluntary Contributions in 2014-15 Biennium		
<i>as of 30 November 2015, in USD</i>		
Budgeted Voluntary Contributions		
	2014-2015 Biennium	
	Commitments	Receipts
GERMANY		
IRENA Innovation and Technology Centre	9,200,000.00	9,200,000.00
UAE		
Operations	5,800,000.00	5,800,000.00
Research	5,800,000.00	5,800,000.00
Governing Body Meetings	3,200,000.00	3,200,000.00
Subtotal UAE Contributions	14,800,000.00	14,800,000.00
Total Budgeted Voluntary Contributions	24,000,000.00	24,000,000.00
Additional Voluntary Contributions		
	2014-2015 Biennium	
Donor/Project	Commitments	Receipts
Belgium/Flemish Government	120,041.17	120,041.17
France	240,000.00	240,000.00
Germany	6,370,945.76	2,738,374.52
Iceland	200,000.00	200,000.00
Japan	1,745,397.58	1,537,877.58
New Zealand	787,500.00	787,500.00
Norway	5,000,000.00	2,000,000.00
Sweden	294,379.99	294,379.99
Switzerland	200,000.00	200,000.00
UAE	189,436.00	189,436.00
Subtotal	15,147,700.50	8,307,609.26
Fund for Developing Countries Representatives		
	2014-2015 Biennium	
Donor	Commitments	Receipts
Germany	98,835.80	68,835.80
UAE	150,000.00	150,000.00
Subtotal	248,835.80	218,835.80
Total Additional Voluntary Contributions	15,396,536.30	8,526,445.06
<i>Note: Contributions under discussion include EUR 3 m from the Government of Germany and EUR 0.9 m from the Government of Luxembourg</i>		

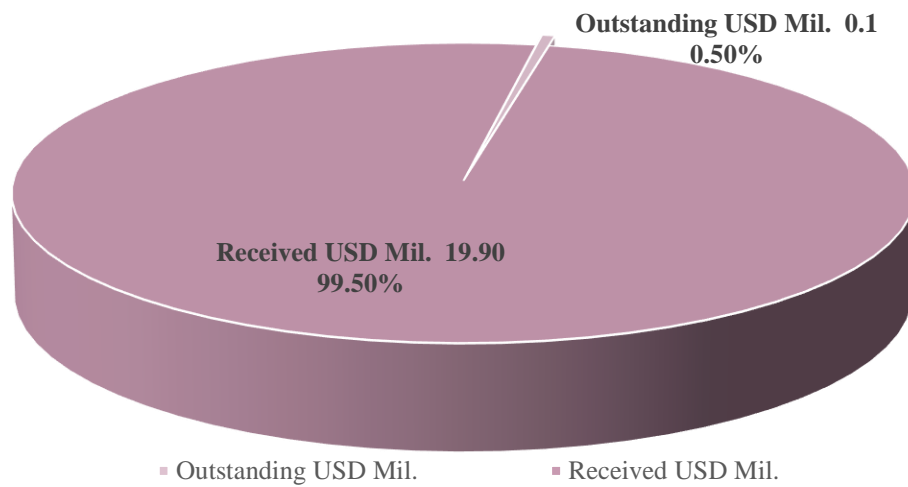
Received and outstanding assessed contributions for 2014 core budget
(as of 30 November 2015)



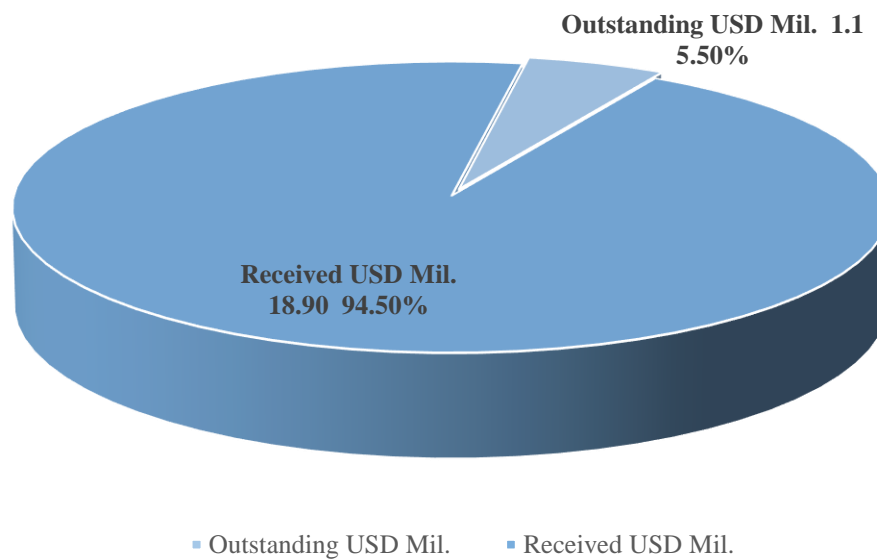
Received and outstanding assessed contributions for 2015 core budget
(as of 30 November 2015)



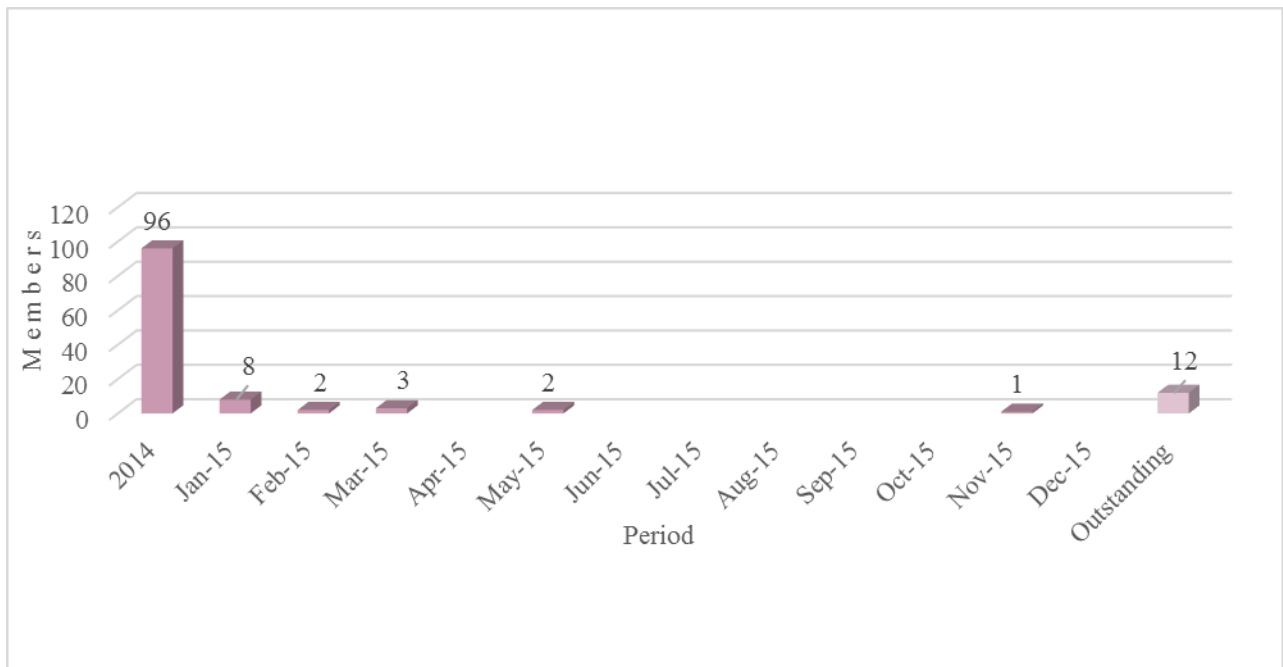
Status of contributions to the 2014 core budget (as of 30 November 2015)



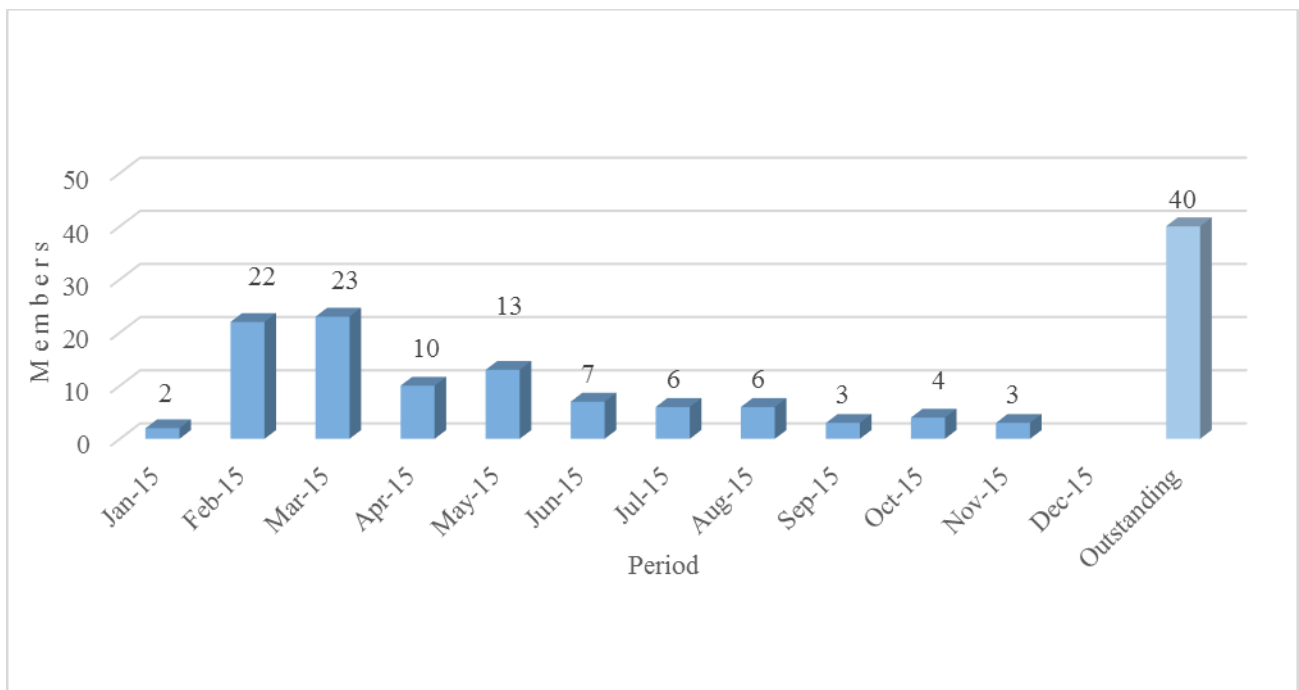
Status of contributions to the 2015 core budget (as of 30 November 2015)



Number of Members with received and outstanding contributions to the 2014 core budget
(as of 30 November 2015)



Number of Members with received and outstanding contributions to the 2015 core budget
(as of 30 November 2015)



Matrix of Thematic Programme Areas Programmatic Activities

Thematic area: Planning for the global energy transition							
Objective: Mainstreaming renewable energy options and strategies in energy plans							
Resources: 10,816 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
SE4ALL Renewables Hub	Established platform for cooperation and concerted action by stakeholders to accelerate deployment of renewable energy	CSP IITC KPFC	Develop the hub function with the participation of all stakeholders, management of IRENA activities and development of a forward looking renewable energy reporting framework for 2030	- Inclusive cooperation framework for all actors, and monitoring and reporting framework for 2030 renewable energy doubling target	ONGOING - Inclusive cooperation framework for all actors, and monitoring and reporting framework for 2030 renewable energy doubling target		
			Support the hub function by developing analysis on the role of women in RE, RE for sustainable livelihoods, and the Nexus	- Develop an analytical approach on the role of women in RE and policy recommendations as input to the conference - Contribute to the SE4ALL Hub on issues related to RE for sustainable livelihood and the Nexus	COMPLETED	- International conference on the role of women in RE	COMPLETED <i>Voluntary contribution from the EC.</i>
			Develop policy recommendations and technical advisory services related to High Impact Opportunities (HIO)			- White papers with concrete recommendations on: 1) enabling legal and regulatory frameworks for scaling up mini-grids; 2) the role of renewable energy in managing peak demand in cities; 3) developing financing solutions for small-scale renewable energy in islands	VC NOT IDENTIFIED
REMAP 2030	Comprehensive and acknowledged roadmap on options and action for doubling the share of renewable energy by 2030	IITC KPFC	Further develop the REMAP 2030 analytical framework and develop guidance on possible pathways, technology and policy options and international cooperation, as well as country and regional analysis, on doubling the share of RE by 2030	- Comprehensive policy and technology roadmap -2nd edition	COMPLETED <i>To be launched Jan 2016.</i>		
				- 2 workshops of national REMAP expert teams	COMPLETED <i>First workshop completed, second workshop scheduled for November 2015.</i>		
				- Development of country action agendas	COMPLETED		

			Establish three REMAP action teams; two on substantive themes (transport, energy efficiency) and one to support the SE4ALL RE hub initiatives	- REMAP - Transport and efficiency roadmap reports	COMPLETED <i>Efficiency and RE roadmap working paper completed and published online in August 2015. Transport roadmap working paper to be launched in Q4 2015.</i>		
				- REMAP/SE4ALL framework for cooperation amongst hubs	COMPLETED <i>Continued coordination of IRENA activities within SE4All network including Director-General as part of Sherpa committee. Close cooperation with C2E2 hub in Copenhagen. G20 has called for SE4ALL action on energy access with an IRENA role.</i>		
			Develop Technology Briefs with concise, policy-relevant and objective information on technology solutions	- 10 additional Technology Briefs for IRENA technology repository	COMPLETED		
			Assess the socio-economic impact of renewable energy deployment in REMAP 2030	- Analysis of the impacts of the REMAP 2030 scenarios on employment, income, energy security, and trade balance	COMPLETED <i>Report "Renewable Energy Benefits: Measuring the Economics" to be launched at the Assembly in January 2016</i>		
REpowering Cities	Increased awareness, partnerships and technical support to local governments on renewable energy options in cities	CSP KPFC	Address energy-related issues in cities by undertaking assessments to identify relevant RE deployment options to complement energy efficiency measures			- Assessment methodology to help local governments prioritise energy efficiency and RE options	VC NOT IDENTIFIED
			Build a systematic approach for expertise and knowledge transfer in waste-to-energy, solar PV and solar thermal, and heating and cooling, through technical assistance and peer-to-peer learning			- A systematic approach to transfer expertise and knowledge amongst cities in specific technology areas, designed and implemented	COMPLETED <i>Voluntary contribution and support from Israel.</i>
			Identify and promote successful renewable energy deployment business models in cities	- A conference to showcase effective business models for deploying RE in cities in partnership with the Global Sustainable Cities Network and Masdar City	COMPLETED		
				- Three workshops to build capacity of entrepreneurs, decision makers, and other key stakeholders in cooperation with Member States	COMPLETED		
			Analyse policies for the deployment of RE in Cities			- Guidelines on policy measures needed to integrate RE at the local level	VC NOT IDENTIFIED

Water, Energy and Land Nexus	Analytical and empirical framework for informed cross-sectoral policy and decision-making in resource-constrained environments	CSP KPFC	Develop an empirical policy framework and deploy an energy-centric tool that will allow policy-makers to empirically assess the impact of renewable energy in the water/energy/land Nexus in specific settings, and to bridge the existing knowledge gaps on the benefits of renewable energy deployment from a Nexus perspective	- A comprehensive, analytical and empirical approach to inform policy-making in designing strategies that emphasise integrated resource management	COMPLETED		
				- Tool for policy-makers to quantitatively assess the impact of RE in the nexus and country case studies to demonstrate it	COMPLETED		
				- Capacity building of the nexus tool	COMPLETED		
Transforming Power Grid Infrastructure	Comprehensive knowledge, resources and guidelines for grid and storage technologies for renewables deployment	IITC	Develop roadmaps on RE grid and electricity storage to facilitate RE integration in different settings	- Two grids & storage technology related workshops to engage stakeholders in the development of roadmaps	COMPLETED		
				- Report on consolidated grid & storage technology roadmaps	COMPLETED		
			Refine IRENA grid-stability assessment methodology, and assistance to countries in the application to facilitate integration of renewables	- Improved and extended IRENA grid-stability assessment methodology and country support in its application	COMPLETED		
			Development of broad knowledge framework for grid, storage and management of variability	- Technical guide(s) with latest developments in RE grid integration technologies, including solutions for storage, smart grids and mini-grids	COMPLETED		
			- Analysis and recommendations on economic and technical feasibility of options of grid and storage technologies for integration of renewables	COMPLETED			
Planning With Renewables	Renewable energy mainstreamed in energy planning, with a focus on the power sector	IITC	Comprehensive overview and assessment of current planning methodologies for RE integration into energy systems	- Report on effective planning methodologies and practices for RE integration into energy systems	COMPLETED		
				- Comprehensive policy-relevant knowledge framework on RE systems integration cost	COMPLETED, ADJUSTED		
				- Two regional workshops on best practices in system planning with RE in LAC and Asia	COMPLETED, ADJUSTED		
				- Cooperation with entities developing modelling scenarios	ONGOING		
			<i>Report "Addressing variable renewables in long term energy planning (AVRIL)" to be released Q4 2015.</i>				
			<i>Merged with RE grid integration costs activity.</i>				
			<i>International Energy Workshop, 3-5 June 2015 (Abu Dhabi)</i>				

Renewables Readiness Assessment and Advisory Services	Countries equipped with knowledge and expertise to implement an enabling policy framework to upscale renewable energy deployment	CSP IITC	Facilitate RRAs, a country-driven process for assessing key policies, potentials and technologies for renewable energy deployment and the actions necessary to create an enabling policy and decision-making framework in Africa, Asia-Pacific, the Middle East and North Africa (MENA), and Latin America and the Caribbean (LAC)	- Facilitate the RRA process upon request in 10 member states. Five (5) RRA reports are published in 2014 and five (5) in 2015 - Design and operationalise an effective approach to utilise the expertise offered by Renewable Energy Policy Advisory Network (REPAN) in RRA and other IRENA programmes	COMPLETED	- Facilitate the RRA process upon request in additional member states.	COMPLETED <i>Funding provided by Norway and through partnerships with GIZ, USAID, WB and UNDP). RRAs completed in the Philippines, with a further 6 RRAs in progress (Antigua and Barbuda, Bahamas, Egypt, Pakistan, Tanzania, and Zimbabwe).</i>
			Utilising IRENA's knowledge base and technical expertise, provide in depth, targeted technical advisory services upon request in resource assessments, legal and regulatory frameworks, implementation of standards and quality assurance mechanisms, structuring public-private partnerships, and RE technology deployment frameworks such as small hydro development in Latin America, biomass co-generation, solar and wind in Caribbean and Africa	Advisory services on standards and quality assurance and enabling frameworks for deployment of renewables provided Best practices in financing small hydro disseminated	COMPLETED	- Advisory services on structuring public-private partnerships and resource assessments provided	COMPLETED <i>Additional funding provided by the Government of Norway. Advisory services on structuring public-private partnerships and resource assessments provided Capacity building on enabling policy and regulatory framework to promote RE investment through first Africa Renewable Energy Training Week held in Oct 2015 in Tanzania.</i>

Thematic area: Gateway to knowledge on renewable energy							
Objective: Renewable energy knowledge accessible to all							
Resources: 7,624 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
Knowledge Gateway	Authoritative, freely accessible global knowledge on renewable energy	KPFC	Design of the structure and launch of the Knowledge Gateway platform	- Web-based Knowledge Gateway platform	COMPLETED	- 2 outreach workshops to seek partnerships with other knowledge organisations	COMPLETED Funding provided by the Government of Norway.
			Integration of additional data and information from IRENA projects and external sources into the platform	- Wider range of data and information available through the Knowledge Gateway	COMPLETED <i>Agreements with IEA and REN21 signed. A survey to analyse the end user profile is ongoing.</i>	- Introduction of the Open Link Data to include data from third parties	COMPLETED <i>Additional funding provided by the Government of Germany.</i>
REthinking Energy (Institutional Publication)	Informed global debate on the transformative potential of renewable energy technologies to address rising global energy challenges	KPFC	Identify themes, research and produce two editions of the annual REthinking Energy publication	- Second and third editions of REthinking Energy publication	COMPLETED, ADJUSTED <i>First edition was launched in September 2014. Second edition published in November 2015, with focus on climate change. Third edition in 2016.</i>		
Renewables statistics	Solid foundations established for the most complete, up-to-date and freely accessible global renewable energy statistics database with high quality data	KPFC	Collection and standardisation of RE data from countries and secondary sources	- Data collected from member countries and secondary sources, standardised, validated and posted online	ONGOING <i>Second round of data collection completed. Capacity data printed and available online.</i>		
			Improvements to RE data accounting methodologies	- Guidebook on practical approaches to RE accounting and reporting	IN PROGRESS, DELAYED <i>Consultation on content completed. Terms and definitions document completed. Bioenergy manual delayed to Q2 2016 to allow for publication of terms and definitions and development of RE statistics training materials.</i>		
The Global Atlas	Enhanced global awareness of renewable resource potentials and policy-makers enabled to make informed planning decisions	IITC KPFC	Expand the coverage of the Global Atlas to all 6 renewable energy sources (solar, wind, bioenergy, geothermal, hydropower, marine energy)	- Global Atlas interface and data infrastructure upgraded to accommodate maps for five renewable energy sources	COMPLETED	- Global Atlas interface and data infrastructure includes maps for marine energy	VC NOT IDENTIFIED
				- Data quality framework (quality, validation and limit of use of the data) developed and implemented in the entire Atlas	COMPLETED		

			Capacity building for energy planners and policy-makers on the use of spatial planning techniques for energy systems planning and policy making, as well as beginning the integration of the Atlas and Costing work			- Develop a practical capacity building module targeted at energy planners and policy-makers	COMPLETED <i>Funding provided by the Government of Flanders (Belgium) and the Government of Germany. Sessions held in Tanzania, Egypt, Peru and the Philippines.</i>
				- Detailed guidebook on the methods used for mapping renewable energy potentials	COMPLETED, ADJUSTED <i>Scope change to case studies and focused on methodology.</i>		
			Facilitation of resource measurement campaigns	- Upon countries request, scope the need for technical assistance and seek for possible resources and technical partnerships to initiate measurement campaigns	COMPLETED		
IRENA Renewable Energy Learning Partnership (IRELP)	Freely accessible renewable energy education and training database enriched with career opportunities and guidance, and best practices for long-term education strategies	KPFC	Establishment of an online forum to facilitate the development of renewable energy curricula by stakeholders	- Launch of the online forum and establishment of an online community	COMPLETED		
			Expansion of the renewable energy career centre	- Develop and expand the career centre and provide information on RE job opportunities and links with employers and employment agencies	COMPLETED - Develop and expand the career centre		
			Cooperation with partners to increase access to and awareness of renewable energy education and training	- Joint promotion of renewable energy education, training and tools worldwide	COMPLETED		
RE Policy and Best Practice: Status and Trends	Global reference repository of renewable energy policies, regulations and best practice	KPFC	Analysis of policy status and trends based on standardised information on renewable energy policies and measures from Members	- Contents of the policies and measures database updated on a biannual basis and expanded through cooperation with leading RE policy database providers	COMPLETED		
				- Annual report on status and trends in renewable energy policy	COMPLETED, ADJUSTED <i>A report on status and trends in RE policy with a focus on Latin America was launched in June 2015, supported by country-specific case studies conducted end of 2014.</i>		
			Systematise best practice and case studies on renewable energy deployment	- Case studies and best practice information integrated in the Knowledge Gateway	COMPLETED		
Renewables: The True Costs	Authoritative and comprehensive information and analysis of the true cost	IITC	Renewable Costing Alliance and expansion of the IRENA Renewable Cost Database to become the most comprehensive resource on renewable energy costing	- Launch and operation of the Alliance, substantially expanding the Cost Database and improving the quality of data available	ONGOING <i>20 new Alliance members. Discussions underway with 50 public and private organisations.</i>		

	competitiveness of renewables globally to help shape national and global debates, and global analysis of real cost issues and clear policy recommendations and tools to accelerate renewables deployment.		Up-to-date analysis of the improved cost competitiveness of solar PV compared to local retail electricity prices	- Quarterly report on PV parity evolution for 10 countries	ONGOING <i>Highly detailed model for PV Parity Indicators developed, with access to 750,000 cost data points for small-scale solar PV. PV parity evolution is reported through the IRENA Quarterly Newsletter.</i>		
			Expansion of IRENA Costing Reports to cover the entire spectrum of energy uses	- Three RE cost reports: Updated power generation, marine/aviation/rail transport, grid integration technologies, RE integration systems costs	IN PROGRESS, ADJUSTED <i>Cost of Renewables for Power Generation launched January 2015. Marine costing merged with RE for shipping technology brief. RE integration systems cost merged with RE grid integration costs activity. Africa solar PV cost reduction opportunities in preparation (Q3 2015). Report on industrial, residential and commercial stationary applications in preparation (Q1 2016). Power generation cost reduction report scheduled for Q1 2016.</i>		
Global investment dynamics	Solid global resource of RE investment information and financial flows, accessible to all, showcasing global investment dynamics and potential sources of financing	KPFC	Complementing information on renewable energy investment by developing standardised data on gaps identified, including small-scale renewable energy applications and a mapping of sources of possible financing for project developers	- Collection of targeted investment data to support policy-makers and IRENA analyses	COMPLETED <i>Data set has been launched on REsource.</i>	- Analysis of renewable energy investment flows, highlighting investment trends and gaps and business models	IN PROGRESS <i>Additional funding provided by the Government of Norway. Study to be published in 2016.</i>
				- Methodological paper establishing a framework for comprehensive renewable energy investment flows data collection	COMPLETED <i>To be published in 2016</i>		
Coalition for Action on Public Support to RE	Global coalition effectively disseminating authoritative, consistent, and unified messages on RE	KPFC	Operationalise the Coalition for Action on Public Support to gather and disseminate effectively renewable energy facts and analysis in collaboration with major RE advocates in industry and civil society	- Establishment of the structure, operational mode and strategy of the Coalition for Action	COMPLETED		
				- Formation of a network of RE public information experts	COMPLETED		
				- Development of innovative mechanisms for dissemination of information	COMPLETED		

Thematic area: Enabling investment and growth							
Objective: Improving policy frameworks and enabling market conditions for accelerated deployment of renewable energy							
Resources: 8,252 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
Policy assessment	Contribution to the global debate and increased awareness of policy options in a dynamic energy market	KPFC	Assess the key challenges faced by policy-makers in adapting to the structural changes in the energy sector (specifically changing ownership structures), analyse best practices in adopting effective measures and provide recommendations	- Analysis of the impact of the changing market dynamics, including ownership structure, in the energy sector on RE deployment and policy adaptation measures	COMPLETED <i>Report to be published in Q1 2016</i>		
Regional Market Analysis	Enhanced global knowledge of policy options for opening energy markets to renewable energy investment	KPFC	Analyse regional markets for the deployment of RE in two regions, identify best practices of several countries and formulate recommendations	- Regional assessment of status and trends in the LAC region to draw policy lessons, identify best practices and help leverage potential synergies	COMPLETED	- Regional workshop and outreach to discuss and disseminate the results of the LAC assessment	VC NOT IDENTIFIED
				- Regional market assessment of policies and trends for RE in the GCC, including best practices on policy, regulatory and administrative frameworks facilitating the transition to clean energy systems	COMPLETED <i>Regional market assessment of policies and trends for RE in the GCC</i>	- Regional workshop and outreach to discuss and disseminate the results of the GCC assessment	VC NOT IDENTIFIED
ireValue: Social, Economic and Environmental Impacts	Unique knowledge platform on socio-economic and environmental impacts empowers policy-makers and increases public awareness with relevant analysis and information	KPFC	Develop the knowledge framework on socio-economic impact of renewable energy deployment (income, trade balance, energy security) of RE deployment for solar, wind and off-grid applications. With partners, carry out studies that analyse experiences and best practices from different countries and regions that will focus on the adoption of policies that maximise value creation and the dissemination of existing tools that allow policy-makers to empirically assess selected socio-economic impact	- Re Jobs - Comprehensive and authoritative analysis on the status and trends of renewable energy jobs drawing from the IRENA data collection on jobs	COMPLETED <i>2014 and 2015 edition</i>		
				- Report on the socio-economic impacts of large-scale as well as off-grid renewable energy technologies	COMPLETED <i>Report on the socio-economic benefits of solar and wind - econValue report 2014</i>		
						- Dissemination of tools and methodologies to estimate the socio-economic impacts of renewable energy deployment	COMPLETED <i>Funding provided by the Government of Germany.</i>
						- Formulation and dissemination of best practices on end of life treatment of PV modules	COMPLETED <i>Funding from the Government of Germany. Joint Report with IEA PVPS.</i>

Energy Pricing	Increasing investment in renewable energy by developing guidelines and approaches to optimal energy pricing frameworks and reforms required in current policies	KPFC	Analyse energy pricing frameworks under specific market conditions, with the objective of developing recommendations for economically, socially and environmentally optimal pricing that enables renewables technologies to be effectively integrated in decision-making	- Contribution to MENAREC 6 in Libya in May 2014 through an analytical framework for North Africa	IN PROGRESS, DELAYED <i>MENAREC6 has been postponed to Q1 2016. Draft report has been finalised.</i>		
				Report on the impact of energy pricing on renewable energy deployment in GCC countries	COMPLETED <i>Regular consultation with major stakeholders on energy pricing and deployment opportunities. This was integrated into the GCC market analysis.</i>		
						- Development of guidelines and approaches on energy pricing	VC NOT IDENTIFIED
RE finance	Enhanced understanding of risks and innovative mitigation options and tools to develop bankable projects to facilitate renewable energy investment	IITC KPFC	Analyse risk and evaluate risk mitigation instruments in renewable energy investment	- Report classifying the risks, identifying the gaps in risk mitigation and evaluating the performance of existing risk mitigation instruments	COMPLETED, ADJUSTED <i>Work has been consolidated. Report has been finalized to be released in Q1 2016, with expanded scope.</i>		
						- High-level meeting about risk mitigation, including political and technology risks	VC NOT IDENTIFIED
				Develop technology- and region-specific modules for the IRENA project development tool, the "Project Navigator"	- Expansion of the navigator to include additional technologies (Biomass, Concentrated Solar Power, Geothermal and Hydropower) and region-specific aspects (financial sources, regulatory, policy and technical aspects required for project development)	IN PROGRESS <i>Wind - Online Utility PV - final draft Small PV - Contract Signed Minigrids - Contract awarded Small Hydro - Agreement reached with JICA, guidelines under development Geothermal, Bioenergy Requisition in place, tender started Regional adaptations: India, SIDS, West Africa</i>	
	Validate and refine the Project Navigator tool by carrying out 7 pilot studies	- Refined Navigator based on the results of 7 pilot projects in collaboration with partners (ADFD, Pacific Fund)	COMPLETED, ADJUSTED <i>- Refined Navigator based on the results of 7 pilot projects</i>				
Cooperation with the Abu Dhabi Fund for Development	Investments in projects with replicable and/or innovative business models that promote energy access in developing countries	KPFC	Support the implementation of two project cycles of the IRENA/ADFD project facility	- Annual award of approximately USD 50 million for projects under the IRENA/ADFD project facility	COMPLETED, ONGOING		
Quality Assurance and Standardisation	Higher investor confidence through development of	CSP IITC	Operationalise standards and quality assurance mechanisms tailored to the needs of IRENA Members	- Technical advice to regional initiatives on quality assurance for RET - regional studies and workshops	COMPLETED		

	authoritative information and advice on standards and quality assurance		Develop best practices and recommendations on quality assurance for selected RE technologies	- Report on development and implementation of quality assurance mechanisms for three renewable energy technologies, including solar domestic hot water and off-grid PV systems	IN PROGRESS <i>Reports on Solar Water Heaters, Small Wind Turbines, Electricity Grid Codes finalised with expected release by end of 2015. A further report on PV systems in progress.</i>		
			Develop and operate a Standards and Patents information platform	- Expansion and improvement of web platform for RE standards and patents	COMPLETED		
			Develop competency standards for trainings to certify installers in renewable energy technologies through a consortium of technical institutions, industry associations and forums of leading practitioners	Establish a global collaboration for a recognised certification scheme of renewable energy technology installers – starting with solar PV Preliminary competency standards developed for solar PV installers certification training	COMPLETED <i>MoU signed between IRENA and UEMOA. ECREEE committed to hosting the Regional Certification Provider. The preliminary competency standards will be finalised (Job Task Analysis document in its final phase) by the beginning of Dec 2015.</i>		
			Assist countries in adopting and implementing certification of renewable energy technology installers through national and regional technical institutes			- Dissemination of the certification scheme for solar PV installation and operation	COMPLETED <i>Implemented in partnership with UEMOA and ECREEE.</i>
Innovation and Research, Development and Demonstration (RD&D)	Enhanced innovation through international cooperation and streamlined national RD&D plans	IITC	Analyse the policy framework for optimal technology deployment and provide advice for successful diffusion of modern RE technologies in developing countries	- Assessment of options for modern biomass in Africa and advanced biofuels in Asia	IN PROGRESS, DELAYED <i>The Africa study will be published by Q4 2015; however, country coverage has been reduced to three countries for this year due to delay. For Asia study, scope was set for lignocellulosic biofuel in SE Asia, with expected release Q1 2016.</i>		
			Map and analyse the gaps for and benefits of collaborative RD&D on RE technologies in regions and RD&D planning	Regional assessments on collaborative RD&D for RE in Africa, Eastern Europe and Central Asia Advice on national RD&D programming upon request	COMPLETED, ADJUSTED <i>South-south cooperation between Brazil and Africa for biofuels production has been assessed. Study to be published in Q4 in Latin America: IRENA will co-organise a workshop in Ecuador, November 2015.</i>		
			Analysis of future technologies and potential for deployment in markets to match new energy needs with innovative and cost-effective RE solutions	- Studies on innovative RE technologies, including advanced biofuels, new electricity storage, mini-grid, floating off-shore wind	COMPLETED <i>Electricity Storage analysis has been incorporated in the published study "Battery Storage for Renewables: Market Status and Technology Outlook". Studies on advanced biofuels and mini-grids</i>		

					<i>finalised, in process of publication, and offshore wind study in process to be completed by end of 2015.</i>		
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Thematic area: Renewable energy access for sustainable livelihoods							
Objective: Contributing to sustainable livelihoods through access to renewable energy							
Resources: 3,393 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
IOREC platform	Scaling up off-grid renewable energy deployment by providing the platform for stakeholder engagement on a global level	KPFC	Support enabling frameworks for off-grid renewable energy deployment	- Second International Off-grid Renewable Energy Conference and Exhibition and associated activities within the IOREC platform	COMPLETED		
				- Regional workshop with practitioners and public institutions responsible for rural electrification on barriers and solutions	COMPLETED		
Mini-Grids	Enabling conditions for renewable energy-based mini-grid deployment to shift the paradigm for universal energy access	CSP KPFC	Facilitate a consultative process and develop an analytical framework to increase RE mini-grid deployment	- Recommendations on policies and regulatory measures to support renewable energy-based mini-grid deployment	COMPLETED <i>Report draft will be finalised by Q4 2015</i>		
			Build a public-private partnership to promote hybrid mini-grids	- Preparation of site-specific business models for 6 sites, including recommendations on financial mechanisms, local stakeholder base and key steps required for implementation of demonstration projects	COMPLETED		
			Build a cross-cutting mini-grid initiative focusing on policy, regulatory, finance and business models in collaboration with well-established implementing and financing institutions including the private sector	- Four analytical country studies focusing on the policy and regulatory frameworks necessary to promote investments in mini-grids, including follow up for designing implementation strategies	COMPLETED, ADJUSTED <i>Scoping of capacity needs for enhancing the deployment of RE mini grids in the ECOWAS region undertaken in partnership with ECREEE. The outcome will provide for a capacity building action plan. Study has been initiated and consulting team will provide for a first draft by end of 2015.</i>		
			Build capacity of policy-makers and entrepreneurs to deploy renewable energy mini-grid at scale	- Capacity needs assessment in one region and two training workshops on enabling frameworks and business model delivery	IN PROGRESS, DELAYED, ADJUSTED <i>A scoping study has been undertaken which looks into the potential of biomass power generation for off-grid power in West Africa.</i>	- Capacity needs assessment and training workshops on enabling frameworks and business model delivery in additional regions	COMPLETED

Off-grid for Niche Applications	Accelerated deployment of off-grid renewable energy solutions in isolated communities and urban areas	CSP	Assist countries, upon request, in developing deployment strategies and facilitate knowledge exchange on off-grid renewable energy technologies in rural and remote settings	- Expert training workshops conducted for off-grid applications for productive use (e.g. solar pumping and micro-hydro)	COMPLETED, ADJUSTED <i>Missions to Jordan, providing technical support to UNHCR in developing RE solutions for refugee camps.</i>		
			Partner with private sector actors with regional or global presence to design and implement a plan to showcase renewables technologies for off-grid applications in urban and peri-urban areas			- Implementation strategies for off grid designed with private sector players	VC NOT IDENTIFIED
Capacity Building for Entrepreneurs	Increased renewable energy deployment through greater financial and technical assistance to SMEs	CSP	Support SMEs by creating expert groups to provide guidance to RE entrepreneurs on identifying business opportunities	- Expert groups established	COMPLETED		
			Support business incubation centres and facilitate sharing of experience among similar institutions across regions	- Facilitate experience sharing between business incubation centres and similar institutions across regions	COMPLETED		
			Build capacity of financing institutions to assess technology risks in developing countries	- Two webinars to build the capacity of public service officials for developing proposal for funding	COMPLETED	- Two training workshops for financing institutions to build capacity to assess technology risks and provide best practices to structure lending to RE project	COMPLETED <i>In partnership with India incubation centres, UK AID and DFID.</i>

Thematic area: Islands: lighthouses for renewable energy deployment							
Objective: Island energy systems transformed through renewable energy							
Resources: 2,972 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
GREIN	Improved knowledge of solutions and conditions for investment in renewable energy applications on islands	CSP IITC	Establish and support of 6 GREIN clusters	Clusters on resource assessment, waste-to-energy, desalination, roadmaps, grids and tourism established and operational Report on settings for success in implementing renewables on islands	COMPLETED		
			Assist islands in the development of their Renewable Energy Roadmaps	- Technical assistance provided for island roadmaps	COMPLETED		
			Analyse islands' grid stability for the integration of a higher share of renewable energy upon request	- Advice to island utilities on how to maintain grid stability with high shares of variable renewables results in accelerated deployment	COMPLETED <i>Grid stability study for Samoa provided the recommendations to operate power system with planned 14 MW of solar PV and 0.5 MW of wind power. A second study was requested by the government of Samoa to analyse technical options allowing it to achieve 100% RE. Grid stability study for Aitutaki is being used by the Cook Islands Renewable Energy Department in their roadmap for the implementation of RE projects to achieve 100% RE by 2020. Grid stability study for Antigua provided the public utility APUA with the technical knowledge and awareness of technical changes to operate the system with the planned 9 MW of solar PV and 18 MW of wind power. Awareness among local experts about the importance of planning for RE integration was increased and communication among stakeholders facilitated, as a consequence new request from the government to facilitate long term planning process have been discussed</i>		

			Demonstrate the business case for investments in renewable energy in the tourism sector	- RE audits completed in 9 islands	COMPLETED, DELAYED, ADJUSTED Energy Service Company (ESCO) Capacity assessment currently undertaken in 9 islands of the Caribbean region and will be completed by Dec 2015. Collation of 20 case studies of best practices and RE deployment currently ongoing in 9 islands of the Caribbean region and will be completed in Dec 2015. Collation of 20 case studies of best practices in 9 islands of the Pacific region to be undertaken in Nov and will be completed by Dec 2015.		
			Demonstrate the business case for waste-to-energy and desalination systems	- Cost/benefit analysis for waste-to-energy and desalination systems on islands with projected payback periods	COMPLETED		
			Assist islands to develop renewable energy resource assessment strategies	- Guidebook for detailed wind resource measurement on islands	COMPLETED		
Partnerships for Action in SIDS	Strengthened partnerships to advance renewable energy deployment in SIDS	IITC	Showcase opportunities for RE deployment through IRENA activities on islands as a contribution to the SIDS Conference in Samoa	- Contribution to the Conference and building partnerships for action with islands and development partners	COMPLETED Contribution to Samoa Conference	- Follow-up on renewable energy-related outcomes of the Conference	COMPLETED Funding provided by Government of Germany and Government of Norway. SIDS Lighthouses Initiative developed, launched and operationalised.
Building Capacity in Islands	Improved capacities to meet national renewable energy targets and attract investments in SIDS	CSP	Implement the on-going IRENA capacity building initiatives in Pacific SIDS	2 training workshops on policy and regulatory frameworks 3 training workshops and follow-up technical assistance for financing institutions	COMPLETED		
			Assist island States to create a pool of certified technicians	- One training workshop to certify renewable energy engineers and technicians	COMPLETED	- Additional training workshops to certify renewable energy engineers and technicians	COMPLETED, ADJUSTED Consolidated under Lighthouses. Funded by Governments of Germany, New Zealand and Norway.
			Provide targeted technical assistance to SMEs in the Caribbean to deploy renewable energy technologies	- Training workshops for SMEs in Caribbean and AIMS islands	IN PROGRESS, DELAYED		

Thematic area: Regional action agenda							
Objective: Regional integration with increased shares of renewables to meet energy needs							
Resources: 4,244 (USD thousands)							
Component	Impact	Division	Activities	Deliverable (2014-2015)	Status	Deliverable (subject to additional voluntary contributions)	Status
Africa Clean Energy Corridor	Growing renewable power deployment and investment in Eastern and Southern Africa strengthens economic growth, job creation and energy access	CSP IITC KPFC	Implement the action agenda for the Clean Energy Corridor formulated in close consultation with regional and national stakeholders	- Identification and analysis of renewable power development zones and associated transmission corridors in Eastern and Southern Africa Power Pool countries	COMPLETED		
			Support country and regional planning processes and identify potential renewable power development zones	- Workshops to promote integrated resource planning of generation and transmission facilities in the Eastern and Southern African Power Pool countries	COMPLETED		
			Forge regional consensus on long-term needs for new generation and transmission capacity needed to harness renewable energy	- Agreement reached on long-term needs for generation and transmission capacity	COMPLETED		
			Assist countries and regional entities to develop enabling regulatory frameworks	Recommendations for harmonised regulatory frameworks to promote renewable power investment and trade Workshops on market and regulatory frameworks to encourage the market entry of renewable power sources in Africa	IN PROGRESS <i>Regulatory Empowerment Project under implementation through a project agreement with RERA. First Regulators Training Week organised in Jan 2015. First Africa RE Training Week organised in Tanzania in Oct 2015.</i>		
			Build the capacity of policy-makers, utilities, grid operators to incorporate increased shares of variable renewable power	Capacity building workshops to help power pools in Africa assess the options for renewable power development zones Capacity building workshops to help transmission utilities in Eastern and Southern Africa Power Pools operate power grids with a diversified mix of renewable power plants	COMPLETED		
			Assess financial models and mechanisms for lowering the cost of capital	Recommendations on implementable mechanisms to lower the cost of finance Dissemination of strategies for reducing costs of capital for renewable power options in Africa through workshops	COMPLETED, ADJUSTED <i>A study was completed, with inconclusive findings and some data subject to confidentiality, so not fit for publication. The findings of the above study have been disseminated internally, and integrated into RE Finance activities and advisory services.</i>	- Workshops and outreach activities to strengthen the engagement of the donor community and the private sector in the Africa Clean Energy Corridor	COMPLETED <i>Funding provided by the Government of Norway.</i>

Central America Clean Energy Corridor	Integrated power market for renewables in Central America taking advantage of regional scale economies	CSP KPFC	Identify opportunities for accelerated renewable power development in SIEPAC with a focus on transmission infrastructure and regulations	Report on gaps and opportunities for renewable power development, including gaps in financing Convene stakeholders to discuss key actions for zoning, planning & enabling markets and finance that could help overcome the barriers Assessment of regulatory frameworks to promote investments, trade & long-term contracts	COMPLETED <i>Focus adjusted based on stakeholder feedback</i> <i>Meetings and workshops held with key stakeholders, leading to development of a new strategy for the Clean Energy Corridor for Central America (CECCA). The strategy has already undergone a public review process in the region. Official endorsement by Central American energy ministers will take place by the end of 2015.</i>	
			Identify potential zones for concentrated renewable power development and links with the SIEPAC transmission corridor	Identification and analysis of renewable power development zones and associated transmission corridors Workshops to promote integrated resource planning of generation and transmission facilities in the Central American Electrical Interconnection	COMPLETED, ADJUSTED <i>Focus adjusted based on stakeholder feedback. A new strategy for the Clean Energy Corridor for Central America (CECCA), to be implemented throughout the following biennium. Within the strategy, further scoping on zoning has been proposed for 2016-17.</i> <i>After thorough consultation with stakeholders in the region, the new CECCA strategy responds to the main pressing needs, which will be addressed by its Capacity Building and Enabling Frameworks pillars.</i>	
			Build the capacity of power pools, utilities and regulators to plan and operate grids with a diversified mix of renewable power	Capacity building workshops to help power pools assess the options for renewable power development zones Capacity building workshops to help transmission utilities in Central America operate power grids with a diversified mix of renewable power plants	COMPLETED, ADJUSTED <i>Focus adjusted based on stakeholder feedback. Technical capacity building workshop held in El Salvador February 2015.</i> <i>5-day workshop held in Madrid, Spain on 5-9 Oct 2015 on the operation of systems with high shares of variable renewable energy. Held with the Spanish Transmission System Operator (TSO), REE, imparting its experience, with participants from the TSOs of all Central American countries connected to the SIEPAC transmission line, as well as the regional operator and regulator.</i>	- Workshops and outreach activities to strengthen the engagement of the donor community and the private sector in the Central America Clean Energy Corridor

<p>Emerging Regional Clean Energy Corridors</p>	<p>Effective regional frameworks of cooperation to increase the share of renewables in power grids</p>	<p>CSP KPFC</p>	<p>Support Southeast Asian countries to exploit renewable resources in the region through the on-going integration of the ASEAN Power Grid</p>	<p>Reports on gaps and opportunities for renewable power development in Southeast Asia, Middle East and North Africa, and Central Asia Three regional workshops to develop work plans to support the integration of renewable energy options into the grid, with power pools, utilities, regulators and other stakeholders</p>	<p>IN PROGRESS <i>Greening ASEAN power grid: ASEAN Position Paper has been finalised and used as a communication document with the ASEAN countries. Discussion ongoing with ASEAN Center for Energy and HAPUA on co-developing the action agenda building on the strategic and technical consultations, and also co-developing ASEAN Renewable Energy Outlook.</i> <i>Pan Arab Clean Energy: Gap analysis study initiated to identify priority actions of the regional programme to support RE deployment in the Maghreb region. Consultations held in Tunisia, Algeria and Morocco held in May and June 2015 to discuss the preliminary findings of the gap analysis study with major national and regional stakeholders. Gap analysis report to be finalised by Dec 2015.</i> <i>Consultations initiated with Central Asian countries and regional players to identify key elements of a regional approach to support RE development in Central Asia.</i></p>	<p>- Workshops and outreach activities to strengthen the engagement in the Emerging Regional Clean Energy Corridors</p>	<p>COMPLETED <i>Voluntary contribution from Japan, The proposal of initiating "Greening ASEAN Power Grid" was presented to, and accepted by ASEAN Senior Officials on Energy during the ASEAN Energy Ministers Meeting. A regional technical consultation workshop has been planned jointly with IRENA's regional partners including Heads of ASEAN Power Utilities/Authorities and ASEAN Center for Energy, under the auspices of the ASEAN Secretary.</i> <i>A technical consultative workshop held in Sep 2015 in Abidjan for initiating the expansion of the Africa Clean Energy Corridor activities to West Africa.</i></p>	
<p>Empowering through partnerships</p>	<p>Enhanced knowledge and skills to design and implement renewable energy policies and projects</p>	<p>CSP</p>	<p>Build an active interface, in different renewable energy technologies, between countries, to share experiences and know-how to overcome barriers and attract investments</p>		<p>Identification of 2 training institutions/organisations in Member countries to deliver targeted trainings in partnership with IRENA 2 practical training sessions for technicians for early stages of the supply chain</p>	<p>COMPLETED</p>	<p>Identification of additional training institutions/organisations in member countries to deliver targeted trainings in partnership with IRENA Additional practical training sessions for technicians for early stages of the supply chain</p>	<p>VC NOT IDENTIFIED</p>
			<p>Develop capacities of key stakeholders to design and implement legal and regulatory frameworks for geothermal deployment</p>			<p>- Technical assistance in geothermal law and regulations in Latin America and Caribbean, Asia and Africa</p>	<p>COMPLETED</p>	

			Form a global IRENA Resource Network that supports various renewable energy projects in their countries	- (Global IRENA Resource Network that supports various renewable energy projects in their countries)	COMPLETED, ADJUSTED <i>Groups being formed under the IRENA Community.</i>	- Enhancement of curriculum for renewable energy in collaboration with expert institutions	COMPLETED, ADJUSTED <i>Consolidated under IRENA Community</i>
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