

INTERNATIONAL RENEWABLE ENERGY AGENCY

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**Annual Report of the Director-General
on the Implementation of the Work Programme and Budget for 2016-2017**

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INTRODUCTION

1. This report provides an account of the implementation of the IRENA Work Programme and Budget for 2016-2017. At the end of the sixth year of its existence, IRENA's membership has risen to 154 Members and 26 states in accession, attesting to the significance of its mandate and a strong need for international co-operation on accelerated development and deployment of renewable energy. With its near-universal membership and a growing body of work, IRENA plays a central role in the global effort to transform the energy system to meet the economic, social and environmental objectives.

2. In the course of the biennium, IRENA implemented its programmatic activities along the three pillars of its medium-term strategy to deliver cutting-edge analyses and information, offer advice when needed, and create a platform for dialogue and co-operation among key stakeholders. Knowledge generated by the Agency informed the energy sector global dialogue, shaped policy formulation, increased Members' capacity, and promoted innovation. IRENA's comparative advantages, such as its global reach, its direct connection to Members and the public good nature of its work, uniquely position it to shape the sector and influence the global discourse on energy and sustainable development.

3. The 2016-2017 biennium was framed by the global drive to advance the implementation of the 2030 Agenda for Sustainable Development and the objectives of the Paris Agreement on climate change, which came into force in September 2016. Combined, these offer a compelling framework for international co-operation, with renewable energy at the centre of efforts. Sustainable Development Goal (SDG) 7, highlights the need for a significant increase in the share of global renewable energy to achieve universal access to sustainable energy and to meet a range of developmental goals. Similarly, the Paris Agreement specifically acknowledges the need for enhanced deployment of renewable energy to achieve universal access to modern energy services. It also recognises that averting the effects of climate change will require engagement and action on behalf of all stakeholders.

4. These international agreements have triggered a range of actions over the past two years. Among them was the submission of Nationally Determined Contributions (NDCs) under the Paris Agreement. IRENA analysed renewable energy components of NDCs to gain a better understanding of the commitments made, including their relationship with national energy plans. The report *Untapped potential for climate action: Renewable energy in Nationally Determined Contributions*, released at COP23 in November 2017, shows that, if current NDCs are fully implemented, 80 gigawatts (GW) of renewable energy capacity would be added each year globally through 2030. While this reflects a noteworthy commitment of almost 150 countries that included renewables in their NDCs, it is significantly below the average of 125 GW of new renewable energy capacity that has been brought online annually between 2010 and 2016. Moreover, through its work in the context of Renewable Energy Roadmaps - REmap, IRENA has demonstrated that the cost-effective potential for renewables provides the basis for an ambitious decarbonisation strategy based on renewable energy and energy efficiency.

5. To inform the G20 work under the German Presidency, IRENA analysed possible pathways and the requisite investment needed in the energy sector to realise the Paris Agreement objectives. The analysis shows that ambitious deployment of renewable energy, in conjunction with energy efficiency measures, could account for around 90% of the energy-related carbon emission reductions needed by 2050, while creating over 24 million jobs in the process. To reach this level of decarbonisation, the share of renewable energy would need to increase from around 15% of primary energy supply in 2015 to 65% in 2050. Achieving this transformation is not simply a question of replacing fossil fuels with renewable energy sources. The renewables-dominated energy system of tomorrow requires innovative approaches that reflect a diversity of technologies and actors, and a massive shift in investment.

6. IRENA has provided a platform for international co-operation that is necessary to drive this change. For instance, in 2016, this included the convening of the first IRENA Innovation Week that gathered diverse energy stakeholders who discussed the latest and most pertinent issues surrounding technology, infrastructure, markets and policies in diverse settings. In 2017, IRENA hosted Renewable Energy Day during COP23, in collaboration with the Governments of Fiji, Germany and the United Arab Emirates, and Deutsche Post DHL. Benefiting from its global reach and forward-looking mandate, IRENA convened leading thinkers and actors in the energy sector to share paradigm-shifting approaches and initiatives, and showcase cost-effective solutions available today. Platforms such as these provided insights into the latest developments and enabled the exchange of best practices and experiences. They also injected a sense of confidence and optimism that the energy system of the future is within reach.

7. The competitiveness of renewable energy technologies, bolstered by enabling frameworks and continuous innovation, has made it a solution of choice for multiple economic, social and environmental policy objectives. IRENA's annual statistics¹ show that renewable energy generation capacity grew to over 2,006 GW worldwide, with an 8.7 % increase in 2016 amounting to 161 GW in new installed capacity. Around 70 % of the increase in 2016 took place in the global South, with 58 % in Asia and 12.1 % in Africa, where the capacity additions doubled compared to growth in 2015. These trends reflect the strong business case of renewable energy technologies prevailing in a wide range of settings. They also reflect a shift in mindsets on the potential to advance multiple social, economic and environmental benefits through the renewables-based energy transformation.

8. In this context, job creation remains a major consideration for policy-makers. IRENA's latest annual jobs review shows that, in 2016, there were 9.8 million jobs in the sector, almost double from the initial review undertaken in 2013. The Agency's analyses of employment trends and potentials also suggest that this number could rise to 24 million in 2030. The employment benefits are seen in developed and developing countries alike. For instance, in 2015, Bangladesh added an estimated 700,000 solar home systems, raising the total cumulative installations in the country to 4.5 million. IRENA estimates that the workforce in the stand-alone solar PV sector in the country increased by 13%, reaching 127,000 jobs, a quarter of which are in manufacturing, with the remaining spread across distribution, installation and aftersales services.

9. Such examples show that renewables, underpinned by a confluence of economic, political and social drivers, have stimulated the development of new approaches that diverge from the grid-based models dominant to date. This was evident in the third edition of the International Off-grid Renewable Energy Conference (IOREC) that IRENA convened in Nairobi, Kenya in September 2016. Public and private stakeholders alike emphasised the emergence of cost-effective business models, based on the modular nature of renewable energy, which are meeting a range of economic and social needs in remote communities. Deployment of off-grid and decentralised solutions have transformative impacts and are providing a crucial input to a wide range of productive and income-generating activities and essential services.

10. The third edition of IRENA's flagship publication Rethinking Energy analysed the relationship between renewables and a range of SDGs. The report shows that access to modern energy services is critically coupled to a country's sustainable development. It also shows that the true value of renewable energy goes beyond the energy services that it provides, helping to achieve most, if not all, of the SDGs. Transparent, accurate and timely data helps to understand these linkages and informs sound policy-making. IRENA's initial estimates show that off-grid renewable electricity capacity reached 2,800 megawatts (MW) at the end of 2016; from these figures, around 60 million households are thought to be served by off-grid renewable electricity. While challenging, collecting and improving this data will play a major role in the global effort to meet the Sustainable Development Goals.

¹ IRENA, Renewable capacity highlights, 2017

11. As the renewable energy sector matures and expands, policies are being regularly adapted to suit changing market conditions in all settings. In the current biennium, IRENA analysed markets in Latin America and South-East Asia to better understand renewable energy trends, investment and policy developments in these regions, as well as to draw lessons learned for the benefit of all Members. Significant recent policy trends included the gradual shift from tariff-based mechanisms to auctions, and illustrated the increasing need for additional flexibility measures within power systems. IRENA kept abreast of these developments and studied the growing number of auctions, which, at the end of 2016, were held in at least 67 countries, up from only six in 2005. The Agency also provided recommendations on how governments can adapt their policies and take into consideration the evolution of the ownership structure in the electricity sector.

12. In keeping with the strategic priorities for the biennium, IRENA has placed strong emphasis on regional engagement. For instance, in Africa, the action agenda of the West Africa Clean Energy Corridor plan was approved at the highest level by Economic Community of West African States (ECOWAS) Ministers in 2016 and endorsed at the Heads of State Summit in June 2017. In Asia, the joint statement released by the Association of South-East Asian Nations (ASEAN) Energy Ministers and IRENA in September 2017 outlined a long-term collaborative plan to accelerate renewable energy deployment in line with the region's 2025 aspirational renewable energy target of 23%. In June 2017, the Astana Communiqué on Accelerating the Uptake of Renewables in Central Asia identified key action areas for collaboration with IRENA. The Abu Dhabi Communiqué on Accelerating the Uptake of Renewables in South East Europe, adopted in January 2017, on the other hand, provided the basis to develop a regional action plan in close collaboration with the Energy Community and the European Union. Regional work also included the development of a REmap regional study for the European Union, findings of which were most recently discussed with policy-makers and stakeholders.

13. Deepening and broadening the Agency's engagement, and communication and outreach efforts, to reach wider audiences in a more impactful manner was a major focus of the current biennium. In support of the delivery of the programmatic activities, IRENA convened 17 meetings across five regions. It also contributed to the work of others, including other international organisations, private sector entities and academic institutions. These engagements and partnerships, coupled with the Agency's active country-level assistance, will be of the utmost importance as the Agency enters its new strategic and programmatic cycle in 2018.

14. A detailed account of IRENA's work is provided in the present report, which also includes the matrix of deliverables detailing progress to date. This progress has been greatly facilitated by the timely receipt of Members' contributions. To date, 99.5% of assessed contributions for 2016 and 87.4% of assessed contributions for 2017 have been received. In addition, USD 10 million was received from Germany and USD 8.2 million from the United Arab Emirates, as part of budgeted core non-assessed contributions. Over USD 16 million was received in additional voluntary contributions from the European Commission, France, Germany, Italy, Japan, Kingdom of the Netherlands, Norway, Sweden, United Arab Emirates, and the Walloon Region of Belgium.

Thematic Programme Areas

I. Planning for the global energy transition

15. The world's energy system is changing at multiple levels. This change is taking hold across all energy-dependent sectors: electricity, industry, buildings and transport; and is reshaping related areas such as production, networks and markets. In support of this ongoing global energy transformation, IRENA is focusing on the latest developments in a number of areas to provide cutting-edge analysis and advice for policy-makers at all levels.

REthinking Energy

16. Over the years, IRENA has provided forward-looking analyses on renewable energy trends and development in its institutional publication, *REthinking Energy*. In January 2017, IRENA released the third edition, which focused on policy, finance and investment, and technology - three key areas for the adoption of renewable energy as the energy transformation accelerates. Among others, *REthinking Energy* examined the central role that renewables play in meeting the Sustainable Development Goals (SDGs), demonstrating how renewable energy can contribute to the achievement of a range of development objectives. Such an analysis is instrumental in helping to understand the full benefits of renewable energy deployment, as policy-makers consider their strategies for the future. The report was developed in consultation with a broad range of stakeholders, enriched by the Agency's global reach and the wealth of knowledge and experience within IRENA membership. Its summary was translated into seven languages and the findings were presented and discussed in a high-level session at the Vienna Energy Forum on 11 May 2017.

Power system design for renewable energy integration

17. Realising countries' long-term plans for power sector transformation requires a clear understanding of the current situation and the definition of sound pathways for the future. This can only be achieved through a careful and detailed planning process that assesses and values the current and future benefits, challenges and solutions. IRENA focused on three areas during the 2016-2017 biennium:

- i) further development of knowledge products and support tools for the power sector;
- ii) mutual learning and exchange of experiences with power system planners and operators; and
- iii) direct country advice.

18. Among these knowledge products is the report *Addressing Variable Renewable Energy in Long-term Energy Planning (AVRIL)*, released in January 2017, which provided an overview of methodologies for long-term energy planning with high shares of renewables. The report findings were widely disseminated, foremost through seminars and workshops organised with partners, including the National Renewable Energy Laboratory (NREL), the World Bank, the International Energy Workshop (IEW), the German Environment Ministry, and the Mexican government. These events reached over 300 power system planners from Africa, Asia, Europe and the Americas with the anticipated impact of influencing policy-making.

19. IRENA's work with countries greatly contributes to its efforts to consolidate and share expert knowledge and experience for the benefit of all IRENA Members. For instance, the technical guide *Transforming Small Island Power Systems: Technical Planning Studies for the Integration of Variable Renewables* presents the experience gained by IRENA through direct engagement with more than ten Small Island Developing States (SIDS) on the use of technical studies to plan the integration of high shares of variable renewable energy (VRE) in small islands. The guide was used in three regional events, organised by the associations of utilities from the Caribbean and the Pacific (CARILEC and PPA), as a common framework to support local stakeholders in understanding and assessing the technical challenges and solutions associated with the transformation of their power systems.

20. IRENA's knowledge framework to support the transformation of the power sector has been enhanced by the development of two new analytical tools: IRENA's FLEXtool, to assess the flexibility of a power system with high shares of VRE, and the Energy Storage Valuation Framework which identifies the most valuable applications of energy storage technologies for a particular power system. The FLEXtool is currently being piloted in Colombia to support an update of the national generation and transmission expansion plan. It is envisaged that these tools will be applied to enhance power sector analyses in REmap countries.

21. As part of IRENA's capacity building efforts, the Agency has undertaken regional training courses together with regional partners and United Nations organisations, including United Nations Framework Convention on Climate Change (UNFCCC) and the International Atomic Energy Agency (IAEA), to disseminate best practices and energy planning tools. These collaborative efforts helped to further disseminate IRENA's planning methodologies, including as part of the IAEA training on Nationally Determined Contributions (NDCs) for selected African countries in May 2017. These efforts were complemented by the application of IRENA's System Planning Test (SPLAT) model to Central Africa to enhance the planning capacity in the region. This work has been expanded to Latin America, starting with a seminar in Buenos Aires, Argentina where best practices for planning with high shares of variable renewables were shared with delegates from Latin America. As a result of this seminar, planning gaps in the region were mapped to guide IRENA's future work.

IRENA-SWAZILAND ENERGY PLANNING CAPACITY BUILDING PROGRAMME

The Renewables Readiness Assessment (RRA) conducted by Swaziland in 2014 identified long-term energy planning and energy statistics as key areas for follow-up action. In 2016, the government of Swaziland, with support from IRENA, designed a programme to enhance national long-term capacity and to update the national energy master plan. The programme included online and face-to-face training courses on the SPLAT model and scenario development. The national project group comprised of a Working Team and a Steering Committee. The Working Team worked on the national energy master plan by collecting data, executing computer models and developing analysis, with input from IRENA as needed. The Steering Committee, composed of senior officials, guided the efforts of the Working Team to ensure policy relevance and to endorse the analysis. To ensure long-term sustainability, the programme engaged other international organisations active in energy planning, such as the International Atomic Energy Agency (IAEA). The national project group is expected to finalise the draft national energy master plan and hold a national consultation meeting with key stakeholders, before submitting it for cabinet approval in early 2018.

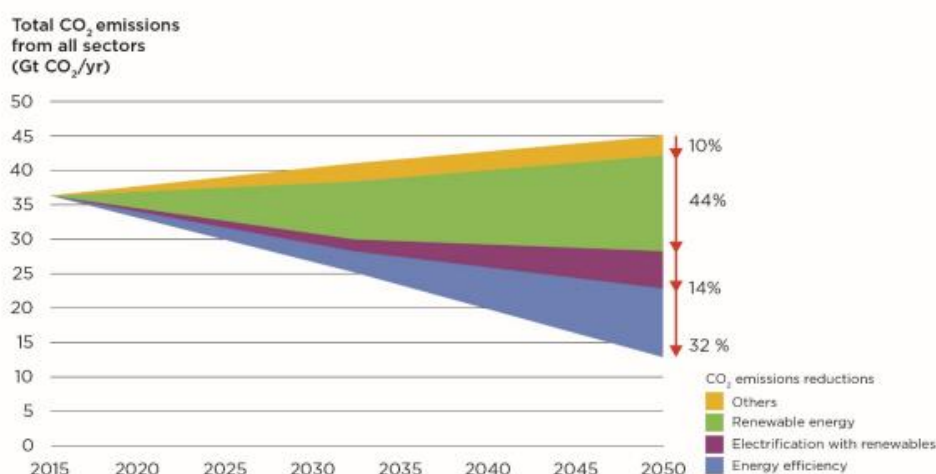


Transforming Energy

22. IRENA's Renewable Energy Roadmap (REmap) focuses on identifying the realistic potential of renewable energy to 2030 and beyond, in all parts of the global energy system. It quantifies renewable energy potentials in terms of associated costs and investments, as well as the resulting contribution to climate and environmental objectives. IRENA continued broadening the REmap coverage globally, expanding the network of national experts engaged in this work and the wealth of data that informs country analyses. Most recently, IRENA released three in-depth REmap country reports for India, Indonesia, and the Russian Federation, providing detailed outlooks for renewable energy options in these countries. These studies are expected to help inform long-term energy planning in these major energy-consuming economies, to identify least-cost investments, avoid stranded assets and reap the economic and societal benefits of renewable energy deployment. IRENA has also expanded its portfolio of in-depth sectoral analyses with the release of a roadmap for renewable energy in district heating and cooling. The report contains nine country case studies, concluding that in most cases there is significant untapped potential to increase the role of renewable energy in this important sector for the energy transition.

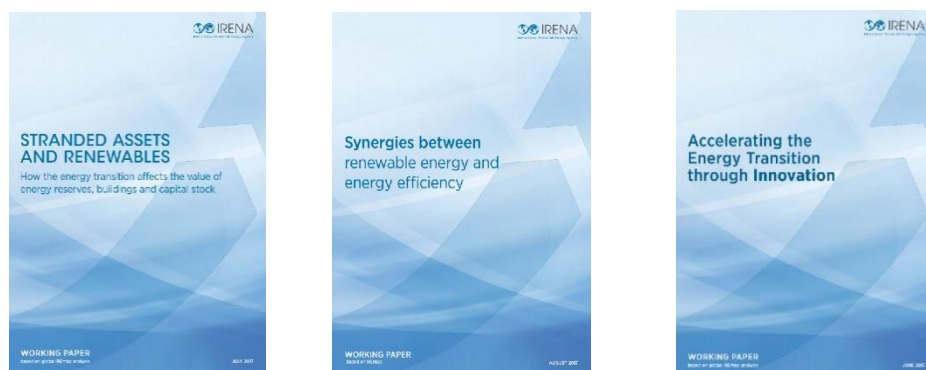
23. At the request of, and with support from, the European Commission, IRENA carried out a REmap regional analysis for the European Union (EU) to show how its currently proposed renewable target of 27% by 2030 can be realised and whether cost-effective renewable technology options are available for the EU to go beyond that target. Preliminary results were presented at the EU Sustainable Energy Week in June 2017. Updated results were presented in Brussels in October 2017, showing that the current target can not only be reached, but also increased. IRENA is in the process of finalising the report as an input to the ongoing EU debate on the subject.

24. IRENA also released a report entitled *Perspectives for the Energy Transition*, co-authored with the International Energy Agency (IEA) in March 2017. The report provides an analysis of the global energy system and focuses on long-term energy system decarbonisation pathways in line with the Paris Agreement. The report, supported by Germany in its role as G20 Presidency, was released at the 2017 Berlin Energy Transition Dialogue (BETD). This work required an expansion of the REmap framework for G20 countries to the year 2050, and a deeper assessment of low and no carbon energy technologies. The report shows that renewable energy and energy efficiency can provide 90% of the emission reductions needed to set the world on a path to limiting temperature rise to 2 degrees °C or below, with a 66% probability.



25. Building on the in-depth analyses carried out for the BETD 2017 report, IRENA released three additional detailed working papers looking at key themes related to energy transition. *Accelerating the energy transition through innovation* describes the innovation needs in low-carbon technology, policies and regulation, infrastructure, business models and market design, to enable the decarbonisation of the

energy sector between now and 2050. *Stranded assets and renewables* provides a quantitative assessment of the potential impact of the energy transition on the value of energy reserves, buildings and other assets, highlighting the economic consequences of delayed policy action to reach the Paris Agreement targets. *Synergies between renewable energy and energy efficiency* highlights the positive effects of jointly pursuing both strategies, including a faster reduction in energy and emissions intensity, reduced energy system costs and related societal and environmental benefits, such as lower levels of air pollution.



Bioenergy

26. Bioenergy plays a key role in the global energy transition. As requested by Members, IRENA has placed an added focus on bioenergy, to consider its sustainability potential, technology pathways and scale-up strategies. In the course of the biennium, a range of activities has been undertaken to advance this work. A roundtable on Sustainable Bioenergy Supply was organised in co-operation with the IEA and with the support of Germany, which resulted in a better understanding of the long-term resource outlook. Three reports have been issued with the support of Japan. *Boosting Biofuels: Sustainable Paths to Greater Energy Security* highlighted the global supply potential from the more thorough collection of farm and forest residues. A report on biofuel potential in Southeast Asia was launched at the ASEAN regional conference in June 2017. A similar study on biofuel potential, focused on Ghana, Mozambique, Nigeria, South Africa and Uganda, was also released. Further knowledge products include a brief on *Bioenergy and Sustainable Development* developed in co-operation with the IEA Bioenergy Agreement and the United Nations Food and Agriculture Organisation (FAO). This brief was presented during the 2017 European Biomass Conference and Exhibition (EUBCE) and the Clean Energy Ministerial (CEM) in Beijing, China.

27. In terms of bioenergy technology pathways, a *Technology Outlook: Advanced Liquid Biofuels* was published with detailed costing information on a wide range of options. Additionally, the Government of Finland supported a study regarding Finnish best practices in biorefineries, pyrolysis oil and circulating fluid bed reactors for solid biomass power generation. In terms of bioenergy scale-up strategies, IRENA developed new tools, including a Project Navigator tool to help developers design and finance projects for the supply of bioenergy commodities. An algorithm is under development to enhance the conversion of data into spatially explicit estimates of wood crop yields. IRENA has also engaged the Brazil-led Biofuture Platform, which is dedicated to furthering the market development of advanced biofuel technologies. Its inaugural meeting was held on the sidelines of the seventh session of the IRENA Assembly on 14-15 January 2017. Since then, IRENA has participated in its various activities including in the first Biofuture Summit in Brazil in October 2017.

Technology status & outlook

28. There is a global consensus that innovation will continue to be crucial in achieving the global development and climate objectives. The Agency's knowledge products delivered during the biennium 2016-2017, such as the *Technology Briefs* for the transport sector, the *Innovation Technology Outlooks* for mini-grids, offshore wind and advanced biofuels, as well as online tools such as *INSPIRE*, are used by policy-makers and the private sector, informing and steering national and international debates.

29. Over the past biennium, IRENA increasingly focused on convening stakeholders capable of contributing to and benefiting from the dialogue on innovation. Notable events include the *IRENA Innovation Week 2016* and the *Ministerial Roundtable on Innovation for the Power Sector Transformation* at the IRENA Assembly in 2017. These convened Members, the private sector, the scientific community and civil society to discuss innovative, emerging global solutions, which can be replicated and implemented at the local level. Information on promising renewable technology solutions and on the means to support these solutions to reach the market helps countries to streamline their innovation efforts. Experience has shown that innovation discussions cannot be limited to technology, but also have to address policy and regulations, enabling infrastructure, business models and market design, as well as financial instruments.

30. To ensure complementarity of effort, the Agency has also partnered with, and contributed to, international initiatives like Mission Innovation (MI), the Clean Energy Ministerial (CEM), the Energy Transition Coalition (ETC), and the World Economic Forum (WEF).

Convening stakeholders to accelerate innovation

In May 2016, IRENA convened the first IRENA Innovation Week. The four-day event covered a wide range of topics and engaged more than 200 participants, including policy-makers, engineers, private sector actors, utilities, regulators, and thought-leaders from around the globe. The event offered the opportunity to discuss the latest developments and trends in grids, energy system modelling, planning and business applications, and priority areas for support in decentralised, emerging and mature electricity systems. The event enabled the sharing of expectations on innovative solutions for the transformation of utilities and systemic, technological and operational innovation. It also considered issues such as market design and enabling frameworks.



Opening Panel at the IRENA Innovation Week 2016

The Ministerial Roundtable on Innovation for the Power Sector Transformation during the IRENA Assembly session in January 2017, triggered a lively dialogue between Ministers and private sector leaders on the importance of innovation to accelerate the transformation towards a sustainable energy sector globally.

The Roundtable's wide-ranging discussions highlighted that innovation would continue to drive the transformation of the energy sector across the entire energy landscape. The sessions underlined that digitalisation has already become a driver for emerging innovation, fostering new business models, greater flexibility in power systems and closer interaction between all stakeholders in energy markets. While innovation in technology will continue to play a major role, innovation in policy, regulation, market design, business models, finance and infrastructure will be equally essential.



H.E. Dr. Thani Ahmed Al Zeyoudi, Minister of Climate Change and Environment, United Arab Emirates; H.E. German Arce, Minister of Mines and Energy, Colombia; H.E. Rainer Baake, State Secretary for Economic Affairs and Energy, Germany; H.E. Irene Cañas, Vice Minister of Energy, Costa Rica; H.E. Ralph Gonsalves, Prime Minister, St Vincent and the Grenadines.



Irene Rummelhoff - Executive Vice President, New Energy Solutions, Statoil; Peder Andreassen – CEO Energinet.dk; Boris Schucht, CEO, 50Hertz.

Global Geothermal Alliance

31. The Global Geothermal Alliance (GGA) was launched in 2015 to provide a platform for collaboration on geothermal energy, with the aim to significantly accelerate its development and deployment. Its constituency has since expanded to 42 members and 31 partners across the globe. Over the past biennium, IRENA, as co-ordinator and facilitator of the initiative primarily focused its efforts on the operationalisation of the Alliance. To this end, a concise plan of action for the Alliance has been adopted by GGA members in 2016. As part of this action plan, the GGA received 19 requests for assistance from governments and industry, which included requests for technical assistance, advisory services, capacity building support, and facilitation of access to financing and risk mitigation instruments. IRENA has involved the Alliance's members in identifying the best way of responding to the requests and needs brought forward. Within the context of the Italian Presidency of the 2017 IRENA Assembly, a high-level meeting was organised in Florence in September 2017 to further refine the work of the GGA with the support of the Government of Italy.

Governments Adopted the 'Florence Declaration' and Agreed to Work Closer to Advance Geothermal Energy

Leaders and ministers from more than 25 governments met in Florence, Italy on 11 September 2017, to accelerate the global adoption of geothermal energy. The First High-Level Conference of Global Geothermal Alliance (GGA) represented the largest ministerial gathering dedicated to geothermal energy development to date. The meeting was attended by more than 200 high-level public, intergovernmental, non-governmental and private sector representatives committed to scaling up geothermal energy deployment worldwide.

Through the 'Florence Declaration' – an outcome of the meeting – GGA members reaffirmed the commitment to work together to identify and implement measures that will significantly increase the speed of geothermal energy development around the world.



The 2017 Florence Declaration as well as the main outcomes of the conference are available online: www.globalgeothermalalliance.org

32. IRENA has also contributed to the work of the Alliance through a range of programmatic activities including regional capacity building programmes for Africa, Central America, and the Pacific. For instance, the regional workshop co-organised by IRENA, LaGeo and the Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) in August 2017 in El Salvador allowed identifying gaps and barriers in geothermal policy and regulation in Central America, which will guide the work of the Agency and inform the GGA.

REpowering cities

33. Cities are home to more than half the world's population and represent two-thirds of global energy consumption today. Over the 2016-2017 biennium, IRENA provided meaningful input on renewable energy for cities in the outcome report of the United Nations Conference on Housing and Sustainable Urban Development - HABITAT III, which was held in October 2016 in Quito, Ecuador. IRENA thus helped ensure that renewables are placed firmly on the agenda of the UN HABITAT process for the future. IRENA also organised a Renewable Energy Day at HABITAT III, in collaboration with the Governments of Ecuador, Germany and the United Arab Emirates, to ensure that informed debates and decision-making take place in these settings.

34. IRENA has initiated research and stakeholder consultations for the project on *Energy Solutions for Cities of the Future*, supported by the voluntary contribution of the German government under the International Climate Initiative (IKI). The core objective of this project is to demonstrate how innovative solutions for deployment of renewable energy in cities empower local and national policy-makers and other stakeholders such as utilities and investors to transform their energy supply to a sustainable and renewables-based system, contributing to achieving the national climate and development objectives. So far, multiple city case studies across the three project countries show policies in place or under development that can serve as best practice, or untapped renewable energy potential that can contribute to the cities' sustainable development. As part of the project, the Agency is also in the early stages of developing a web application that would support assessing rooftop PV installations in buildings across two to three cities, and potentially aid in examining alternative policy options to incentivise city wide deployment.

II. Enabling investment and growth

35. Transitioning the energy system to a primarily renewable-based structure is a multifaceted process, and decreasing costs and increased recognition of the benefits of renewable energy are powerful drivers of change. During the past biennium, IRENA focused on further data collection, and the release of highly relevant policy and benefits work including an updated report on renewable energy benefits. IRENA has also worked toward strengthening its project development tools by expanding the Sustainable Energy Marketplace to cover all developing countries globally and new regional insights and user-friendly technical guides to the Project Navigator. Together, these measures aim to create enabling policy and market conditions for accelerated investment in, and deployment of, renewable energy.

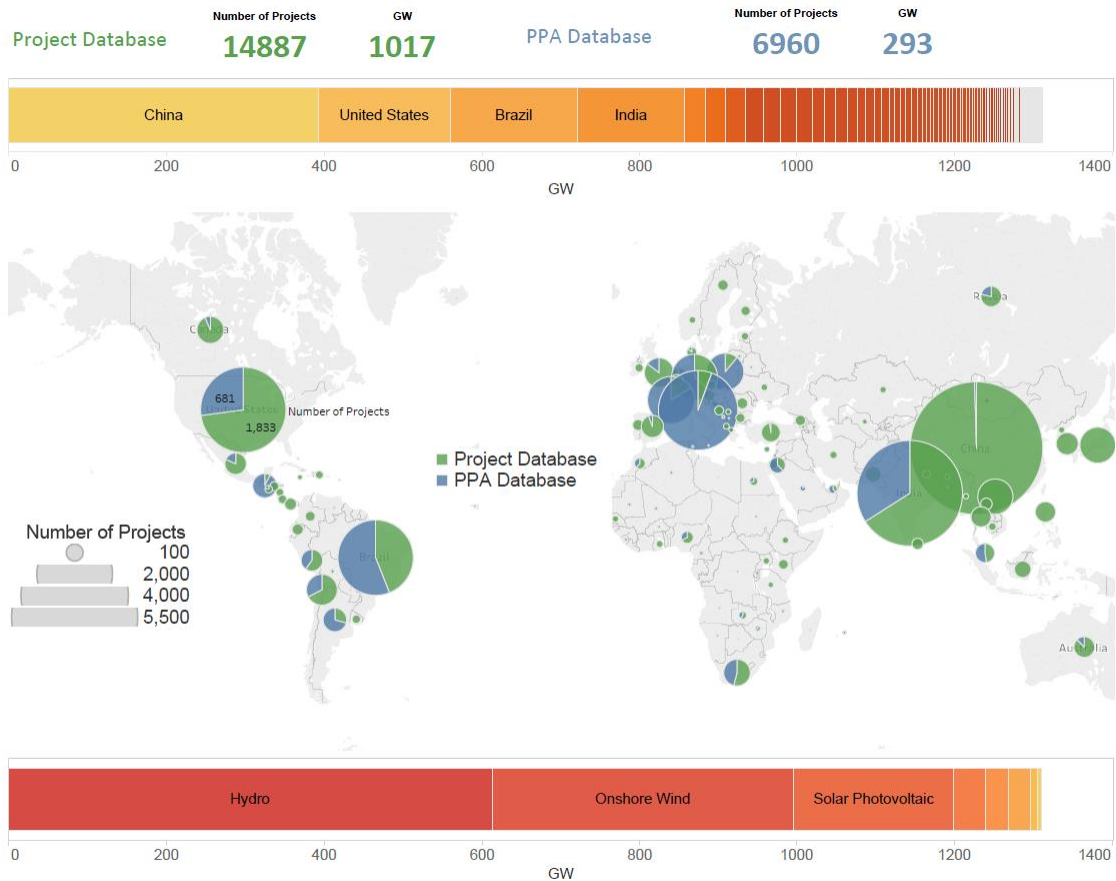
Renewable energy costs

36. The costs and competitiveness of the renewable energy technologies and fuels are at the heart of the debate around how quickly the energy transformation can be achieved. With the urgency of action encapsulated in the Paris Agreement, up-to-date, reliable cost data from a trusted source is a prerequisite for robust policy-making that maximises the economic, social and environmental benefits of renewable energy for Members.

37. In 2016 and 2017, the Agency focused on building the Renewable Cost Database of real-world projects, which allows IRENA to be an authoritative voice on the cost and competitiveness of renewables. IRENA's key contributions in 2016 and 2017 included:

- Growing the database on cost and performance data to over 15,000 projects globally (+6,000 in 2016-17), representing 1,020 GW of capacity in 147 countries, supported by the IRENA Renewable Costing Alliance, which has 36 members. A PPA/Auction price database was developed with around 6,700 projects included, representing 280 GW of operating or upcoming capacity. The development of a database of renewable costs in stationary applications has been started, with initial results for heat pumps in Europe presented to stakeholders in 2017.
- Analysis of the cost reduction potential for solar PV, CSP, onshore and offshore wind to 2025 in *The Power to Change* report, developed with the support of the Government of Germany. This work contributed to the CEM discussions held in Beijing, China and San Francisco, USA in 2016.
- A detailed analysis conducted with the World Bank on CSP cost reduction potential and competitiveness challenges and opportunities for the MENA region.
- Analysis of solar PV costs in Africa for solar home systems, mini-grids and utility projects to identify competitive cost structures for a continent with excellent solar resources, but low deployment outside South Africa and North Africa (*Solar PV Costs in Africa: Costs and Markets*) also supported by the Government of Germany.
- *Electricity Storage and Renewables: Costs and Markets to 2030* analyses the applications for electricity storage, current costs and performance and their outlook to 2030 to inform the debate on the role of storage in different market segments and when storage is needed. This work was supported by the Government of Japan.
- *Cost and Competitiveness Indicators: Rooftop Solar PV* highlights cost reductions and competitiveness of rooftop solar PV to provide greater clarity to policy-makers of the latest trends, while analysis of onshore wind learning curves has updated an important input assumption used by energy and climate modellers, as well as many research institutions. IRENA also contributed, with the support of the Government of Germany, competitiveness and market potential data to the *21st Century Power Partnership* report on corporate sourcing of renewable energy as part of the CEM Campaign for the Corporate Sourcing of Renewables.

38. IRENA also directly contributed to Member discussions about the potential competitive role of renewables in providing insight and data. This has included providing bespoke data collection, short topic papers, and organising workshops for Members including on storage in Ecuador, and cost reduction potential for solar PV in Japan. IRENA’s cost data and analysis have continued to be highly sought after by industry, researchers and policy-makers. IRENA responds to an average of 2-3 data requests per week while invitations to work with external partners on projects greatly exceed the ability to collaborate, which indicates that the Agency has acquired credibility and trust internationally.



In Focus: Cost Analysis

Analysis of the costs and performance of renewables has become a sought-after IRENA product. This data is being used by the IEW, World Bank, REN21, UNFCCC, McKinsey, and PWC, among others. Cost data and insights continue to be profiled by the media, which in 2016 and 2017 included CNN, The New York Times, The Washington Post, The Guardian and The Economist, to name a few. Cost insights are also informing industry players, with briefings on IRENA's analysis and reports sought by senior management at Engie (2nd largest power company in the world) and Trafigura (USD 97 billion in sales). Upon request, advice is provided to Members ranging from cost reduction potential to inform research and policy priorities (NEDO and METI in Japan), through understanding current cost trends and competitiveness (Albania, Pakistan and Tunisia), to requests for data collaboration (Chile).



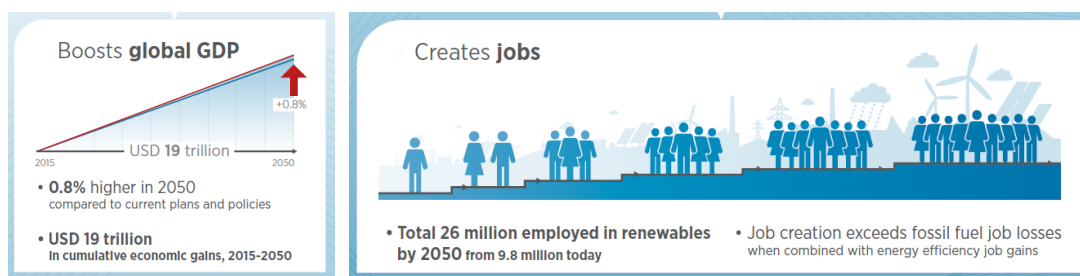
IRENA Cost Analysis Used in Many High-Level Reports

Renewable energy benefits

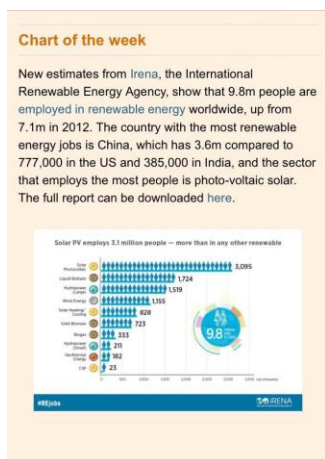
39. Building on its earlier work, the Agency provided the first quantification of the macroeconomic impact of renewable energy deployment in the report *Renewable Energy Benefits: Measuring the Economics*, which showed that doubling the share of renewables in the energy mix by 2030 would increase global GDP by up to 1.1 %, improve welfare by up to 3.7 % and support over 24 million jobs in the sector. Analysis has had significant reach, with report findings featured in hundreds of news articles and leading media outlets including The Economist, The Guardian, Reuters, Bloomberg, Forbes, the Huffington Post and El Pais. The report has also been cited by academic institutions such as Harvard Kennedy School, International Institute for Applied Systems Analysis (IIASA) and Potsdam Institute for Climate Impact Research (PIK), and has triggered related work worldwide.

40. This work has been expanded to 2050 as part of IRENA's input to *Perspectives For The Energy Transition – Investment Needs For A Low-Carbon Energy System* study, developed with the support of Germany in its G20 Presidency role and launched by IRENA and IEA at the opening ceremony of the Berlin Energy Transition Dialogue 2017 in Berlin. The analysis suggests that additional investment needed for the decarbonisation of the energy sector in line with the Paris Agreement can have positive impacts on employment and growth. Global GDP could be boosted by approximately 0.8% in 2050 and about 6 million additional jobs can be created, accounting for job losses in the fossil fuel industry. The report, and the macroeconomic analysis in particular, was widely quoted with over 700 media mentions

to date, including in major global newswires such as the Huffington Post, Associated Press, Bloomberg and Reuters. The report has also been referenced in surveys (e.g., OECD Economic surveys) and books (such as surveys and Entrepreneurship and Business Development in the Renewable Energy Sector). IRENA received requests from several member countries to continue the work and is currently expanding the results and themes that emerged from the *Perspectives for the Energy Transition* report. The three major themes that have been selected to explore are i) regional breakdown to deepen the understanding of economic drivers on GDP, ii) the implications of the energy transition for the labour market, including the skills requirements, and iii) the role of finance in facilitating the energy transition, and the extent to which finance presents a barrier to the large-scale investment required to realise such a shift in energy generation. The results will be presented at the 2018 Berlin Energy Transition Dialogue.



41. IRENA has continued to provide insights on the latest status and trends of employment in the renewable energy sector through its *Renewable Energy and Jobs – Annual Review* series. As is the case every year, IRENA has provided the sidebar on Jobs in REN21’s Global Status Report on Renewable Energy. The 2017 edition of the *Renewable Energy and Jobs – Annual Review* series was published in May, with up-to-date data and analysis on the topic. The *Annual Review* series continues to gain extensive traction worldwide and in the media. Editions have been cited in close to 1,000 online news articles, including coverage by media outlets such as Bloomberg, the Financial Times, France 24, The Guardian, and the Huffington Post, as well as in social media. Many publications also include the latest figures from *Renewable Energy and Jobs – Annual Review*.



Financial Times Chart of the week



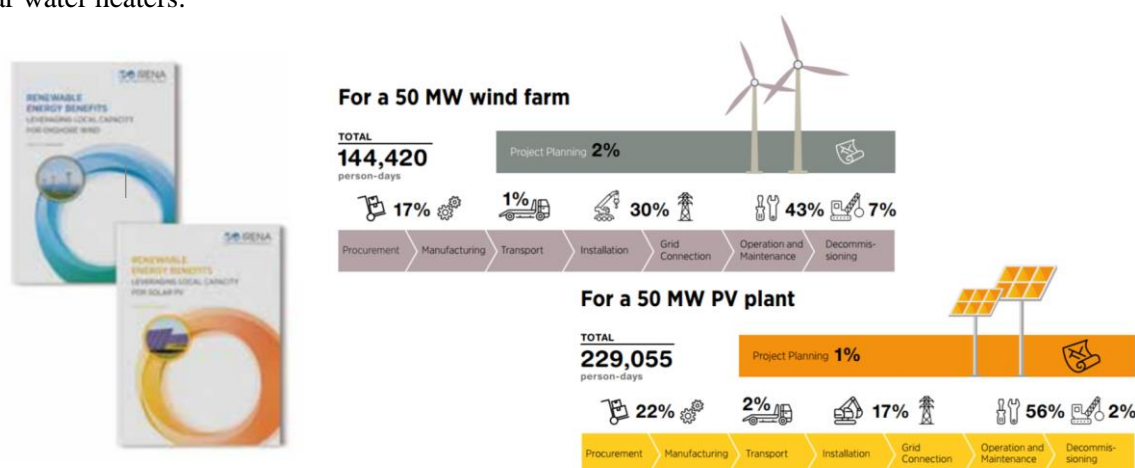
Selected publications citing IRENA Renewable Energy and Jobs – Annual Review 2016

42. In addition, Massachusetts Institute of Technology invited IRENA to present its work on *Renewable Energy and Jobs* at the MIT Energy Initiative (MITEI) Annual Research Conference (December 5-6, 2017). The program focused on the clean energy transition towards 2050 and beyond.

43. Furthermore, IRENA’s jobs analysis has been used to build the business case for renewable energy in the public discourse by several US politicians including former Vice President Al Gore ([link](#) and [link](#)), former Secretary of State John Kerry ([link](#)), Congressman Raja Krishnamoorthi ([link](#)) and former

Michigan Governor Jennifer Granholm ([link](#)). The latest review, for example, has also been reported to be used by the European Political Strategy Centre - the in-house think tank of the European Commission - for Presidential briefs, including for the meeting of President Juncker with the US President.

44. In anticipation of the jobs that will be created as a result of renewable energy deployment plans, IRENA analysed the skills needed for the development of solar PV and onshore wind as part of the study *Renewable Energy Benefits: Leveraging Local Capacity*. Each study includes materials and equipment required along the value chain. The analysis is now being carried out for offshore wind and solar water heaters.



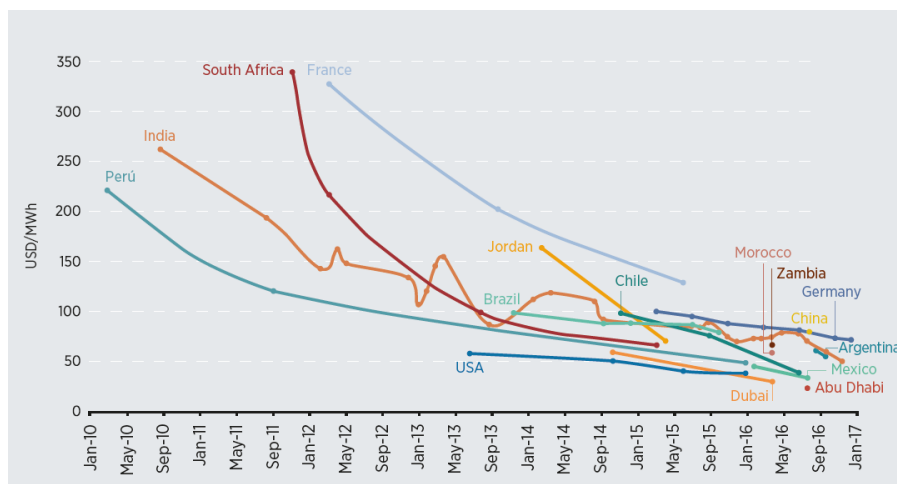
45. Complementing its global analysis on *Renewable Energy Benefits*, IRENA has begun analysing the project-level impacts of large-scale renewable energy projects, in particular solar and wind. Looking at the impacts on communities of the different stages of project development provides valuable insights on measures that can maximise benefits and highlight socio-economic considerations that deserve greater attention. IRENA's report, entitled *Maximising community benefits of large-scale renewable energy deployment: Insights from sub-Saharan Africa*, examines key lessons and best practices from utility-scale solar and wind projects in sub-Saharan Africa. It is based on the empirical analysis of several case studies utilising the frames of employment, skills and gender. This analysis fills an important knowledge gap and supports policy making that maximises public value of the energy transition.

Policy options to accelerate deployment

46. As the costs of renewable energy technologies continue to fall, there is a growing need for policies to adapt to rapidly-changing dynamics. In this context, IRENA's study *Adapting Market Design to High Shares of Variable Renewable Energy* was presented at the 13th Council meeting in May 2017. The report analyses the main challenges and identifies lessons learned and best practices. It provides recommendations on how governments can adapt their policies and take into consideration the evolution of the ownership structure in the electricity sector. The report forms part of IRENA's study on the design of deployment policies to facilitate the integration of large-scale renewable generation in support of the ongoing transformation of the power sector. The electricity market design, and policy and regulatory recommendations will be used in the forthcoming brief on G20 deployment of renewable energy (under the Argentinian G20 presidency) together with deployment policies, including those for auctions.

47. Building on IRENA's guide on the design of auctions, which is increasingly being used by policy-makers and development banks, an in-depth review of the most recent auction results was conducted. This review provides an analysis of the factors contributing to the record-breaking prices seen in auctions globally. The report was launched at IRENA's Policy Day in June 2017 and since then, it has been cited in numerous reports and papers, and IRENA has been invited to present it in many major events. These included the Asian Clean Energy Forum in Manila, the EU Sustainability Week in Brussels, the

Renewable Energy Congress in El Salvador, the International Renewable Energy Conference in Mexico (MEXIREC) and several workshops with the European Bank for Reconstruction and Development (EBRD), World Bank, the Chinese National Energy Administration, the Energy Community, among others. The findings were also discussed in a webinar organised by IRENA that gathered experts and parliamentarians to discuss the latest trends and best practices in policy design.



Global trends in prices resulting from PV auctions

48. IRENA has continued to analyse policies and regulations that are needed to ensure the energy transition. In addition, *Renewable Energy Policies in a time of Transition* is a report produced jointly by IRENA, the IEA and REN21 with the collaboration of NREL and GIZ, that provides an overview of the latest trends and analysis of innovative policies to support renewables in power, heating and cooling and transport. The analysis goes beyond deployment policies to include measures for system integration of variable renewable energy and calls for the consideration of broader policies to provide an enabling environment for the transition. This is shown in the new classification of policies presented in the report. The findings will be presented at the eighth session of the IRENA Assembly.



49. To provide access to the most up-to-date information on policy developments, IRENA has continued to collaborate with the IEA to expand and enrich the IEA/IRENA Policies and Measures Database, which holds more than 2,000 policies for approximately 120 countries. In 2017, IRENA added and updated over 90 policies for 12 countries with a regional focus on Latin America and South-East Asia.

50. IRENA has conducted a regional market analysis on Southeast Asia to be published at the eighth session of the IRENA Assembly. The analysis encompasses broader economic and energy sector trends as well as renewable energy investment and policy developments in the region. IRENA has initiated discussions with several regional stakeholders, including country focal points, the ASEAN Centre for Energy, the Asian Development Bank, GIZ and UNESCAP to gather inputs on knowledge gaps to be addressed in the analysis. In this context, a dedicated event on *Enabling Policy and Financing Frameworks for Accelerating Renewable Power Deployment* was organised in June 2016 in Bangkok. An expert meeting to share preliminary findings of the study took place alongside the Asia Clean Energy Forum (ACEF) in Manila in June 2017. The findings will also be discussed at a roundtable discussion on the main policies needed to attract a greater share of private capital to renewable energy projects in the region, organised at the World Future Energy Summit by Singapore Energy Market Authority, Sustainable Energy Association of Singapore (SEAS) and IRENA.

Financing renewables

51. IRENA has continued its work with climate finance institutions such as the Green Climate Fund (GCF), the Climate Investment Funds (CIFs) and the Global Environment Facility (GEF) to advance and facilitate funding for renewable energy programmes and projects. To increase collaboration with GCF, IRENA presented renewable energy activities at GCF workshops for Africa, the Pacific SIDS and the Caribbean SIDS. IRENA is also now a potential delivery partner for GCF readiness activities should a country chose to nominate the Agency for this work.

As a readiness partner of the GCF, countries can request that IRENA provides advice on a range of substantive matters, uses its tools such as RRAs and REmap, and supports project development in collaboration with implementing entities.



52. IRENA's 2016 publication *Unlocking renewable energy investment: the role of risk mitigation and structured finance* has provided a strong basis for discussions with financial institutions, including with public development banks at events such as the 2017 Global Infrastructure Forum in Washington D.C. in April 2017. Its findings highlighted the need to streamline project preparation processes. As a result, IRENA has partnered with the Terrawatt Initiative to develop a set of standardised project documents for solar PV installations. This initiative brought together 15 international law firms and over 25 financial institutions to draft templates for project documentation to help streamline project development processes worldwide.

53. Building on the 2016 report, further work focused on investment by institutional investors. IRENA has reached out to institutional investors to identify the main reasons why investment in renewable energy assets by such investors remains limited and to provide concrete and practical solutions to address these constraints. Two roundtable meetings were held in Addis Ababa and Singapore in October and November 2017, respectively, to obtain further input from the regional finance community. At these roundtables, local investors emphasised among other points the importance of local currency financing, streamlined access to energy markets and stable, long-term off-taker arrangements. This work is ongoing, a literature review was completed, and a survey and data analysis are underway.

54. In collaboration with the Climate Policy Initiative and utilising IRENA's Global Public Investment database, IRENA has also prepared a report on the Renewable Energy Finance Landscape to be released in early 2018. The Report documents the various aspects of the significant increase in renewable energy investment up to 2015, when investment in renewables surpassed all fossil fuel based power generation for the first time. Lower solar and wind costs were a significant driver of falling renewable energy investment between 2015 and 2016; each US dollar of investment financed more capacity than in previous years.

55. Building on earlier investment analysis, a report released in November 2017 presented an assessment of the renewable energy component of NDCs, including an estimate of the investment needs of implementing renewables targets set in the NDCs. The report *Untapped Potential for Climate Action: renewable energy in nationally determined contributions*, also highlights the potential to strengthen the ambition of NDCs in a way that would bring planned climate action more closely in line with the objective of the Paris Agreement to keep mean global temperature rise well below 2°C.

Project facilitation

56. The Sustainable Energy Marketplace, an online matchmaking platform launched in December 2015, has expanded rapidly, attracting project sponsors and developers, financial institutions and service and technology providers. The Marketplace currently encompasses some 150 projects seeking investors to finance an aggregate project value of approximately USD 7 billion (bn) across Africa, Latin America and the Caribbean.

57. The Sustainable Energy Marketplace has completed the second phase of development to expand geographically and improve the usability of the platform. The Marketplace has become a global platform covering all developing countries in Africa, Latin America, Asia, Southern and Eastern Europe and all Small Island Developing States.



Sustainable Energy Marketplace Key Facts and Figures

Global platform

- 150 renewable energy projects
- 3 GW of renewable energy capacity under development
- USD 6.7 bn worth of investment opportunities
- 50 financing institutions (public and private)
- 115 financing instruments
- 136 service providers and 54 technology suppliers

Outreach in 2016/17

- Six webinars
- Presentations at eleven conferences/workshops

Recent outcomes

- Financial closure for two projects
- Seven projects in LAC and one project in Africa receiving project development support
- One bioenergy project received USD 100,000 in funding to scale-up its business model consisting of transforming croton nuts into croton oil biofuel, a natural replacement for diesel fuel in water pumps and generators
- A solar irrigation project is receiving pro bono management support to engage farmers in a rural region in Africa

Key partners

- Energy and Environment Partnership (EEP)
- Inter-American Development Bank (IDB)
- Power Africa
- Private Financing Advisory Finance Network (PFAN)
- Pacific Region Infrastructure Facility (PRIF)
- Regional Center for Renewable Energy and Energy Efficiency (RCREEE)
- Sustainable Energy for All (SE4All)
- United Nations Economic and Social Commission for Western Asia (UNESCWA)
- United Nations Economic Commission for Europe (UNECE)

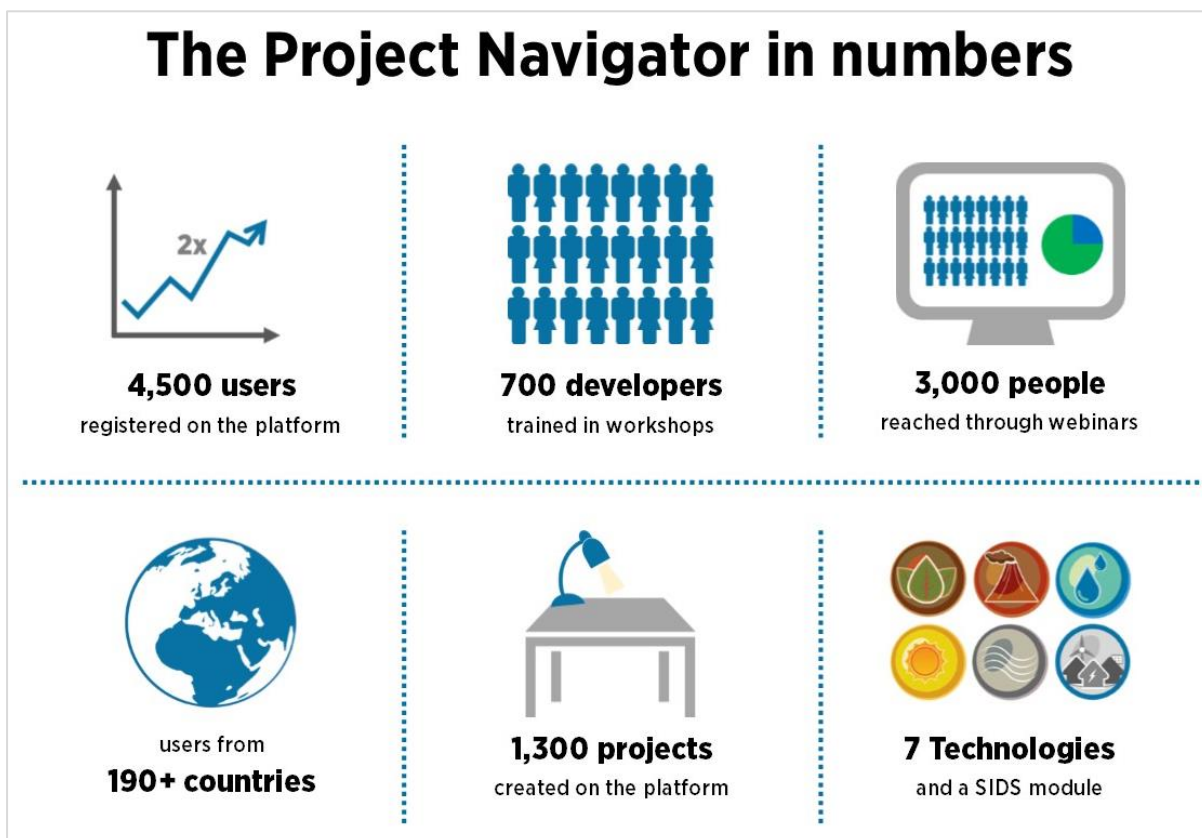
58. The development of renewable energy projects still requires significant support. The IRENA Project Navigator (Navigator) has been developed with that in mind. The Navigator is an online platform to assist with the development of bankable projects, and its expansion and rollout have continued in 2016 and 2017. This included a Geothermal Module to support the activities of the Global

Geothermal Alliance and an Islands Module. The latter, supported by the German International Climate Initiative (IKI) has been expanded with a number of tools, templates and guidance on key renewable energy technologies, specifically relevant for the deployment of projects in the context of SIDS.

59. The visibility of the Project Navigator has significantly increased by the introduction of new technical guidelines, on-site and online outreach activities and increased collaboration with partner organisations. These include institutions such as ADFD, AfDB, AREI, AIIB, AUC, USAID, ECREEE, RCREEE and IFDD who have expressed interest to use the Project Navigator tools to support project



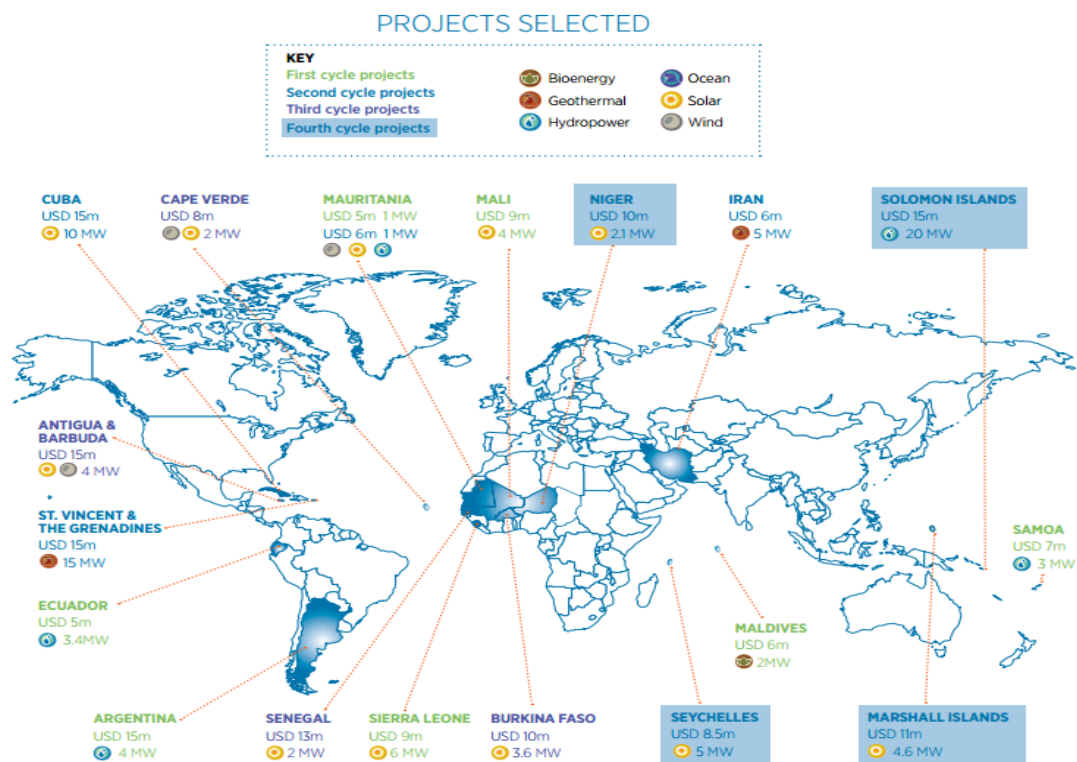
development. In the course of the biennium, a series of on-site workshops have been conducted. Project developers from ten West African countries have been trained on the use of the Navigator. In Southeast Asia, approximately 200 project developers from Lower Mekong countries participated in the training. Most recently, the training activities supported 200 project developers in Iran. All participants have provided positive feedback with high engagement metrics, attesting to the relevance of this work. Preparations are ongoing to carry out a series of Project Navigator training workshops for project developers in the Caribbean, AIMS, and Pacific islands.



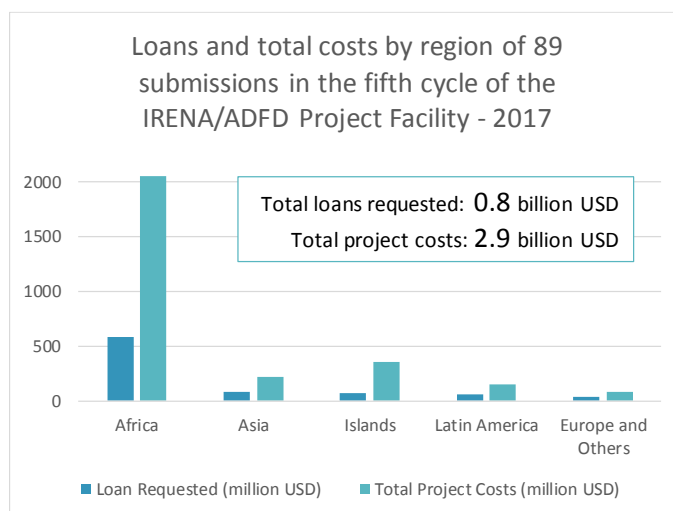
60. IRENA and the Abu Dhabi Fund for Development (ADFD) have continued to collaborate on a joint Project Facility to support replicable, scalable and potentially transformative renewable energy projects in developing countries. ADFD committed USD 350 million in concessional loans, over seven annual funding cycles, to renewable energy projects recommended by IRENA.

61. During the 2016-2017 biennium, which constituted the fourth and fifth funding cycles of the Facility respectively, IRENA and ADFD concluded a revised Co-operation and Support Agreement. The agreement aims to improve the selection process and the engagement of experts and to support ADFD in post-selection activities.

62. With the completion of four project cycles, the Facility has enabled the allocation of USD 576 million in funding to 19 projects in 18 countries. Out of this total, USD 189 million represents ADFD concessional loans, with the remaining USD 387 million resulting from co-financing. The funded projects are expected to bring 100 MW of new energy capacity online and benefit over a million people and businesses with improved access to energy and sustainable livelihoods.



63. In the fifth cycle, 89 project applications were submitted for consideration by mid-February 2017, which represents a 10 % increase in the number of applications compared to the previous funding cycle. Selected projects will be announced in January 2018 at the eighth session of the IRENA Assembly.



III. Renewable energy access for sustainable livelihoods

64. Universal access to modern energy services is key to alleviating poverty and stimulating economic growth. There is an opportunity to design an efficient new energy system based on the modular and decentralised nature of renewable energy, which can have a multiplier impact in terms of reduced health effects, improved livelihoods, poverty alleviation, job creation, gender equality and enhanced access to water and food. Specifically, work in 2016 and 2017 has focused on analysis and capacity building to support mini-grid sector development and to strengthen the ability for small- and medium-sized enterprises to provide decentralised solutions.

Decentralised solutions for access

65. IRENA has continued to analyse policies and regulatory frameworks to promote mini-grid development in co-operation with the private sector. In September 2016, IRENA organised the 3rd International Off-grid Renewable Energy Conference & Exhibition (IOREC) in Nairobi, Kenya. The event, which witnessed record participation of some 400 participants, was organised in partnership with the Kenyan Ministry of Energy and Petroleum and the Alliance for Rural Electrification (ARE). It attracted stakeholders from government, rural electrification agencies, the private sector, financing institutions, development agencies and academia. Key findings from IOREC discussions were analysed and synthesised into a comprehensive outcome report: *Accelerating Off-grid Renewable Energy: Key Findings and Recommendations from IOREC 2016*. The report was presented at IRENA's seventh Assembly in January 2017 during the Ministerial Roundtable entitled *Catalysing off-grid renewable energy deployment – Towards universal electricity access and the attainment of SDGs*.

Applied decentralised solutions

66. The ECOWAS Renewable Energy Entrepreneurship Support Facility has continued to develop the capacity of small and medium entrepreneurs in West Africa. IRENA, in collaboration with ECREEE and with financial support from the Government of Luxembourg and the World Bank organised a series of technical training workshops for selected entrepreneurs throughout the biennium. These workshops addressed specific requests for technical assistance, such as enterprise management and development of bankable renewable energy project proposals for financing using IRENA's Project Navigator, solar PV project design, sizing, installation and operation and maintenance. Building on the success of the West Africa experience, IRENA has launched a similar facility in Southern Africa, in partnership with SACREEE and with the voluntary contribution from the Government of Norway. A kick-off meeting for the programme was held in Lesotho in April 2017, in partnership with UNDP, to agree on the objectives and conceptualisation of the programme. The first regional workshop bringing together SMEs and financial institutions was organised in Mauritius in November 2017.

The ECOWAS Renewable Energy Entrepreneurship Support Facility

The Facility aims to provide advisory assistance to small and medium-sized (SME) renewable energy enterprises in West Africa to scale up their businesses and attract financing. Since its launch in 2015, the Facility has supported over 80 enterprises through various training courses, advisory assistance, facilitating partnerships, networking and match-making with financial institutions. Enterprises benefitting from technical assistance managed to scale up their business activities through increasing their human resources and revenues, implementing innovative operation and marketing strategies, developing bankable project proposals and securing financing. In 2017, the World Bank provided additional funding that would ensure the continuation of IRENA's SME development initiatives.

IV. Regional action agenda

67. Regional co-operation is a key element to bring about efficiencies and economies of scale in deployment, to facilitate a diverse mix of renewable energy sources, overcome technology barriers, increase the security of supply and meet growing demand. Common regional action agendas also empower countries in their pursuit of development and climate objectives. IRENA continues to support these goals by building capacity through targeted advisory services at both regional and national level.

Clean Energy Corridors in Africa

68. IRENA continued to advance its work on Clean Energy Corridors (CEC), aligned with the priorities developed with regional and national stakeholders. In this context, the Agency presented its work on the CECs in Africa to the Specialised Technical Committee in charge of the energy of the African Union (AU) in Togo in March 2017. As a result, the Ministerial Declaration recommended encouraging “the Member States to integrate the concept of the CECs into their national renewable energy and climate change agenda”. IRENA was also featured in the AU plan of action that would guide the renewable energy policy and strategy development in the coming years.

69. Building on the work to date on the *Africa Clean Energy Corridor* initiative, the zoning work has been deepened at national levels. These results were incorporated into regional planning in Eastern and Southern African power pools, as well as into the revision process of the Programme for Infrastructure Development in Africa (PIDA). Further, the regional workshop in Namibia in April 2017 enabled data gathering on the sites earmarked for development. This output provided a basis for financial viability analyses to inform power procurement procedures in the relevant countries as well as the regional planning processes. Concerning the regulatory work, IRENA supported the Regional Electricity Regulators Association for Southern Africa (RERA) to develop a knowledge base on regulatory actions supporting renewable energy development in the region. IRENA also helped RERA with its capacity building efforts and long-term planning processes and recommendations have been provided on the existing planning frameworks in the SADC region, namely Namibia and Zimbabwe.

70. The *West Africa Clean Energy Corridor* (WACEC) action plan was approved by the ECOWAS Energy Ministers in December 2016. Regulation on the WACEC was adopted by the ECOWAS Council of Ministers as an annex to the ECOWAS Treaty and was reported to the Summit of ECOWAS Heads of States in June 2017 in Liberia. The initial phase of the implementation of the action plan included the scoping of the WACEC solar component. This work, supported by the EU Energy Initiative’s Technical Assistance Facility, led to the development of a specific implementation plan. IRENA engaged with the West Africa Power Pool to identify sites to be analysed in accordance with their current master plan. Relevant data for each project country and site was also obtained so that financial viability assessments could be conducted. To facilitate regional market integration, technical assistance for the development of enabling frameworks has been prioritised, with the focus on the development of renewable energy Power Purchase Agreements as well as the planning and operation of grids with higher shares of variable renewables. The kick-off meeting for the capacity building programme took place in Dakar in December 2017.

Clean Energy Corridor of Central America

71. In line with the Clean Energy Corridor of Central America (CECCA) Strategy endorsed by the SICA Energy Ministers in December 2015, IRENA initiated the CECCA implementation in Panama as the selected pilot country with two separate activities related to technical and regulatory aspects. On a technical level, IRENA worked with the Secretary of Energy of Panama and other stakeholders, including, the Transmission System Operator (CND), to facilitate the operationalisation of the country’s midterm renewable energy targets. A priority area of action, identified in the country’s RRA and during the stakeholder consultations, was the improvement of the technical capacities of local planners to assess the impact of the expected shares of VRE on the system stability and reliability. To support the country in approaching this priority area, a training course for power system planners was organised,

focusing on grid integration studies. The knowledge acquired during the training helped improve the quality of planning studies carried out by the CND. On a regulatory level, IRENA has been supporting the restructuring of PPAs to promote the accelerated deployment of wind and solar PV in Panama.

Emerging regional corridors

72. Based on the outcomes from the two rounds of the consultative process with multiple stakeholders in the region, IRENA has stepped up its engagement with the Association of Southeast Asian Nations (ASEAN) to support efforts to improve the region's electricity interconnectivity. This is an important step towards the achievement of the region's renewable energy ambitions (i.e. 23% renewable share by 2025). IRENA engaged with the Power Grid Consultative Committee of the ASEAN utilities to discuss plausible options for setting up an ASEAN electricity exchange model, borrowing from the experience



of established regional grid interconnections in other regions.

73. The first ASEAN-IRENA Ministerial Dialogue took place during the ASEAN Ministers of Energy Meeting (AMEM) in Manila in September 2017, resulting in a Joint Statement that envisages IRENA's intensified engagement in the region. At the Asia Clean Energy Forum 2017, which also took place in Manila in

June 2017, IRENA co-chaired the Renewable Energy Track, defining the discussion agenda as well as structuring the programme. Collaboration has been strengthened with the Asian Infrastructure Investment Bank with emphasis on developing bankable renewable energy projects.

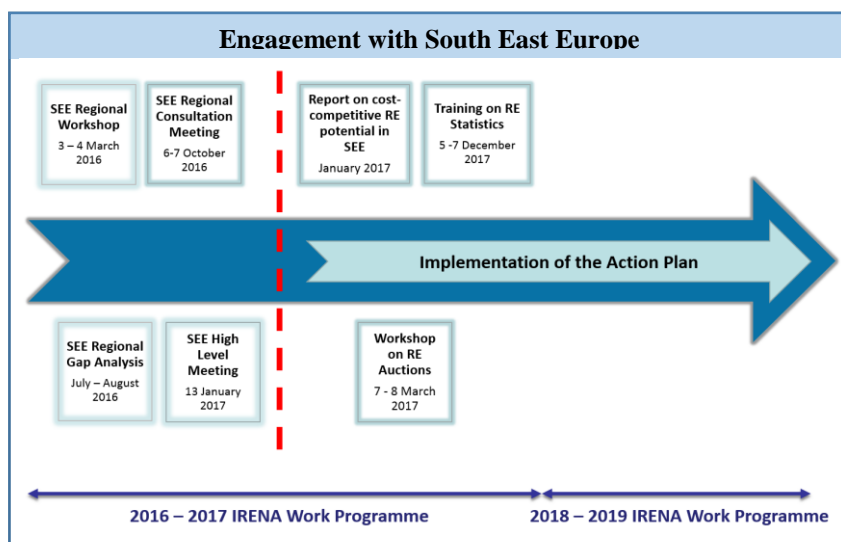
Enabling regional action

74. **South East Europe.** Building on a region-wide consultation process undertaken in 2016, the *High-Level Meeting on Renewable Energy in South East Europe* (Abu Dhabi, January 2017) resulted in the adoption of the *Abu Dhabi Communiqué on Accelerating the Uptake of Renewables in South East Europe* by the heads of the delegations in attendance. This document laid out foundations for IRENA's engagement in the region with a goal to support the creation of more conducive frameworks for renewable energy investment. Moving forward with the implementation of the regional action plan, IRENA and the Energy Community Secretariat organised a workshop on renewable energy auctions in March 2017. A regional training on renewable energy statistics was held in December 2017, in collaboration with the Ministry of Infrastructure and Energy of Albania.



High-Level Meeting on Renewable Energy in South East Europe

75. IRENA's publication entitled *Cost-Competitive Renewable Power Generation: Potential across South East Europe* was also presented at this event. The study draws attention to the region's vast renewable energy potential amounting to approximately 740 GW, out of which almost 130 GW can be implemented in a cost-competitive manner.



IRENA-Energy Community Workshop on Renewable Energy Auctions

76. IRENA supported the process for the extension of the Central and South-Eastern European Connectivity (CESEC) initiative, which included regional collaboration on electricity markets, renewables development and energy efficiency. Following the preparatory discussion during the CESEC Ministerial meeting in Budapest in 2016, renewables formally became part of the CESEC scope of work during the Bucharest Ministerial meeting in 2017. Considering the substantive input provided to both discussions, IRENA was asked to support the CESEC implementation plan on renewables, as part of IRENA's regional engagement with SEE.

77. **Central Asia.** As an outcome of the *Ministerial Dialogue on Renewable Energy in Central Asia* co-organised by IRENA and the government of Kazakhstan in June 2017 in Astana, the *Astana Communiqué on Accelerating the Uptake of Renewables in Central Asia* was released with the objective of establishing key areas of co-operation to promote renewable energy development in the region. The *Communiqué* is a result of a region-wide consultative process, which commenced in October 2016 in Baku and concluded at a regional workshop in April 2017 in Abu Dhabi. The first activity for the implementation of the regional initiative was the Uzbekistan renewable energy workshop organised in partnership with the World Bank in Tashkent on 5-6 December 2017 to discuss best practices in renewable energy policy, regulations, institutional set-up, technologies as well as project facilitation in preparation for the elaboration of a national action programme on renewable energy for the period 2017-2021.

78. **Latin America.** As part of its deepening engagement in *Latin America*, IRENA took part in two regional Ministerial meetings. The first meeting took place in September 2017 in Chile on the Energy and Climate Partnership of the Americas (ECPA) and the second meeting with the Latin American Energy Organisation (OLADE) in December 2017 in Argentina. In the framework of the 47th OLADE Ministerial, IRENA organised an event in collaboration with OLADE and the Government of the Republic of Argentina, which provided a forum to discuss the key challenges and opportunities for renewable energy development in the region, with emphasis on the country's innovative auction programme (RenovAR) and renewable energy project facilitation.

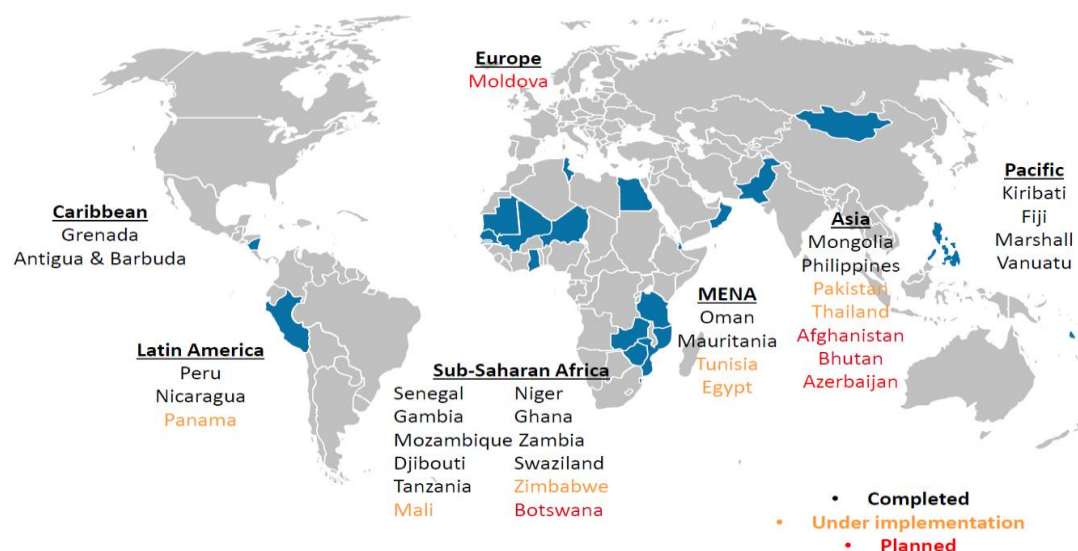
79. **Pan Arab Clean Energy (PACE) Initiative.** As an outcome of the stakeholder meeting held in January 2017, IRENA, in close co-operation with the Arab League and RCREEE, developed a specific plan of action for the implementation of the initiative. This action plan was approved by the LAS Technical Committee in September 2017 before its submission to the next Arab Ministerial Council for Electricity for endorsement.

80. **Central Africa.** In light of the growing interest for realising the renewable energy potential in the region, IRENA is collaborating with the Economic Community of Central African States (ECCAS) on the development of a regional roadmap for renewable energy, which will identify the gaps and bottlenecks as well as the key priority actions. This Regional Renewable Energy Roadmap is envisaged to be validated at the technical level (end-March 2018), prior to submission for ministerial approval.

81. **Energy Transition Coalition.** Frameworks that encourage collaboration around issues of common interest will be instrumental in catalysing action and facilitating partnerships around the global energy transformation. The First International Forum on Energy Transition held in Suzhou, China, jointly organised by the Chinese government and IRENA endorsed the Suzhou Declaration. This Declaration proposed to form a coalition of partner countries undertaking energy transition, and to establish the IRENA-China international research and co-operation centre for energy transition to support the activities of the proposed Coalition.

Country support and advisory services

82. During the past biennium IRENA has continued to support countries in assessing policies, resource potential and technologies for renewable energy deployment. Such support includes facilitating RRA consultations and providing targeted advisory services for the implementation of recommendations. For instance, following the completion of RRA Mongolia in March 2016, the Mongolian authorities took practical steps for grid infrastructure assessment and training for grid operators at the National Dispatch Center of the country.



83. Following the launch of the RRA Philippines programme in April 2017, a post-RRA analysis entitled *Accelerating renewable mini-grid deployment: A study on the Philippines* was published in September 2017, making several key recommendations to accelerate the development of renewable mini-grids in the Philippines. The RRA Tanzania report published in September 2017 considered local content, education and training aspects of renewables development, and made recommendations in this respect. As part of a post-RRA technical support to Mauritania, IRENA, in co-operation with RCREEE, organised a capacity building workshop in Nouakchott in December 2017. The workshop focused on suitability analysis for solar and wind zones, grid codes and project development support for on- and off-grid RE projects. The RRA processes in Mali, Pakistan, Panama, Tunisia and Zimbabwe in different stages of completion, with publication of reports expected in 2018.

84. During the 2016-2017 biennium, the Agency piloted a combined implementation of the RRA and REmap in Egypt and Thailand through a single, integrated process. The final products consolidated the RRA's recommendations, which aimed at short- to medium-term measures for enabling conditions, with REmap's technology-focused analysis, which included a longer-term vision for renewables deployment. The report for Thailand was published in November 2017. The analytical results will be used as inputs for updating the current Power Development Plan of the country. Following the technical consultations in September 2016 and the subsequent validation workshop in May 2017 that consolidated the RRA recommendations and discussed the preliminary results of the REmap analysis, the report for Egypt would be released in early 2018.



Panama RRA Expert Workshop, October 2016



Panama RRA Validation Workshop, June 2017

85. Islands are showing increasing ambition in the transformation of their energy systems, with some aiming for a complete transition to renewables in the immediate future. To support this transformation, IRENA is providing knowledge, tools, services and a platform for co-operation to facilitate the planning for, and implementation of, renewable energy solutions.

SIDS Lighthouses

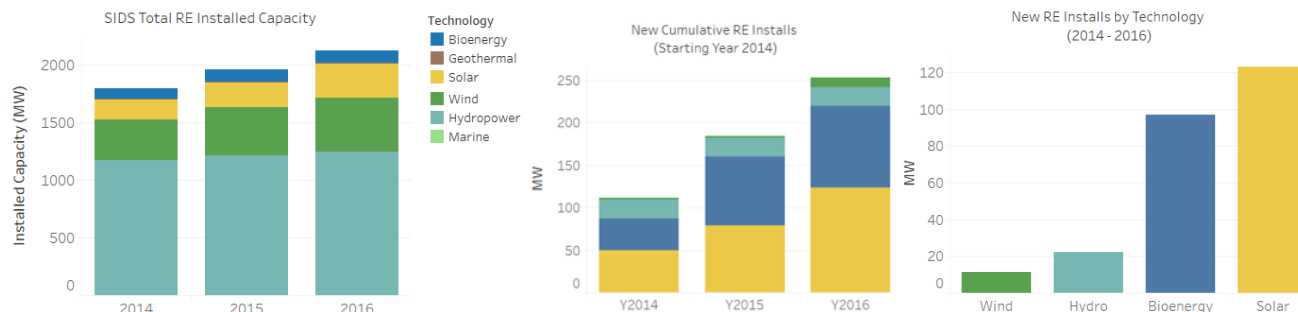
86. Since 2014, IRENA has consolidated its work with the Small Island Developing States (SIDS) under the umbrella of the SIDS Lighthouses Initiative (LHI). Comprising 36 SIDS² and 19 development partners³, the LHI aims to achieve a range of objectives by 2020, including:

- Mobilise USD 500 million for renewable energy investment;
- Deploy 100 MW of new PV;
- Deploy 20 MW of new wind power;
- Deploy significant quantities of small hydropower and geothermal energy and ocean energy technology projects in progress; and
- Ensure all participating SIDS develop renewable energy roadmaps.

² Antigua & Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Cabo Verde, Cuba, Comoros, Cook Islands, Dominican Republic, Micronesia (Federated States of), Fiji, Grenada, Guyana, Kiribati, Maldives, Marshall Islands, Mauritius, Montserrat, Nauru, New Caledonia, Niue, Palau, Papua New Guinea, St. Lucia, St. Vincent and the Grenadines, Samoa, Sao Tome and Principe, Seychelles, Solomon Islands, Tonga, Trinidad and Tobago, Turks and Caicos, Tuvalu, and Vanuatu.

³ European Union, France, Germany, Italy, Japan, New Zealand, Norway, United Arab Emirates, United States of America, Indian Ocean Commission, IRENA, Association of the Overseas Countries and Territories of the European Union, UNDP, World Bank, ENEL, Clean Energy Solutions Center, Clinton Climate Initiative, Rocky Mountain Institute - Carbon War Room, and SEforALL.

87. Today, the total renewable capacity in all SIDS accounts for more than 2 GW. More than 250 MW of renewable energy capacity has been installed from 2014 to 2016, out of which 123 MW of solar PV, 95 MW of bioenergy and 11.5 MW of wind. With this progress in mind, the LHI will align its focus to reflect the new realities including the commitments under NDC and new partner initiatives, such as the AOSIS-led IREI.



88. Facilitating knowledge sharing is a key objective of the LHI. As the facilitator of the Initiative, IRENA has developed a dedicated website, which at present consolidated all IRENA work on SIDS. This site will also feature partner knowledge and tools, as well as a dedicated collaborative space.

89. IRENA has undertaken a range of programmatic activities to accelerate the progress of the SIDS LHI. *Quickskans* serve as a key component of the Initiative as a tool for the rapid assessment of barriers and opportunities for renewable energy deployment in SIDS. A total of 38 Quickskans have been completed to date. Also, the Association of the Overseas Countries and Territories of the European Union (OCTA) applied the methodology to 18 overseas countries and territories (OCTs). These studies help uncover areas where specific support is needed in the SIDS context and have been guiding the follow-up action, as well as identification of priority areas. A summary Quickscan report that details the background, methodology, impact and future potential was released at COP23 in Bonn. Quickscan analysis has been carried out in co-operation with SIDS governments, and supported by voluntary contributions from Germany (IKI), New Zealand and Norway.



IRENA on-site visit to hydropower plant in Espiritu Santo Vanuatu, August 2016



Opening of a technical workshop in Cuba, August 2016



Utility Engineers from Tuvalu, Tonga, Federated States of Micronesia, Kiribati and the Cook Islands at Hydrotasmania's Flinders, Island Hybrid Energy Hub, December 201

90. IRENA has also worked with a range of partners to develop SIDS roadmaps. For example, the Kiribati Integrated Energy Roadmap (KIER) was transmitted to the government for approval in June 2017. The renewable energy deployment options in the KIER have since been used by the World Bank's SREP funding programme for renewable generation in South Tarawa and Kiritimati. A roadmap analysis for Palau, which provides renewable energy deployment options for the main national grid, is being used by the government of New Zealand to support Palau's renewable energy goals. The Japan International Cooperation Agency (JICA) has expressed interest to use these roadmap results to support a study on upgrade and maintenance improvement of the national power grid. The roadmap was also discussed with the President as an input for the country's NDCs.

91. Complementing the roadmap work, IRENA has undertaken a number of studies in SIDS to identify the required measures for the integration of variable renewables into the existing grid. Grid integration studies for Antigua and Barbuda, Cook Islands and Samoa were concluded in the course of the biennium, and studies for the Dominican Republic, Fiji, and Vanuatu were started in 2017 and the final results are expected for 2018.

92. Grid integration studies offer a practical and timely support to SIDS. For example, the study for the Cook Islands has supported the development of Cook Islands Renewable Energy Charts for the island of Aitutaki, and informed the implementation plan to achieve 100% renewables in the country by 2020. A grid integration study in Antigua has given policy-makers and the public utility insights on the amount of variable renewable energy that can be implemented on the island without major infrastructure upgrades. The study helped dispel the technical doubts to move forward with the planned PV projects and the first 3 MW were commissioned. The results of the study have also facilitated the national discussions about more ambitious targets. The grid integration study for Samoa identified the technical constraints associated with the implementation of the PV and wind generation projects planned to achieve the national target of 100% renewable energy. An energy storage system, recommended in the study to allow the reliable operation of the grid with the addition of 14 MW of solar PV, is currently being procured.

93. IRENA has also refined its methodology for grid stability studies of isolated power systems and is completing technical guidelines on variable renewable energy grid integration issues; operational and investment planning; and island-specific issues, in close co-operation with the University of Darmstadt, Energinet and Tractebel. This work has been supported by the Governments of Germany and Norway.

94. IRENA has also placed a greater focus on project support and facilitation, which has been identified as a major barrier to renewable energy deployment. IRENA has been developing the Islands Module of the Project Navigator that features technology-specific information and practical experiences on mini-

grids, covering the complete lifecycle of a renewable energy project: identification, assessment, selection, pre-development, development, construction, operation and decommissioning. The project, supported by the German International Climate Initiative (IKI), will continue to be refined and expanded with new technology guidelines.

95. Under the SIDS Lighthouses Initiative, IRENA has continued to collaborate with partners to build capacity as well as to identify new project opportunities and explore practical steps to develop bankable proposals. In this context, IRENA and the Government of Japan have co-ordinated a series of training workshops to explore enabling environments to support the deployment of renewable energy in SIDS. The first training workshop was held in Kuala Lumpur, Malaysia in August 2015, followed by the second workshop on financing renewable energy in SIDS in Fiji in December 2016 with support from the U.S. Department of State, Pacific Community (SPC), the Asian Development Bank (ADB), and the World Bank. The third training workshop explored the development of project proposals to access climate finance and was held in Tokyo and Kobe, Japan, in October 2017.

VI. Gateway to knowledge on renewable energy

96. IRENA continued its focus on dissemination of objective, timely, and authoritative information to reach a global, targeted audience. New data and analysis have been released and outreach activities in areas of quality infrastructure analysis have helped spread recent analytical findings and increase.

RE Statistics

97. The quality and scope of IRENA's renewable energy statistics continue to improve, with greater coverage of countries' energy balances and a new dataset released in 2017, giving preliminary estimates of off-grid electricity generation from renewables. In addition to the third edition of *Renewable capacity statistics* published in March 2017, IRENA's second *Renewable energy statistics* yearbook was published in June 2017. This included the global capacity statistics (2000-16), global electricity generation statistics (2000-15), global public investment data (2009-16) and renewable energy balances (2014 and 2015) for 110 countries. The latest statistics show that global renewable electricity capacity increased by a record 161 GW (8.7 %) in 2016 to reach 2,011 GW. In addition, renewable generation in 2015 was 5,512 TWh and public investment in renewables in 2016 amounted to USD 16.7 bn.

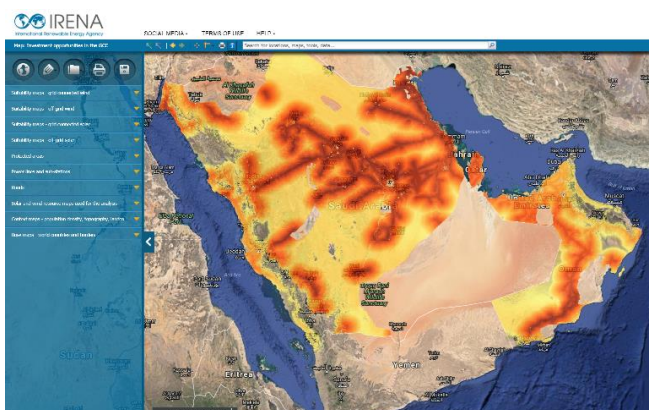
98. To improve the availability of data and facilitate trade, IRENA presented a proposal to the World Customs Organisation (WCO) in May 2017 to clarify the Harmonized System codes used to record trade in solar energy products. The proposal was accepted in principle and IRENA will continue to work with countries at the WCO on the details for implementation in the next edition of the Harmonized System (HS2022). In collaboration with OECD, IRENA also collected data and prepared a methodology for Sustainable Development Goal, Indicator 7.a.1: International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems. The methodology was approved by countries in November 2017 and IRENA and OECD will start reporting this data to the UN SDG Monitoring Unit in 2018.

99. To help build local capacities in data collection, IRENA published three statistical guides and held five renewable energy statistics training workshops in South Africa (with in-kind support from the Government of Denmark), Hungary and Thailand (with support from the Government of Germany and FAO), the UAE and Albania. These workshops trained 142 statisticians and national energy experts from 62 countries. As in previous years, these training workshops have had a measurable impact in terms of an increase in the number of countries being able to produce internationally comparable renewable energy statistics. IRENA also supported the China National Renewable Energy Centre in the development of a statistical system for measuring non-electricity renewables, which will be incorporated into China's national energy statistics.

The Global Atlas

100. Consistent with its original goals to create the basis for data and resource assessment expertise sharing in the renewable energy sector globally – IRENA's Global Atlas has delivered a highly functional geographic information platform. The Atlas brought together more than 50 international research institutions to share over 2000 renewable energy maps on this single and consistent platform covering solar, wind, bioenergy, geothermal and tidal energy.

101. In 2016/17, the Global Atlas platform, now version 3.0, hosted over 170,000 web visitors, all with varying interests including – project development, finance, education, policy research and sustainable development.



102. The Agency has also leveraged on the visibility afforded to data contributors to the platform, to change the resource mapping landscape. Progress in recent years has been immense with renewable energy maps for solar and wind available today for public use on the Global Atlas with a 1km spatial resolution, global coverage and extensively validated, compared to 10-40km maps sparsely validated only five years ago.

103. Through the zoning methodology, the Agency supported regional market analysis in the Gulf Cooperation Council (GCC), Latin America, South East Europe and West Africa. These maps identify suitable zones, for both utility-scale and decentralised solar and wind development, and provide an indicative technical potential. The zoning methodology developed has since been replicated with IRENA's support by other international institutions, notably by ECREEE for advisory services to sponsor countries on power generation planning and EUTAP in the context of planning for a solar energy corridor for West Africa.

104. IRENA extended its resource assessment activity to the demonstrative utilisation of mesoscale solar and wind time series. This methodology can serve early stage site appraisal and due diligence, and has been applied in Comoros, Cabo Verde, Swaziland, Zimbabwe, and recently Bhutan, Lesotho and Mali. Furthermore, the Global Atlas bioenergy simulator was launched in Q2 2017 and is freely accessible online. It allows assessment of bioenergy potential for particular feedstocks and end-use. A similar web tool for estimating the levelised cost of wind power on any selected land parcel is being developed by IRENA and is scheduled for release at the end of 2017.

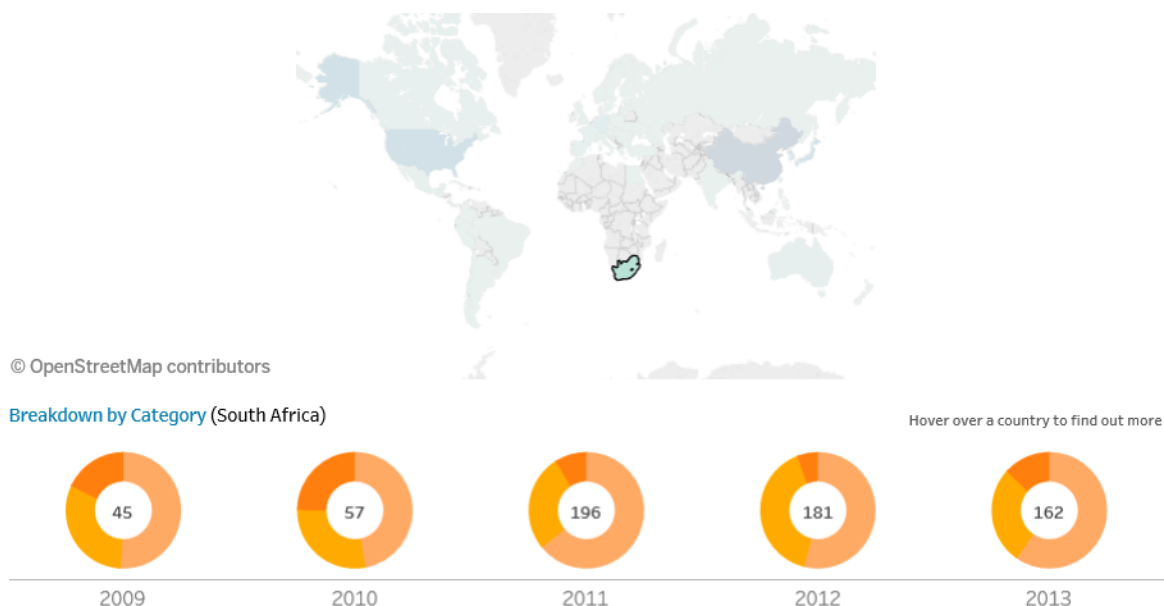
Quality and infrastructure, standards and patents

105. Renewable energy technologies competitiveness is improving rapidly, as shown by the recent prices observed in the onshore and offshore wind, CSP and PV technologies. The next challenge for a major scale-up in renewable energy markets is to assure, to all stakeholders, that these technologies will deliver the services with the expected performance during the lifetime. This context is reflected in the increasing requests from countries and organisations for support and guidance on the build-up of quality assurance frameworks to protect and nurture renewable energy markets. While IRENA is not a standardisation, testing or certification body, during the 2016-2017 biennium the Agency helped countries in understanding how to build up and operationalise a quality infrastructure, as well as the impact of such a quality infrastructure on renewable energy markets.

106. In the last five years, IRENA has delivered analytical work in this field for technologies including wind, solar thermal, PV and grids. The INSPIRE web tool on renewable energy patents and standards is becoming an important reference source of information for stakeholders. IRENA has also provided direct support in this area, including to China on offshore wind standardisation, Latin American and African countries on PV technology, Japan on the impact of extreme weather conditions on the quality of PV and wind systems. International organisations such as IEA and ENTSO-E are also using IRENA's work on technical standards for grid connection as the key reference on the subject. IRENA has also supported GCC countries upon their request to establish a network of PV test laboratories to exchange information on quality related aspects of this technology under GCC weather conditions.

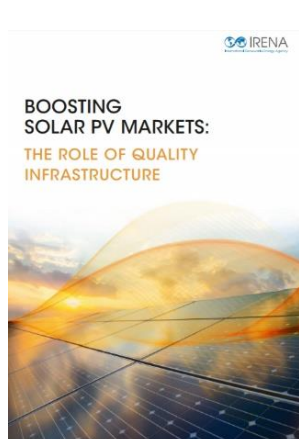
107. IRENA has positioned itself as a unique policy-driven international organisation in the energy sector that supports countries in implementing quality assurance frameworks. IRENA, as mentioned by partner organisations, is the only organisation bridging the gap between quality infrastructure bodies, industry, consumers and policy-makers. This field of work has also triggered great interest in the private sector and the renewable energy industry in particular. The work done to date has also been delivered due to the concrete support from interested partner organisations, such as the International Electrotechnical Commission (IEC), the German Metrology Institute (PTB), and industry associations such as SolarPower Europe, Solar United, the World Wind Energy Association and the IEA PVPS Task 13.

Nurturing PV markets through quality assurance and standardisation



INSPIRE – IRENA’s platform on information standard and patents in renewable energy: Annual number of Solar Technology patents filed in South Africa between 2009 and 2013 (inspire.irena.org)

From less than 10 gigawatts (GW) worldwide in 2006, installed solar PV capacity reached nearly 300 GW in 2016. More than 71 GW was added in 2016, with over USD 113 bn invested in solar energy technologies. As solar photovoltaic (PV) power systems become increasingly competitive, continued market growth depends on assurances of performance and durability. Quality assurance protects and accelerates future PV investments, lowers capital costs, improves performance, extends module lifespans and lowers the resulting electricity costs. However, comprehensive quality assurance requires physical and institutional infrastructure. This so-called, Quality Infrastructure (QI), comprises the total institutional network and legal framework that formulates and implements standards. It also includes testing, certification, metrology and accreditation.



IRENA’s report *Boosting Solar PV Markets: the role of quality infrastructure* outlines the best practices to develop and implement QI for solar PV. The data and analysis provide:

- Guidance for establishing proper QI mechanisms, showcased through successful experiences with utility-scale, distributed-generation and off-grid PV development in 11 countries;
- Five case studies are offering quantified cost-benefit analysis for QI implementation at different stages of PV plant development.

The report also shows that benefits achieved are consistently seen to outweigh the costs of QI implementation. Independent quality testing under engineering, procurement and construction (EPC) contracts can boost PV system performance by 2–3%, one case study shows.

Enhancing environmental and resource sustainability

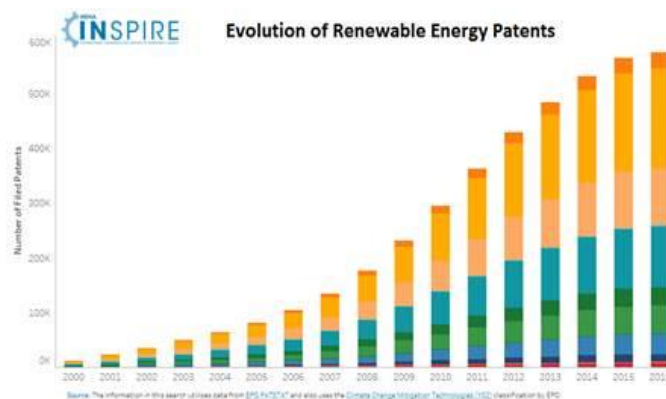
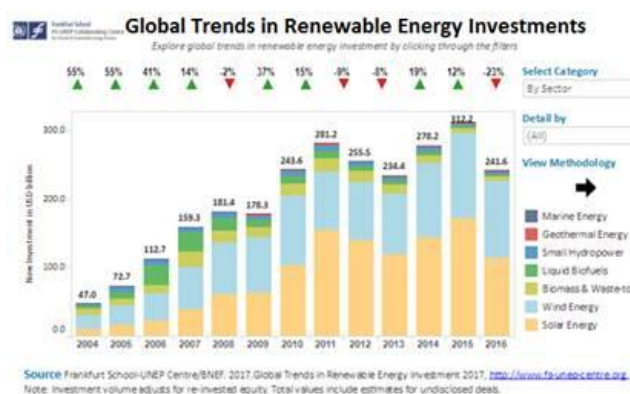
108. In June 2016, IRENA published jointly with IEA PVPS an analysis of the end-of-life management of photovoltaic panels. As the findings of the report underline, recycling PV panels at their end-of-life can unlock a large stock of raw materials and other valuable components. The recovered material injected back into the economy can serve for the production of new PV panels or be sold into global commodity markets, thus increasing the security of future raw material supply. The report has attracted major interest from policy-makers, the private sector and the research community and has been downloaded more than 60,000 times.

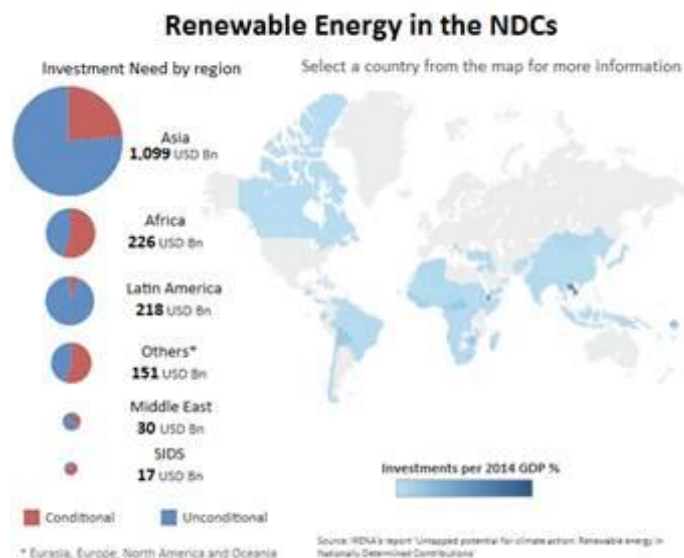
109. In January 2015, IRENA published a study on *Renewable Energy in The Water, Energy & Food Nexus*. The report highlights the key role of renewable energy for integrated resource management in energy planning. This laid the grounds for IRENA's work stream on the interrelations of energy with the agriculture and water sector, including work *Solar-pumping for Irrigation*, and *Renewable Energy Benefits: Decentralised Solutions in the Agri-Food Chain*. The Agency also undertakes quantitative analysis on the impacts of greater renewable energy deployment on water use in the power sector. As part of this, IRENA published a brief in 2016 on *Water Use in China's Power Sector* to showcase the impacts of renewables in terms of potential water savings in the power sector. To continue its line of country-level quantitative analysis, IRENA will be launching the brief *Water Use in India's Power Sector – Impact of renewables and cooling technologies to 2030* at the eighth Assembly, January 2018.



Knowledge hub

110. In response to feedback received from Members and external stakeholders, IRENA's online knowledge hub REsource was upgraded with a continuous focus on integrating the most recent and accurate content available. REsource has become a major component of the new streamlined corporate website and the data section was expanded to become the Agency's user-friendly interactive data centre, comprising the latest statistics on renewable energy balances, country data on the renewable energy component of Nationally Determined Contributions (NDCs), REmap options, finance, costing, technology innovations, patents and socio-economic benefits. To continuously improve the REsource platform, and provide transparent, easily accessible data and information on renewable energy, IRENA has developed a renewable energy Tagger, a tool creating a universal renewable energy dictionary with smart interconnections across renewable energy terminologies. The renewable energy Tagger was developed in collaboration with REEEP and with the support of voluntary resources from the government of Germany.

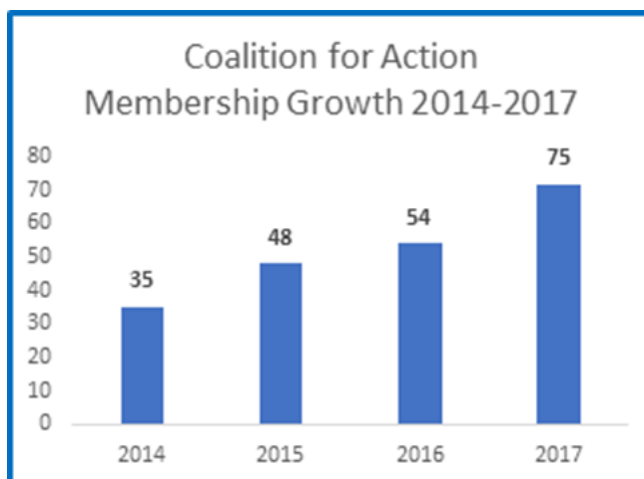




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Multi-stakeholder engagement

112. Over the last two years, the IRENA Coalition for Action has attracted numerous additional members, including key private sector stakeholders, all expressing a strong interest to engage further with and contribute to the substantive work of IRENA. During the first annual strategy meeting in January 2017, the Coalition adopted a work plan divided into three streams, including the continuation of the Communication Network, the creation of a Business and Investors Group, and a focus on the engagement in IRENA's strategic and programmatic activities. During 2017, the communication group has developed and launched two joint campaigns in conjunction to the G20 meeting and COP23. The Business and investors group has developed a white paper on the scaling up of renewable energy investment to be presented in a public private dialogue at the 8th IRENA Assembly in January 2018. In addition, Coalition activities include support for the development of an index for corporate sourcing of renewable energy, the REMade Index, which is currently under development. The REMade Index is made possible thanks to a voluntary contribution from the Government of Germany and will be the main deliverable of the Clean Energy Ministerial corporate sourcing campaign.



VII. Enhancing international co-operation and communication and outreach

113. The 2016-2017 biennium offered the opportunity to deepen and broaden IRENA's external engagement, communication and outreach efforts to achieve greater impact and reach a broader audience. IRENA's communication and outreach strategy in 2016 focused on positioning renewable energy as the solution to a host of economic, social and environmental issues, in addition to building on the momentum of the climate solutions agenda. In 2017, IRENA continued to strengthen its role as the global voice of renewables in a number of key international settings through various targeted media campaigns, publication launches and attendance at key events.

Facilitating international co-operation

114. The biennium was framed by the centrality of renewable energy in the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement on climate change, which was the key focus of IRENA's international co-operation efforts. IRENA was actively engaged in helping to shape the narrative of the energy transition, and signalling pathways to accelerate it within key international settings such as the United Nations, the G7 and G20. The Agency engaged with a broad range of countries, regions and initiatives to enhance international co-operation to accelerate the transition to a sustainable energy future. An increased focus on partnerships with non-government actors, such as cities, the private sector and civil society, catalysed action on renewable energy through a broad range of stakeholders.

115. IRENA continued to support global measurement efforts to facilitate the implementation of the Sustainable Development Goals (SDGs) in close collaboration with key international partners. This was done via the provision of analytical input and statistical data, as well as through the participation in outreach activities, including the High-Level event on renewable energy as an economic driver of sustainable development, organised in co-operation with UN partners and other stakeholders in the margins of the 2017 UN High-Level Political Forum. Within this context, the Agency has been recognised by the UN community as the global custodian agency for statistical data and analysis on renewables and clean energy investment-related targets. IRENA is also supporting ongoing preparations on the official review of SDG 7 at the United Nations in 2018.

116. The IRENA Director-General's direct engagement with the United Nations System partners took various forms, including the active participation in high-level meetings of the UN General Assembly in 2016 and 2017, during which he emphasised the need for accelerating the energy transition to meet both sustainable development and climate goals. He further participated as the energy voice at the High-Level event organised by UNFCCC and the President of the UN General Assembly in March 2017 to catalyse action across the sustainable development and climate agendas. IRENA also participated in the UN Ocean Conference in June 2017 with a special event on the status and potential of ocean energy technologies, especially in SIDS contexts.



United Nations General Assembly

117. Within the G7 and G20 context, IRENA actively contributed to the 2016 Energy Ministerial in Beijing, which adopted the IRENA-led *G20 Voluntary Action Plan on Renewable Energy* to drive the continued expansion of renewable energy in G20 countries. The *Climate and Energy Action Plan for Growth* adopted by the Hamburg G20 Summit in July 2017 called on IRENA to support the G20 efforts by providing a regular update on the global transformation of the energy sector and further investment needs. The Agency contributed to an analysis on enhancing energy access through renewable off-grid solutions at the G7 energy ministers meeting in April 2017, and the Director-General outlined the role of renewable energy in realising a number of SDGs and in meeting global climate objectives at the G7 environment ministers meeting in Italy in June 2017.



The Director-General at a roundtable discussion at the G7 in Italy in June 2017.

118. During the biennium, regional engagements increased considerably. In September 2017, for instance, the Director-General participated in the ASEAN Meeting of Energy Ministers (AMEM) in Manila, Philippines, which witnessed the first AMEM-IRENA dialogue resulting in a Memorandum of Understanding (MoU) outlining a strategic partnership and areas for co-operation. In May 2016, the Director-General also took part in the Italy-Africa Ministerial Conference in Rome, Italy, highlighting the role of renewable energy in powering economic growth and meeting energy demand in Africa while advancing sustainable development on the continent. IRENA also participated in the OLADE Ministerial meeting in Buenos Aires, Argentina, in December 2017.

119. Within the context of engagement with the private sector, the Director-General contributed to the Clean Energy Ministerial in San Francisco in June 2016 and in Beijing in June 2017, presenting the Agency's work as a partner in the Corporate Sourcing of Renewables Campaign, which encourages companies to increase their commitments to power their operations with renewable energy. He further delivered keynote addresses at the World Energy Congress in Istanbul, the Goldman Sachs Low Carbon Economy Forum in London, and at the opening of the European Utility Week in Amsterdam in October 2017.

Member Engagement

120. Throughout the biennium, IRENA's governing body meetings, consisting of two Assembly sessions and four Council meetings, were conducted successfully with strong engagement from the membership and other stakeholders. Each Assembly session was attended by over 1000 delegates from more than 150 countries, with a steadily increasing number of Heads of State and Government, as well as Ministers present. Participants from over 140 international and regional partners, organisations and other entities actively engaged in the renewable energy sector participated as well. IRENA Assembly sessions continue to gain increased international momentum, underscoring the indispensable role of renewables in the international sustainable development and climate agendas.

121. Held only six weeks after the adoption of the Paris Agreement, the sixth session of the Assembly was the first intergovernmental meeting after COP21. It presented an important platform for countries to discuss how to meet the ambitions resulting from the Agreement and the adoption of the SDGs,

particularly SDG 7 on Energy. Two Ministerial Roundtables were held to consider post-COP21 actions, specifically to boost renewable energy deployment and scale up investment in renewables. The seventh session of the Assembly in 2017 underlined the importance of innovation, energy access and private sector engagement. Ministerial Roundtables examined timely themes in the global energy transformation: firstly, innovation for the next stage of the power sector transformation; and secondly, catalysing off-grid renewable energy deployment to help realise universal electricity access and achieve the SDGs. Preparations are currently underway for the eighth session of the Assembly to be held in January 2018.



High-level event at the seventh session of the IRENA Assembly in 2017.

122. Meetings of the IRENA Council during the 2016-2017 biennium continued to facilitate consultations and co-operation among Members. Throughout the biennium the meetings of the Council saw high participation, with the last meeting held in November 2017 attracting almost 250 delegates representing 91 countries. These numbers demonstrate a strong interest in the Council's deliberations, including from States in Accession and non-Members; an interest that should be capitalised on and translated into more active engagement by as many country representatives as possible. In its efforts towards sustainable management practices, the Agency is progressing towards paperless meetings and conferences. Increased use of the IRENA meeting mobile application has resulted in 85 % reduction in paper usage during Council meetings throughout the biennium.



Participants at the 12th IRENA Council meeting in Abu Dhabi, November 2016.



Rethinking Energy 2017, Renewable Energy and Jobs Annual Review 2017, and the 2016 Global REmap report were launched to Members and the public during 2016-2017 governing body meetings.

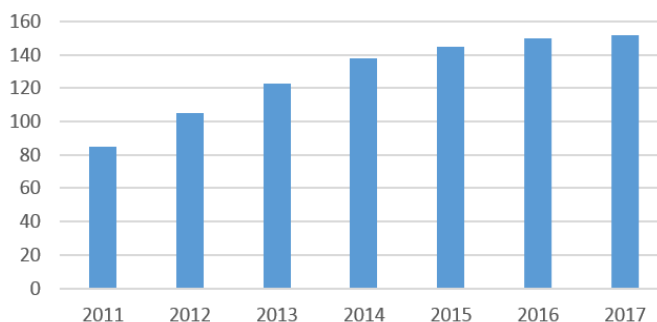
123. Since the beginning of 2016, the Fund for Developing Country Representatives (FDCR) has supported the participation of 126 delegates from Least Developed Countries (LDCs) and Small Island Developing States (SIDS) in IRENA governing body meetings. This has allowed for a high level of participation by these countries in deliberations of IRENA’s intergovernmental meetings.

124. In support of the programmatic delivery of the Work Programme, in addition to its regular governing body meetings, the Agency has organised events in different countries and regions. The planning and organisation of IRENA’s events has been consolidated and streamlined, resulting in more efficient and cost-effective delivery of the logistics of these meetings.

125. IRENA’s engagement with parliamentarians was significantly strengthened over the 2016-2017 biennium, reaching out to a parliamentary network that comprises legislators with an interest in renewable energy and related matters. The IRENA Legislators Forum – held in 2016 and 2017 in conjunction with the IRENA Assembly – has provided a platform for members of parliament to engage in knowledge and experience sharing on the deployment of renewable energy and the associated benefits.

126. IRENA continues to encourage Members to accredit Permanent Representatives, and engage with the diplomatic community in the United Arab Emirates through regular meetings and discussions. Over the course of the biennium, the number of Permanent Representatives accredited to the Agency increased from 37 to 48. Several Members are in the process of finalising accreditation procedures for their Permanent Representatives to IRENA. Through this as well as through its appointed Permanent Observer to the United Nations in New York and various other channels, the Agency is diversifying and strengthening its engagement with its membership on issues of interest to Members, as well as with States in the process of accession to IRENA and non-affiliated states on the topic of membership.

IRENA Membership



IRENA membership has steadily increased since 2011. In the course of 2016-2017 biennium the following countries have joined the Agency as new Members: Afghanistan, Bhutan, Botswana, El Salvador, Lebanon, Nepal, Saint Lucia, Thailand and Uzbekistan, bringing the total number of Members to 154 (153 States and the European Union). A further 26 States are in the process of accession to the Agency.

Efficient, transparent and innovative management

127. The Legal Office continued to provide support in the conduct of the Agency’s activities by reviewing contracts for the procurement of goods and services, and provision of advice on the application of IRENA regulations, rules and procedures, as well as on legal matters in general, including Memoranda of Understanding and voluntary contribution agreements. It also supported the ongoing negotiations of a supplementary agreement with the Government of the United Arab Emirates to govern IRENA’s occupancy of its permanent headquarters in Masdar City.

128. In addition, internal audits continued to be carried out to ensure internal controls are in place and effective across the Agency. Twelve key recommendations stemming from these audits were reported to IRENA’s Council meetings, eight out of which were fully implemented, and the remaining four are currently under implementation. Internal audits are carried out independently and objectively to help management enhance governance, risk management and internal control systems, and will continue to be reported to the membership through specific reports.

Communication and outreach

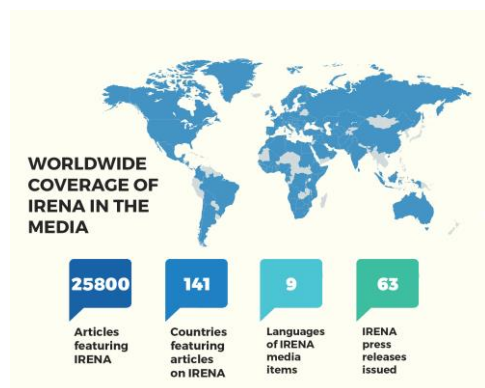
129. The 2016-2017 biennium offered the opportunity to deepen and broaden IRENA’s external engagement, communication and outreach efforts to achieve greater impact and reach wider audiences. IRENA’s communication and outreach strategy focused on positioning renewable energy as the solution to a host of economic, social and environmental issues, in addition to building on the momentum of the global climate change agenda. IRENA’s communications increasingly leveraged social media, video and other media to expand the organisation’s online constituency, while providing excellence in terms of messaging, media outreach and convening to reinforce IRENA’s position as the platform for international co-operation around renewable energy.

130. Tailored communication material was shared on a consistent basis with the membership covering a variety of programmatic matters to ensure Members are well informed about, and can benefit from, activities, services and knowledge products developed by the Agency. This was accomplished by stepping up systematic communication with membership on programmatic initiatives, activities, events and publications. The REMember on-line platform consolidated relevant and up-to-date information for the membership to facilitate effective engagement with IRENA’s programmes.



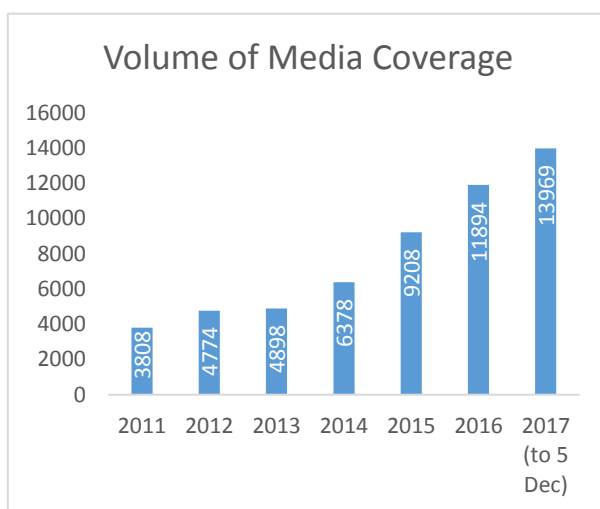
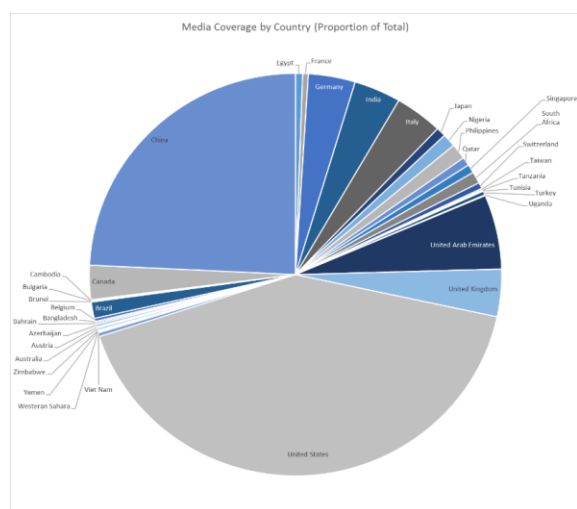
Tailored communication materials for Members included the ‘IRENA Bulletin’ – an e-newsletter informing membership on relevant IRENA activities, events and knowledge products; ‘In Focus’ briefs, which serve to introduce membership to specific topics in a concise manner and were utilised by Members as a practical source of information on programmatic issues; and the monthly ‘Publications Update’, giving Members a comprehensive overview of the latest releases, strengthening the dissemination of IRENA knowledge products and encouraging Member engagement.

131. During the biennium, the Agency stepped-up its communication around major events and milestones of strategic importance to IRENA. Events organised by IRENA were further complemented by dedicated coverage targeted specifically to Members.



IRENA’s media outreach provided the global community with new, insightful and transformative data to accelerate the global energy transition, strengthening media outreach around key reports and publications by developing rich and engaging media packages for journalists and others. As a result, IRENA was mentioned in over 25,000 news stories including in some of the world’s most influential media outlets, such as Al Arabiya, Associated Press, BBC, Bloomberg, CCTV, CNBC, CNN, Deutsche Welle, The Economist, Economic Times, Financial Times, The Guardian, Le Monde, The New York Times, El Pais, Reuters, RT, Sky News Arabia, Sydney Morning Herald, The Times of India, The Wall Street Journal, and Xinhua.

132. IRENA’s media engagement during the Sixth and Seventh Assembly sessions provided a unique window into the world’s platform for co-operation around renewable energy. Media partnerships with the Financial Times in 2016 and with CNN in 2017 brought leading journalists to moderate IRENA discussions, as well as the creation of prime-time feature segments, TV commercials and digital campaigns reaching a large public audience. According to CNN reporting, IRENA advertising had a click-through rate 30 times higher than the network average. IRENA also hosted journalists from around the world at its Sixth and Seventh Assemblies, increasing the quality of focused reporting on renewables and ensuring wide media coverage.



133. IRENA also developed a strategy to be more deliberate in deploying social media at different global and regional events, as well as at strategic times targeting different time zones around the world. As a result, IRENA’s Twitter following, for instance, grew by more than 230% during the biennium, with more than 28 million impressions. IRENA also strengthened its partnerships and use of influencers to amplify its messaging through initiatives like the Coalition for Action #Renewables4Climate campaign. The campaign hashtag was used over 3,000 times on social platforms with over 20 million impressions. Over the course of the biennium, IRENA grew its Facebook constituency to more than quarter-of-a-million followers, and its LinkedIn engagement by 90%, driven by greater post frequency.

134. IRENA also expanded its use of visuals and innovative display materials during the biennium. The Agency produced more than fifty videos to promote key activities, events and products. A video produced to highlight renewables on SIDS that was promoted across IRENA’s social media channels

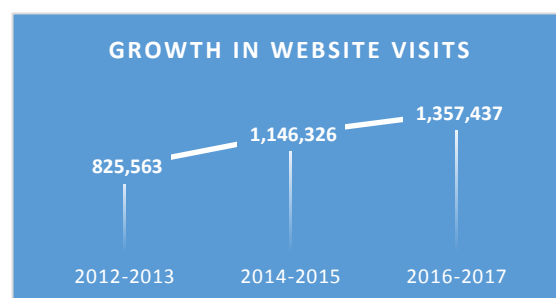
was viewed 1.3 million times online. Many of IRENA's videos featured interviews with key figures and were featured in international and regional partners' videos and social media channels. During the EU Sustainable Energy Week and the UN Climate Change Conference in 2017, IRENA conducted public awareness campaigns raising awareness about the benefits of renewable energy. Visual communications platforms during these events included magazine spreads, photo cubes and a renewable energy-themed train.



In addition to featuring IRENA in the summer edition of Revolve, the Agency joined forces with the specialised European publication to raise awareness during the EU Sustainable Energy Week 2017 and COP23 through photographic cubes in the streets of Brussels and Bonn, respectively.

135. The IRENA website saw continuous growth in the amount of returning visitors, reaching 1,350,000 during the biennium, with over four million page views. In November 2017, following a multi-year redevelopment project, IRENA launched its new website, which incorporates 18 separate portals, introduces new pages of content, and refines existing content into a rich user experience. Utilizing the latest online technology, the website has been developed to showcase the extensive work of the organisation and its stakeholders, to better position the Agency as the Voice of Renewables, and underscore the key facets of the global energy transformation currently underway.

136. During the 2016-2017 biennium, the Agency released over 70 new reports and briefs. Reader-friendly web content and targeted communications activities have strengthened the dissemination of this growing body of publications. Over the biennium, IRENA's publications and knowledge products were downloaded 4.1 million times and have been referenced by governments, the UN and other international bodies, civil society, the private sector, and academics around the world.



137. Along with its international communications efforts, the Agency has taken several steps to enhance outreach in the UAE, by hosting and receiving several visits by high-level officials, international private sector entities, academic and research institutions at the Headquarters. To engage youth, IRENA launched a pilot Summer Trainee Programme – ‘Gain Real Office Work Training Here – GROWTH@IRENA’ targeting undergraduate students, providing them with an opportunity to learn more about IRENA and renewable energy. IRENA held two lecture series in co-operation with the University of Bonn during the biennium, continuing its outreach to the students and young professionals interested in the renewables field. In New York, outreach to and collaboration with a variety of stakeholders within the academic community continued, such as with the Columbia University Center on Global Energy Policy, Yale University, Pace University, and the Council on Foreign Relations.

VIII. Administration and Management Services

138. The Administration and Management Services continued its efforts to provide support to the Agency to implement the 2016-2017 biennium work programme, while seeking and providing solutions and enhancements to current processes. In this regard, the implementation of the Oracle ERP system is underway and, when fully implemented, it will further enhance the efficiency of business processes of the Agency.

Finance and budget

139. Finance and budget services continued to support the Agency's full compliance with its Financial Regulations and Procedures in accordance with the International Public Sector Accounting Standards (IPSAS). Financial and budgetary services were provided to Members, staff and other stakeholders, aligned with international accounting standards and budget practices. The services included preparation of the financial statements for the Agency and the Staff Provident Fund, issuance of annual bills and regular follow-up with Members for the collection of outstanding assessed contributions, registering and allotting voluntary contributions, settlement of vendor and supplier invoices, and regular internal support services including payroll, budget utilisation updates and general advice to support the sound financial management of the Agency. Additional activities included support for addressing internal and external audit recommendations and extensive efforts associated with the ERP implementation.

Information and Communication Technology

140. As a knowledge-based organisation operating in an increasingly digital environment, ICT has become a strategic enabler and tool for the Agency in the implementation of its Work Programme. To lower the operational risks and reduce costs related to ICT support, many outsourced services have been in-sourced, strengthening internal capacity. Further, to enhance the availability and resilience of ICT services, IRENA has adopted hybrid Cloud-based and on-premise infrastructure and services, which provided increased operational flexibility with no major capital investments needed for ICT infrastructure. Regular monitoring and reviews of ICT services ensured the right technology and deployment models for IRENA while keeping in mind current and future requirements of the Agency.

Human Resources

141. Human resources spanned administrative, operational and strategic activities. Significant effort was placed on aligning human resource policies and processes more closely with the Agency's strategic and programmatic objectives. This included additional personnel sourcing and building organisational capabilities that are needed to achieve the Agency's operational objectives with the right combination of skills, knowledge, competencies and expertise, while promoting geographical, cultural and gender diversity. Human resource practices, rules and procedures have continued to be refined and updated to ensure effective and efficient responsiveness to the emerging and evolving needs and challenges of the Agency while safeguarding its core values and principles.

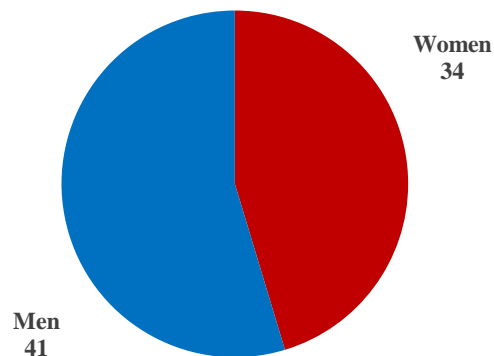
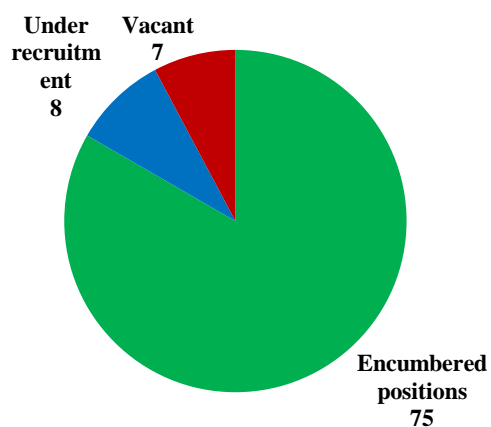
142. Attracting, developing and retaining highly qualified staff is key to the Agency's success. In this respect, IRENA has stepped up its outreach efforts to attract talent from all over the world, including tapping into Members' expertise, including through the mechanisms provided by the decision of the Assembly at its second session (A/2/DC/5) such as loan arrangements and Junior Professional Officer Programme. During the period from 1 January 2017 and 14 December 2017, 45 vacancies (core and non-core) were announced and over 9,000 applications received. Out of 90 core posts, 83 are filled or under recruitment (75 filled and 8 under active recruitment) and seven were vacant. The 75 staff are from 43 nationalities out of which 45 % are women and 55 % are men.

Approved and filled/under recruitment posts by level as of 14 December 2017

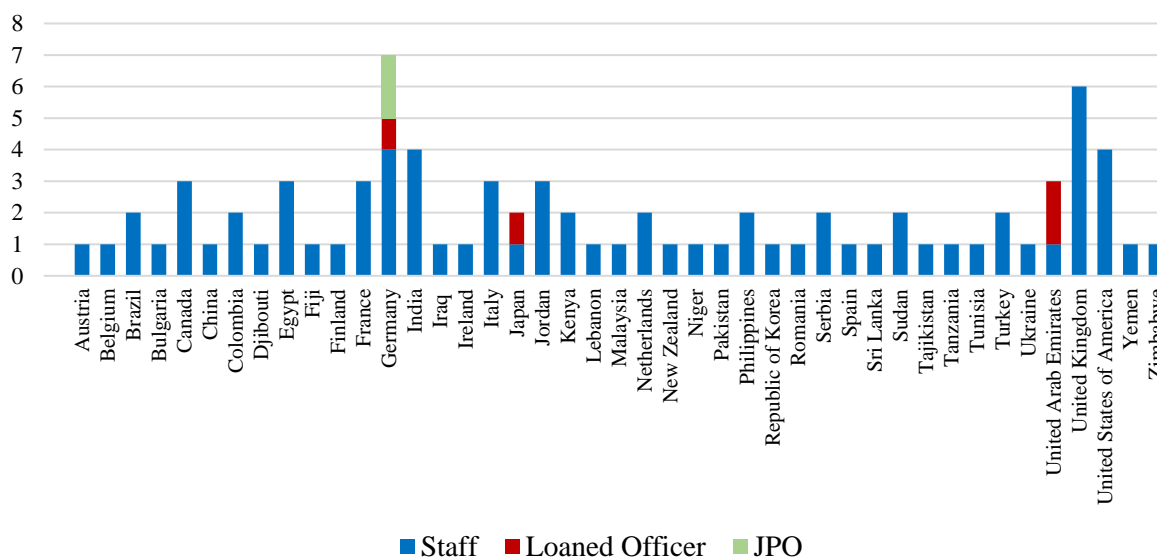
| Level | Approved | Filled or Under Recruitment |
|---|-----------|-----------------------------|
| ASG | 1 | 1 |
| D-2 | 1 | 1 |
| D-1 | 5 | 5 |
| P-5 | 17 | 16 |
| P-3/4 | 37 | 33 |
| P-2/1 | 3 | 3 |
| Sub-total Professional and above | 64 | 59 |
| General Services | 26 | 24 |
| Total | 90 | 83 |

Staffing status as of 14 December 2017

Gender distribution as of 14 December 2017 (filled)



Geographical distribution as of 14 December 2017 (filled posts)



Loaned Personnel

| Division | Title | Loaned from |
|-----------------|---|--------------------|
| SMED | Liaison and Protocol Officer | UAE |
| SMED | Advisor - Outreach and Communications | UAE |
| IITC | Bioenergy Analyst | Japan |
| IITC | Loaned Officer – Quality Assurance and Standards for Renewable Energy | Germany |

Junior Professional Officers (JPO)

| Division | Title | JPO from |
|-----------------|---|-----------------|
| KPFC | Associate Programme Officer - Policy | Germany |
| IITC | Associate Programme Officer - Energy Planning | Germany |

Procurement

143. The Agency has continued to implement its procurement planning to ensure cost-effective solicitation of goods and services. To ensure transparency, fairness, openness and competitiveness, procurement opportunities were being posted on IRENA's website as well as disseminated to the vendors registered with IRENA. Through continuous market research and a recent call for Expression of Interest (EOI), IRENA's vendors' database has been further enlarged to maximise competition. As of 30 September 2017, the database included more than 350 new vendors specialised in renewable energy consulting services from 25 countries of different regions of the world. Some 400 contracts were awarded in 2017, valued at more than USD 7 million.

General services and travel

144. The General Services and Travel Section has continued to facilitate travel services provided to staff members, delegates, participants in conferences and workshops. In 2017, the Agency facilitated participation in 22 workshops and co-ordinated 2,055 travel requests. The General Services has continued to provide facility management services for IRENA Headquarters and staff. This is an important function which contributes to a healthy and productive work environment while delivering continuous day-to-day services for staff. As part of these ongoing services, General Services has instituted a Health and Safety programme and further measures are planned to be implemented in the future.

Biennial budget overview

2016-2017 Biennium Budget Utilisation by funding source (in USD Thousands)

| | 2016-2017 Biennium Budget | Utilisation as at 14 December 2017 | |
|---|---------------------------------|------------------------------------|--|
| | | Commitment and Expenses | Proportion of 2016-2017 Biennium Budget |
| Assessed Contributions (Core Budget) | 42,934 | 41,463 | 97% |
| Core Non-Assessed UAE | | | |
| UAE Support | 5,000 | 4,742 | 95% |
| Governing Body Meetings | 3,200 | 3,036 | 95% |
| Subtotal | 8,200 | 7,778 | 95% |
| Core Non-Assessed Germany | | | |
| Innovation and Technology | 10,000 | 9,725 | 97% |
| Subtotal | 10,000 | 9,725 | |
| Total Core Non-Assessed | 18,200 | 17,503 | 96% |
| Grand Total | 61,134 | 58,966 | 96% |

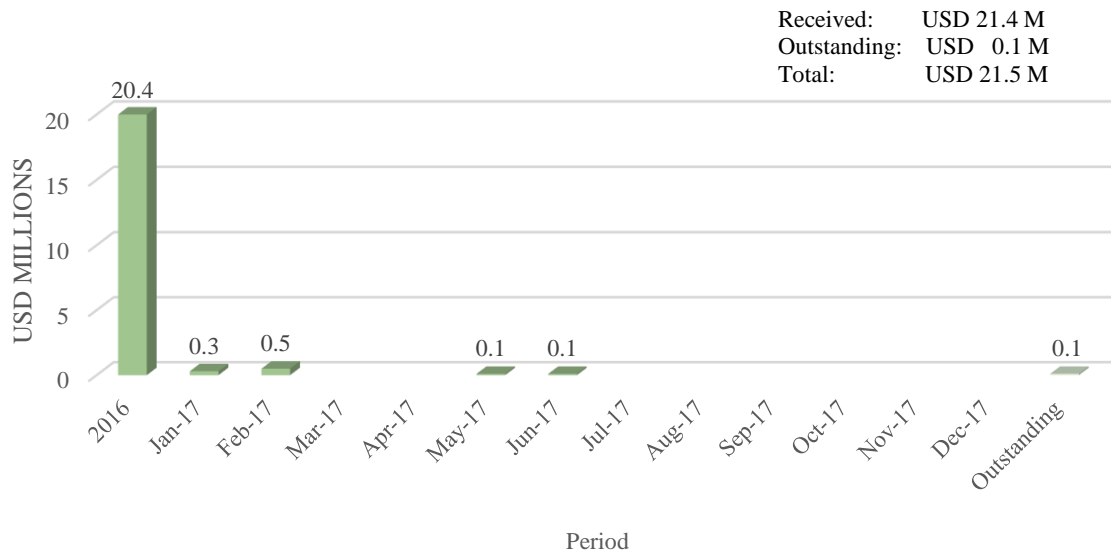
Other voluntary contributions, as of 14 December 2017, in USD

| <i>Other Voluntary Contributions</i> | | |
|--------------------------------------|--------------------|-------------------|
| Donor/Project | 2016-2017 Biennium | |
| | Committed | Received |
| Belgium - Walloon Region | 1,179,250 | 1,179,250 |
| European Commission | 326,087 | 97,830 |
| France | 530,970 | 530,970 |
| Germany | 9,825,316 | 5,913,852 |
| Italy | 350,000 | 350,000 |
| Japan | 1,159,917 | 1,159,917 |
| Kingdom of the Netherlands | 108,040 | 108,040 |
| Norway | 4,732,117 | 1,816,310 |
| Sweden | 46,178 | - |
| United Arab Emirates (UAE) | 4,249,847 | 4,249,847 |
| Subtotal | 22,507,722 | 15,406,016 |

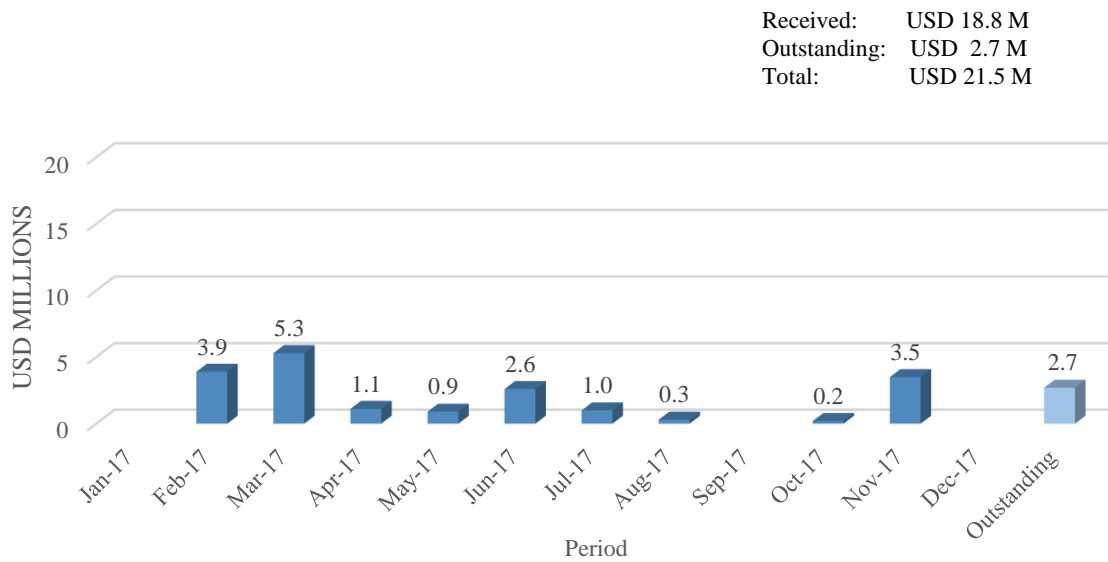
| <i>Fund for Developing Countries Representatives</i> | | |
|--|--------------------|----------------|
| Donor | 2016-2017 Biennium | |
| | Committed | Received |
| Germany | 200,000 | 200,000 |
| Philippines | 5,000 | 5,000 |
| United Arab Emirates (UAE) | 400,000 | 400,000 |
| Subtotal | 605,000 | 605,000 |

| | | |
|---|-------------------|-------------------|
| Total Additional Voluntary Contributions | 23,112,722 | 16,011,016 |
|---|-------------------|-------------------|

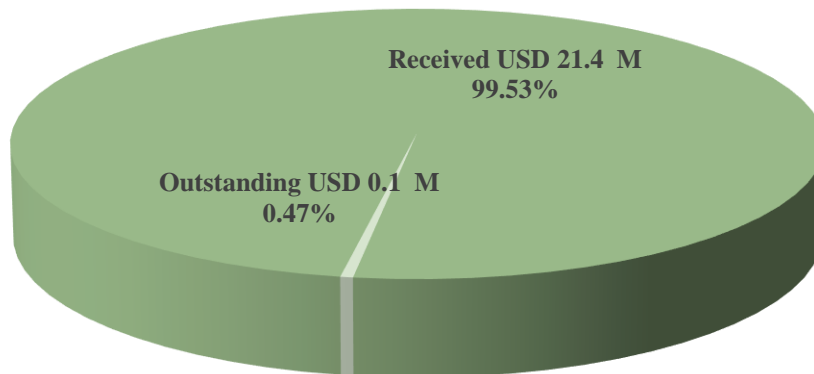
Received and outstanding assessed contributions for 2016 core budget (as of 14 December 2017)



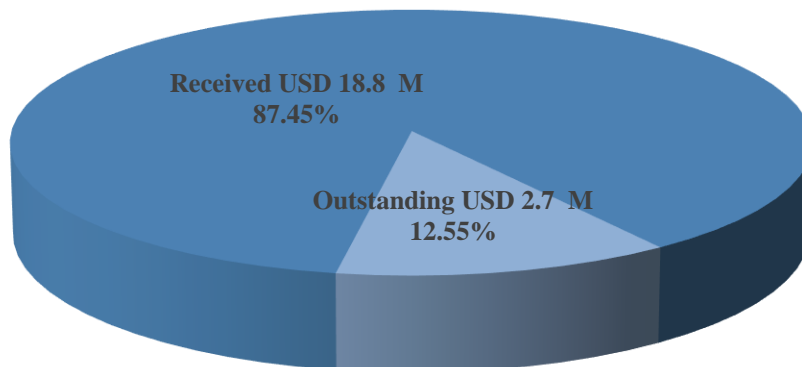
Received and outstanding assessed contributions for 2017 core budget (as of 14 December 2017)



Status of contributions to the 2016 core budget (as of 14 December 2017)



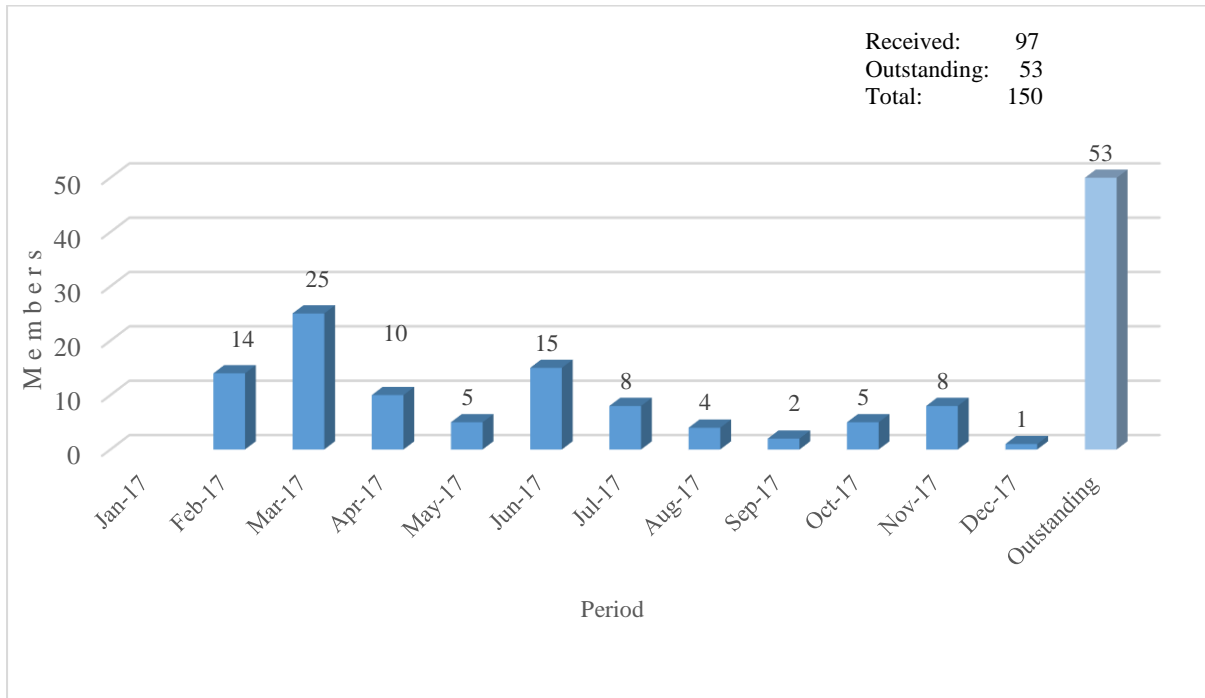
Status of contributions to the 2017 core budget (as of 14 December 2017)



Number of Members with received and outstanding contributions to the 2016 core budget (as of 14 December 2017)



Number of Members with received and outstanding contributions to the 2017 core budget (as of 14 December 2017)



Thematic Programme Areas - Matrix

Programme activities

| Thematic area: Planning for the Global Energy Transition | | | | | |
|---|--|--|--|--|--------------------|
| Objective: Countries successfully transform their energy systems to meet national targets and strategies to decrease global emissions and improve energy security | | | | | |
| Resources (core assessed, non-assessed and other sources): 12,356 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| REthinking Energy | <ul style="list-style-type: none"> Global Report: Completion of the Third Edition of REthinking Energy. | <p>Completed.</p> <ul style="list-style-type: none"> The third edition of REthinking Energy was completed and released at the IRENA seventh Assembly, with global citations and downloads. | | | Q3 2017 |
| Power system design for RE integration | <ul style="list-style-type: none"> Methodology for grid integration planning* | <p>Completed.</p> <ul style="list-style-type: none"> AVRIL report on tools for planning Guides on grid integration technical studies to plan the development of power systems compatible with renewable energy integration targets for islands. | <ul style="list-style-type: none"> Deployment of methodology for grid integration planning. | <p>In progress. Ongoing.</p> <ul style="list-style-type: none"> Deployment of ACEC zoning work into SPLAT model. Application of GIS based zoning approach to power sector planning Participation in expert meetings and publication of produced content. <p><i>VC from the Government of Norway.</i></p> | Q2 2016 Q4 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | Timeframe** | |
|--|---|--|--|---|----------------------------|
| | Core | Status | Other sources | | |
| Power system design for RE integration (continued) | <ul style="list-style-type: none"> • Workshop on methodology for integration planning* | <p>Completed.</p> <ul style="list-style-type: none"> • The IRENA Innovation Week, in May 2016 included a workshop for integration planning. • Technical workshops for grid operators in Central America in Panama in October 2016 and June 2017. • IRENA side event on capacity expansion modelling with VRE at the International Energy Workshop, July 2017 • Regional workshop on long-term planning with VRE for South American countries, in Argentina in August 2017. • Training on incorporating VRE on network studies for secure and stable grid operation for TSO in Panama as part of CECCA pilot project. | <ul style="list-style-type: none"> • One additional workshop on integration planning. | <p>Completed.</p> <ul style="list-style-type: none"> • Workshops for Technical Experts on Planning and Operating Systems with high shares of renewable energy held in Tonga, Cuba, St. Maarten and Samoa <p><i>VC from Germany, New Zealand and Norway.</i></p> | <p>Q2 2016 Q2 2017</p> |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| | | | | | |
|--|--|---|---|---|---------|
| | | <ul style="list-style-type: none"> • Participation and contribution to training workshops on VRE integration planning organized by NREL, and GIZ. | | | |
| | <ul style="list-style-type: none"> • Advice on use of established industry simulation tools for planning* | <p>Completed.</p> <ul style="list-style-type: none"> • Comparative study on modelling tools finalised, and released. • Advice on use of tools ongoing. | <ul style="list-style-type: none"> • Simulation tools applied. | <p>Completed.</p> <ul style="list-style-type: none"> • Applied for EU REmap <p><i>Voluntary contribution from the EC.</i></p> | Q4 2016 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|--|--|---|---|-------------------|
| | Core | Status | Other sources | Status | |
| Power system design for RE integration (continued) | <ul style="list-style-type: none"> • Latin America country studies on integration of VRE into long-term planning* | <p>Completed.</p> <ul style="list-style-type: none"> • Gap assessment for South American countries based on the results of IRENA regional workshop on power sector planning with variable renewables held in Argentina in August 2017 • Gap analysis and identification of technical assistance priority tasks for Panama as pilot country of the CECCA Initiative, completed in June 2017. | <ul style="list-style-type: none"> • Training programme on the use of long-term planning tool in Africa. | <p>Completed.</p> <ul style="list-style-type: none"> • Training programme on long-term energy planning completed in Swaziland, and the final draft energy master plan has been put forward for final stakeholder review. <p><i>In kind contribution from Swaziland</i></p> <ul style="list-style-type: none"> • Kick-off mission for energy planning capacity building project for Sierra Leone completed. • ECREEE training for 10 countries - held third training session in January 2016. <p><i>In kind contribution from ECREEE.</i></p> <ul style="list-style-type: none"> • Collaborative trainings with IAEA ongoing. <p><i>Voluntary contribution from the Government of Norway.</i></p> | Q1 2016 - Q4 2016 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|---|---|---|---|-------------------------------|
| | Core | Status | Other sources | Status | |
| Power system design for RE integration (continued) | <ul style="list-style-type: none"> Indicator system for flexibility assessment of power systems* | <p>Completed.</p> <p>IRENA developed a methodology and tool (FlexTool) to assess flexibility of power systems and identify a least cost mix of solutions to address the flexibility gap.</p> | <ul style="list-style-type: none"> Deploy indicator system including two dialogue events for grid planners, transmission and distribution system operators, grid regulators; evaluation of flexibility and adequacy options. Two workshops to collect input and feedback on grid integration methodologies. | <p>Resources not identified.</p> | <p>Q2 2016</p> <p>Q4 2017</p> |
| | | | <ul style="list-style-type: none"> Guidelines on EVs, interconnectors and electricity storage as flexibility measures. | <p>In progress.</p> <ul style="list-style-type: none"> Development of the global storage valuation framework, to complete Q2 2018. <p><i>VC from Government of Japan.</i></p> | <p>Q4 2016⁴</p> |

⁴ Timeframe adjusted

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|------------|--------|--|---|-------------------|
| | Core | Status | Other sources | Status | |
| Power system design for RE integration (continued) | | | <ul style="list-style-type: none"> • Country application of innovative grid and market design guidelines and methodologies, upon request. | | Q1 2016 - Q4 2017 |
| | | | <ul style="list-style-type: none"> • Advisory services on the development of power sector transition plans. | <p>Completed.</p> <ul style="list-style-type: none"> • Advisory services provided to Swaziland which are strengthening national capabilities in strategic long-term energy planning. <p><i>Voluntary contribution from the Government of Norway.</i></p> <p>In progress.</p> <ul style="list-style-type: none"> • Development of national training programme to Sierra Leone for build-up of a national energy planning capacity and development of a national energy master plan. • Updates of SPLAT model for Western African countries and publication of the updated planning and prospect report for RE in West Africa. | Q1 2016 - Q4 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---------------------|---|---|--|--|----------------------------|
| | Core | Status | Other sources | Status | |
| Transforming Energy | <p>Completed.</p> <ul style="list-style-type: none"> • REmap global technology roadmap analysis - third edition (Perspectives for the Energy Transition)* | <p>In progress.</p> <ul style="list-style-type: none"> • Continuous update of country reports to feed into the third edition. | <ul style="list-style-type: none"> • REmap - third edition covering an additional 10 countries, five individual country reports; energy efficiency & renewables action team and transport action team; Socio-economic briefs; two national expert workshops; regional and sectoral roadmaps and REmap information platform. | <p>Completed.</p> <ul style="list-style-type: none"> • REmap ASEAN • REmap G20 toolkit (2016) • Perspectives for the Energy Transition (2017) • Stranded assets • Synergies between Renewable Energy and Energy Efficiency • The Renewable Route to Sustainable Transport • Two national expert workshops <p>Ongoing.</p> <ul style="list-style-type: none"> • REmap South Africa • REmap EU • REmap Kazakhstan • REmap/RRA Egypt <p><i>VC from the EU and Governments of Germany and Japan</i></p> | <p>Q1 2017 Q4 2017</p> |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|------------------------------------|------------|--------|---|--|-------------------|
| | Core | Status | Other sources | Status | |
| Transforming Energy (continued) | | | <ul style="list-style-type: none"> • Analysis of the impacts of REmap 2030 options on water use in the power sector for different countries. | Resources not identified. | Ongoing |
| | | | <ul style="list-style-type: none"> • Country analysis (5 countries) on policy frameworks, energy sector transformation and market design. | Completed. <ul style="list-style-type: none"> • REmap India • REmap Dominican Republic • REmap Indonesia • REmap Russian Federation • REmap/RRA Thailand <i>VC from the Governments of Germany and Japan</i> | Q1 2016 – Q4 2017 |
| | | | <ul style="list-style-type: none"> • System for characterisation and selection of bioenergy technology pathways to be deployed for a bioenergy Navigator module. | In progress. <ul style="list-style-type: none"> • Work has started for solid biomass combustion for power generation. <i>VC from the Government of Japan.</i> | Q1 2016 - Q4 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|------------------------------------|------------|--------|---|--|----------------------|
| | Core | Status | Other sources | Status | |
| Transforming Energy (continued) | | | <ul style="list-style-type: none"> • Bioenergy cost-supply report. | <p>Completed.</p> <ul style="list-style-type: none"> • <i>Boosting Biofuels</i> analysis published in May 2016, presented in multilateral fora. • Workshop comparing sustainable supply estimates, Berlin, September 2016 • Joint brief on sustainable resource potential with FAO and IEA Bioenergy. • Follow-on analysis of resource potential in Southeast Asia published in June 2017. • Follow-on analysis of resource potential in Sub-Saharan Africa published fall 2017. • Follow-on analysis of bioenergy potential from restoring degraded lands in Africa published fall 2017. <p><i>VC from the Governments of Germany and Japan.</i></p> | Q4 2016 |
| | | | <ul style="list-style-type: none"> • Data on processing residue availability to support project development. | <p>In progress.</p> <ul style="list-style-type: none"> • Biomass residue data collection and analysis for several countries in Sub-Sahara Africa underway. <p><i>VC from the Government of Japan</i></p> | Q2 2016 - Q2 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | Timeframe** | |
|------------------------------------|------------|--------|---|---|-------------------|
| | Core | Status | Other sources | | |
| Transforming Energy (continued) | | | <ul style="list-style-type: none"> • A bioenergy assessment tool for Global Atlas to include costs and other parameters. | <p>Completed.</p> <ul style="list-style-type: none"> • Bioenergy simulator available on website. • Webinar on simulator in April 2017. <p><i>VC from PRIMAFF and the Government of Japan. In kind resources from the Government of Belgium.</i></p> | Q4 2016 |
| | | | <ul style="list-style-type: none"> • Advisory services on bioenergy technology options, upon request. | <p>In progress.</p> <ul style="list-style-type: none"> • Joint paper on energy and land use with UNCCD • Workshop on bioenergy project development under preparation. • Development of G20 toolkit for bioenergy. • Survey of food and fuel success stories in developing countries with ICRAF - World Agroforestry Centre. • Assessment of best practices potential for sustainable bioenergy from boreal forests. <p><i>VC from the Governments Germany, Japan and Sweden. In kind contribution from Finland.</i></p> | Q1 2016 - Q4 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|-----------------------------|--|--|--|--|--------------------|
| | Core | Status | Other sources | Status | |
| Technology status & outlook | <ul style="list-style-type: none"> • Report: “<i>The Innovation Landscape for RE Technologies</i>”* | <p>In progress.</p> <ul style="list-style-type: none"> • “Accelerating the Energy Transition Through Innovation” has been completed providing an initial landscape of technology options for the decarbonisation. • Full report on the Innovation Landscape will be ready Q1 2018 | <ul style="list-style-type: none"> • Two preparatory workshops for the Innovation report. | <p>Completed.</p> <ul style="list-style-type: none"> • Workshop during Innovation Day in May 2016. • Expert meeting in Brussels with ENTSO-e on innovative infrastructure, Sep 2017 • Workshop with utilities at the European Utility Week, Oct 2017. • Workshop on community power at the Global Science, Technology and Innovation Conference, Oct 2017. <p><i>Resourced through leveraging core and other funds.</i></p> | Q2 2016 Q4 2017 |
| | <ul style="list-style-type: none"> • Status briefs for five technologies* | <p>Completed.</p> <ul style="list-style-type: none"> • Geothermal • Wind power • Biofuels for aviation • Biogas for transport sector • Biogas for cooking | <ul style="list-style-type: none"> • Additional technology briefs. | <p>In progress.</p> <ul style="list-style-type: none"> • Logistics for biomass • Ocean energy: data on progress ocean energy technologies has been collected for the last two years. <p><i>Resourced through leveraging core and other funds.</i></p> | Q1 2016 Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|--|---|---|--|---|---|
| | Core | Status | Other sources | Status | |
| Technology status & outlook (continued) | <ul style="list-style-type: none"> • Outlook report for heating and cooling energy storage* | <p>Completed.</p> <ul style="list-style-type: none"> • Report “Renewable energy in district heating and cooling: A sector roadmap for REmap” has been completed. The report broadens the scope from storage to district heating networks. | <ul style="list-style-type: none"> • Outlook report for 1) offshore wind and 2) electric vehicles | <p>Completed.</p> <ul style="list-style-type: none"> • Offshore wind Report launched at the World Wind Energy Conference in Nov 2016. • Electric vehicles technology brief. <p><i>Resourced through leveraging core and other funds.</i></p> | <p>Q4 2016 Q4 2017</p> |
| | <ul style="list-style-type: none"> • IRENA Energy Week to support Innovation Landscape report* | <p>Completed.</p> <ul style="list-style-type: none"> • IRENA Innovation Week took place on 11-13 May 2016. | <ul style="list-style-type: none"> • IRENA Energy Week | <p>Resources not identified.</p> | <p>Q2 2017</p> |
| | | | | <ul style="list-style-type: none"> • Global report on status and trends of hydropower. | <p>Resources not identified.</p> |

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| Component | Activities | | | | Timeframe** |
|--|------------|--------|--|---|-------------------|
| | Core | Status | Other sources | Status | |
| Technology status & outlook (continued) | | | <ul style="list-style-type: none"> • Country advisory services in designing and implementing renewable energy technology innovation strategies. | <p>Completed.</p> <ul style="list-style-type: none"> • Country advisory services provided to Member states during the IRENA Innovation Day event on innovation strategies for an energy system transformation. • Support to UNFCC Technology Executive Committee on technology transfer mechanisms for renewable energy. • Support to VITO on research strategy on renewable energy technologies. • Advice to Repsol on projections for renewable energy to integrate more renewables into their 2050 market strategy. | Q1 2016 - Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|----------------------------|---|---|---|--|-----------------|
| | Core | Status | Other sources | Status | |
| Global Geothermal Alliance | <ul style="list-style-type: none"> Establish a GGA platform for communication. | <p>Completed.</p> <ul style="list-style-type: none"> GGA action plan finalised through an intensive consultative process with GGA member countries and partner institutions: The first Call for Activity Proposals launched Dedicated website developed and launched. | <ul style="list-style-type: none"> Advisory services on enabling frameworks and capacity building workshop to raise awareness and strengthen capacity of public stakeholders in the Pacific. | <p>Completed.</p> <ul style="list-style-type: none"> The concept note of geothermal energy technical assistance and capacity building initiative for the Pacific finalised. <p><i>VC from the Government of Japan.</i></p> | Ongoing Q3 2017 |
| | <ul style="list-style-type: none"> Establish a GGA platform for communication. (continued) | <ul style="list-style-type: none"> High-level event held in Florence, Italy, on 11-12 September 2017, with participation of 22 GGA Member Countries, 4 non-GGA Member Countries, and 9 GGA Partner Institutions. GGA side-event held in the framework of COP23 in Bonn, Germany in November 2017. | | | |
| | | | <ul style="list-style-type: none"> Methodology for geothermal capacity needs assessment applied in one region. | <p>In progress.</p> <ul style="list-style-type: none"> The IRENA geothermal capacity needs methodology will be applied to a region yet to be identified. <p><i>VC from the Government of Switzerland.</i></p> | Q4 2016 |

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| Component | Activities | | | | Timeframe** |
|--|------------|--------|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Global Geothermal Alliance (continued) | | | <ul style="list-style-type: none"> • Additional advisory services and training to GGA member countries to help create necessary enabling frameworks to promote investments. | <p>Completed.</p> <ul style="list-style-type: none"> • Options for developing geothermal datasets in Global Atlas examined. • Assessment of the geothermal market status in East Africa as well as identification and mapping of existing and potential near term projects in the pipeline at the regional level. <p><i>VC from the Governments of France and Japan.</i></p> | Ongoing |
| | | | <ul style="list-style-type: none"> • Partnerships with expert institutions to deliver targeted capacity building activities related to geothermal energy. | <p>Resources not identified.</p> | Q2 2017 |
| | | | <ul style="list-style-type: none"> • Stakeholder outreach to feature geothermal energy prominently at major events of relevance. | <p>Resources not identified.</p> <ul style="list-style-type: none"> • While additional resources are required, IRENA is leveraging its presence at different events for this purpose. | Ongoing |

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| Component | Activities | | | | Timeframe** |
|-------------------|------------|--------|---|---|-------------|
| | Core | Status | Other sources | Status | |
| REpowering Cities | | | <ul style="list-style-type: none"> • Methodology for and application of building stock assessments for identifying renewable energy potential in cities. | In progress. Adjusted to Q4 2017. <i>VC from the Government of Germany</i> | Q4 2016 |
| | | | <ul style="list-style-type: none"> • Report on renewable integration options and enabling electricity and heat/cold distribution infrastructure in cities. | Completed. <ul style="list-style-type: none"> • The report, <i>Renewable Energy in Cities</i>, was launched at Habitat III 2016. | Q4 2016 |
| | | | <ul style="list-style-type: none"> • Workshops and outreach, including Habitat III • Disseminate results to build knowledge and share best practice. | Completed. <ul style="list-style-type: none"> • <i>Habitat III outreach supported by the Governments of Ecuador, Germany and the United Arab Emirates.</i> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Methodology and capacity building to support the monitoring of renewable energy impact on the carbon footprint of cities. | In progress. <i>VC from the Government of Germany.</i> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Methodology on biomass resource assessment customised to the Latin America context and training for its effective implementation. | In progress. <ul style="list-style-type: none"> • Geographical focus expanded beyond the LAC. <i>VC from the Government of Germany.</i> | Q2 2017 |

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| Component | Activities | | | | Timeframe** |
|----------------------------------|------------|--------|---|---|-------------|
| | Core | Status | Other sources | Status | |
| REpowering Cities (continued) | | | <ul style="list-style-type: none"> • Map stakeholders and urban settings for identification of commonalities. | In progress. <i>VC from the Government of Germany</i> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Briefs on innovative policy, regulatory and financing approaches to incentivise renewable energy deployment and energy efficiency measures in cities. | In progress. Adjusted to Q3 2018. <i>VC from the Government of Germany</i> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Outreach to UNFCCC Workstream 2. | Ongoing. <ul style="list-style-type: none"> • Attendance at and reporting on UNFCCC workshops. | Q4 2017 |

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| Thematic area: Enabling investment and growth | | | | | |
|---|--|--|--|----------------------------------|--------------------|
| Objective: Improving policy frameworks and creating enabling market conditions for accelerated deployment of renewable energy | | | | | |
| Resources (core assessed, non-assessed and other sources): 12,762 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| Renewable energy costs | <ul style="list-style-type: none"> Expanded and refined IRENA Renewable Costing Alliance* | Completed. Ongoing. <ul style="list-style-type: none"> 6000 new projects added. Database now has LCOE data for 15000 projects. Utility scale PPA/Tender database created with 7000 projects. Overview of O&M costs and cost breakdown data collection started. | <ul style="list-style-type: none"> One report on grid parity in the power sector. | Resources not identified. | Q1 2016 Q4 2017 |
| | <ul style="list-style-type: none"> Costing report on Biofuels for Transport* | Not started. | <ul style="list-style-type: none"> One renewable energy investment volume report. | Resources not identified. | Q4 2016 |

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| Component | Activities | | | | Timeframe** |
|------------------------------------|---|---|--|--|----------------------------|
| | Core | Status | Other sources | Status | |
| Renewable energy costs (continued) | <ul style="list-style-type: none"> Papers on cost or competitiveness topics including power generation updates in 2016 and 2017, renewable energy finance costs, wind learning curve decomposition, energy storage and self-consumption. * | <p>In progress.</p> <ul style="list-style-type: none"> Cost data update and released in “<i>Power to Change</i>” report (2016). <i>Power generation costs update: 2017</i> released at Assembly 2018 (including wind learning curve analysis). Onshore wind learning curve and financing cost working papers started, release 2018. Self consumption analysis integrated into <i>IRENA Cost & Competitiveness Indicators Rooftop solar PV</i> report. | <ul style="list-style-type: none"> Renewable energy competitiveness indicators by country and application. | <p>Completed.</p> <ul style="list-style-type: none"> Data and analysis for commercial electricity tariffs and volumes, and market analysis published in 21st Century Power report on Corporate Sourcing for CEM VC from the Government of Germany. Electricity storage & Renewables: costs and markets to 2030 report released in Oct 2017. Workshop with METI on solar PV cost differentials (Oct 2017) VC from the Government of Japan. | <p>Q4 2016 Q4 2017</p> |
| | | | <ul style="list-style-type: none"> Global Atlas on economic solar PV applications. | <p>Resources not identified.</p> | <p>Q4 2017</p> |
| | <ul style="list-style-type: none"> Quarterly PV Parity Indicator tool applied* | <p>In progress.</p> <ul style="list-style-type: none"> Renamed <i>IRENA Cost & Competitiveness Indicators: Rooftop Solar PV</i>. (see above) | <ul style="list-style-type: none"> Regional analysis on cost reduction opportunities for solar and wind technologies. | <p>Completed.</p> <ul style="list-style-type: none"> Cost reduction potential for solar and wind to 2025 released in June 2016 (<i>The Power to Change</i>). VC from the Government of Germany. | <p>Ongoing</p> |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|------------------------------------|---|--|---|----------------------------------|----------------------|
| | Core | Status | Other sources | Status | |
| Renewable energy costs (continued) | | | <ul style="list-style-type: none"> • Cost data collection methodology developed and applied for renewable energy in China and other countries. | Resources not identified. | Q4 2016 ⁵ |
| Renewable energy benefits | <ul style="list-style-type: none"> • Global report on Renewable Energy and Jobs - Annual Review 2016 and 2017. | Completed. <ul style="list-style-type: none"> • Annual Review 2016 launched at the 11th Council. • Annual Review 2017 launched at the 13th Council. | | | Q2 annually |
| | <ul style="list-style-type: none"> • Report on maximising value creation from one renewable energy technology. | Completed. <p>Executive summaries of Leveraging Local Capacity for Offshore wind and Solar Water Heaters to be published in Q1/2018.</p> | <ul style="list-style-type: none"> • Global report on maximising value creation from geothermal deployment (web-based). | Resources not identified. | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Guide for policy makers to disseminate lessons learnt on maximising value creation from other renewable energy technologies and applications. | Resources not identified. | Q4 2017 |

⁵ Timeframe adjusted.

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| Component | Activities | | | | Timeframe** |
|---------------------------------------|---|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Renewable energy benefits (continued) | | | <ul style="list-style-type: none"> Global report on maximising value creation for renewables-based heating and cooling applications (web-based). | Resources not identified. | Q4 2016 |
| | <ul style="list-style-type: none"> Global report on the structural and distributional economic dimension of renewable energy deployment. | Completed. <ul style="list-style-type: none"> Analysis contained in G20 study: <i>Perspectives for the Energy Transition</i>. Resourced by the VC from the Government of Germany. | | | Q4 2017 |
| | | | <ul style="list-style-type: none"> Regional report on socio-economic impacts of renewable energy deployment (web-based). | Resources not identified. | Q4 2016 |
| | | | <ul style="list-style-type: none"> Analysis of the socio-economic impacts from renewable energy deployment by 2030 in selected countries. | Completed. <ul style="list-style-type: none"> Analysis expanded to 2050. Analysis contained in G20 study: <i>Perspectives for the Energy Transition</i>. VC from the Government of Germany. | Ongoing |
| | | | <ul style="list-style-type: none"> Report: the potential role of RE for energy security and resilience, including the impact of renewables on electricity security. | Resources not identified. | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|---|---|--|---|----------------------------------|-------------|
| | Core | Status | Other sources | Status | |
| Policy options to accelerate deployment | <ul style="list-style-type: none"> Global report on state-of-the-art analysis of innovative policy design and practice. | Completed. <ul style="list-style-type: none"> <i>Adapting Market Design to High Shares of Variable Renewable Energy</i> launched at the 13th Council. Joint study with IEA and REN21 on <i>Renewable energy policies in a time of transition</i> to be presented at 8th Assembly. | <ul style="list-style-type: none"> Policy guide on analysis of growth in decentralised generation on decision-making in the power sector. | Resources not identified. | Q4 2017 |
| | | | <ul style="list-style-type: none"> Country analysis (4 countries) of policy and institutional frameworks, selected socio-economic impacts, the nexus of water-food and energy. | Resources not identified. | Q4 2017 |
| | <ul style="list-style-type: none"> Update of the policy and measures database. | Ongoing. <ul style="list-style-type: none"> From Q4 2015 to Q4 2017, 248 policies and policy updates have been added. | <ul style="list-style-type: none"> Regional report on policy status and trends based on policy and measures database. | Resources not identified. | Q4 2017 |
| | <ul style="list-style-type: none"> Regional report on market analysis of policies and trends for renewable energy in Southeast Asia. | Completed. <ul style="list-style-type: none"> To be released at the 8th Assembly. | <ul style="list-style-type: none"> Report on good practices in policy design. | Resources not identified. | Q4 2017 |
| | | | <ul style="list-style-type: none"> Two thematic briefs providing in-depth analysis of emerging regional policy themes. | Resources not identified. | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|----------------------|--|--|--|---|--------------------|
| | Core | Status | Other sources | Status | |
| Financing renewables | <ul style="list-style-type: none"> IRENA's country-level public-sector investment statistics as an authoritative dataset and basis for analytical work. | Completed <ul style="list-style-type: none"> Annual data collection concluded and published as part of statistics publication. Dashboard on public renewable energy investments updated and available through REsource. | <ul style="list-style-type: none"> Analysis of financial structures for RE projects. | Completed. <ul style="list-style-type: none"> Public finance database has been expanded to capture financial instruments used. <i>VC from the Government of Norway.</i> | Ongoing Q2 2017 |
| | <ul style="list-style-type: none"> Analysis of the linkages between policies, incentives, public investments and achievement of renewable energy targets. | Completed (adjusted). <ul style="list-style-type: none"> Focus on financing the implementation of the renewable energy target in NDCs. Summary report and data dashboard published. | <ul style="list-style-type: none"> Two high-level expert meetings to feed into the process of the report writing/study. | N/A. | Ongoing Q2 2017 |
| | <ul style="list-style-type: none"> Global report on the state-of-play of financial instruments and structures to mobilise institutional investors in the RE sector. | Completed (adjusted). <ul style="list-style-type: none"> <i>Renewable energy finance landscape</i> to be released at 8th Assembly. | <ul style="list-style-type: none"> Conference and working papers on financial risk mitigation instruments. | Resources not identified. | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|----------------------|--|--|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Financing renewables | <ul style="list-style-type: none"> • Collaboration with the GCF. | <p>Ongoing.</p> <ul style="list-style-type: none"> • IRENA participated in regional GCF meetings for Africa, and the Caribbean; drafted framework agreement for IRENA to act as Delivery Partner for GCF readiness activities. | <ul style="list-style-type: none"> • Expert meetings on public finance for RE. | <p>Resources not identified.</p> | Ongoing |
| Project facilitation | <ul style="list-style-type: none"> • Regional Marketplace portals for RE projects in Africa, LAC region and SIDS also open to energy efficiency projects. | <p>Completed.</p> <ul style="list-style-type: none"> • Global Platform includes regional portals for renewable project in Africa, Latin America and Caribbean. • Energy Efficiency project types added and eligible to register on all portals. | <ul style="list-style-type: none"> • Renewable energy project facilitation activities expanded to include all of the developing world and expanded active facilitation. | <p>Completed.</p> <ul style="list-style-type: none"> • Expansion of the Marketplace to cover all developing countries, including Asia, SIDS and South East Europe. <p><i>VC from the governments of France, Germany and UNESCWA. Partnerships with MDBs/IFIs etc.</i></p> | Ongoing |
| | <ul style="list-style-type: none"> • At least six events focused on capacity building* | <p>In progress.</p> <ul style="list-style-type: none"> • Held training sessions in West Africa (ECOWAS) and WAPP. • Webinar on Bioenergy and Mini-grids bankable project development held. | <ul style="list-style-type: none"> • Capacity building workshops and webinars to support project preparation and capturing results. | <p>Ongoing.</p> <ul style="list-style-type: none"> • Leveraging IRENA’s presence at various events. | Ongoing |

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| Component | Activities | | | | Timeframe** |
|----------------------|---|---|---|--|-------------|
| | Core | Status | Other sources | Status | |
| Project facilitation | | | <ul style="list-style-type: none"> • Selection of projects for the 4th and 5th cycle of the IRENA/ADFD Project Facility. | <p>Completed.</p> <ul style="list-style-type: none"> • 4th cycle projects selected in January 2017. • 5th cycle projects to be announced in January 2018. <p><i>VC provided by ADFD.</i></p> | Q4 annually |
| | <ul style="list-style-type: none"> • Two technical concepts for Project Navigator* | <p>In progress.</p> <ul style="list-style-type: none"> • Geothermal technical concept. • TCG Biogas under development. | <ul style="list-style-type: none"> • Two additional technical concepts for Project Navigator. | <p>In progress.</p> <ul style="list-style-type: none"> • SIDS islands module. • Technical tools & project templates for Mini-Grids and Solar Home Systems to support the SIDS Lighthouse Initiative. <p><i>VC from the Government of Germany.</i></p> | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|----------------------------------|---|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Project facilitation (continued) | <ul style="list-style-type: none"> • Project development assistance through Project Navigator* | <p>Completed.</p> <ul style="list-style-type: none"> • Trained over 700 workshop participants, reached 1500+ people through outreach activities. • Training sessions in Djibouti, Ethiopia, Mauritania, Nigeria Senegal, Vietnam, Iran (Islamic Republic of). • Webinar on Utility- scale PV, mini-grids, geothermal and woody biomass projects. • Webinar on project development with the French Francophonie Institute (IFDD) • Online training on bankable project development for AfDB. | <ul style="list-style-type: none"> • Additional Project development assistance through Project Navigator. | <p>In progress.</p> <ul style="list-style-type: none"> • Workshop on Marine Technologies in preparation. • SIDS-focused outreach and workshops. <p><i>VC from the Governments of France and Germany.</i></p> | Q4 2017 |

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| Thematic area: Renewable energy access for sustainable livelihoods | | | | | |
|---|---|--|---|----------------------------------|-------------|
| Objective: Improved livelihoods through access to renewable energy | | | | | |
| Resources (core assessed, non-assessed and other sources): 4,323 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| Decentralised solutions for access | <ul style="list-style-type: none"> • Third International Off-grid Renewable Energy Conference and Exhibition and associated follow-up activities to promote an enabling environment. | <p>Completed.</p> <ul style="list-style-type: none"> • IOREC took place from in 2016, in partnership with the Kenyan Ministry of Energy and Petroleum, and ARE. | <ul style="list-style-type: none"> • Regional thematic workshops on specific deployment barriers and issues identified during IORECs. | Resources not identified. | Q4 2017 |
| | <ul style="list-style-type: none"> • Development of the framework for the Off-Grid Renewable Energy Policies database. | <p>Completed.</p> <ul style="list-style-type: none"> • Scoping exercise of existing databases conducted to define framework. | <ul style="list-style-type: none"> • Inclusion of off-grid policies from at least 20 countries in the Off-Grid Renewable Energy Policies database. | Resource not identified. | Q4 2017 |
| | <ul style="list-style-type: none"> • Global report on policies to maximise socio-economic benefits of off-grid applications. | <p>Completed.</p> <ul style="list-style-type: none"> • Adjusted: Focus on on-grid renewables installation in Sub-Saharan Africa. • Site visits completed, analysis and drafting completed. • To be published Q1/2018 | <ul style="list-style-type: none"> • Working papers on innovative business models to accelerate financing of off-grid solutions. | Resources not identified. | Q2 2017 |

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| Component | Activities | | | | Timeframe** |
|--|--|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Decentralised solutions for access (continued) | • Develop and apply methodologies on decentralised renewable energy system planning* | Not started. | | | Q4 2017 |
| | • In-depth technical guide for mini-grids and their characteristics* | Completed. • Launched at IOREC. | • Briefs on policies and regulatory measures to support renewable energy-based mini-grid deployment. | Completed. • Launched at IOREC. | Q4 2016 |
| Applied decentralised solutions | | | • Technical reports to assess resource data on decentralised potential within the Africa Clean Energy Corridor RE Zoning work. | Resources not identified. | Q4 2017 |
| | | | • Additional advisory services on policy frameworks, business models and technology solutions, with regional and country-specific approaches on decentralised electrification solutions. | Resources not identified. | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|--|---|--|--|---|
| | Core | Status | Other sources | Status | |
| Applied decentralised solutions (continued) | <ul style="list-style-type: none"> Advisory services to identify capacity needs and develop a regional action plan on RE mini-grids in the ECOWAS region. | Completed. <ul style="list-style-type: none"> Capacity Needs Assessment for the deployment of renewables-based mini-grids completed, in collaboration with ECREEE. | <ul style="list-style-type: none"> Additional advisory services in the ECOWAS region to identify capacity needs and develop a regional action plan on RE mini-grids. | Resources not identified. | Q4 2016 |
| | <ul style="list-style-type: none"> Advisory services to strengthen RE enterprises to develop bankable projects under the ECOWAS Renewable Energy Entrepreneurship Support Facility. | Completed. <ul style="list-style-type: none"> The second call for proposals for the Facility finalised. Technical Committee meeting held in June 2016, Steering Committee meeting held in August 2016 and two technical training workshops held in September and November 2016. The third call for proposals for the Facility finalised. Technical Committee meeting held in April 2017, Steering Committee meeting to be held in early 2018. | <ul style="list-style-type: none"> Additional advisory services to explore the replication of the ECOWAS Renewable Energy Entrepreneurship Support Facility in other regions. | Completed. <ul style="list-style-type: none"> Entrepreneurship Support Facility launched in Southern Africa <i>VC from the Government of Norway</i> | Q4 2017 |
| | | | | <ul style="list-style-type: none"> Training for small and medium scale entrepreneurs and financial institutions on renewables-based electrification solutions in sub-regions of Africa and in Asia. | Completed. <ul style="list-style-type: none"> Southern African regional workshop held in November 2017 bringing together SMEs and financial institutions. <i>VC from the Government of Norway</i> |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|--|--|--|--|--|
| | Core | Status | Other sources | Status | |
| Applied decentralised solutions (continued) | <ul style="list-style-type: none"> Advisory services to strengthen RE enterprises to develop bankable projects under the ECOWAS Renewable Energy Entrepreneurship Support Facility. | <p>Completed.</p> <ul style="list-style-type: none"> The second call for proposals for the Facility finalised. Technical Committee meeting held in June 2016, Steering Committee meeting held in August 2016 and two technical training workshops held in September and November 2016. The third call for proposals for the Facility finalised. Technical Committee meeting held in April 2017, Steering Committee meeting to be held in early 2018. | <ul style="list-style-type: none"> Additional advisory services to explore the replication of the ECOWAS Renewable Energy Entrepreneurship Support Facility in other regions. | <p>Completed.</p> <ul style="list-style-type: none"> Entrepreneurship Support Facility launched in Southern Africa <p><i>VC from the Government of Norway</i></p> | Q4 2017 |
| | | | | <ul style="list-style-type: none"> Training for small and medium scale entrepreneurs and financial institutions on renewables-based electrification solutions in sub-regions of Africa and in Asia. | <p>Completed.</p> <p>Southern African regional workshop held in November 2017 bringing together SMEs and financial institutions.</p> <p><i>VC from the Government of Norway</i></p> |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Thematic area: Regional action agenda | | | | | |
|--|---|--|--|---|-------------|
| Objective: Regional integration with increased shares of renewables to meet energy needs | | | | | |
| Resources (core assessed, non-assessed and other sources): 16,250 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| Africa Clean Energy Corridor | <ul style="list-style-type: none"> Workshop to validate identified wind, solar PV and CSP zones. | Completed. <ul style="list-style-type: none"> Consultations held in 2016 with regional partners on ground validation of identified zones. Workshop organised in April 2017. | <ul style="list-style-type: none"> Additional workshops and partnerships to validate identified wind, solar PV and CSP zones and enable incorporation into national and regional energy planning processes. | Completed. <ul style="list-style-type: none"> Incorporation of the zoning work into the System Planning Test (SPLAT) model and the national energy master plan in Swaziland. Projects of regional importance are being identified for submission to the power pools and PIDA. <i>VC from the Government of Norway.</i> | Ongoing |
| | | | <ul style="list-style-type: none"> Advisory services to enable ACEC countries independently develop the identified zones. | Resources not identified. | Ongoing |
| | | | <ul style="list-style-type: none"> Regional technical guide of good practice for calculating cost reflective tariffs and establishing sufficient investment incentives into renewables. | Resources not identified. | Q1 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|---|---|--|--|--------------------|
| | Core | Status | Other sources | Status | |
| Africa Clean Energy Corridor (continued) | <ul style="list-style-type: none"> Advisory services on policy and legislative support through Renewables Readiness Assessments. | Completed. <ul style="list-style-type: none"> The RRA process completed in Zimbabwe; the report is under finalisation. | <ul style="list-style-type: none"> Additional advisory services on policy and legislative support through Renewables Readiness Assessments. | Completed. <ul style="list-style-type: none"> The RRA process completed in the United Republic of Tanzania. <i>VC from the Government of Norway.</i> | Ongoing |
| | <ul style="list-style-type: none"> Workshop for stakeholder consultation to update the zoning study. | Completed. <ul style="list-style-type: none"> Consultations held in 2016 with national and regional partners on methodology for updating. Workshop organised in April 2017 | <ul style="list-style-type: none"> Additional workshops for stakeholder consultation to update the zoning study. | Resources not identified. | Q4 2016 Q4 2017 |
| | <ul style="list-style-type: none"> Training for regulators on power systems operating with higher shares of VRE. | Completed. <ul style="list-style-type: none"> The first stakeholder consultation workshop took place in Namibia, 18-19 April 2016. | <ul style="list-style-type: none"> Additional training for regulators on power systems operating with higher shares of VRE. | Resources not identified. | Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe ** |
|--|--|--|---|--|---------------------------------|
| | Core | Status | Other sources | Status | |
| Africa Clean Energy Corridor (continued) | <ul style="list-style-type: none"> The ACEC Consultative Forum to facilitate partnerships and dialogue. | <p>Completed. Adjusted.</p> <ul style="list-style-type: none"> This deliverable was adjusted to align with the new framework for all energy related initiatives in Africa. Member States of the African Union to “integrate the concept of the Clean Energy Corridors into national renewable energy and climate change agendas as well as the process of creation of a sustainable and low-carbon power markets” as part of the Ministerial Declaration of the 1st STC Meeting held in March 2017. | <ul style="list-style-type: none"> Regional guide of good practice for power system development and technical report for application in a pilot country. | <p>In progress.</p> <ul style="list-style-type: none"> Conducted interviews with global practitioners and pilot country stakeholders. Findings under review by regional / national decision makers. Results shared in a workshop in 2017. <p><i>VC from the Government of Norway.</i></p> | Ongoing Q1 2017 ⁶ |
| | <ul style="list-style-type: none"> Partnerships and advisory services for ACEC action agenda development and implementation in West Africa. | <p>Completed.</p> <ul style="list-style-type: none"> An action agenda adopted at the West Africa Energy Ministers’ Meeting in December 2016; then endorsed by Council of Ministers and reported to the Summit of Head of States in June 2017. Joint work programme developed with the West Africa Power Pool. Scoping work for the solar component of the WACEC completed in partnership with ECREEE and EU TAF. Kick-off meeting for the grid planning and operation component of the WACEC capacity building programme took place in December 2017. | <ul style="list-style-type: none"> Additional advisory services to implement the action agenda for ACEC West Africa. | <p>Completed.</p> <ul style="list-style-type: none"> Analysis and detailed maps showing technical potential, produced for solar and wind, on- and off-grid. Site assessment in West Africa. <p>In progress.</p> <ul style="list-style-type: none"> Training programme in Sierra Leone for build-up of a national energy planning capacity and development of a national energy master plan. <p><i>VC from the Government of Norway and the UAE.</i></p> | |

⁶ Timeframe adjusted.

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---------------------------------------|---|--|---|--|--------------------|
| | Core | Status | Other sources | Status | |
| Central America Clean Energy Corridor | <ul style="list-style-type: none"> Advisory services to finalise the action agenda by the governments. | <p>Completed.</p> <ul style="list-style-type: none"> CECCA strategy endorsed by regional Energy Ministers. | | | Q2 2016 |
| | <ul style="list-style-type: none"> Platform to establish partnerships and operationalise dialogue. | <p>Completed.</p> <ul style="list-style-type: none"> Detailed activities of the CECCA strategy implementation developed implemented in co-ordination with relevant regional, national and development partners, incl. IADB, USAID, GIZ, ECLAC. | <ul style="list-style-type: none"> Advisory services to support SICA/SIEPAC. | <p>Resources not identified.</p> | Q2 2016 Q4 2017 |
| | <ul style="list-style-type: none"> Training for national and regional system operators on RE grid integration. | <p>Completed.</p> <ul style="list-style-type: none"> Training conducted for South America operators in Spain in 2016. Training for TSO in Panama (pilot country) on grid integration studies completed in October 2017. | <ul style="list-style-type: none"> Technical report on the identification of maximum penetration levels of variable renewable energy under secure conditions in the regional system. | <p>Completed.</p> <ul style="list-style-type: none"> Two stakeholder meetings in October 2016 and June 2017 to discuss proposal for methodology for technical report. Activity is being implemented by partner institutions in the region (World Bank, GIZ and IADB), IRENA provided review to WB component. <p><i>Leveraging core resources.</i></p> | Q3 2017 Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|---|--|--|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Central America Clean Energy Corridor (continued) | <ul style="list-style-type: none"> • Technical report for an assessment of the monitoring and control system, control room tools and operating practices currently in place | <p>Completed.</p> <ul style="list-style-type: none"> • Technical enabling component of the initiative finalised and under implementation (pilot project in Panama). • A technical stakeholder workshop organised in October 2016 as part of the scoping of the work for pilot implementation of the VRE integration study in Panama. • Gap analysis report finalised. • Technical training on grid integration conducted in Panama in Oct 2017. | <ul style="list-style-type: none"> • Training for national and regional regulators on regulatory governance frameworks for RE grid integration. | <p>Resources not identified.</p> | Q4 2016 |
| | <ul style="list-style-type: none"> • Advisory services for the implementation of regulatory governance frameworks for RE grid integration. | <p>Completed.</p> <ul style="list-style-type: none"> • A regulatory stakeholder workshop organised in October 2016 to support deployment of VRE integration study in Panama and the region. | <ul style="list-style-type: none"> • Additional advisory services for the implementation of regulatory governance frameworks for RE grid integration. | <p>In progress.</p> <ul style="list-style-type: none"> • In depth review of investment incentives resulting from current and proposed market / PPA design in Panama. <p><i>Leveraging core resources.</i></p> | Q4 2016 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|------------|--------|---|--|-------------|
| | Core | Status | Other sources | Status | |
| Central America Clean Energy Corridor (continued) | | | <ul style="list-style-type: none"> • Workshop for scoping of activities in line with the CECCA strategy. | <p>Completed.</p> <ul style="list-style-type: none"> • A stakeholder workshop held in Panama on 26-27 October 2016 as part of policy and regulatory scoping. • A technical stakeholder workshop as part of the scoping of the work for pilot implementation of the VRE integration study in Panama. <p><i>Resources provided by GIZ and Economic Commission for Latin American countries (ECLAC).</i></p> | Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---------------------------------|---|--|---|--|--------------------|
| | Core | Status | Other sources | Status | |
| Emerging Clean Energy Corridors | <ul style="list-style-type: none"> Advisory services to develop and implement the action agenda for ASEAN Clean Energy Corridor by the governments. | <p>Completed (adjusted).</p> <ul style="list-style-type: none"> The first consultation workshop held in collaboration with ASEAN Centre for Energy. The second consultation workshop took place in Thailand in June 2017. Priority areas of co-operation between IRENA and ASEAN countries identified through a Joint Statement of the first ASEAN-IRENA Ministerial Dialogue in Manila in September 2017. | <ul style="list-style-type: none"> Additional advisory services to implement the action agenda for ASEAN Clean Energy Corridor by the governments. | <p>Resources not identified.</p> | Q2 2016 Ongoing |
| | <ul style="list-style-type: none"> Platform to establish and operationalise dialogue, co-operation and co-ordination among the key ASEAN regional and national stakeholders. | <p>Completed.</p> <ul style="list-style-type: none"> Co-operation with ASEAN institutions (ASEAN Secretariat, ACE, and HAPUA) as well as key regional partners established. Preparations of a joint initiative to facilitate the integration of renewables in collaboration with the ASEAN Renewable Energy Sub-Sector Network. | <ul style="list-style-type: none"> Training in the areas related to the implementation of the action agenda for ASEAN Clean Energy Corridor. | <p>In progress.</p> <ul style="list-style-type: none"> A workshop on technology, policy and finance was held in Thailand in mid-June. An ASEAN wide capacity building workshop under preparation covering the priority areas identified in the ASEAN-IRENA Joint Statement for implementation in early 2018. <p><i>VC from the Government of Japan.</i></p> | Ongoing |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--------------------------|--|--|---|--|--|
| | Core | Status | Other sources | Status | |
| Enabling regional action | <ul style="list-style-type: none"> Advisory services to develop the PACE action agenda by governments. | <p>Completed.</p> <ul style="list-style-type: none"> Gap Analysis for Maghreb region finalised. PACE Action Plan approved by LAS Technical Committee on Energy Efficiency and Renewable Energy in September 2017, prior to submission to the next LAS Ministerial of Electricity. | <ul style="list-style-type: none"> Additional advisory services to implement the PACE action agenda. | <p>Resources not identified.</p> | <p>Q4 2016 Q4 2017</p> |
| | <ul style="list-style-type: none"> Platform for dialogue, co-operation and co-ordination among the key PACE regional and national stakeholders. | <p>Completed.</p> <ul style="list-style-type: none"> Regional stakeholder consultations meeting held in January 2017 in co-operation with the Arab League, RCREEE and the World Bank. | <ul style="list-style-type: none"> Additional training to help key stakeholders in PACE countries advance the action agenda. | <p>Completed.</p> <ul style="list-style-type: none"> A workshop on Power Purchase Agreement for RE organised in conjunction with MENAREC6 outlining key aspects for developing bankable PPAs. <p><i>VC from the Government of Germany.</i></p> | <p>Q2 2017⁷ Q4 2017</p> |

⁷ Timeframe adjusted.

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|---|--|---|--|----------------------------|
| | Core | Status | Other sources | Status | |
| Enabling regional action (continued) | <ul style="list-style-type: none"> • Action plan for IRENA's engagement in the South-eastern Europe. | <p>Completed.</p> <ul style="list-style-type: none"> • South East Europe regional consultative meeting in Romania in October 2016. • High-Level Meeting on Renewable Energy in South East Europe in January 2017 adopted the <i>Abu Dhabi Communique on Accelerating the Uptake of Renewables in South East Europe</i>, • Regional Action Plan has been developed. • A joint IRENA-Energy Community Workshop on Renewable Energy Auctions completed. • Regional parliamentary meeting in Serbian Parliament (June 2017) presented status and trends of renewable energy and identified parliamentary actions to accelerate the uptake of renewable energy in the region. • A regional training on RE statistics completed in December 2017. | <ul style="list-style-type: none"> • Workshops for stakeholder engagement and technical reports on potential for RE integration in national plans in South-eastern Europe. | <p>Completed.</p> <ul style="list-style-type: none"> • Report "<i>Cost-competitive renewable power generation: Potential across South East Europe</i>" launched in January 2017 • A joint IRENA-Energy Community workshop held in Austria in March 2016 on preliminary findings of the report. <p><i>VC from the Government of Germany.</i></p> | <p>Q4 2016 Q4 2017</p> |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|--|---|---|---|--------------------|
| | Core | Status | Other sources | Status | |
| Enabling regional action (continued) | <ul style="list-style-type: none"> • Develop an action agenda for a regional approach for RE development in Central Asia. | <p>Completed.</p> <ul style="list-style-type: none"> • First round of consultations in Baku in 2016. • Ministerial Dialogue on Renewable Energy in Central Asia as part of the Energy Ministerial Conference “Meeting the Challenge of Sustainable Energy” in June 2017 released the <i>Astana Communiqué on Accelerating the Uptake of Renewables in Central Asia</i>, with key areas for collaboration with IRENA. | | | Q4 2016 |
| | <ul style="list-style-type: none"> • Platform for dialogue, co-operation and co-ordination among the key Central Asia regional and national stakeholders. | <p>Completed.</p> <ul style="list-style-type: none"> • Regional Workshop on Renewable Energy in Central Asia in April 2017. • Participation in the EXPO 2017 in Astana during June-September 2017. | <ul style="list-style-type: none"> • Advisory services in the areas related to the implementation of the action agenda for Central Asia. | <p>Completed.</p> <ul style="list-style-type: none"> • Uzbekistan Renewable Energy Workshop jointly organised by IRENA and World Bank in Tashkent in December 2017. <p><i>Resources provided by World Bank and leveraging core resources.</i></p> | Q4 2016 Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---------------------------------------|--|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Country support and advisory services | <ul style="list-style-type: none"> • 6 RRA Country Reports. | Process completed, report under finalisation. <ul style="list-style-type: none"> • RRAs Tunisia, Mali, Panama. • RRA/REmap Egypt. | <ul style="list-style-type: none"> • Additional RRA Country Reports. | Completed. <ul style="list-style-type: none"> • RRA Mongolia • RRA Antigua and Barbuda • RRA United Republic of Tanzania • RRA Philippines Process completed, report under finalisation. <ul style="list-style-type: none"> • RRAs Pakistan and Zimbabwe. <i>VC from the Governments of Japan and Norway.</i> | Ongoing |
| | | | <ul style="list-style-type: none"> • Incorporate the integrated resource approach in IRENA's Renewables Readiness Assessment methodology and country reports. | Resources not identified. | Ongoing |
| | | | <ul style="list-style-type: none"> • Advisory service for the implementation of RRA recommendations including technical advice on statistics, energy planning, resource assessment, finance, etc. | Completed. <ul style="list-style-type: none"> • Post RRA support to Mozambique in RE investment. Workshop held in November 2016. • Post RRA support to Mauritania in November 2017. • Post RRA support to Panama in progress on RE integration. <i>VCs from the Governments of Norway and the UAE.</i> | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|---|---|--|--|----------------------|
| | Core | Status | Other sources | Status | |
| Country support and advisory services (continued) | | | <ul style="list-style-type: none"> • Advisory services for Indonesia REmap/RRA pilot. | <p>Completed (adjusted).</p> <ul style="list-style-type: none"> • Process completed to develop a combined REmap/RRA for Thailand. <p><i>VC from the Government of Japan.</i></p> | Q1 2017 |
| | <ul style="list-style-type: none"> • Advisory services and training for post-RRA implementation upon country requests. | <p>Completed.</p> <ul style="list-style-type: none"> • A workshop, with training component, on project development and resource assessment was held in July 2016 in Djibouti. | <ul style="list-style-type: none"> • Additional post RRA services. | <p>Resources not identified.</p> | Ongoing |
| | | | <ul style="list-style-type: none"> • Advisory services for the development of an implementation plan based on the recommendations from the RE manufacturing report for three North African countries. | <p>Resources not identified.</p> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Methodology of renewables manufacturing potential applied in additional countries. | <p>Completed.</p> <ul style="list-style-type: none"> • An additional study for Lebanon, Jordan and the UAE completed in collaboration with UNESCWA. <p><i>VC from the Government of Germany.</i></p> | Q1 2017 - Q4 2017 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | Timeframe** | |
|---|------------|--------|---|---|---------|
| | Core | Status | Other sources | | |
| Country support and advisory services (continued) | | | <ul style="list-style-type: none"> • Advisory services in support of the design and implementation of power system governance structures. | <p>Completed.</p> <ul style="list-style-type: none"> • Work initiated in South Africa to explore the scaling of the REIPPP approach. • Workshop held in Cape Town in November 2016. <p><i>VC from the Government of Germany.</i></p> | Q2 2017 |
| | | | <ul style="list-style-type: none"> • Technical assistance and training to the key stakeholders in the formulation of ASEAN renewables target implementation plans. | Resources not identified. | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Additional advisory services upon request. | Resources not identified. | Q1 2017 |
| | | | <ul style="list-style-type: none"> • Technical report and support for MENAREC 6. | <p>Completed.</p> <ul style="list-style-type: none"> • MENAREC6 successfully implemented. <p><i>VC from the Government of Germany and support provided by regional partners (LAS, UNESCWA, RCREEE).</i></p> | Q2 2016 |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Thematic area: Islands: lighthouses for renewable energy deployment | | | | | |
|---|--|---|---|---|--|
| Objective: Island energy systems transformed through renewable energy | | | | | |
| Resources (core assessed, non-assessed and other sources): 3,743 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe ** |
| | Core | Status | Other sources | Status | |
| SIDS Lighthouses | <ul style="list-style-type: none"> • Grid studies support (2 island studies). * | <p>Completed.</p> <ul style="list-style-type: none"> • VC leveraged core resources. See status under other sources. | <ul style="list-style-type: none"> • Support to and management of the SIDS Lighthouses Initiative. | <p>In progress.</p> <ul style="list-style-type: none"> • Support and management of the SIDS Lighthouses Initiative. <p><i>VC from the Governments of Germany, New Zealand and Norway.</i></p> | <p>Q4 2017 Ongoing</p> |
| | | | | <ul style="list-style-type: none"> • Advisory services including Quickscans, Renewable Readiness Assessments, Roadmaps, Resource Assessments, Grid Integration Studies and Transition Plans. | <p>Completed.</p> <ul style="list-style-type: none"> • RRA for Antigua and Barbuda • Kiribati and Barbados Roadmaps • SIDS Lighthouses technical workshop in Cuba • Grid integration study for Antigua and Barbuda and Cook Islands • Follow-up grid integration study for Samoa • Supported Pacific Power Association (PPA) and the University of South Pacific (USP) in performing a grid integration study for Kiribati • Interim report for SIDS Lighthouses quickscan launched at COP23 <p>In Progress.</p> <ul style="list-style-type: none"> • Grid integration study for Fiji, Vanuatu and Dominican Republic • Finalisation of Palau Energy Roadmap • Completion of <i>guide for planning the operation and expansion of electricity grids in small systems hosting high shares of variable renewables</i> <p><i>VCs from Governments of Germany, Japan, New Zealand, and Norway.</i></p> |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe* |
|---------------------------------|------------|--------|--|---|------------|
| | Core | Status | Other sources | Status | |
| SIDS Lighthouses (continued) | | | <ul style="list-style-type: none"> • Training workshops to address legal, regulatory, institutional, human resource and other constraints supported | <p>Completed.</p> <ul style="list-style-type: none"> • Two training workshops in Pacific SIDS and Maldives on enabling environments (February 2016 and 2017). • Technical workshop in St. Martin on grid integration and planning together with CARILEC (July 2016). • Technical Session in Pacific Power Association Conference on grid integration planning and storage, in Tonga (August 2016). • Capacity building for engineers from utilities of the Pacific Islands. • SIDS Energy Day and High-Level Dialogue organized at COP23. <p>In Progress.</p> <ul style="list-style-type: none"> • Islands Module (small hydro, biogas and industrial heat applications) of Project Navigator <p><i>VCs from Government of Germany (IKI), the Kingdom of the Netherlands, and New Zealand. In-kind support by the Government of Japan and the United States</i></p> | Q4 2017 |

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| Component | Activities | | | Timeframe** | |
|---------------------------------|------------|--------|---|---|----------------------|
| | Core | Status | Other sources | | |
| SIDS Lighthouses (continued) | | | <ul style="list-style-type: none"> • Tools for monitoring, evaluating, communicating progress of the initiative, and sharing knowledge developed | <p>Completed.</p> <ul style="list-style-type: none"> • SIDS LHI website launched <p>Ongoing.</p> <ul style="list-style-type: none"> • Progress of LHI indicators tracking from 2014 to date measured and shared on various SIDS related platforms • LHI activity tracker updated monthly <p><i>VC from the Government of Germany</i></p> | Q4 2016 ⁸ |

⁸ Timeframe adjusted.

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | Timeframe** | |
|--|------------|--------|--|---|---------|
| | Core | Status | Other sources | | |
| Global Renewable Energy Islands Networks (GREIN) | | | <ul style="list-style-type: none"> GREIN platform continuously updated for the sharing of best practices and case studies related to the GREIN cluster areas. | <p>Completed.</p> <ul style="list-style-type: none"> GREIN consolidated under the Lighthouses umbrella. <p><i>VC from the Government of Germany</i></p> | Ongoing |
| | | | <ul style="list-style-type: none"> Dissemination of information through cluster-specific webinars, newsletters, etc. | <p>Completed.</p> <ul style="list-style-type: none"> Technology Options for Renewable Desalination in Kiribati (Executive Summary and Final Report) completed. Workshops held in St. Lucia and Fiji on use of ESCOs in tourism sector held in July 2016. Technology Options for Renewable Desalination in Cabo Verde completed. <p><i>VC from the Government of Germany and Norway.</i></p> | Ongoing |
| | | | <ul style="list-style-type: none"> Regional workshops and other meetings to facilitate dialogue across and among regions and islands. | <p>Adjusted.</p> <p>See reporting under Lighthouses.</p> | Ongoing |

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| Component | Activities | | | Timeframe** | |
|------------------------------|------------|--------|--|--|---------|
| | Core | Status | Other sources | | |
| Enabling projects in islands | | | <ul style="list-style-type: none"> • Development and execution of at least 3 bankable RE projects in partner countries. | <p>Completed.</p> <ul style="list-style-type: none"> • Site suitability assessments in the Comoros and Cabo Verde. • Expansion of Sustainable Energy Marketplace. • 24 projects with partial and full fund investment identified. • Project preparation and procurement advice provided to Antigua and Barbuda for 1MW wind and 1MW solar project • Islands Module for Project Navigator developed. <p><i>VC from the Government of Germany.</i></p> | Q4 2017 |
| | | | <ul style="list-style-type: none"> • Partnerships developed with expert institutions to provide targeted support in planning, identifying, structuring, and executing viable renewable energy projects in SIDS. | <p>Ongoing.</p> <ul style="list-style-type: none"> • Projects are supported through preparation grants in Caribbean in co-operation with IADB, six projects selected. • Partnership with PRIF for support through Marketplace in Pacific. • Concept for SIDS project accelerator finalised. <p><i>VC from the Government of Germany.</i></p> | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Thematic area: Gateway to knowledge on renewable energy | | | | | |
|--|---|--|---|---|-------------|
| Objective: Renewable energy knowledge accessible to all | | | | | |
| Resources (core assessed, non-assessed and other sources): 11,658 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| RE Statistics | <ul style="list-style-type: none"> RE Statistics Database: Provisional estimates of RE capacity on REsource six months after year-end, with final figures for capacity and energy balances within 18 months. | Completed. <ul style="list-style-type: none"> Capacity data published March 2016 and 2017. Complete dataset published June 2016 and 2017. | Working paper: lessons learnt from case studies in renewable energy data collection | Completed. <ul style="list-style-type: none"> Working paper on biogas data collection studies published November 2017. <i>Leveraged other resources.</i> | Q4 2017 |
| | <ul style="list-style-type: none"> Statistics training: two training courses held in countries and regions where renewable energy data is relatively weak, leading to improved response rate to IRENA annual statistics questionnaire. | Completed. <ul style="list-style-type: none"> Training course for MENA Region, Abu Dhabi, February 2017. Training course for SEE Region, Tirana, December 2017. | <ul style="list-style-type: none"> Two additional training courses and further capacity building support to improve quality and completeness of renewable energy statistics, including for decentralised off-grid solutions. | Completed. <ul style="list-style-type: none"> Training course held in South Africa in September 2016. <i>In kind contribution from Denmark.</i> <ul style="list-style-type: none"> Training course for East and Southeast Asia, end November 2016 in Bangkok. Training workshop in Eastern Europe, in Budapest in December 2016. <i>VC from the Government of Germany and funding from FAO.</i> | Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|------------------|---|--|---|--|--------------------|
| | Core | Status | Other sources | Status | |
| The Global Atlas | <ul style="list-style-type: none"> Maintenance of solar and wind Atlas, including demonstration for measurement data collected by governments, donors and public finance entities. | <p>Completed.</p> <ul style="list-style-type: none"> Release of the new Global Atlas 3.0 with improved functionalities. Solar and wind maps with 1 km spatial resolution available for public use. Development of a new approach to screening resource potential for prospective sites (wind, solar PV, solar PV- diesel hybrid, solar PV-battery storage) | <ul style="list-style-type: none"> Technical infrastructure assessments, e.g. cities, highly-populated areas in developing countries, etc. | <p>In progress.</p> <p><i>VC from the Government of Germany (IKI)</i></p> | Ongoing Q4 2016 |
| | | | <ul style="list-style-type: none"> Refinement and completion of new data set of marine & hydro, including zoning tools and working papers. | <p>Resources not identified.</p> | Ongoing |
| | <ul style="list-style-type: none"> Completion of bioenergy and geothermal, including zoning methodology and tools. | <p>Completed.</p> <ul style="list-style-type: none"> Bioenergy tool available online. <p>In progress.</p> <ul style="list-style-type: none"> Development of a wind LCOE web tool. | <ul style="list-style-type: none"> Global Atlas training sessions (webinars and workshops) and constantly updated training module on how to use maps and data in the policy formulation process. | <p>Resources not identified.</p> | Ongoing |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|--|--|---|--|--------------------|
| | Core | Status | Other sources | Status | |
| The Global Atlas (continued) | | | <ul style="list-style-type: none"> Preliminary high potential renewable energy zones identified based on zoning methodology. | <p>Completed.</p> <ul style="list-style-type: none"> Zoning for South America, GCC, West Africa, South East Europe, Dominican Republic and Fiji. <p><i>VC from UAE and leveraging other resources.</i></p> | Q4 2017 |
| Quality infrastructure, standards and patents | <ul style="list-style-type: none"> INSPIRE platform refinement, outreach and dissemination. * | <p>Completed.</p> <ul style="list-style-type: none"> INSPIRE 2.0 has been completed incorporating new features to analyse patent and standards trends for enabling technologies, in addition to RE technologies. Also includes new online interactive dashboards for users | | | Ongoing |
| | <ul style="list-style-type: none"> Technical QI analysis report for 1) utility-scale PV and 2) smart-grids or mini-grids. * | <p>Completed.</p> <ul style="list-style-type: none"> <i>Boosting Solar PV markets: the role of quality infrastructure</i> has been completed and published. The report covers both utility scale and PV mini-grid technologies | <ul style="list-style-type: none"> QI analysis reports for additional technologies upon request | <p>Resources not identified.</p> | Q4 2016 Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---|------------|--------|---|---|-------------|
| | Core | Status | Other sources | Status | |
| Quality infrastructure, standards and patents (continued) | | | <ul style="list-style-type: none"> • Advisory services and two workshops on the development and implementation of QI frameworks for renewable energy technologies for two countries/regions. | <p>Completed.</p> <ul style="list-style-type: none"> • Advisory service to Latin American countries on quality infrastructure for RE, and contribution to Mexico solar water heaters quality control strategy. • Workshop on quality assurance and climate change with 30 experts in November 2016. • Event on PV Testing networks for the GCC • Webinar on Grid Codes for Mexico in July 2017 • Regional event on QI for PV in the Latin American Region in Chile, Sep 2017 • Workshop on Grid Codes for Mauritania in December 2017 <p><i>Leveraging other events and resources.</i></p> | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|---|--|--|--|----------------------------------|--------------------|
| | Core | Status | Other sources | Status | |
| Quality infrastructure, standards and patents (continued) | | | <ul style="list-style-type: none"> Advisory services and workshop on Accreditation and Certification of training institutions and their programmes based on established and new regional certification schemes. | Resources not identified. | Q2 2016 Q3 2017 |
| | <ul style="list-style-type: none"> Workshops with selected training institutions for the implementation of a regional certification scheme for solar PV installers. | Completed. Adjusted. <ul style="list-style-type: none"> Preparatory work for advisory services completed for the implementation phase of the certification scheme for solar PV installers. | <ul style="list-style-type: none"> Advisory services and workshop on the international accreditation of selected training institutions and their programmes. | Resources not identified. | Q2 2017 Q4 2017 |
| | <ul style="list-style-type: none"> Advisory services and workshop for the international accreditation of the certification scheme. | Completed. Adjusted. <ul style="list-style-type: none"> Advisory services initiated for completion in early 2018. | <ul style="list-style-type: none"> Advisory services and workshop for the establishment of the regional certification scheme. | Resources not identified. | Q4 2017 Q4 2016 |
| | | | <ul style="list-style-type: none"> Advisory services and workshop for the creation of the administrative structure of the programme. | Resources not identified. | Q4 2016 |

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| Component | Activities | | | | Timeframe** |
|---|--|--|--|--|--------------------|
| | Core | Status | Other sources | Status | |
| Enhancing environmental and resource sustainability | <ul style="list-style-type: none"> Policy guide on best practices to enable a sustainable scale-up of renewable energy applications that positively impact water and food security. | Completed. <ul style="list-style-type: none"> Publication of brief: <i>Solar Pumping for Irrigation: Improving livelihoods and sustainability.</i> | <ul style="list-style-type: none"> Reports on environmental impacts of solar, wind and geothermal technologies. | Completed. <ul style="list-style-type: none"> Publication of report: <i>End of life management of PV panels.</i> In collaboration with IEA PVPS. <i>VC from the Government of Germany.</i> | Q4 2017 Q4 2016 |
| | | | <ul style="list-style-type: none"> Working paper quantifying the environmental impacts and benefits relative to other energy technologies. | Resources not identified. | Q4 2017 |
| | | | <ul style="list-style-type: none"> Public guidelines for renewable energy environmental impact assessment for public financial institutions. Workshop with financial institutions. | Resources not identified. | Q2 2017 |
| | | | <ul style="list-style-type: none"> Eight briefs (case studies) to showcase the benefits of renewable energy in the water, energy and food nexus. | Completed. <ul style="list-style-type: none"> One country analysis <i>Water Use in India's Power Sector – Impact of renewables and cooling technologies to 2030.</i> <i>Resourced through the partnership with WRI.</i> | Q4 2017 |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|---------------|---|--|---|---|-------------|
| | Core | Status | Other sources | Status | |
| Knowledge Hub | <ul style="list-style-type: none"> Maintenance and expansion of the REsource platform. | Ongoing. <ul style="list-style-type: none"> Integration of all IRENA data into a single knowledge hub. Ongoing updating of data streams. | <ul style="list-style-type: none"> Creating "specialised" mini-REsource platforms for other IRENA projects. | Adjusted. <ul style="list-style-type: none"> Incorporated in the new IRENA website. | Ongoing |
| | | | <ul style="list-style-type: none"> Making REsource multi-lingual, <i>i.e.</i> making the platform available and searchable in several languages. | Resources not identified. | Ongoing |
| | | | <ul style="list-style-type: none"> Further expansion of REsource by validating and integrating reliable external content of third parties. | Ongoing. <ul style="list-style-type: none"> Limited external content integrated in the data section with in-house human resources. <p><i>VC from the Government of Norway. To integrate larger external content additional funding is required.</i></p> | Ongoing |
| | | | <ul style="list-style-type: none"> Advisory services to countries and public entities seeking to develop similar knowledge platforms. | Resources not identified. | Ongoing |

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| Component | Activities | | | | Timeframe** |
|------------------------------|---|--|---|--|------------------------------|
| | Core | Status | Other sources | Status | |
| Multi-stakeholder engagement | <ul style="list-style-type: none"> Expand and operationalise the IRENA Coalition for Action. | Completed. <ul style="list-style-type: none"> Membership grew to 75, with strong engagement of Coalition partners around three work streams in 2017. | <ul style="list-style-type: none"> Support work to develop a consumer label in co-operation with industry and civil society organisations. | In progress. Adjusted. <ul style="list-style-type: none"> A <i>REmade Index</i> report focused on corporate sourcing of renewables to be published in 2018. <i>VC from the Government of Germany.</i> | Ongoing Q2 2016 |
| | | | <ul style="list-style-type: none"> Organise an annual high-level meeting of the Coalition. | Resources not identified. | Q2 2016 Q1 2017 ⁹ |
| | | | <ul style="list-style-type: none"> Maintain and moderate the public debate on the IRENA Community. | Adjusted. No resources received. <ul style="list-style-type: none"> Phasing out of the IRENA Community. | Ongoing |
| | | | <ul style="list-style-type: none"> Maintain and expand the four databases of the IRENA Learning Platform. | Adjusted. No resources received. <ul style="list-style-type: none"> Phasing out of IRELP. | Ongoing |
| | | | <ul style="list-style-type: none"> 'Model IRENA' simulations, including extensive preparatory trainings. | Resources not identified. | Ongoing |
| | | | <ul style="list-style-type: none"> Regular university and school visits in the Host Country. | In progress. <ul style="list-style-type: none"> Hosted more than 12 universities and school visits to the IRENA headquarters. | Q4 2017 |

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| Component | Activities | | | | Timeframe** |
|--|---|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Multi-stakeholder engagement (continued) | | | <ul style="list-style-type: none"> Design, maintain, coordinate and launch the IRENA renewable energy e-learning initiative. | Adjusted. <ul style="list-style-type: none"> Focus on RE skills gap assessment. | Q2 2016 |
| | <ul style="list-style-type: none"> Hosting of legislators' meeting on the side lines of the Sixth Assembly and the preparation of the second legislators meeting*. | Completed. <ul style="list-style-type: none"> The first Legislators Forum successfully completed on 15 January 2016. The second Legislators Forum successfully completed on 13 January 2017. | <ul style="list-style-type: none"> Outreach to legislators and other parliamentary stakeholders and dissemination of tailored RE information. | Resources not identified. | Ongoing |

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| Thematic area: Enhancing international co-operation and communications and outreach | | | | | |
|--|---|--|--|--|-------------|
| Objective: Actively engage Members, leverage strategic partnerships and communicate with stakeholders and the public | | | | | |
| Resources (core assessed, non-assessed and other sources): 17,237 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| Facilitating international co-operation | <ul style="list-style-type: none"> • Ongoing support to Members. | Completed. | | | Ongoing |
| | <ul style="list-style-type: none"> • Two Assembly meetings and related events* | Completed. <ul style="list-style-type: none"> • 6th session of the Assembly successfully held. • 7th session of the Assembly successfully held. | Supported the participation of delegates through the Fund for Developing Country Representatives (FDCR). | Completed. <ul style="list-style-type: none"> • 48 delegates from 30 countries supported in 2016, and 64 delegates from 37 countries in 2017. <i>Multi-donor fund.</i> | Ongoing |
| | <ul style="list-style-type: none"> • Increased number of IRENA Members. | Ongoing. <ul style="list-style-type: none"> • Nine new Members to date over the period 2016-2017. • Four new States in Accession during the biennium. | | | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|-----------|---|--|--|---|-------------|
| | Core | Status | Other sources | Status | |
| | <ul style="list-style-type: none"> • Four Council meetings and related events* | <p>Completed.</p> <ul style="list-style-type: none"> • 11th, 12th, 13th and 14th meetings of the Council and related events successfully held. | Supported the participation of delegates through the Fund for Developing Country Representatives (FDCR). | <p>Completed.</p> <ul style="list-style-type: none"> • 6 delegates from 6 countries for 11th Council meeting. • 3 delegates from 3 countries for 12th Council meeting. • 5 delegates from 5 countries for 13th Council meeting. • 4 delegates from 4 countries for 14th Council meeting. <p><i>Multi-donor fund.</i></p> | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|--|---|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Facilitating international co-operation (continued) | <ul style="list-style-type: none"> • Meetings of subsidiary bodies, as necessary* | <p>Completed.</p> <ul style="list-style-type: none"> • Meetings of subsidiary bodies at the 11th, 12th, 13th and 14th Council meetings successfully held. | | | Ongoing |
| | <ul style="list-style-type: none"> • IRENA booth at WFES* | <p>Completed.</p> <ul style="list-style-type: none"> • Programmatic meetings held during WFES 2016 and 2017. • Delivery of IRENA booth and support for WFES 2016 and 2017. | | | Ongoing |
| | <ul style="list-style-type: none"> • Increased programme-related communication to Member States* | <p>Completed.</p> <ul style="list-style-type: none"> • Compiled and circulated Bulletins, programmatic In Focus briefs, periodic 'Publication Updates' and additional information messages on IRENA in 2016 and 2017. | | | Ongoing |
| | <ul style="list-style-type: none"> • Further development of content and functionalities of online portal for Members* | <p>Completed.</p> <ul style="list-style-type: none"> • REMember updated as required. | | | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|---|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Facilitating international co-operation (continued) | <ul style="list-style-type: none"> Facilitate engagement of Permanent Representatives in the Agency and heightened outreach to other Permanent Missions at Headquarters* | <p>Completed.</p> <ul style="list-style-type: none"> The number of Permanent Representatives accredited to the Agency increased from 37 to 48. 15 Members accredited a new Permanent Representative following the end of tenure of a preceding Permanent Representative. 8 Embassy Briefings and Introductions were held in 2016 and 2017. | | | Ongoing |
| | <ul style="list-style-type: none"> Development of a Member communication network. | <p>In progress.</p> <ul style="list-style-type: none"> Contact made with IRENA focal points to connect with national communication counterparts. 267 focal points representing 87 IRENA Members and States in Accession subscribed to the 'IRENA Media Briefs' | | | Ongoing |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|--|---|--|---|-------------|
| | Core | Status | Other sources | Status | |
| Dissemination of knowledge, data and analysis. | <ul style="list-style-type: none"> • Communications strategies. | <p>Completed.</p> <ul style="list-style-type: none"> • Developed 2016 and 2017 communications strategy, including a series of campaigns for a range of products, events, initiatives and publications, including engagement at: G20, UNFCCC COP22 and COP23, UN Habitat III, IRENA Assembly sessions, IRENA Innovation Week, Clean Energy Ministerial, the World Future Energy Summit, the Global Geothermal Alliance, IOREC, and Coalition for Action. | <ul style="list-style-type: none"> • Educational videos and infographics to simplify complex renewable energy concepts. | <p>Resources not identified.</p> | Ongoing |
| | <ul style="list-style-type: none"> • Social media | <p>Completed.</p> <ul style="list-style-type: none"> • Conducted social media campaigns, including: IRENA Assembly sessions (#IRENA6A and #IRENA7A), REmap 2.0 (#REmap), IRENA’s 5th Anniversary (#REthenandnow), Summer of Solar (#summerofsolar), COP22 (#REenergise), COP23 to support various key publications. | | | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|--|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Dissemination of knowledge, data and analysis (continued) | <ul style="list-style-type: none"> • Social media (continued) | <ul style="list-style-type: none"> • Twitter followers increase by 231%, with more than 28 million impressions. • Facebook increase by more than 1000%, LinkedIn followers increase by 90%. • New Instagram account with 117% growth in 2017. | | | Ongoing |
| | <ul style="list-style-type: none"> • Editorial maintenance of IRENA web properties and digital media. | <p>Completed.</p> <ul style="list-style-type: none"> • IRENA.org website relaunch in November 2017, with new design, content, and functionality. • Search Engine optimisation of existing web pages underway. • Website content updated 3-4 times/week. | | | Ongoing |
| | <ul style="list-style-type: none"> • Digital media production and distribution* | <p>Completed.</p> <ul style="list-style-type: none"> • Designed and disseminated over 220 infographics and photocards based on IRENA events, products and data. • Created 50+ promotional videos. • Distributed 70+ press releases in seven languages. Garnered 25,800 media mentions. | | | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|--|--|---|---|-------------|
| | Core | Status | Core | Status | |
| Dissemination of knowledge, data and analysis (continued) | <ul style="list-style-type: none"> Digital media production and distribution* (continued) | <ul style="list-style-type: none"> Developed 110+ newsroom articles. Regular op-eds by Director-General on his Huffington Post page. | | | |
| | <ul style="list-style-type: none"> Press conferences, webinars. | <p>Completed.</p> <ul style="list-style-type: none"> Conducted 20+ press events. Hosted media programme for 6th and 7th Assembly Conducted media campaign with FT at 2016 Assembly and with CNN at 2017 Assembly, reaching millions online and via TV. | | | Ongoing |
| | <ul style="list-style-type: none"> Strengthened media and stakeholder lists. | <p>Completed.</p> <ul style="list-style-type: none"> Consistently updated global media lists based on coverage/media queries. Procured new tool to gain access to 2.5 million journalists worldwide. | <ul style="list-style-type: none"> Increase language-specific capacity and production of language-specific communications materials. | <p>Resources not identified.</p> | Ongoing |
| | <ul style="list-style-type: none"> Agency-wide publications co-ordination, planning, production and communications support. | <p>In progress.</p> <ul style="list-style-type: none"> Release of 70+ reports and papers in 2016 and 2017 to date (30 September) with reader-friendly web content and targeted communication. ISBN designations for all IRENA publications to increase global visibility and impact. | | | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|---|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Dissemination of knowledge, data and analysis (continued) | <ul style="list-style-type: none"> • Editing, translation, proofreading and graphic design to support programmatic publishing outputs* | <p>Completed.</p> <ul style="list-style-type: none"> • Released REmap global report summary (2016 edition) in seven languages. • Prepared summaries for the 2nd and 3rd editions of <i>REthinking Energy</i> in six languages* • Targeted regional or country-specific translations, such as joint brief with China Water Risk in Chinese, Latin America market analysis, REmap Dominican Republic summaries in Spanish, key points from a REmap paper on the Russian Federation in Russian. • Collaboration with the Government of Kazakhstan to translate key recent publications and brochures for Astana EXPO 2017. <p>In progress.</p> <ul style="list-style-type: none"> • Dialogue with Members and specialist institutes to further strengthen translation process. | | | Ongoing |

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| Component | Activities | | | | Timeframe** |
|---|--|---|--|----------------------------------|-------------|
| | Core | Status | Other sources | Status | |
| Dissemination of knowledge, data and analysis (continued) | • Planning and implementation of programmatic events in support of the Work Programme* | Completed. • Supported the organisation of and participation in 150+ meetings in 118 countries with about 1000 participants in 2016-2017. | | | Ongoing |
| | | | • Conduct RE training programmes for journalists, media organisations and spokespersons. | Resources not identified. | Ongoing |
| | | | • Develop strategic media partnerships and engagements to expand coverage of IRENA activities. | Resources not identified. | Ongoing |
| | | | • Conduct media relations events in target markets. | Resources not identified. | Ongoing |

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| Component | Activities | | | | Timeframe** |
|--|--|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Strengthen institutional structures and accountability | <ul style="list-style-type: none"> Facilitating the full implementation of the Headquarters Agreement and the Agreement on the IITC Seat. | <p>In progress.</p> <ul style="list-style-type: none"> Discussions with the Government of the UAE on a supplementary agreement to govern IRENA's occupancy of its permanent headquarters in Masdar City. Regular meetings with Host Countries to address issues of mutual interest. | | | Ongoing |
| | <ul style="list-style-type: none"> Outreach to increase the number of Members granting privileges and immunities to IRENA. | <p>In progress.</p> <ul style="list-style-type: none"> IRENA continues to engage with States to encourage them to take actions for the implementation of Assembly decision A/3/DC/5 on an Agreement on Privileges and Immunities for IRENA. Egypt, Germany, Poland, Spain and the United States have implemented this decision. | | | Ongoing |
| | <ul style="list-style-type: none"> Further enhancing the protection of IRENA and its interests. | <p>In progress.</p> <ul style="list-style-type: none"> Continuous provision of the necessary legal support. Continued oversight by the Internal Audit Office. | | | Ongoing |

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| Thematic area: Administration and Management Services | | | | | |
|---|---|---|---|--|-------------------|
| Objective: Support the Agency's programmatic work through comprehensive and efficient business processes that foster accountability and transparency. | | | | | |
| Resources (core assessed, non-assessed and other sources): 11,174 (in USD thousands) | | | | | |
| Component | Activities | | | | Timeframe** |
| | Core | Status | Other sources | Status | |
| Finance | <ul style="list-style-type: none"> • Comprehensive finance support to the Agency. | Ongoing. <ul style="list-style-type: none"> • Timely processing of Payroll and Payment; Funds invested and monitored; Accounts prepared and updated. Monthly and year-end financial closure. | <ul style="list-style-type: none"> • Voluntary Contribution Reporting. | In progress. <ul style="list-style-type: none"> • Reporting system for voluntary contributions institutionalised. <i>Resourced by Programme Support Costs.</i> | Ongoing |
| | <ul style="list-style-type: none"> • Audited IPSAS compliant Financial Statements. | Completed. <ul style="list-style-type: none"> • Audit of Financial Statements for Agency and Staff Provident Fund for 2015 and 2016 successfully completed | | | Q2 2016 - Q2 2017 |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate business process. | Ongoing. <ul style="list-style-type: none"> • Advice and Support provided to internal and external stakeholders; Annual billing of assessed contributions completed; collections follow-up ongoing. | | | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|-----------|--|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Budget | <ul style="list-style-type: none"> • Comprehensive budgetary support to the Agency. | <p>Ongoing.</p> <ul style="list-style-type: none"> • Annual 2016 and 2017 core budgetary allotments prepared and issued. • Voluntary Contribution allotments prepared and issued on time; Funds availability certified and reported upon. • System design, data preparation and data migration to new Oracle ERP system. | | | Ongoing |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate budgetary process. | <p>Ongoing.</p> <ul style="list-style-type: none"> • Advice and support provided to different Agency stakeholders. • Enhancement and monitoring of updates to budgetary systems and applications. • Continuous monitoring and update of funds reservations and requests. | | | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--|---|---|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Information and Communication Technology | <ul style="list-style-type: none"> • Comprehensive IT services to the Agency in all of its physical locations* | In progress. <ul style="list-style-type: none"> • Global connectivity and 24 x 7 communication services. • Email services and collaboration support. • Technology support for knowledge management. • Helpdesk support. • Operational support for ICT portals and websites. | | | Ongoing |
| | <ul style="list-style-type: none"> • ERP for IRENA in support of integrated resources management and controls. | In progress. <ul style="list-style-type: none"> • Comprehensive review of the technology and deployment modalities as well as the review and adaptation of business processes. • Oracle Cloud ERP Solution is under implementation | | | Ongoing |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate business process* | In progress. <ul style="list-style-type: none"> • In-sourcing of ICT support is completed. • Business process optimisation ongoing. | | | Ongoing |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|-----------------|--|--|---------------|--------|-------------|
| | Core | Status | Other sources | Status | |
| Human Resources | <ul style="list-style-type: none"> • Comprehensive HR support services. | <p>In progress.</p> <ul style="list-style-type: none"> • Ongoing administration of staff benefits and entitlements. • Performance evaluation system refined and new Performance Appraisal Forms and Guidelines completed. • Ongoing sourcing and recruitment of staff and other personnel. | | | Ongoing |
| | <ul style="list-style-type: none"> • Development of the workforce planning strategy. | <p>In progress.</p> <ul style="list-style-type: none"> • A thorough review of vacancy rates and turnover trends completed. | | | Q2 2016 |
| | <ul style="list-style-type: none"> • Facilitate work-life balance | <p>In progress.</p> <ul style="list-style-type: none"> • Review of proposals for work-life balance. | | | Ongoing |
| | <ul style="list-style-type: none"> • Systematic induction programme designed and implemented in all IRENA offices, including ethics training. | <p>In progress.</p> <ul style="list-style-type: none"> • Regular induction sessions held. Participant feedback fed into development of induction material. | | | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe** |
|--------------------------------|--|--|---------------|--------|-------------------|
| | Core | Status | Other sources | Status | |
| Human Resources (continued) | <ul style="list-style-type: none"> • Periodic staff training and development programmes, including on performance management. | In progress. <ul style="list-style-type: none"> • Needs assessment underway. | | | Ongoing |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate human resource process. | In progress. <ul style="list-style-type: none"> • Ongoing review, evaluation and revision of the HR rules, policies and processes, manuals and templates, as required. | | | Ongoing |
| Procurement | <ul style="list-style-type: none"> • Comprehensive procurement support. | Completed. <ul style="list-style-type: none"> • Call for expression of Interest EOI for Renewable Energy Consultancy services and market research to expand the vendor’s database for competitive bidding. | | | Ongoing |
| | <ul style="list-style-type: none"> • Master Procurement plan for increased efficiency. | In progress. <ul style="list-style-type: none"> • Completed for 2016 and under completion for 2017 | | | Q1 2016 - Q1 2017 |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate procurement process. | In progress. <ul style="list-style-type: none"> • Procurement SLAs were developed, and procurement forms/templates are under review. | | | Ongoing |

NOTE: Activities marked with an asterisk () are resourced by core assessed and core non-assessed funds

**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds

| Component | Activities | | | | Timeframe* * |
|---------------------------|---|--|---------------|--------|-----------------|
| | Core | Status | Other sources | Status | |
| General services & Travel | <ul style="list-style-type: none"> • Comprehensive travel processes and support including for governing body meetings, programmatic events and staff travel* | In progress. <ul style="list-style-type: none"> • Preparation and support of the Council meetings, and programme-related travel. | | | Quarterly |
| | <ul style="list-style-type: none"> • Key Asset Management System. | In progress. Ongoing. <ul style="list-style-type: none"> • Facility Management support for IRENA Headquarters and staff. • Fixed Asset System procured and data uploaded, ongoing fixed assets management, control, tracking and reporting. | | | Ongoing |
| | <ul style="list-style-type: none"> • Health and safety plans in all IRENA offices* | In progress. <ul style="list-style-type: none"> • Health and Safety Plan implemented. More enhancements in the health and safety practices are planned for IRENA HQ and staff. | | | Ongoing |
| | <ul style="list-style-type: none"> • Streamlined, efficient and accurate business process* | In progress. <ul style="list-style-type: none"> • Regular review of existing travel and business processes within General Services | | | Ongoing |

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**NOTE: Timeframe for deliverables under 'other sources' is subject to availability of funds