

REGIONAL ACTION PLAN: ACCELERATING RENEWABLE ENERGY DEPLOYMENT IN LATIN AMERICA



Latin America hosts some of the world's most dynamic renewable energy markets, with more than a quarter of primary energy coming from renewables, twice the global average. Across the region, hydropower plays a central role in the energy sector, and while several Latin America countries hold some of the world's most promising geothermal resources, others have pioneered bioenergy deployment. Yet, despite these positive developments, energy demand is rising, energy security remains a concern, and the impacts from climate change in the energy sector are becoming more pronounced.

The region is advancing in low-carbon growth. It derives more than 200 gigawatts (GW) of its power (56% of the total) from renewable sources, mainly large-scale hydropower and biomass. More recently, countries have begun deploying increasing levels of solar, wind and geothermal power, which total over 10 GW of installed capacity. The region is also fostering the growth of distributed energy resources and holds significant potential to accelerate decentralised renewable energy generation.

Latin America has seen significant investment in renewable energy in recent years, with total investment exceeding USD 16 billion, or about 6% of the global total. Between 2010 and 2015, total investment in renewable power generation in the region reached nearly USD 120 billion, placing several countries in Latin America among the top 10 largest renewable energy markets globally. These trends attest to the rapid evolution of the region's energy mix towards a more diversified set of technologies, with more countries adopting different forms of renewables.

Hydropower assets will continue to play a critical role in the region's renewable energy scale-up, and are consistent with the integration of variable renewable energy resources. Latin America has developed extensive local knowledge on the social and environmental considerations to ensure sustainability in hydropower generation, which can help guide deployment in the future.

Bioenergy is also a field of significant potential for Latin America. The production of bioenergy for transport from sugarcane was pioneered in the region and is used at scale in key markets, along with considerable amounts of liquid biofuels for transport from maize and soy. As in other regions, bioenergy from crop residues and

municipal wastes, among other feedstocks, can cost-effectively process heat for industry (including biorefineries), provide space heating and cooling for buildings, and add balancing support to variable renewables in the power and heating sectors. Harnessing bioenergy's potential in a sustainable manner will be key to Latin America's development and energy transformation.

Enabling policies have played a decisive role in the region's uptake of renewables. Policy instruments, from auctions to solar thermal requirements to biofuel blending mandates, have helped drive crucial cost reductions. Latin America also benefits from highly competitive development costs, notably for onshore wind, and more recently, solar photovoltaic. In addition, policy makers increasingly recognise renewables as a catalyst for job creation, GDP growth, development of local industries and energy access. For countries with high shares of hydropower, investment in non-hydropower renewables promises valuable resource complementarities and improved power system reliability.

Regional Consultative Process

The Abu Dhabi Communique on Accelerating Renewable Energy Uptake in Latin America, adopted by the countries of the region during IRENA's 5th Assembly (January 2015), identified several areas of co-operation to support renewable energy deployment in the region, including: resource assessments; energy planning; grid integration of variable renewable energy; policy support mechanisms; energy market integration; the off-grid sector; capacity-building and information dissemination.

These priorities were later reinforced by the findings of IRENA's 2016 report *Renewable Energy Market Analysis: Latin America*, which emphasised the need to catalyse public and private finance, adapt policies to changing market conditions, adopt a system-level approach in the power sector, and maximise socio-economic benefits. As such, in recent years, IRENA's engagement in the region has focused on providing support for renewable energy policy, regulation, finance and grid integration, including through the ongoing Clean Energy Corridor for Central America (CECCA) initiative.

Against this backdrop, IRENA undertook stakeholder consultations with its Latin American Members in 2018 to identify priority areas for this Regional Action Plan. This plan provides a listing of IRENA technical-advisory and capacity-building activities, which aim to address the main barriers to renewable energy deployment in the region. Such work, which leverages a range of IRENA's tools and analytical products, is intended to be undertaken in collaboration with key partners and in conjunction with ongoing initiatives in Latin America.

Implementation and Operationalisation

Despite the diversity of energy systems across Latin America and varying capacity-building needs, several common challenges that have been identified through IRENA's consultations and engagement to date can be addressed through regional action.

The plan is intended to be implemented in close co-operation with national and regional stakeholders, as well as regional and international organisations that share a common vision of accelerating renewable energy deployment in the region. Moreover, the implementation of the Regional Action Plan in Central America will be synchronised with that of the CECCA initiative.

IRENA will also collaborate with regional and development partners, aiming to ensure that impact is maximised through synergies and complementarity with ongoing renewable energy work in Latin America. In addition to regional-level activities, IRENA will continue to engage with countries bilaterally through the Renewables Readiness Assessment (RRA), the Renewable Energy Roadmap (REmap) and other specific technical country-level engagements.

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Regional Action Plan

Based on the feedback received through the regional consultative process, and taking into consideration the 2015 Communique and 2016 Market Analysis, IRENA's regional engagement will focus on the following areas:

Long-term Power Sector Planning

With large-scale integration of renewable energy rapidly expanding throughout Latin America, energy planners must cope with new challenges related to variability and long-term power system modelling, while utilising a strong hydropower and bioenergy resource base in many countries. IRENA, through its power sector transformation work, has been supporting national and regional planners with guidance on how to better represent variable renewable energy in the long-term planning process. In particular, this work includes techno-economic assessments that inform policy development and set optimal targets for renewable power uptake. Building on the Agency's 2017 workshop in South American countries, IRENA will provide further training and exchanges of best practices on scenario modelling and variable renewable capacity expansion.

Power System Flexibility

The IRENA FlexTool helps to assess the flexibility of power systems with high shares of variable renewable energy and identify a least-cost mix of solutions to address flexibility gaps. The tool has been applied in Colombia, Panama and Uruguay to support national power system planning and provide flexibility assessments for the integration of variable renewables. As a detailed and open-source tool, the FlexTool can be applied in additional Latin American countries. The tool can help to optimize and leverage high shares of hydropower as a key source of flexibility. Further work could build on IRENA's analyses of sector-coupling (power-to-heat, power-to-gas and power-to-electric mobility) and different types of energy storage (e.g. pumped hydro storage, battery storage), as well as reflect studies on market design such as *Adapting Market Design to High Shares of Variable Renewable Energy* (2017).

Grid Integration of Variable Renewable Energy

Through the CECCA initiative, IRENA has been providing technical trainings on managing and operating power systems with increasing penetration of VRE. In this context, this work is intended to be expanded to additional Latin American countries and deepened in the form of capacity-building and advisory services, as required.

Enabling Policy and Regulatory Frameworks

Many countries in Latin America have developed a robust set of enabling policy and regulatory measures to create a conducive environment for renewable energy investments. Countries with less advanced renewables markets would benefit from the sharing of best practices on effective policy support schemes from outside the region as well as tailored technical support. In this context, particular attention will be given to renewable energy auction design and power purchase agreement (PPA) structures, which have emerged as critical elements affecting renewable energy investment decisions.

To support policymakers with the auction process in particular, IRENA has published four studies: *Renewable Energy Auctions in Developing Countries*, *Renewable Energy Auctions: A Guide to Design*, *Renewable Energy Auctions: Analysing 2016*, *Renewable Energy Auctions: Cases from sub-Saharan Africa*. A fifth report on auctions will analyse design elements that support the integration of variable renewable energy, the maximisation of local benefits and the adoption of auctions for increased electricity access. Capacity building activities can build on these reports and IRENA's broader policy analyses to support Latin American countries with auction design and enabling policy frameworks.

Furthermore, as part of the CECCA initiative, IRENA has developed a financial modelling tool to assess investment incentives of solar PV and wind PPA designs in a pilot country, Panama. This tool will be expanded to capture additional technologies and national markets in Latin America.

Finally, IRENA, jointly with the Terrawatt Initiative (TWI), has set out to standardise project documentation (including, inter alia, a PPA template) for solar photovoltaic projects. The Open Solar Contracts initiative provides a comprehensive legal documentation solution and is designed to be universally applicable. This will be made available online to the solar power community in the region.

Maximising Socio-economic Benefits

A number of countries in Latin America have implemented measures to maximise the socio-economic benefits of renewable energy deployment, including job creation, the development of local industries and supporting community benefits. Such measures are very important in the region to ensure that the energy transition benefits all communities, especially in areas that have considerable renewable energy resources and are inhabited by indigenous communities. Therefore, the findings of IRENA's work on socio-economic benefits and renewable energy jobs can support the design and adoption of policy frameworks that are supportive of a just and fair energy transition.

In addition, considering the significant role of cities in the energy transformation, IRENA is undertaking a range of analytical and technical activities to gain insights into urban best practices, technology solutions and economic aspects. Cities in Latin America could benefit from these analyses, including best practices on policy frameworks in renewables deployment that have been identified in selected cities, such as those in Costa Rica.

Regional REmap Analysis

IRENA's Renewable Energy Roadmap (*REmap*) analysis – done in collaboration with countries – investigates all renewable energy options to support the energy transformation at the country, regional and global level. A regional REmap study provides a common framework to compare energy plans and ambition levels for energy transformation among countries, and at the regional level to 2030, with a view to 2050. Moreover, the regional REmap process also facilitates the exchange of experiences among countries and can be used as input for national energy planning. In this context, IRENA will undertake a regional REmap study in Central and/or South America, taking into account the vast opportunities in those regions to scale-up all forms of renewables in the power sector and end-use sectors.

Geothermal Energy

Since 2013, IRENA has been actively supporting the region's efforts to accelerate geothermal energy deployment. In collaboration with the Latin America Energy Organisation (OLADE) and the International Geothermal Association (IGA), IRENA implemented the "Geothermal Initiative in Andes", the region's first such programme, to support the development of the vast but largely untapped geothermal potential of Andean countries. IRENA has continued to support geothermal energy development in the region under the umbrella of the Global Geothermal Alliance (GGA), which has 12 members from Latin America as of December 2018.¹ In this context, the Agency will aim to find synergies with GGA members and partners to facilitate exchanges of insights within Latin America and with other regions, build public awareness of geothermal resources, provide further capacity-building and technical advisory services to develop effective enabling frameworks and associated mechanisms, and accelerate the uptake of geothermal energy (power generation and direct use) at the national and regional levels.

¹ Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru

Project Development and Finance

Renewables often face perceptions of high technology risk, along with cumbersome administrative procedures and insufficient transparency in the project cycle, as well as limited access to financing and risk mitigation instruments. To help improve project quality and visibility, market transparency and access to finance in the region, IRENA and the Inter-American Development Bank (IDB), in 2016, launched the Sustainable Energy Marketplace for Latin America. To develop a pipeline of investment mature projects and scale-up renewable energy investment in Latin America, IRENA will provide advisory support to project developers in the region to help bring projects to financial closure and will engage with local actors, such as national investment promotion agencies, to identify and facilitate project development.

IRENA's other online project facilitation platform, the Project Navigator, supports project developers with guidelines that can improve the bankability of projects. In addition, the Agency offers a Global Atlas site appraisal service to help screen project sites earmarked for solar and wind development. In order to strengthen the renewable energy project pipeline (both centralised and decentralised) in the region, IRENA will organise regional and country-level workshops on project facilitation tools and services for countries in Latin America.

Clean Energy Corridor of Central America (CECCA)

The CECCA initiative aims at supporting the accelerated deployment and cross-border trade of renewable power in Central America. Since 2015, capacity building support and technical advice have been provided on power system operations and regulation (PPA design) for variable renewables. The synergies and complementarities with the broader regional programme will be used in the course of the implementation of the CECCA implementation plan.

This Regional Action Plan establishes the framework of IRENA's engagement in Latin America. It is intended as the basis for further discussion ahead of the development of future IRENA Work Programmes.

	Action Plan Priorities	Activity	Objective
1	Long-term power sector planning	Workshop	Build further capacity on long-term planning with high shares of variable renewable energy (<i>follow-up to December 2017 workshop in South America</i>).
2	Power system flexibility	Technical advice	Enhance power system flexibility, especially in the context of strong hydropower resources, and support national electricity system planning efforts by expanding FlexTool application to additional countries and sharing IRENA knowledge products on the topic.
3	Grid integration of variable renewable energy	Technical advice and training	Build capacity on operating and managing power systems with rising shares of variable renewable penetration through technical training including sharing best practices identified in IRENA's analyses on the topic.
4	Enabling policy and regulatory frameworks, and socio-economic impacts	Workshop	Strengthen enabling policy by sharing best practices on renewable energy policy support mechanisms (national and local level). Enhance knowledge on socio-economic impacts (jobs, welfare, GDP, etc.) and related policy requirements (energy, labour, industrial, etc.).
		Technical advice and training	Assess investment incentives of renewable energy PPAs through introduction of financial modelling tool in South America.
5	Regional renewable energy roadmap (REmap)	Analysis	Identify all renewable energy options and support energy transformation in countries through undertaking a regional REmap study in Central America and/or South America (subject to availability of funding).
6	Geothermal Energy	Training	Promote geothermal energy development in regional renewable energy engagements. Encourage the participation of Latin American countries and stakeholders in the framework of the Global Geothermal Alliance's networks of experts to facilitate exchanges of insights and experiences on geothermal deployment (power generation and direct-use) at the national and regional levels, and increase public awareness of geothermal resources.
7	Project development and finance	Workshop	Share best practices and enhance understanding of renewable energy financing and risk mitigation measures. Facilitate renewable energy project development and access to finance through promotion of the use of IRENA's Project Navigator and Sustainable Energy Marketplace platforms, and by organising matchmaking workshops for project developers and financiers.
		Technical advice	Undertake financial assessment of solar and wind project sites based on IRENA's Global Atlas site appraisals.
8	Clean Energy Corridor of Central America (CECCA)	Technical advice, training, workshop	Synchronise the implementation of the CECCA implementation plan with this Regional Action Plan for Latin America.