

# Renewable Energy in Latin America

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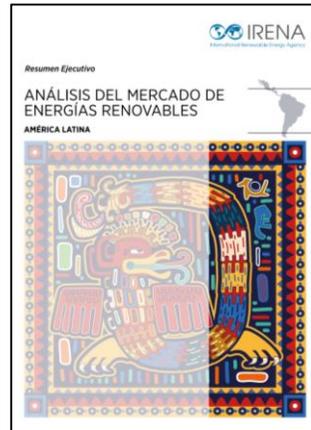
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# Development of the Regional Action Plan for Latin America

Abu Dhabi Communique  
on Accelerating  
Renewable Energy  
Uptake in Latin America



Consultative  
process to develop  
Regional Action  
Plan



2015



2016



2018



2019

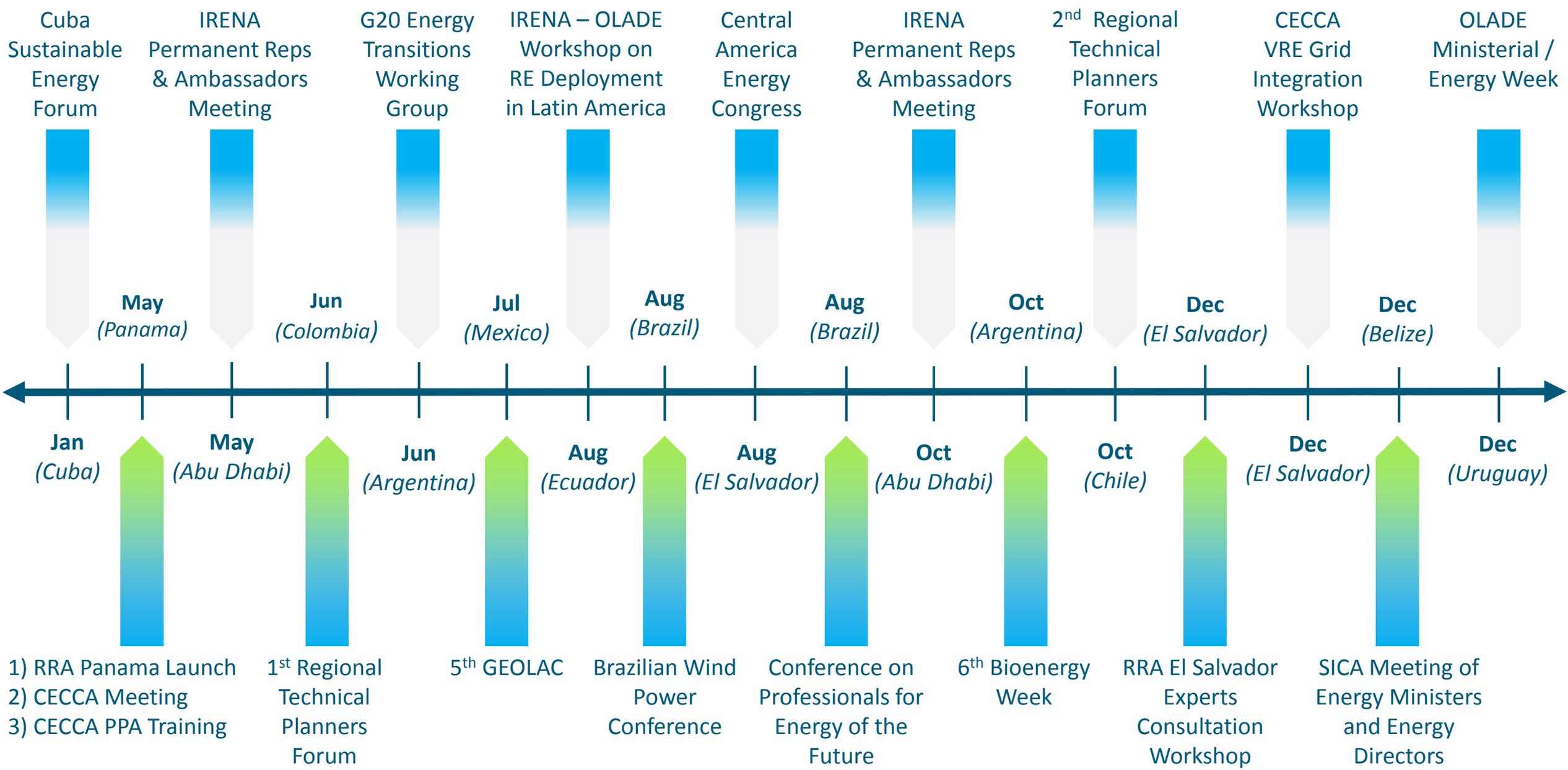


Regional Market  
Analysis:  
Latin America



Regional Action  
Plan: Accelerating  
Renewable Energy  
Deployment in  
Latin America

# Overview of 2018 Latin America Engagements



**1. Long-term power sector planning**

**2. Power system flexibility**

**3. Grid integration of variable renewable energy**

**4. Regional renewable energy roadmap (REmap)**

**5. Enabling policy and regulatory frameworks, and socio-economic impacts**

**6. Project development and finance**

**7. Geothermal energy**

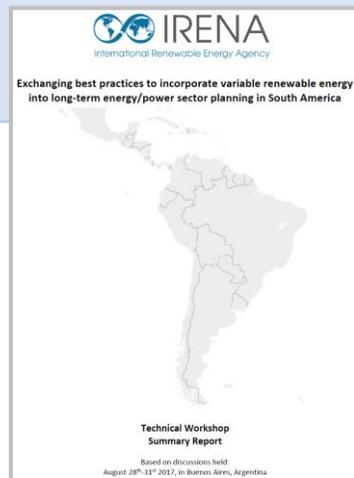
**8. Clean Energy Corridor of Central America (CECCA)**

## *Enhance understanding of best practices for long-term power system planning and modelling with high shares of variable renewable energy*

### Latin America Regional Workshop on Long-term Planning

*(Buenos Aires, 2017)*

- Experience exchange and identification of opportunities for improvement
- Follow-up areas include system flexibility, capacity credit of VRE, RE data improvement (costs, resources), topics beyond modelling e.g. grid codes, remuneration of energy system services (flexibility and transmission investment)



### Regional Technical Forums for Energy Planners

*(First Forum, Bogota, June 2018)*

#### **High-level takeaways:**

- Country contexts are different but concerns are similar:
    - *Modelling RE costs, modelling generation adequacy, modelling flexibility, modelling transmission*
  - Extensive global experience with power systems and VRE
  - IRENA should serve as a platform to identify specific needs and facilitate knowledge exchange
- (Second Forum, Santiago, Oct. 2018)*
- IRENA's FlexTool case study for Colombia and Uruguay presented

## Promote the wider adoption and improved use of long-term energy scenarios for clean energy transition



LONG-TERM SCENARIOS FOR THE ENERGY TRANSITION

A CAMPAIGN BY THE CLEAN ENERGY MINISTERIAL

- » **Launch:** May 2018 at the 9<sup>th</sup> CEM meeting, Copenhagen
- » **Duration:** one year (possible extension of multiple years)
- » **Lead countries:** Denmark, Germany
- » **Operating agent:** IRENA
- » **Current Country Members:** Brazil, Canada, Chile, Finland, Japan, Mexico, the Netherlands, UAE, UK

- » **Current Technical Partners:** China National Renewable Energy Centre, European Commission, IEA - ETSAP, Joint Institute for Strategic Energy Analysis
- » **Recent and Upcoming Activities:**
  - Webinars (LTES experiences shared by Brazil, Chile, Mexico)
  - 2019 Campaign meeting planned to exchange regional experience and good practices for scenario development (Brazil, February 2019)

### Use of scenarios for policy making

- » Share experience in the use of energy scenarios for national and regional policy planning
- » Identify ways to make scenarios more relevant to policy and investment decisions

### Development of scenarios for clean energy transition

- » Showcase new tools & methods to address new, disruptive elements of the transition
- » Identify modelling gaps (end-use innovation, sector coupling, and VRE energy integration)

### Approaches to capacity enhancement

- » Identify institutional relationships between use and development communities
- » Share experience within your country (in-house vs out sourcing approaches for scenario development)

## *Enhance power system flexibility and national electricity planning through the application of flexibility assessments*

### IRENA FlexTool

- Analyse system operations using time step that represents real-world challenges (hour or less in the case of VRE)
- Identify a least-cost mix of flexibility options for a power system that might be facing insufficient flexibility at certain points during operations

#### Inputs:

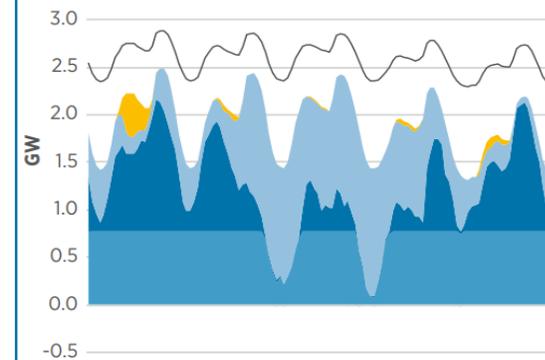
- Generation mix
- Demand
- VRE profiles
- Scenarios
- Reserve requirements
- Investment candidates



**IRENA FlexTool**



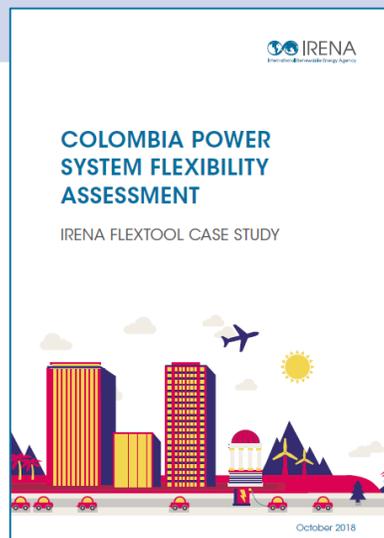
#### Outputs:



## FlexTool Case Study: Colombia

### Conclusions and Impact

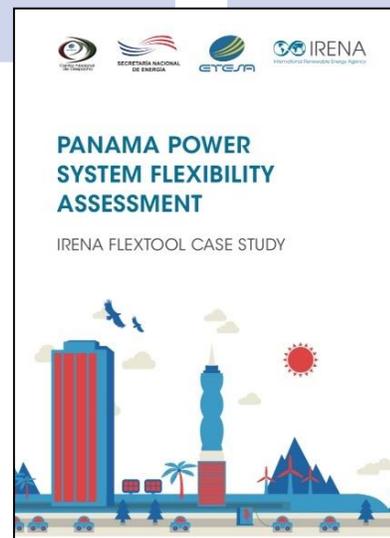
- In 2030, despite the high share of VRE, Colombia's power system will be flexible enough even if a dry year (even if Ituango hydropower plant is not considered)
- Colombia could reach the 100% RE share by further installing VRE resources and complementing them with energy storage (Pumped Hydro relevant)
- **Based on results, UPME plans to add chapter on flexibility to next national power expansion plan (period 2018-2032)**



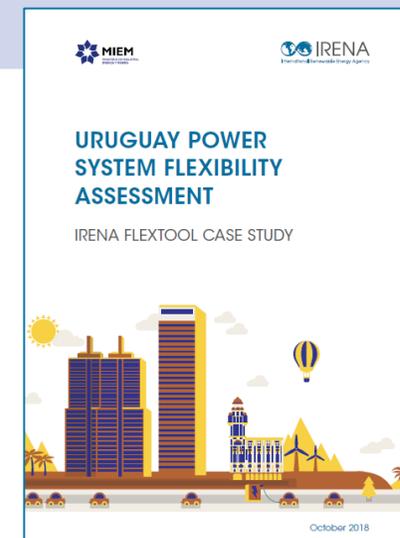
## FlexTool Case Study: Uruguay

### Conclusions and Impact

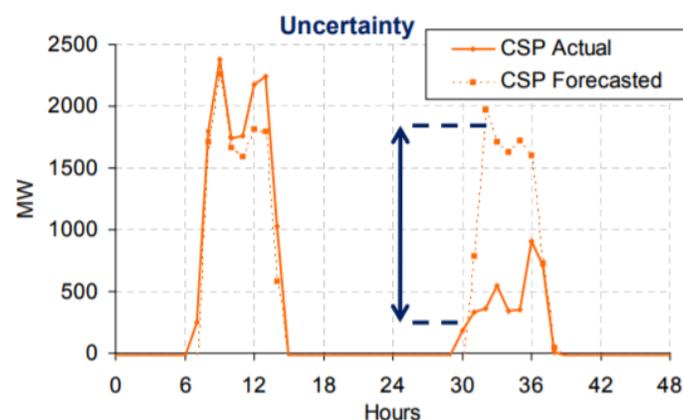
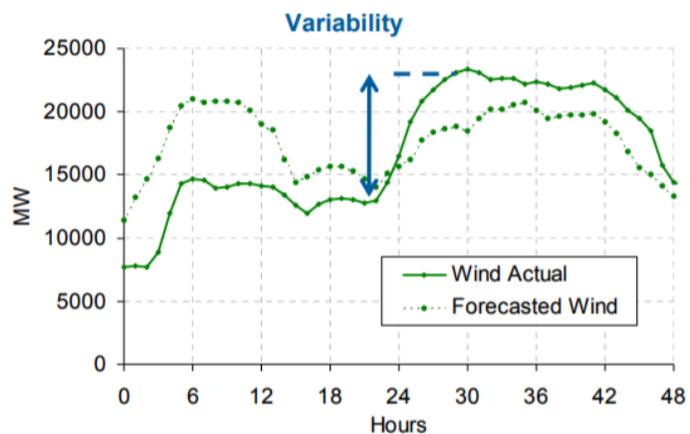
- Uruguay is very close to 100% RE share and will have a 100% RE share in the 2030 reference scenario (in 2030 dry scenario shares reduces to 86%); high excess of VRE if no measures take place to avoid them
- Could benefit from active cross-border market with Argentina and Brazil (export excess VRE) and explore sector coupling
- **MIEM recognises the FlexTool as a useful evaluation to reveal additional flexibility measures and allow integrated assessments of sector coupling.**



(2019)



## *Build capacity on operating and managing power systems with rising shares of variable renewable energy penetration*



### IRENA Grid studies

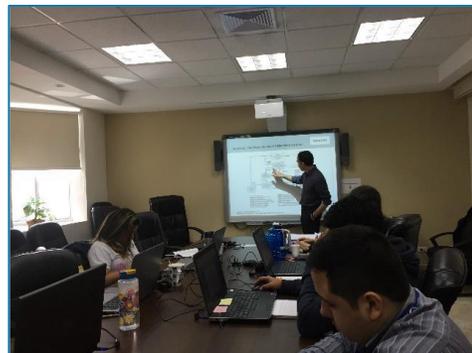
#### ➤ Grid Integration Study to Assess the Expansion of High Shares of Variable Renewable Energy in the Operation of the Power System of the Dominican Republic (*ongoing*)

*VRE integration studies can answer questions such as:*

- How much VRE can be safely deployed in the grid?
- What are the technical impacts of deploying significant amounts of VRE?
- How does VRE impact energy markets and power system economics?
- What strategies are the most effective in integrating renewables?

**Grid Integration  
Support Under  
CECCA  
(Technical  
Component of  
the Initiative)**

Regional training on  
Power Operations with  
High Shares of VRE  
(Spain, 2015)



Regional training on  
Modelling Renewables  
in PSS/e for Power  
System Studies  
(El Salvador, 2018)



National training on  
Power System  
Operations with High  
Shares of VRE  
(Panama, 2017)



## *Evaluate all renewable energy options to support the energy transformation at the country, regional and global level*

### REmap Study: Process and Outcomes

Countries express interest in REmap through formal request to IRENA

Consultation workshops with relevant stakeholders

Diagnostic of renewable energy, energy efficiency and climate plans

Country-level REmap tool (spreadsheet framework to create the REmap scenarios)

REmap report and resulting datasets

**Latin American countries that have been part of REmap (global / country) studies:**  
Argentina, Brazil, Colombia, Dominican Republic, Ecuador, Mexico, Uruguay



# Action Area: Regional Renewable Energy Roadmap (REmap)

*A regional approach to renewable energy can be more efficient and maximise impact by:*

- ◉ Providing a platform for exchanging views on policy making, planning, investment, stakeholder engagement, etc.
- ◉ Sharing best-practices and experiences
- ◉ Assessing aggregated impact of national plans
- ◉ Identifying areas to improve long-term planning
- ◉ Benchmarking of ambition, e.g. in RE, climate, etc.
- ◉ Identifying synergies in e.g. infrastructure development
- ◉ Optimizing the best resources available within the region
- ◉ Creating economies of scale for market players

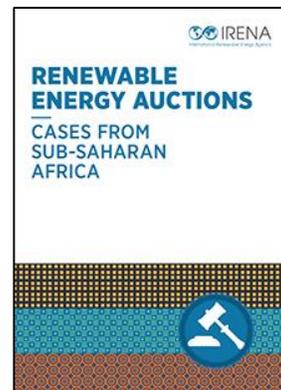
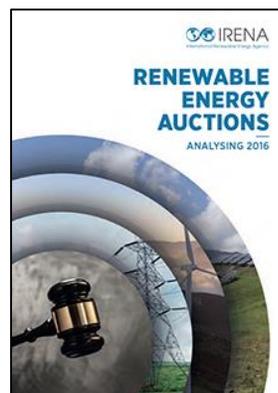
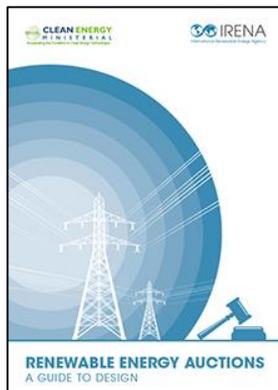
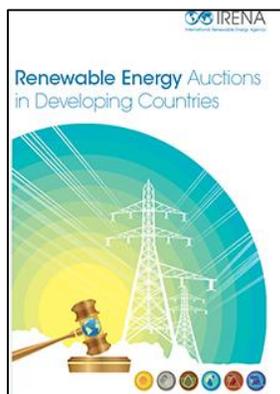
- **Regional Remap for Latin America**  
e.g. Central America, South America
- **Leverage potential collaboration and partnerships**  
ECLAC, GIZ, IDB, OLADE, SE4ALL, SICA, World Bank
- **Align with IRENA's existing regional platforms and tools**  
e.g. CECCA and FlexTool in Central America



## *Support the development of enabling policy and regulatory measures to help create a conducive environment for renewable energy investments*

### Renewables Energy Auctions

- Analyse and disseminate lessons learnt and best practices in the design and implementation of auctions
- Forthcoming report on auction design to include variable renewable energy integration, local benefits and electricity access

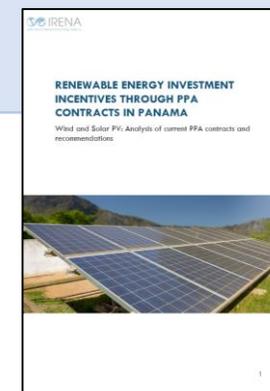


### Renewable Energy

### Power Purchase Agreements

*(piloted in Panama under CECCA initiative)*

- Financial model built to assess solar PV and wind PPA designs
- Report with potential PPA adjustments to strengthen RE investment climate



## ***Support the implementation of policy measures that maximise the socio-economic benefits of renewable energy deployment***

### Renewable Energy Benefits

#### Job creation

- Support development of strong policies and regulations in energy, industry, employment sectors to maximise socio-economic benefits

#### Leveraging local value creation

- Analyse requirements for local content, local jobs and benefits for communities
- Leverage existing manufacturing industries and capacities in support of maximizing local value creation

#### Best policy practices in urban setting

- Share best practices for renewable energy development in cities e.g. technology solutions; economic aspects
- *Costa Rica case study*

## *Promote geothermal energy in regional renewable energy engagements*

### Geothermal Capacity Building Programme

- Regional workshop on Unlocking Geothermal Investments in Central America (August 2017, El Salvador)

### Geothermal resource classification (IGA and WB ESMAP)

- Application in 4 pilot–countries of UNFC Classification Framework on Geothermal Energy Resources and Reserves

### Supporting Geothermal Direct Uses

- GGA Event on Direct Utilisation of Geothermal Energy and Food Security (April 2018, Iceland)
- “Accelerating Geothermal Heat Adoption in the Agri-food Sector: Key lessons and recommendations” – launch at GGA Side Event (12 January)

Under the umbrella of  
the Global Geothermal  
Alliance (GGA)



GLOBAL  
GEOTHERMAL  
ALLIANCE

**GGA Members in Latin America** : Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Peru  
**GGA Partners in Latin America**: CEGA (Chile), CeMIEGeo (Mexico), IDB, IGA, OAS, World Bank ESMAP, UNEP

## Support development of bankable projects, facilitate access to finance and enhance understanding of risk mitigation measures

### Global Atlas FOR RENEWABLE ENERGY

#### Site Appraisal Service

- Obtain reliable wind speed and solar irradiance data
- Assess annual energy production and financial feasibility

### SUSTAINABLE ENERGY MARKETPLACE

- 11 projects in Central America
- 68 projects in South America
- Total installed capacity of 2.1 GW
- Total investment size of USD 4.4 bn

### IRENA PROJECT NAVIGATOR

- Technical guidelines for geothermal power projects, utility-scale solar PV projects and mini-grid applications under development (in Spanish)



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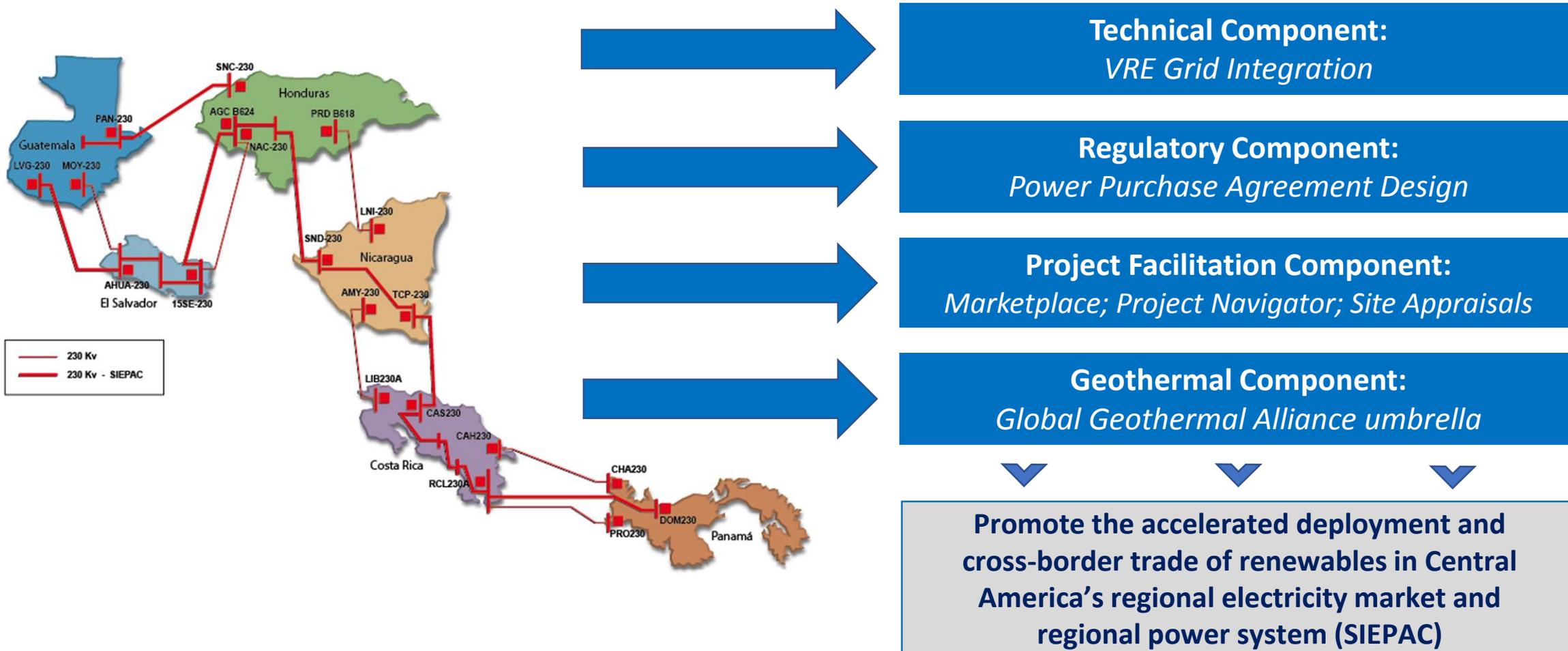
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### IRENA ADFD Supporting Energy Transition

- 7<sup>th</sup> cycle ongoing (Feb. 2019); USD 50 million available; Up to 50% project costs covered with 20-year loan period



## *Synchronise the implementation of CECCA with the Regional Action Plan for Latin America*



## *The Regional Action Plan for Latin America will leverage key partnerships and regional forums / platforms*



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# THANK YOU

