INTEGRACIÓN EFICIENTE DE ENERGÍAS RENOVABLES VARIABLES AL SISTEMA COLOMBIANO

YOUNG LEADERS WORKFORCE TRAINING PROGRAM OVERVIEW & IMPACT

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PROGRAM SUMMARY & OBJECTIVES

To support the Government of Colombia's plans to transform its power sector, the U.S. Agency for International Development (USAID) has assembled a cross-organizational team to develop and deliver a comprehensive workforce training program for young energy sector leaders in Colombia designed to enhance the efficient integration of growing volumes of variable renewable energy (VRE) to the energy sector.

The team—which includes USAID's Colombia Mission, the National Renewable Energy Laboratory (NREL), USAID's Scaling Up Renewable Energy (SURE) program implemented by Tetra Tech, and the U.S. Energy Association (USEA)—collaboratively developed a series of seven capacity building modules designed to ready Colombia's energy sector workforce to participate in the construction, operation, and grid integration of VRE projects, such as wind and solar.

Nearly 60 early career professionals from over 20 organizations within the Colombian energy sector completed the young leaders workforce training program, which was implemented between May 2020 and May 2021 and included nearly 70 hours of pre-recorded and live training content. Participants also conducted applied research through the development of strategic action plans for their organizations, which leveraged the training content and focused on specific activities or initiatives that training participants could carry forward as next steps beyond the initial training program.

The first cohort of participants with potential for future leadership roles were selected for participation, with an emphasis on the inclusion of women. The program was originally designed to be presented in-person in Colombia; however, due to COVID-19 travel restrictions, the team swiftly reimagined and reformatted the trainings into a robust online curriculum that includes presentations from leading energy experts plus interactive discussions with trainees to foster collaboration and engagement. The program's added focus on promoting women's participation was designed to promote gender equity and strengthen skills related to the technical, economic, regulatory, and policy elements of Colombia's clean energy transition. Because the training program is both scalable and replicable, future capacity building programs using the cohort approach can be developed to further amplify the program's impact.

> "AS AN EARLY CAREER PROFESSIONAL AND AS A WOMAN, BECAUSE OF WHAT I LEARNED IN THIS TRAINING, I FEEL POISED AND READY TO HELP USHER IN A NEW, CLEAN ENERGY FUTURE FOR COLOMBIA."

Giovanna Cano
Chief of Planning and Regulation, Empresa de Energía de Boyacá S.A. ESP

COLOMBIA'S RENEWABLE ENERGY CONTEXT

The Government of Colombia is preparing for a substantial power sector transformation in the near term. Dramatic shifts in economic, political, technological, and environmental conditions are driving the need for increased non-conventional renewable energy generation. Although hydropower has historically been a reliable source of renewable energy in Colombia, providing nearly 70% of the country's energy, climate change and changing weather patterns associated with El Niño are resulting in increased intensity and frequency of droughts, such as in 2016 when those weather patterns led to rationing of energy during peak hours. Additionally, coal and gas plants are required to operate during drought years to support the grid when hydro energy cannot, resulting in greater costs to end users and increased environmental emissions.

To meet the growing demand for secure, reliable, and sustainable energy while honoring its commitments under the Paris Agreement, Colombia launched its Energy Plan 2050 in 2016, which aims to diversify the country's energy resources and increase the share of wind, solar photovoltaic, and geothermal energy.

ROLE OF USAID AND PARTNERS IN COLOMBIA

PARTNERSHIP & RELATIONSHIP BUILDING

Bring together leading experts from the U.S. and around the world to support the Colombian energy sector to efficiently plan for and manage the integration of high volumes of VRE.

TECHNICAL ASSISTANCE & CAPACITY BUILDING

Provide high-quality, timely, and holistic capacity building and technical assistance to the Government of Colombia and other energy sector stakeholders.

PROMOTING WOMEN

Promoting the participation and leadership of women in Colombia's energy sector.

SUPPORTING COLOMBIA'S RENEWABLE ENERGY GOALS

EMISSIONS REDUCTIONS

Reduce greenhouse gas emissions by 51% by 2030 and achieve carbon neutrality by 2050

ENERGY ACCESS

By 2022, Colombia aims to expand the electrical coverage to 100,000 new users, with the goal of reaching 100% access to electricity nationally by 2030

DOMESTIC RENEWABLE ENERGY

Integrate 4GW of domestic NCREs by 2030, representing nearly 75% of the nation's power generation

ELECTRIC MOBILITY

Deploy 600,000 EVs by 2030 and reach 100% electric or zero-pollution public transportation by 2035.

PROGRAM EVOLUTION: HOW THE YOUNG LEADERS WORKFORCE TRAINING PROGRAM CAME TO BE

This Young Leaders Workforce Training Program represents the latest phase of broader collaboration between the Colombian electricity sector and USAID and its partners. USAID, NREL, USEA, and Tetra Tech's collaboration in Colombia pre-dates the training program, and previous efforts undertaken by this project team informed and created a foundation for the workforce training program.

2017

- The USAID-NREL Partnership, USEA, and Tetra Tech (which implements USAID's SURE Program) begin collaborating under the USAID Colombia Mission's leadership to support the Government of Colombia in the design, preparation, and implementation of the first renewable energy auction.
- Project team holds a series of working sessions with key stakeholders, including MME, CREG, and XM, to discuss future VRE integration scenarios and pathways.
- Project team provides advisory support on Colombia's first successful solar and wind power procurement auction, which resulted in 2.5 gigawatts (GW) of new solar and wind projects to be in operation by 2023. Following the successful auction, the Government of Colombia announces a goal of 20% solar and wind integration by 2030.

2019

- Project team holds series of scoping meetings in Colombia to determine what support will be needed to help the Government of Colombia reach its 2030 renewable energy goal and to prepare for the energy sector transformation associated with 2.5 GW of new solar and wind projects.
- Project team conceptualizes the Young Leaders Workforce Training Program to address the technical challenges of efficiently integrating large volumes of VRE to meet ambitious renewable energy targets and begins course planning.

2020

- Covid-19 Pandemic hits.
- Program is redesigned to be virtual and is launched in May 2020.

2021

- Attendees successfully complete the Young Leaders Workforce Training Program in May 2021.
- The project team selects four action plans for follow-on technical assistance and advisory support, and continues to respond to needs on the ground, expanding support on a range of topics, including electric transportation, geothermal, hydrogen, and hybrid system integration.

PROGRAM STATS

61

participants representing **21 organizations in Colombia** including the Ministry of Mines and Energy (MME), the Planning Office of the Ministry of Mines and Energy (UPME), Colombia's Energy and Gas Regulator (CREG), the Colombian Renewable Energy Association (SER), and the Fund for Non-Conventional Energies and Efficient Energy Management (FENOGE), among others.

70%

of the initial cohort of training participants were **women**

117

individual training presentations representing over **48 hours** of recorded training content

78

expert presenters from Colombia, the United States and other countries

20+

hours of **live collaboration sessions** and special seminars covering additional topics, such as Green Hydrogen, models and tools, Working with Indigenous Communities

7

modules spanning a wide range of topics, including: key VRE trends, policy and planning for the efficient integration of VRE, VRE economics, distribution sector planning, resilient energy solutions, electrification, and change management, among many others.

PROGRAM IMPACTS

IMPACTS: BUILDING RELATIONSHIPS WITHIN THE COLOMBIAN ENERGY SECTOR, AND BETWEEN THE U.S. AND COLOMBIA

This involves substantial collaboration and input from the Government of Colombia and other key energy sector stakeholders. Engaging with key stakeholders early in the process amplifies the impact of the program in several ways:

- Curriculum directly meets the needs of the Colombian energy sector and is tailored to respond to actual needs on the ground.
- Colombian stakeholders are actively involved in the curriculum delivery, providing presentations on the Colombian energy context as part of training to better enable the workforce training participants to contextualize and apply case studies from abroad to their specific organizational and country context, respectively.
- Collaborating and engaging with the private sector presents opportunities to spur investment and deployment.
- Live collaboration sessions and team action plan development provide opportunities for different players and organizations in Colombia's energy sector to coordinate and communicate in new ways.
- Building a comprehensive training program with content spanning the technical, political, and social dimensions of energy transitions enables participants with a wide range of technical backgrounds to learn about topics that they typically are not exposed to and to gain a more holistic understanding of the energy sector transition underway in Colombia.

INFORMED DECISION MAKING

Providing future leaders with vital information to make informed decisions to accelerate efficient VRE integration

ACTIONABLE CONTENT

Training participants and providing the opportunity to discuss and apply the training content to their current work, integrating it directly and in real time to Colombia's energy transition

SCALABLE IMPACTS

Broadening impact as workforce trainees share knowledge and connections forged during the training to their respective organizations to amplify program reach

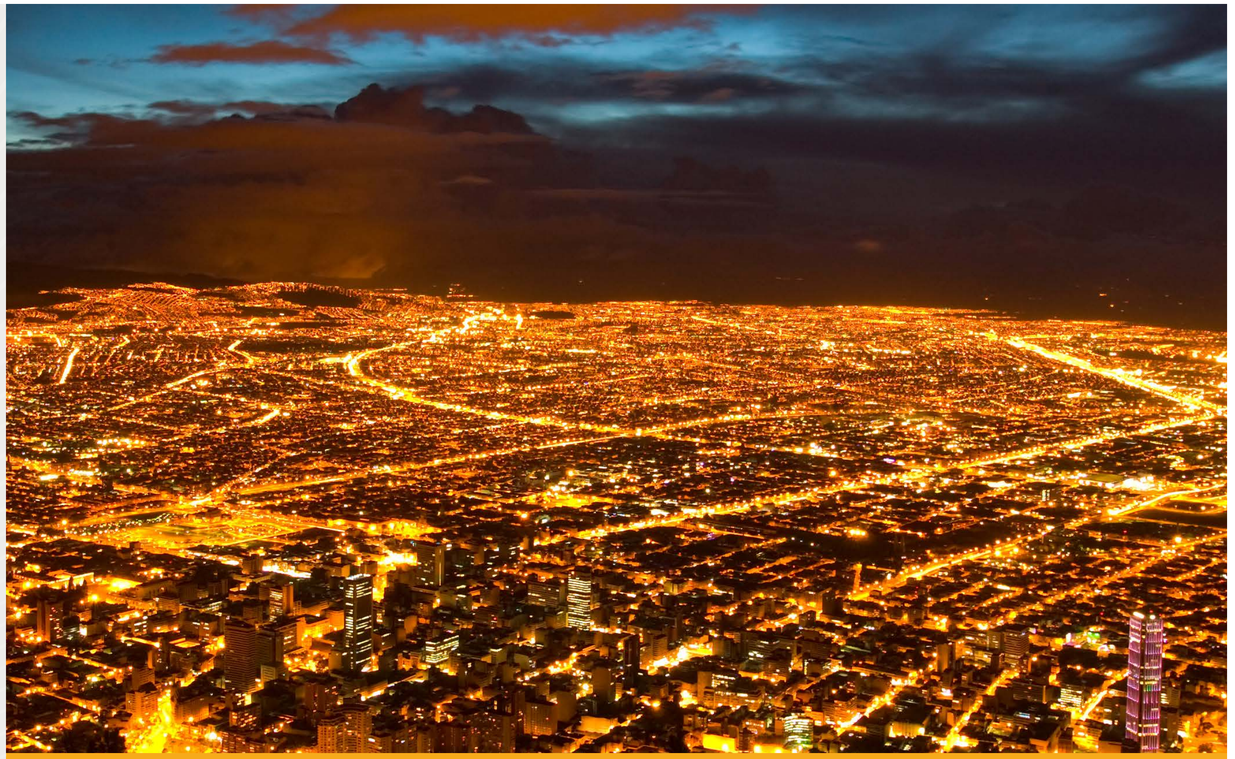
SUPPORTING THE NEXT PHASE OF COLOMBIA'S CLEAN ENERGY TRANSITION

Technical Assistance for Action Plan Implementation:
Planning for the Efficient Integration of Distributed Energy Resources

As part of the Young Leaders Workforce Training Program, the initial cohort of participants were required to develop action plans, applying the content they received through the program to real-world energy questions they were facing in their respective organizations. The USAID-NREL Partnership in Colombia, in conjunction with SURE and USEA, selected four action plan teams to receive tailored NREL technical assistance to support plan implementation.

The four plans selected represent various aspects associated with planning for the efficient integration of distributed energy resources, including:

- ELECTRIC VEHICLE FLEET PLANNING
- SMART CITY PLANNING FOR ELECTRIC MOBILITY
- DISTRIBUTED SOLAR PHOTOVOLTAIC GENERATION MODELING
- REGULATORY CONSIDERATIONS FOR DER INTEGRATION



USAID and NREL are implementing a cohort approach to technical assistance—wherein each team will receive tailored assistance, but updates and results will be regularly shared across the action plan teams—to draw out important connections, leverage applicable resources (including research and analysis), foster more robust stakeholder involvement, and facilitate more coordinated development across related initiatives.

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To learn more, visit:

www.nrel.gov/usaid-partnership/project-colombia.html.

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