USAID
FROM THE AMERICAN PEOPLE

APRIL 2021

Climate Change Mitigation in the Power Sector

April 27th | 8:00–8:45 am

SESSION OBJECTIVES

By the end of this session, we will be able to:

1. Better understand current U.S. and international climate change policies and the relevance of these policies to USAID's mission and programming.
2. Recognize how the power sector fits into the broader climate change picture and opportunities for climate change mitigation, including low carbon development, in the power sector.
3. How the Strengthening Utilities and Promote Energy Sector Reform (SUPER) Task Order can help your Mission address power sector climate change priorities.

SESSION AGENDA

8:00 – 8:05	Domestic and International Climate Change Priorities
8:05 – 8:10	Relevance to USAID and its Missions
8:10 – 8:20	Climate Change and the Power Sector
8:20 – 8:30	How SUPER can help
8:30 – 8:45	Q&A

Domestic and International Climate Change Priorities

Decarbonization of Power Sector

EO 1390 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

- Publish an interim social cost of carbon, nitrous oxide, and methane
- Develop innovative financing mechanisms that leverage private sector dollars to maximize investment in the clean energy revolution

Clean Energy Innovation R&D

EO 14007- President's Council of Advisors on Science and Technology

- Accelerate innovation in supply-chain resilience including reliability, cold supply chain, disaster response, risk management, energy storage, and large capacity batteries.

Climate Change in Foreign Policy

EO 14008 - Tackling the Climate Crisis at Home and Abroad

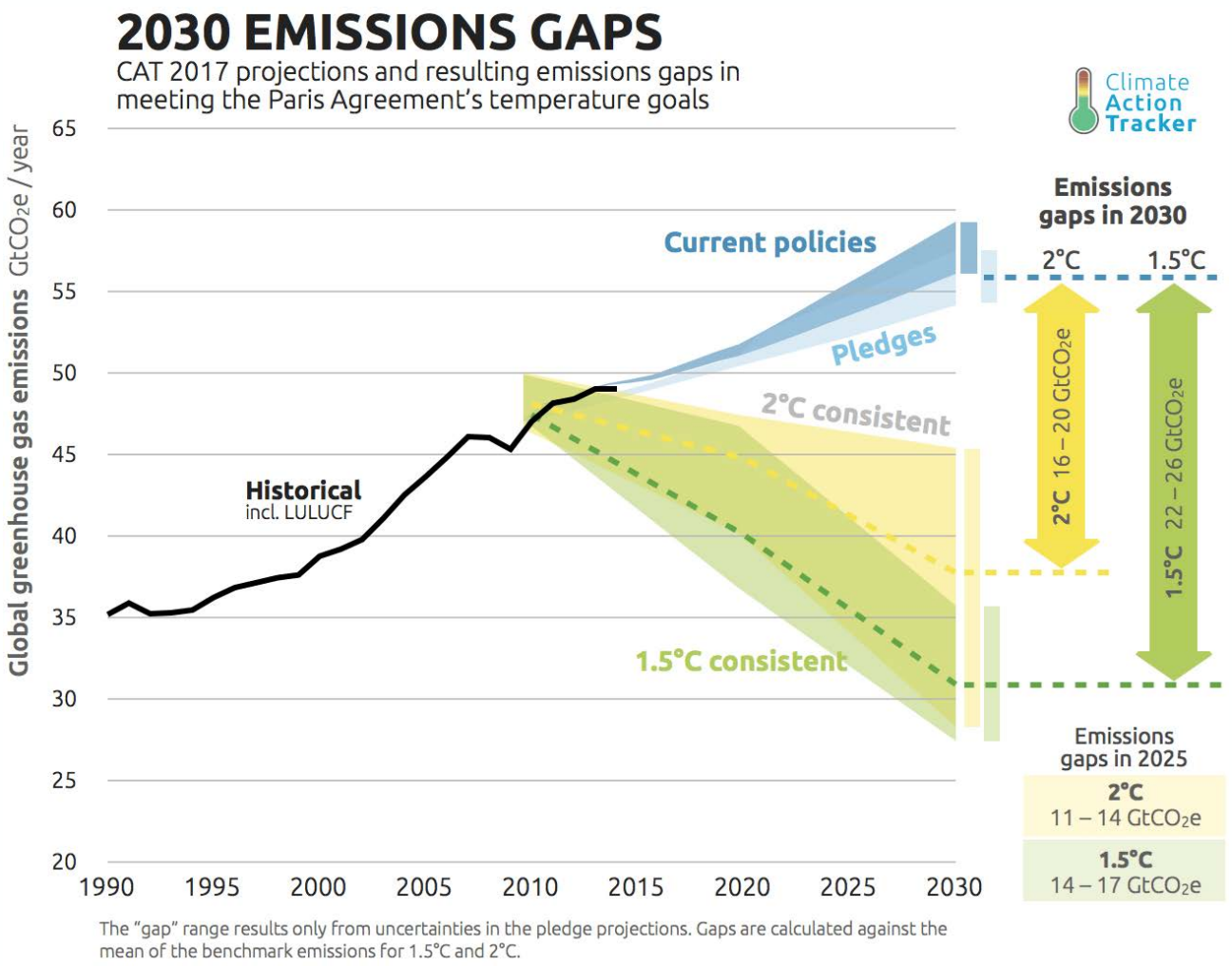
- Agencies involved in international work are to submit plans incorporating climate considerations
- The Secretary of Defense is to lead the development of a Climate Risk Analysis to incorporation into national security analyses and simulations.

Memo on Restoring Trust in Government Through Scientific Integrity and Evidence – Based Policymaking

- Requires agencies to develop scientific integrity policy and to designate a Chief Science Officer and Scientific Integrity official

Climate change urgency is high and in focus both domestically and abroad; the new Administration has set a variety of climate goals and targets that will affect all USG agencies, including USAID

Domestic and International Climate Change Priorities



United Nations Framework Convention on Climate Change (UNFCCC) & Paris Accord

- Signatory countries have signed a pact to limit global warming to **no more than 2 C**, and ideally 1.5 C, than pre-industrial levels. This will require a 7.6% cut in GHG emissions each year from 2020 to 2030 (UN report).
- De-carbonization of the power sector has been cited as crucial to achieve this goal. Net growth in carbon emissions from power sector is expected to come from non-OECD countries (EIA).
- Each country proposes Nationally Determined Contributions (NDC) and reports on how they will tackle their GHG emissions and address climate adaptation measures
  - 184 countries have submitted NDCs to the UNFCCC
  - 103 of the NDCs included power-sector targets
  - NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.
- Asia and Africa regions need the most support to develop carbon markets and economic instruments for mitigation action
- To achieve global GHG emission reduction goals annual energy related CO2 emissions needs to decline by 70% below today's levels by 2050 (IRENA)

Policy Relevance to USAID and Partner Countries

Both domestically and internationally there is an increased interest and focus on climate change

What can USAID mission do to get more engaged?

1. Engage ministries on NDC commitments and assist with updating; support respective countries development or implementation of their NAMAs; participate in bilateral and multinational climate change initiatives; increased multilateral engagement on climate-related public and private finance

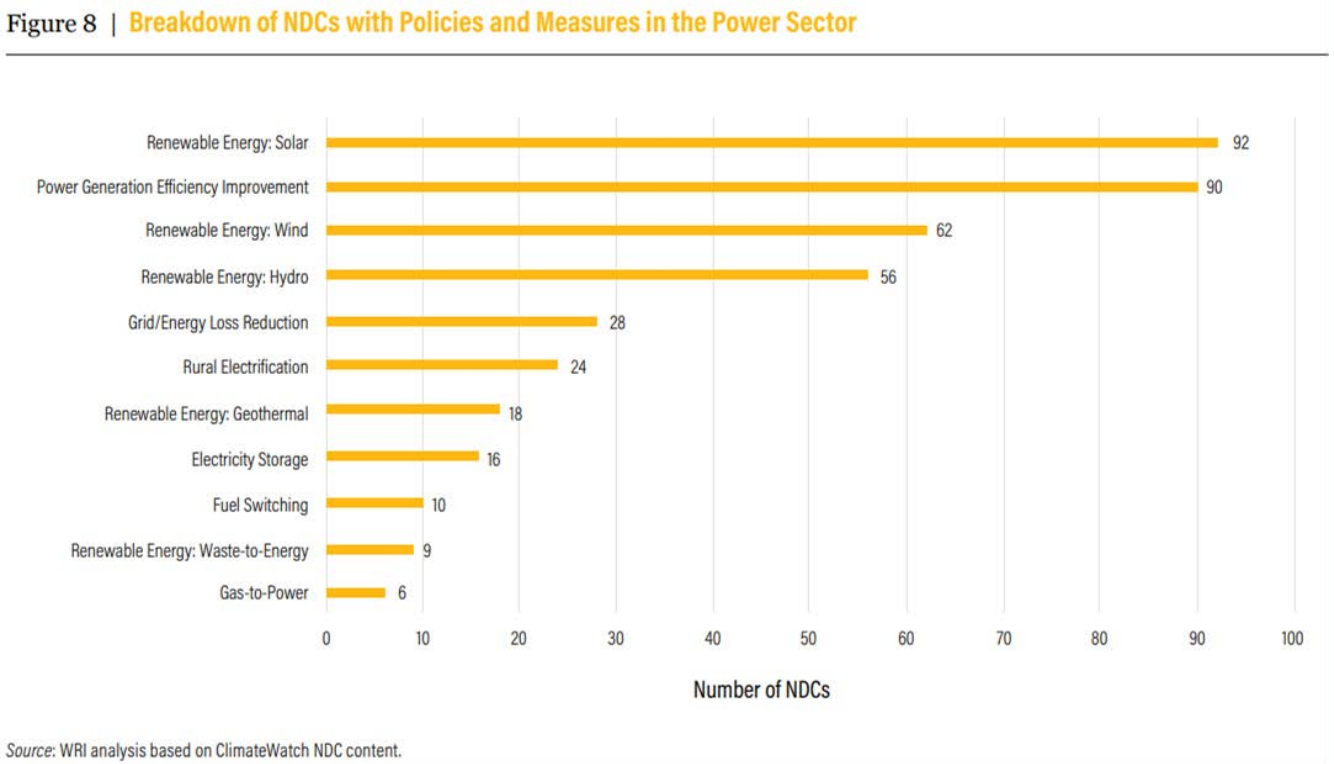
2. Focus on private sector engagement strategies to channel corporate commitments to counterpart needs; Green Climate Fund; creating a clean energy export and climate investment initiative; USAID support for de-risking of PSE relative to low carbon development

3. Modify program design: prioritize decarbonization, clean energy technology, focus away from coal and natural gas as it aligns to sector realities for counterparts; creating a clean energy export and climate investment initiative

Mitigating Climate Change and the Power Sector

The power sector is inextricably tied to global emission reductions goals

The power sector is the largest source of energy-related CO2 emissions accounting for 2/3 of global emissions. Within the power sector coal represents 30% of global energy-related CO2 emissions. (World Research Institute, 2019).



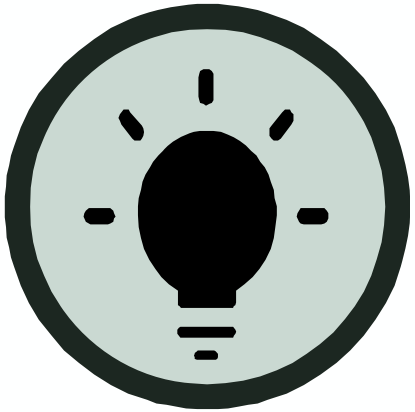
Source: Enhancing NDCs: Opportunities in the Power Sector. World Research Institute.2019

NDC power targets must be more expansive than simply increasing RE targets.

So, how to help the power sector reduce GHG emissions?

Investments

Regulations and Policy



Innovation and Energy Supply Chain Infrastructure

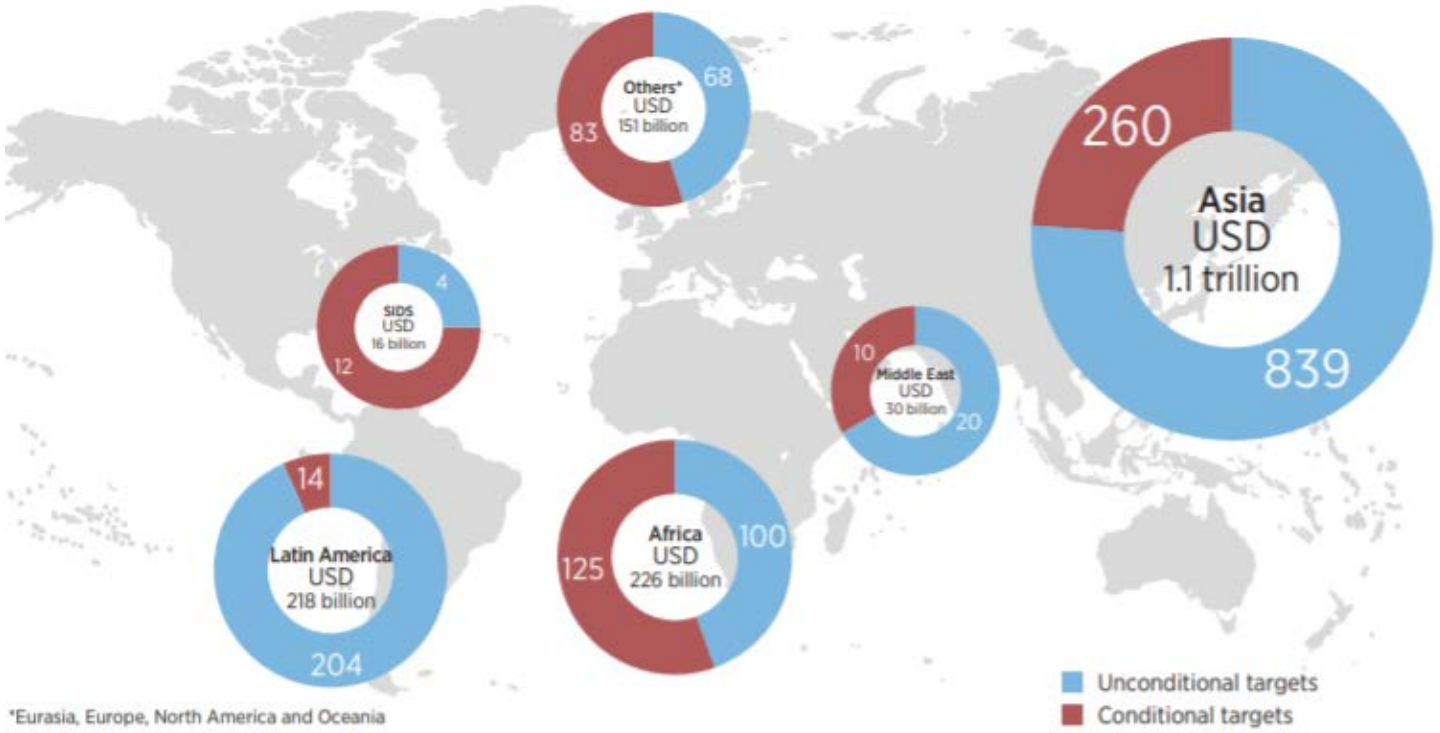
How to help the power sector reduce GHG emissions?

Investment

Substantial investment is required for the power sector to meet climate mitigation targets.

More than USD $1.7 trillion is needed by 2030 to implement renewable energy targets contained in NDCs worldwide, according to IRENA, mainly in Asia and Africa.

Figure 1 **Total investment needed by 2030 for the implementation of renewable energy targets in current NDCs (USD billion)**



- An "**unconditional contribution"** is what countries could implement without any conditions and based on their own resources and capabilities.
- A "**conditional contribution**" is one that countries would undertake if international means of support are provided, or other conditions are met.

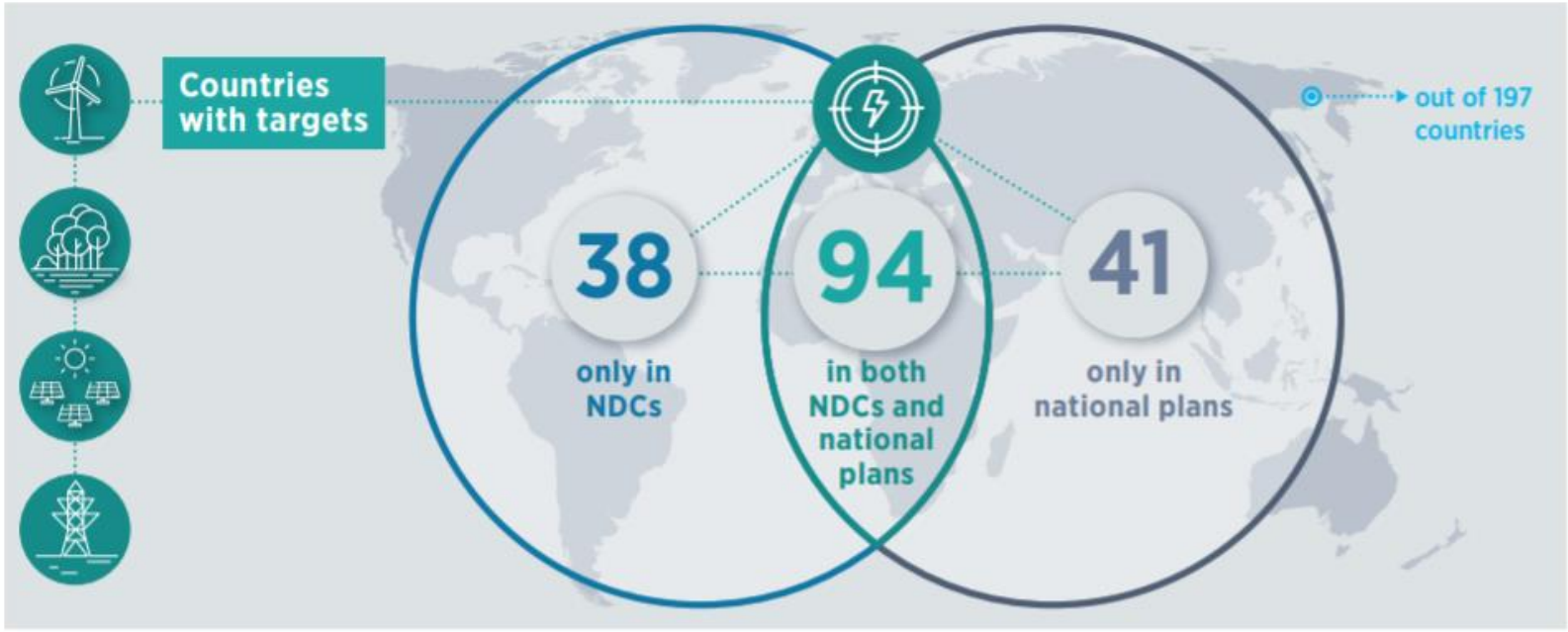
Source: Untapped potential for climate action: Renewable energy in Nationally Determined Contributions (irena.org). International Renewable Energy Agency. 2017

How to help the power sector reduce GHG emissions?

Regulations and Policy

There are overlapping layers of regulation that govern the power sector - countries have NDCs and legislative mandates; utilities' have integrated resource plans; regulators set tariffs and incentives.

These regulations need to be aligned and streamlined to meet climate change goals.

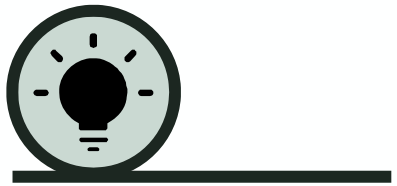


NDCs = Nationally Determined Contributions pledged under the Paris Agreement
IRENA analysis

Source: NDCs in 2020: Advancing renewables in the power sector and beyond (irena.org) International Renewable Energy Agency. 2019

Only 94 countries include renewable power targets in both NDCs and national plans

How to help the power sector reduce GHG emissions?

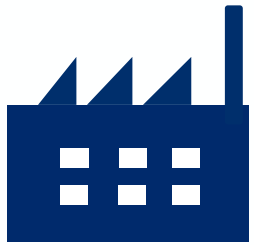


Innovation and Energy Supply Chain Infrastructure

There are numerous entry points for climate change mitigation across the energy supply chain.

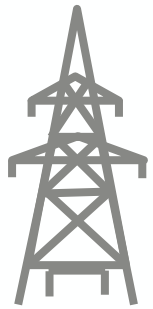
Adding renewables to generation mix is critical but also addressing existing coal assets, enhancing grid flexibility, making end-use sectors less energy intensive, and incorporating IoT and digitization solutions throughout will help reduce GHG emissions.

Generation



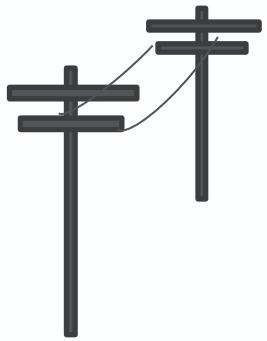
- Prioritize more renewable/clean generation
- Add more localized, distributed generation
- Support expansion of off-grid clean energy
- Lower emissions in current fossil fuel generation (i.e., scrubbers, coal flexing)

Transmission



- Needs to be more flexible to incorporate intermittent, localized, and distributed sources
- Needs to support RE integration to grid
- Batteries will be compulsory
- Should accommodate a wider range of climate scenarios

Distribution



- Smarter networks can help reduce power usage and stabilize grid
- Improved customer choice helps reach climate change goals
- Smart meters improve transparency

Customer

- Allow for more customer choice that ties to climate change preferences
- Prioritize energy efficient appliances, equipment, lighting
- Accommodate a future with an electric fleet

IoT, digitization, localization

How SUPER can help your Mission

1

Setting the Agenda

How can your Mission engage with their host country or region to support achievement of low carbon pledges and targets in the respective NDCs and related NAMAs and other sector policies and strategies?

2

Planning Interventions

What strategies and programs need to be developed to incorporate climate change priorities?

3

Taking Action

What projects can your Mission sponsor to help counterparts prepare their power sector and energy infrastructure for climate change?

How SUPER can help your Mission

Regulations and Policy

Investment

1 Setting the Agenda

- Helping adapt Mission CDCS to accommodate climate change priorities and to align with the USAID's Climate Change Strategy which is in the process of being updated
- Identifying opportunities to modify and update Nationally Determined Commitments (NDCs), plan for implementing projects related to NDCs, and quantifying progress against NDC
- Examining NDCs and the power sector's role in achieving emissions reductions; identify opportunities to increase ambitions in national NDC plans based on updated scenarios
- Aligning NDCs back to power sector programs, including financial modeling, IRP, or capital investment planning matched to NDC targets

How SUPER can help your Mission

2 Planning the Interventions

Regulations and Policy

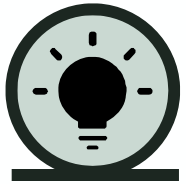
- Develop strategies and roadmaps focused on leveraging the economic benefits of the implementation renewable and energy efficiency initiatives (e.g., development of cleantech businesses, demand side management)
- Updating power sector plans to integrate new/updated country level targets and energy sector resilience plans for climate shocks.
- Stakeholder analysis and coordination on new business areas, including all the appropriate entities part of the process (e.g., energy efficiency, system operations, resilience and adaptive capacity planning, corporate PPAs)

Innovation and Energy Supply Chain Infrastructure

How SUPER can help your Mission

3 Taking Action

Investment



Innovation and Energy Supply Chain Infrastructure

- Utilize the landscape of climate finance mechanisms and mobilizing new sources of private and public investment for climate change mitigation projects
- Channel corporate commitments to climate change to support power sector growth
- Perform grid integration studies and investment plans for renewables
- Prep electricity sector counterparts to accommodate more renewable sources (trainings, software upgrades)
- Leverage technology systems to systematize and track energy mitigation actions

Illustrative Example of How SUPER can help your Mission

1 Setting the Agenda - Brainstorming how to help on climate change

- Create a climate change intervention list and scorecard for Missions
  - Understand current state of emissions targets, list potential activities, prioritize interventions based on mutually agreed criteria
- Map current state with directly with counterparts, in particular utility companies, and design roadmap to achieve future NDC targets and to implement NAMAs
  - Design and implement a utility decarbonization framework
  - Undertake a prosperity mapping exercise

Emission Reduction Opportunity Scorecard

Opportunities for Emissions Reductions in Partner Countries	Potential Emissions Impact	Potential Economic Impact	Employment Potential	USAID Tools Readily Available	Strength of USAID relationships with counterpart	Political Will	Timeline to Implement
Increase available RE generation options	5.24	4.26	1.00	0.03	0.36	1.21	2.00
Help integrate RE to the grid through operator training	1.52	1.64	0.36	0.67	0.33	0.21	0.05
Plot decarbonization pathways for state-owned utility	1.95	2.30	2.00	0.00	0.00	2.00	0.07
Improve enabling environment for investment in RE	4.74	4.02	0.59	0.05	0.22	0.58	0.93

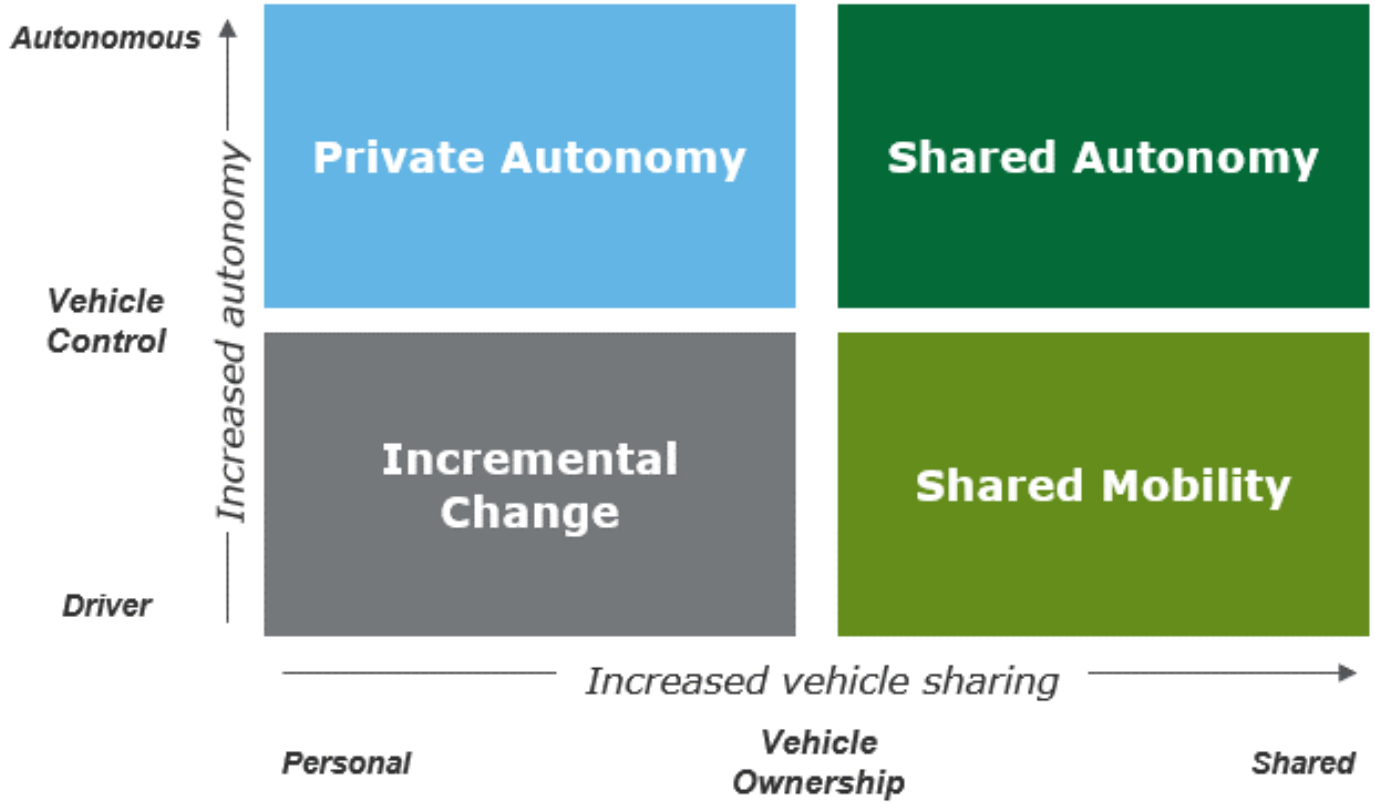
Rank	Score	Emissions Reduction Activity	Assessment
1	22.53	Increase available RE generation	Strong potential emission impact
2	16.05	Help integrate RE to the grid through operator training	Strong counterpart support
3	7.40	Plot decarbonization pathways for state-owned utility	High employment potential, low emission
4	5.65	Improve enabling environment for investment in RE	Smaller impact
5	3.74	Grid integration study	Cost and timeline
6	2.03	Capital investment planning matched to NDC	Lacking political will

- Steps: Understand partner country's targets and current state; define potential USAID interventions; create scoring criteria and weighting; prioritize those interventions according to USAID's abilities and the impacts
- Output: A prioritized list interventions that USAID can support in a partner country to help them address key climate change needs

Illustrative Example of How SUPER can help your Mission

2 Planning the Intervention – EV Impact Modeling

- Undertake a scenario analysis
- Modeling different policy approaches and resulting impacts including:
  - Forecasting EV sales and economic impact
  - Cost-benefit analysis of building out electric vehicles charging infrastructure
  - Evaluating the impact of EVs as a new demand/load profile
  - Analyzing the use of EVs for supply regularization and/or grid storage
  - Facilitating three-way communication between utility, customers, and vehicles for EVs to discharge power back to grid & meet power needs



Framework developed for Office of Sustainable Transport within the Department of Energy to help their team engage government agencies, industry, academia, and national lab stakeholders in developing a strategic outlook for enabling an energy efficient future of mobility in the United States

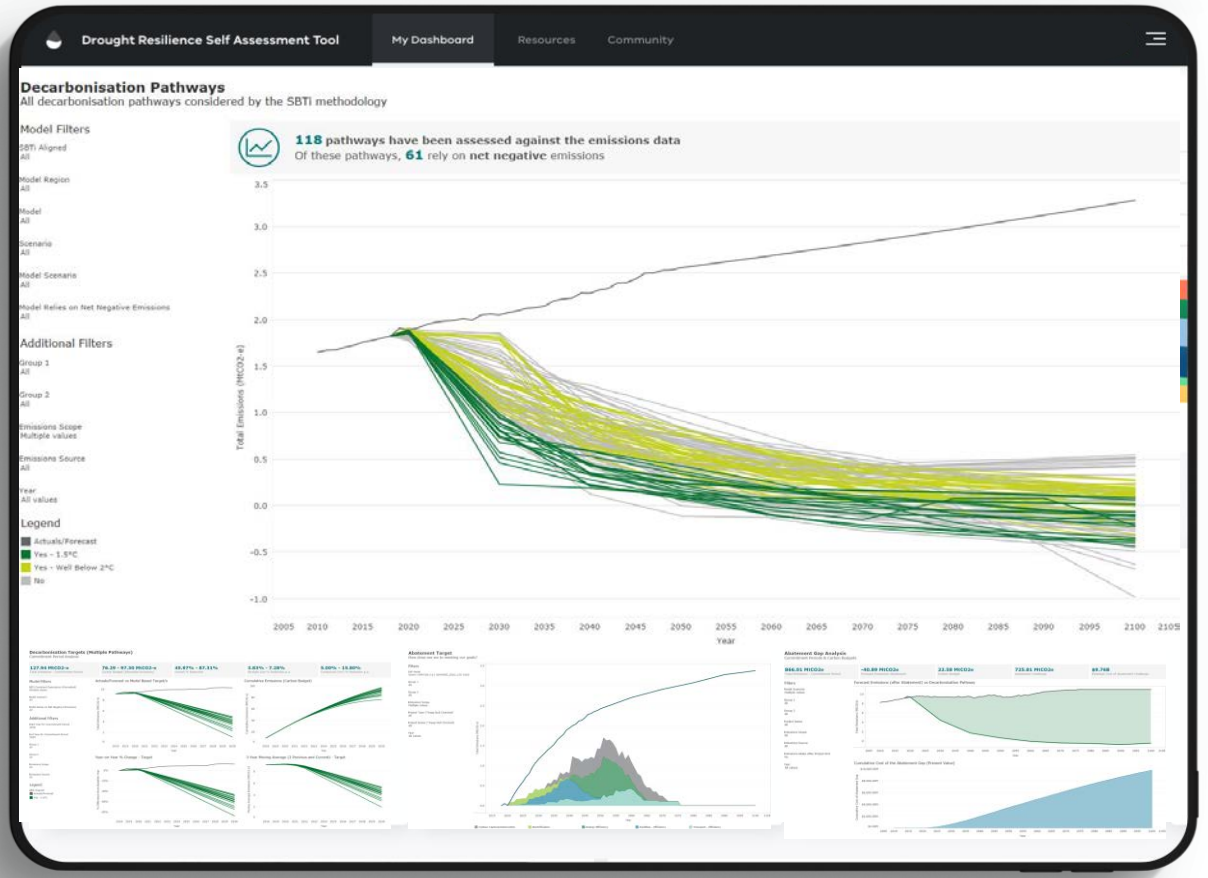
Illustrative Example of How SUPER can help your Mission

3

Taking Action - Climate Risk Modeling and sourcing of climate finance investments

- Develop a tool to systematize and model climate risks and emissions data to track mitigation and adaptation actions
  - Decarbonization tool
  - Abatement portfolio management, decarbonization scenarios, and abatement impact analyses
  - Climate risk adaptation tool
- Mobilize finance and attract financial investments for renewables and climate resilient infrastructure to increase the supply of clean energy

Mitigation Module sample abatement curve



In Australia, combined climate risk modelling and with an understanding of emissions reduction pathways at a sector level, to achieve net zero emissions

Deloitte.

Thank You.

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Acronyms

CDCS	Country Development Cooperation Strategies
CO2	Carbon Dioxide
CRM	Climate Risk Management
EO	Executive Order
EV	Electric Vehicles
GHG	Green house gas
INDC	Intended Nationally Determined Contributions
IoT	Internet of Thing
IRENA	International Renewable Energy Agency
IRP	Integrated Resource Plan
LMIC	low and middle-income country
NAMA	Nationally Appropriate Mitigation Action
NDC	Nationally Determined Contributions
OECD	Organization for Economic Cooperation and Development
PPA	Power purchase agreements
RE	Renewable Energy
SUPER	Strengthening Utilities and Promote Energy Sector Reform
UNFCC	United Nations Framework Convention on Climate Change

The power sector both impacts and is impacted by climate change

Looking forward the power sector will have to continue to analyze and understand climate risks and innovate and implement methods for adapting to risks in order to create a more resilient energy sector.

A sample of Climate Risks confronting the power sector

- **Rising sea levels** damaging costal infrastructure
- **Changing rainfall patterns** diminishing available hydro resources and hydropower productivity.
- **Severe weather events** resulting in lost revenue to utilities and challenge efforts to improve performance.
- **Increasing temperatures** may decrease solar cell efficiency and cause an increase in electricity demand

Adapting to the impacts of climate change will require expenditures to build more resilient infrastructure and an investment in renewable energy resources.