INTERCONNECTION INNOVATION e-XCHANGE
U.S. DEPARTMENT OF ENERGY

Program Overview | 6/12/23

Ammar Qusaibaty, i2X Co-lead, Solar Energy Technologies Office

An initiative spearheaded by the Solar Energy Technologies Office and the Wind Energy Technologies Office

Executive Order on Climate and Equity

- **Establishes the Administration's climate goals:** A carbon-free electricity sector by 2035 and a decarbonized economy by 2050.
- **Establishes the Justice40 Initiative:** Sets a goal that 40 percent of the overall benefits of certain Federal Investments (including clean energy and energy efficiency) are to flow to disadvantaged communities.
- **Prioritizes climate in foreign policy and national security.**
- **Requires a government-wide approach to climate**
- **Requires the Federal agencies to use authorities, public lands/waters, and financial programs to catalyze clean energy deployment**

Administration Priorities COVID Plan

BRIEFING ROOM

Executive Order on Tackling the Climate Crisis at Home and Abroad

JANUARY 27, 2021 • PRESIDENTIAL ACTIONS

The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents. Domestic action must go hand in hand with United States international leadership, aimed at significantly enhancing global action. Together, we must listen to science and meet the moment.

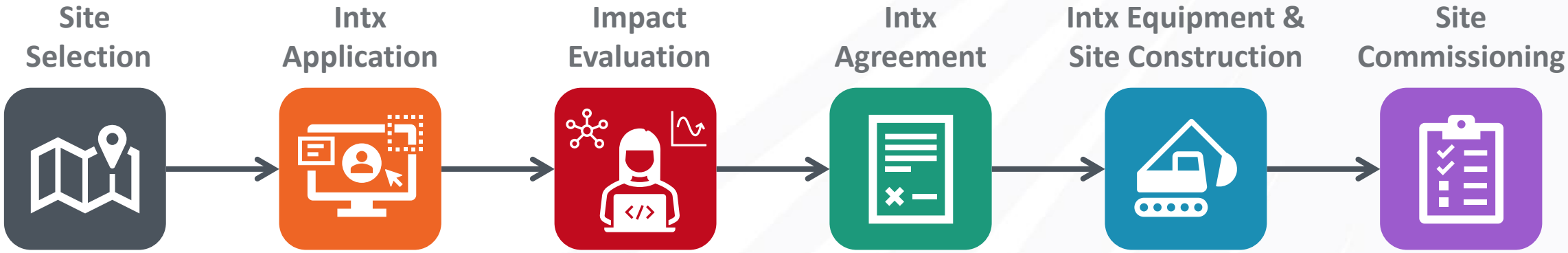
By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Examples of difficult interconnection challenges*

Utility Stakeholder view	High volume of "speculative" applications	Queue gaming by developers	Limited capacity and resources at utilities to match demand	Re-study work because of high withdrawal rates
Developer Stakeholder view	Limited Grid-Capacity Transparency	Lengthy Queue Processing Timelines	High Impact Study Costs	Uncertainty in Cost of System Upgrades

*Based on comments from stakeholders during interconnection hosted workshops
SETO - Reimaging Interconnection for Solar Energy, June 2021
WETO – Distributed Wind Workshop, August 2020 and Wind Systems Integration Workshop, June 2021
i2x – Kick-off Webinar, i2X Office Hours, Community Solar Developers, RE+ Event

Solutions and innovations (Today)



Site Selection	Intx Application	Impact Evaluation	Intx Agreement	Intx Equipment & Site Construction	Site Commissioning
Hosting Capacity Development & Validation Processes	Queue Application Processing Strategies	Engineering Resource Management & Study Process Strategies	Study & Upgrade Cost Transparency Practices	Construction Queue Management	Commissioning Staff Resource Availability
Grid Capacity Analysis & Transparency Requirements	Queue Management & Application Requirements	Standardized Evaluation Screening Criteria	Cost Allocation Methods for Capacity Upgrades	Third-Party Utility Equipment Installer Options	Standardized Commissioning Requirements
Hosting Capacity Analysis Methods & Tools	Application Intake Tools & Automation	Advanced Modeling & Automated Impact Evaluation Tools	Dynamic Controls & Operational Profiles	Non-Wire Alternative Technologies	Virtual & Off-Site Commissioning Tools

Technology & Engineering Administrative Processes Markets and Regulation

i2X Key Elements

Mission: To enable a **simpler**, **faster**, and **fairer** interconnection of clean energy resources all while enhancing the **reliability**, **resiliency**, and **security** of our electric grid.

Stakeholder Engagement

Nation-wide engagement platform and collaborative working groups

Data & Analytics

Collect and analyze interconnection data to inform solutions development

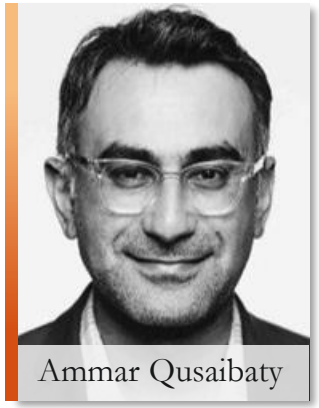
Strategic Roadmap

Create roadmap to inform interconnection process improvements

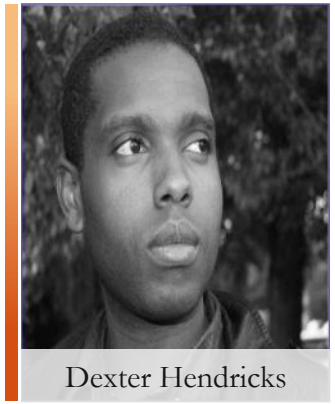
Technical Assistance

Leverage DOE laboratory expertise to support stakeholder roadmap implementation

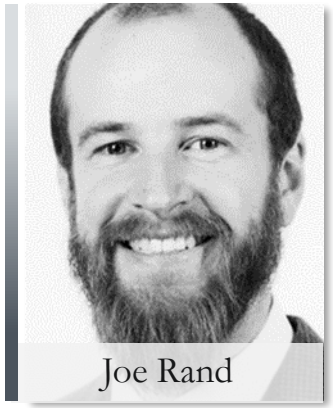
i2X Leadership Team

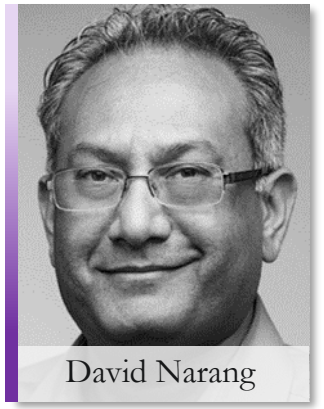

SETO
Ammar Qusaibaty

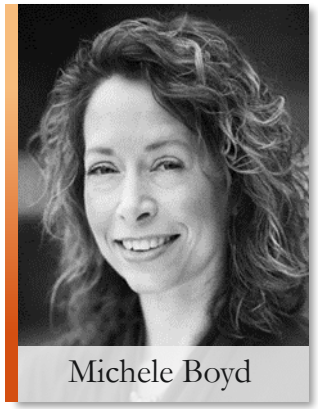

WETO
Cindy Bothwell


SETO
Dexter Hendricks

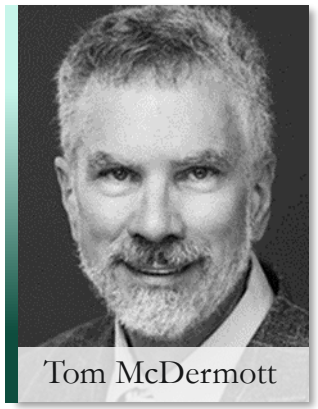

PNNL
Diane Baldwin


LBNL
Joe Rand

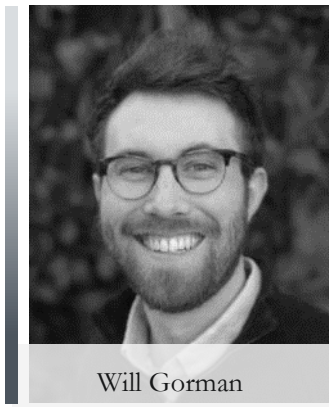

NREL
David Narang

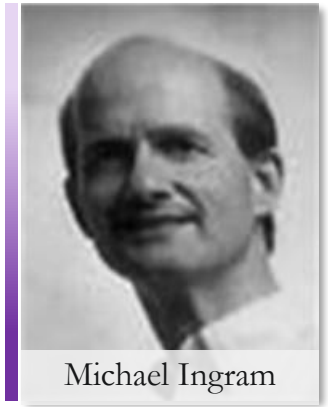

SETO
Michele Boyd


WETO
Jian Fu


PNNL
Tom McDermott


PNNL
Karyn Boenker


LBNL
Will Gorman


NREL
Michael Ingram

Highlights on i2X since June 2022

Stakeholder Engagement

- 740+ people at 530+ partner organizations joined i2X
- 9 meetings in our Solution e-Xchanges completed and more planned
- 60+ Office-Hour Calls with stakeholders

Data & Analytics

- BPS interconnection cost reports for MISO, PJM, NYISO, SPP published
- 2023 Queued Up report updates published on IX timelines for BPS
- Interconnection cost reports for ISO-NE to publish soon

Strategic Roadmap

- Early outlines of the Roadmap presented in public events
- Overviews of the Roadmap's companion interconnection study guides
- A technical engineering group for a BPS interconnection study guide started

i2X Solution e-Xchange Topic Areas

Queue Management and Cost Allocation	Innovative interconnection solutions exist? Technology, regulation, administration, and organizational change focus
Grid Engineering Practices and Standards	Engineering and technology focus *How* can proposed solutions be executed?
Equity and Energy Justice	Multidisciplinary *Who* is impacted by and benefits from proposed solutions?
Data Transparency	Multidisciplinary *What* transparency concerns must be addressed?
Interconnection Workforce and Training	Multidisciplinary

Additional subjects, like capacity maps, cross these topics and will be addressed from these different perspectives. Follow the schedule of events on the i2X website.

5-Year Strategic Roadmap

By stakeholders for stakeholders

Discussion Goal: 50% cost and 50% schedule reduction in 5 years and transitioning to no more than 1-year from application to build going forwards

- Expert-Informed goal setting
- Success milestones & gaps to address
- Transparent key performance indicators
- Covers both DER & BPS and their interplay
- Customizations for size and region
- Covers challenging topics
- Stakeholder Actions. Multi-stakeholder actions
- Transition planning for new processes
- Buy-in, Adoption, and Updates

U.S. DEPARTMENT OF ENERGY
Building a Better Grid
National Transmission Planning Study

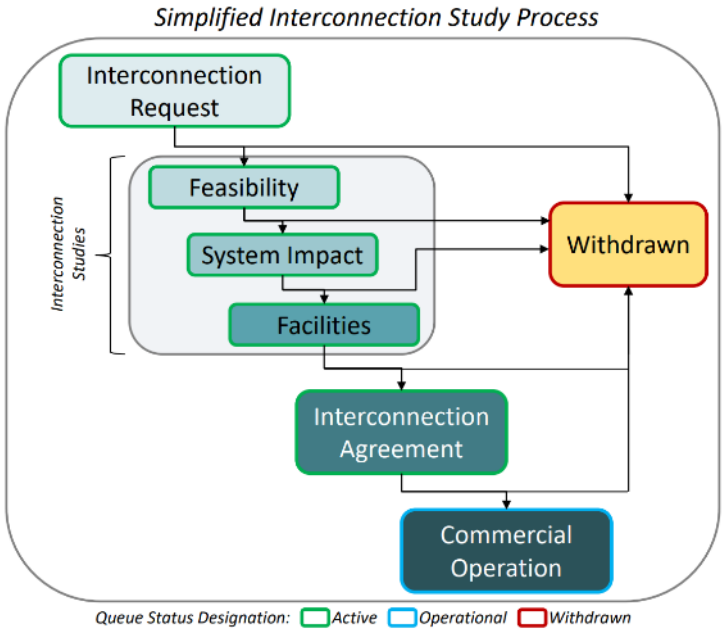
FERC NOPR RM22-14

i2X Technical Assistance Opportunity

- **Purpose:** Support U.S.-based organizations facing interconnection challenges (DER or BPS)
- **Scope:** Solar, wind, storage or hybrid integration of these technologies
- **Funding:** Up to $750,000 for up to 12 projects. More **funding available** as needed
- **Areas of interest examples**:
  - Alternative solutions to direct transfer trip grid upgrades
  - Methods for prescreening and interconnection planning for community-based renewables
  - Integrated grid planning and interconnection queue management
  - Practices for affected systems interconnection studies on transmission grid networks
  - Interconnection-related network upgrade estimation tools
  - Cost allocation methodologies for grid upgrades that enable fast-track interconnection study

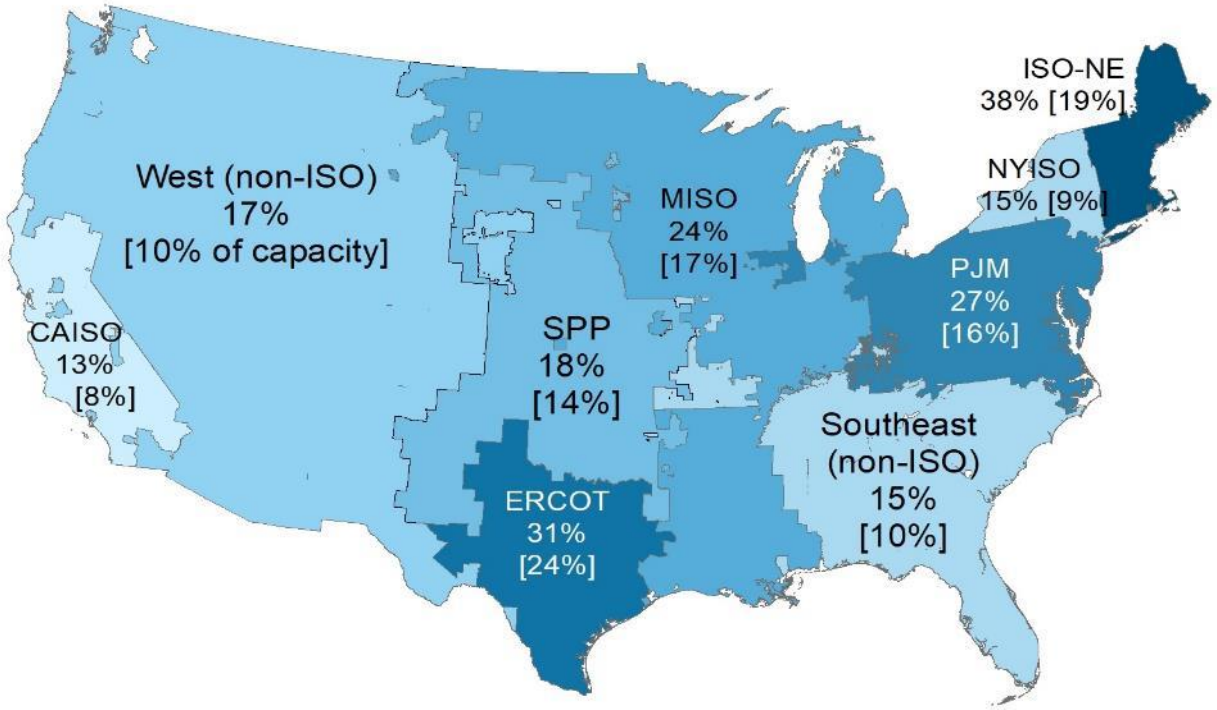
Only 21% of projects that applied for interconnection prior to 2018 have been built – 72% have been withdrawn (7% are still actively trying!)

One consequence of high withdrawal rates is the need to restudy the projects that remain in the queue, increasing uncertainty in cost outcomes and further elongating the process



Source: Rand et. al., "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2021", April 2022: https://doi.org/10.2172/1864543

Source: Berkeley Lab, "Queued Up". 2023



The completion rate is even lower when calculated in terms of proposed capacity [14%]

Join . Engage . Collaborate

Questions?

Website: energy.gov/i2X

Email: i2x@ee.doe.gov

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