NARUC-NASEO DER INTEGRATION AND COMPENSATION WORKSHOP

September 20-21, 2022

BREAKFAST: 8:00AM – 8:45AM
WELCOME AND INTRODUCTIONS: 8:45AM – 9:00AM

WIFI: MarriottBonvoy_Guest

WELCOME!

Kirsten Verclas, NASEO
Danielle Sass Byrnett, NARUC
Jeff Loiter, NARUC

Thank you to the U.S. Department of Energy for supporting this effort.

AGENDA

DAY 2: DER INTEGRATION THROUGH ADVANCING INTERCONNECTION

9:00AM – 10:10AM: Session 1A: Aligning Policy and Regulation for Interconnection, *NREL*

10:10AM – 10:30AM: Session 1B: U.S. Department of Energy I2X Initiative, *DOE*

10:30AM – 11:00AM: Break

11:00AM – 12:00PM: Session 2A: Effective Practices in Hosting Capacity Analysis, *DOE*

12:00PM – 1:00PM: Lunch

National Association of State Energy Officials

AGENDA

DAY 2: DER INTEGRATION THROUGH ADVANCING INTERCONNECTION

1:00PM – 2:00PM: Session 2B: Screening Criteria Options, *DOE*

2:00PM – 3:00PM: Session 2C: 1547-2018 Adoption Decisions, *NREL*

3:00PM – 3:20PM: Break

3:20PM – 5:00PM: Session 3: State Action Planning, *NARUC & NASEO*

5:00PM: Wrap-up & Feedback

National Association of State Energy Officials

Session 1A: Aligning Policy and Regulation for Interconnection

Michael Ingram, NREL

David Narang, NREL

National Association of State Energy Officials

Journaling & Collaborative Discussion

Session 1B: U.S. Department of Energy I2X Initiative

Shay Banton, DOE

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

an EERE collaboration between SETO & WETO

NARUC-NASEO

Distributed Energy Resource Integration & Compensation Initiative Workshop

September 21st, 2022

i2X Mission

To enable the **simpler**, **faster**, and **fairer** interconnection of clean energy resources all while boosting 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

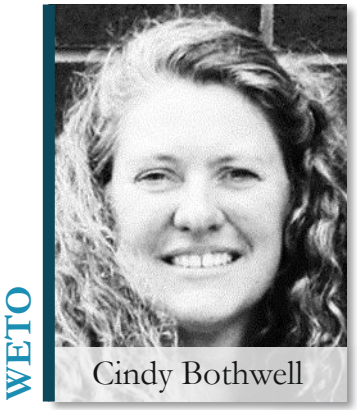
Strategic Roadmap

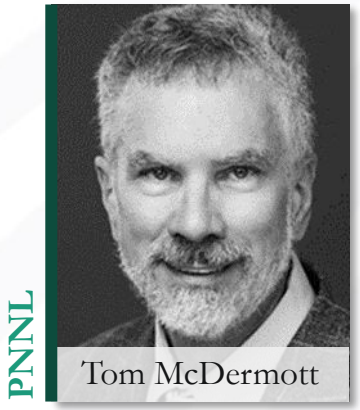
Create roadmap to inform interconnection process improvements

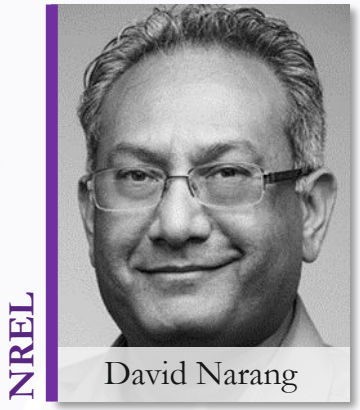
Technical Assistance

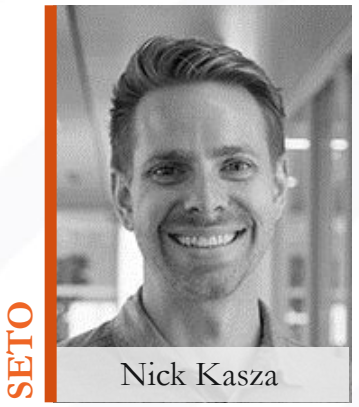
Leverage DOE laboratory expertise to support stakeholder roadmap implementation

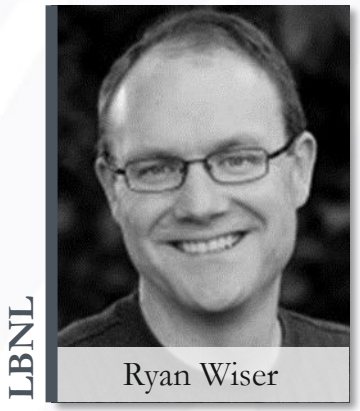
i2X Leadership Team

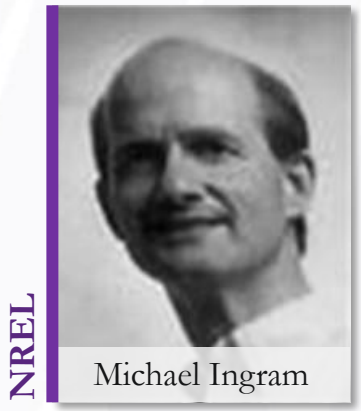








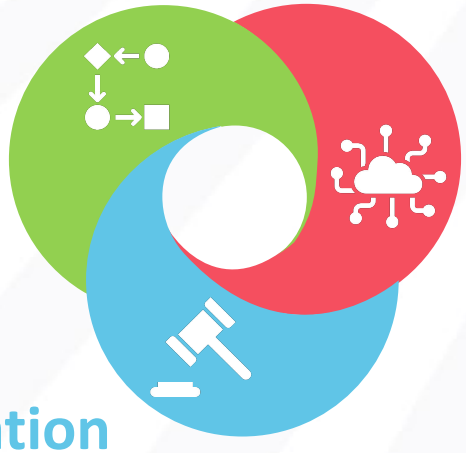




A Framework for Examining & Understanding Interconnection

A Framework for Examining Interconnection

Site Selection → Intx Application → Impact Evaluation → Intx Agreement → Intx Equipment & Site Construction → Site Commissioning

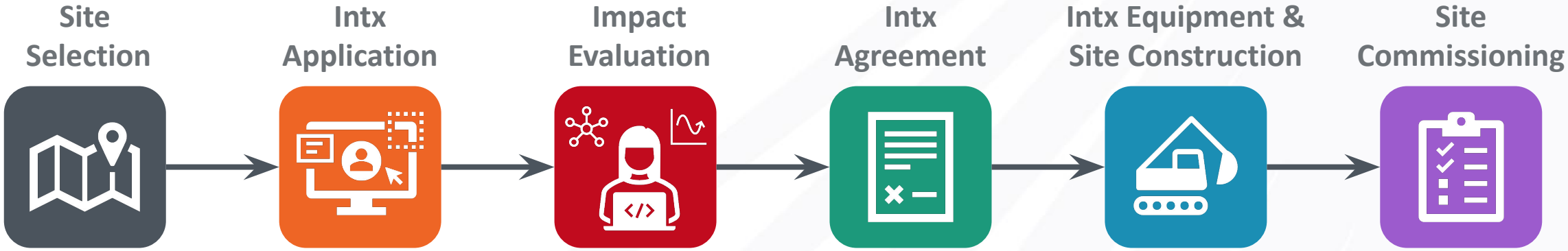


Administrative Processes

Technology & Engineering

Markets and Regulation

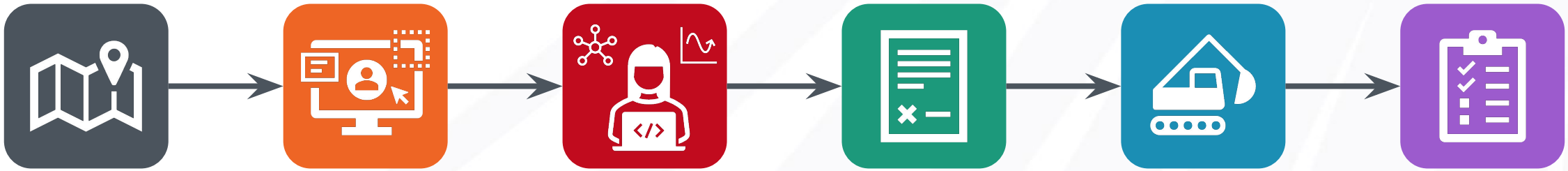
A Framework for Examining Interconnection



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	Flexible Intx Technologies & Operational Profiles	Non-Wire Alternative Technologies	Virtual & Off-Site Commissioning Tools

Technology & Engineering Administrative Processes Markets and Regulation

A Framework for Examining Interconnection



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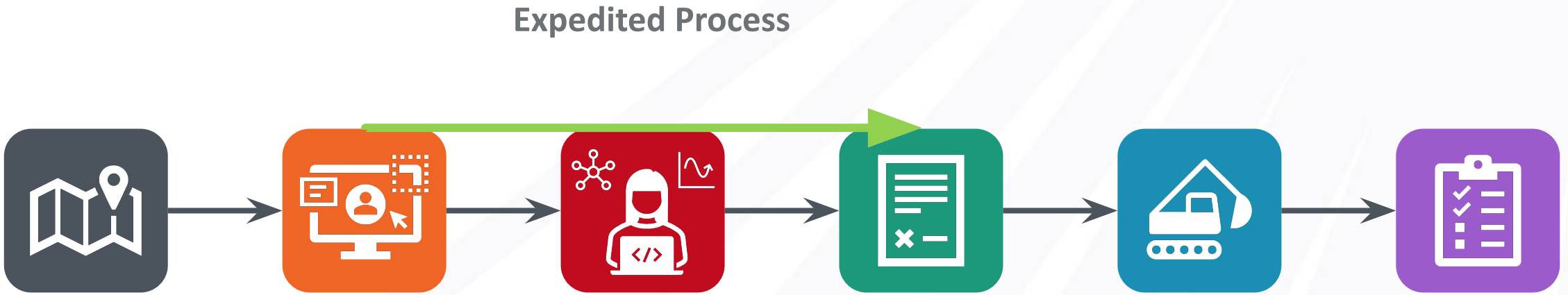

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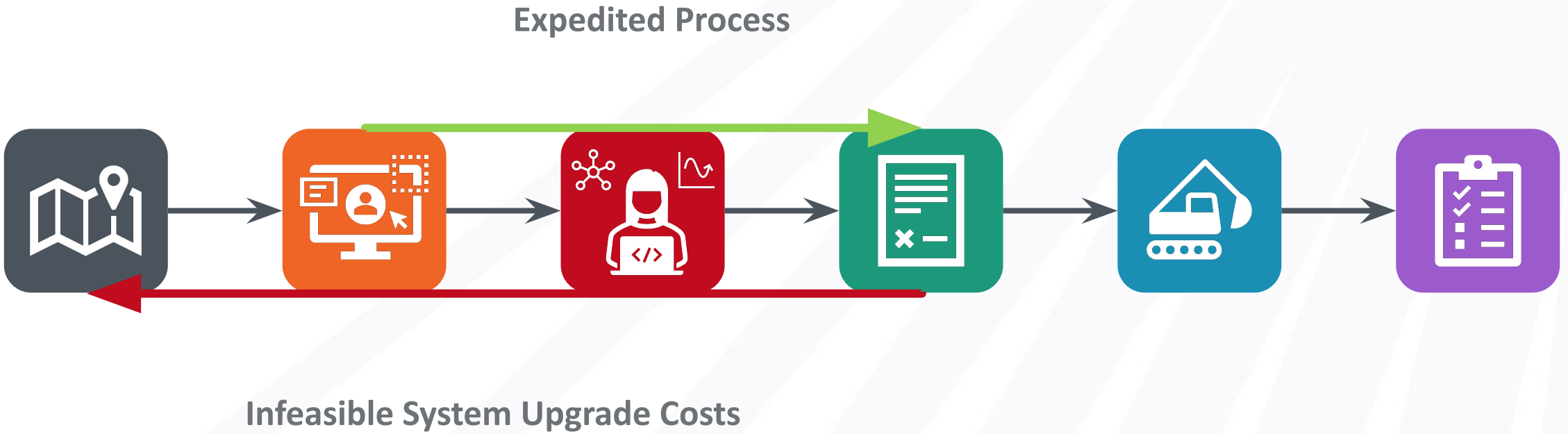

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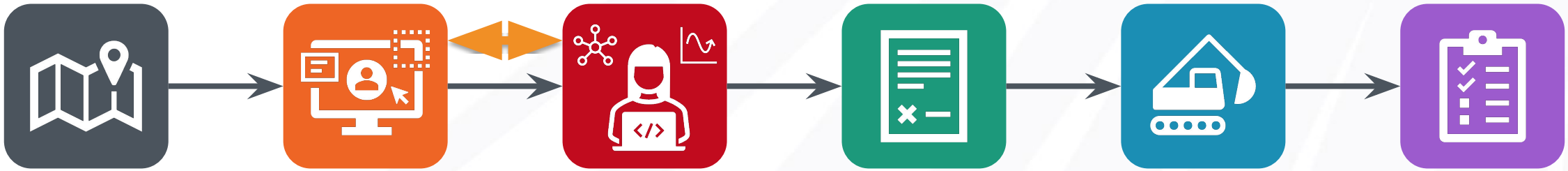

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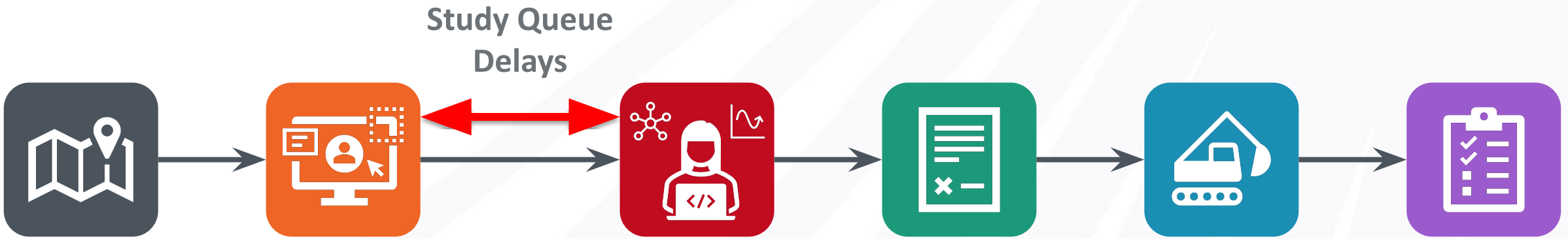

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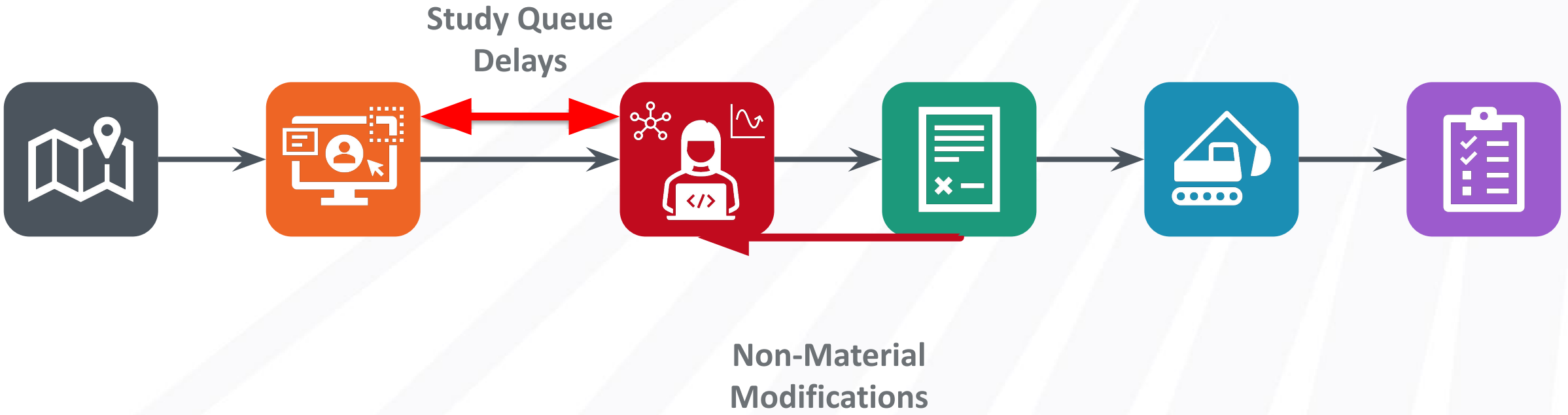

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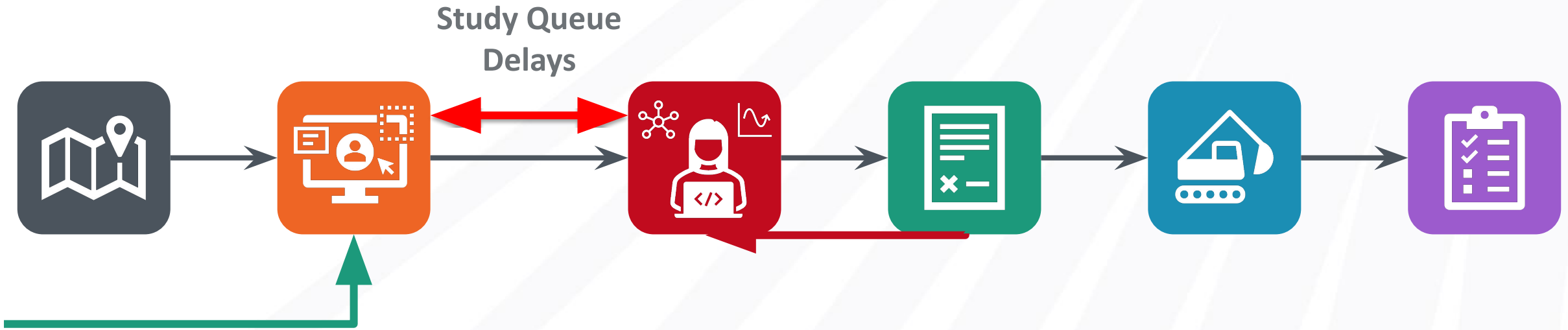

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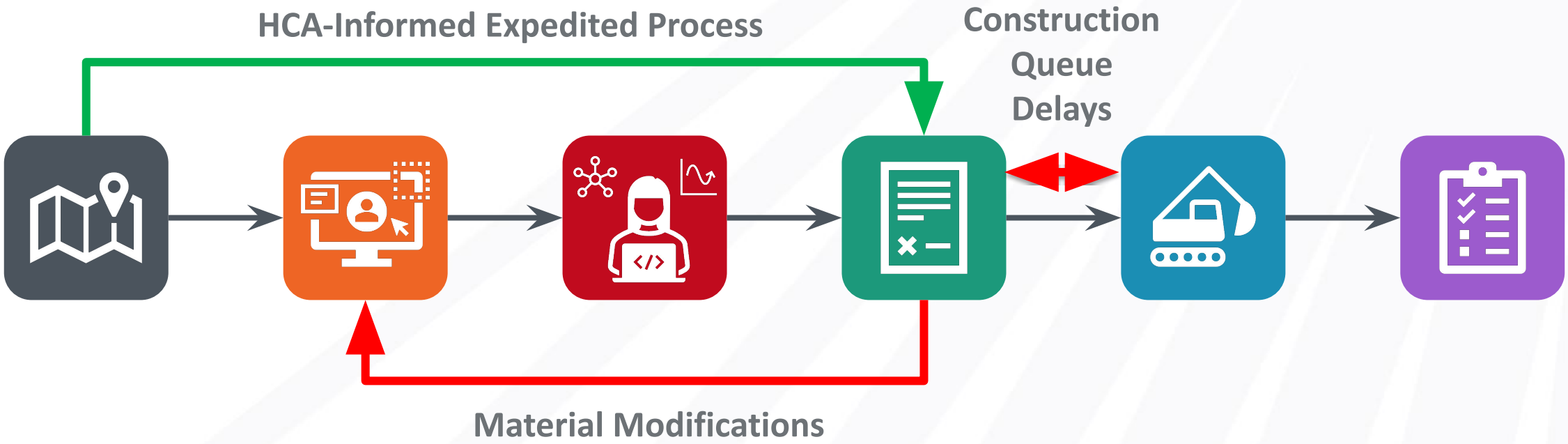
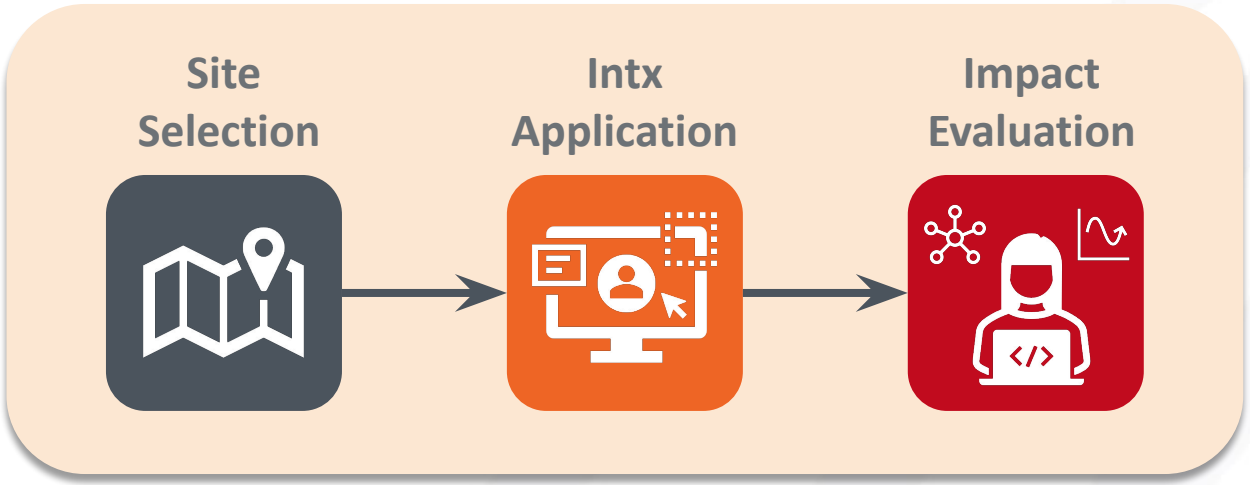


Workshop Focus Areas



- Hosting Capacity Analysis
- Screening Criteria
- IEEE 1547-2018 Adoption

Hosting Capacity

- Overview and Components
- Current Implementation
- Evaluating Tool Effectiveness
- Decisions Points

INTERCONNECTION INNOVATION e-XCHANGE
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What is hosting capacity?

Hosting Capacity

"[The] amount of DERs that can be accommodated on the distribution system at a given time and at a given location under existing grid conditions and operations, without adversely impacting safety, power quality, reliability or other operational criteria, and without requiring significant infrastructure upgrades." (Stanfield & Safdi, 2017, p. 3)

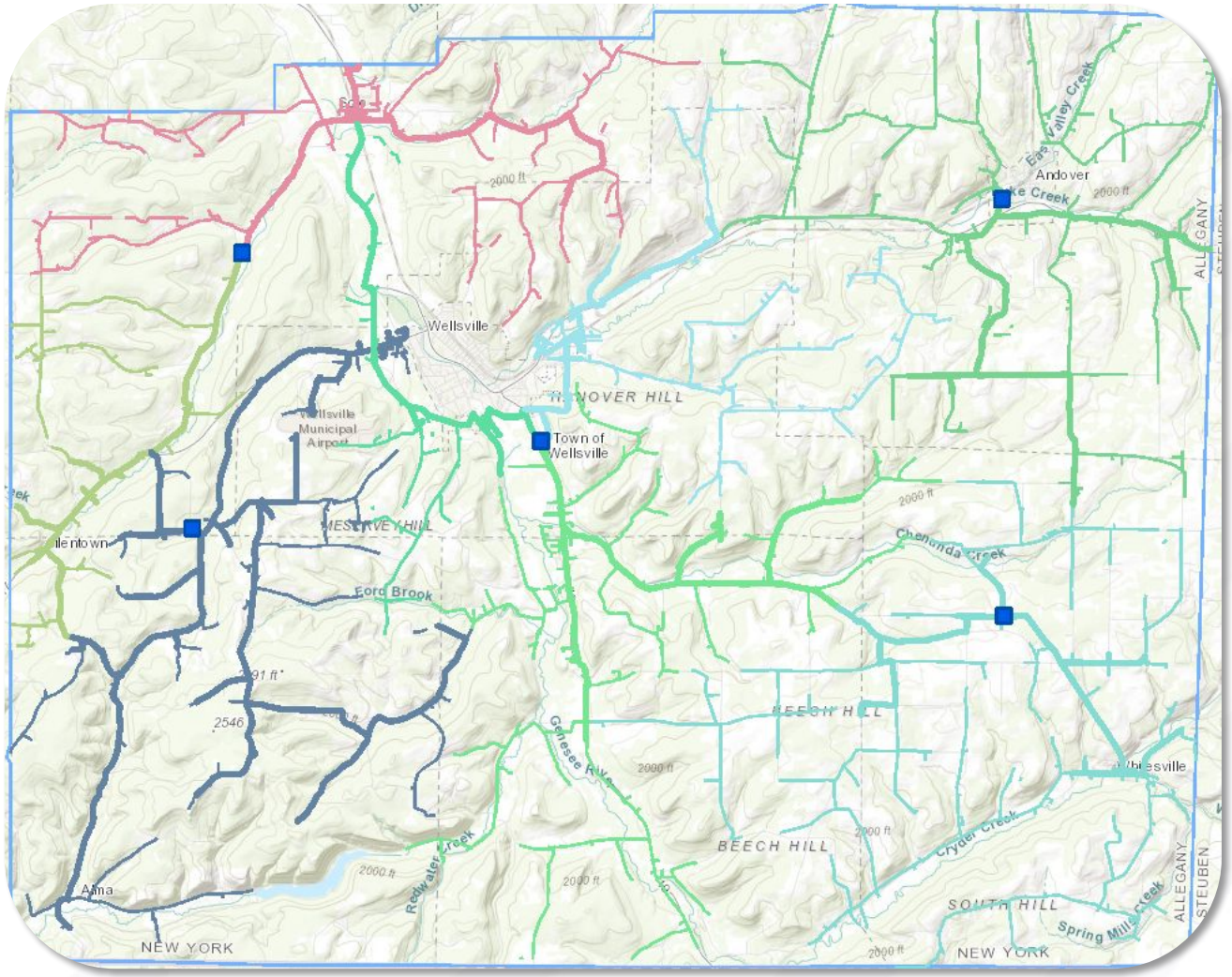
Hosting Capacity Analysis

"[E]valuates a variety of circuit operational criteria—typically thermal, power quality/voltage, protection, and safety/reliability —under the presence of a given level of DER penetration and identifies the limiting factor or factors for DER interconnections." (Stanfield & Safdi, 2017, p. 3)

Hosting Capacity Validation

The development and implementation of robust, standardized, and repeatable practices that ensure that the input models, evaluation methods, tools, and analysis outputs associated with Hosting Capacity Analysis are accurate, and where errors can be quickly identified and remedied. (Nagarajan & Zakai, 2022, p. v)

HCA Components



Source: National Grid New York System Data Portal

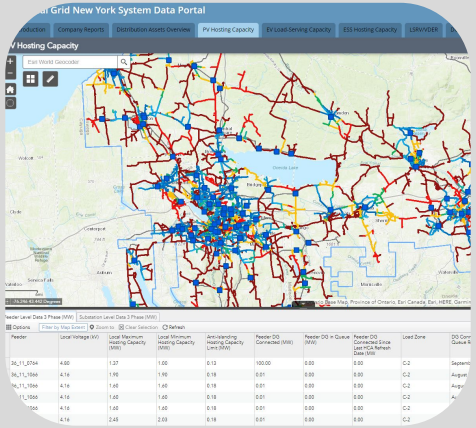
Markets & Regulation
General HCA Requirements
Implementation & Capability Timelines
Update Frequency Requirements
Validation Processes & Procedures

Technology & Engineering
Tools, Inputs, & Assumptions
Automation & User Interface
Integration with Other Tools

Administrative Processes
Development, Updating, & Validation Resources
Integration into Evaluation Procedures

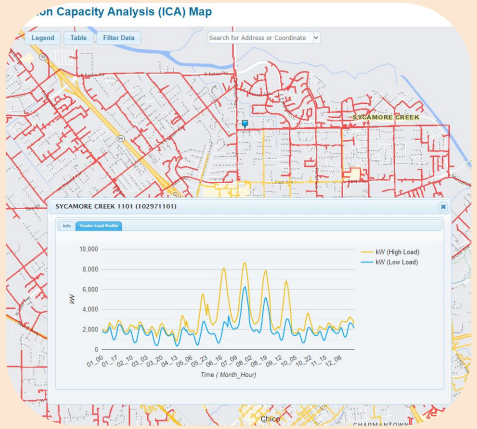
Current Implementation Examples

New York State



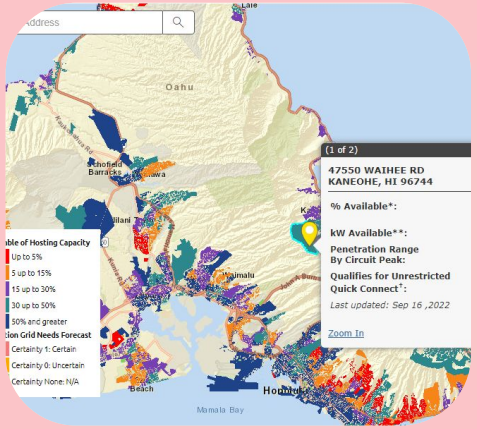
- **Tool:** EPRI DRIVE
- **Visualization:** ESRI ArcGIS
- **Load:** Static Values
- **Technologies:** PV, ESS, EVs
- **Frequency:** Bi-Annual
- **Items of Note:** Provides Cost Sharing Information

California



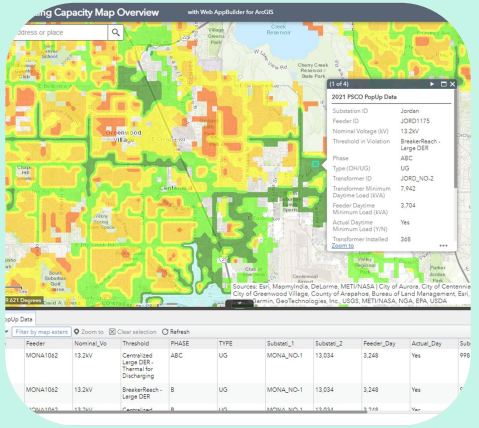
- **Tool:** CYME ICA
- **Visualization:** Google Maps
- **Load:** Yearly Curves
- **Technologies:** PV & Load
- **Frequency:** Monthly
- **Items of Note:** Integrated into Screening Process, Operational Flexibility

Hawaii



- **Tool:** N/A
- **Visualization:** N/A
- **Load:** N/A
- **Technologies:** PV+
- **Frequency:** N/A
- **Items of Note:** Used in interconnection process for quick connect

Colorado



- **Tool:** N/A
- **Visualization:** ESRI ArcGIS
- **Load:** N/A
- **Technologies:** PV
- **Frequency:** Annual+
- **Items of Note:** Provide external links to download entirety of HCA data

Are you currently considering incorporating Hosting Capacity Analysis into your state’s rules? Why or why not?

Examining Tool Effectiveness

HCA in Interconnection

Examining the Impacts of Various Tools

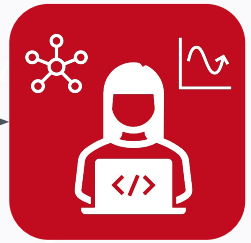
Site Selection

Developers search for prospective sites by reaching out to site-owners.

Intx Application

Developers submit and pay for applications into the interconnection queue. ***Utilities*** receive, check, and filter applications.

Impact Evaluation



Utilities perform impact evaluations to determine what system thresholds may be exceeded if proposed projects interconnect.

Does **Hosting Capacity Analysis** enable the **simpler**, **faster**, and **fairer** interconnection of clean energy resources all while maintaining reliability, resiliency, and security of the electric grid.

What does **simpler** mean to you and to each stakeholder?

What does **faster** mean to you and for overall policy goals?

What does **fairer** mean to you and for balancing the playing field?

HCA in Interconnection

Examining the Impacts of Various Tools

Simpler?

Site Selection → Intx Application → Impact Evaluation

Pre-Application Reports:
"[Reports] generated by a utility at the request of prospective interconnection applicants to provide technical information about a specific point of interconnection." (Peterson & Lockhart, 2018, p. v)

vs.

Hosting Capacity Analysis:
"[E]valuates a variety of circuit operational criteria—typically thermal, power quality/voltage, protection, and safety/reliability —under the presence of a given level of DER penetration and identifies the limiting factor or factors for DER interconnections." (Stanfield & Safdi, 2017, p. 3)

+ Simpler rules and easier enforcement	Regulators	+ Increased visibility for future policy and rulemaking
- Lower process efficiency and retention rates		- Much more complex rulemaking process
+ Easier to implement at low request rate levels	Utilities	+ Easier to manage at high request levels
- Costly & requires internal grid expertise to be useful	Developers	???
???	Consumers	+ Can easily align location with available capacity

HCA in Interconnection

Examining the Impacts of Various Tools

Faster?

Site Selection → **Intx Application** → **Impact Evaluation**

Pre-Application Reports:
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+ Fast individual processing with automation capabilities	Processing	+ Batch processing reduces overall resource allocation
- Lower quality and less useful datapoints	Transparency	- Increases security concerns due to high transparency
+ Low validation process requirements	Validation	+ GIS verified hosting capacity
???	???	???

HCA in Interconnection

Examining the Impacts of Various Tools

Fairer?

Site Selection → **Intx Application** → **Impact Evaluation**

Pre-Application Reports:
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+ Requires minimal upfront internal resources making it easy for both small and utilities to implement	+ Reduces information barriers by removing internal grid expertise requirements needed for pre-app review
- High cost to developers and consumers who must purchase a pre-app for each potential site	- Requires extensive and costly internal resource building to develop and manage the tool
???	???

HCA in Interconnection

Examining the Impacts of Various Tools

Site Selection → Intx Application → Impact Evaluation

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Confidentiality: Are there any data privacy concerns regarding either tool?

Security: Are there any security concerns regarding either tool?

Decision Points in Rulemaking for Hosting Capacity Analysis*

*Note: The information in this section is in early development with a final decision matrix to be a part of the i2X Strategic Roadmap (Q3.FY23)

HCA Decision Points

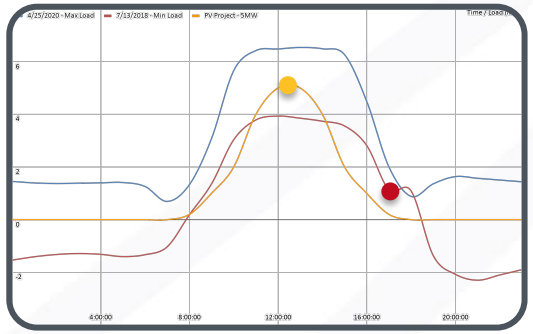
What are the key decision points for policy makers and regulators when mandating the development and implementation of Hosting Capacity Analysis?

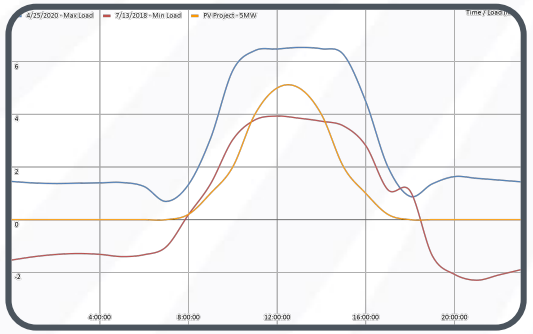
- Generation & Load Profile Temporal Granularity
- Update Frequency
- Spatial Resolution
- Validation Processes
- Analysis Methods
- Data Access

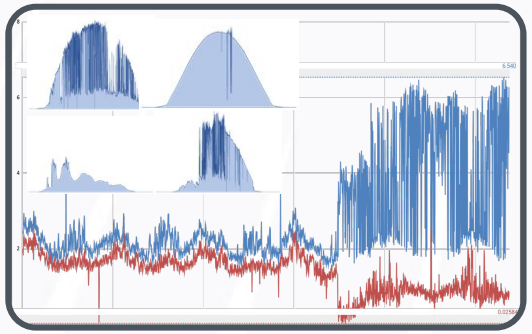
HCA Decision Points

- Generation & Load Profile Temporal Granularity
- Update Frequency
- Spatial Resolution
- Validation Processes
- Analysis Methods
- Data Access

Spot/Point	Load Curves	Seasonal+ Load Curves
Selection and evaluation of load and generation **points** to evaluate potential impact.	Selection and evaluation of load and generation **curves** to evaluate potential impact.	Selection and evaluation of **multiple** load and generation **curves** to evaluate potential impact







We will tackle this topic in the following section:
Screening Criteria

Simpler → Faster → Fairer

Increasing Complexity & [Accuracy or Useability]

HCA Decision Points

- **Update Frequency**
- **Spatial Resolution**
- **Validation Processes**
- **Analysis Methods**
- **Data Access**
- **Generation & Load Profile Temporal Granularity**

Interval	**As-Needed**	**Real-Time**
Updating the system-wide HCA at a predetermined interval (3M, 6M, 12M) incorporating new generation or system changes	Updating HCA for a portion of the grid shortly after new generation or grid infrastructure is installed	Automated HCA that is integrated with other utility systems and is updated in real-time once new applications are approved.

Example:

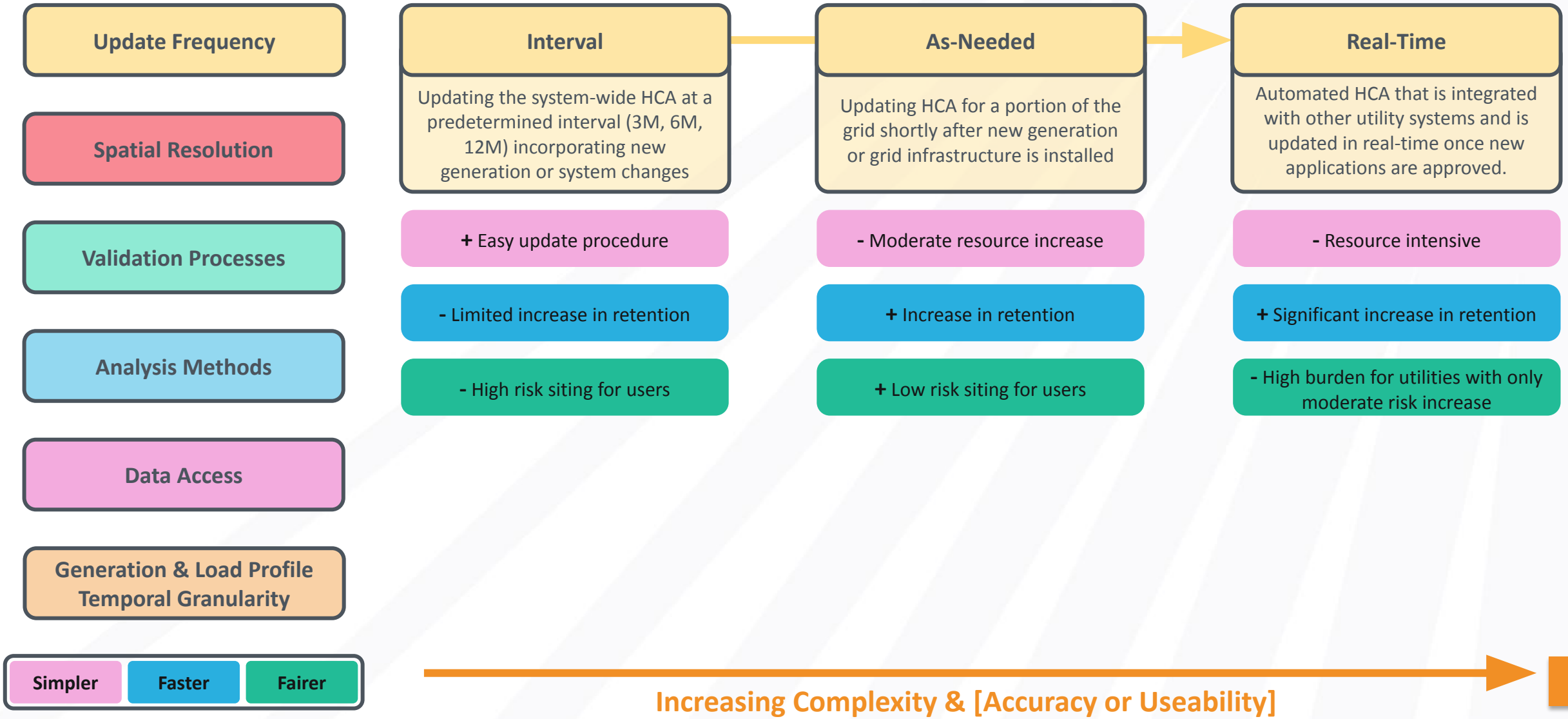
*You are a community looking to install a **2 MW PV System** on a distribution feeder that runs through your town. You review your utility's hosting capacity map for said feeder directly next to available land and see the following:*

Scenario 1	**Scenario 2**	**Scenario 3**
Available HC: 2.5 MW *(Refresh Date: 10.21)*	**Available HC:** 2.5 MW *(Refresh Date: 8.22)*	**Available HC:** 2.5 MW *(Refresh Date: Today)*
Connected DG: 2 MW *(Refresh Date: 9.22)*	**Connected DG:** 2 MW *(Refresh Date: 9.22)*	**Connected DG:** 2 MW *(Refresh Date: Today)*

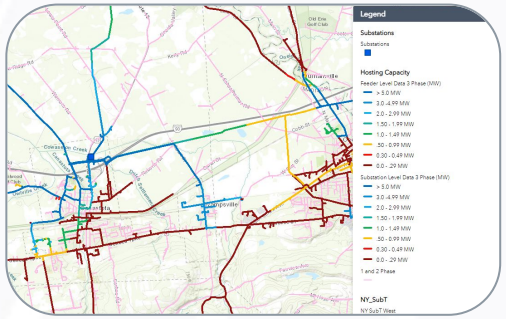
Simpler | Faster | Fairer

Increasing Complexity & [Accuracy or Useability]

HCA Decision Points



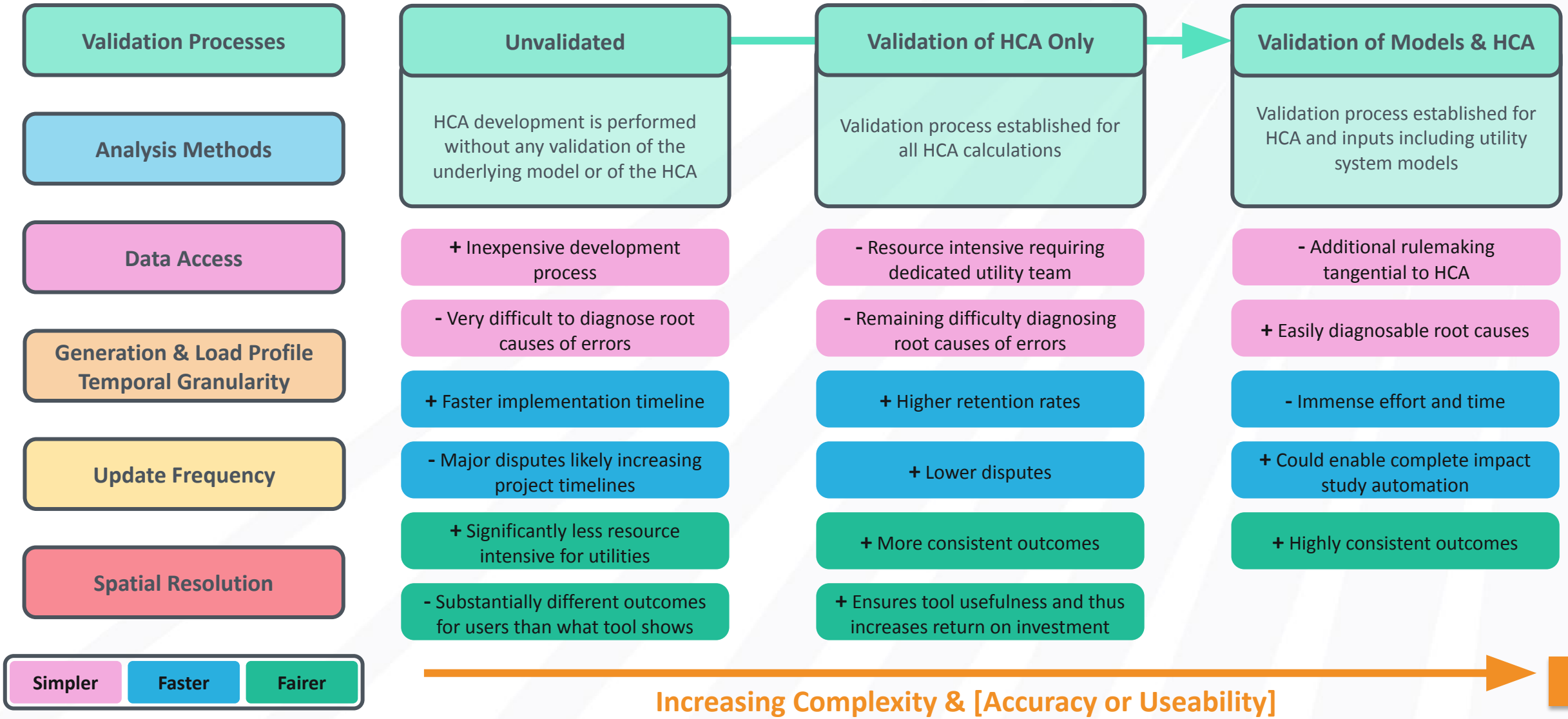
HCA Decision Points

	System-Wide / Heat Map	Circuit Level	Sub-Circuit Level
Spatial Resolution	System-wide GIS heat maps showing location data with HCA – may show queue or circuit data	HCA value is calculated across full circuit – may depict highest and lowest HCA values (circuit head vs. end)	HCA value is calculated and shown at nodes across the circuit giving locational sub-circuit HCA specificity.
Validation Processes	 **Source:** PSEG-LI HCA, 2019	 **Source:** PEPCO HCA, 2022	 **Source:** National Grid NY HCA, 2022
Analysis Methods	- Insufficient for locating existing grid infrastructure	+ Grid infrastructure transparency for better siting	+ No additional analysis needed to interpret results
Data Access	- Unlikely to increase project retention beyond pre-app reports	- High error margin leads to large number of disputes	+ Lower number of infeasible applications clogging queue
Generation & Load Profile Temporal Granularity	- Inaccessible to anyone without grid expertise to confirm siting	- Grid expertise gap still exists	+ Expertise gap closed while still providing advanced user benefits
Update Frequency			

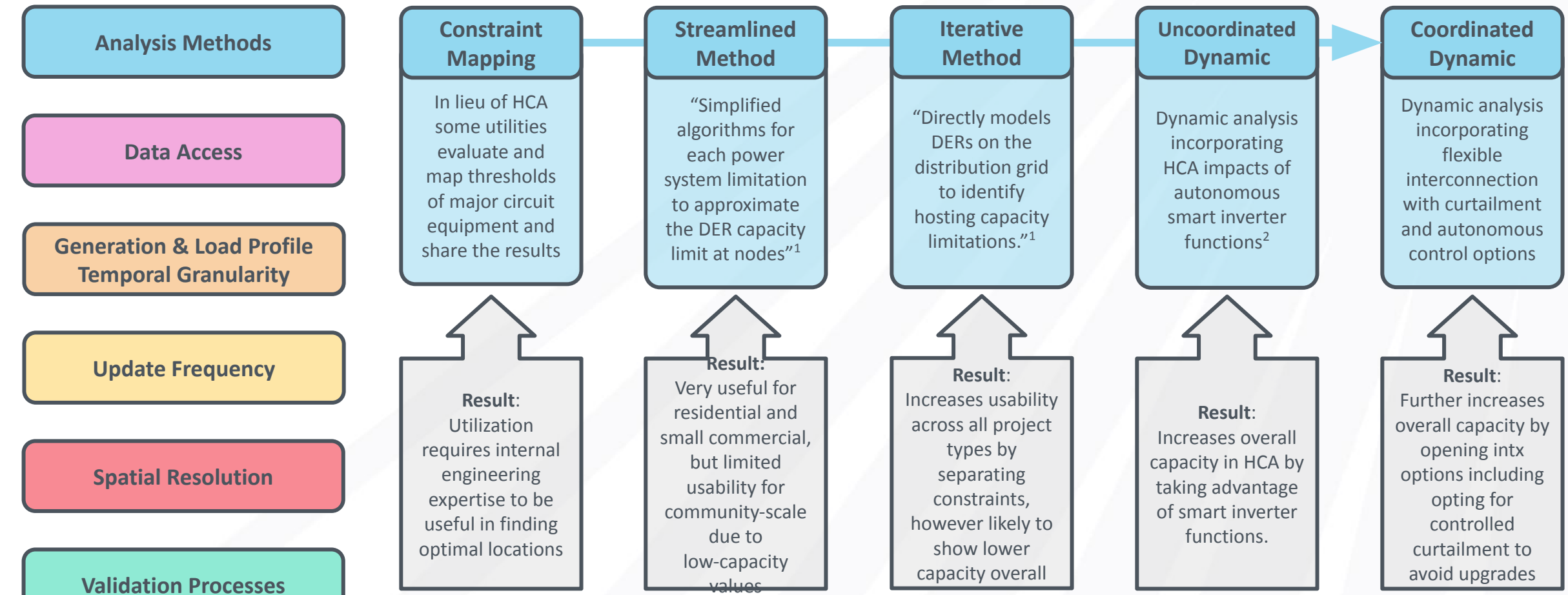
Simpler → Faster → Fairer

Increasing Complexity & [Accuracy or Useability]

HCA Decision Points

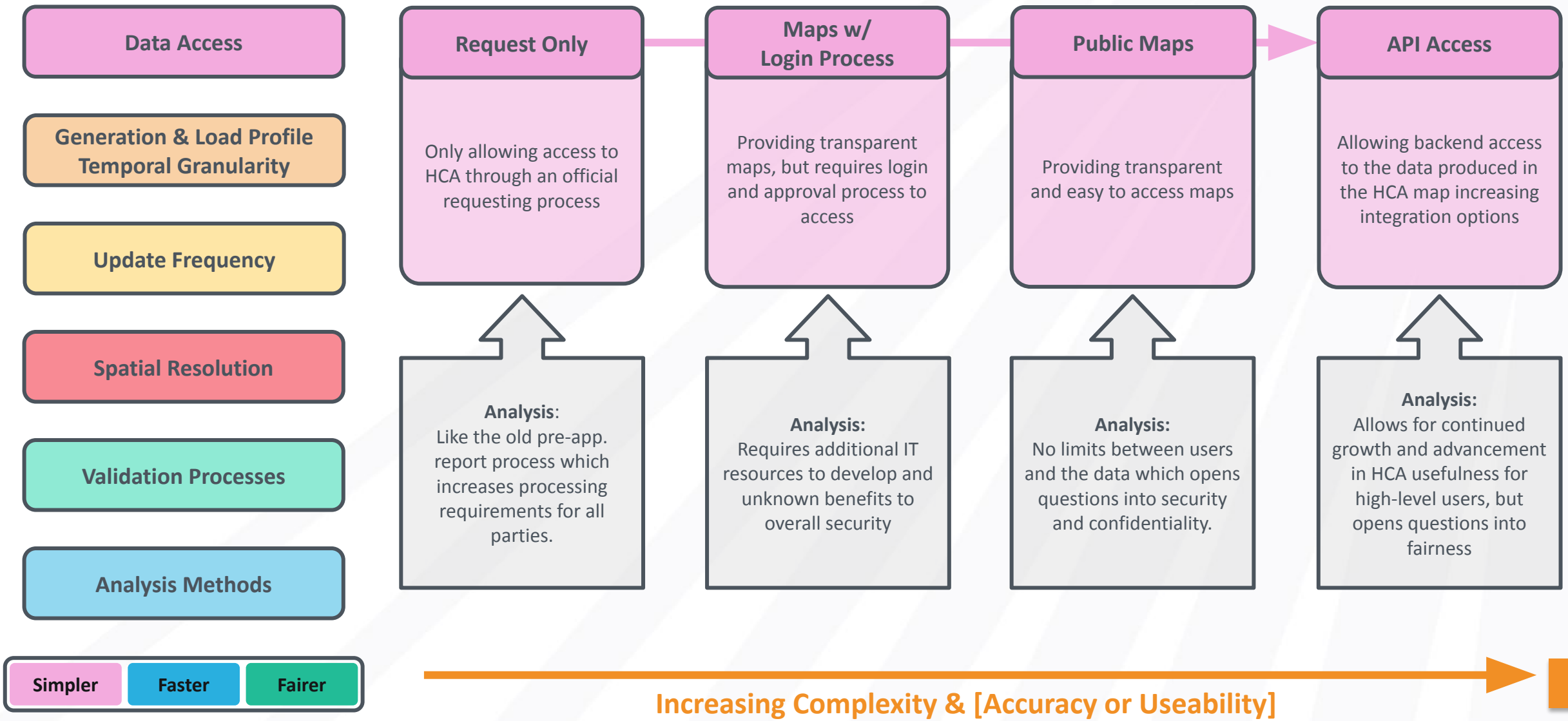


HCA Decision Points

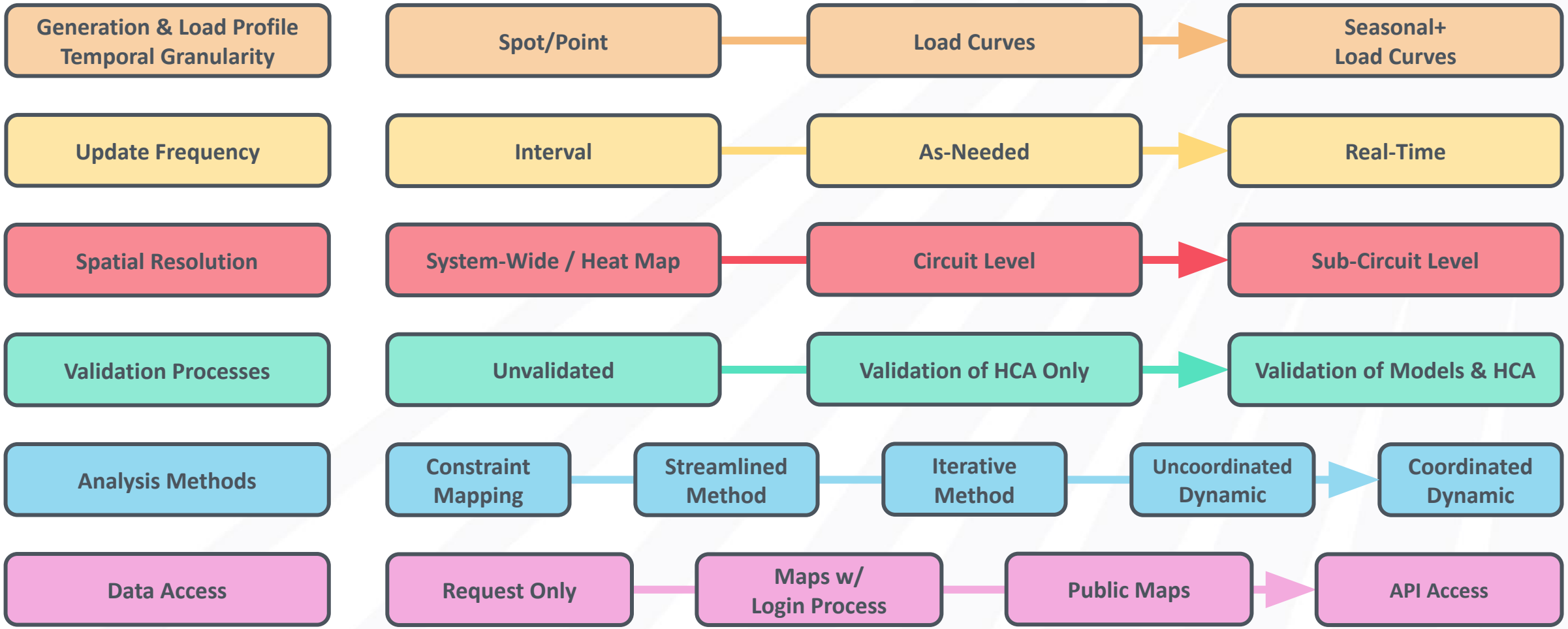


1 – (Stanfield & Safdi, 2017, p. 3)
2 – (Giraldez, n.d.)

HCA Decision Points



HCA Decision Points



Simpler | Faster | Fairer

Increasing Complexity & [Accuracy or Useability]

Screening Criteria

- Overview and Components
- Current Implementation
- Decisions Points

What are Screening Criteria?

Screening Criteria

The inputs, assumptions, and evaluation methods used throughout the interconnection process to determine the potential impact that a newly proposed generating system may have on the electric grid. Can be simplified or made more or less stringent in order to accomplish different goals at each stages of the interconnection process.

Important Definitions

- **Voltage Violations:** Criteria used to examine the impacts to the reliability of the circuit's voltage as mandated by national standards such as Voltage Tolerance (ANSI C84.1), Flicker (IEEE 1453), and Rapid Voltage Change (IEEE 1547).
- **Thermal Violations:** Criteria used to examine the thermal impacts to grid equipment as mandated by manufacturer specifications such as Continuous Thermal, Withstand Rating, and Backfeeding Capabilities.
- **Protection Violations:** Criteria used to examine the impacts to circuit protection schemes dictated by utility-determined protection engineering principles including Coordination, Anti-Islanding, Fault Sensitivity, Effective Grounding, etc.

Screening Components

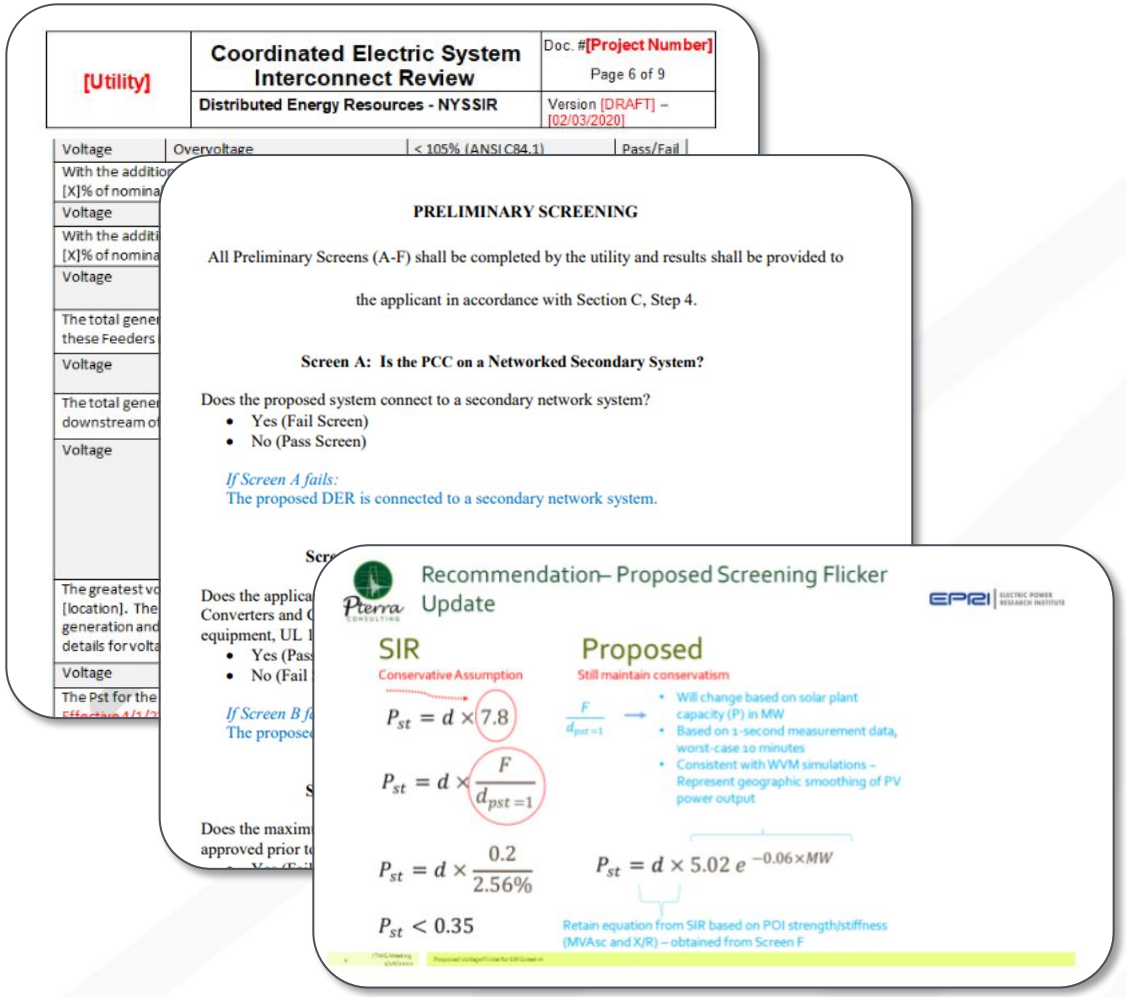
Markets & Regulation
Standardized Screening Criteria
Standardized Inputs & Assumptions
Expedited Process Procedures
Feedback & Revision Mechanisms

Technology & Engineering
Inputs & Assumptions
Tool Capabilities & Automation
Integration with Other Tools

Administrative Processes
Process Implementation Strategies
Resource Requirements

Current Implementation Example

New York State



Feedback and Revision Mechanisms:

- Interconnection Technical Working Group (LINK)
- Interconnection Policy Working Group (IPWG)

Standardized Screens & Process Templates:

- Preliminary Screening Analyses & Template (LINK)
- Coordinated Electric System Interconnect Review Analyses & Template (LINK)
- Standardized Voltage Flicker Screen (LINK)
- Standardized Anti-Islanding Criteria (LINK)

Source: New York State Department of Public Services Website – Interconnection Technical Working Group

Do you have experience integrating standardized screens into your rulemaking process? If yes, what were some major challenges encountered?

Decision Points in Rulemaking for Screening Criteria*

*Note: The information in this section is in early development with a final decision matrix to be a part of the i2X Strategic Roadmap (Q3.FY23)

Screening Criteria Decision Points

What are the key decision points for policy makers and regulators when mandating the development and implementation of Standardized Screening Criteria?

- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements

Screening Criteria Decision Points

- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements

Spot/Point

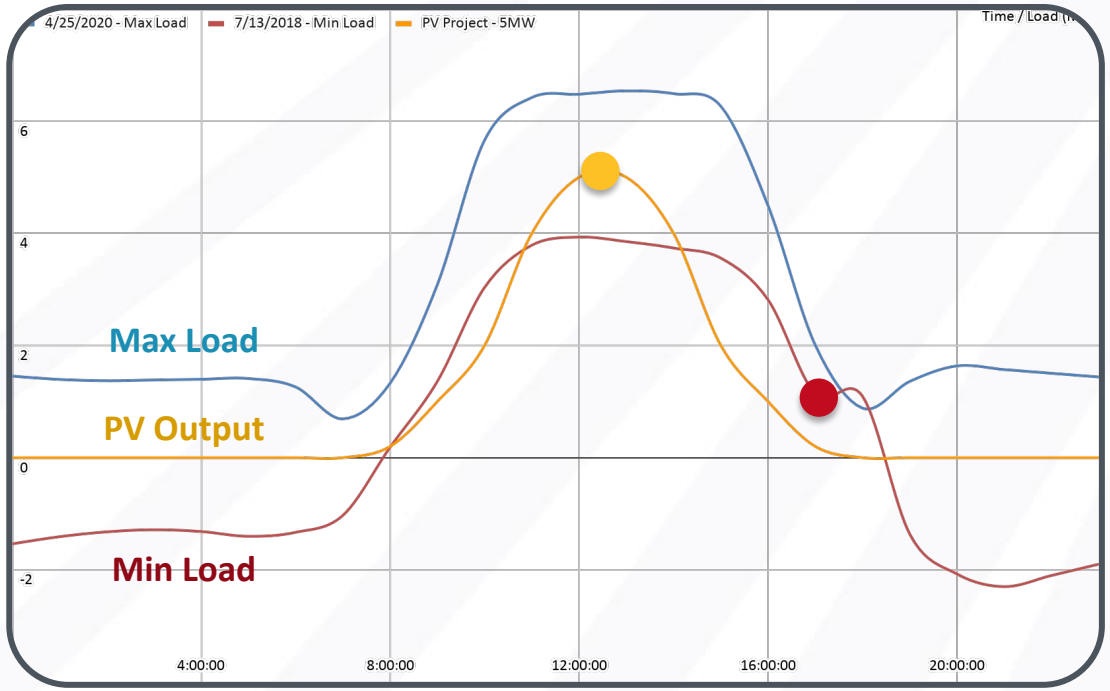
Selection and evaluation of load and generation **points** to evaluate potential impact.

Load Curves

Selection and evaluation of load and generation **curves** to evaluate potential impact.

Seasonal+ Load Curves

Selection and evaluation of **multiple** load and generation **curves** to evaluate potential impact



- \+ Easy to determine load value
- \+ Easy to determine generation value
- \+ Easy to evaluate
- \- High number of projects need complex studies

- \+ Can be automated relatively easily
- \- Length of overall process expanded greatly
- \- Greatly increases number of rejected projects

- \+ Likely does not require additional utility resources
- \- Treats all generators the same
- \- High cost to developers due to low retention rates

Simpler | Faster | Fairer

Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements

Spot/Point

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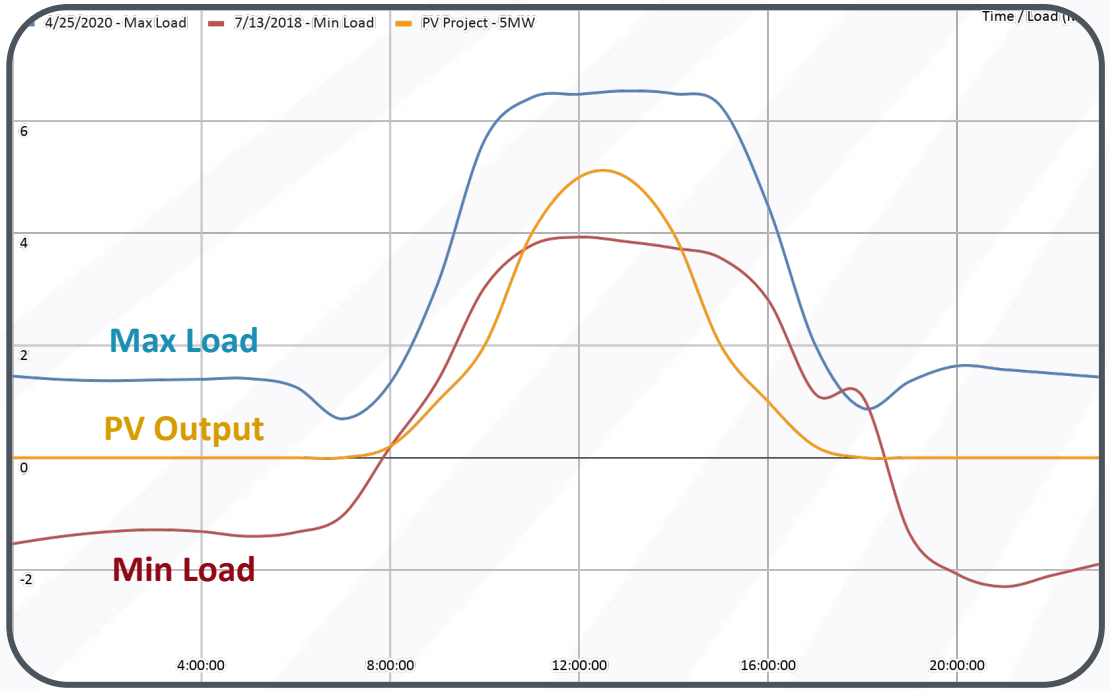
Seasonal+ Load Curves

Selection and evaluation of **multiple** load and generation **curves** to evaluate potential impact



- Still easy to find load curve
- Negligible increase in complexity of screening steps
+ Lower number of projects needing impact studies
- Requires upfront generator curve selections

+ Shortened evaluation process in aggregate
+ Can be automated, albeit with added complexity
- Slight increase to screen processing time
- May require additional training

- Negligible increase to utility resources
+ Generator operational profile is considered

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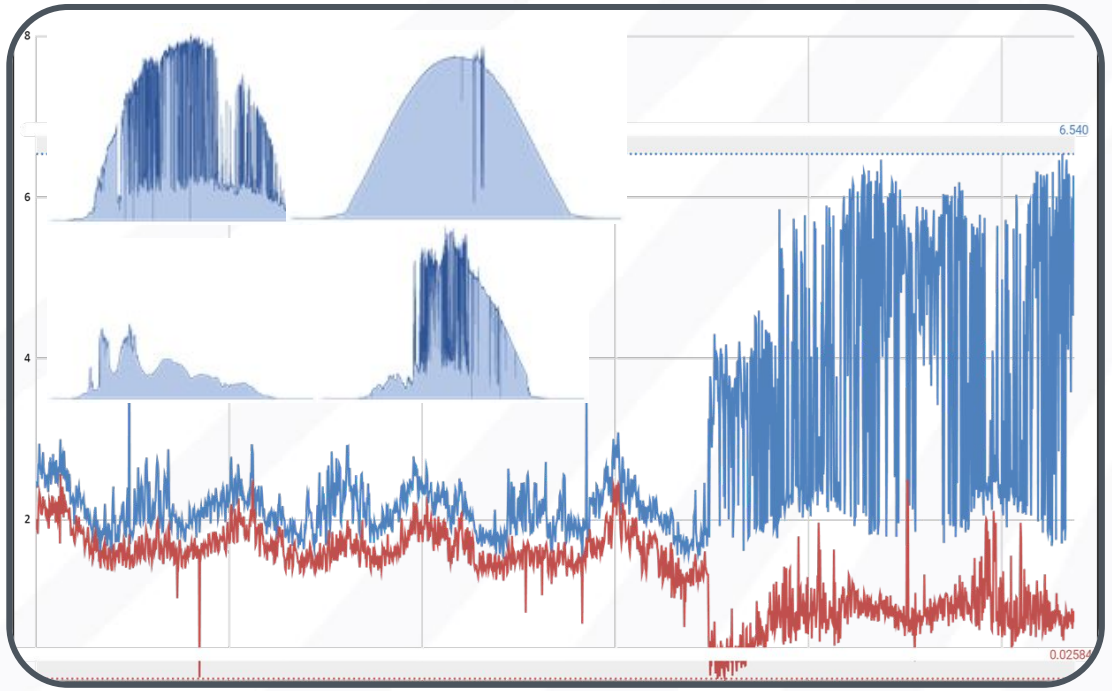
Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements

Spot/Point	Load Curves	Seasonal+ Load Curves
Selection and evaluation of load and generation **points** to evaluate potential impact.	Selection and evaluation of load and generation **curves** to evaluate potential impact.	Selection and evaluation of **multiple** load and generation **curves** to evaluate potential impact



+ Could reduce number of future impact studies
- Large increase in resources for curve selection
- Large increase in engineering resources

+ Can be automated relatively easily
- Very difficult to automate
- Large increase in screen processing time

+ Most accurate and fair method for all generators
+ Could allow for early operational flexibility discussions to later simplify the impact study
- Major increase in utility resource costs per project

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Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity

UL 1741 Certification	UL 1741.SA Certification	UL 1741.SB Certification
Certification based on testing requirements of IEEE 1547-2013	Certification based on testing requirements of CA Rule 21	Certification based on testing requirements of IEEE 1547-2018

We will tackle this topic in the following section:
1547-2018 Adoption

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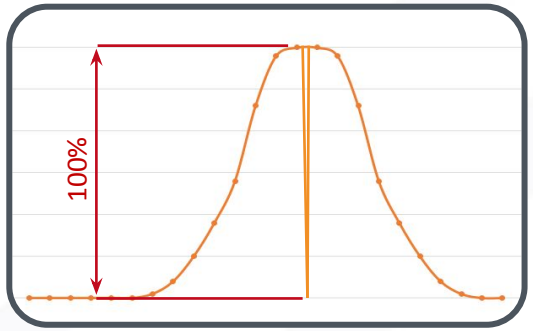
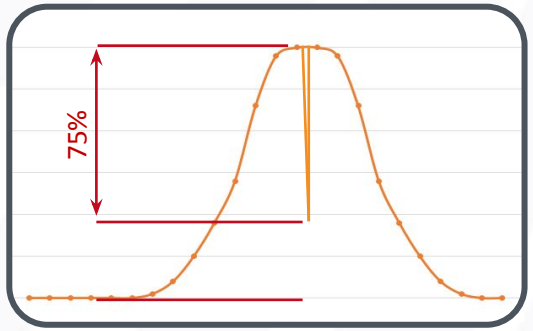
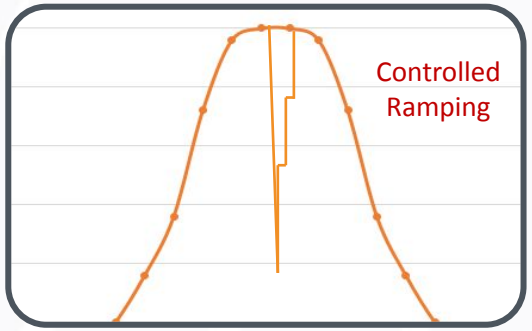
Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Voltage Violations
- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity
- Equipment Certifications

Highly Volatile Fluctuations	Worst-Case Fluctuation	Fluctuation Under Controls
Highly volatile fluctuations assumed regardless of actual operational characteristics or physical constraints	Maximum possible fluctuation based on technology's operational profile and physics-based thresholds	Maximum possible fluctuation based on available control support functions enabled by certified inverter equipment
		
- Lower retention rate	+ Higher retention	+ Highest retention
+ Low processing time	- Slight increase to processing	- Major increase to processing
- Not realistic depiction	+ Realistic depiction	+ Advances technology usage

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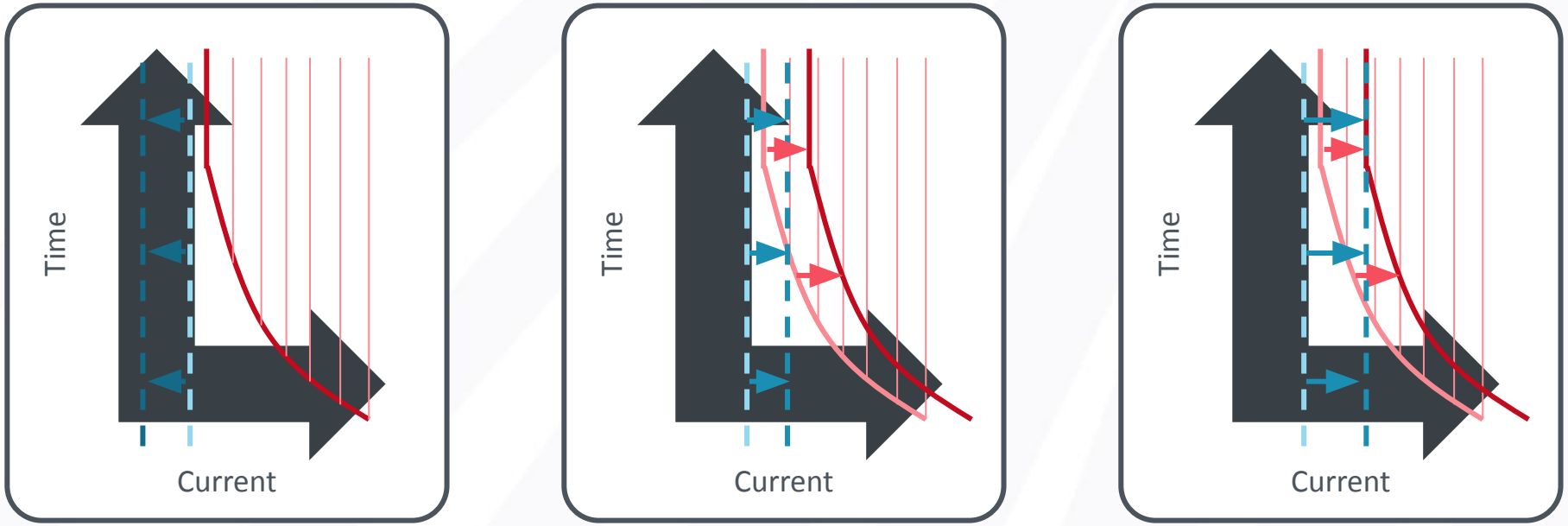
Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Thermal Violations
- Protection Violations
- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations

DER-Specific Derating without Load Considerations	Moderate Derating with Load Considerations	OEM Thresholds with Load Considerations
Arbitrary derating of equipment thermal thresholds often applied to DER only regardless of load	Derating of equipment thresholds in alignment with standard utility practices and with consideration of loading conditions	Actual manufacturer threshold specifications used with consideration of load conditions



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Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Thermal Violations
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DER-Specific Derating without Load Considerations	Moderate Derating with Load Considerations	OEM Thresholds with Load Considerations
Arbitrary derating of equipment thermal thresholds often applied to DER only regardless of load	Derating of equipment thresholds in alignment with standard utility practices and with consideration of loading conditions	Actual manufacturer threshold specifications used with consideration of load conditions
+ Complete certainty in not exceeding thresholds	+ Complete certainty in not exceeding thresholds	+ Very high certainty in not exceeding thresholds
- Major reduction in overall capacity thus limiting goals	+ Major increase in overall capacity and achievable goals	+ Slight increase in overall capacity and goal achievability
- Differing treatment of current for generation vs. loads	+ Recognition of load impacts & electrification on capacity	- Not aligned with typical reliability practices
Current	Current	Current

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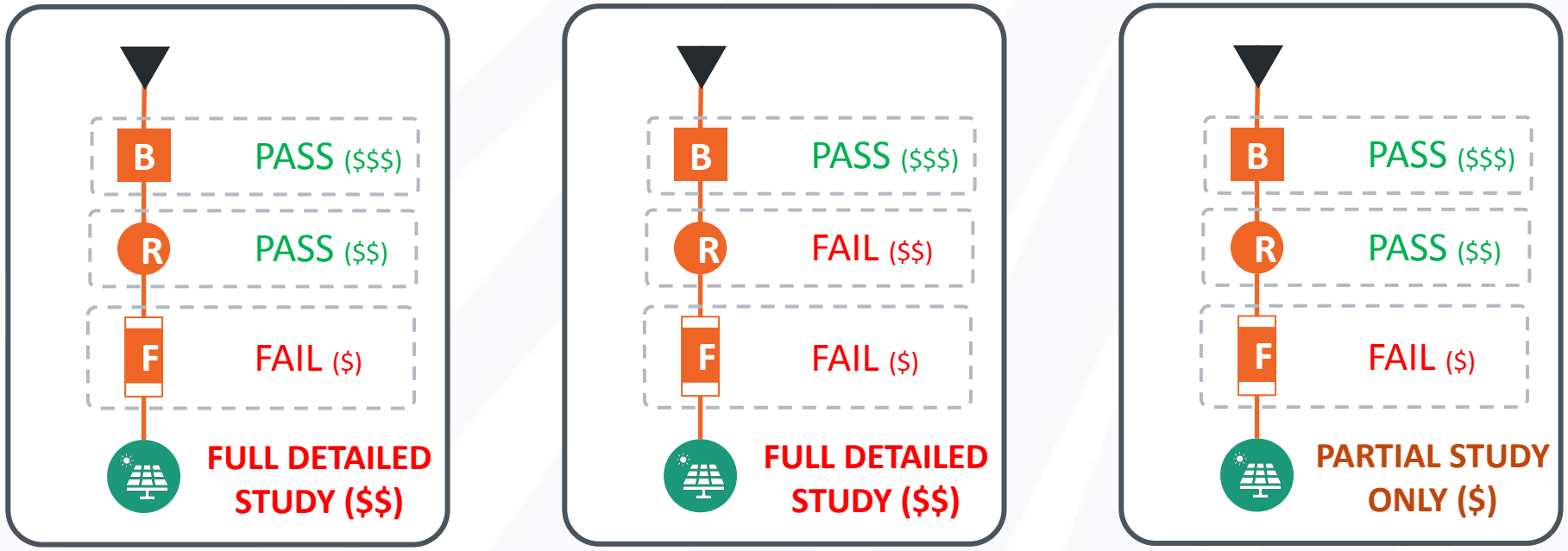
Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Protection Violations
- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations

Any Device	Major Equipment Only	Supplemental Protection Review Process
First protective device that fails the screen determines whether the project requires detailed analysis, regardless of scale.	Only screened devices that would cause a major financial burden or require substantial engineering study are flagged for detailed study	Supplemental protection review process that is separate from a detailed study for sites that only fail protection screen.



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Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Protection Violations
- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity
- Equipment Certifications
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- Thermal Violations

Any Device	Major Equipment Only	Supplemental Protection Review Process
First protective device that fails the screen determines whether the project requires detailed analysis, regardless of scale.	Only screened devices that would cause a major financial burden or require substantial engineering study are flagged for detailed study	Supplemental protection review process that is separate from a detailed study for sites that only fail protection screen.
+ Scalable stepwise screening procedures	- Additional guidance with additional processing	+ Reduced scope of detailed study to just required area
+ Process ends when failure is determined – 'optimized'	+ Reduces number of projects requiring detailed study	+ Quicker supplemental review for low impact projects
- Small projects forced to undergo costly detailed studies	+ Small projects avoid costly studies	+ Balances burden placed on utilities and developers
FULL DETAILED STUDY ($$)	FULL DETAILED STUDY ($$)	PARTIAL STUDY ONLY ($)

Simpler | Faster | Fairer

Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points

- Anti-Islanding Requirements
- Generation & Load Profile Temporal Granularity
- Equipment Certifications
- Voltage Violations
- Thermal Violations
- Protection Violations

Anti-Islanding Limit

Aggregate DER compared to precalculated circuit penetration limit before which islanding risk is determined to be negligible.

Anti-Islanding Detailed Screening Process

Perform a series of simplified screens to determine generation mix as proxy for whether there is an increased risk of islanding

Screen Removal

Removal of anti-islanding screens completely due to high trust in inverter technologies and research showing negligible probability

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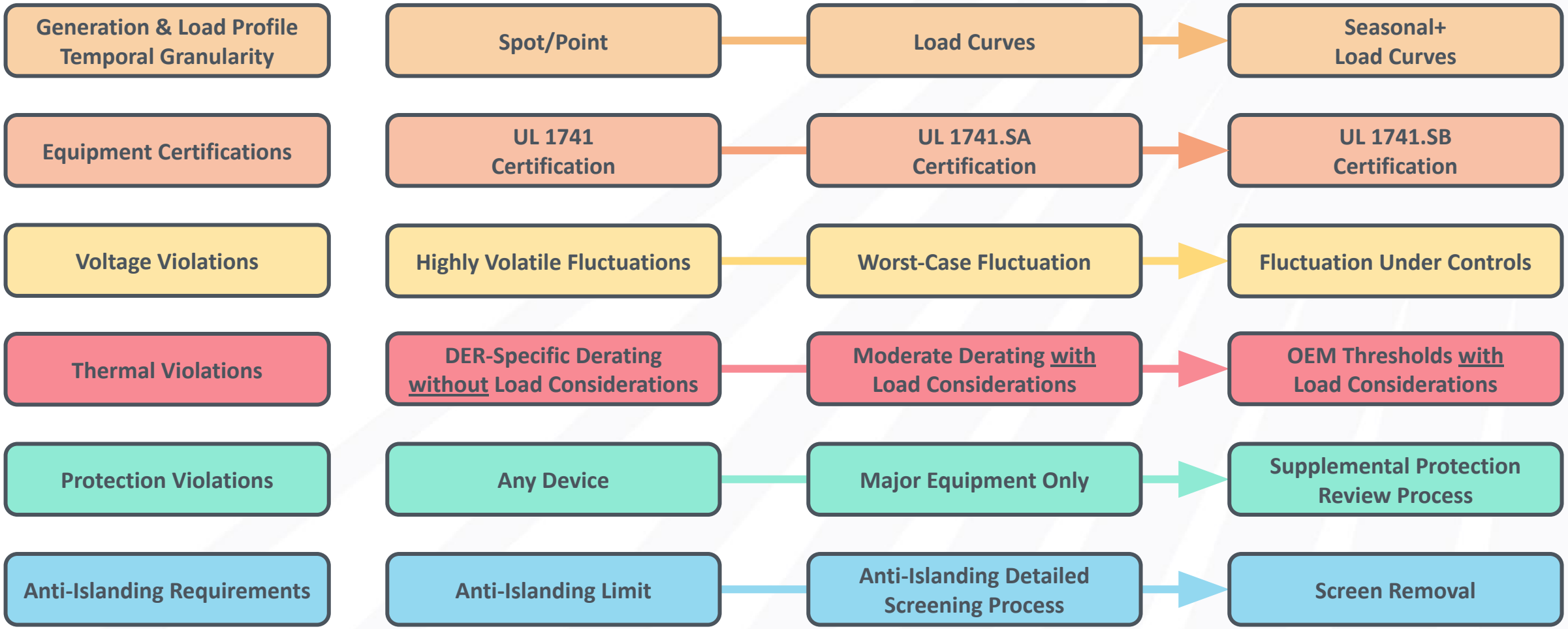
Increasing Complexity & [Accuracy or Useability]

Screening Criteria Decision Points



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

Thank You!

Website: energy.gov/i2X

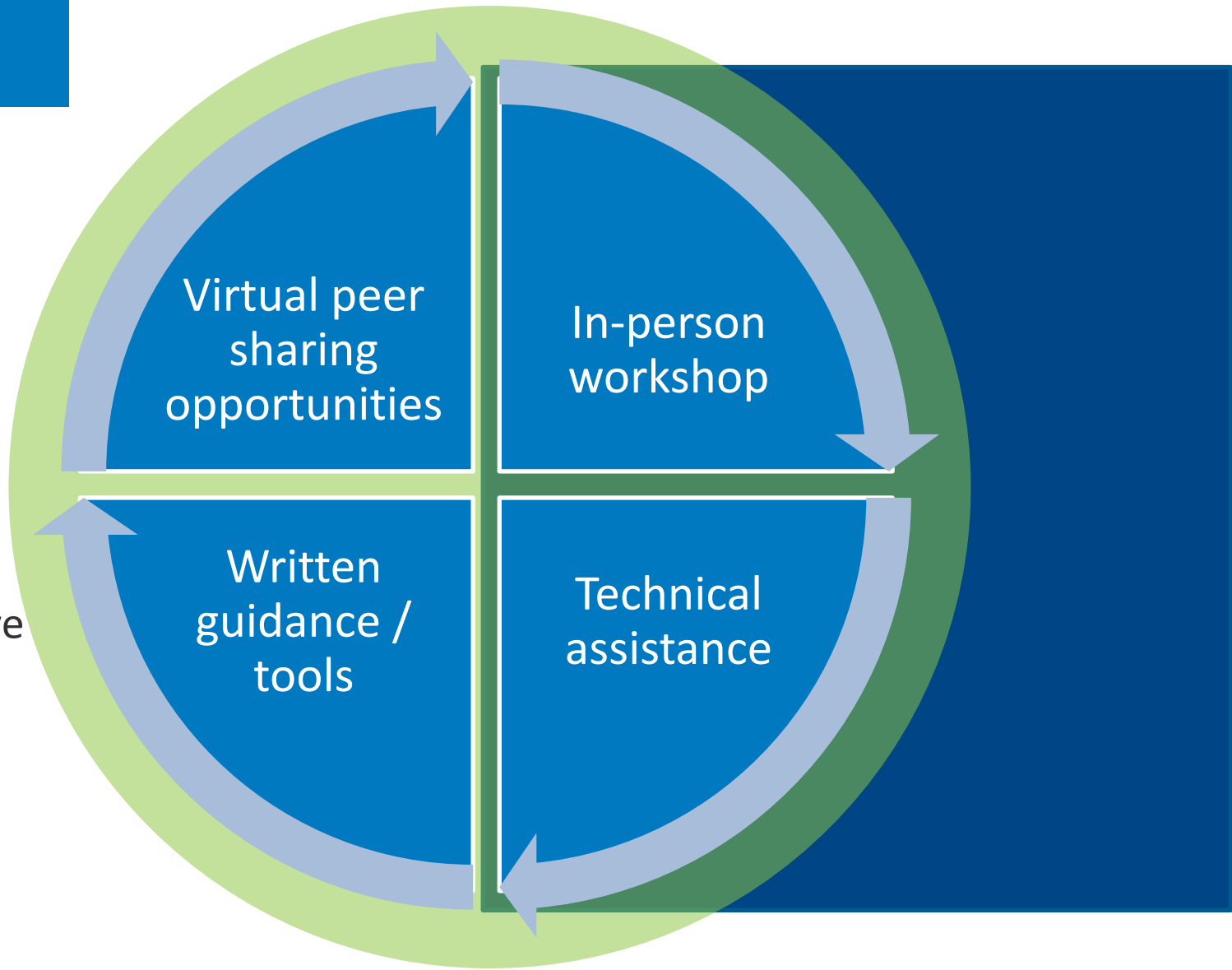
Email: i2X@ee.doe.gov

References

1. Stanfield, S. & Safdi, S. (2017). *Optimizing the Grid – A Regulator's Guide to Hosting Capacity Analyses for Distributed Energy Resources*. Interstate Renewable Energy Council. https://irecusa.org/wp-content/uploads/2021/07/IREC-Optimizing-the-Grid-2017-1.pdf
2. Nagarajan, Adarsh and Yochi Zakai. 2022. *Data Validation for Hosting Capacity Analyses*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A40-81811. https://www.nrel.gov/docs/fy22osti/81811.pdf
3. Giraldez, J. (n.d.). *Advanced Hosting Capacity Analysis*. Solar Market Research & Analysis. National Renewable Energy Laboratory. https://www.nrel.gov/solar/market-research-analysis/advanced-hosting-capacity-analysis.html

RELATED NARUC EVENTS & OPPORTUNITIES

- NARUC members-only Regulators' Roundtables on DER Interconnection Processes
  Sept. 14 and Oct. 24, 2022
- NIST Smart Grid interoperability technical assistance
  see Jeff Loiter for FY23 opportunities
- NARUC Grid Data Sharing Collaborative
  framework for demo in Spring 2023



NARUC Grid Data Sharing Collaborative

Ultimate Outputs:

- Summary of PUC dockets on grid data sharing (2022)
- Framework for grid data sharing that each state can later tailor to their goals and priorities (Spring 2023)

Problem

Lack of a framework for adjudicating interests among utilities, DER developers,
and others re: sharing power system “grid data”

Participants

- Utility commissions
- Utilities
- DER / technology providers
- Cybersecurity experts

Process

- Three invite-only workshops in May, Sept, Jan
- One role play / simulation framework demonstration prior to release

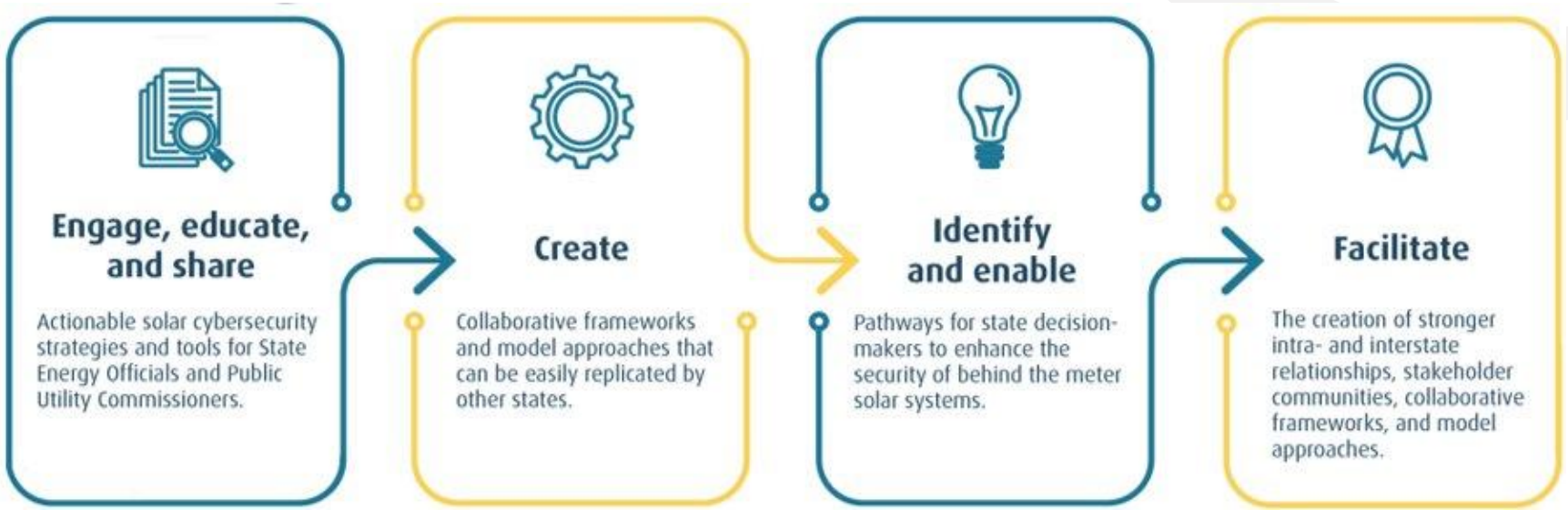
Use Cases

- DER Interconnection
- Fleet Electric Vehicle Siting & Charging
- Enabling DER Management and Utilization
- Distribution System Planning

Cybersecurity Advisory Team for State Solar (CATSS)

Goals:

- **Convene** State Energy Office Directors and Public Utility Commissioners to identify challenges, priorities, and mitigative actions in addressing solar cybersecurity issues
- **Enable** critical strategies and solution pathways for state decision-makers to enhance the security of solar systems
- **Facilitate** the discussions between state officials and solar and cybersecurity experts to create new relationships
- **Create** collaborative frameworks and model approaches that can be easily replicated by other states



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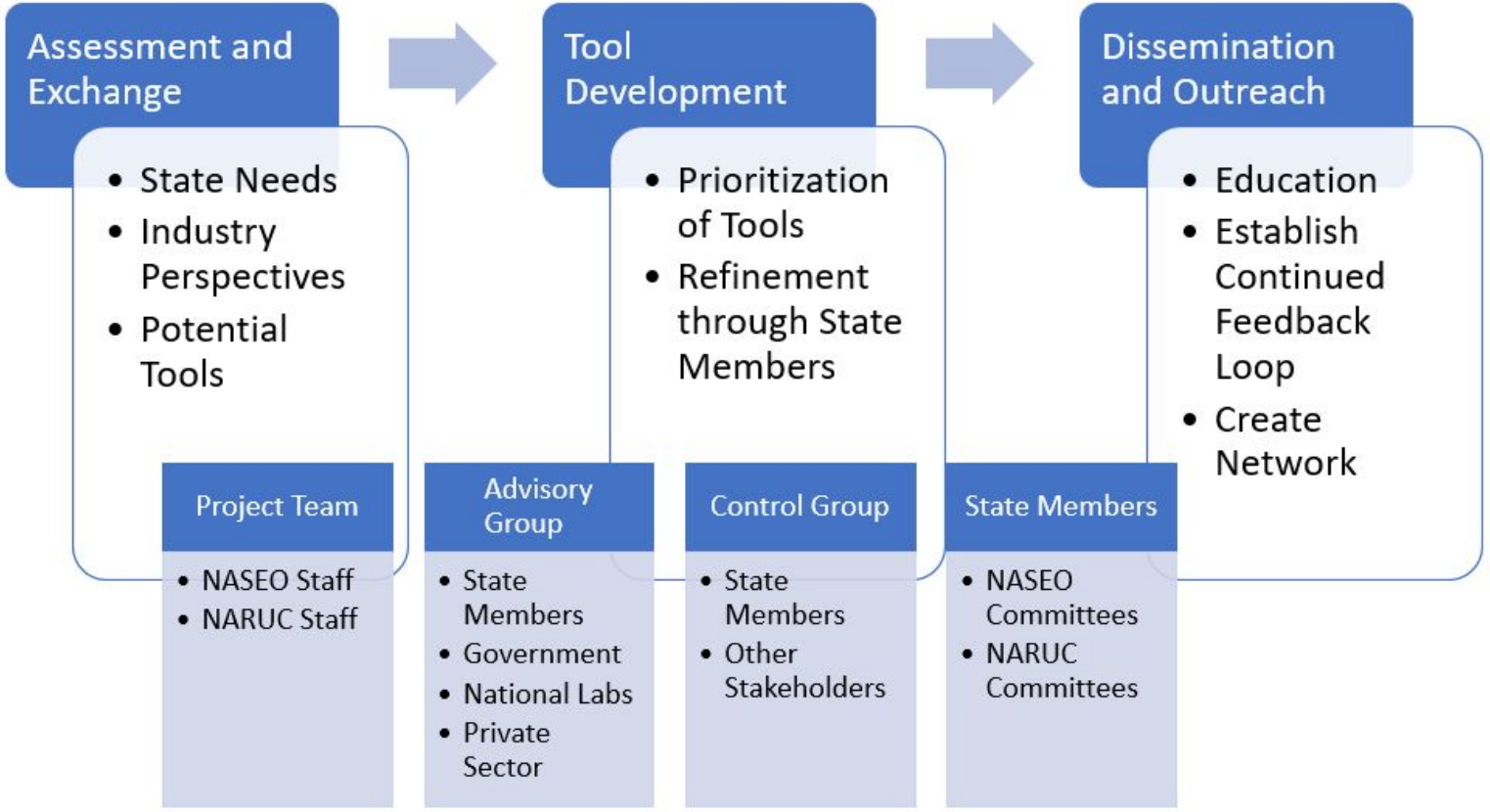
CATSS Project Steps and Participants



National Association of State Energy Officials

BREAK

Return at 11:00AM

https://bit.ly/DERICWorkshop_Day2

National Association of State Energy Officials

Session 2A: Effective Practices in Hosting Capacity Analysis

Shay Banton, DOE

NASEO
National Association of State Energy Officials

LUNCH

Return at 1:00PM

https://bit.ly/DERICWorkshop_Day2

NASEO
National Association of State Energy Officials

Session 2B: Screening Criteria Options

Shay Banton, DOE

National Association of State Energy Officials

Session 2C: 1547-2018 Adoption Decisions

Michael Ingram, NREL

David Narang, NREL

NASEO
National Association of State Energy Officials

Journaling & Collaborative Discussion

BREAK

Return at 3:25PM

https://bit.ly/DERICWorkshop_Day2

Session 3: State Action Planning

Danielle Sass Byrnett, NARUC

Jeff Loiter, NARUC

Kirsten Verclas, NASEO

https://bit.ly/DERICWorkshop_Day2

National Association of State Energy Officials

WRAP UP & FEEDBACK

Day 1 Slides: https://bit.ly/DERICWorkshop_Day1
Day 2 Slides: https://bit.ly/DERICWorkshop_Day2

National Association of State Energy Officials

Thank you for attending!

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