

# ***Is the Grid Ready: Preparing for Solar***

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**NY Solar Summit 2015**

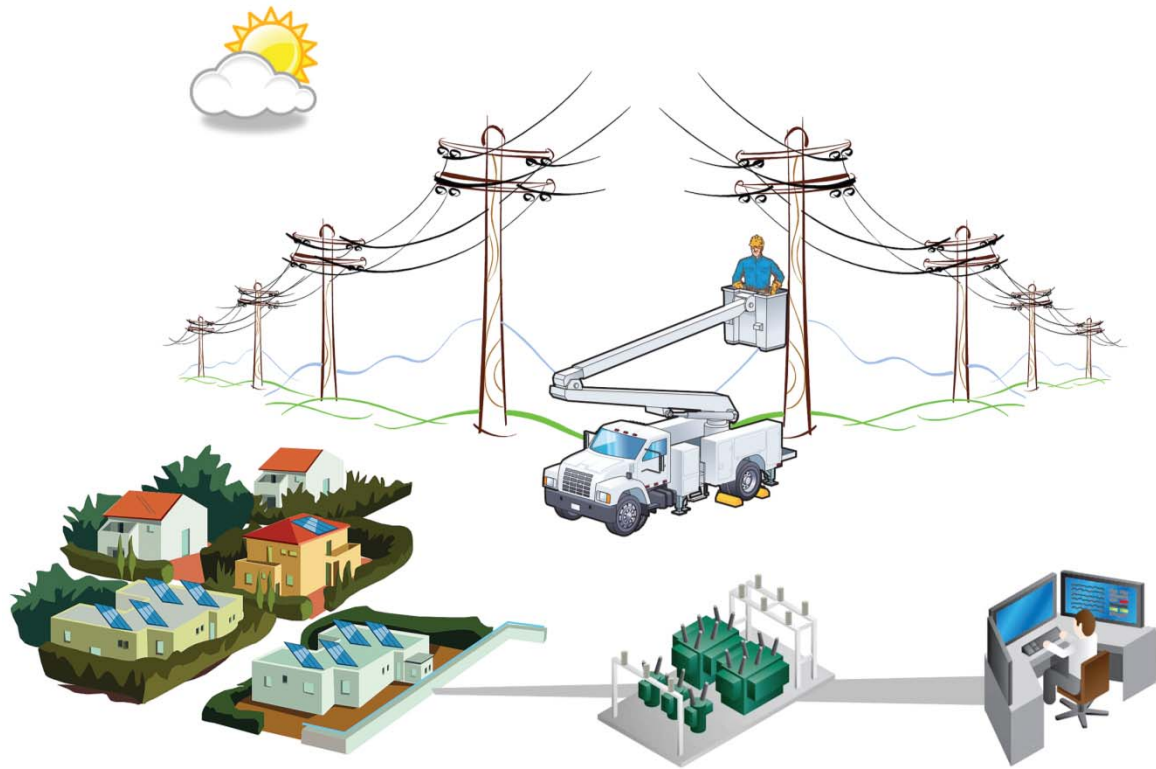
**Sustainable CUNY and  
John Jay College , NYC**

**June 10, 2015**

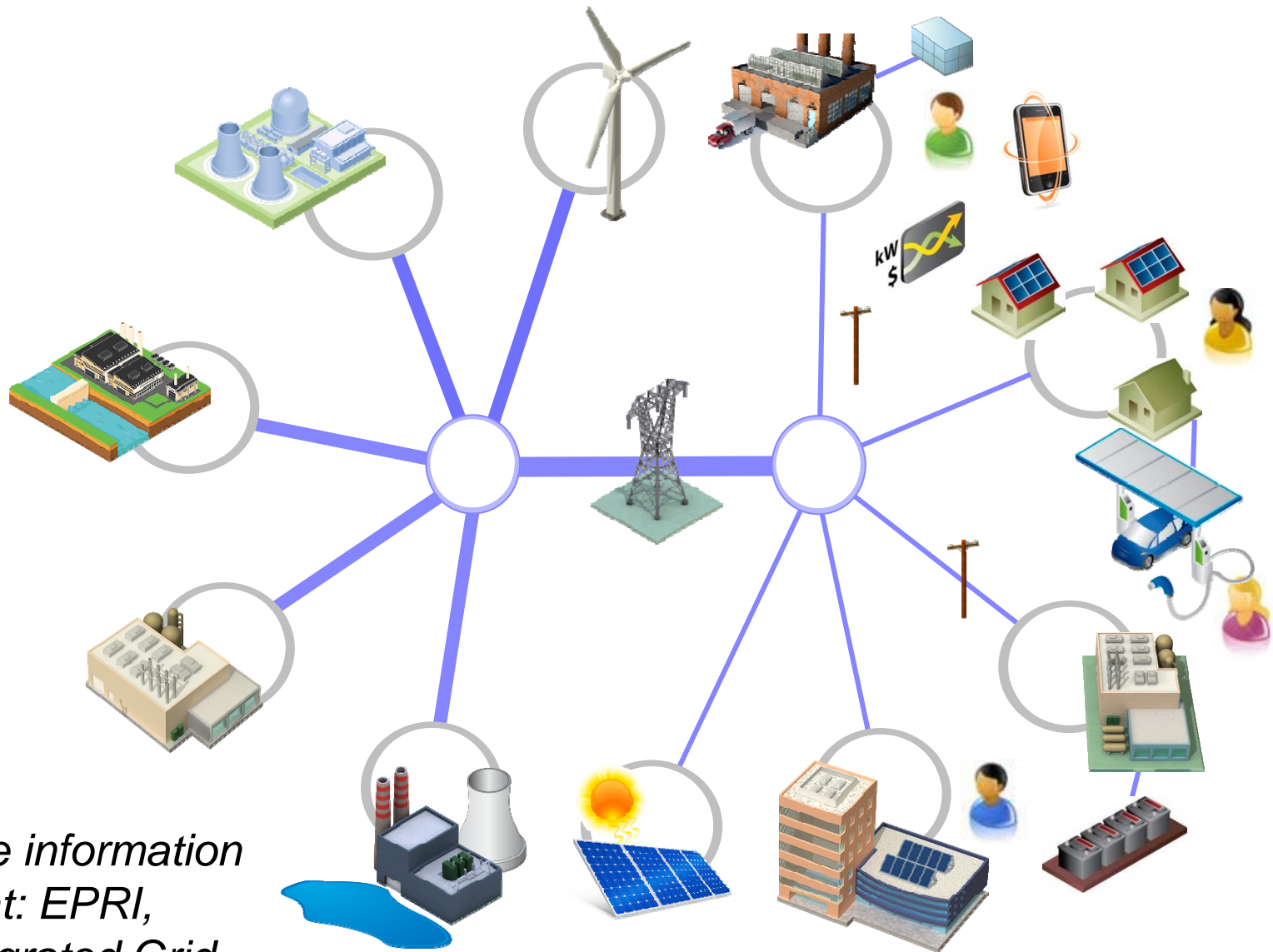


# Agenda: Preparing the Grid for Solar

- Making best use of grid “Hosting Capacity”
- Zeroing in on smart inverter settings
- Streamline PV-grid study methods in analysis tools
- Improve methods to include any DG in system-wide grid planning



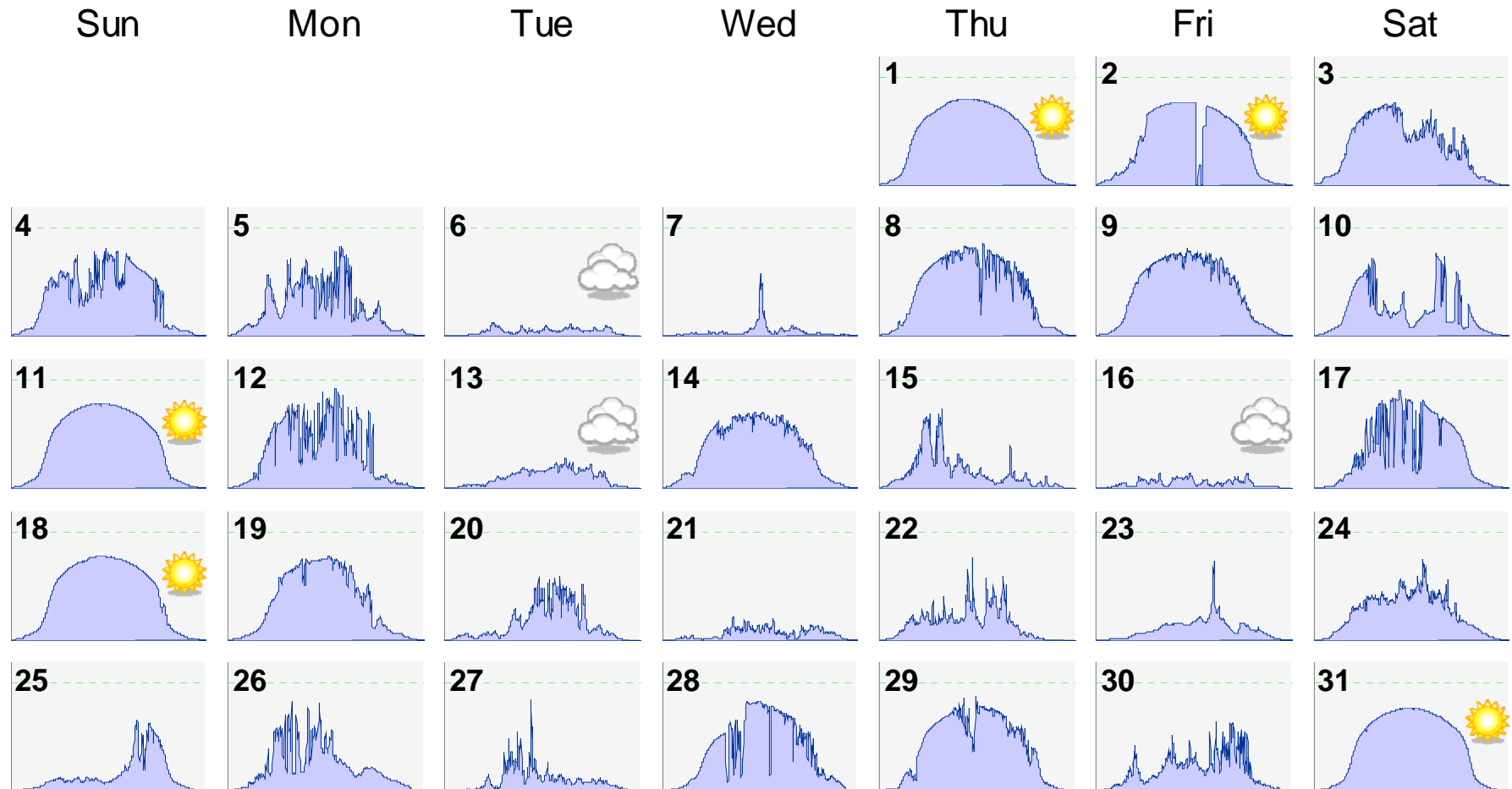
# Changing Landscape: An Integrated Grid is a Better Grid



*For more information  
on-line at: EPRI,  
The Integrated Grid*

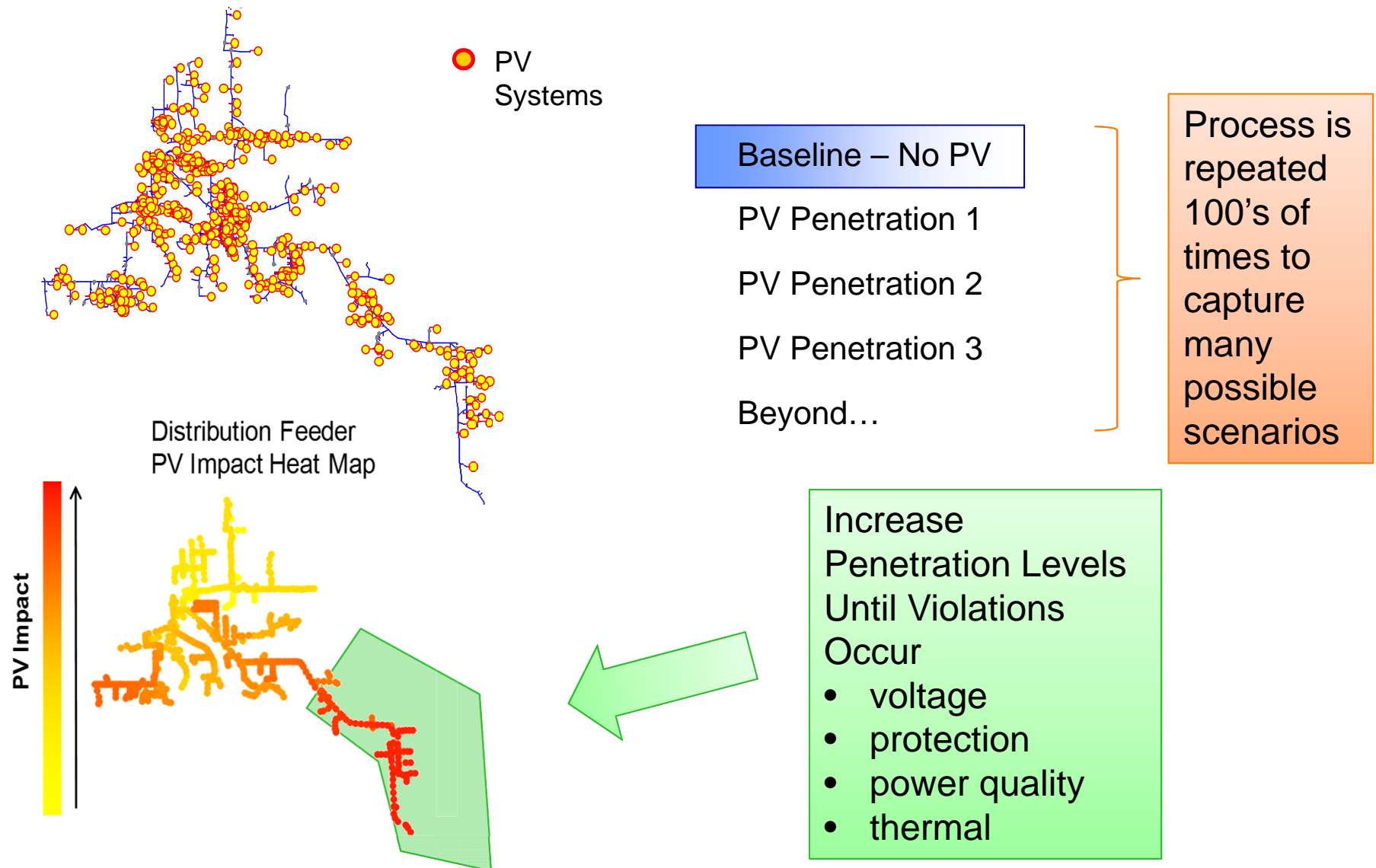
# Analysis tools need to consider realities of PV generation

## December 2011: Tennessee 1MW PV System Power



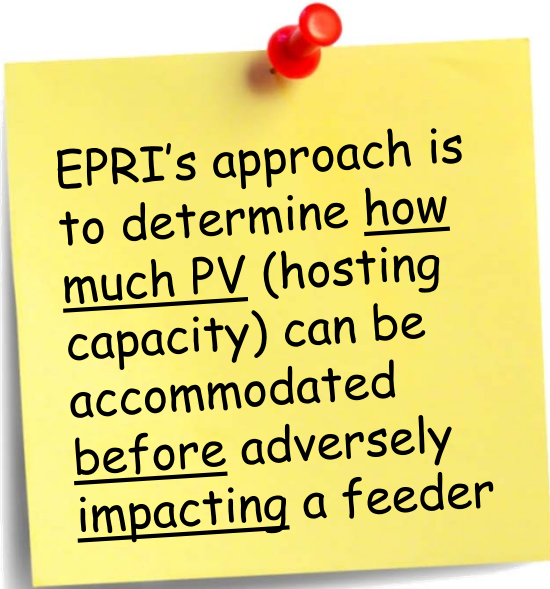
Calendar profiles are 1-minute averages derived from 1-sec data

# Individual feeder PV “Hosting Capacity” is important





# How much PV can the existing grid host?



EPRI's approach is to determine how much PV (hosting capacity) can be accommodated before adversely impacting a feeder

*EPRI White Paper summarizing ~ 5 years of research on the Integration of DER.*

**Search “Title, EPRI and 3002004777”**

## Distribution Feeder Hosting Capacity: What Matters When Planning for DER?

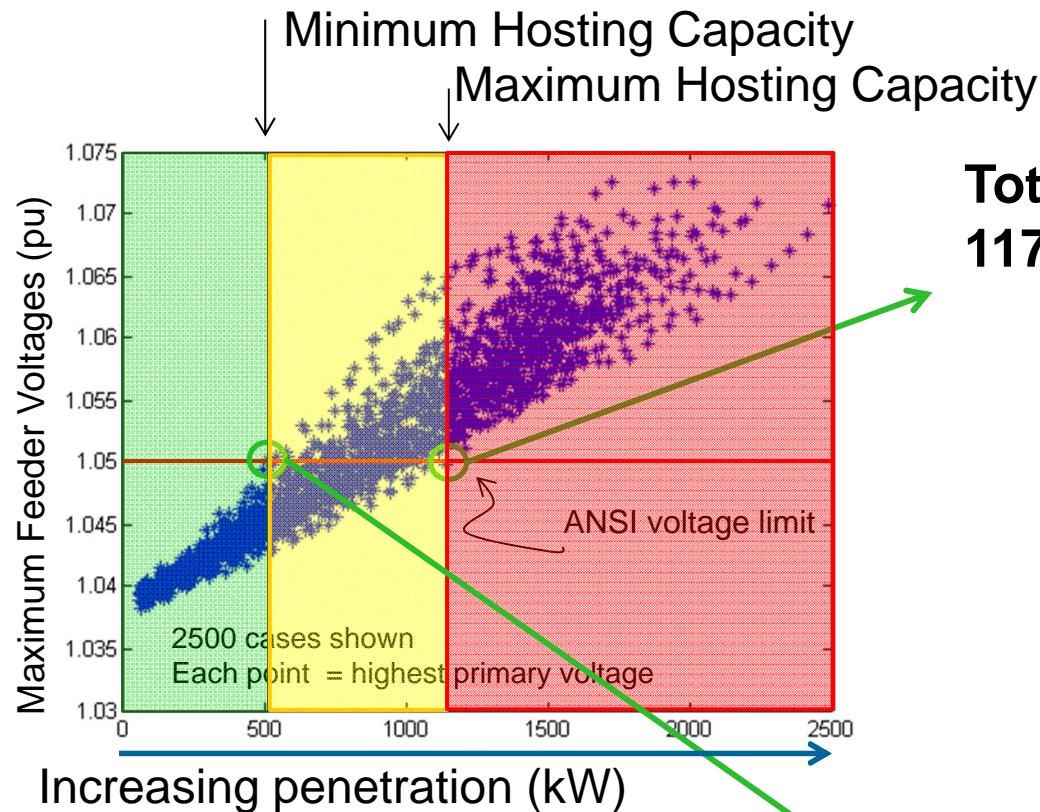
April 2015

### What matters most?

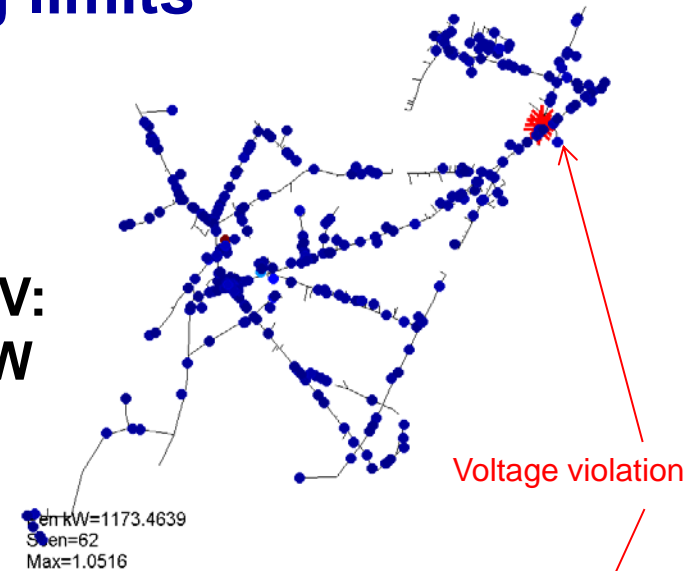
- DER technology
- DER size and location
- Feeder construction and operation



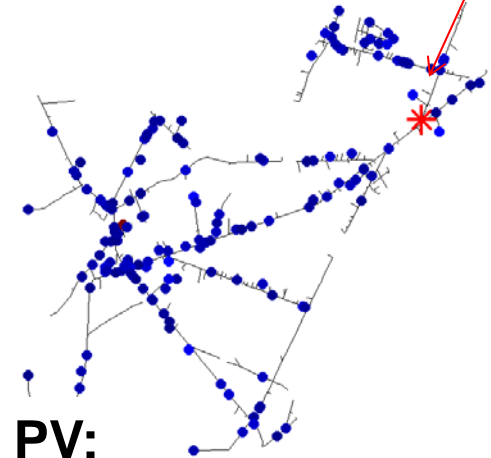
# Example: Overvoltage related hosting limits for a selected feeder



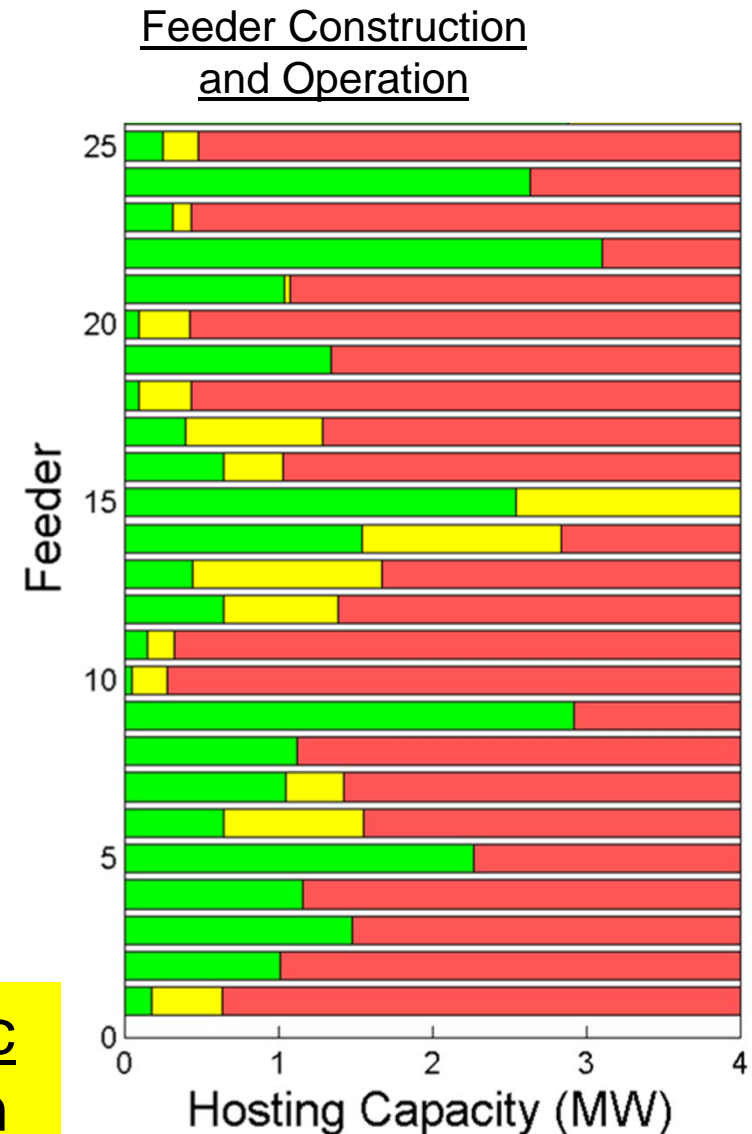
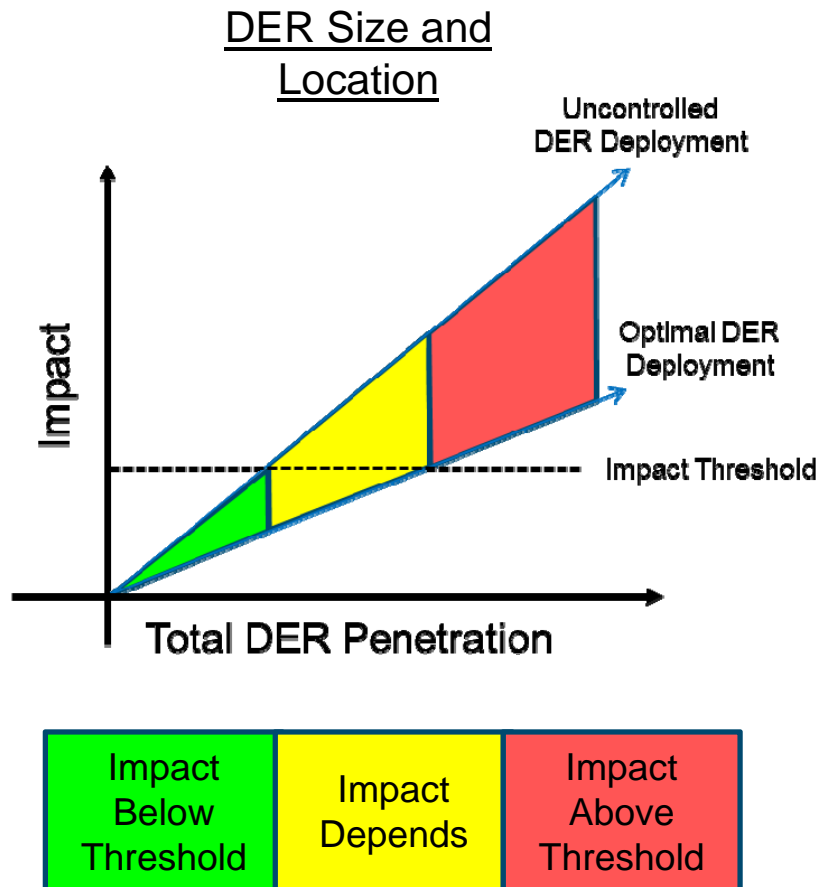
**Total PV:  
1173 kW**



**Total PV:  
540 kW**



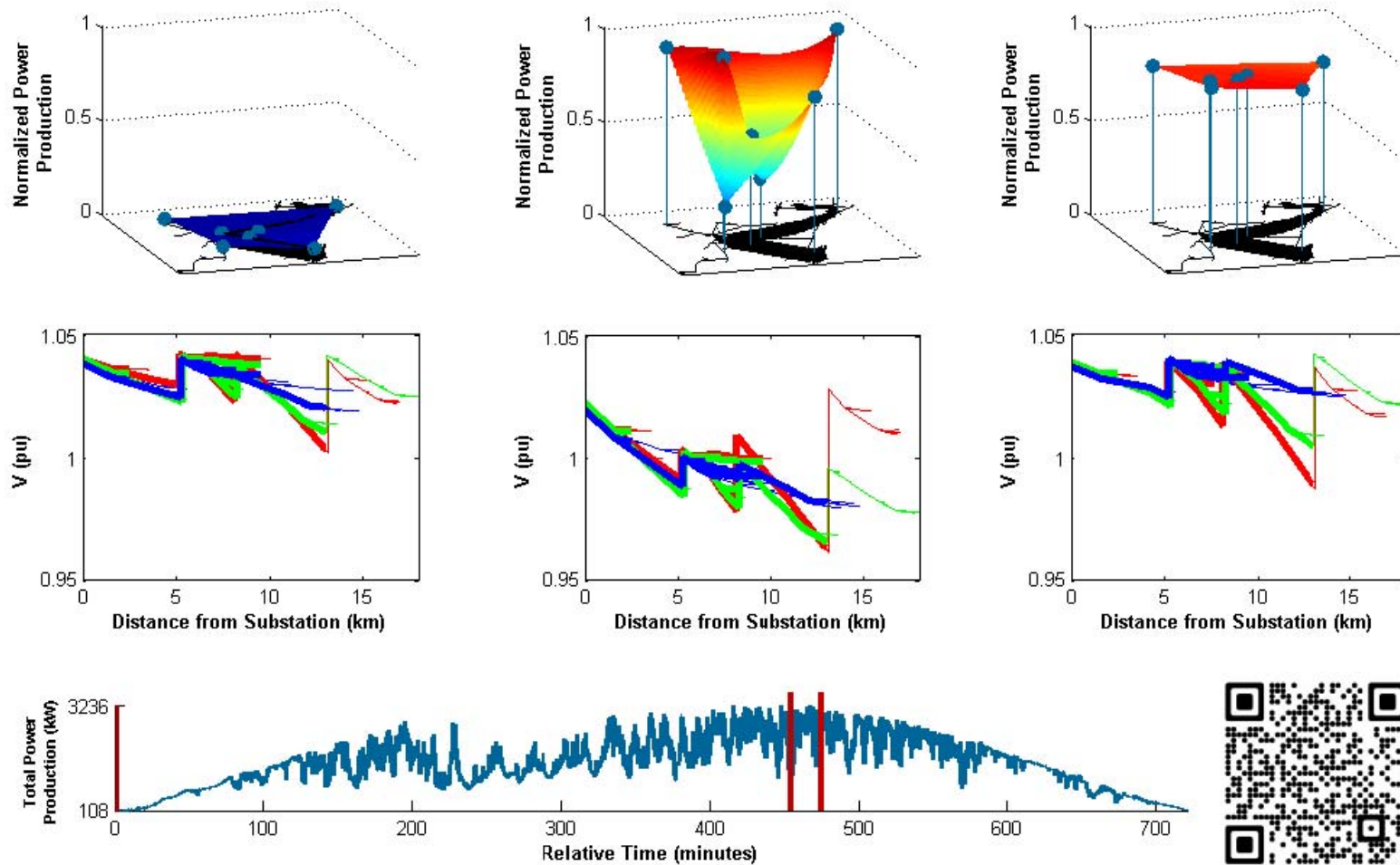
# Challenge: Each Feeder has unique response to PV



EPRI supports “**OpenDSS**” a public software for research and education

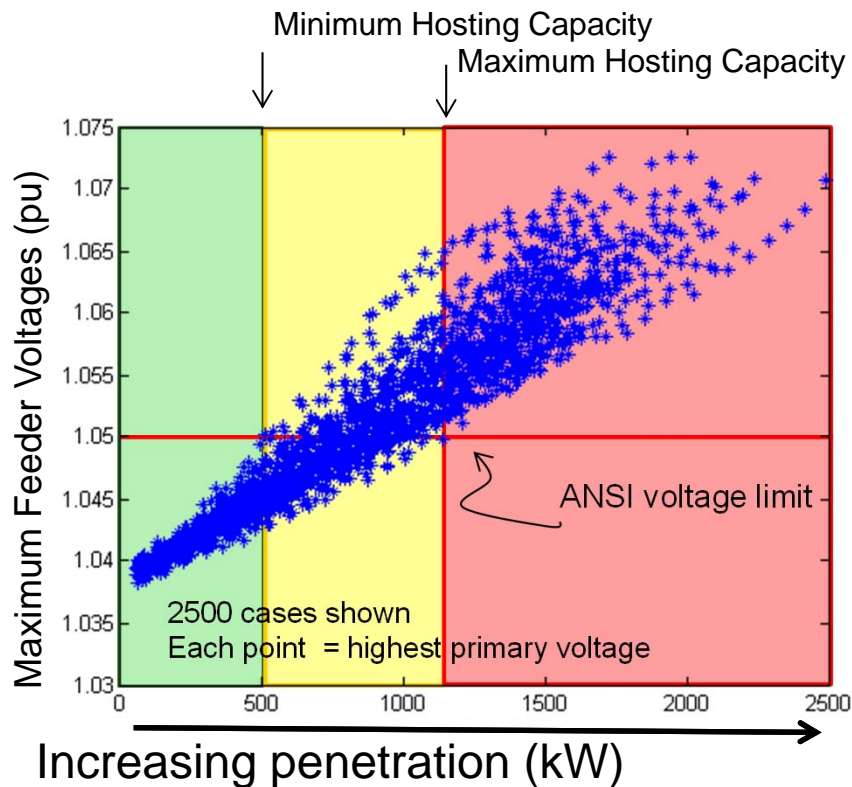


# Spatial- and time-based feeder with PV demo

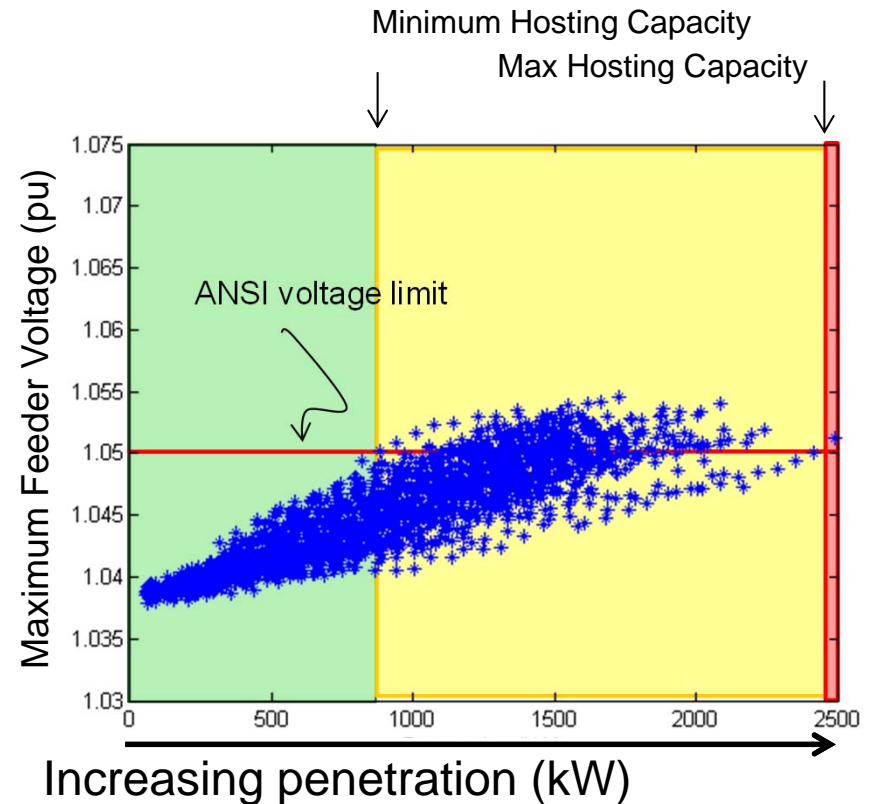


# Inverter grid support makes a difference

## PV at Unity Power Factor



## PV with Volt/var Control

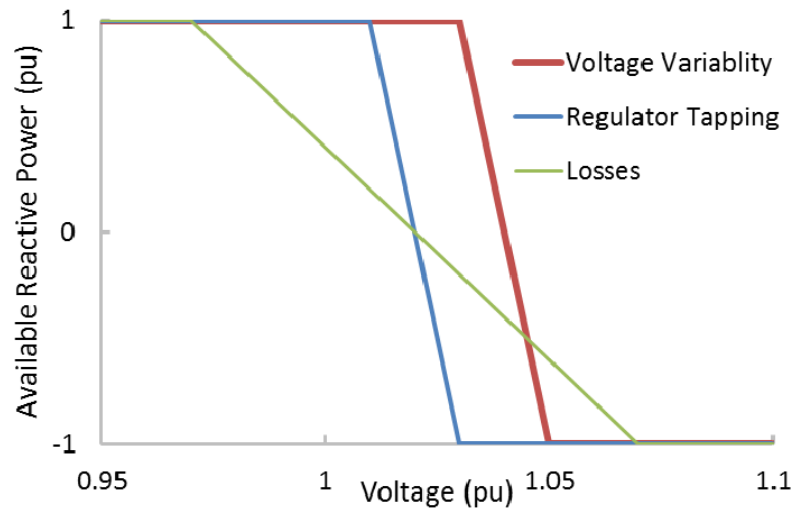


No observable violations regardless of PV size/location

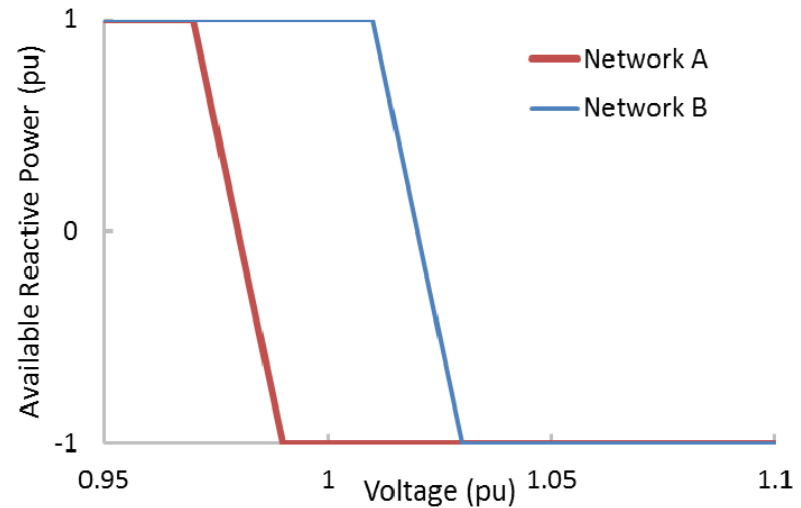
Possible violations based upon PV size/location

Observable violations occur regardless of size/location

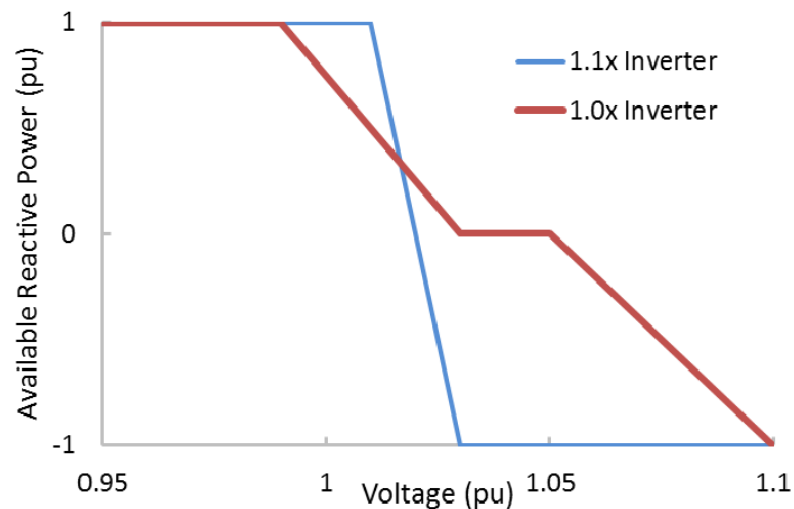
# Best settings for inverters vary.... it depends



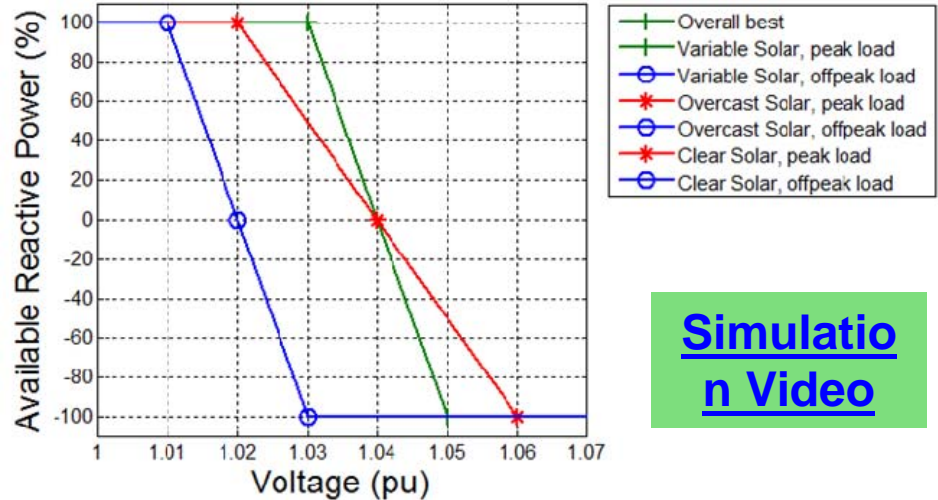
depend on performance objective



depend on feeder characteristics



depend on inverter sizing



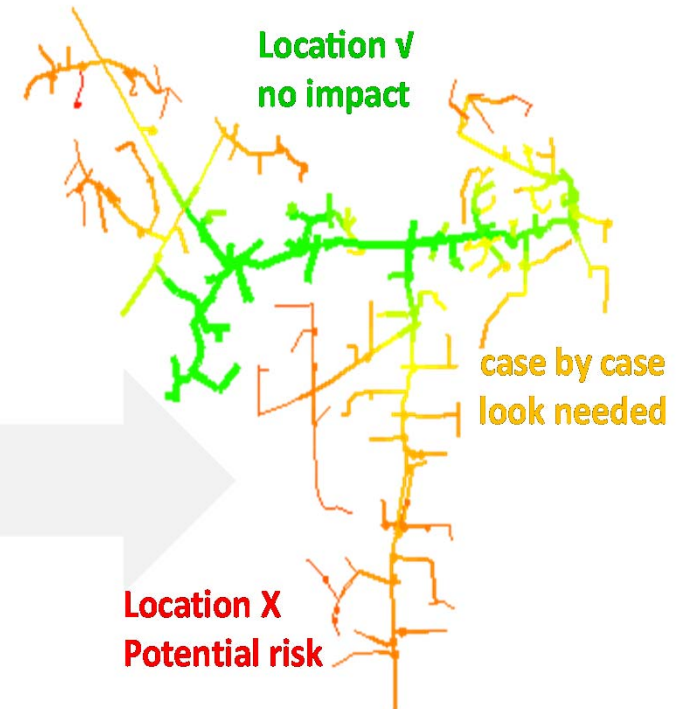
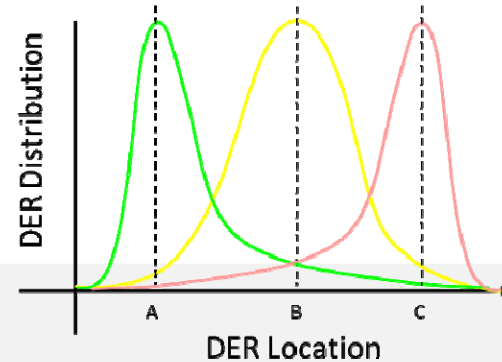
[Simulation Video](#)

depend on load & solar profile

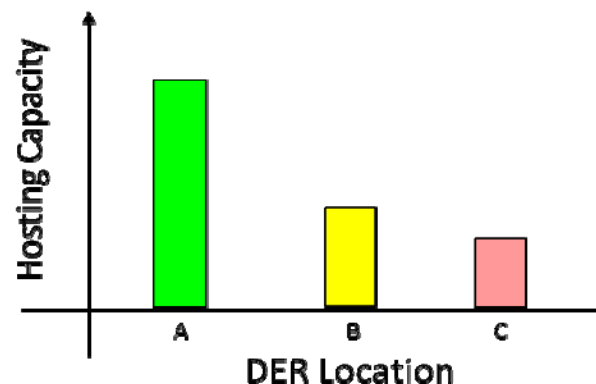
# Moving from research methods to everyday utility analysis tools



## Apply Methods



**Get Data**  
(e.g. from in  
CYME, Milsoft,  
Synergi, DEW)



## Show Output

Details on Streamlined Method: [EPRI Report 3002003278](#)

# Extending method to system-wide planning for DER

- Hosting capacity analysis is a first step...

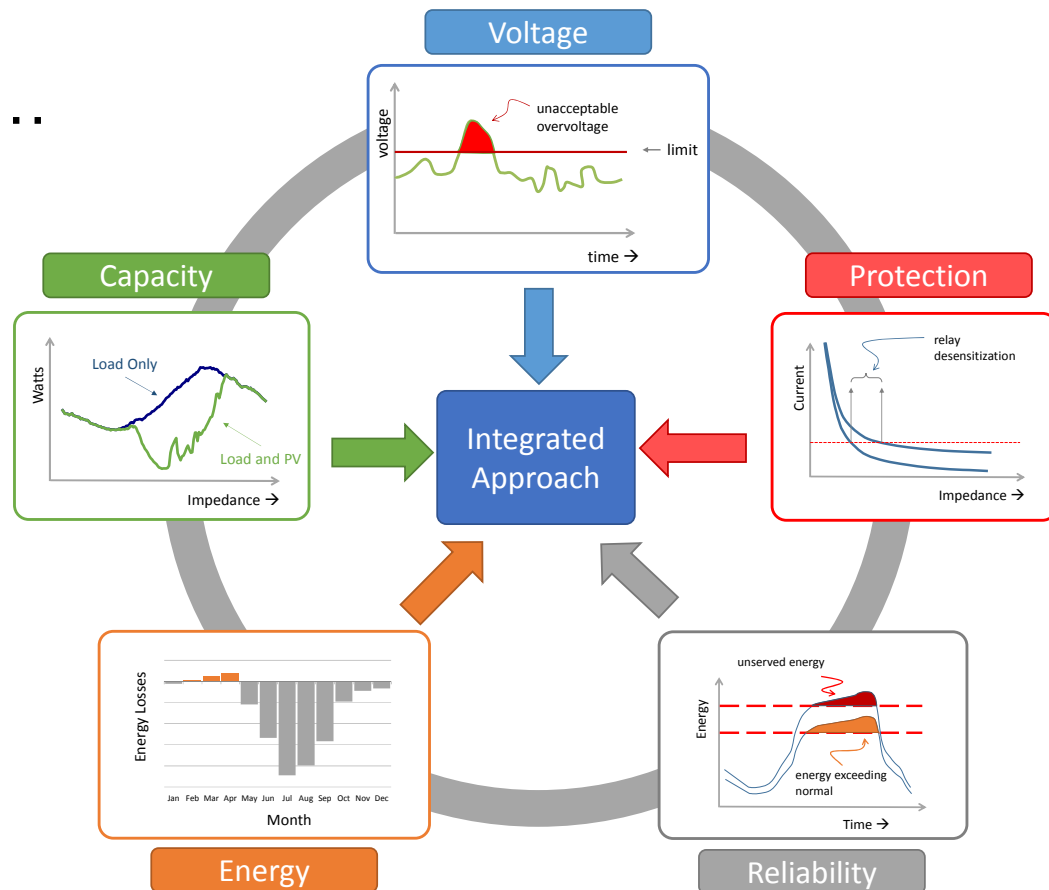
- Thermal Capacity Analysis

- Deferral of system upgrades
- Loss of life

- Energy Analysis

- Distribution losses
- Energy consumption

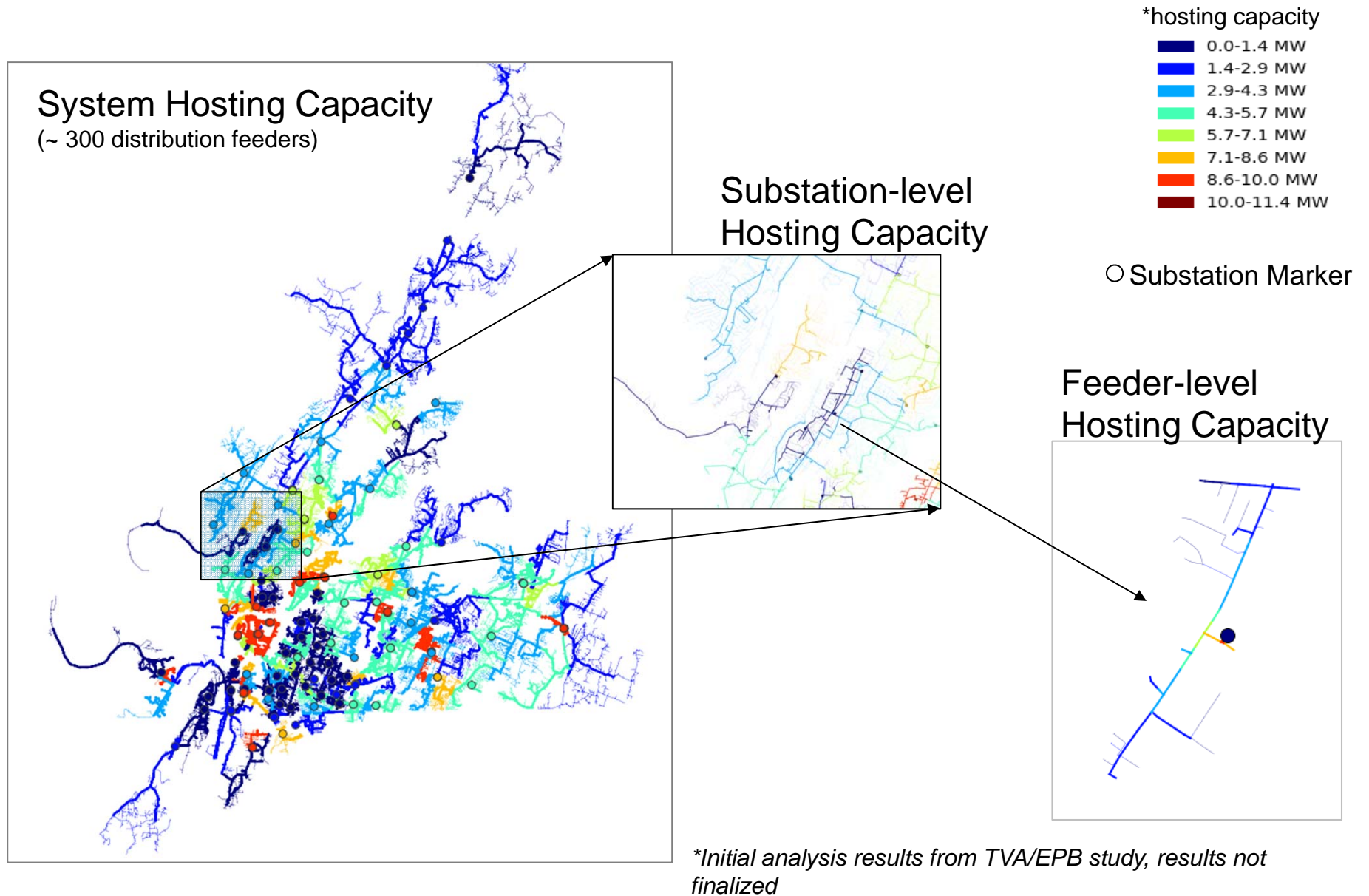
- Cost/Benefit Analysis



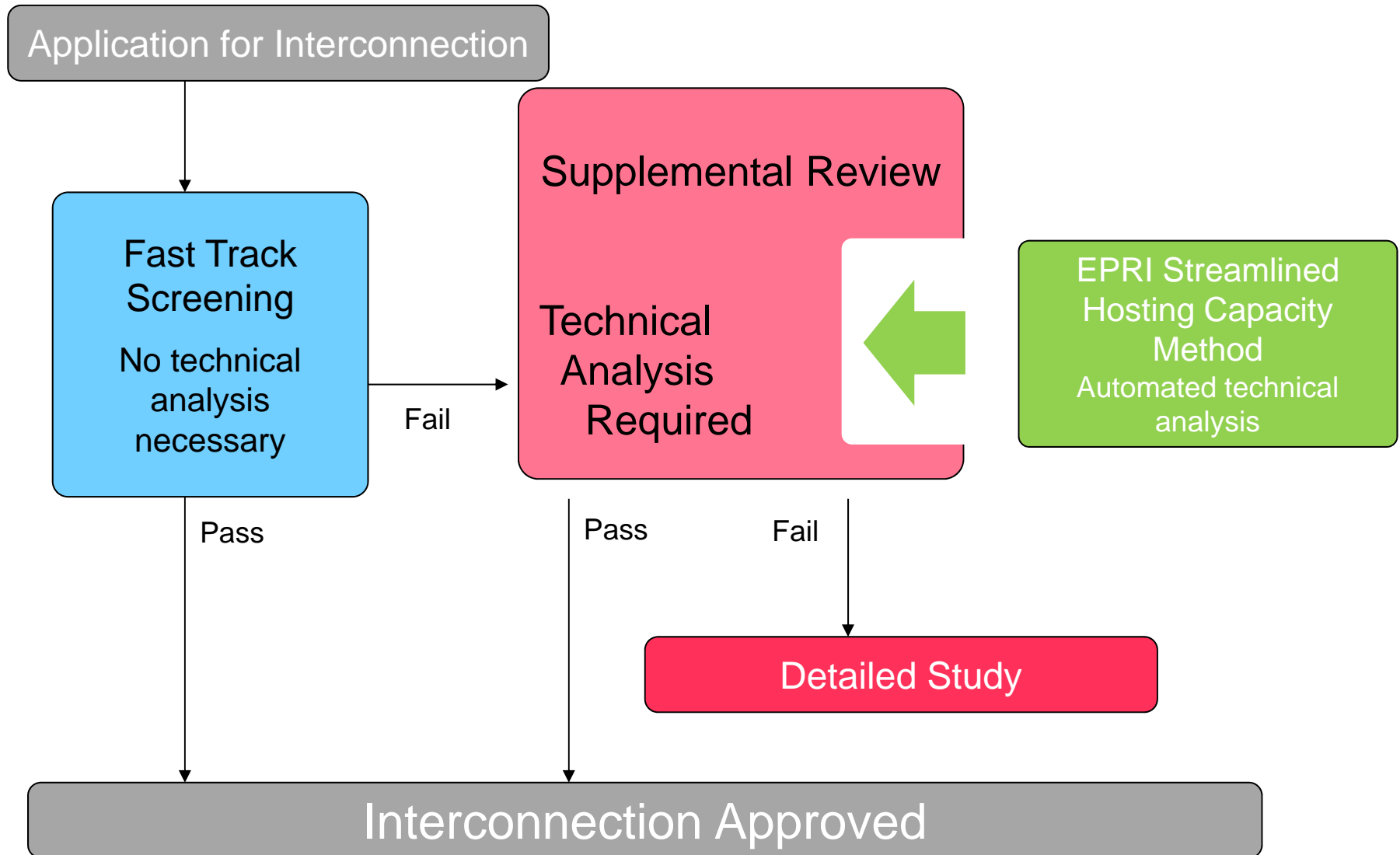
For more information Contact Bruce Rogers,  
423-341-4606 [brogers@EPRI.com](mailto:brogers@EPRI.com)



# Sample from EPB serving Chattanooga, TN



## Potential: More automated technical screening coordinated with longer-term distribution planning





## Together...Shaping the Future of Electricity

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[tkey@epri.com](mailto:tkey@epri.com)