Transmission Perspective on Interconnection Rule Issues

vermont electric power company

VELCO

Deena Frankel,
Facilitator

Scott Harding,
Operations Engineer

Topics

- Visibility and control from a transmission perspective
- Why “real-time” data matters
- VELCO’s challenges posed by lack of visibility
- GMP’s challenges posed by lack of visibility
- Data options: what is “good enough”
  - Potential role of Vermont Weather Analytics Center

“Visibility” from VELCO’s perspective means knowing what is installed and how it is operating

Guiding principles: what VELCO seeks to achieve

1. Maintain reliable grid operation and compliance with FERC, NERC, NPCC standards
2. Maximize integration of renewables
3. Assure renewables are fully “counted” in regional planning and operations

1 What do we need for reliable operations?

- Knowledge of what is installed and operating on the system and where
- Real-time data on resource output for larger resources and AMI level data below some threshold

2 What do we need for integration?

- Same as above plus effective screening in pre-application & permitting regarding the ability of the interconnecting system to handle additional generation

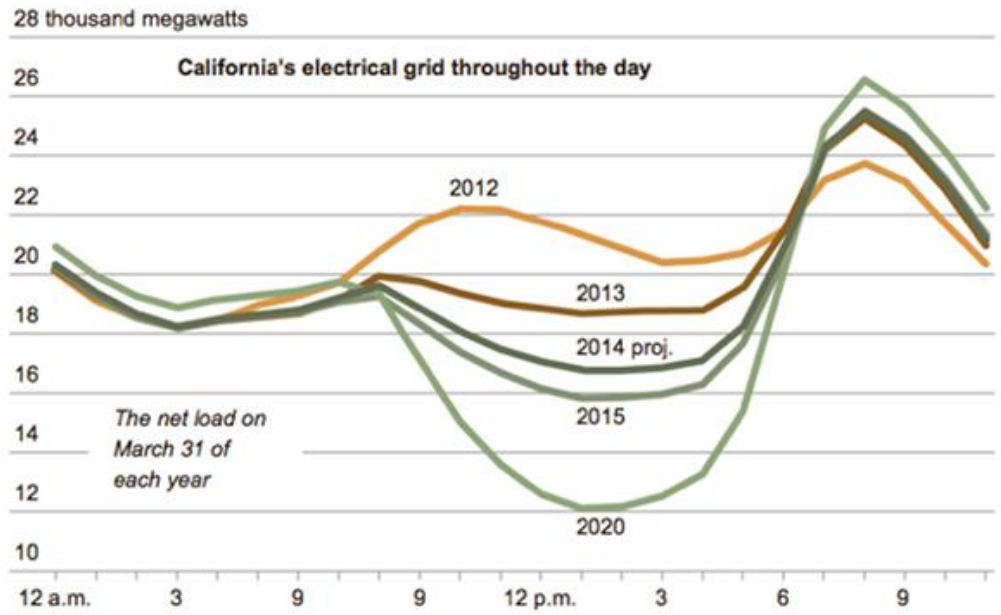
3 What do we need for maximum value to VT?

- Reliable historical, operational and policy data. Without good data demonstrating the installation, availability and reliability of DER, ISO and VELCO Operations will tend to make conservative assumptions that discount its value since small-scale DER is not visible to ISO nor VELCO
- **Conservative assumptions equate to increased cost**

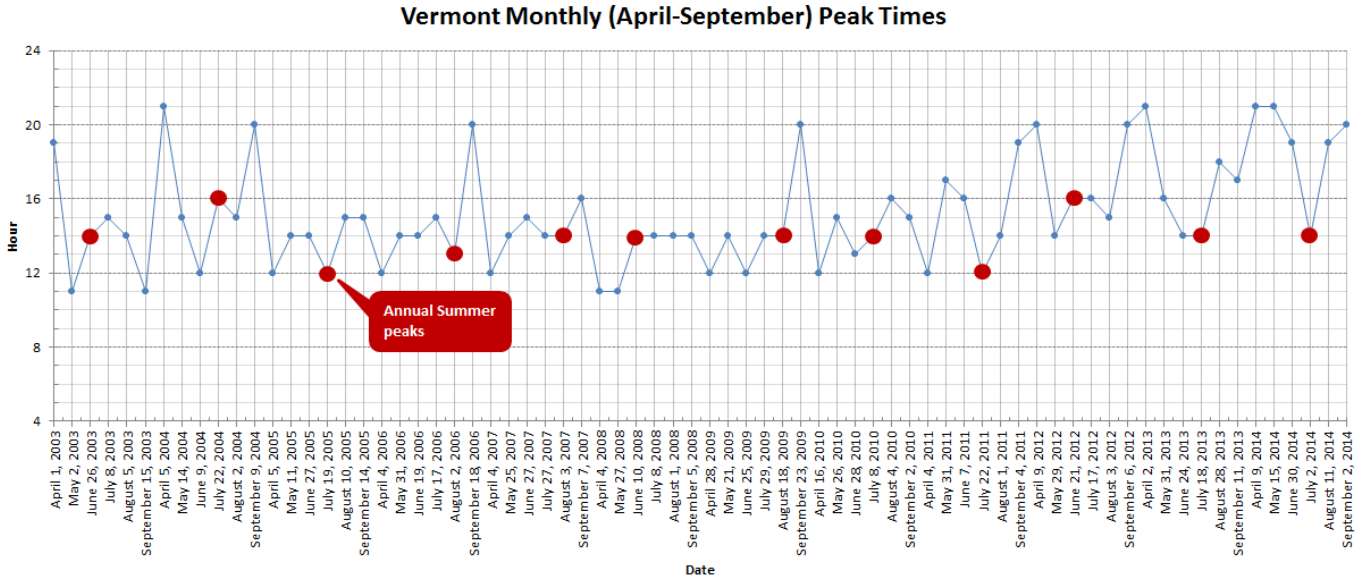
“Control” from VELCO’s perspective

- Control issues—ability to curtail or limit DER for protection, safety, system operations, maintenance, emergencies—are primarily DU matters as the resources in question are interconnected at the distribution level
- VELCO would not expect to control/curtail resources that are not visible to ISO-NE, however, large amounts of small-scale DER may lead to curtailment of larger resources where a region has reached the limits of ability to integrate additional generation, e.g., NEK
  - Public policy question regarding who should bear the cost of infrastructure upgrades needed to meet goals for renewables

Why does "real-time" data matter?



Source: CalISO



VT's peak, on average, is moving later in the day as solar penetration increases

How VELCO's challenges differ from DUs

- **All** stakeholders share some shared challenges
  - Lack of a readily accessible database of resource (technology, nameplate), status (permitted, installed, operating), and performance
  - Electronic filing system is designed for a different purpose
- VELCO specific
  - DUs have access to resource-specific data through their interconnection relationship that VELCO lacks and needs
  - VELCO needs a flow of data about DER output to our Energy Management System, aggregated at interface between distribution and subtransmission
  - Some meter data restricted by utility policy, e.g., BED
    - May become a barrier for VT Weather Analytics Center if granular forecasting substitutes for real-time data of smaller resources
  - VERY significant challenges with lack of reliable meter data transmission for SPEED and some QF

DU perspective: Importance of DG visibility for adequate system operation

- Distribution system must be designed to handle bi-directional peak load
  - DG can mask the actual amount of retail customer load as seen by GMP*. The “real” peak power flow that could occur with sudden loss of DG or sudden loss of load (for high DG) could exceed system capabilities.
- System operators must be prepared for all possible combinations for DG production and load situations
  - Requires real time exchange of information (MW, MVAR, voltage) given load profiles can vary drastically
  - Advanced monitoring and control (voltage profiles and reactive power)
  - More difficulty managing load transfers between circuits
  - Power actually flows up onto the higher voltage system
    - More limitations on sectionalizing subtransmission without added investment (load break capability on airbreaks) which directly impacts reliability
  - Necessary for efficient scheduling of dispatchable resources (i.e.hydro)
- Troubleshooting system problems
  - Voltage variations/thermal limitations
  - Distribution System Protection (trips on load/miscoordination)

– * Example: 3 MW of actual customer load would only appear to GMP as 2 MW of (net) load if there was 1 MW of DG in operation.

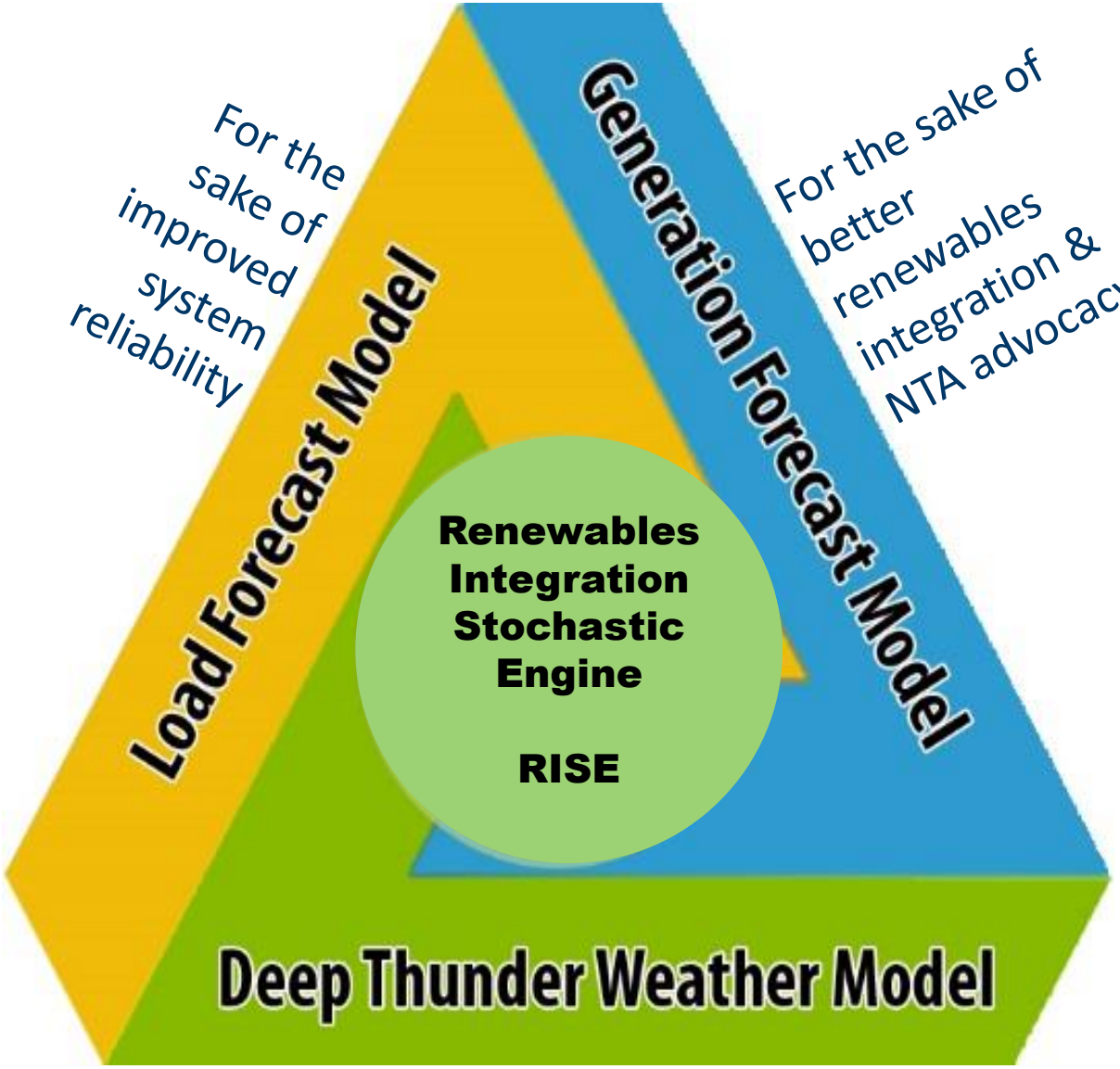
Data: What is “good enough”

- **Ideal**: real-time data
- **Reality**: real-time=real $$
- Alternative:
  - Real-time SCADA data above X kW?
  - AMI data coupled with best available forecasting tools for projecting resources below X kW
    - Vermont invested in AMI in part b/c it promises this kind of application. Let’s use it.
  - Should this proceeding set a uniform, statewide X?

VELCO IBM Partnership

VT Weather Analytics Center

RISE component to optimize Vermont's generation, demand response and transmission resources.



For the sake of enhanced storm response