
VERMONT WEATHER ANALYTICS CENTER PROJECT

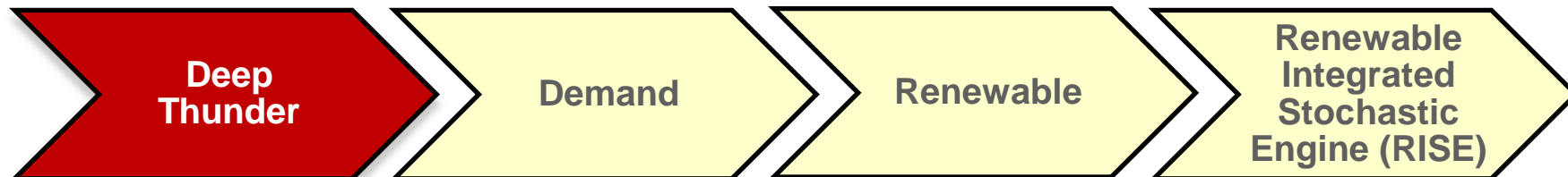


Project cost; Deep Thunder model

Cost Update

- Actuals to date: \$10.3M. Project forecasted to come in at baseline estimate with approved contingency of \$0.5M used, totaling \$13.6M

VTWAC Model Suite



Developments

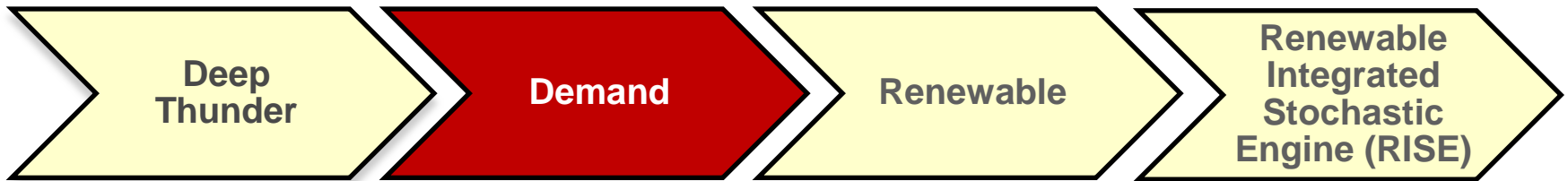
- Forecast available 90 minutes sooner
- Weather workshop held November 3rd at the State Emergency Operations Center (SEOC) in Waterbury
- Implemented daily weather model performance verifications
- 1 km² model domain enlarged by 30 km to the west providing better visibility to weather approaching from New York
- VTWAC portal access provided to VTrans, Agency of Natural Resources, Department of Agriculture, and the Department of Emergency Management and Homeland Security.

Next steps

- Extend forecasts to 72 hours providing more lead time for storm events and longer duration renewable energy and demand forecasts
- Incorporate additional web portal customizations and feature requests

Demand model

VTWAC Model Suite



Developments

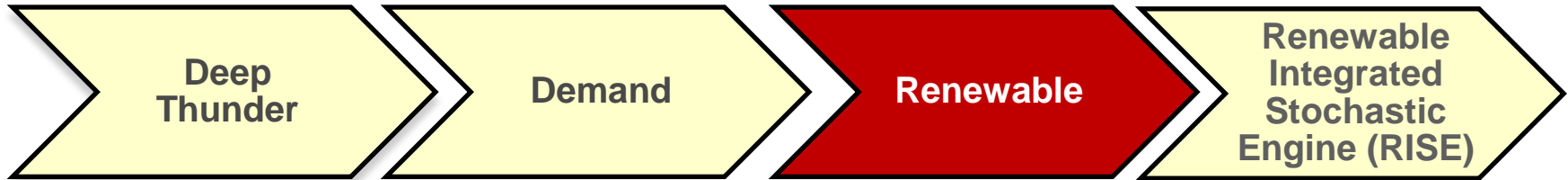
- Deployed additional models for VPPSA's 12 Members
- Incorporated hourly information of state load providing closer to real-time information on the portal
- Automated ingestion of GMP and VEC AMI data
- Improved mean absolute percentage error (MAPE):
 - State: 1.6%, Distribution Utilities: 2-3%,

Next steps

- Extend forecasting period to 72 hours
- Deploy additional models for Stowe Electric Department
- Continue development of bidding use case
- Review new use cases developed using integrated AMI data

Renewables model

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Developments

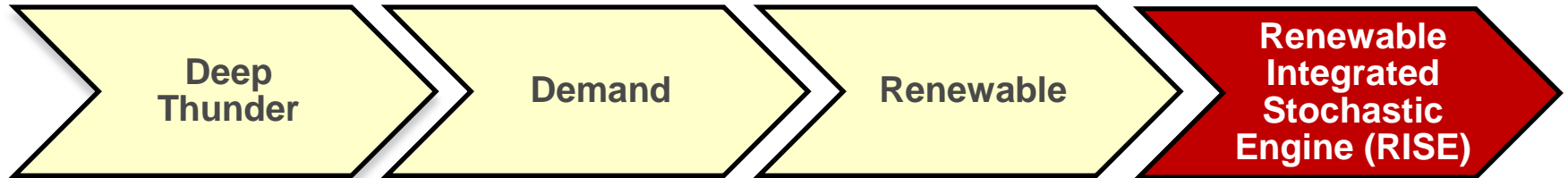
- Data feeds created for Georgia Mountain and Sheffield wind farms.
- Added data from SURFRAD station at Post Road to analyze irradiance forecast independent of PV equipment
- Developed approach for improving solar forecast accuracy, currently being testing for one farm

Next steps

- Provide visualizations for Georgia Mountain, Sheffield, and Searsburg wind farms
- Develop additional information for ISO-NE for review and discussion
- Secure detailed analysis of solar and wind farm model performance

RISE model

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Developments

- Completed RISE analytics engine
- Coordinating work with EMS team on OSI cutover
- Developing automated export of EMS data
- Completed RISE visualizations; IBM completed a test output demonstration

Next steps

- Demonstrate Stochastic Contingency Analysis for VELCO Operations
- Implement automatic data-feeds

Delivering Value

- Initial feedback from our owners and state agencies identified key benefits and use cases including the following:
 - Safety/Reliability: wind chill/heat index, storm information, lightning prediction, targeted customer alerts/weather information, road condition alerts due to expected snow squalls, high winds, flooding, etc.
 - Operations: storm preparedness and response, improved outage scheduling, demand analysis capability to the substation level, impact assessment of distributed energy resources, etc.
 - Maintenance/Construction: ice bridge construction, mat placement, wetland construction, scheduling wind farm maintenance, etc.
 - Planning: improved NTA development, refined assessment of SHEI constraint storage need, DU customer collaboration on solar installations, prospective solar/wind site output assessments, etc.
 - Compliance: Act 56, Interconnection Rule, and Water Quality regulations
 - Demand Management: demand response, peak management, efficiency measures validation, etc.

Next Steps

- Sustainably operationalize the value of the work to date
 - Complete current Joint Development Agreement (JDA) with IBM to secure full value of core work as well as additional use cases
 - Build-out Vermont's High Performance Computing Cluster (HPCC)
 - Secure agreement with UVM/Lyndon State College/VTC
 - Goal: establish greater self sufficiency for ensemble weather forecasting and VELCO/DU application development
- Negotiate proposed follow-on JDA with IBM
 - Scope of work focused on value/use cases provided by VELCO, DUs
 - Requires committed VELCO/DU resource engagement
- Seek to provide Vermont state agencies and businesses data/information of value