# Integral Analytics Advanced DER Forecast & Planning – An Evolving Discipline Spatiotemporal Probabilistic End-Use Scenario Driven

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## **Challenges Facing the Industry**

- Uncertain Demand Patterns EE, DR, Shifting Behaviors (EV, WFH)
- Data Management 8760, scenarios, reporting
- DER Integration Intermittent and variable
- Regulatory Environment Tariffs, incentives, regulations, policies
- Scenario Design New Planning Paradigms and Skills
- Change Management
- Lack of Standards





#### **Advanced DER Forecast & Planning – An Evolving Discipline**

## **The IA Philosophy**

- T&D Has the Most Lose Play Defense
- Marry top-down and bottom-up
- Nodal Analysis and Valuation
- Distributed DER Valuation
- Flexibility in Forecasting and Planning
- Integrate with Data and Systems
- Stakeholder Collaboration
- Assist Change Management





#### **Advanced DER Forecast & Planning – An Evolving Discipline**

## What Goes into the Analysis?

- Statistics Geospatial, Techno-economic
- GIS Mapped Data
- Scenario Design Policies and Regulations
- Probabilistic Forecasting Low, Typical, High
- Statistical End-uses Shape Libraries
- Spatial Disaggregation Agent modeling
- Utility Data

#### **Electric System Planners Impacted Most**



## **Required Tools – 17 Years of Experience Has Shown...**

- Supervised Machine Learning Geospatial Data
- Spatial Load Allocation
- Probabilistic End-use Adoption
- Scenario Design
- Distributed DER Valuation Optimal Location
- Map Management
- Traditional Planning tools Transfers, Capacity

### A Flexible Framework – Integrate with Existing Industry Tools



## **The Framework – Repeatable and Defensible**

- Managing Mapped Data
- Managing the Network/Nodes
- Managing Shapes
- Managing Forecast and Planning Scenarios
- Flexible Data Sources and Reporting

Give the Forecasting Planner a High Degree of Control (Trust)





## **Managing Mapped Data**

- Load Growth Potential Points
- Projects
- Adoption Scoring
- End-use Shapes
- Connectivity
- Metadata





## **Managing a Network**

- Edit a Hierarchy Connectivity
- Node Settings Capacity Limits
- Relationships
- Aggregate Loads/Forecasts
- Disaggregate Load/Forecasts





## **Managing Shapes**

- Library
- Assign to End-use points/services
- Scenarios
- Flexibility

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## **Managing Scenarios**





#### **Spatial Forecast**



## **Flexible Inputs/Output**

Parcel Level Data Macro-Regional **Reports and** Forecasts and APIs IRP Give Users Tools to Manage the Data Parcel-level End-Standard Import Formats Use Power BI Scoring/Forecasts **Reports and APIs** Load Flow, Engineering, **Geospatial Data** CYME/Synergi Financial **Energy and Stats Analysis** Users Control the Normalized Base Plexos/Aurora Load Shapes Narrative



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- Narrow Down the Solution Space
- Planning by Exception
- Planning tools Engineering and Financial

## **Conclusion**

- Use Scenarios to Cover the Risk
- Give Users Tools to Manage the Data
- Give The Forecast Planner a High Degree of Control
- Provide Flexibility



