Integral Analytics

Advanced DER Forecast & Planning – An Evolving Discipline

Spatiotemporal | Probabilistic End-Use | Scenario Driven

darrin.kinney@integralanalytics.com

Last Updated: April ‘23

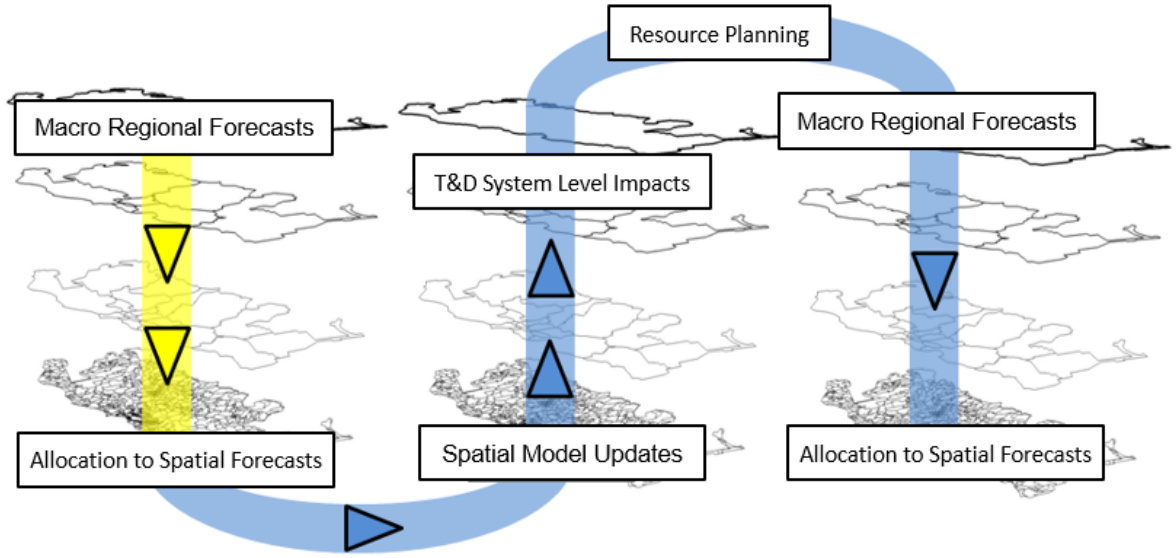
INTEGRAL ANALYTICS

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

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



INTEGRAL ANALYTICS

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

INTEGRAL ANALYTICS

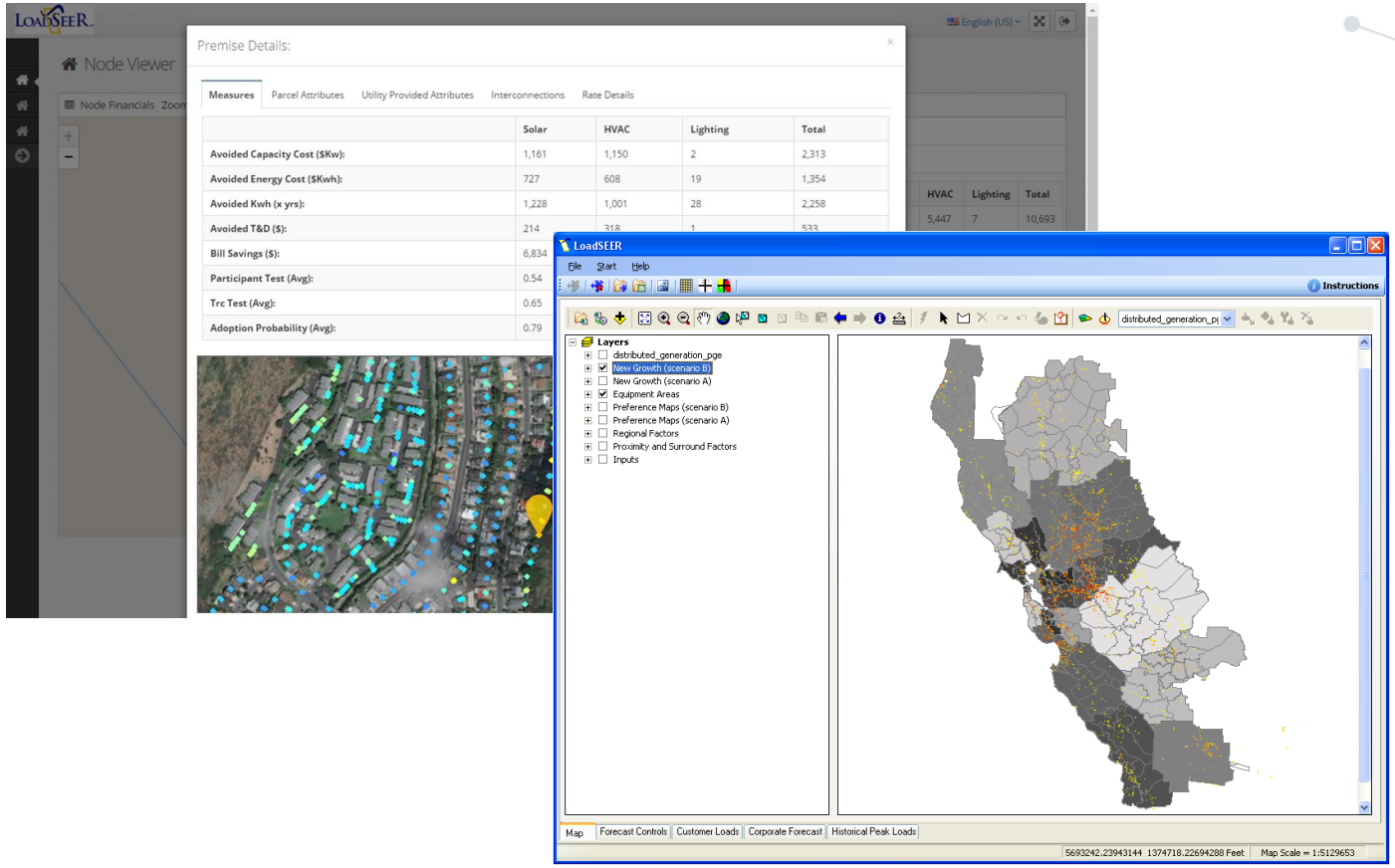
The Framework – Repeatable and Defensible

- 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

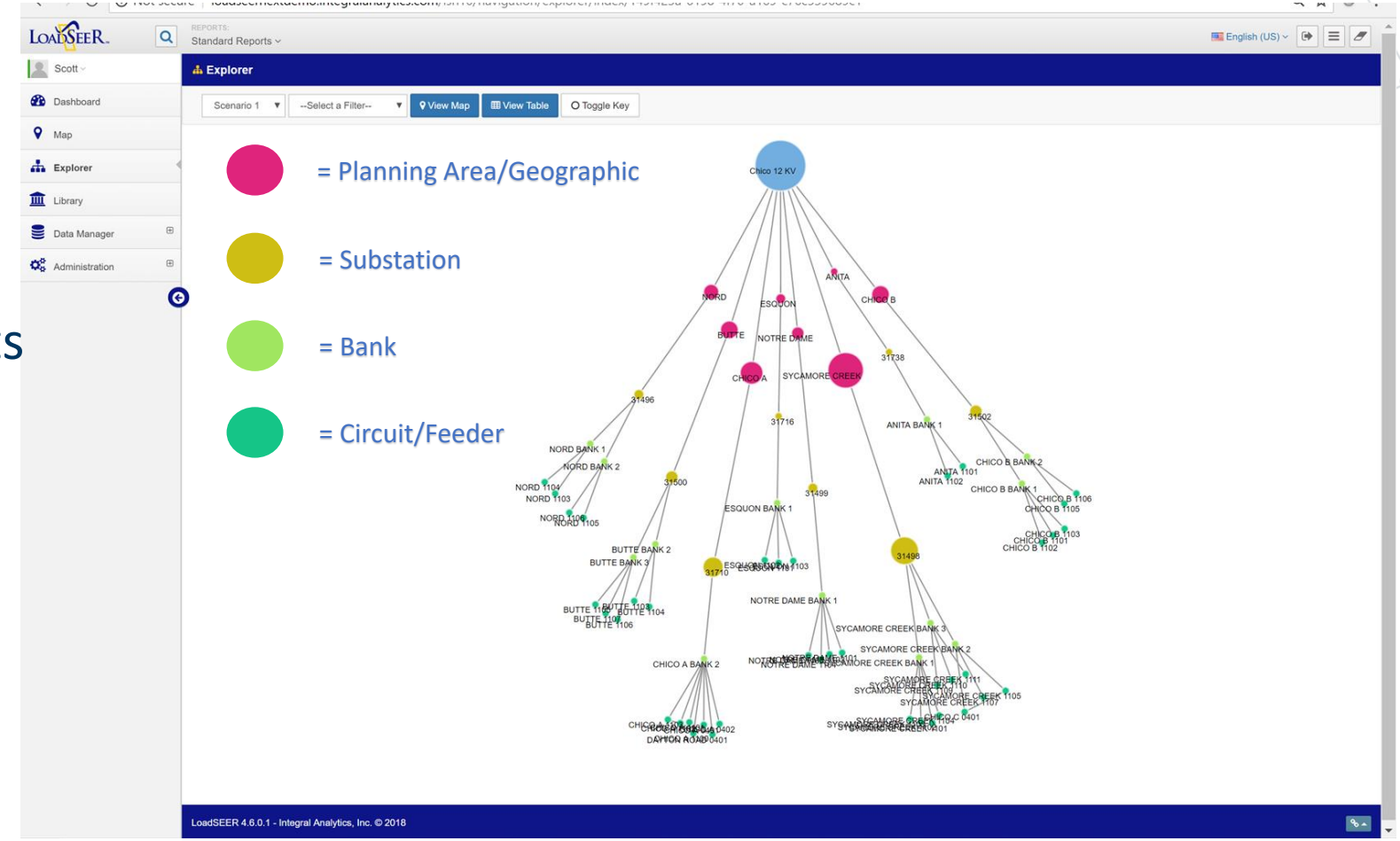


Integral Analytics

DER Scenario Forecasting: A New and Evolving Discipline

Managing a Network

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

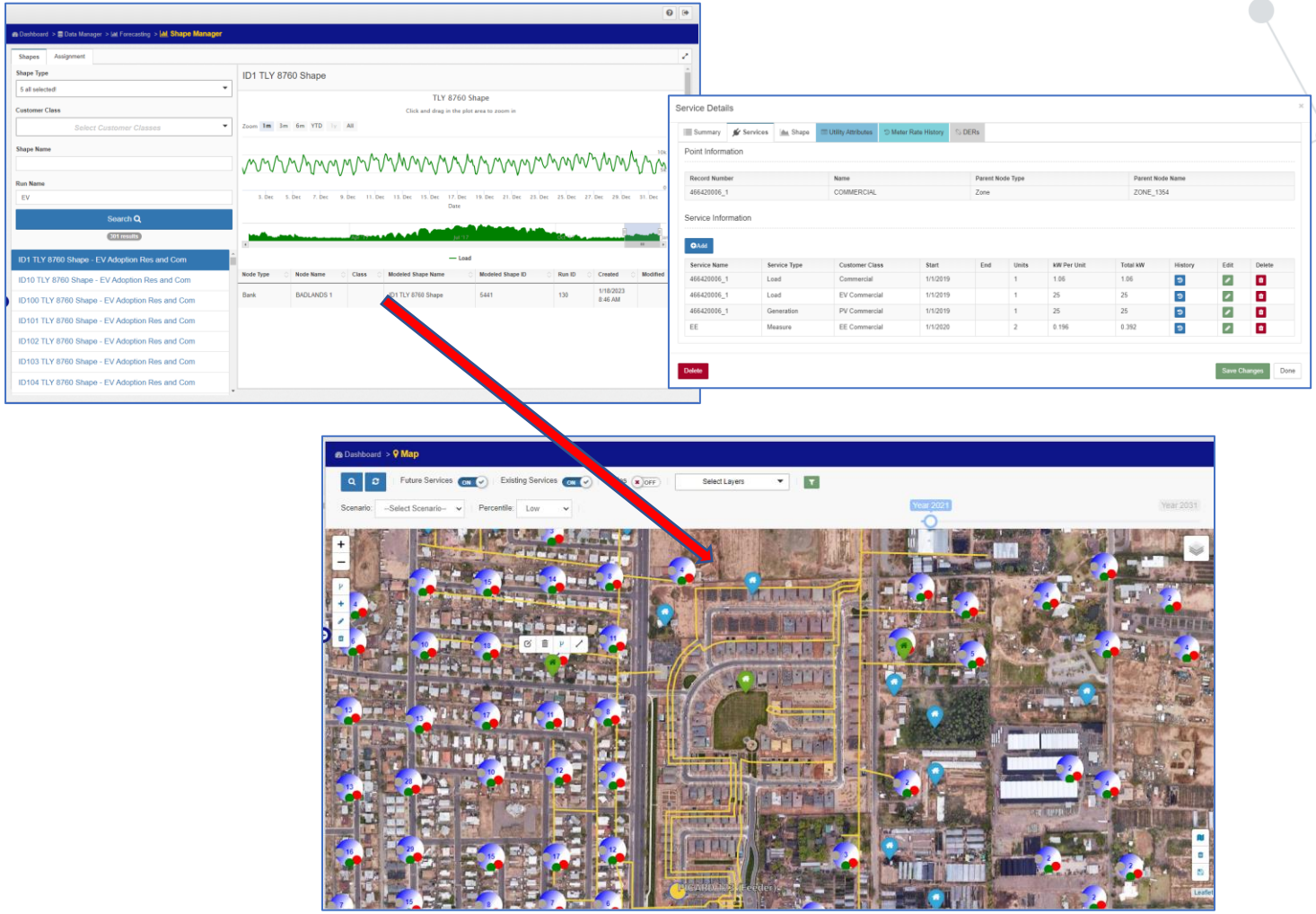


Integral Analytics

DER Scenario Forecasting: A New and Evolving Discipline

Managing Shapes

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

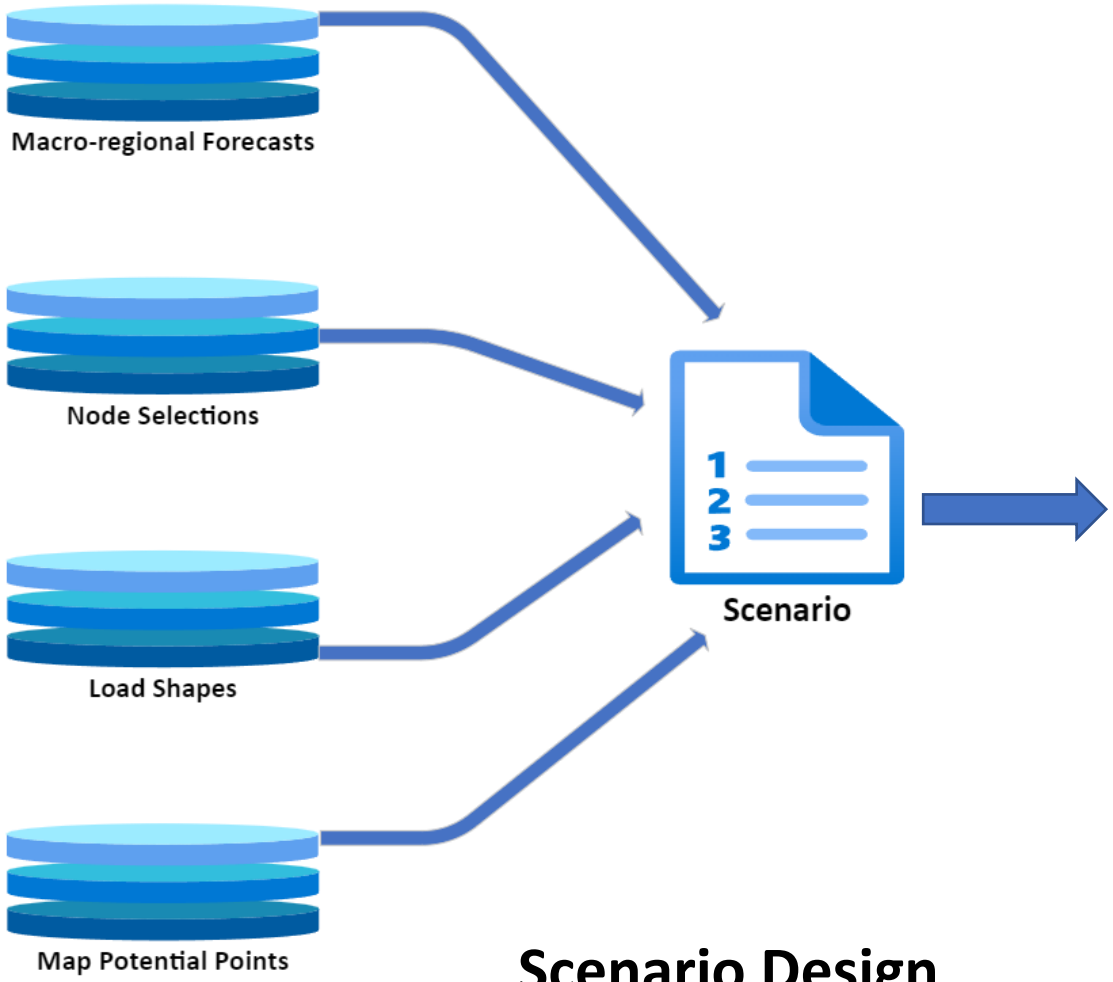


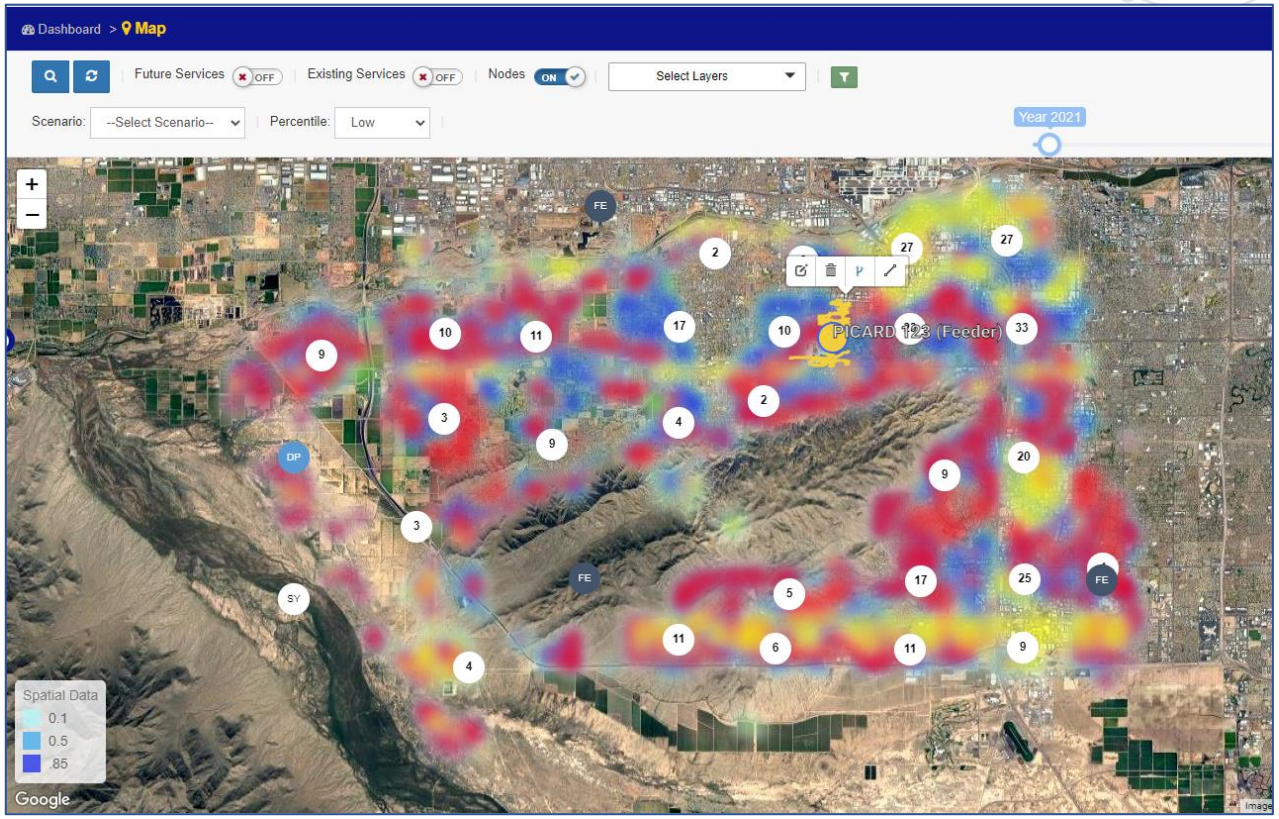
9

Integral Analytics

DER Scenario Forecasting: A New and Evolving Discipline

Managing Scenarios





Scenario Design

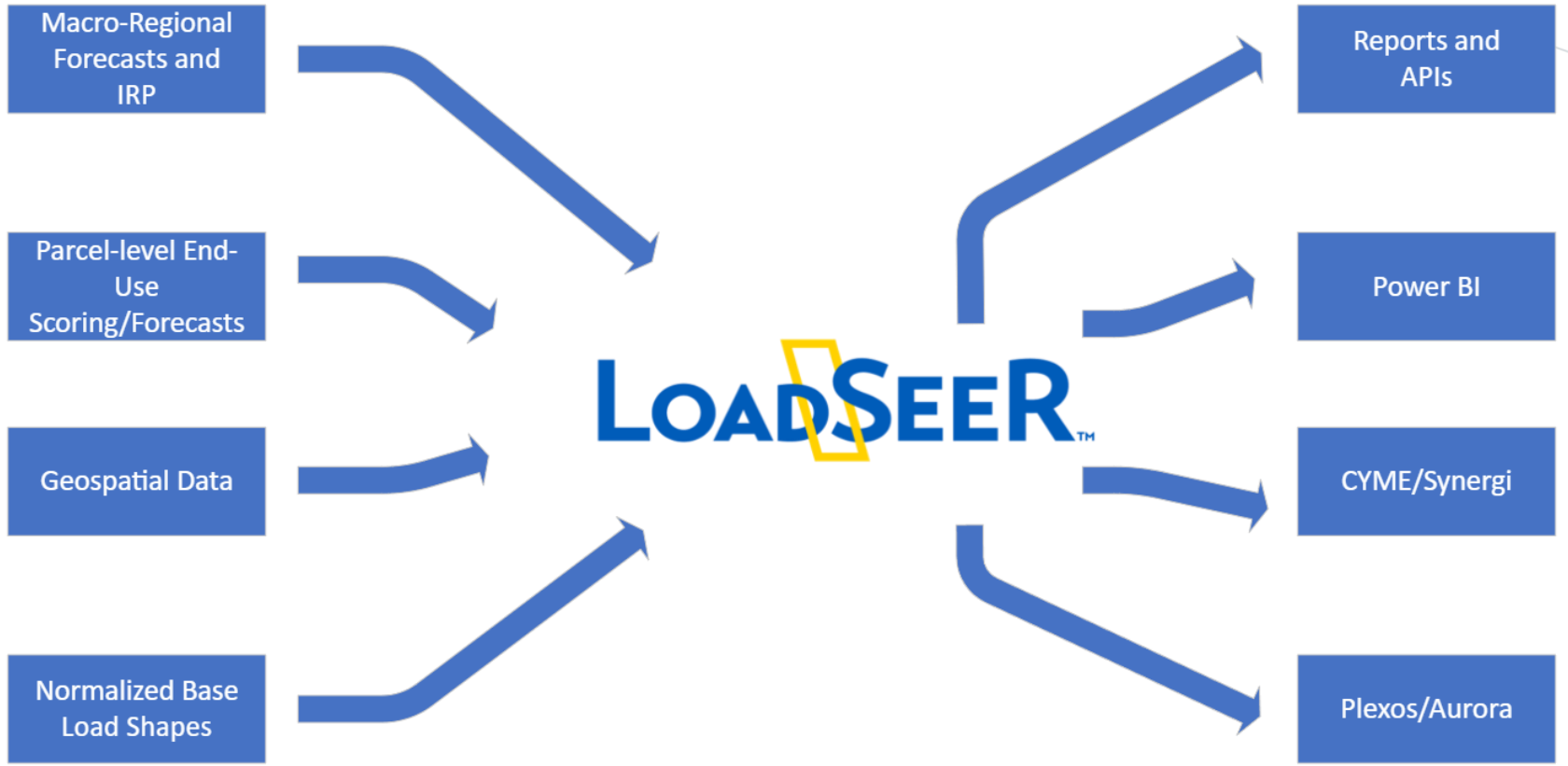
Spatial Forecast

INTEGRAL ANALYTICS

DER Scenario Forecasting: A New and Evolving Discipline

Flexible Inputs/Output

- Parcel Level Data
- Give Users Tools to Manage the Data
- Standard Import Formats
- Reports and APIs
- Load Flow, Engineering, Financial
- Energy and Stats Analysis
- Users Control the Narrative



Integral Analytics

DER Scenario Forecasting: A New and Evolving Discipline

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

INTEGRAL ANALYTICS

DER Scenario Forecasting: A New and Evolving Discipline

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