Building a Data Foundation to Track Trends and Impacts of DER Adoption: SRP's Strategic Approach

About Neudesic

Our Mission

Help clients get on the winning side of digital transformation.

|	
16x	Microsoft Partner of the Year Winner
12	Microsoft Gold Competencies
Top 10	Microsoft Partner Nationally
2,000+	Successful client engagements
1700+	Skilled cloud & data experts
Elite	Access to Microsoft Funding & Programs

About SRP

- One of the nation's largest public power utilities

- Provide reliable, affordable power to more than **1 Million** customers in the Phoenix-area

- Retail electric revenues **$2.9B** (FY22)

- Total electric sales **37,963** (GWh)

- Record System Peak on Monday, July 12, 2022 of **7,615MW** (high temp 115 degree)

- Employees **4,844**
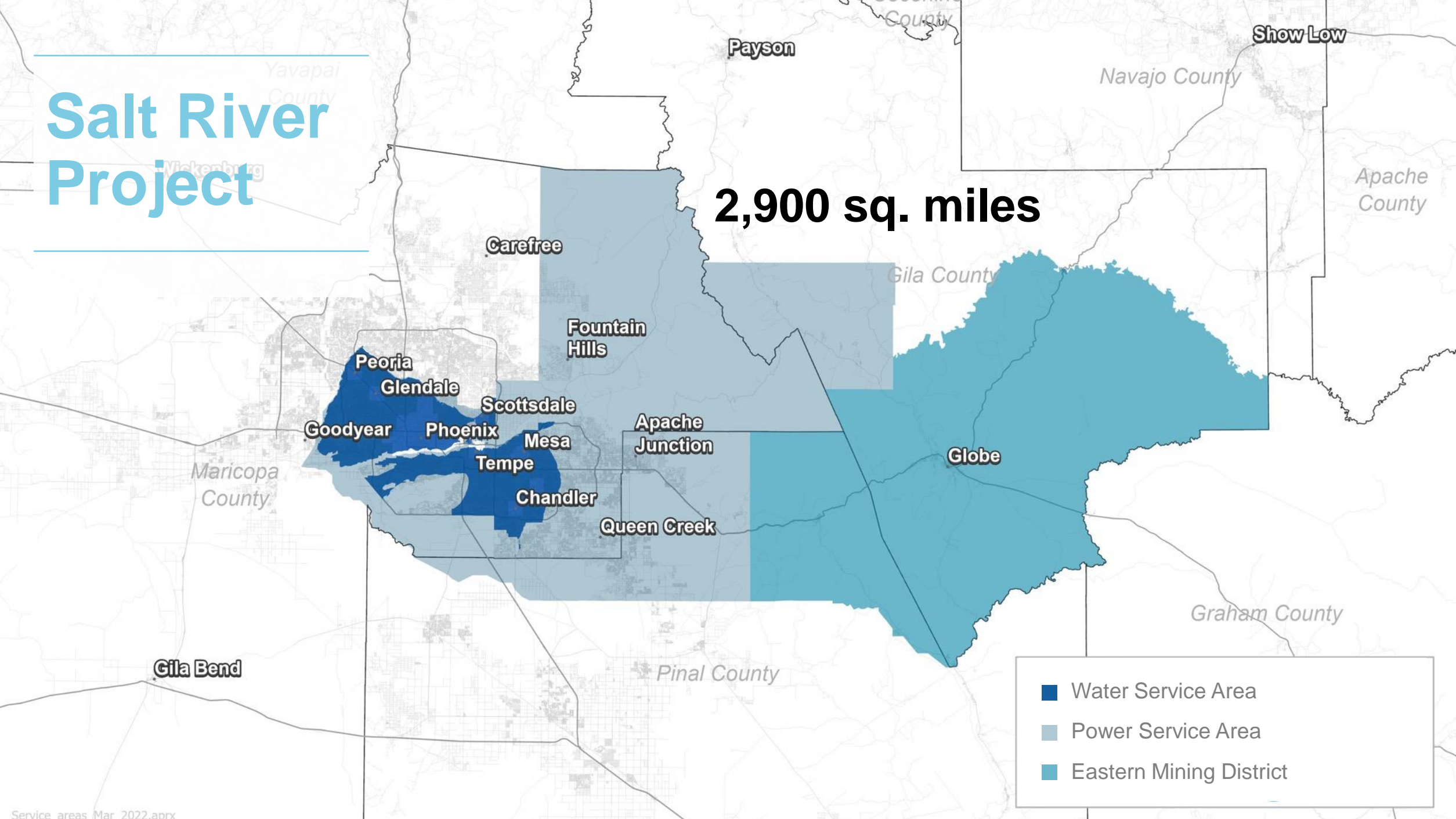
SRP Distribution Overview

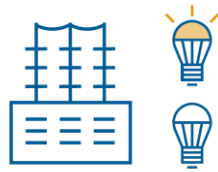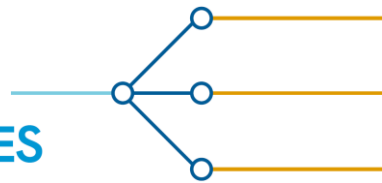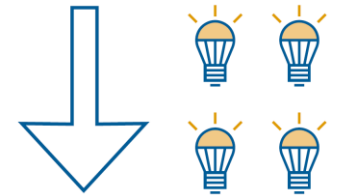Operates and maintains **191 distribution substations.**

282 SUBSTATIONS

Operates and maintains 21,207 circuit miles of lines and **1,441 distribution circuits.**
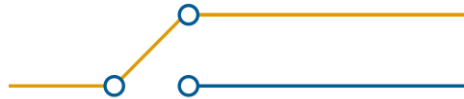
21,207 CIRCUIT MILES

There are more than **178,000 service transformer units.**

12.47 kV POWER

There are **39,113 distribution switches** on the distribution system.

342 AUTOMATED SWITCHES

More than **200 power quality monitors** installed throughout electric system.

200+ POWER QUALITY MONITORS

There are more than **1,134,000 advanced meters** serving SRP customers.

Of these, approximately 674,000 second-generation advanced meters have been deployed.

Reliability

The U.S. Energy Information Administration (EIA) announced that **SRP ranked 1st** in reliability for the year 2020 among all electric utilities with over 500,000 customers.

J.D. Power

- Ranked **1st 22 times** in customer satisfaction for residential customers

- Ranked **1st 13 times** in customer satisfaction for business customers
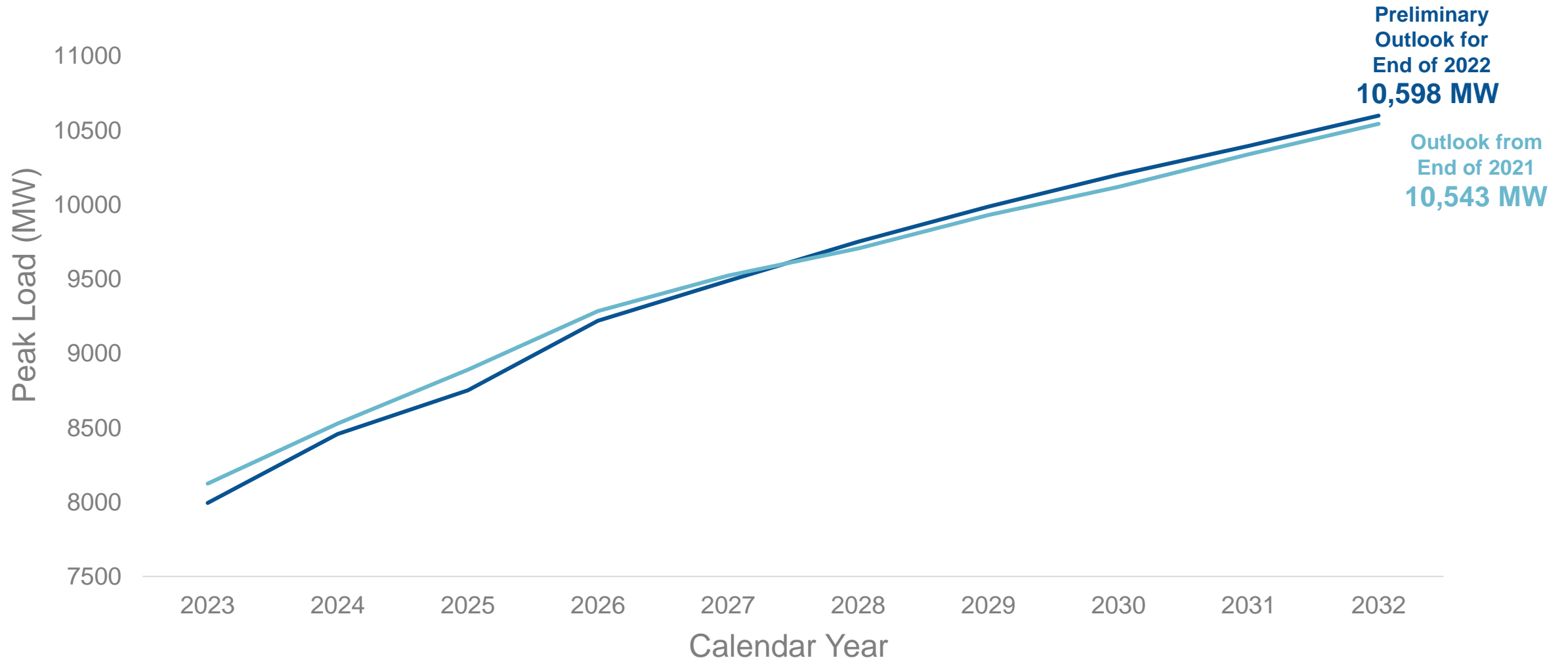
- These mark SRP's **48th award** in the **23 years**

Strong Economic Growth

- Maricopa is the **#1** fastest growing county in the U.S.

- Phoenix was one the first major cities to have recovered **100% of jobs** lost during the pandemic

- The Southwest is becoming America's advanced manufacturing hub

- Housing permits are at the highest since mid-2000's: an average of **132** every day

Significant Near-Term Growth Expected

Preliminary Outlook for End of 2022
10,598 MW

Outlook from End of 2021
10,543 MW

Peak Load (MW)

Calendar Year

Key Takeaway: ~850 MW of new load expected by 2024, ~2,500 MW by 2030

Distribution Enablement Goal

Enable the interconnection of all customer-sided resources, without technical constraint, while ensuring current levels of grid integrity and customer satisfaction.

DER Near-Term Outlook

Today	→	2030	%
DER Customers (Solar & Battery)			
46,000	↗	**105,000**	+128%
DER Capacity (Solar & Battery)			
400MW	↗	**1,065MW**	+166%
Electric Vehicles in Operation			
31,000	↗	**300,000**	+868%

Trends Driving Focus on DER Data

- ✓ Customer Growth in Service Territory

- ✓ Technology Readiness

- ✓ Customers Rapidly Adopting DERs

- ✓ SRP Goal to Enable Customers

- ✓ Desire to Maintain Reliability and Customer Satisfaction

Project Goals & Value

- Leverage shared data from the utility and customer

- Build a foundation to organize and automate tracking and reporting

- Create a tool for leaders, planners, engineers, and operators

- Generate quick insights from multiple data sources managed by different internal departments

Strategic Indicators

Solar & Battery
Electric Vehicle
Price & Cost Trends

Tracking Grid

Voltage Performance
Feeder Tracking
Reverse Power Flow
Failed Service Transformers

Operational Trending

Peak DER
Transformers with DER
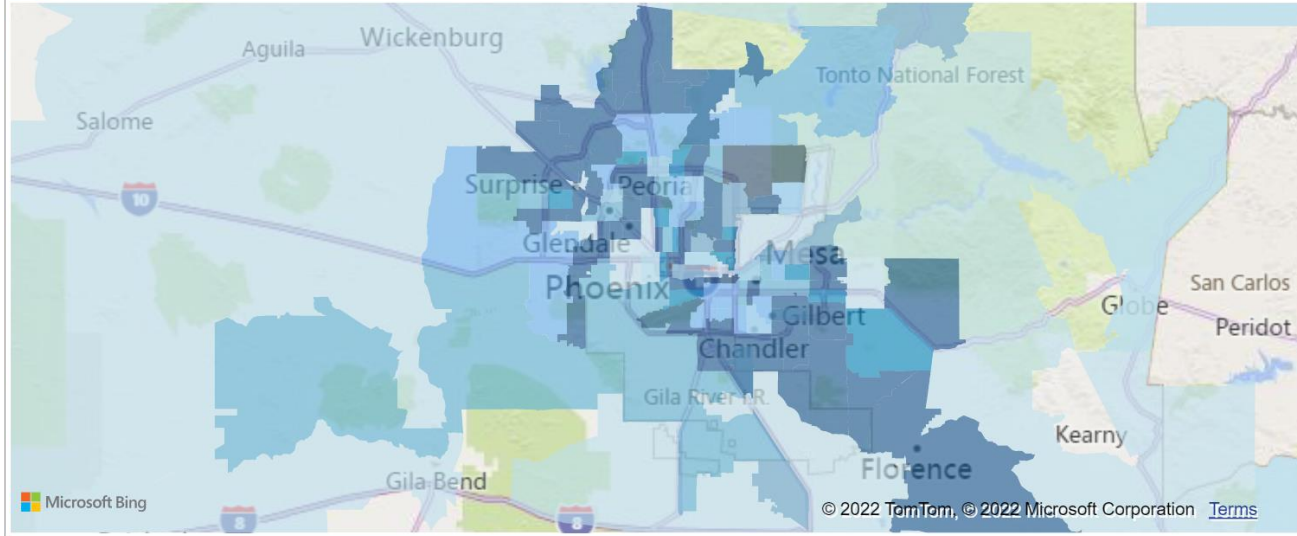Single Phase DER by Feeder
Top 10 Feeders

Electric Vehicles Detail

Multiple selections ▼   All ▼
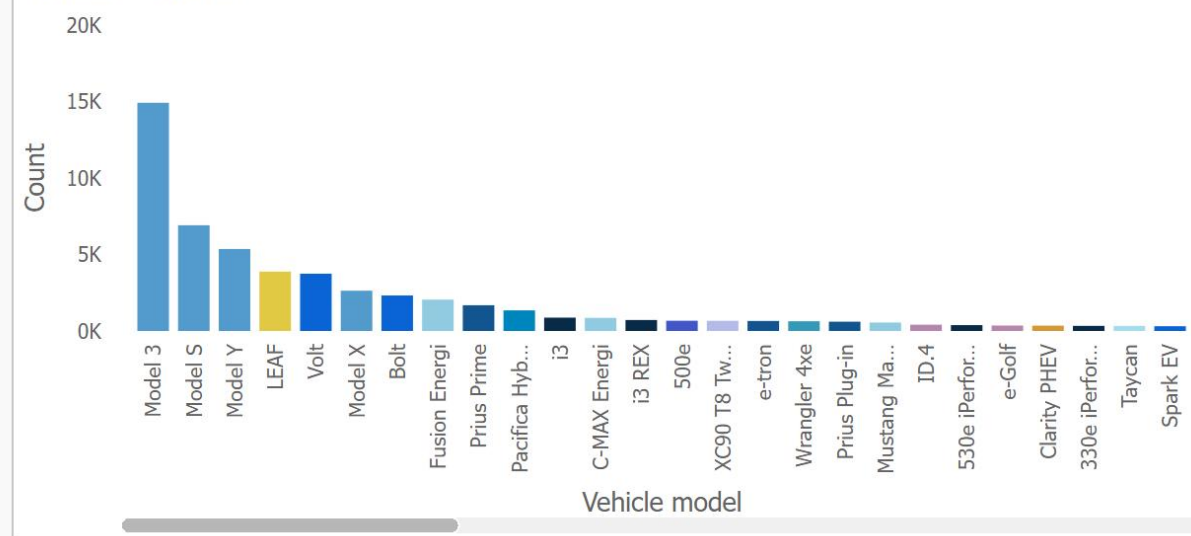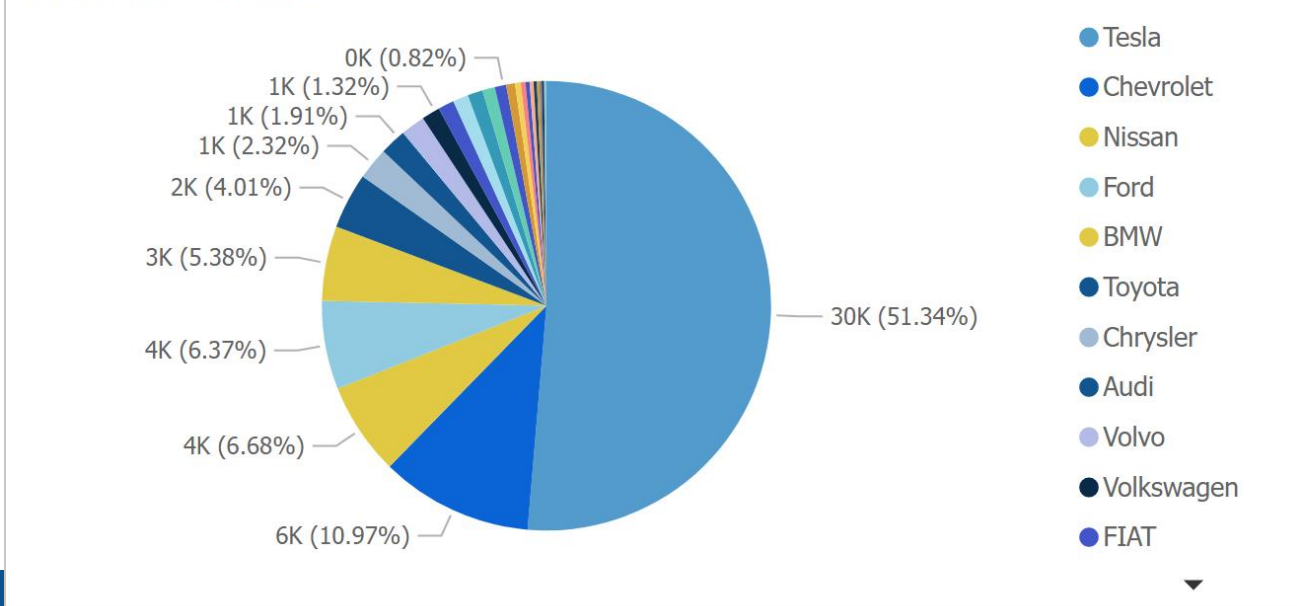
Zip Heat Map

Microsoft Bing
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Vehicle Segment

Count (20K, 15K, 10K, 5K, 0K)

Vehicle model: Model 3, Model S, Model Y, LEAF, Volt, Model X, Bolt, Fusion Energi, Prius Prime, Pacifica Hyb..., i3, C-MAX Energi, i3 REX, 500e, XC90 T8 Tw..., e-tron, Wrangler 4xe, Prius Plug-in, Mustang Ma..., ID.4, 530e iPerfor..., e-Golf, Clarity PHEV, 330e iPerfor..., Taycan, Spark EV

Vehicle Make & Model

0K (0.82%)
1K (1.32%)
1K (1.91%)
1K (2.32%)
2K (4.01%)
3K (5.38%)
4K (6.37%)
4K (6.68%)
6K (10.97%)
30K (51.34%)

- Tesla
- Chevrolet
- Nissan
- Ford
- BMW
- Toyota
- Chrysler
- Audi
- Volvo
- Volkswagen
- FIAT

Vehicle Make

Count (30K, 20K, 10K, 0K)

Segment: Comp... car, Mid-size CUV, Full size car, Sub-c... car, Mid-size car, Comp... CUV, Minivan, Mid-size SUV, Sports car, Full size SUV, Mid-size pickup, Full size van

Reverse Power Flow

Approx. Feeder Count

1,500

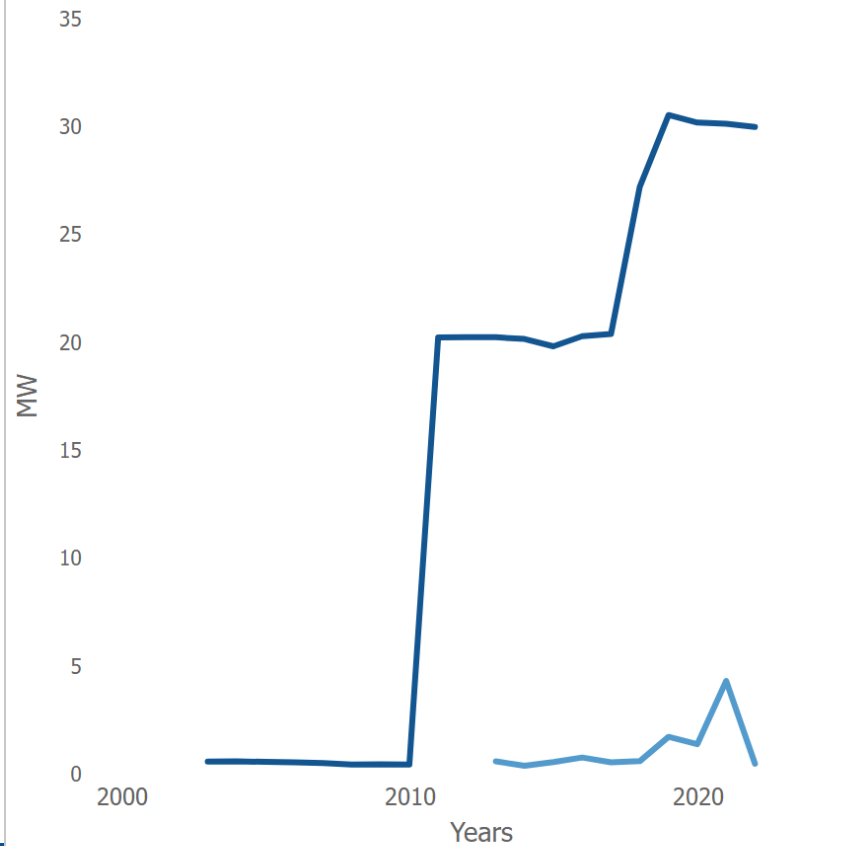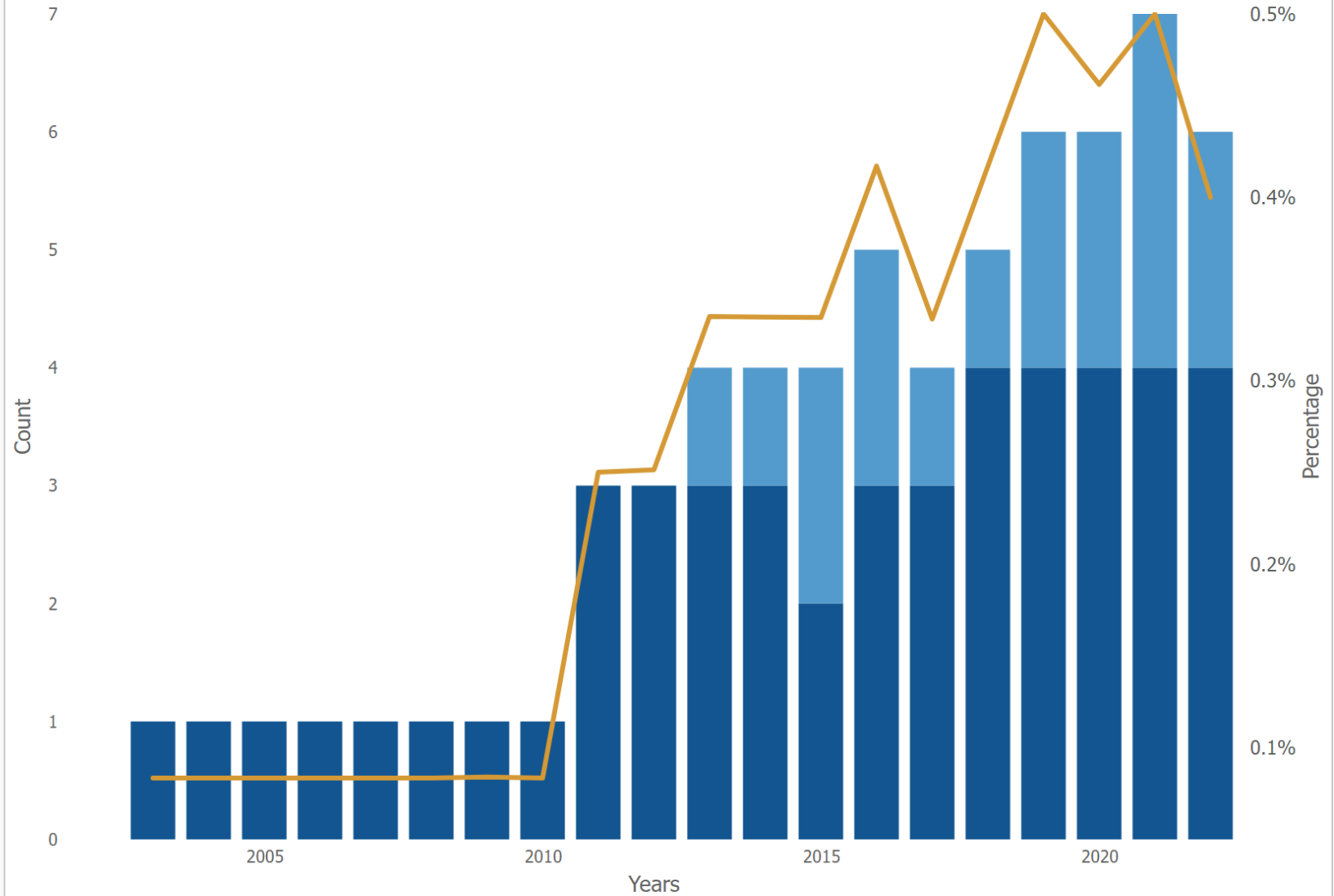## Feeders With Backfeed

9

Total MW of Backfeed

● Dedicated ● Non-dedicated

Total BackFeeders and Percentage by Year and Type

● Dedicated ● Non-dedicated ● Percentage

Keys to Success

- ✓ Corporate platform decision to migrate to **PowerBI**

- ✓ **Analytics team** provided corporate data lake and standards support

- ✓ Data **experts within distribution** functions

- ✓ IT team supported **data access**

- ✓ **Existing** consultant partnership

Game Plan

ALIGNMENT

Hypothesis **Defined ROI**

Listen and understand

Activities
- Define Goals
- Define Success
- Define Risks
- Current State Problem

Deliverables
- Prioritized Goals
- Prioritized Impacted Users, Journeys, Apps

DISCOVER

Diamonds

X Users, X Flows, Assist in defining the notification strategy

Activities
- Stakeholder Interviews
- User Interviews
- Contextual Inquiry
- Heuristic Analysis
- User & System Map
- Business Domain Card Sort
- Architectural Analysis
- Primary & Secondary Research Analysis

Deliverables
- Problem Statement
- Stakeholder Goals, Needs, Wants
- User Persona
- Journey map
- Current Taxonomy
- Research Report
- Recommended Core, Elevate, Differentiate
- Epic Backlog

IDEATION

Feature Roadmap

Target a specific problem / flow to impact

Activities
- Understand the Problem
- Prioritized MVP
- Sketches & Storyboards
- Prototype
- Test

Deliverables
- Mockup / Prototype
- Feedback

PLANNING

Plan

Estimation and Planning

Activities
- Prototype Decomposition
- Feature Backlog Creation
- Feature Estimation

Deliverables
- Feature Level Backlog
- Resources
- Estimation

DELIVER

Value **Results**

Estimation and Planning

Activities
- Story Writing
- Story Grooming
- Why, How, What
- User Validation

Deliverables
- Stories Ready Dev
- Detailed Prototypes
- Architectural Diagrams

Solution Architecture
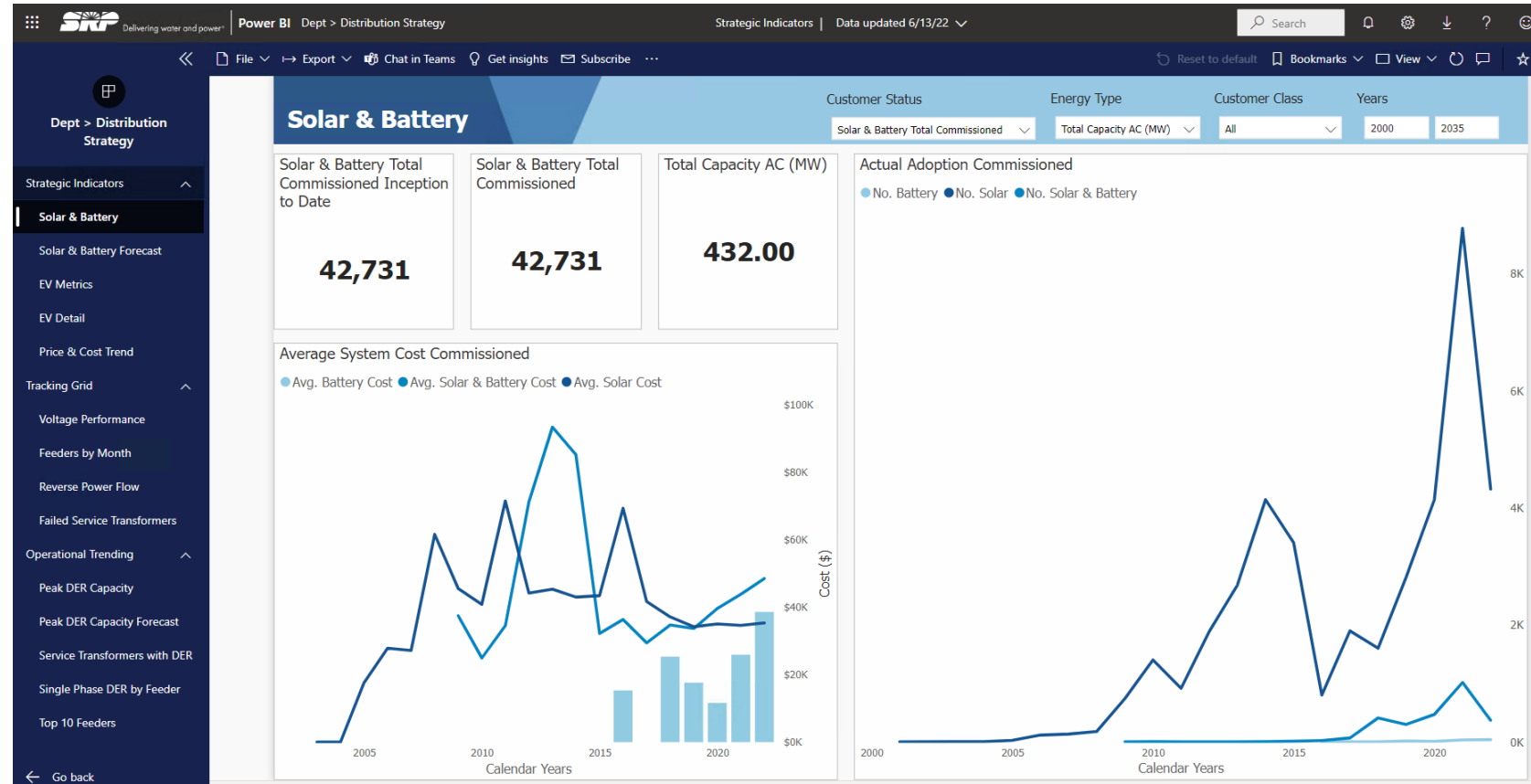
Moved workspace to Premium
- Larger datasets
- Faster data refresh
- Increased storage
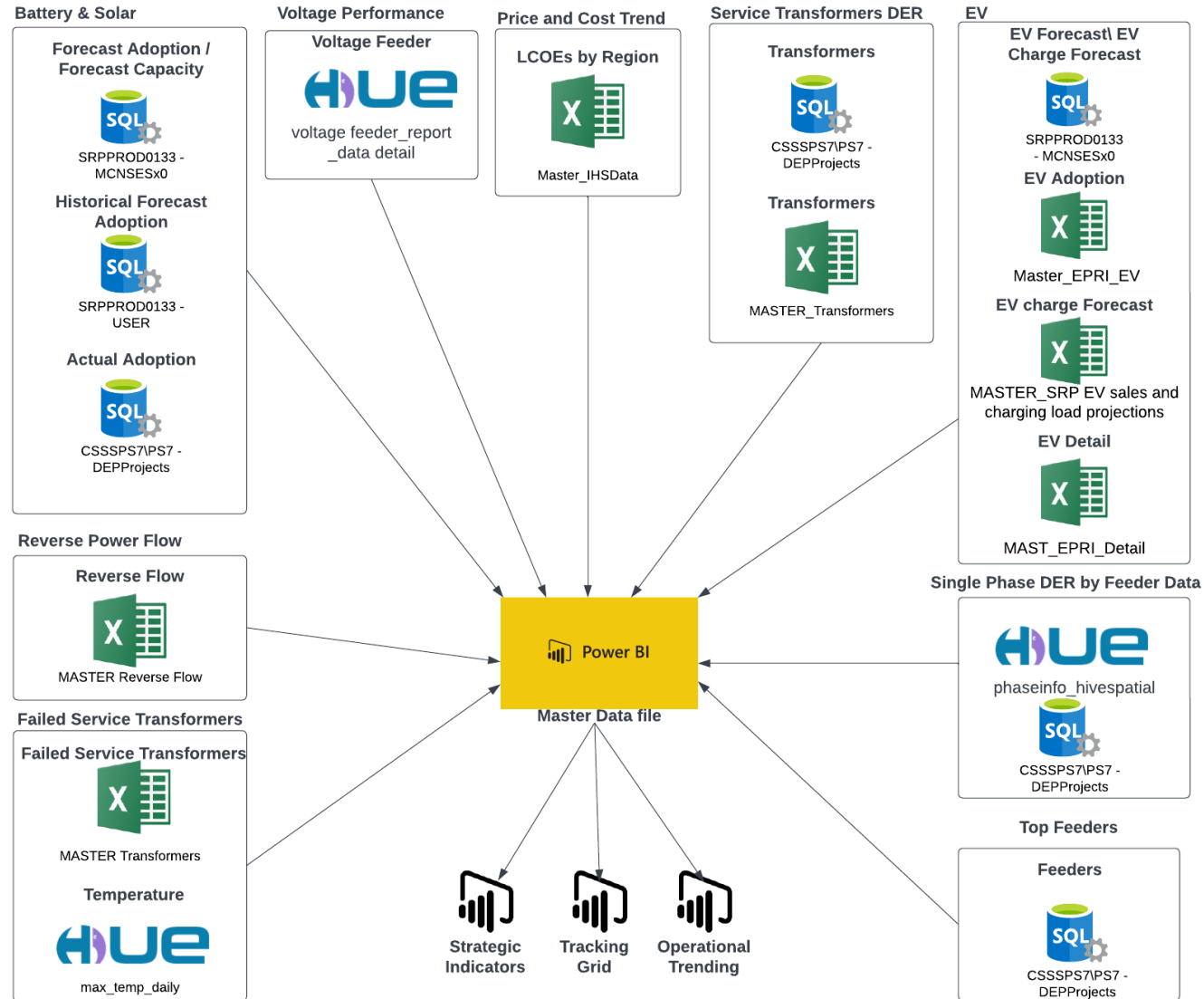
Leverage Data Lake
- Create views for pre-processing data
- Reduce amount of data PowerBI needs to consume

Split Data and report files
- Shared data file
- Separate Dashboard file for each department

The Road Ahead

1. **Share the tool** - rollout internally

2. **Build upon the foundation** - conduct annual upgrades

3. **Strategic communications** - proactive automated reporting

4. **Mature analytics** - correlations and connections