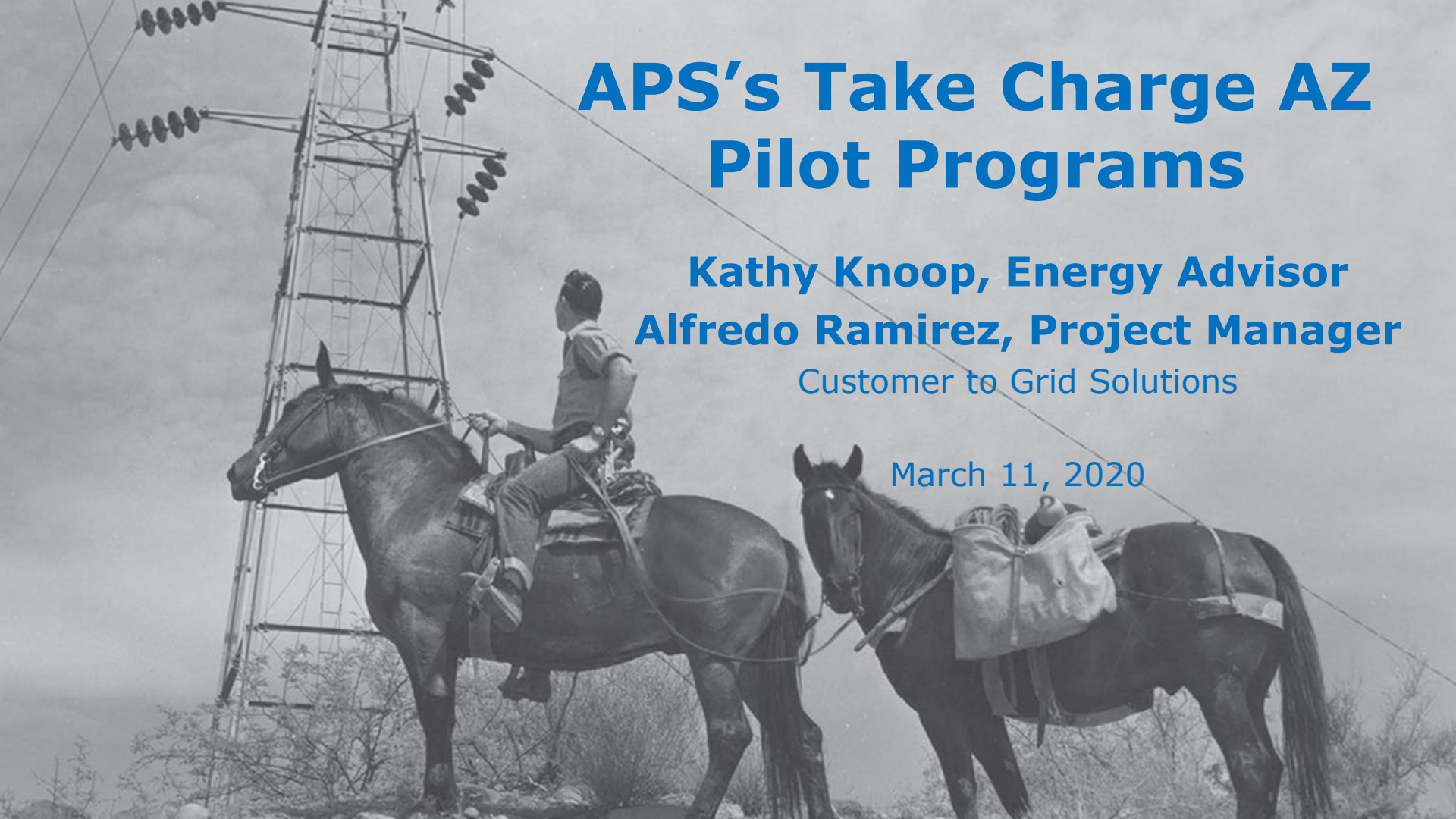


# APS's Take Charge AZ Pilot Programs

**Kathy Knoop, Energy Advisor**  
**Alfredo Ramirez, Project Manager**  
Customer to Grid Solutions

March 11, 2020



# About APS

## APS Service Territory

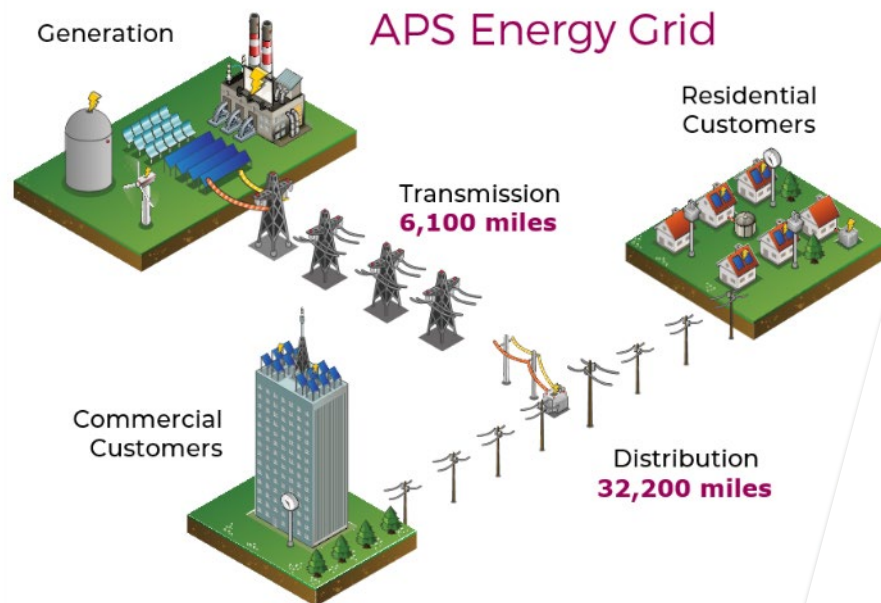
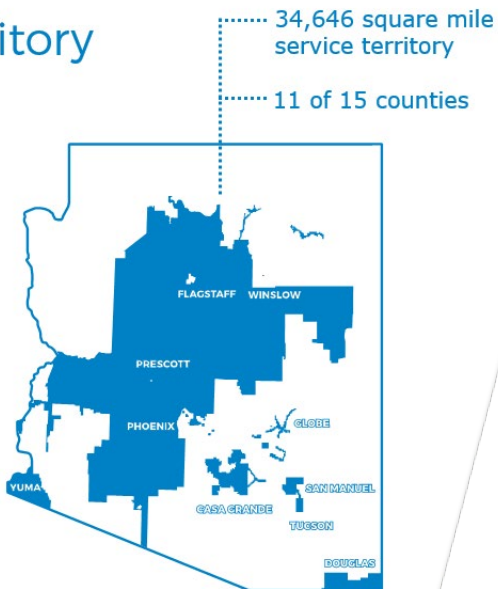
### APS is...

Arizona's largest taxpayer  
\$3.4 billion annual economic impact to AZ

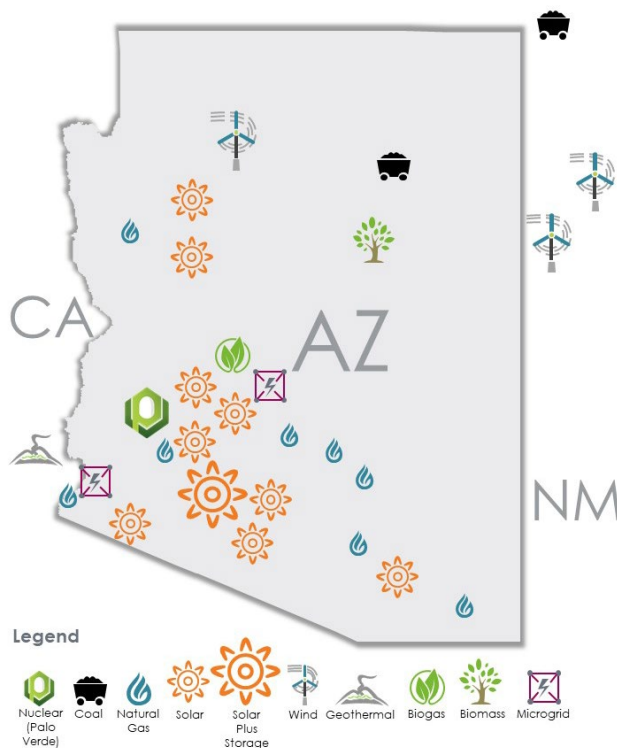
Arizona's largest and longest-serving utility  
Since 1886

Investor owned  
Subject to forms of public control and regulation

~6,300 employees



# APS CAPACITY



## 2020 Resources

	Megawatts (MW)
<b>Natural Gas</b>	3,573
<b>Renewables (Includes DG)</b>	1,891
<b>Coal</b>	1,357
<b>Nuclear</b>	1,146
<b>Power Contracts</b>	2,115
<b>Energy Efficiency</b>	898
<b>Demand Response</b>	38
<b>Microgrid/ESS</b>	34
	<b>11,052</b>

A worker in a hard hat and safety gear is installing solar panels on a roof. The background is a solid orange color.

**1.8+**  
GIGAWATTS

**TOTAL  
RENEWABLE  
CAPACITY**

A close-up view of solar panels installed on a residential roof. The background is a solid orange color.

**#2**  
UTILITY  
IN NATION

**RESIDENTIAL  
SOLAR PER  
CUSTOMER**

**>50%**

A view of solar panels mounted on a roof against a clear blue sky. The background is a solid blue color.

**CLEAN  
RESOURCES**

**#5**  
UTILITY  
IN NATION

**TOTAL SOLAR  
CAPACITY  
INSTALLED**

A view of solar panels installed on a roof, with a green landscape in the background. The background is a solid green color.

**INNOVATIVE  
DISTRIBUTED  
ENERGY  
PROJECTS**

**SOLAR  
BATTERIES  
THERMOSTATS  
WATER HEATERS  
ELECTRIC  
VEHICLES**

Two workers in hard hats are installing a large solar panel on a roof. The background is a solid green color.

**#3**  
IN NATION

**MOST SOLAR  
PER STATE**

## Take Charge AZ L2

- APS Shareholder funded program
  - APS owns and operates 5 years
  - Customer site eligibility requirements
- 
- Customer Responsibility
    - *Four parking spaces*
    - *Electricity cost separate meter/bill/rate plan*
    - *Fees for optional networked solutions*
    - *Legal agreement*
    - *Utility easement*
    - *Periodic surveys*





# APS's Take Charge AZ Pilot Program



## Level 2 Workplace, Fleet and Multifamily

### Overview

- APS is installing up to 600 plugs / 300 chargers throughout APS territory by the end of 2021
- Chargers will be installed primarily at businesses, government buildings, and multifamily residential developments
- 90 sites are in various stages of development

### Benefits

- Increase adoption of electric vehicles
- Gather data and learn about charging habits for future grid optimization
- Improve air quality for all Arizonans.
- Educate customers on optimal charging habits to help soak up excess solar during the middle of the day

# Equipment Options

## ClipperCreek HCS-40

- Provided at no cost: 2 HCS-40R / 7.2 kW each port



## Chargepoint CT4021

- Upgrade CT4021 / 7.2kW each port
- Customer pays additional \$8,613 plus \$1,120/year networking fee



# It Takes a Village



Project Management \* DER \* O & M \* Marketing \* Customer Engagement

Lisa Schaeffer  
Alfredo Ramirez

Kathy Knoop  
Marisa Chronowski

Dina Radowick  
Nonie Black Elk

Donna Crane-Rossi



Program Management and Controls  
Technical Site Eligibility  
Engineering and Permitting  
Customer Engagement  
Construction Management

Molly Amendt, PE  
Nicole Alarcon



Technical Site Eligibility  
Engineering and Permitting

Joshua Ahrens, PE  
Torrey Graf



"Behind the Meter" Construction  
Equipment Procurement  
Permitting Support

Dan King

Make Ready – Primary Work If Needed  
APS Alliance of Contractors (Sturgeon, NPL, PDI)



# Program Phase Overview

Program phases were redefined to streamline workflow, improve efficiency and implement identified best practices. Additionally, incorporation of Trello, provided transparency on project information and status to supporting teams.

## ***Key Program Phases***

- *Desktop Review*
- *Preliminary Design*
- *Customer Acceptance*
- *Final Engineering*
- *Pre-Construction*
- *Construction*
- *Energize and close-out*

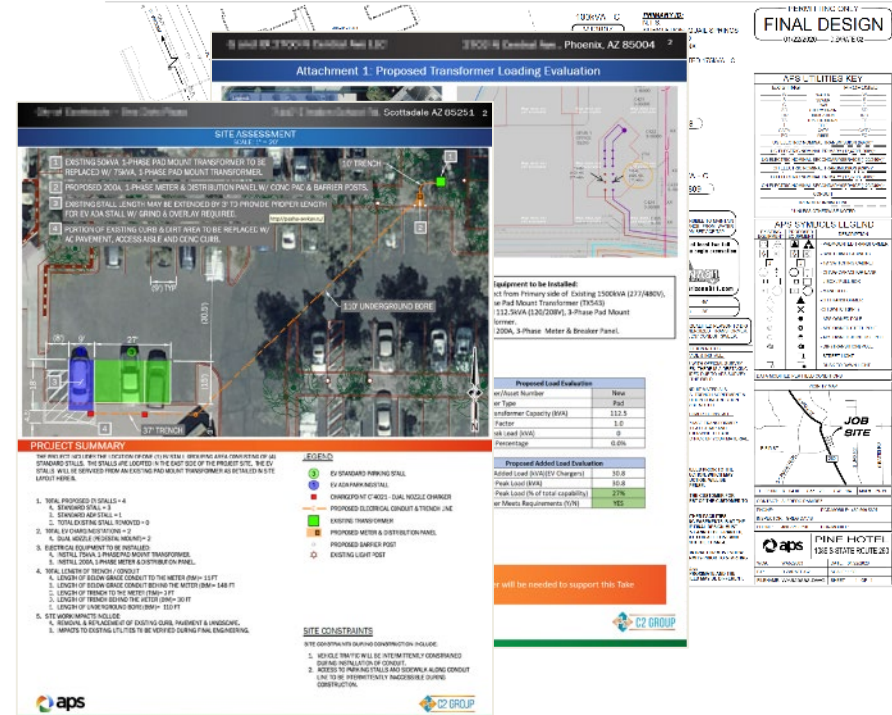


## Best Practice Implementation

Critical to the streamlining and workflow realignments were the introduction of customer-centric standardized design templates for desktop review, preliminary and final design phases.

### ***Benefits to Program:***

- *Increase in customer approvals*
- *Continuity in design throughout the program*
- *Consistency in designs from design firms*
- *Decrease in turnaround times*
- *Easier for internal QC*

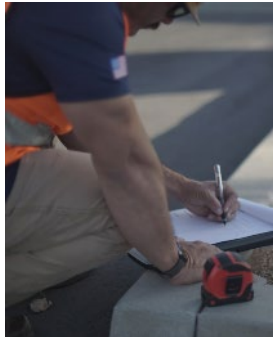


# Tech Integration & Innovation

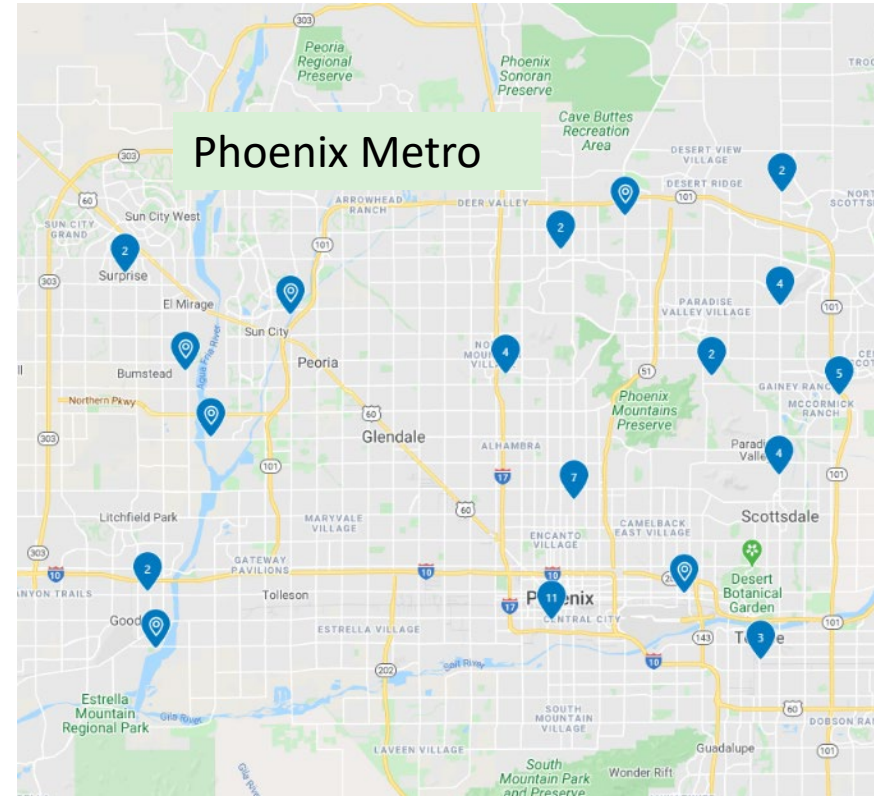
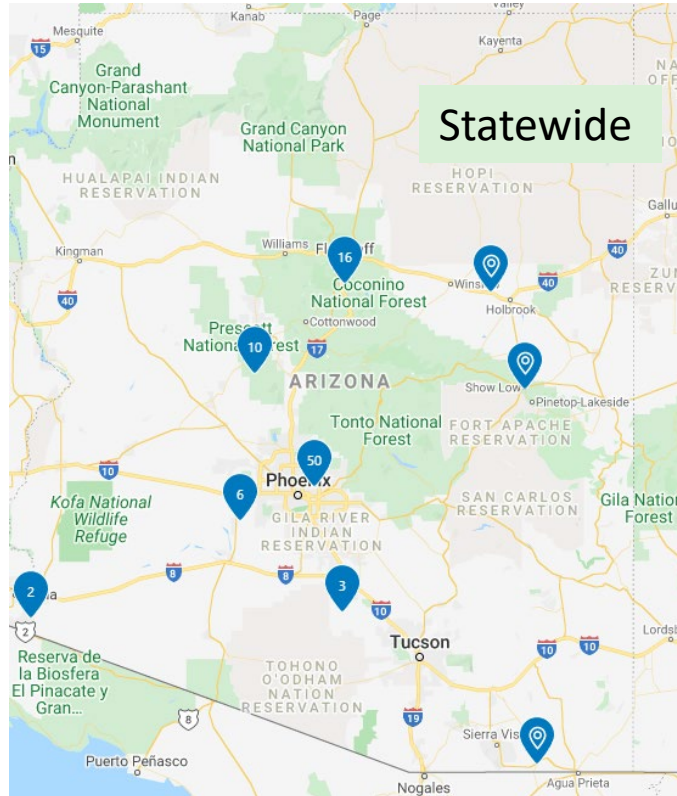
Incorporation of innovative data collection technology such as UAV (drone) for aerial mapping, LiDAR scanning and utilization of 360-degree cameras during initial project site visit.

## ***Benefits to Program:***

- *Improved preliminary and final designs*
- *Provides value engineering*
- *Reduction of the number of site visits*
- *Improved customer experience*
- *Risk mitigation for construction*



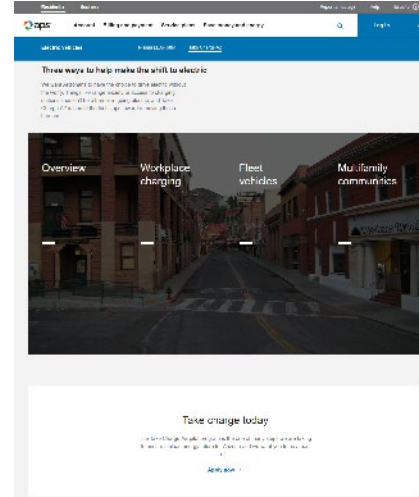
# APS's Take Charge AZ - Level 2 Sites





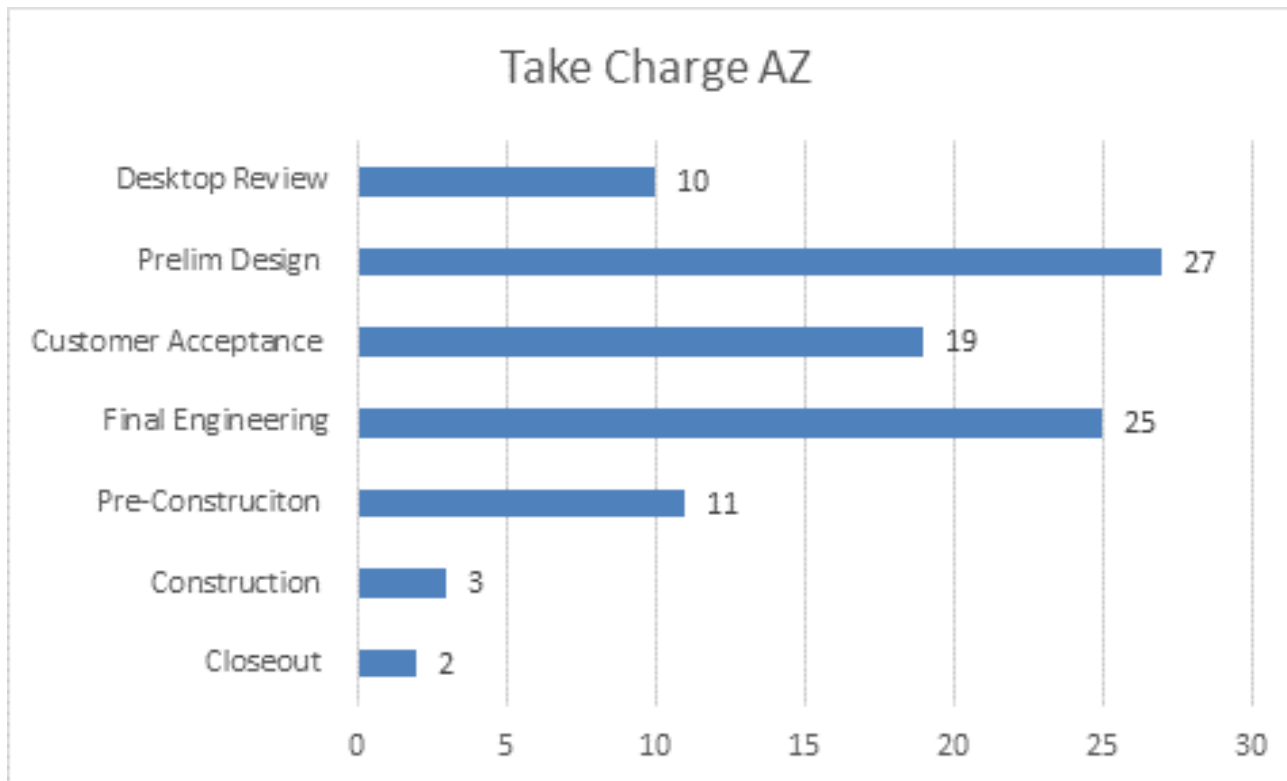
# Marketing, Education and Outreach

- Public outreach events
- Build employee advocates
- Leverage program participant relationships
- Customer centric messaging





# What is our progress?



## L2 Key Learnings and Pivots – Technical

### Key Learning

Designs for the meter pedestal and pedestal to chargers are more complicated than they appeared & require a custom order

Federal ADA guidelines need to be discussed with customer; some customers require compliance

Equipment comes with many options and it can open up error traps and delays if carrying too many options on hand

APS resources typically do not do any design work Behind The Meter (BTM). Only half the required design was completed.

### Program Pivot

Settled on an off-the-shelf setup that can be put together by field personnel and is the same for all sites while we wait for UL listing on the meter pedestal

Redesigning jobs to incorporate ADA or obtaining customer signatures indemnifying APS and design firms

One standard piece of equipment with all features (key and pedestal mounted) was selected for all customers since the cost increase is very minor

One engineering company will complete the entire design from the transformer to the charger to streamline process

## L2 Key Learnings and Pivots – Customer Experience

### Key Learning

Customer representative that applied does not have signing authority on behalf of their company

Customer's preferred location for chargers may not be cost effective

Redlines on customer agreement can be significant

Some customers require significant amounts of time and board approval to execute agreement

Customers prefer charger choices

Some customers prefer charging the end user for energy and for other customers it is a requirement

Customers request to move charger location after initially agreed upon and design is complete

### Program Pivot

Implemented onboarding call to customer prior to initial site visit to confirm and set customer expectations

Desktop review is now conducted before going on customer's site and location discussed in onboarding call

Created list of allowable exception for common redlines

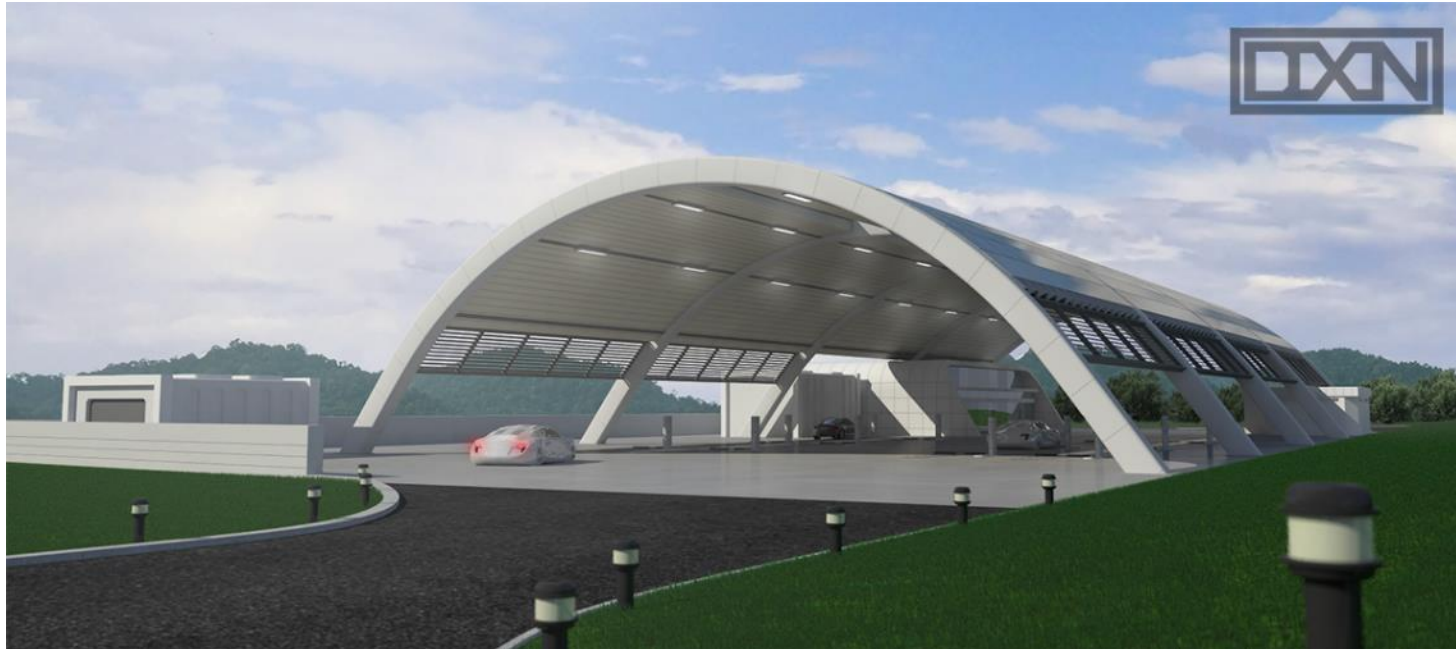
Identifying fast track customers to keep the pipeline moving. Process for signature discussed in onboarding call

Provided a second option to choose from with networking capabilities – customer pays to upgrade

ChargePoint chargers automate end users paying to charge; APS is providing information on free ways for end users to pay

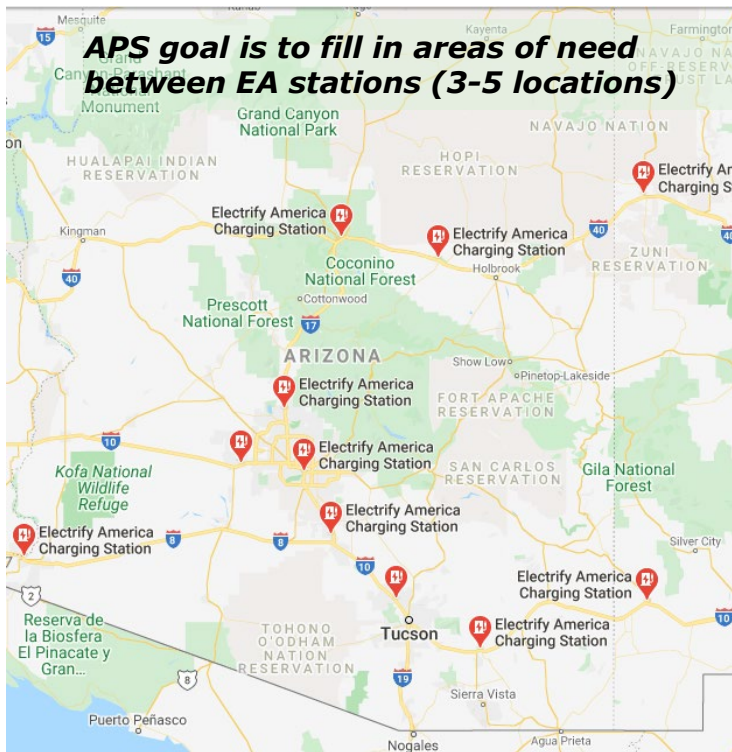
Discuss easement and routing information in onboarding call. Implemented customer signoff before final design is complete

# What's Next?



Credit: SteemIT DXN

# APS's Take Charge AZ pilot program - DCFC



## DC Fast Charger Stations

### Overview

- APS Customer Technology will install between 16-20 (at 3-5 sites) DC Fast Chargers by the end of 2021 along vital rural corridors, helping enable long-distance travel with an EV
- **Helping fill the gap in the DCFC network in highway corridors**

### Benefits

- Increase EV adoption by reducing range anxiety for drivers
- Work with other DCFC providers to build the foundation of the charging infrastructure required to connect underserved and metro areas.



# Questions



# Program Partner Contact Info



C2 Group  
[nicolea@c2group.us](mailto:nicolea@c2group.us)  
[www.c2group.us](http://www.c2group.us)

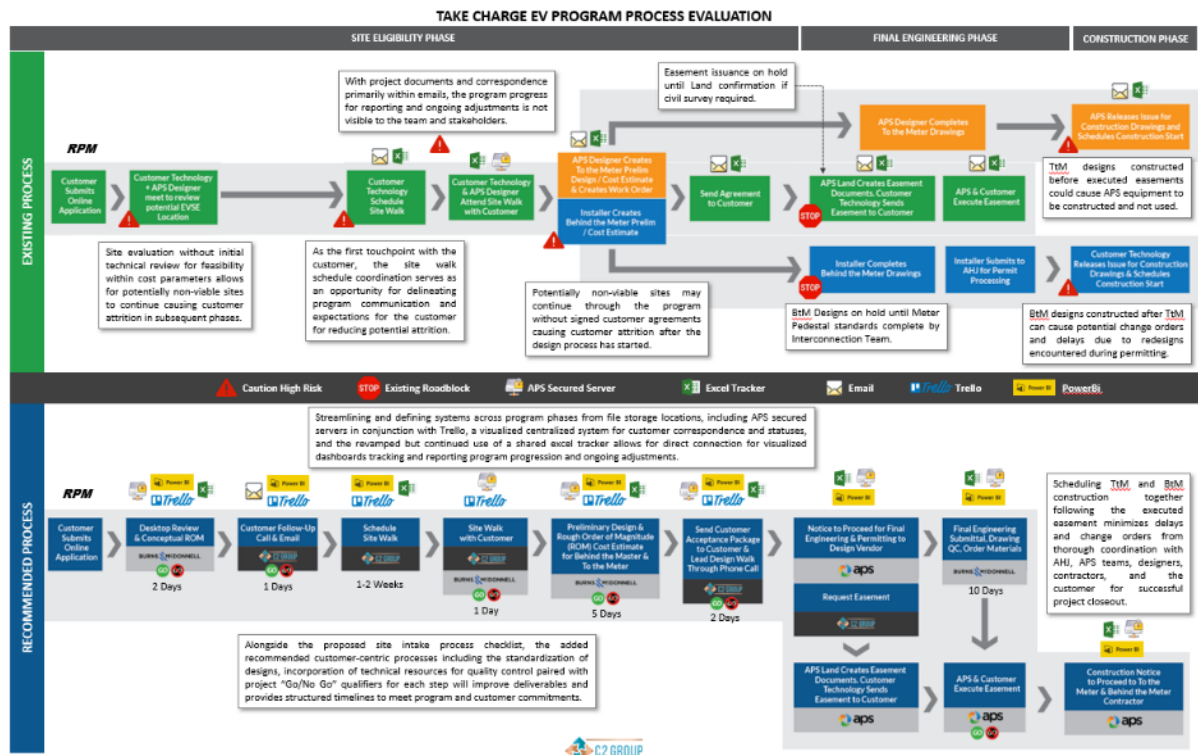


Burns and McDonnell  
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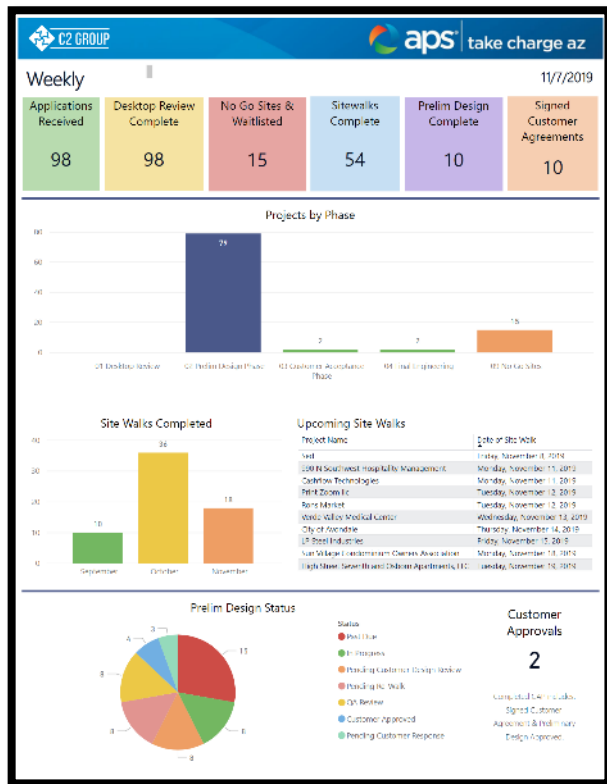
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# Program Progress – A Good News Story

Customized dashboards updated in real-time provide insight into program progress, allows for identification of potential bottlenecks earlier on and increases accountability with program partners.

## Dashboard November 2019



Visibility into the program phases

Identify performance markers

Provide benchmark for strategy pivot

## Dashboard March 2020

