

Implementing Distributed Energy Resources in Austin

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Austin Energy Green Building



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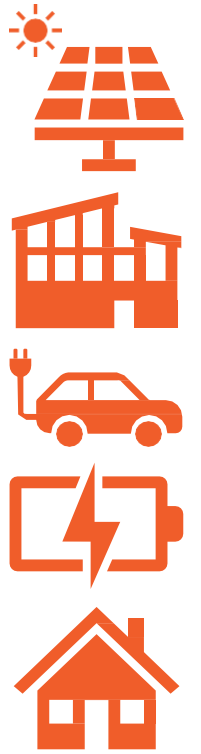
About Austin Energy

- 3rd Largest City Owned utility in the U.S.
- Fully integrated
- Established in 1895 with a culture of civic engagement & innovation



Austin Energy/City of Austin Goals

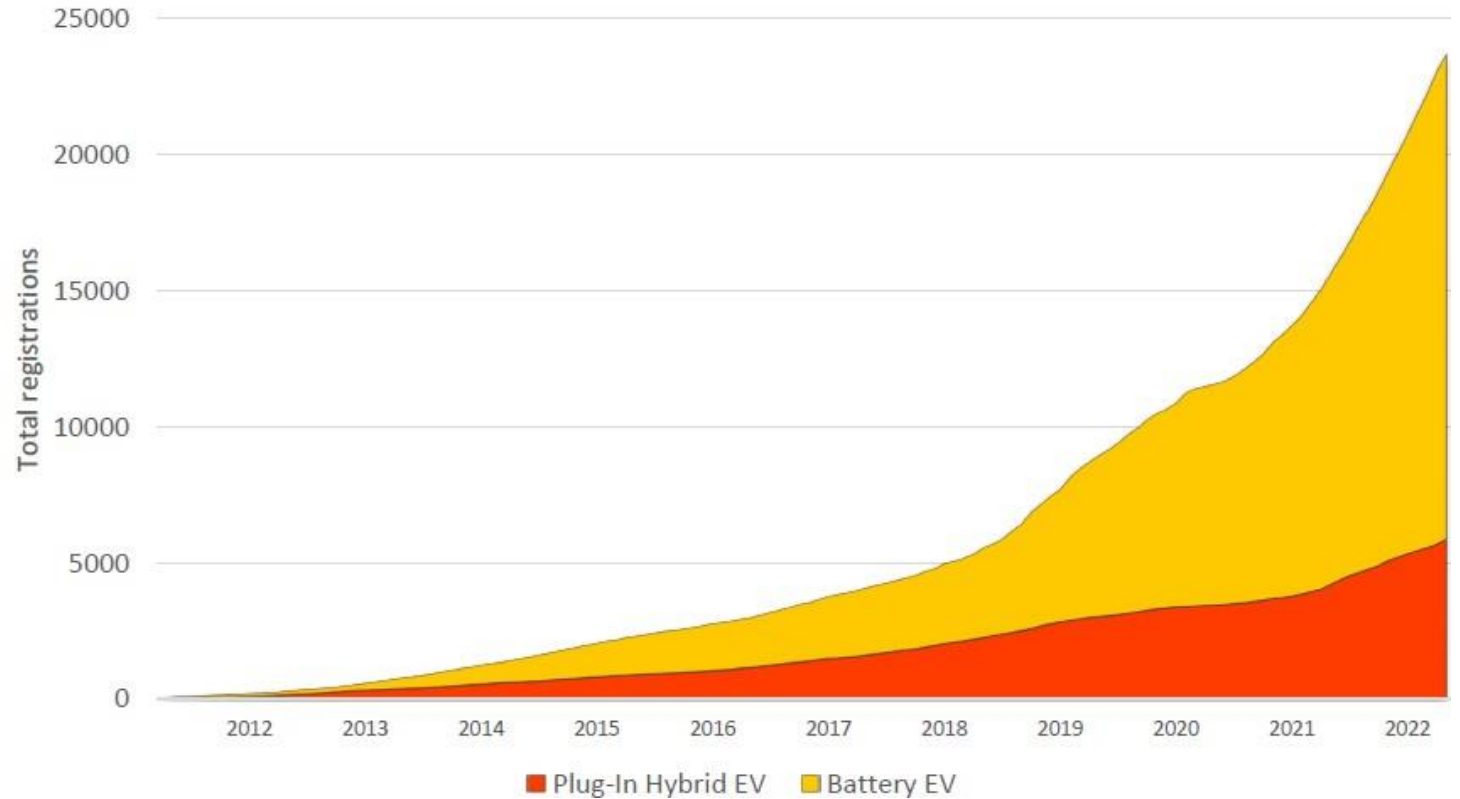
- Achieving 100% carbon-free generation by 2035
- Saving 900 Megawatts through energy efficiency and demand response by 2025
- 375 MW of local solar generation by 2030
- Net-Zero community wide greenhouse gas emissions by 2040



Electric Vehicle Growth in Austin

23,694 EVs in the Austin metro

Record EV registrations in the last quarter also means that there are currently more EVs being driven in Austin than ever before.



Strategy

Austin Energy's 5 EV Pillar Strategy



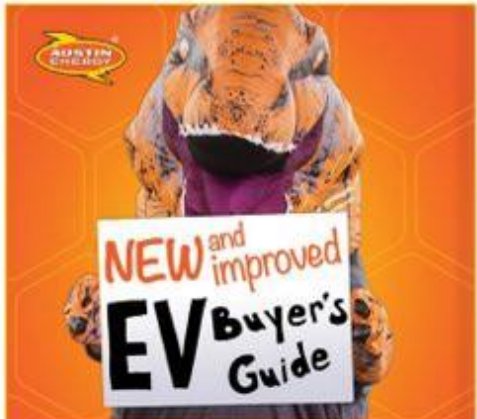
Charging Infrastructure



Equity & Affordability



Fleets & New Mobility



Outreach & Education



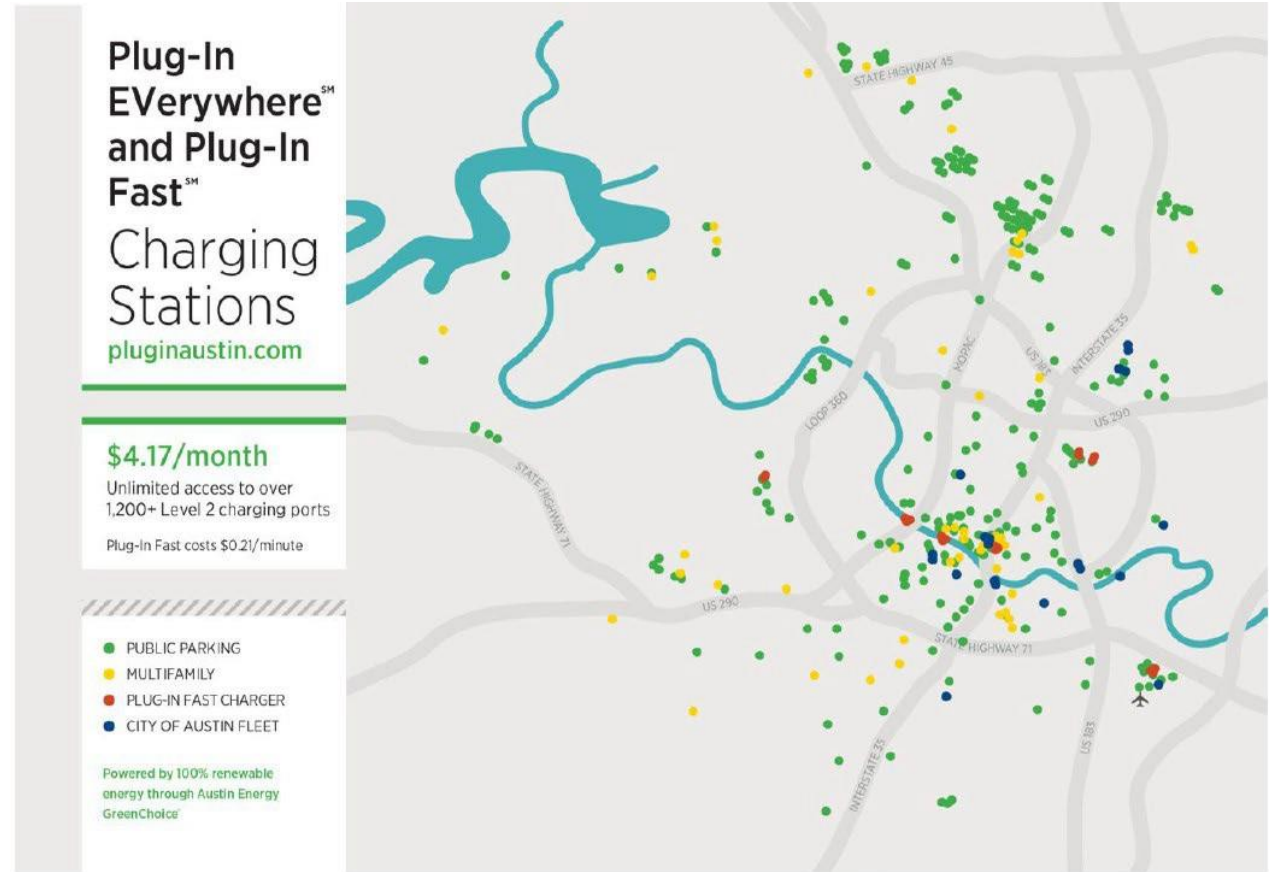
Grid Integration



V2G

Austin Energy EV Charging Programs

- **Plug-In EVerywhere™ Driver Program**
 - \$4.17/mo unlimited charging at 1300+ Level-2 ports
 - \$0.21/min DC Fast charging
- **Plug-In EVerywhere™ Infrastructure Rebate Program**
 - Up to \$1,200 rebate for home Level-2 (\$900 for non wi-fi)
 - Up to \$4,000 rebate for commercial/public Level-2 stations
 - Up to \$10,000 rebate for public DC Fast stations
- **Fleet & Public Infrastructure Pilot Tariff**
 - Commercial “zero energy charge” tariff promotes efficiency and high usage



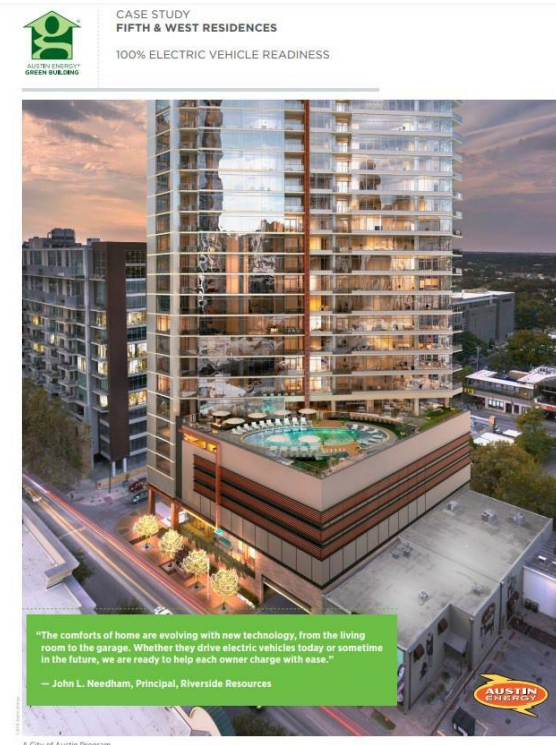
EV Readiness

Goals

- Make at least 10% of all new parking spaces EV Ready
- Significantly reduce future costs for charging infrastructure

Requirements

- Installation of conduit/raceway
- Service Panel Capacity
- Distribution Transformer Capacity
- Sizing – (min 40-amp, 240 Volt)
- Standards based (Includes National Electrical Code Article 625 and Texas Accessibility Regulation)

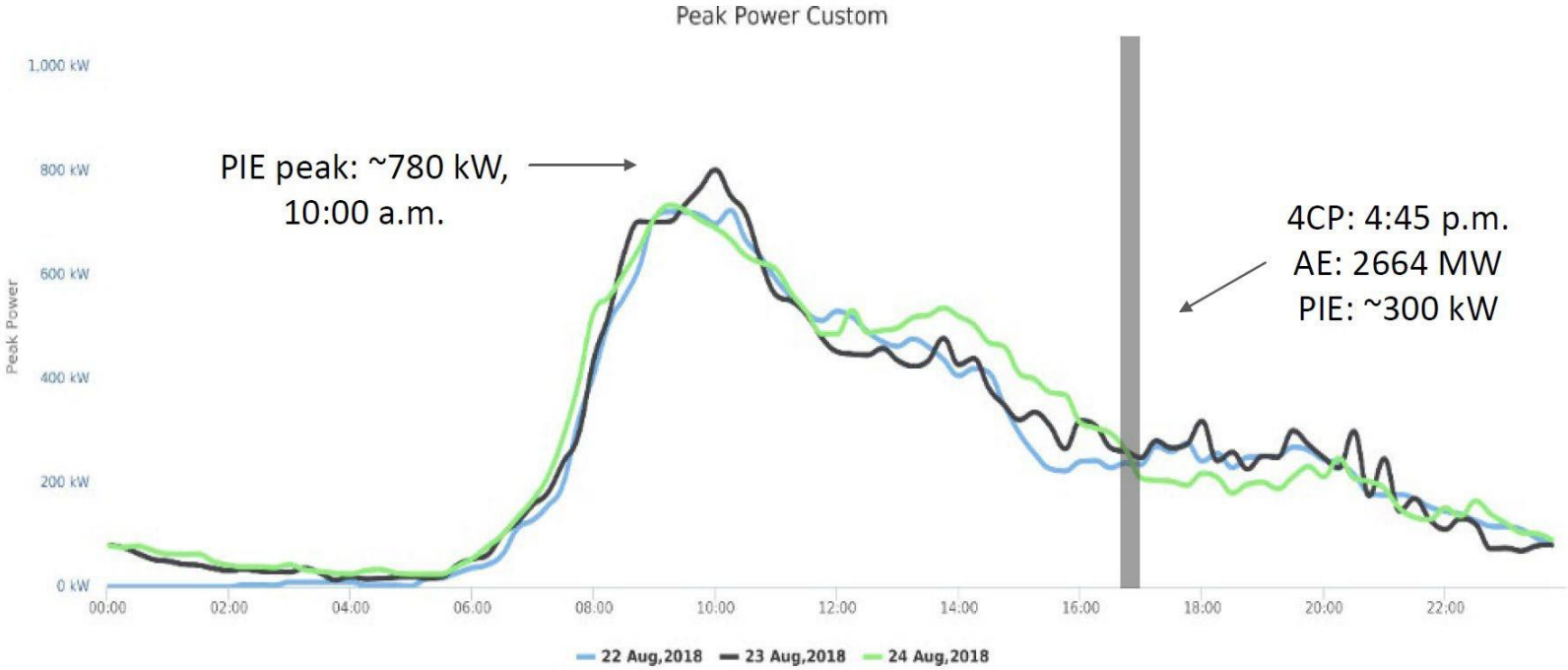


Austin case study on 100% EV Ready

Load Curves for Public Charging

PIE Demand Curves

4CP Contribution – August 2018



August 23, 2018 EV Peak Demand

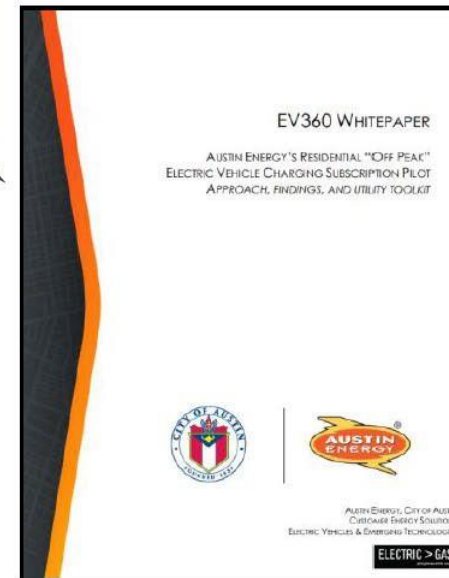


EV360 Pilot Program, Off-Peak Charging

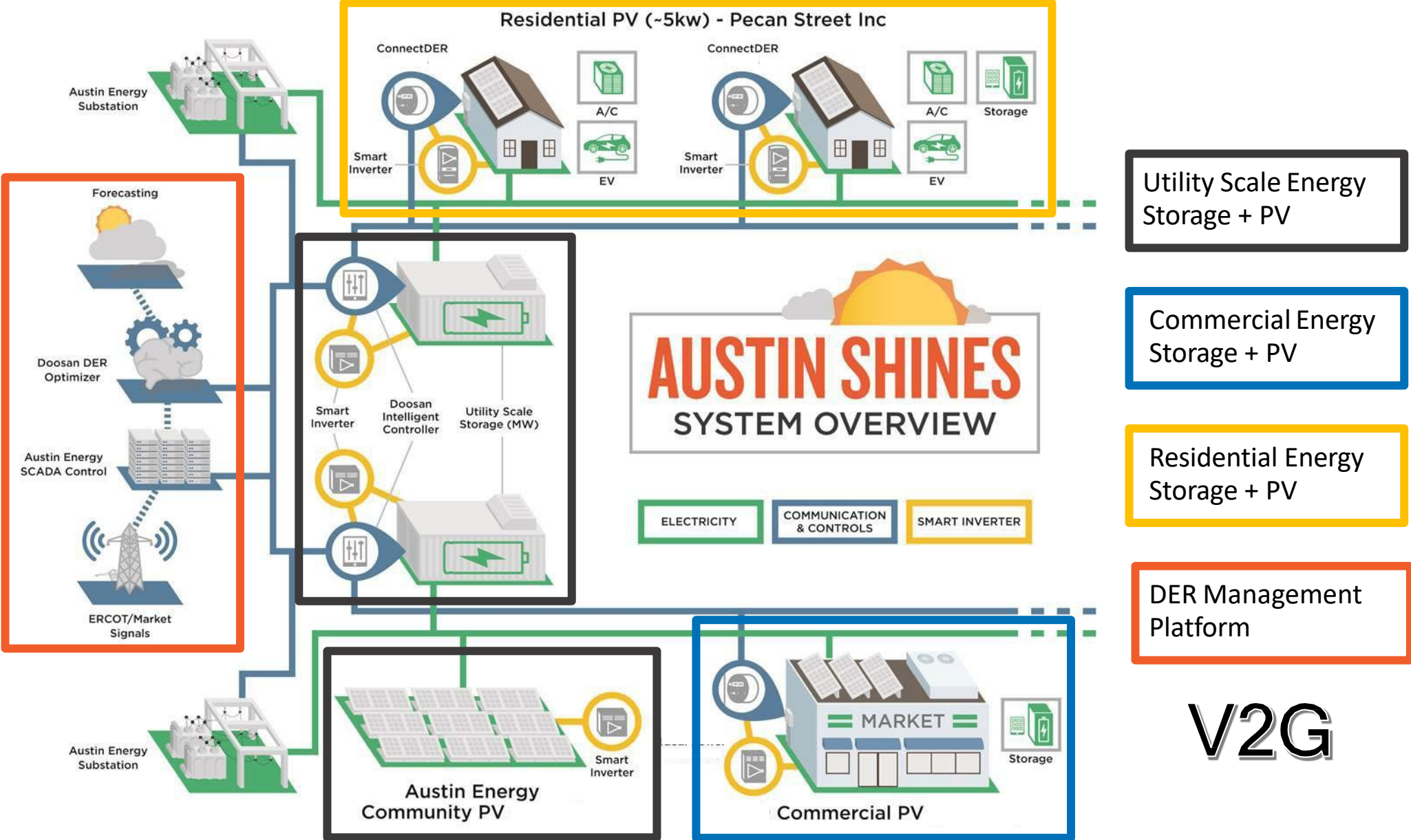


- Tiered Level 2 rebate - \$1,200/\$900 based on WiFi enabled
- EV360 Time of Use (TOU) pilot underway – \$30/month “home & away”

White-
Paper
Available

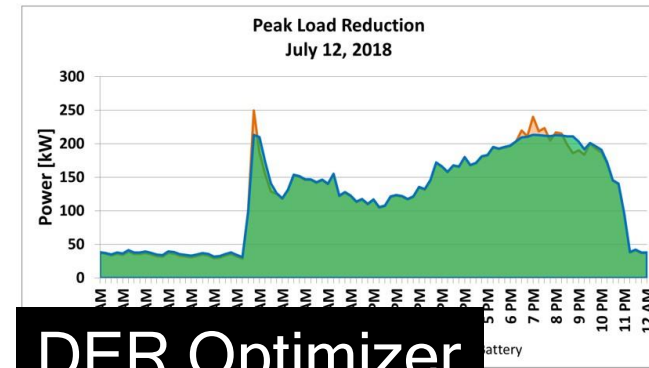


Austin SHINES Project



V2G

Austin SHINES Deployment



DER Optimizer

Commercial Storage



Residential Storage & PV Solar



V2G



Grid Storage & PV
Solar

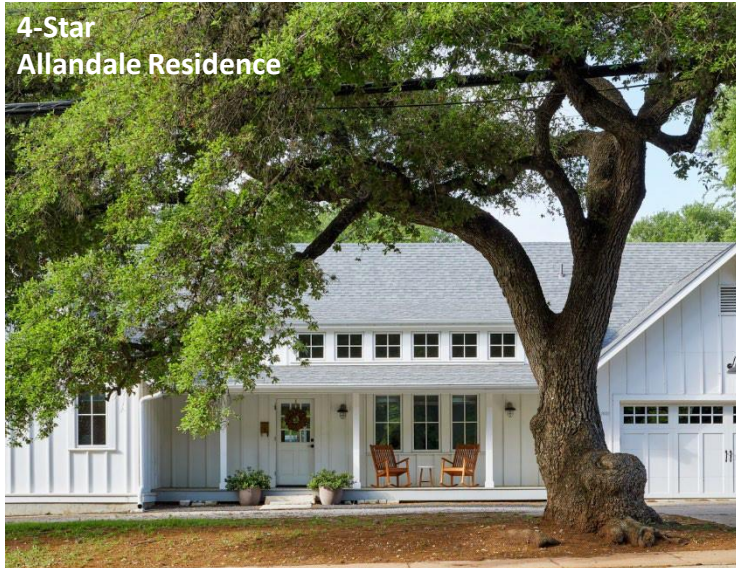
Austin Energy's New HQ

- Implementation Case Study



Austin Energy Green Building Ratings

Austin Energy Green Building (AEGB) rates new construction and major renovation projects for three markets



4-Star
Allandale Residence

Single Family

Production & Custom Homes

18,113

15,824 Austin | 2,289 Extended Area



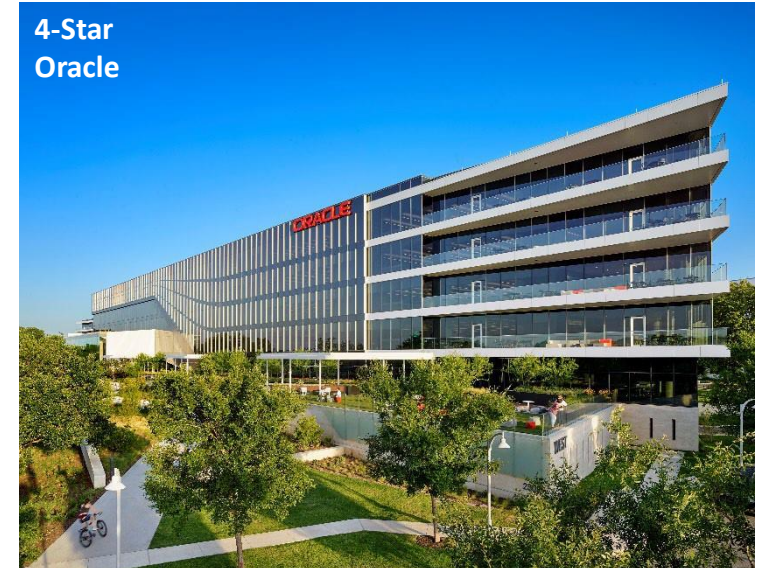
5-Star
Bluebonnet Studios

Multifamily

Residential < 7 Stories

196

38,243,139 sq. ft. | 32,833 dwelling units



4-Star
Oracle

Commercial

& Residential > 7 Stories

327

41,426,144 sq. ft. | 12,080 dwelling units

18,636 AEGB rated projects

total reported from FY 1991 - 2021

Austin Energy Corporate HQ

- Completed in 2021
- 277,000 Square Foot Class A Office Building
Accommodate 1,100 + employees, expandable to
377,000 square feet
- Public displays and community meeting/event
space



The City of Austin took a new approach to facility acquisition, using a private developer with fixed-price and delivery date.



Sustainability at AEHQ

- **AEGB 5-Star Rated**
- On-track for LEED Platinum
- Targeting WELL Building Gold Certification

DERs at the AEHQ:

- Energy efficiency
- District cooling
- Demand response
- Renewable energy
- Electric vehicle charging

To improve the health of building users through physical activity and design that encourages short bouts of activity



Building Energy Performance

- The energy model demonstrates the building performs **65% better** than a building built to code
- The energy savings derive from efficiencies with the building envelope, LED interior lighting, efficient water heating, and efficient HVAC

To reduce the environmental and economic impacts associated with energy use by designing energy efficient buildings and associated systems

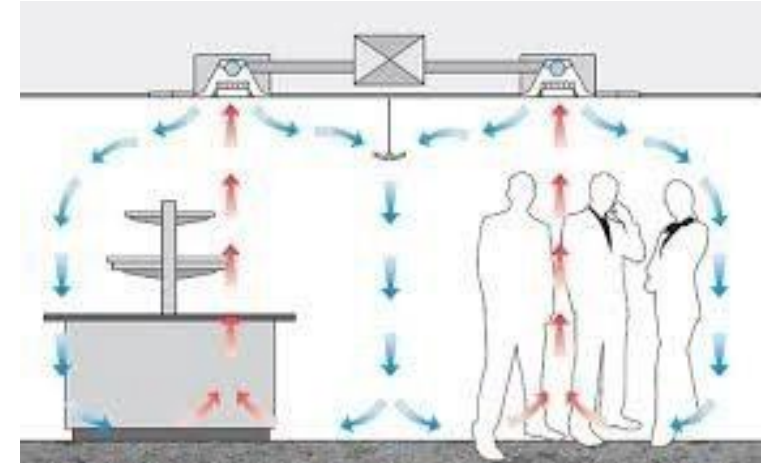
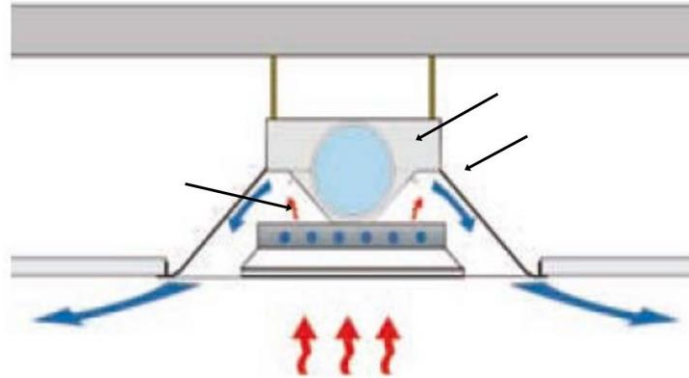


To increase demand for district cooling systems that make energy distribution systems more efficient, increase system reliability, and reduce environmental impacts and greenhouse gas emissions

District Cooling

- The building receives Chilled Water from the **Mueller Energy Center (MEC)** through the district-wide chilled water loop.
- Using the centralized chiller system **free up the roof space** to be maxed out with solar panels
- **Thermal Energy Storage** at the MEC shifts our cooling load to the evening when there is less demand for energy on the grid and prices are often lower

Chilled Beams



What are they?

Convection HVAC System that chills the air around it; use water to transport heating and cooling in lieu of air systems

What are the Benefits?

Higher levels of thermal comfort, less noise, more efficient, less expensive and material intensive compared to air duct systems, conducive to flexible space layouts

What are the Drawbacks?

Can create issues with condensation therefore shouldn't be used in highly humid spaces (eg: gyms), can't be used where there are high ceilings; require a different type of heating





Demand Response

- The building is enrolled in **Austin Energy Load Cooperative** and contributes energy demand reductions in response to price or other signals.
- The building is designed for **Auto-DR** and can respond without the need for human intervention

To promote participation in demand response programs that reduce peak demand on the electric grid, increase system reliability, make generation and distribution systems more efficient, and reduce environmental impacts and greenhouse gas emissions



Renewables

- A **647 kW-DC PV** System was installed that meets **~60%** of the building's annual electrical energy usage
- The array featured **bi-facial panels** at the perimeter which are more attractive from below, and do double duty by capturing light reflected from below

To reduce the environmental and economic impacts associated with fossil fuel energy by increasing on-site energy generation through the use of renewable energy technologies (such as photo voltaic panels, solar thermal and wind turbines)



Electric Vehicle Charging Stations

- The Mueller neighborhood hosts DC Fast Charging Stations at the nearby Mueller HEB supermarket
- **32 Installed Charging ports**, or 3% of the parking stalls are equipped with electric vehicle charging capabilities

To revitalize communities, utilize existing infrastructure, ease development pressure on undeveloped land, and improve and protect the environment by developing brownfield sites



Electric demand reduction

- The EEMs result in an estimated 20% lower peak demand vs. a code minimum baseline.
- Chilled water thermal storage at the district plant offsets an estimated 10-20% of the building's summer peak load.
- Output from the roof-mounted PV system is capable of matching nearly all the remaining summer peak demand.

We will understand this better soon by looking at the actual operational data. A high-fraction of employees working from home upends some of the design assumptions!

To reduce peak demand on the electric grid, increase system reliability, make generation and distribution systems more efficient, and reduce environmental impacts and greenhouse gas emissions.



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