

Fleet Electrification Transition Plan: Project Summary

PUP 424: Research Methods &
SOS 324: Sustainable Energy,
Technology and Systems

Project Description:

The City of Glendale has begun the process of replacing some of its gasoline-powered fleet vehicles with battery electric vehicles. So far, the City has purchased 4 Nissan LEAF vehicles and installed 4 charging stations. Students researched a variety of issues related to fleet electrification to inform the City of Glendale's transition process.

The two classes included 8 student groups, each focused on a different aspect of the electric vehicle transition:

- Based on cost and usage data from the City, how much money will battery electric vehicles cost or save?
- What can we learn by looking at how other cities and large organizations approached electrifying their vehicle fleets?
- What are City of Glendale employees' concerns and expectations for City fleet electrification?
- How are electric vehicle batteries affected by the extreme Phoenix heat in terms of both performance and length of life?
- Which type of charging station is most appropriate for Glendale?
- Given fleet usage, how many charging stations will the City of Glendale need per electric fleet vehicle?
- Where should future public charging stations be located in the City?
- If and when Glendale invests in public charging stations, how should the City regulate their use?

Methods:

The methods employed to answer these research questions ranged from literature review to original survey data collection.



Figure 1: Students from two courses participated in this project: PUP 424 Planning Research Methods (left), and three honors students in SOS 324 Sustainable Energy, Technology and Systems (right)

Results & Recommendations:

- Given the low mileage of most City of Glendale fleet vehicles, it is unclear whether electrifying the fleet will save the City money.
- One student team found that city employees are nervous about the vehicles' range, even though another team's research clearly showed that the Nissan LEAF range is more than enough for nearly every City business-purpose trip.
- To maximize the cost-saving and environmental benefit potential of electric vehicles, the City of Glendale should aim to make the Nissan LEAFs the first choice for city employees who need to travel for City business.
- To accomplish this, the City of Glendale should make sure to market the new electric fleet vehicles internally to employees, and include reassuring data about the vehicles' range.
- Because the Phoenix summer heat can have negative effects on battery performance and life, the City should store their LEAF vehicles in the shade whenever possible.
- As Glendale looks to the future, we recommend that the City consider investing in electric vehicle charging infrastructure that is available to residents as well as city employees.
- Care must be taken in choosing where to locate public charging stations (and our students have some specific recommendations), as well as deciding whether to use a pricing scheme or another mechanism to make sure that users share the infrastructure.



Figure 2: In January 2019, students visited the Glendale Operations Center for a private tour with Fleet Superintendent, Montana Slack. Students also participated in a research strategy session on-site over lunch.

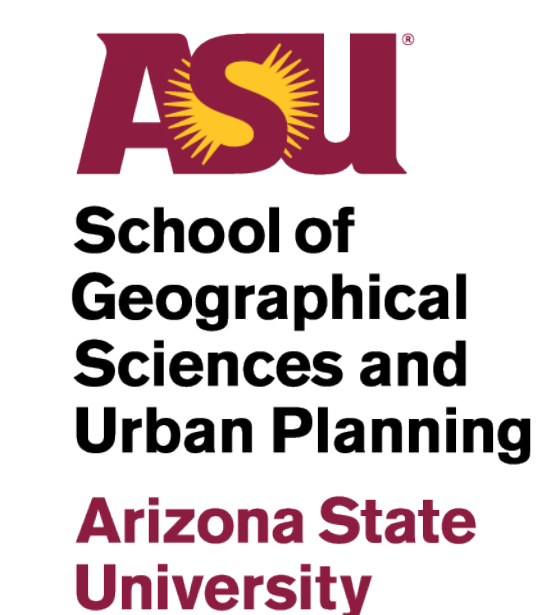


Amanda McKeever

Field Operations Administrator
Project Lead

Michelle Woytenko

Director of Field Operations
Project Lead



Dr. Deborah Salon

Assistant Professor, School of Geographical Sciences and Urban Planning
PUP 424: Research Methods

Participating Students

Rashid Al Hajri	Fahad Albadain	Mohammed Alhajri
Abdulla Al-Marri	Gunnar Chiesa	Nawaf Alboadani
Abdulmagid Bawazair	Hamad Alhazza	Nayeli Sanchez Luna
Ali Bhalloo	Haolin Du	Nicholas Leftwich
Brandon Samwick	John Rosenberg	Saeed Qarh
Cameron Cramer	Kelly Bitler	Taha Almalki
Daniel Loftus	Lydia Schultz	Weigang Cao
Dionne Brown	Masoud Almarri	Weijian Zeng
Esteban Fuerte	Michael Cleveland	Yanzhi Zhang

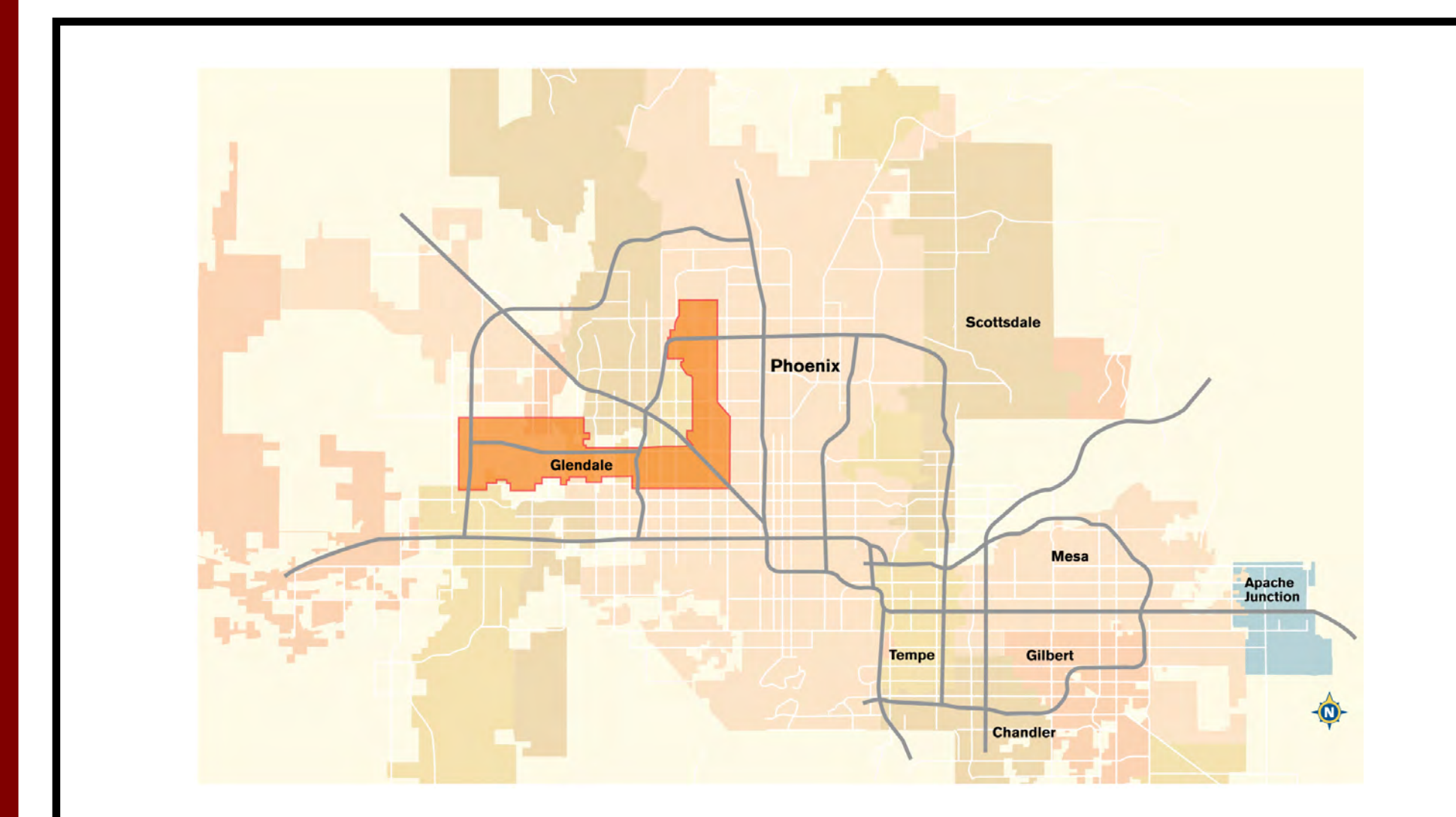


Dr. Nathan Parker

Assistant Professor, School of Sustainability
SOS 324: Sustainable Energy, Technology and Systems

Participating Students

Alise Crippen	Henry Pearson	Kevin Goddard
---------------	---------------	---------------



Email your project comments to: ProjectCities@asu.edu