



# Secretary of Natural Resources Division

# CWY D&C D&SOA

Cherokee Nation and vehicle electrification



# ...build it and they will come.

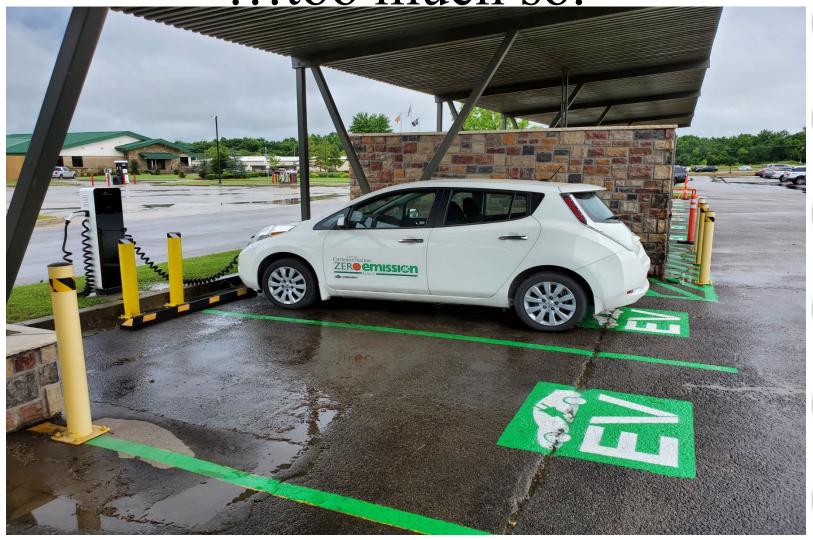


...and they did.

# ...and then the kept coming.



...too much so.



### Lessons learned

### • Fuel Anxiety:

- The entire concept of vehicle electrification is deemed with a significant amount of suspicion (somewhat akin to how the introduction of soccer in the early 1970's was thought a communist infiltration plot by some)
- There are 2 kinds of people...those that do like EV's and those that do not (precious little in-between)



Why is this not cool??!?!.

### • Initial Fleet Purchases:

- · Good deals, OEM's have been very helpful
- Tax credits???

### Initial driving impressions:

- "Wow, this is a real car...I thought it would be like a golf cart!"
- Money talks!

### • Range Anxiety:

- It is real...an affliction suffered more by Boomers than Millennials
- For the most part it is unwarranted (here in OK)

#### • Misc:

- Most gas pumps work...most EV charging stations work, but there is an issue of availability
- DO NOT BUY CHARGERS REQUIRING HAND-WINDING OF CORDS!!!

-women hate them!-

- What you buy today was outdated last year⊗
- Level II works...but nobody wants it. "GIVE ME LEVEL III AND NOT ONE OF THOSE CHEAP 60Kw UNITS!"
- Solar integration looks good and is inexpensive....but the integration is hard and Utilities hate it.

#### • The Future:

- Level III IS GOING to tax the capacity of Utilities (we need to look at these newer BBU units).
- The "switch" seems inevitable...because of greed and laziness

### The 3 types of liars:

- 1. Liars
- 2. D@mn liars!
- 3. Contractors and subcontractors....construction is hard/very technical/expensive

### • Utilities:

- They need education!
- They can be very cooperative...or not (remember "fuel anxiety")
- "Chicken or the Egg"...demand rates/charges can squirrel things quickly
- Their 3 biggest woes when it comes to electrification
  - 1. Capacity
  - 2. Capacity, and
  - 3. Capacity...right now, the power is not there for the future.

### • Interconnectivity and Commissioning:

- Expect problems
- Demand interconnectivity...it is going to happen anyway
- Draft contracts carefully...incorporate "percentage of operability"
- Choose Cons and Subs wisely...beware the low bid!
- Prices are increasing rapidly!!!

# **Heavy Duty!**



# **Transit**



...it's a long story

# **Transit**





# **Transit**



Never pass up a chance to pass on the language®

# **School Bus**



...it is not a long story

## Lessons learned

• Fuel Anxiety...there are 2 kinds of people...those that do like EV's and those that do not (including HD vehicle managers). GET THE RIGHT PEOPLE ON BOARD FIRST!

#### Initial Fleet Purchases:

- Finding good deals...forget it, you are going to pay...a lot.
- Do the math, cradle to grave, include infrastructure, then proceed.

### Initial driving impressions:

- "Wow, this is a real truck...I thought it would be like a golf cart!"
- Money talks...much louder than in the LD spectrum.

### Range Anxiety:

- It is real...and ignored at one's own peril.
- Season, weather, roads, load, topography, etc.

### Misc:

- Most diesel pumps work...most EV charging stations work, but there is a BIG issue of availability (can you afford redundancy?).
- What you buy today was outdated last year ... this industry seems to be changing more rapidly than in the LD world.
- Level II...nope. Level III and do not spare the kW's.

#### • The Future:

- Level III IS GOING to tax the capacity of Utilities (we need to look at integration in the beginning stages of construction).
- The "switch" seems inevitable...because of economics

### • The 3 types of liars:

- 1. Liars
- 2. D@mn liars!
- 3. Contractors and subcontractors....construction is hard/very technical/expensive

### Utilities:

- They need education!
- They can be very cooperative...or not (remember "fuel anxiety")
- "Chicken or the Egg"...demand rates/charges can squirrel things quickly
- Their 4 biggest woes when it comes to electrification
  - 1. Capacity
  - 2. Capacity
  - 3. Capacity, and
  - 4. Capacity...right now, the power is not there for the future.

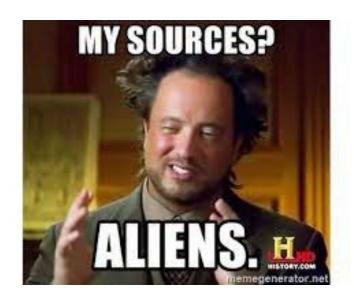
### • Interconnectivity and Commissioning:

- Expect MAJOR problems
- Demand interconnectivity...OEM's are engineering, designing, and building in vacuums. No economic model can withstand the additional costs of proprietary infrastructures.
- Expect failures...this tech is much newer and far less tested than in the light duty realm
- Redundancy...can you afford it?
- Draft contracts carefully...incorporate interconnectivity and "percentage of operability"
- Choose Cons and Subs wisely...beware the low bid!
- Vehicle prices are moderating...infrastructure costs are increasing geometrically!!!

### Too much a good thing:

- Success can be dangerous
- Success can lead to unobtainable demands
- Search out the programs...NOW!

# Electric Vehicles...



...do not be shocked by their success.