

Argonne Energy Systems & Global Security Sciences Capabilities in Support of PEVs

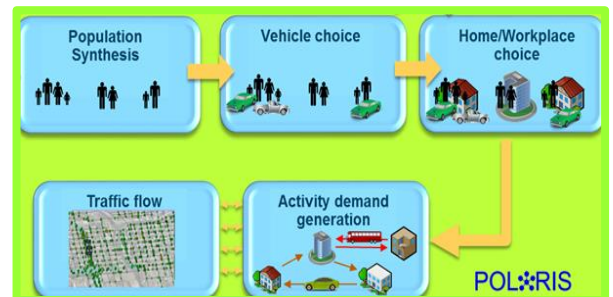
Techno-Economic Analysis

- ❑ Cost analysis of DCFC & extremely fast charging; H2 fueling (HDSAM)
- ❑ Vehicle system simulation (Autonomie) & testing (APRF)
- ❑ Risk analysis of programmatic objectives & impacts
- ❑ Employment analysis of EV & FCEV deployment (JOBS)
- ❑ Battery manufacturing & recycling analysis: Cradle-to-Grave economic & environmental impacts of Li-ion batteries
- ❑ Emissions and Economic Analysis of fleet vehicles (AFLEET)
- ❑ Battery cost modeling (BatPac)
- ❑ Environmental & economic analysis of PEVs & EVSE



Spatial Analysis

- ❑ Transportation system modeling & travel demand simulation (Polaris)
- ❑ Power supply & EV charging demand
- ❑ Population & activity modeling of metro areas & corridors (ChiSim)
- ❑ EV adoption in personal vehicles
- ❑ Behavior & energy implications of CAVs
- ❑ Electric system modeling & simulation
- ❑ Air quality indices
- ❑ Cyber & physical infrastructure vulnerability analysis

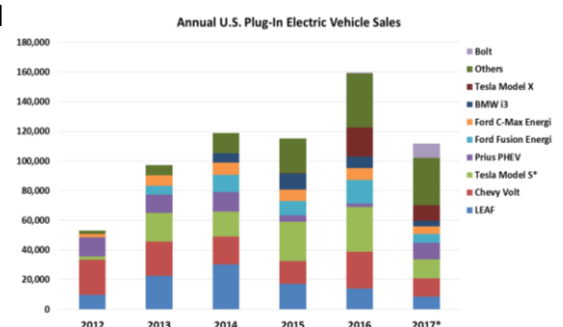


Education & Outreach

- ❑ Midwest EVOlve partnership: Analysis support to 7 states as part of DOE's PEV showcase grants
- ❑ EVolution: Informing Your Choice for a Smart Purchase
 - Powertrain comparison based on consumer needs eliminates bias from pre-conceived notions of models & technologies
 - Calculates energy use & emissions, not just \$ saved
 - Zip code-level data provides customized results
- ❑ EV adoption analysis
 - Monthly sales tracking by make & model
 - Impacts of household demographics, incentives, EVSE availability, weather, utility involvement, etc.
 - Win-Win Smart Charging Practices



EVOLUTION
CHOICES FOR A
SMARTER PURCHASE

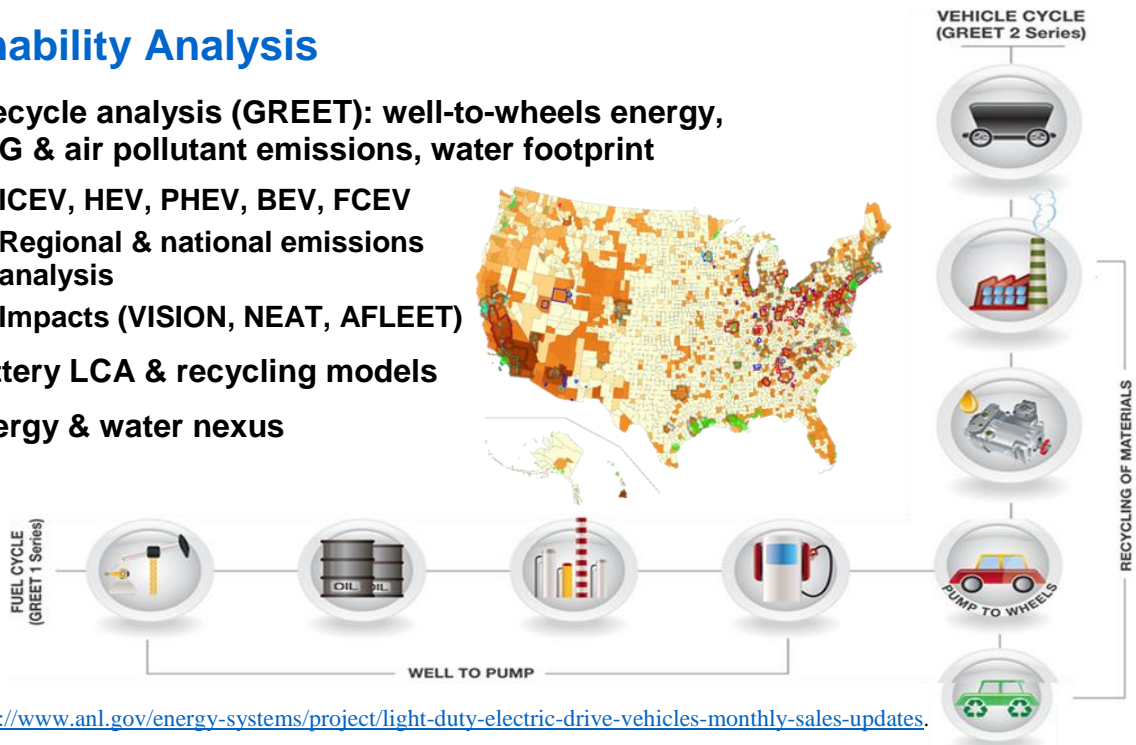


- **Corridor coalitions (I-80, I-90/94, I-95)**
 - FHWA Alternative Fuel corridor designation of I-80 (NJ to Omaha) & continued stakeholder coordination
 - M2M (I-94) & NE Diesel Collaborative (I-95) coordination
- **Stakeholder relations (Clean Cities, energy & EVSE suppliers, OEMs, etc.)**
 - Nearly 25 years of support to DOE's National Clean Cities Program, its coalitions & stakeholders with analysis & tools.



Sustainability Analysis

- **Lifecycle analysis (GREET): well-to-wheels energy, GHG & air pollutant emissions, water footprint**
 - ICEV, HEV, PHEV, BEV, FCEV
 - Regional & national emissions analysis
 - Impacts (VISION, NEAT, AFLEET)
- **Battery LCA & recycling models**
- **Energy & water nexus**



- <https://www.anl.gov/energy-systems/project/light-duty-electric-drive-vehicles-monthly-sales-updates>.
 - *EVOLUTION* Consumer Tool. <http://evolution.es.anl.gov>.
 - *AFLEET*: Evaluates alternative powertrains and fuels emissions and economic impacts. <https://greet.es.anl.gov/afleet>.
 - *BatPac*: Battery Performance and cost model. <http://www.cse.anl.gov/batpac/about.html>.
- GREET*: Well-to-Wheel GHG and criteria pollutants. <https://greet.es.anl.gov>.



For additional information:

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