Powering What's Next in Freight Transportation

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**Sponsor:** Cummins, Inc.

Project Description

- Develop a holistic model to enable manufacturers and policymakers to design innovation and incentives that achieve desired adoption of low and zero emission Class 8 vehicles

- Increase effectiveness of technology and incentives introduced to target reduction of GHG emissions

Approach

- Use System-of-Systems Engineering methodology
- Develop parametrized, time-varying, Freight Transportation System (FTS) components
- Develop TCO optimization model to represent fleet adoption and vehicle utilization behaviors in a U.S. regional line-haul network
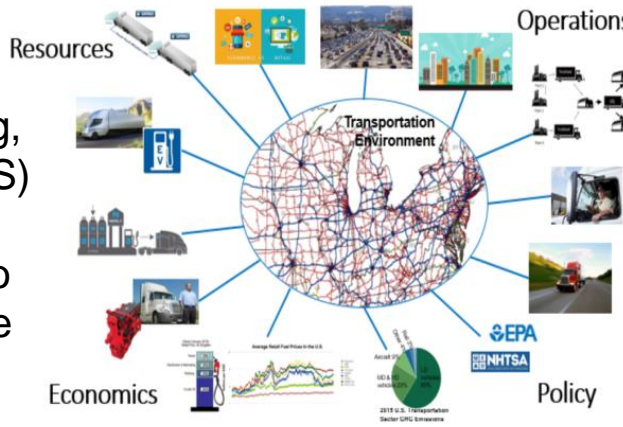
Discussion

- GHG Phase 2 standards cause rapid reduction of CO_2 in 2021, 2024, 2027
- Fast adoption of CNG, 80% by 2028, causes a reduction of 30% in CO_2 emissions
- High adoption of low range vehicles causes shift in freight corridors
- Battery Swap stations enhance adoption of BEVs

Results

Model ➡ **Validation** ➡ **Project Adoption & Emissions**
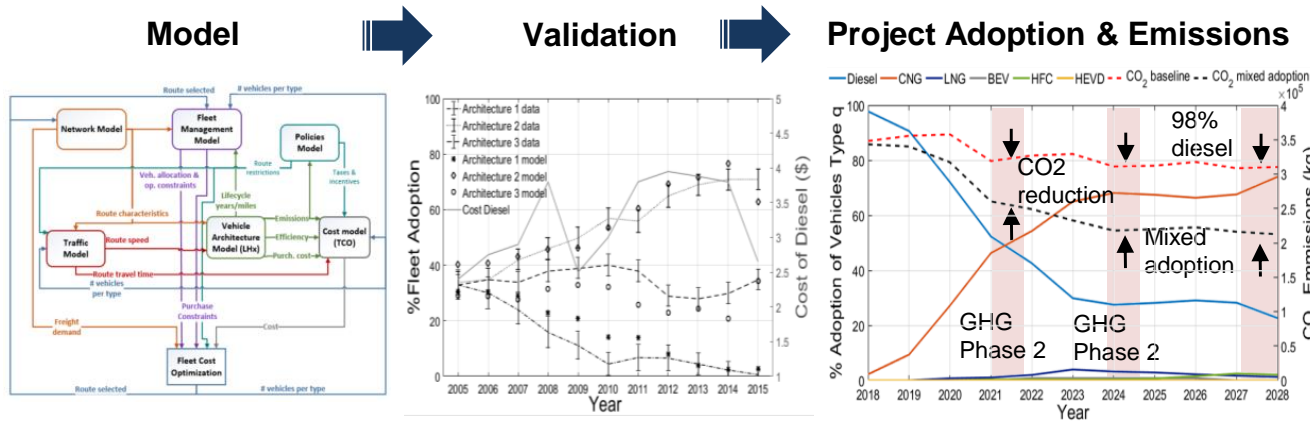
Modeling FTS as SoS allows to project adoption of new technologies and resulting reductions in emissions

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