SAND2019-9453PE

Research Overview & Interest

UCD-Sandia Partnership Program

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PRESENTED BY

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Introduction

Who we are:

A multidisciplinary group with a strong science and engineering emphasis, skilled at anticipating future needs and applying a broad systems perspective.

What we do:

Provide key decision makers with reliable, unbiased and comprehensive information on viable engineering and strategy options for national and global security challenges, and on the effectiveness, risks, benefits, and potential unintended consequences
of those options.

Who am I:

Education: Ph.D. Mechanical and Aerospace Engineering, UC Davis (2018)

Experience:

- Domain: Energy efficiency, renewable energy, transportation technologies, fuel conversion, grid infrastructure, heat transfer and thermo-fluid dynamics

- Tools: Design of experiments, multiphysics simulation, system dynamics, machine learning & statistical, parametric and technoeconomic analysis

External interests: Hiking, swimming, scuba diving, board games

#1 – Intersection of technology and use in heavy duty transportation

Motivation:

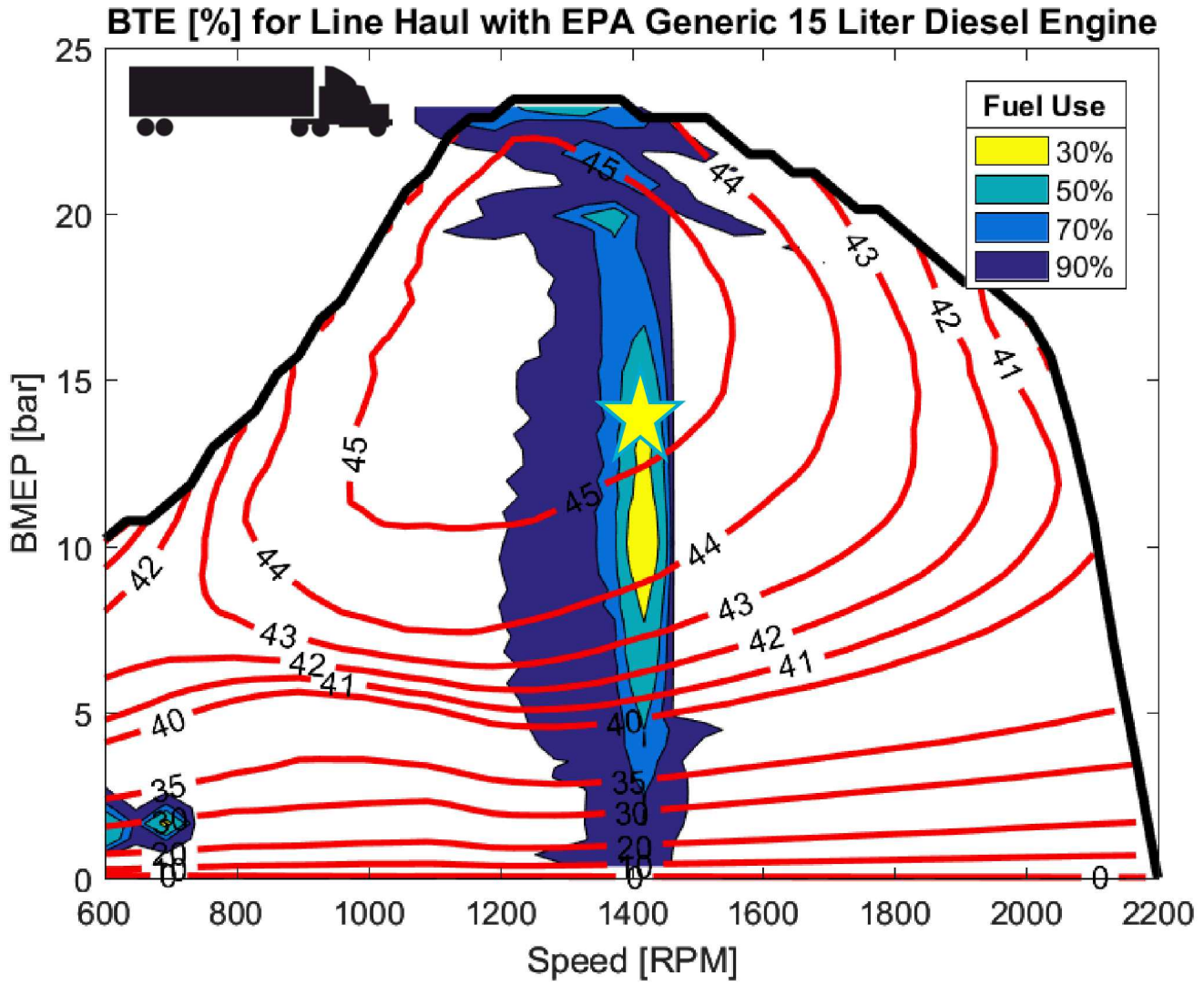
Understand interactions among engine and powertrain subcomponents on efficiency and emissions across load conditions and vehicles, including the associated cost of technology and emissions controls.

Goal:

Inform vehicle technology development by highlighting most impactful potential improvements.

Some ideas for collaboration:

- Laboratory-based engine and powertrain design and data collection
- On-the-road test data



[1] M.Musculus et al. April 16, 2019

#2 - Parametric projections of vehicle adoption

Motivation:

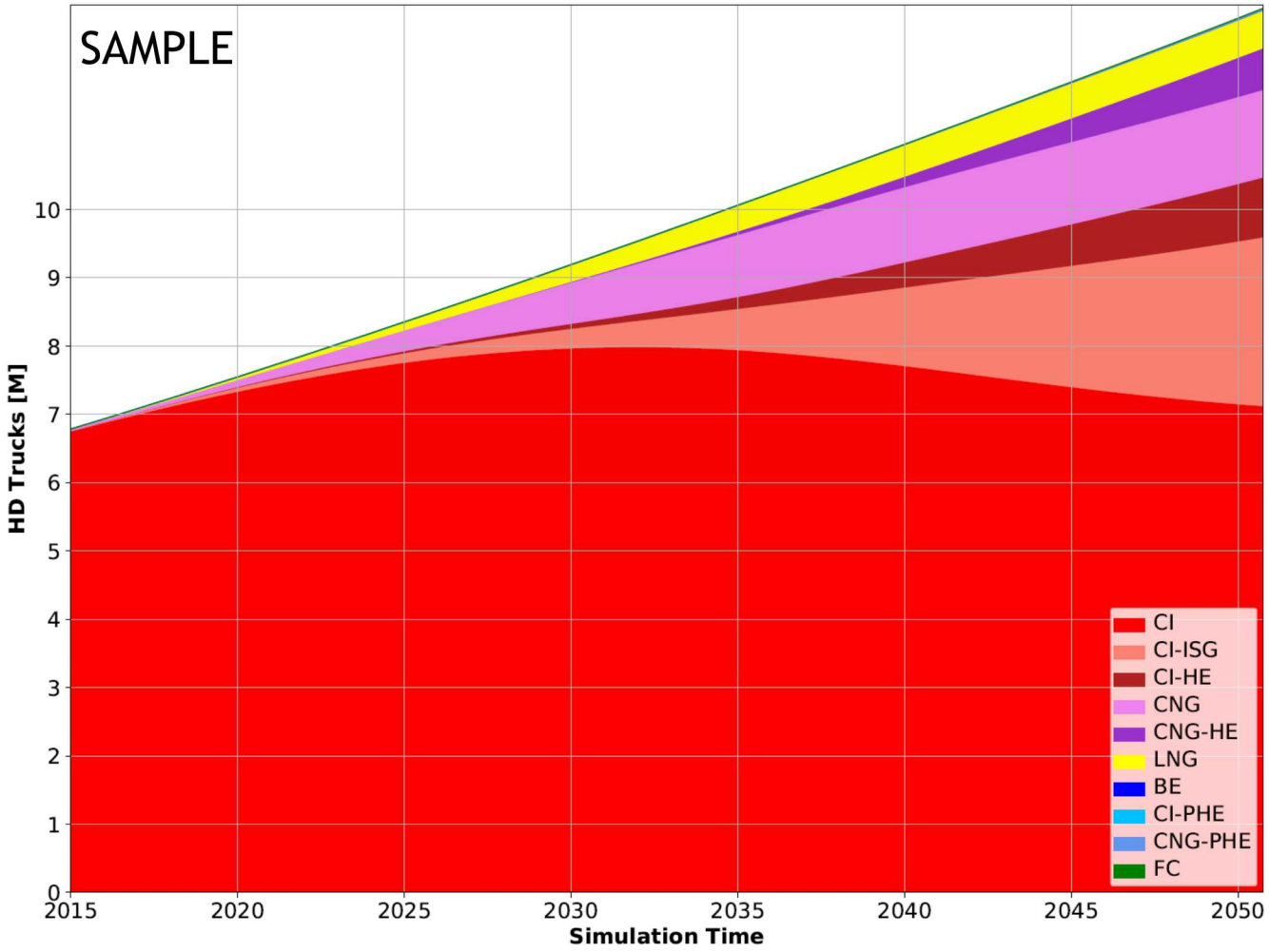
Understand market evolution of light, medium and heavy-duty vehicles across powertrains and vocations, subject to dynamics in costs, preference, availability and policy.

Goal:

Inform broad technology, infrastructure and policy development by highlighting drivers and deficiencies affecting vehicle adoption.

Some ideas for collaboration:

- Data shares – vehicle stock, efficiency, policy, etc.
- Ways to improve/expand system dynamics algorithm



[2] S. Wiryadinata. August 6,2019

#3 – Siting and sizing optimization of alternative fuel production technologies

Motivation:

Understand the potential scale of alternative fuel production technologies, and the competition among them, subject to a multitude of factors:

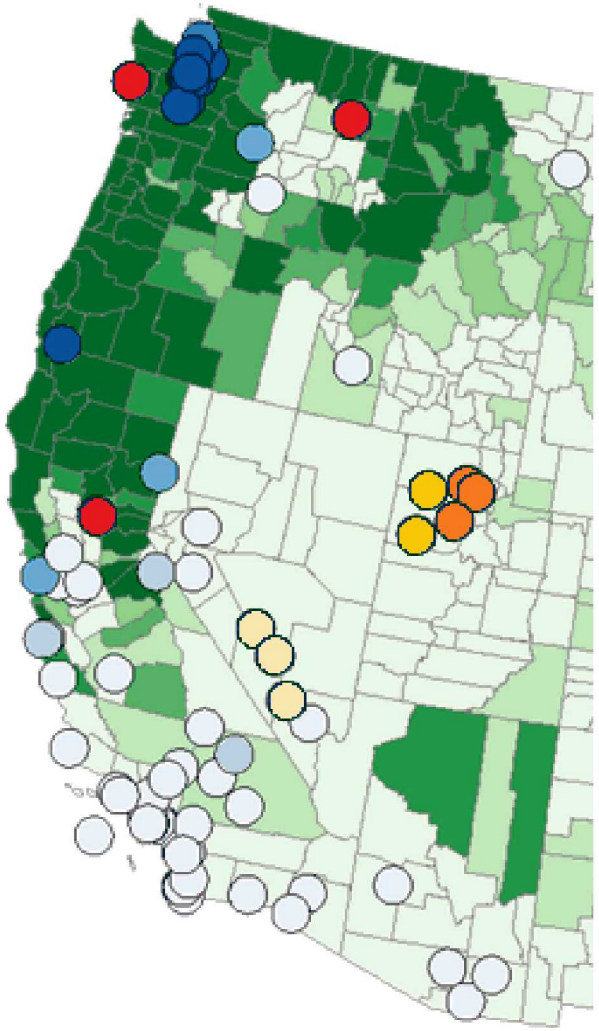
- Source: agricultural & forest residue, energy crop, oils, etc.
- Technologies: FT, HTL, AD, algae-to-fuel, etc.
- Products: gasoline, jet, alcohols, RNG, hydrogen, etc.
- Spatially-resolved fuel demand, logistics, infrastructure and policy

Goal:

Provide decision support for implementing fuel conversion technologies via GIS-based parametric analysis.

Some ideas for collaboration:

- Demonstrate a limited study, leveraging existing work/data



[3] Adapted from S. Paap. May 4, 2010