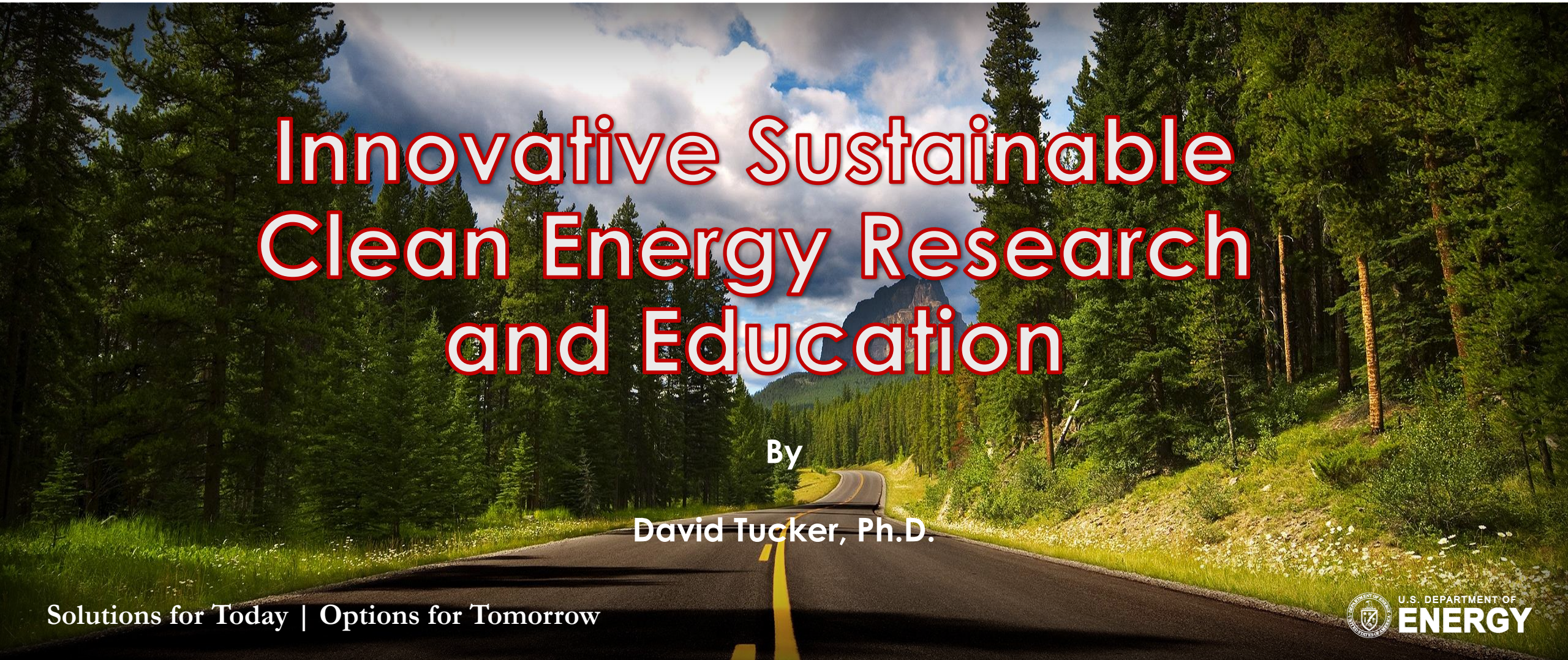
UNESCO Chair

2021 June 14

NATIONAL ENERGY TECHNOLOGY LABORATORY



Innovative Sustainable Clean Energy Research and Education

By

David Tucker, Ph.D.

Solutions for Today | Options for Tomorrow

U.S. DEPARTMENT OF ENERGY

Research Focus by Site

Multiple Sites Operating as 1 LAB System

NATIONAL ENERGY TECHNOLOGY LABORATORY

- Materials Performance
- Alloy Development/Manufacture
- Geospatial Data Analysis

- Process Systems Engineering
- Decision Science
- Functional Materials
- Environmental Sciences

- Energy Conversion Devices
- Simulation-Based Engineering
- In-Situ Materials Characterization
- Supercomputer Infrastructure

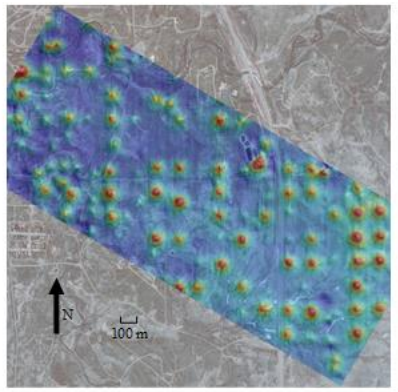
Oil and Gas Strategic Office

Oil and Gas Strategic Office

NETL Core Competencies

NATIONAL ENERGY TECHNOLOGY LABORATORY

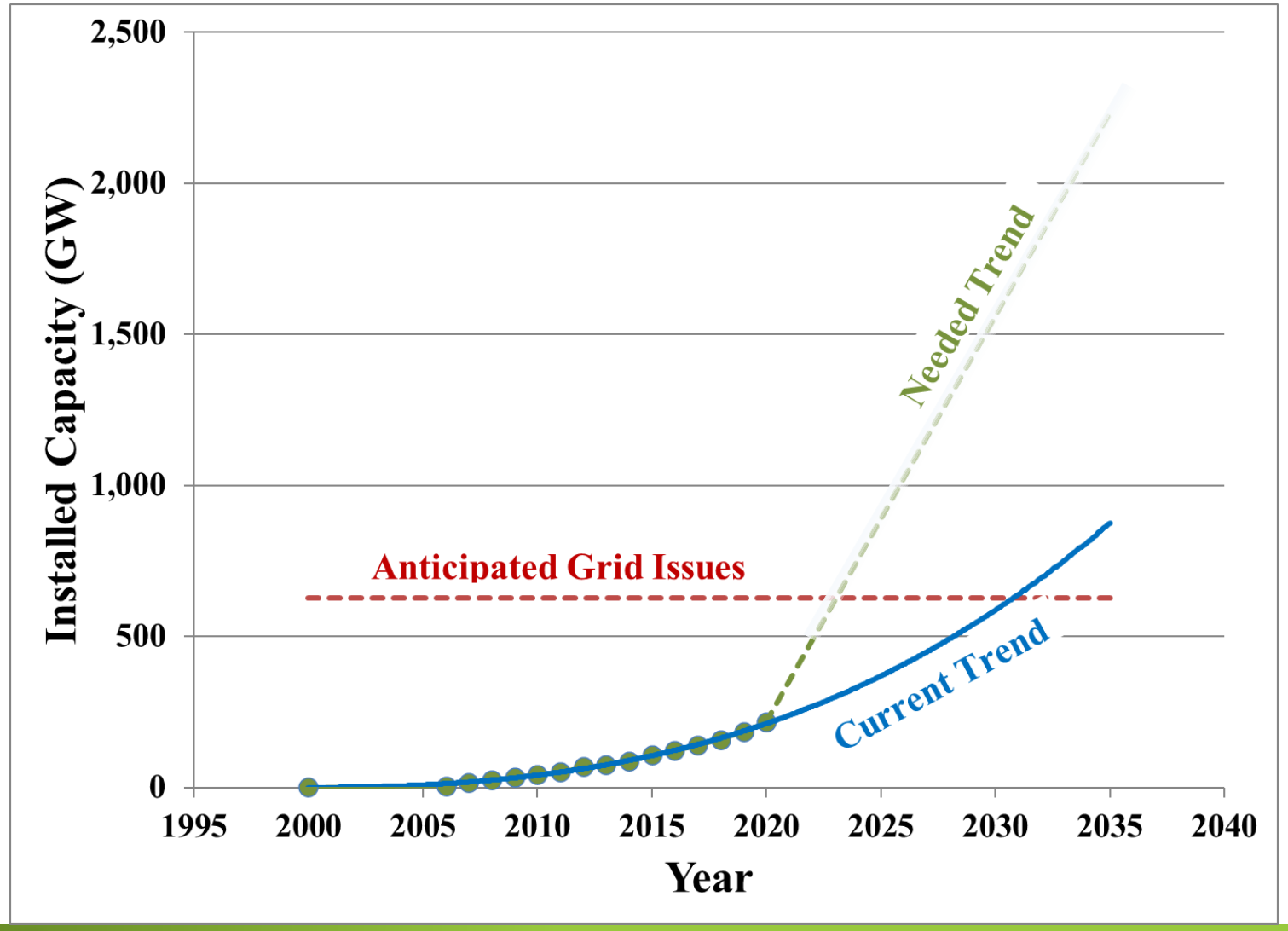
EFFECTIVE RESOURCE DEVELOPMENT • EFFICIENT ENERGY CONVERSION • ENVIRONMENTAL SUSTAINABILITY



COMPUTATIONAL SCIENCE & ENGINEERING	MATERIALS ENGINEERING & MANUFACTURING	GEOLOGICAL & ENVIRONMENTAL SYSTEMS	ENERGY CONVERSION ENGINEERING	SYSTEMS ENGINEERING & ANALYSIS	PROGRAM EXECUTION & INTEGRATION
High Performance Computing	Structural & Functional	Geo-Analysis & Monitoring	Reaction Engineering	Process & System	Technical Project Management
Data Analytics	Design, Synthesis, & Performance	Data Storage, Management, & Analysis	Design & Validation	Multi-scale Modeling, Simulations & Optimization	Market & Regulatory Analysis
Machine Learning	Characterization	Geochemistry	Innovative Energy & Water Processes	Energy Markets Analysis	

Motivation in the U.S.

Combined Solar and Wind

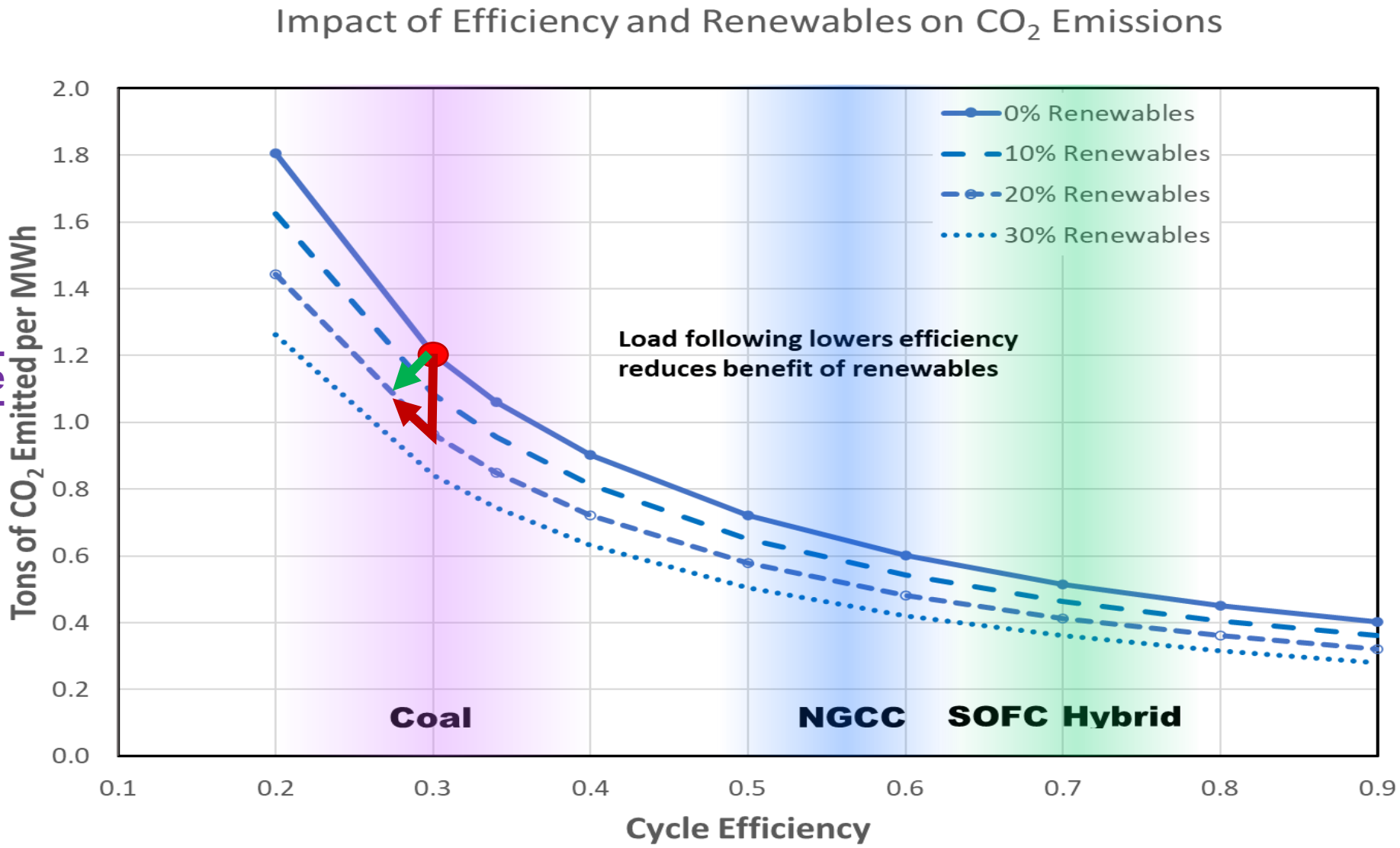


From EO 14008, Sec 205: "The plan shall aim to use, as appropriate and consistent with applicable law, all available procurement authorities to achieve or facilitate: (i) **a carbon pollution-free electricity sector no later than 2035**"

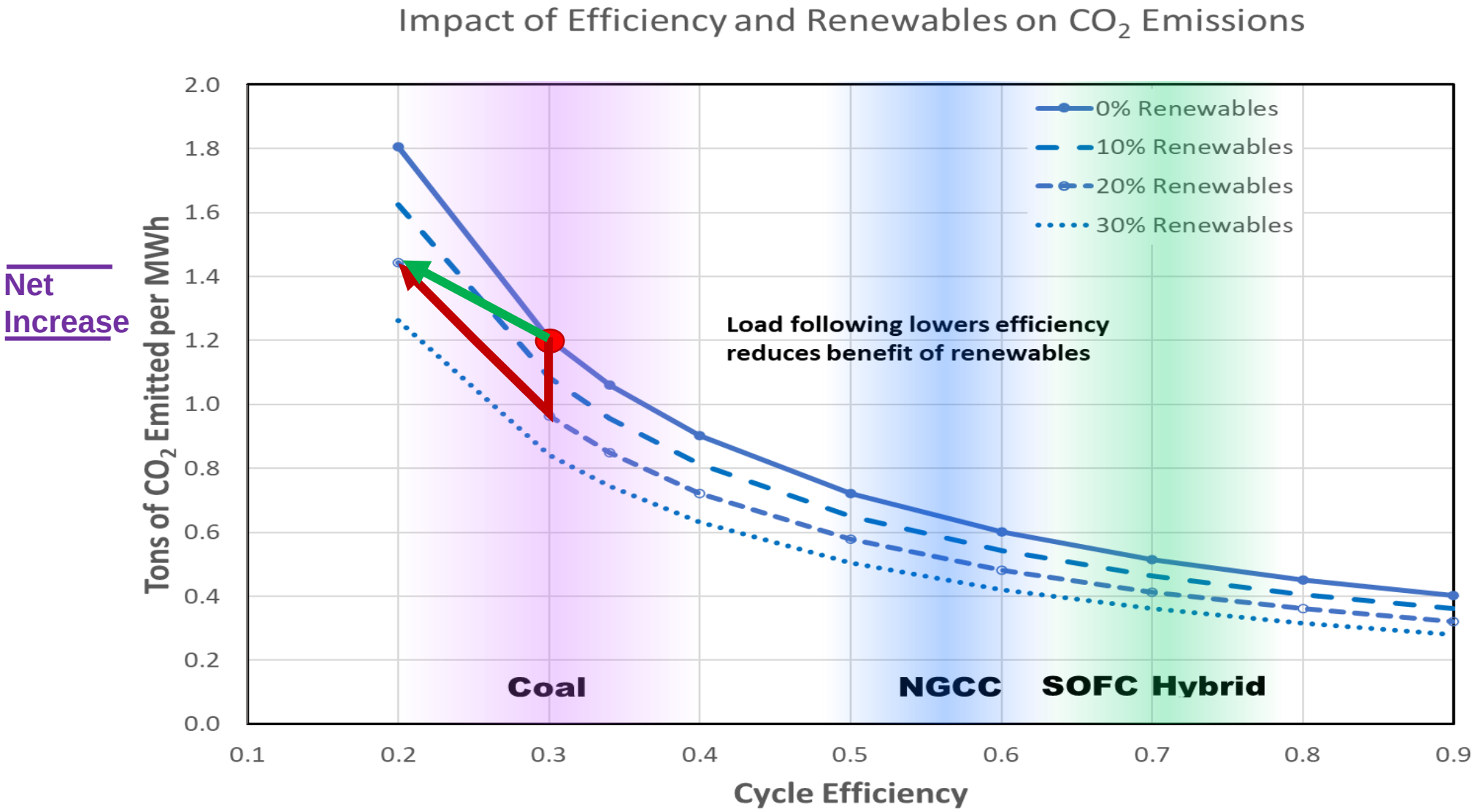
Sources:
DOE, EERE WINDExchange
Solar Energy Industries Association

Motivation in the U.S.

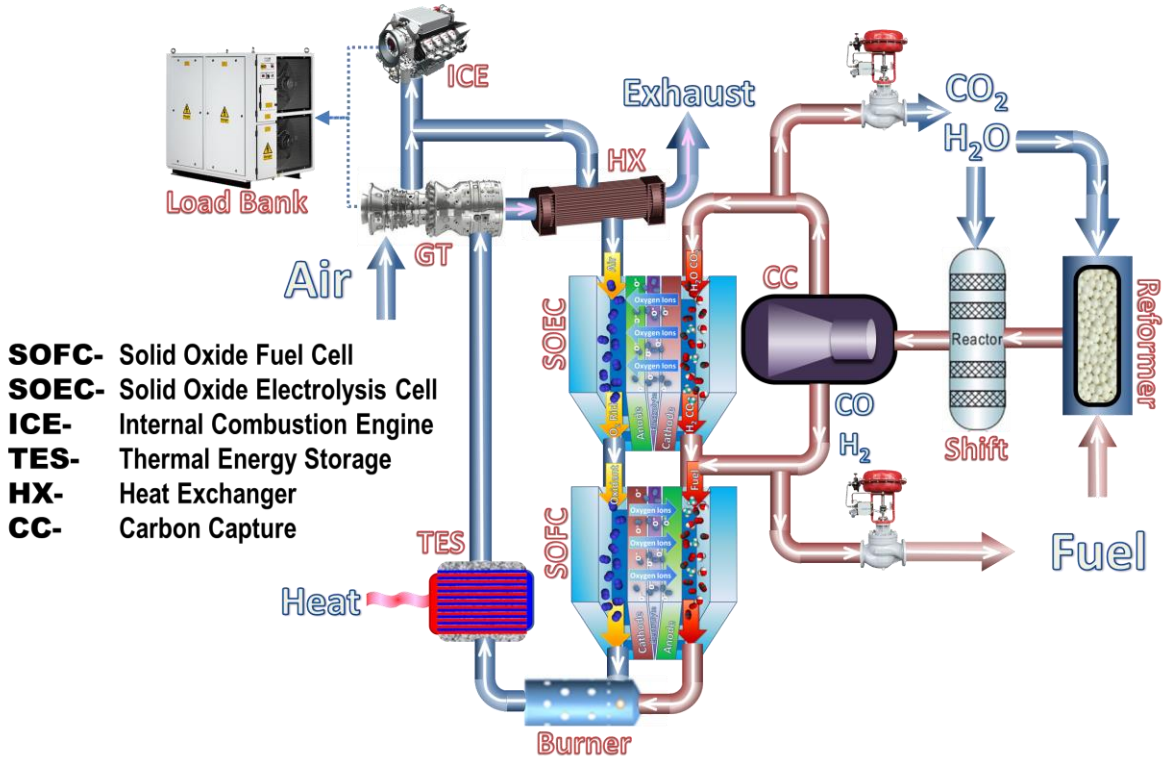
Net Decrease



Motivation in the U.S.

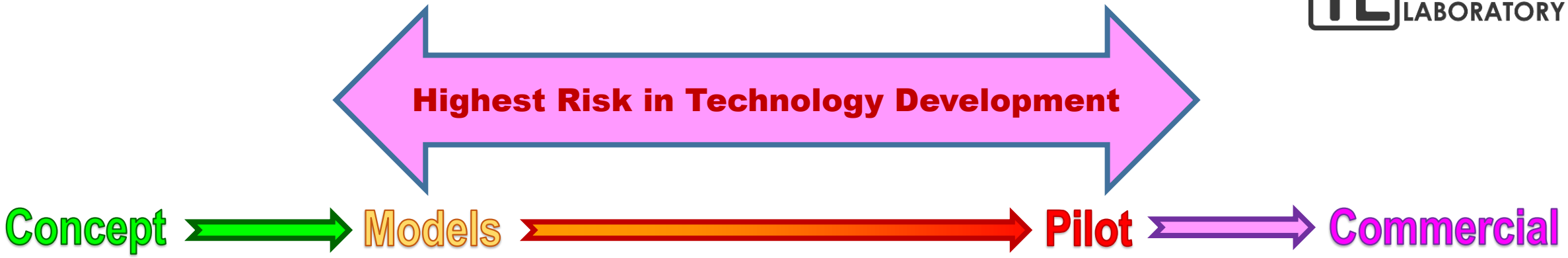


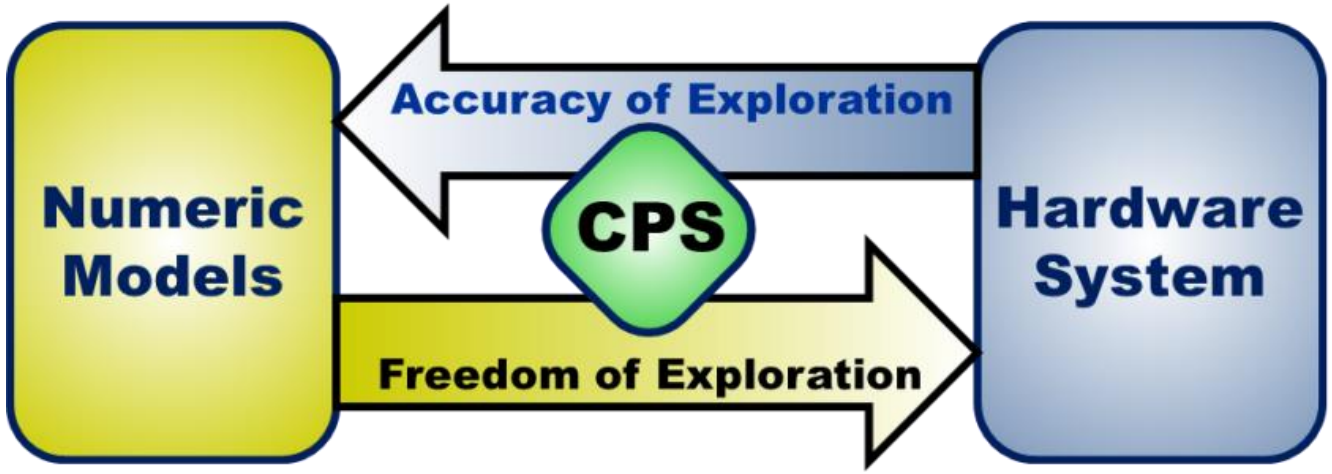
Novel Concepts Needed



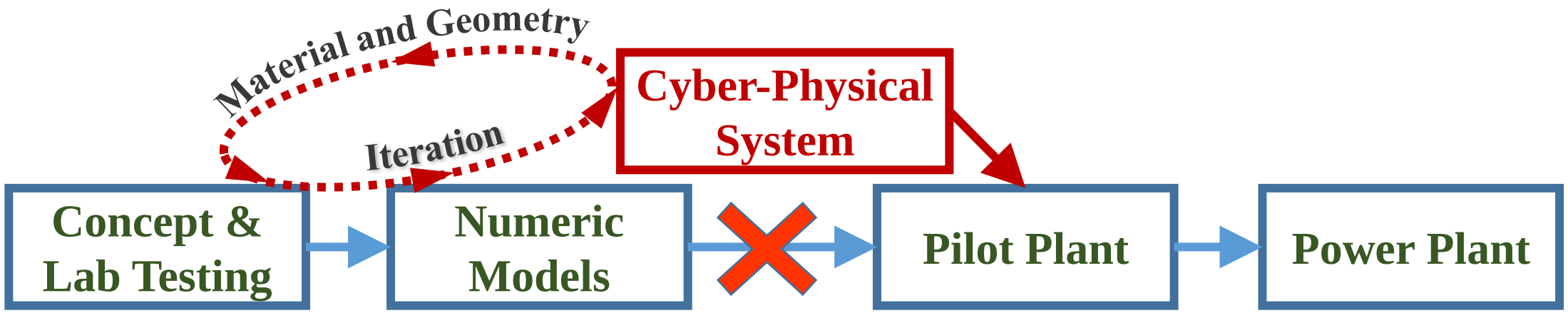
Achieving the highest efficiency and flexibility with the lowest emissions with Integrated Energy Systems

Technology Development





Technology Development Opportunities



Thank You

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