



Integrating Energy Efficiency & Renewable Electricity



Alliance to Save Energy

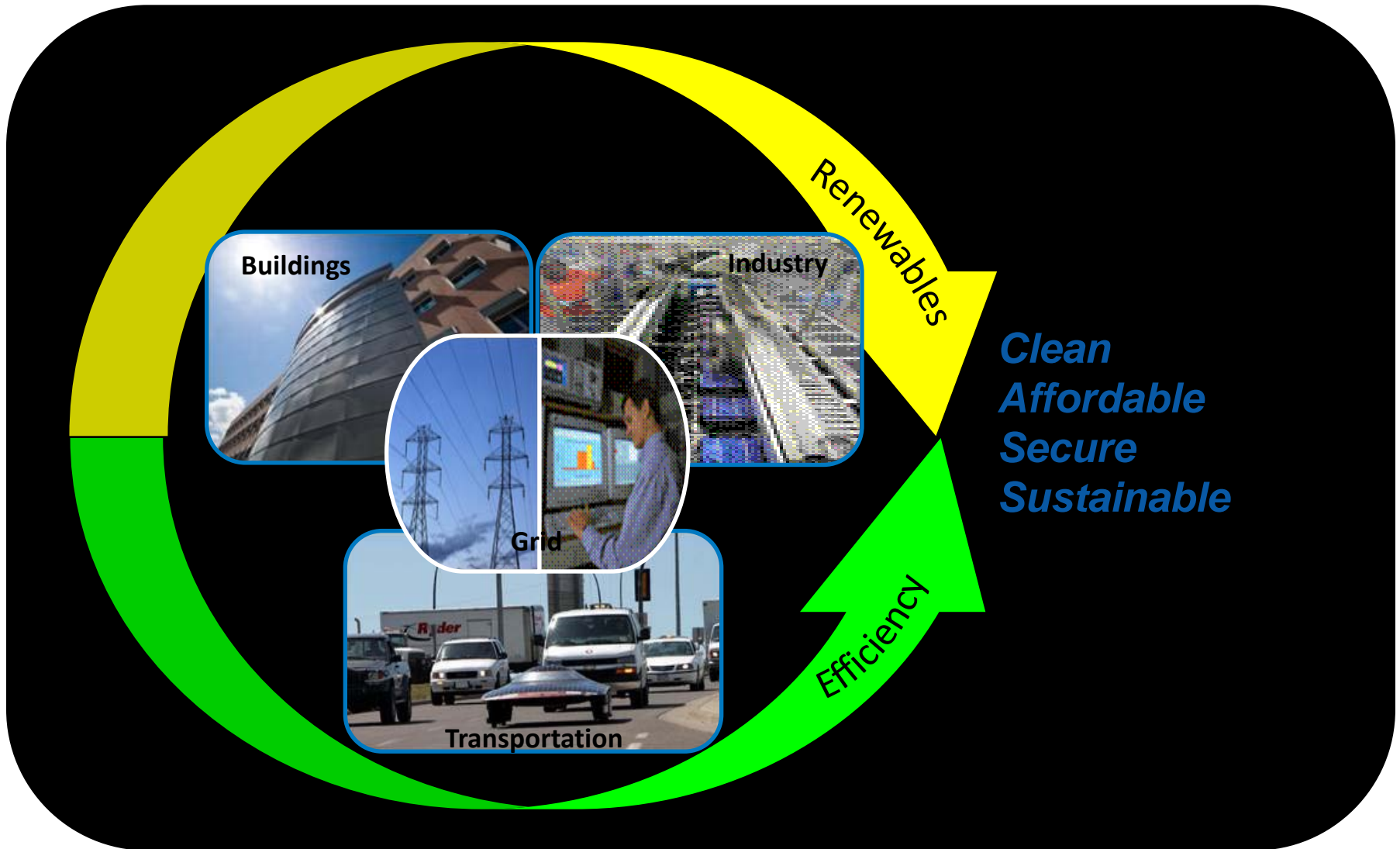
Dr. Dan E. Arvizu

Laboratory Director

September 2010

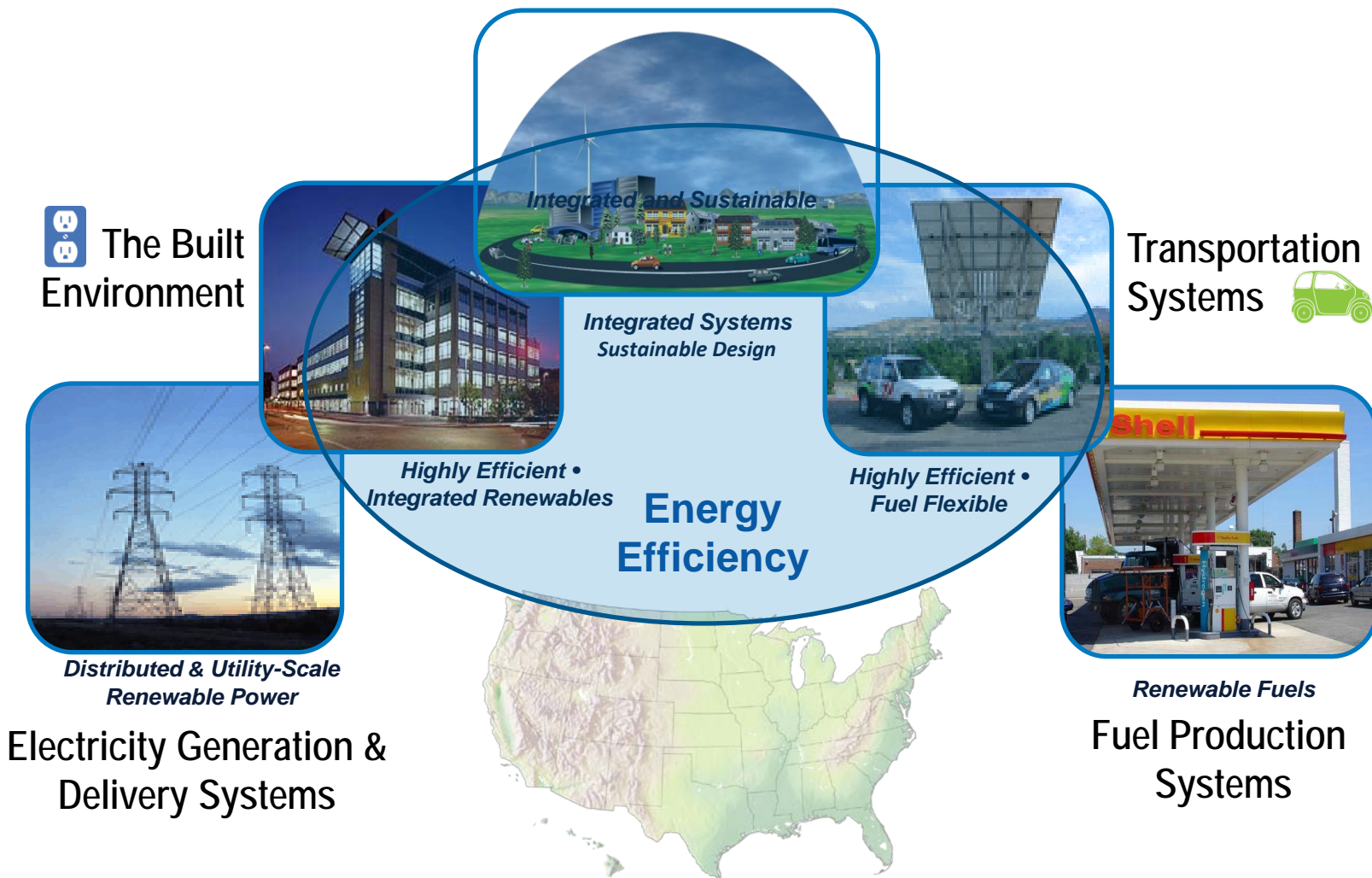
Smart Integration of Efficiency & Renewables

Accelerating the Transition



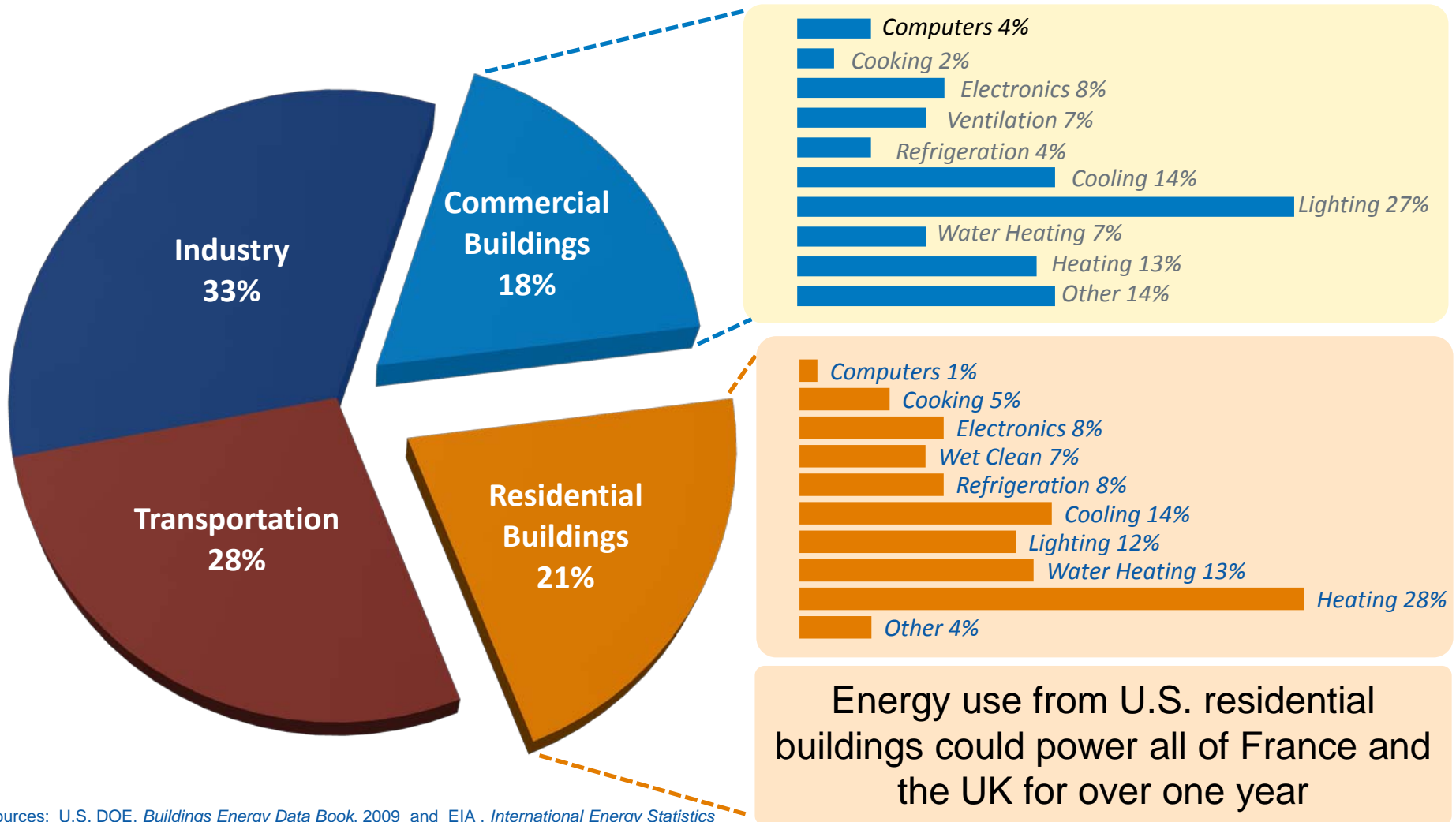
Efficiency as Part of a “Systems” View

Community & Industrial Systems



Efficiency Opportunities

U.S. Buildings Primary Energy Consumption



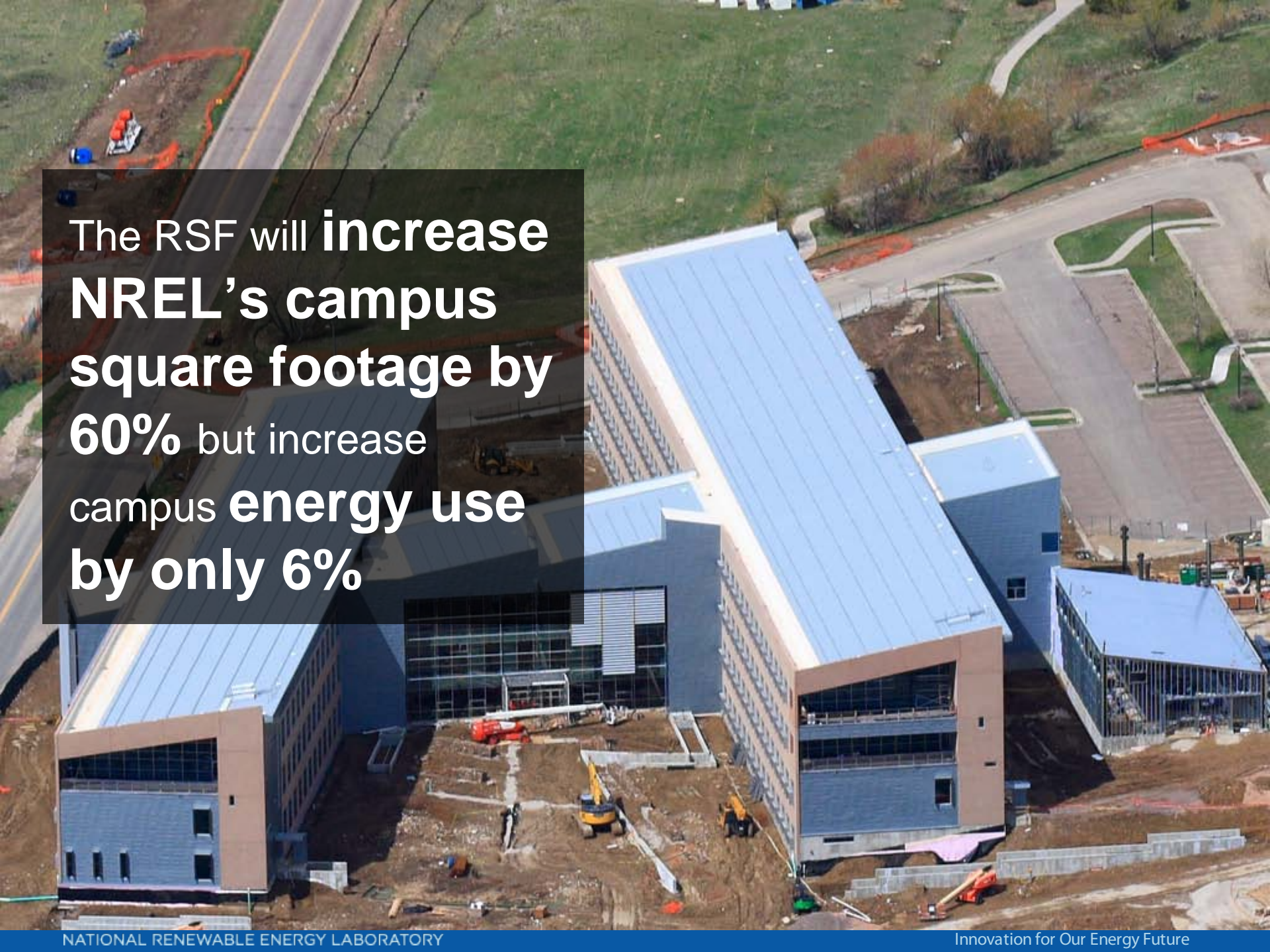
Sources: U.S. DOE, *Buildings Energy Data Book*, 2009 and EIA, *International Energy Statistics*

How Efficiency Leads to More Renewable Generation: NREL's new Research Support Facility




The building will
achieve **LEED**
Platinum rating


but will use **50% less**
energy than if it were
built to current
commercial codes



The RSF will **increase**
NREL's campus
square footage by
60% but increase
campus **energy use**
by only 6%



The RSF's highly efficient green data center will **serve the entire laboratory campus** and be a model for others



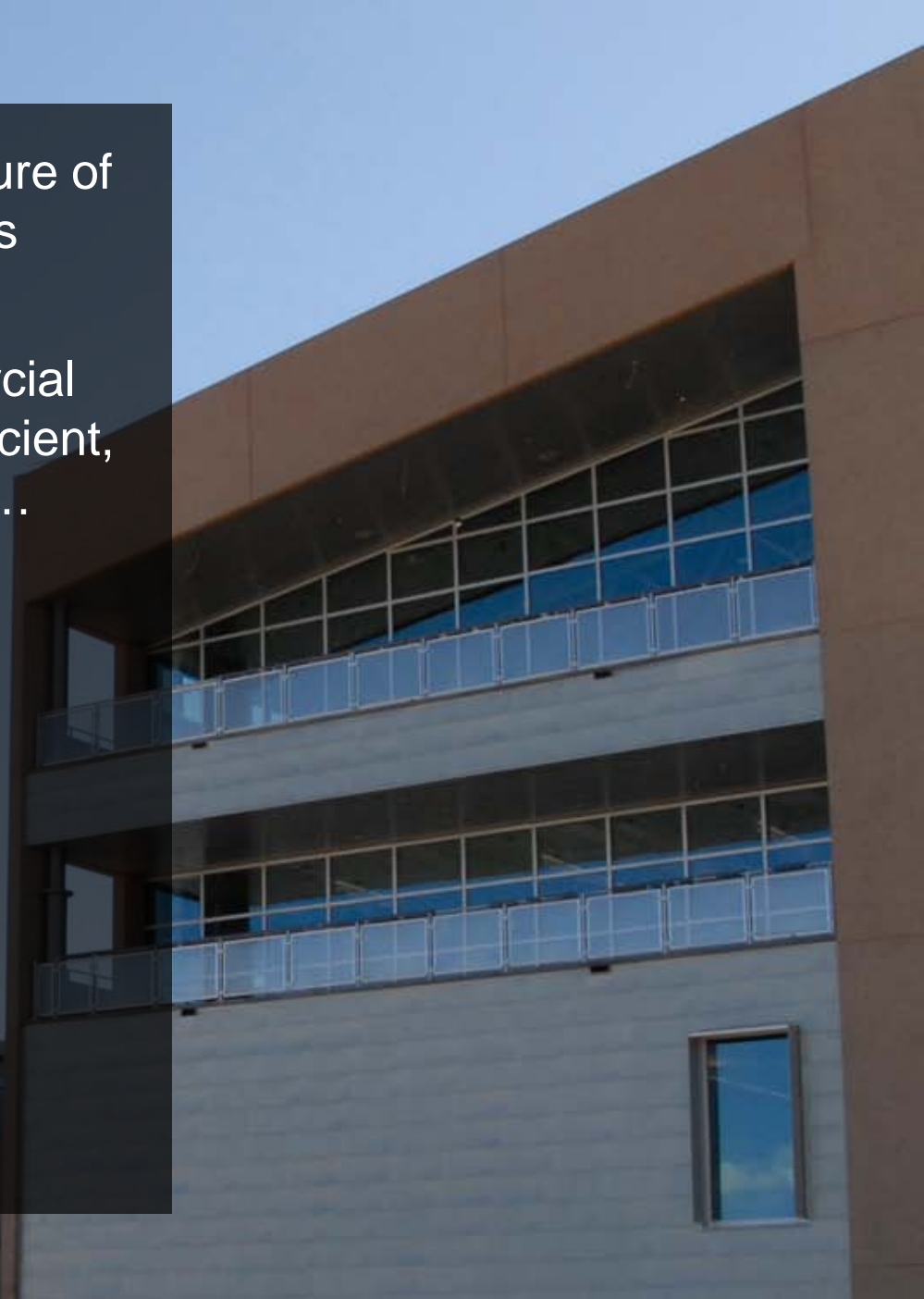
Is a living laboratory
where researchers use
**real-time
building
performance
data** to study building
energy use.

The RSF is a prototype for the future of large-scale, ultra-efficient buildings

It will change the way the commercial building industry views energy efficient, high performance office buildings...

**The reality of ultra-high efficiency buildings:
Doable, affordable.**

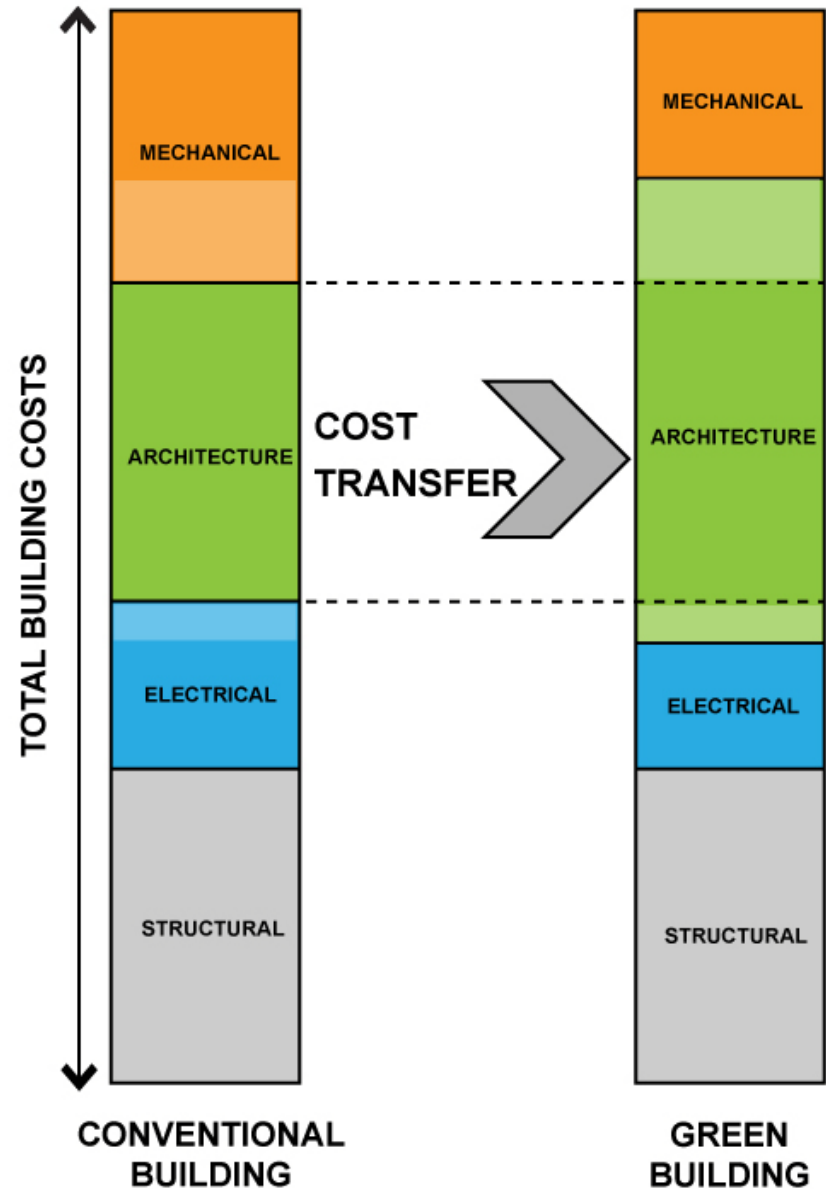
Not a concept, but here today



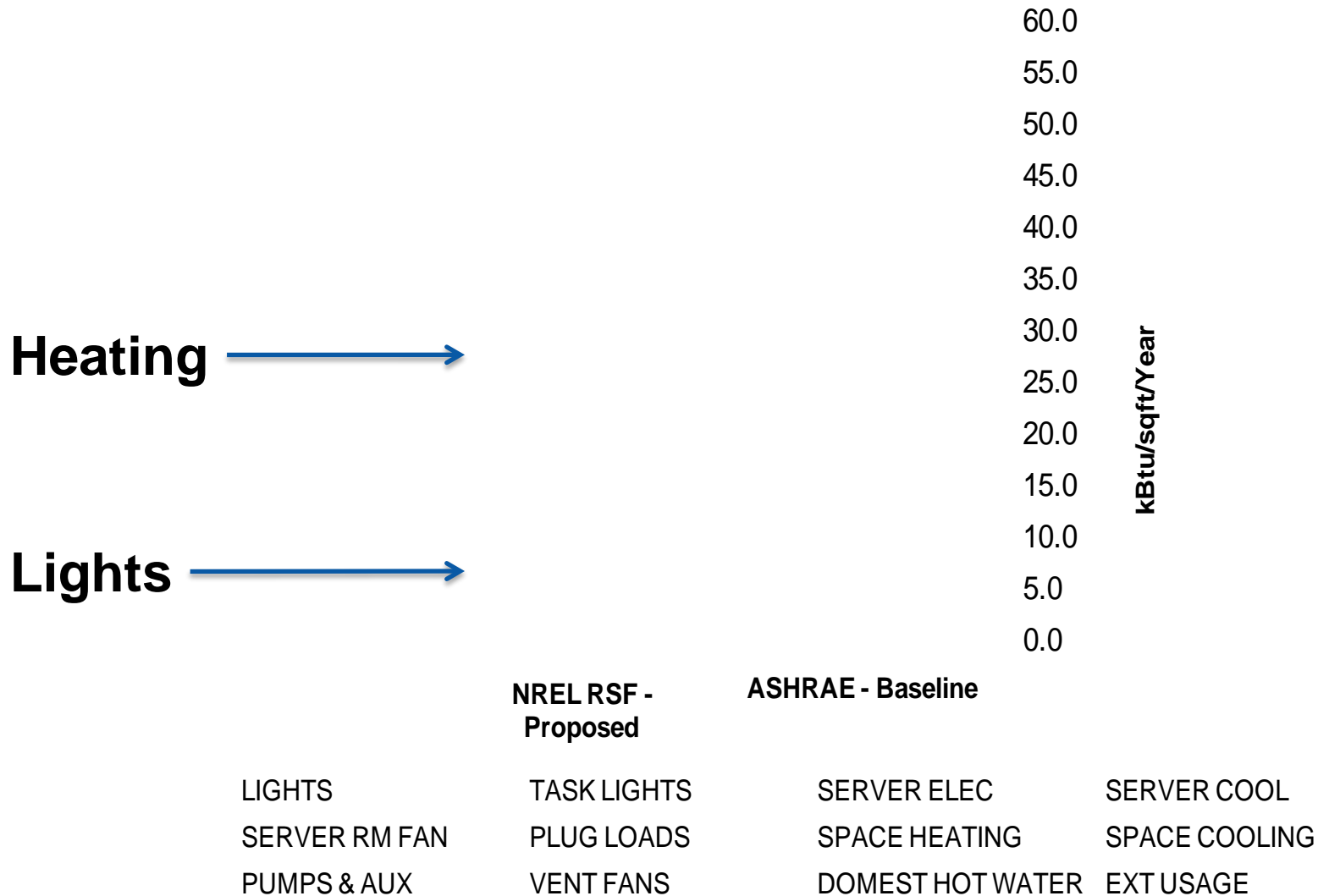
Integrated Design

Cost Transfer

Transfer costs from mechanical and electrical systems to building architecture



NREL RSF Annual Energy Consumption Comparison



Helping utilities with the efficiency/renewable generation nexus: the Energy Systems Integration Facility

- The ESIF is planned to be an approximately 220,000-gross-sq. ft. facility specially designed to accommodate the **critical engineering, testing, optimization, and verification research** needed for integrated engineering systems development.
- **Integrated energy systems and testing technologies** include energy efficiency, generation, storage, distribution, and utilization





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