National Renewable Energy Laboratory
Innovation for Our Energy Future

National Renewable Energy Laboratory: Overview

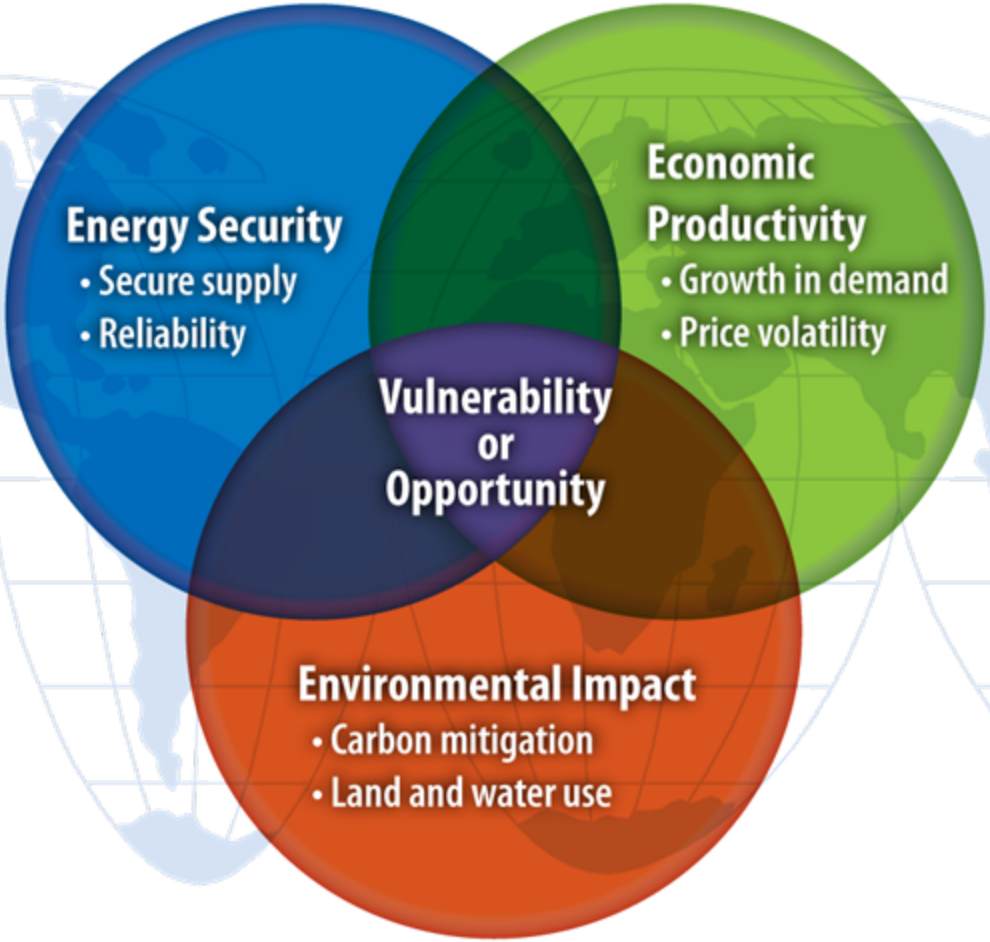
State Energy Advisory Board

STEAB

Bobi Garrett
Associate Director

12 August 2008

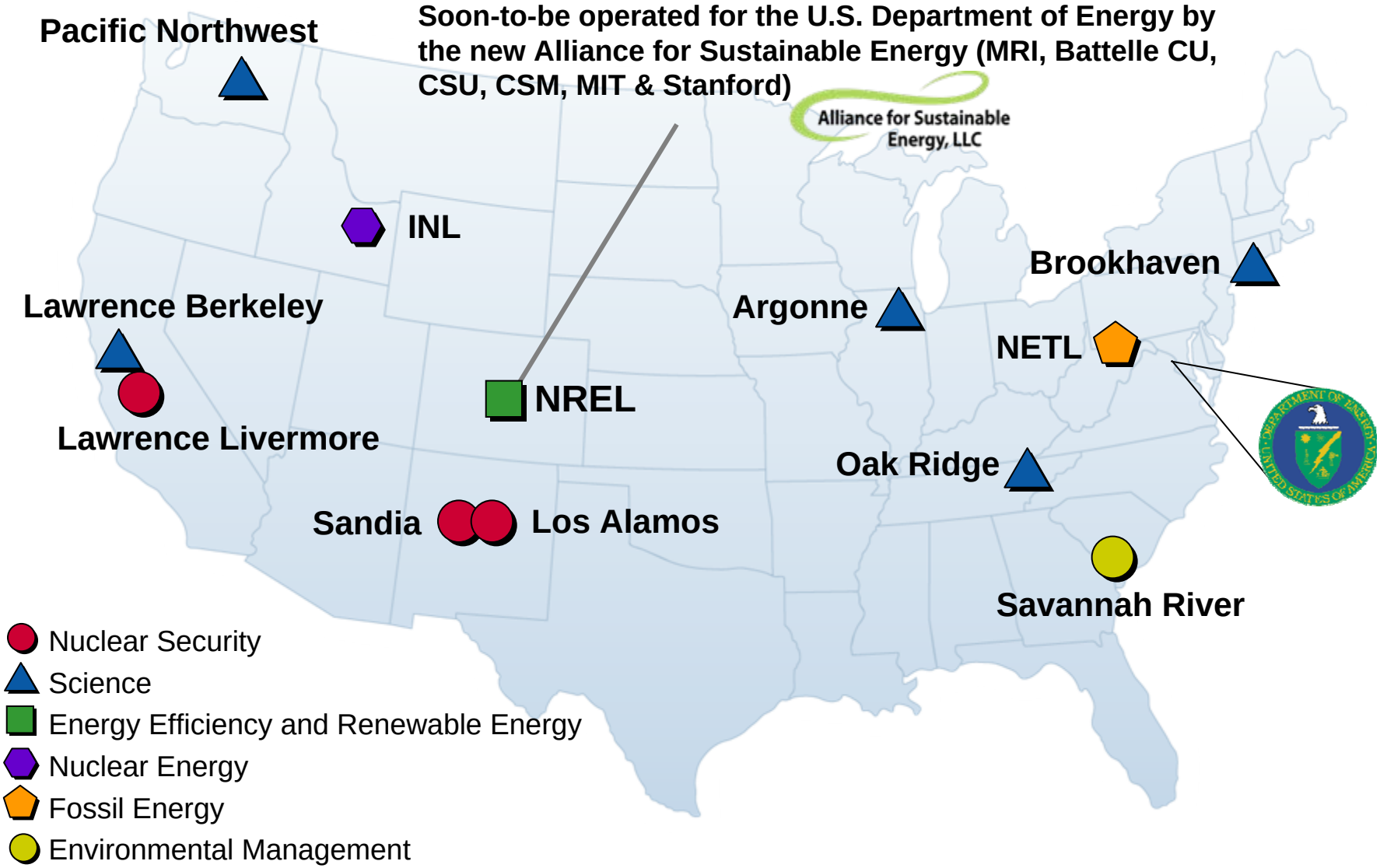
Energy Solutions Are Enormously Challenging



Must address all three imperatives

To Impact Speed and Scale of Impact, An Integrated Approach is Required

Major DOE National Laboratories



NREL Contributes in Three Primary Ways

"Technology Integrator"

"Mine" Discoveries and Validate Innovations

- Universities
- Government Labs
- Commercial Labs

Concepts

Information

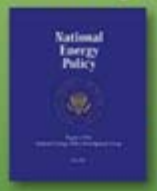
"Science and Technology Innovator"

Steward Unique National Assets & Contribute New Concepts

NREL

"Credible and Objective Advisor"

Policy



Inform the National Energy Agenda

Markets

Inform Market Decisions

What Makes NREL Unique?

- Only national laboratory dedicated to renewable energy and energy efficiency R&D
- Collaboration with industry and university partners is a hallmark
- Ability to link scientific discovery and product development to accelerate commercialization

Getting to “Speed and Scale” – Key Challenges

Implementing Renewable Gigawatts at Scale

NREL 140-1

BARRIERS

- Cost of renewable electricity
- Performance and reliability
- Infrastructure robustness and capacity
- Dispatchability of renewables

Displacement of Petroleum-Based Fuels

NREL 139-1

BARRIERS

- Cellulosic ethanol cost
- Life cycle sustainability of biofuels
- Fuels infrastructure, including Codes/Standards
- Demand and utilization, including intermediate blends

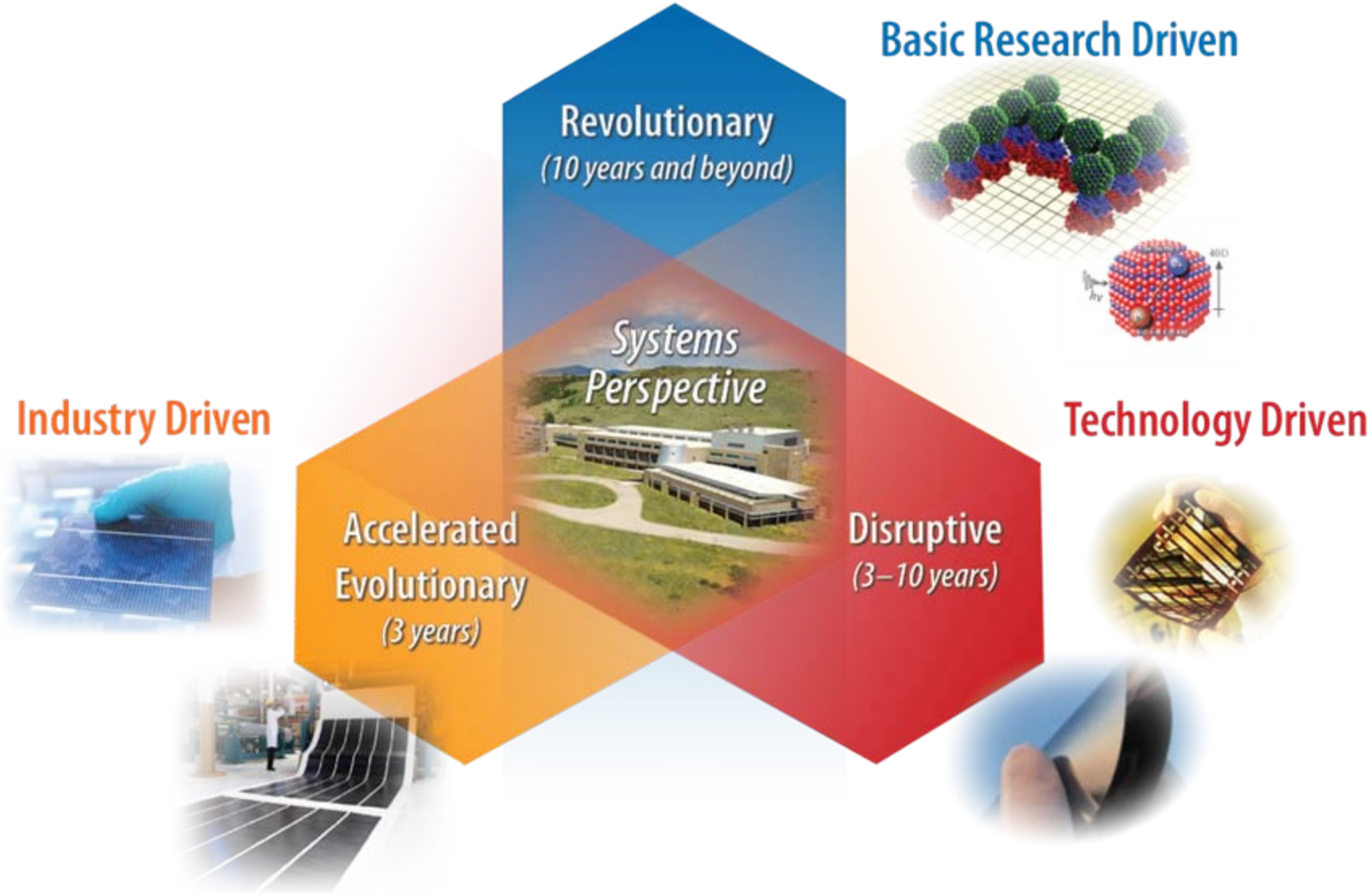
Reducing Energy Demand of Buildings, Vehicles, and Industry

NREL 196-1

BARRIERS

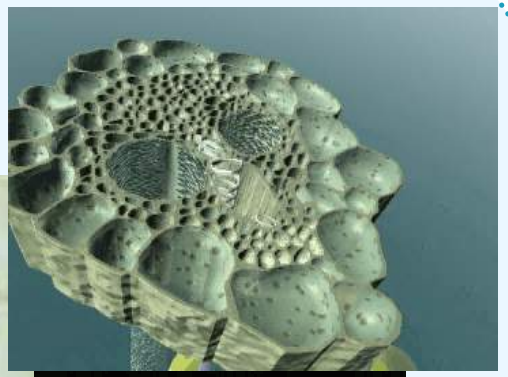
- Coordinated implementation of model building codes
- Market does not value efficiency
- Cost of energy efficient technologies
- Performance and reliability of new technologies

Maximizing Impact – A Balanced Portfolio

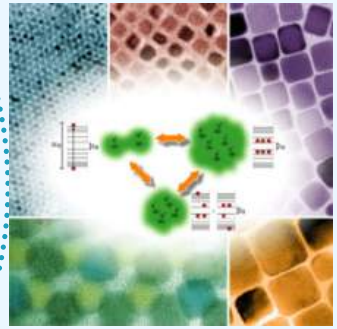


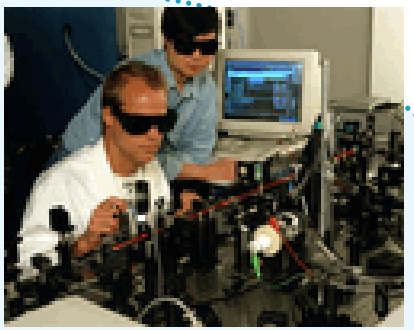
Translational Science is a Key to Accelerating Progress

Systems Biology

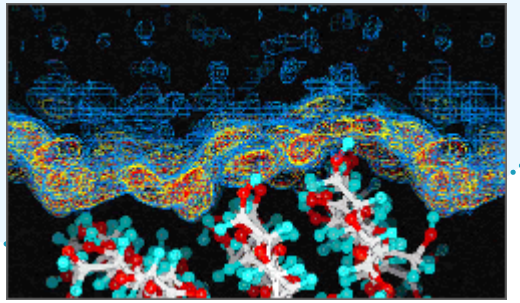


Computational Science





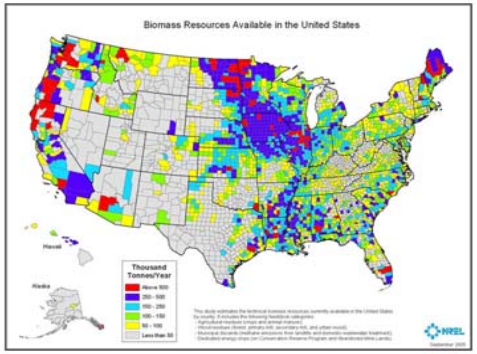
Photoconversion



Connecting new discoveries, via applied research, to the marketplace

Managing the Lab-to-Market Interface

- Industry partnerships from ‘Concept to Commercialization’
- Definitive analyses on technology, policy, and markets to inform policy and market decisions
- Engagement with the investment community
  - Industry growth forums
  - Entrepreneur in Residence
  - Commercialization Mentors



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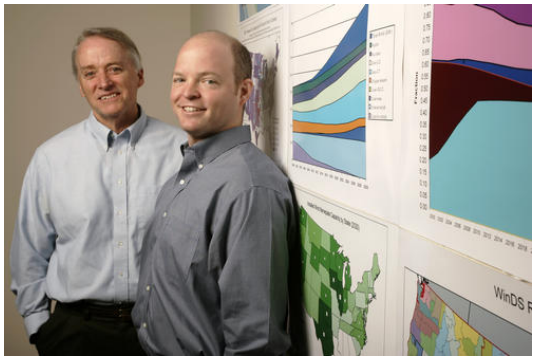
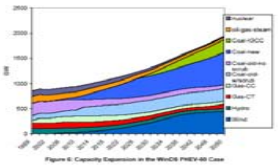


Increased Focus on Data and Analysis

Technical and economic analyses to advance understanding of technology value in context of dynamic markets, policies, energy resources/loads, and infrastructure.

Impact Analysis

Analyze benefits and impacts of programs, portfolios, and policy options

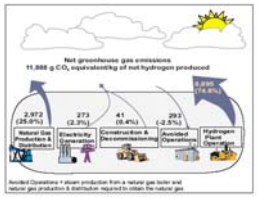


System

Analyze system performance and technology interfaces in the context of the overall system

Technology / Component

Analyze technology and component performance and cost



Resource

Assess resource availability and characteristics

Increasing Attention to Carbon Mitigation Potential Analysis

Technology Development Programs

NREL R&D Portfolio

Efficient Energy Use

- Vehicle Technologies
- Building Technologies
- Industrial Technologies

Renewable Resources

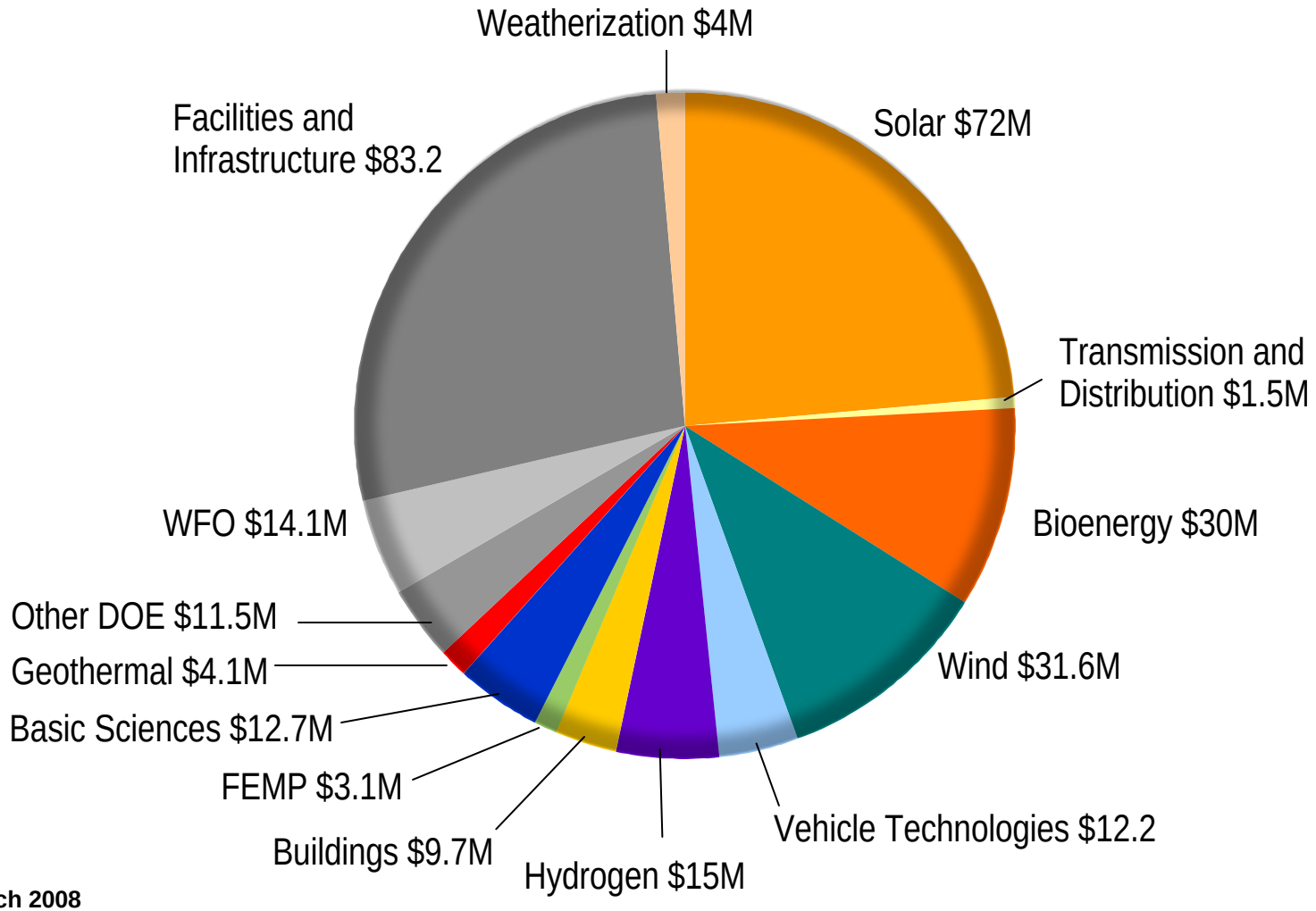
- Wind and water
- Solar
- Biomass
- Geothermal

Energy Delivery and Storage

- Electricity Transmission and Distribution
- Alternative Fuels
- Hydrogen Delivery and Storage

Foundational Science and Advanced Analytics

NREL FY2008 Program Portfolio
Estimated $304 Million



Updated March 2008

NREL: Leadership by Example

TEAM Initiative
- DOE's effort to maximize energy efficiency and renewable energy generation across the DOE complex

Science and Technology Facility achieves LEED 'Platinum'
- First Federal building

NREL Site is "Carbon Neutral"
- Onsite renewables (Mesa Top and NWTC PV)
- Renewable Energy Certificate (REC) purchases

Renewable Fuel Heating Plant
- Will offset 75% of current South Table Mountain campus natural gas use (significant on-site RE project)
- Financed and installed through Energy Savings Performance Contract (ESPC)

Energy Policy Act and Executive Order Requirements
- Currently exceeding EPAct requirements
- Meet or exceed new Executive Order requirements

Vehicle Fleet
- 48 vehicles, 34 (71%) are alternatively fueled
- Fleet petroleum reduced ~45% since 2000

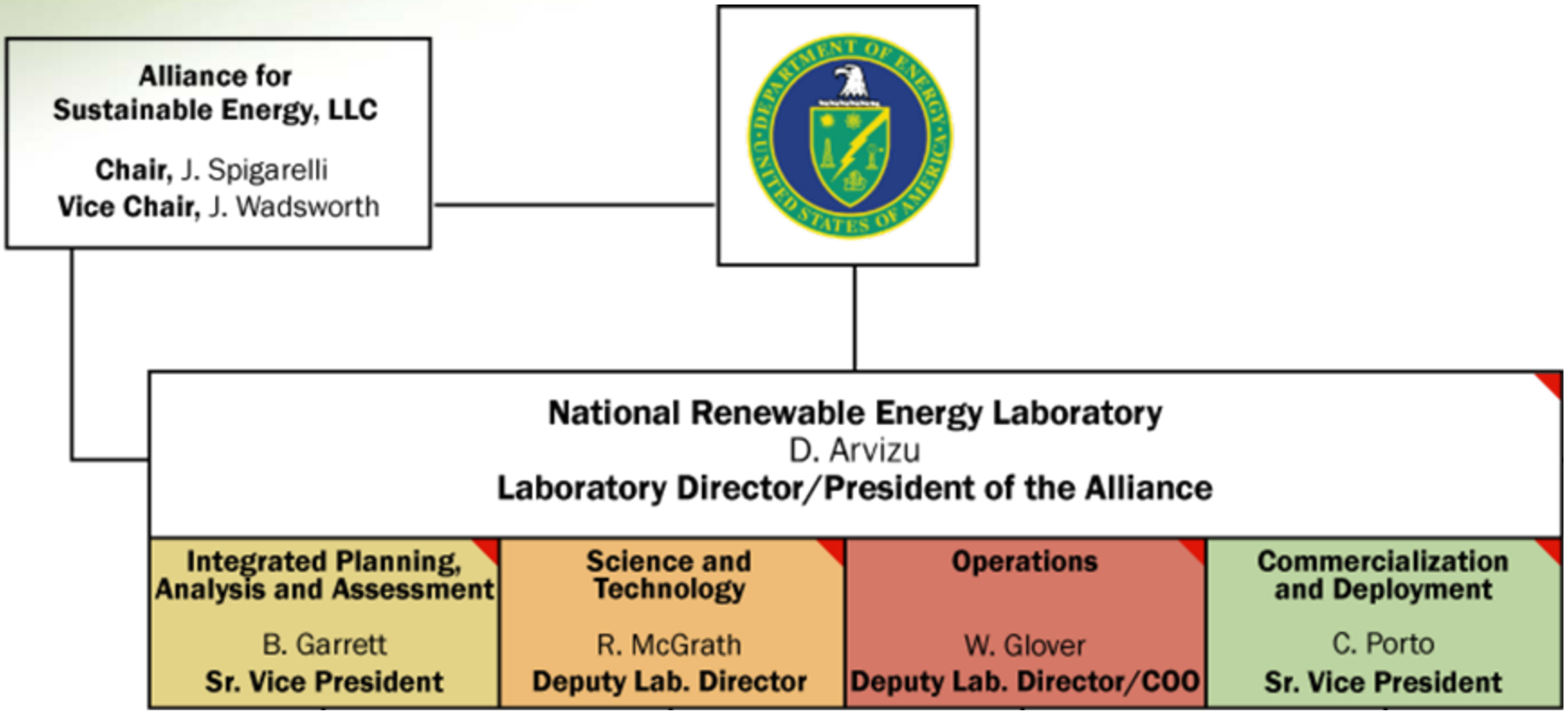
New Management & Operating Contract

Alliance for Sustainable Energy, LLC

To Manage and Operate the National Renewable Energy Laboratory

DOE Selected the Alliance for Sustainable Energy

The New Alliance Team

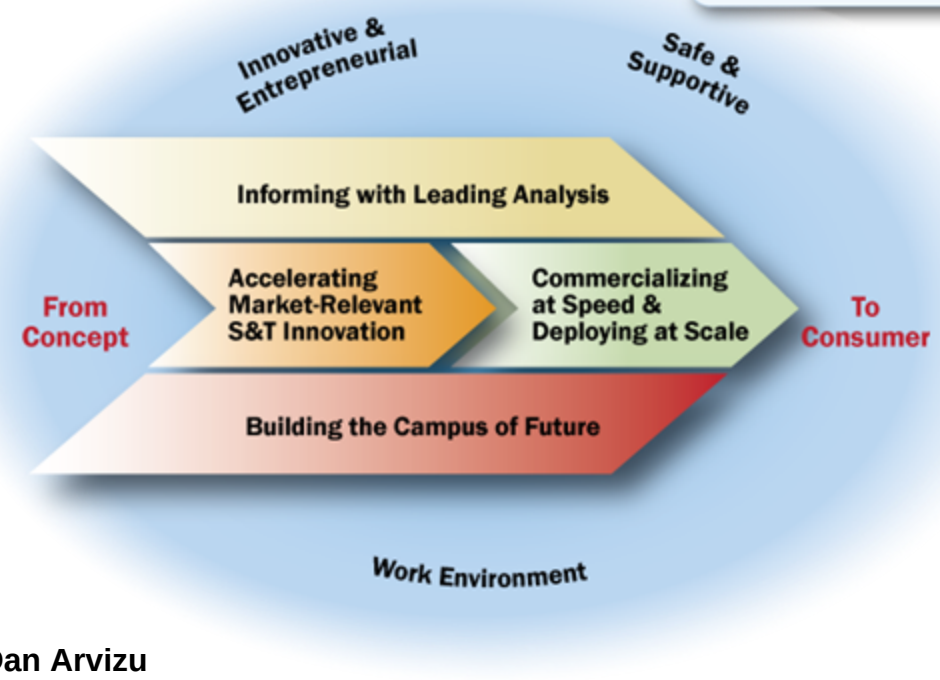


Our Concept for NREL Focuses on Enhanced Leadership

Our Leadership attributes of a great RDD&D Lab:

1. Leading Analysis
2. Innovative, Market-Relevant Science and Technology
3. Rapid Commercialization & Deployment
4. Distinctive Facilities and Resources
5. Safe, Supportive, and Creative Work Environment

Enhancing Leadership

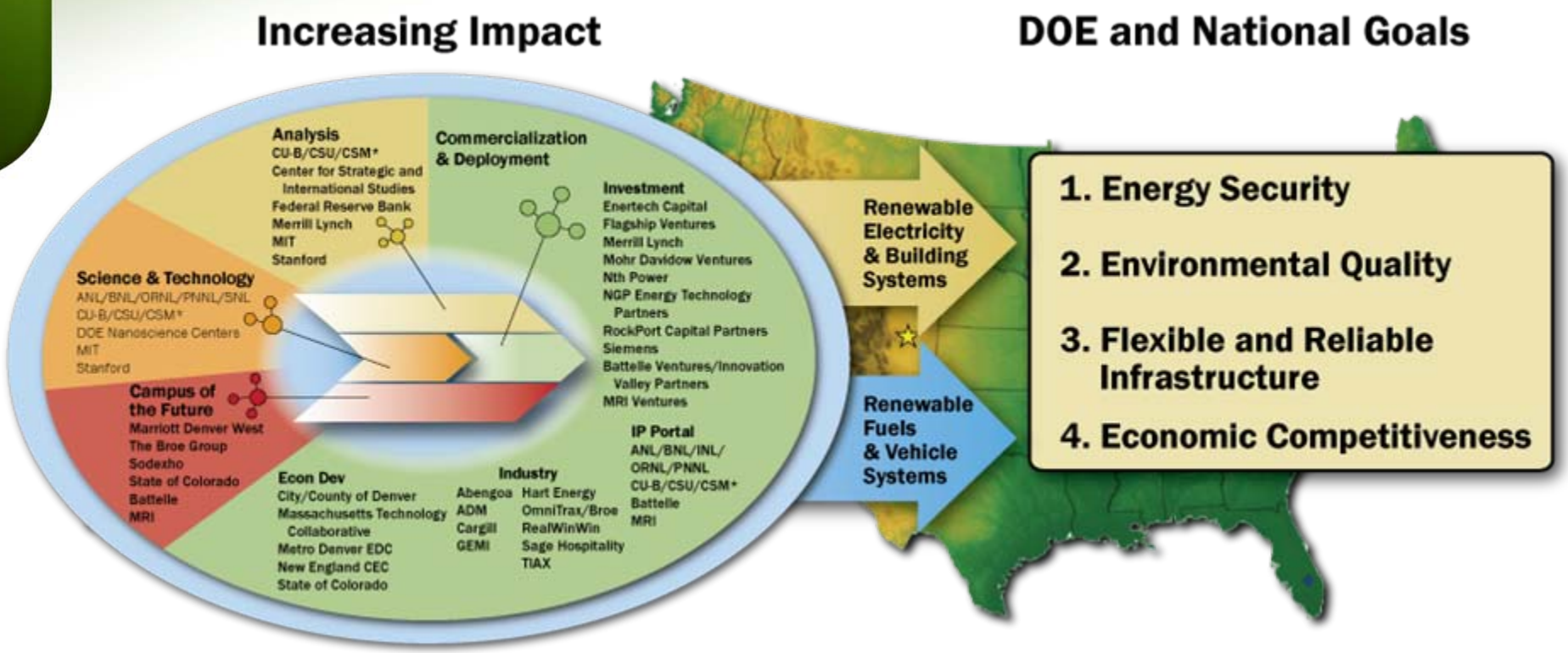


NREL 193-3

Dr. Dan Arvizu

Alliance for Sustainable Energy, LLC

Amplifying Our Impact on National Goals



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