Managing DOE's RD&D Portfolio

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COVID-19 changed our world

U.S. wasn't prepared for, and was slow to adapt to, the pandemic.

- *Didn't heed warnings*
- *Structural gaps exposed*
- *Systemic Inequality*

Lessons for U.S. Critical Infrastructures

- Federal government has a fundamental role in planning and enabling infrastructures.
- More than basic research and development is needed; a combination of basic and applied RD&D to enable commercialization.
- Global supply chain must be agile enough to respond to major disruptions.

Optimizing Impact from Energy Innovation Ecosystem

Must Align

Policy Objectives at Global, National, and Local Levels

- Define and support the public good
- Establish and enforce the rules (Regulations and Standards)
- Allocate development and implementation of resources
- Accountable for resource stewardship

S&T Innovation System

- Enabling creativity to push the frontier of science
- Cultivating Human Talent
- Anticipating challenges and deployment
- Fostering collaboration

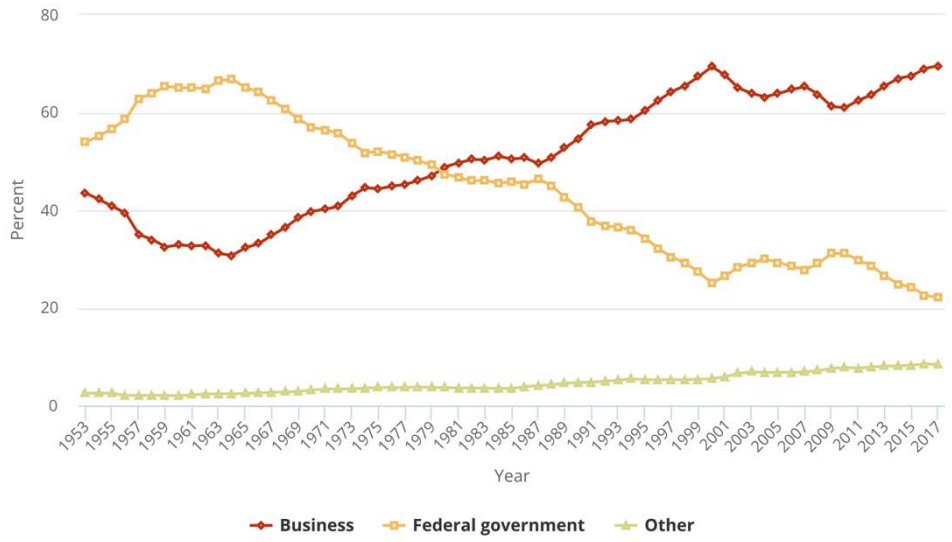
Funding from Public, Private, Philanthropic and Capital Markets

- Governments promote basic, forefront and mission related research
- Industry primarily promotes applied research for profit
- Philanthropy promotes research for societal objectives
- Markets drive economic development

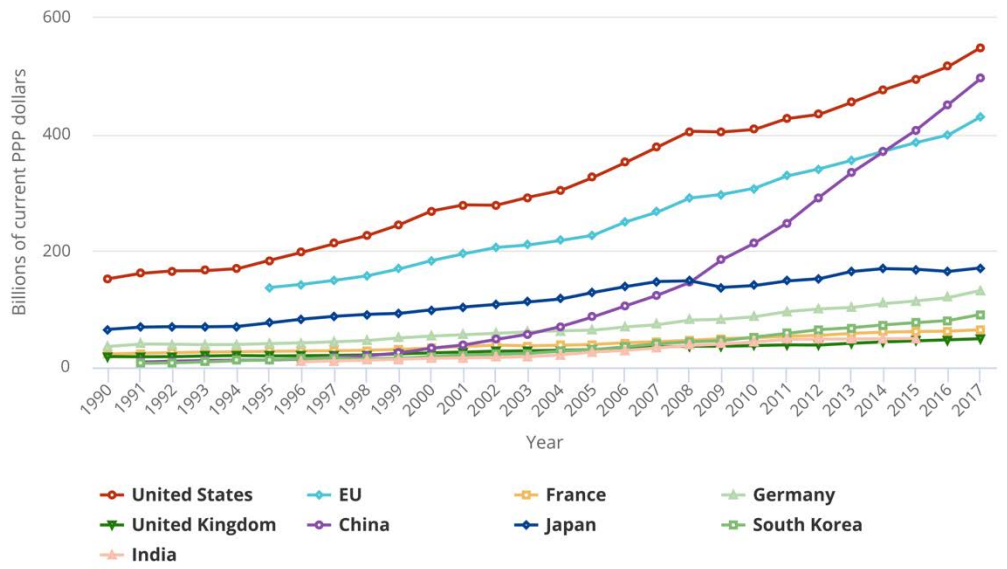
Basic R&D not sufficient to capture expected benefits

- U.S. spent billions on R&D to develop clean energy technologies.
- EU spent tens of billions to develop markets for clean energy.
- Asian countries spent 10 times that to establish global manufacturing.

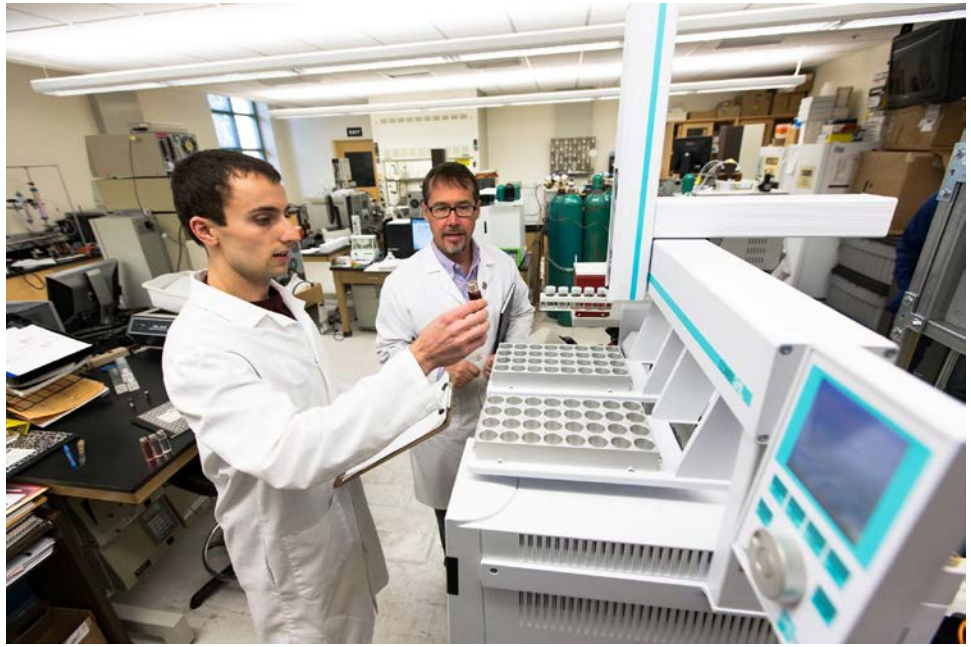
U.S. total R&D expenditures, by source of funds: 1953–2017



Gross domestic expenditures on R&D, by the United States, the EU, and selected other countries: 1990–2017

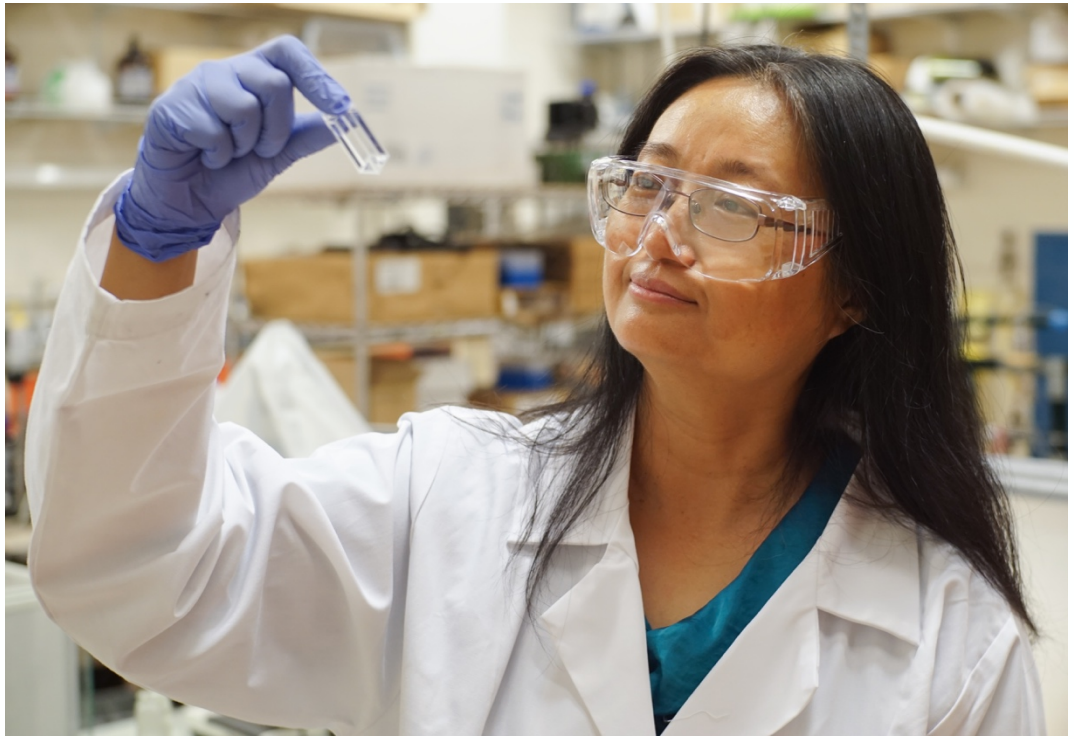


Developing and leveraging our intellectual capital



- National labs, academia, and industry partnerships play a major role in advancing the development and manufacturing of new technologies.
- STEM skills vital for workforce, not just higher education STEM degrees.
- Clean energy industry creating new jobs for skilled technical workforce.

RD&D will drive future growth, considerations include:

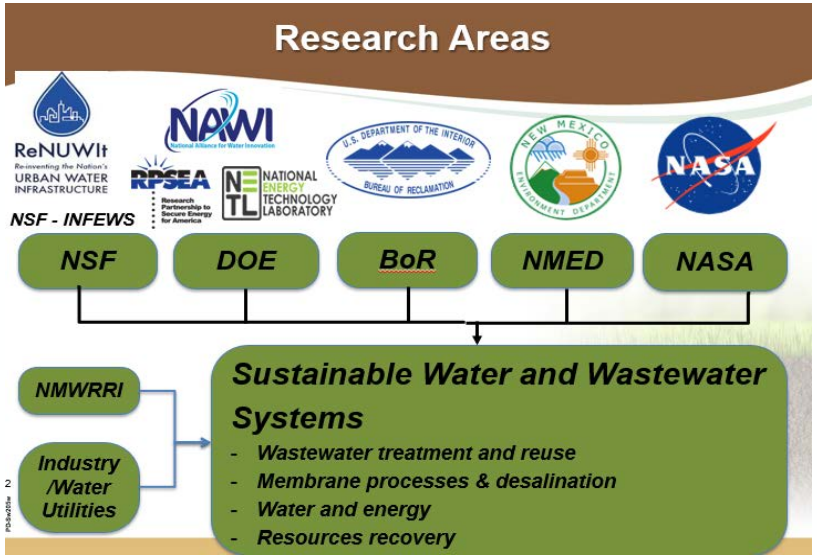


- Bridge the gap between RD&D and commercialization.
- Agile response to changes in the market while managing risk
- Resiliency
- Place-based Innovation Hubs
- Local value creation and economic viability
- Moving from competition to collaboration

New Mexico Produced Water Research Consortium

Filling knowledge gaps:

- Quantify and characterize
- Assess the cost-effectiveness of treatment
- Cost and effectiveness of mineral recovery
- Cost and effectiveness of brine management and disposal
- Analytic sampling methods
- Impact of treated produced water on public health and the environment.



Introduced federal legislation

- Endless Frontier Act
- IMPACT for Energy Act
- Leveraging our National Labs to Develop Tomorrow's Technology Leaders Act
- Securing American Leadership in Science and Technology Act

Post-COVID-19 world conclusions:

- Federal government has vital role in building critical infrastructure and enabling a robust U.S.-centric supply chain.
- National investment thru entire R&D spectrum to ensure global economic competitiveness.
- New mechanisms for public private partnerships and place-based innovation will be necessary to achieve national objectives.

Questions?

- What RD&D strategies will enable and protect the U.S. supply chain?
- Do we need new mechanisms for industry and private sector partnerships?
- How do we ensure social equity?

Thank You

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