Welcome & Introduction

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TEXAS
The University of Texas at Austin
Energy Institute

ENERGY WEEK 2020: "VISION 20-20"

Asst. Secretary, U.S. DOE (EERE)

Student Research Poster Competition

Energy Tradeoffs Panel

ExxonMobil Fellows Lunch

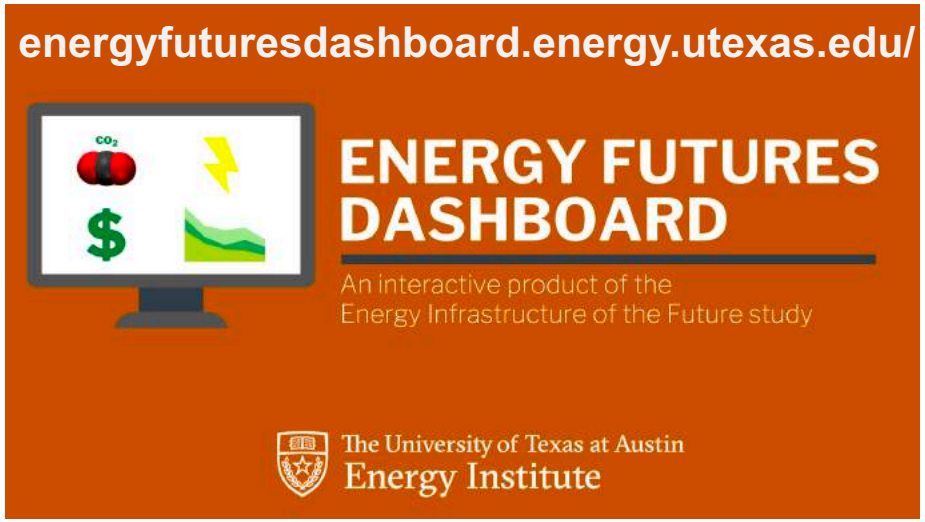
Sustainability Leadership Panel

Women in Energy Networking Breakfast

Deep decarbonization is not an option, it's a necessity

Limiting climate change to substantially less than 2 degrees Celsius requires global emissions to reach net-zero by mid-century (IPCC 2018)

- Scale, scope, and rapidity of the necessary changes are unprecedented, all-encompassing, and truly daunting
- Success in addressing this global challenge *requires coordination and alignment across markets, governments, and cultures*



Large-scale energy transition: Shifts in patterns of energy use in the society

"Energy transitions have been, and will continue to be, inherently prolonged affairs, particularly so in large nations whose high levels of per capita energy use and whose massive and expensive infrastructures make it impossible to greatly accelerate their progress even if we were to resort to some highly effective interventions …" (V. Smil, 2012)

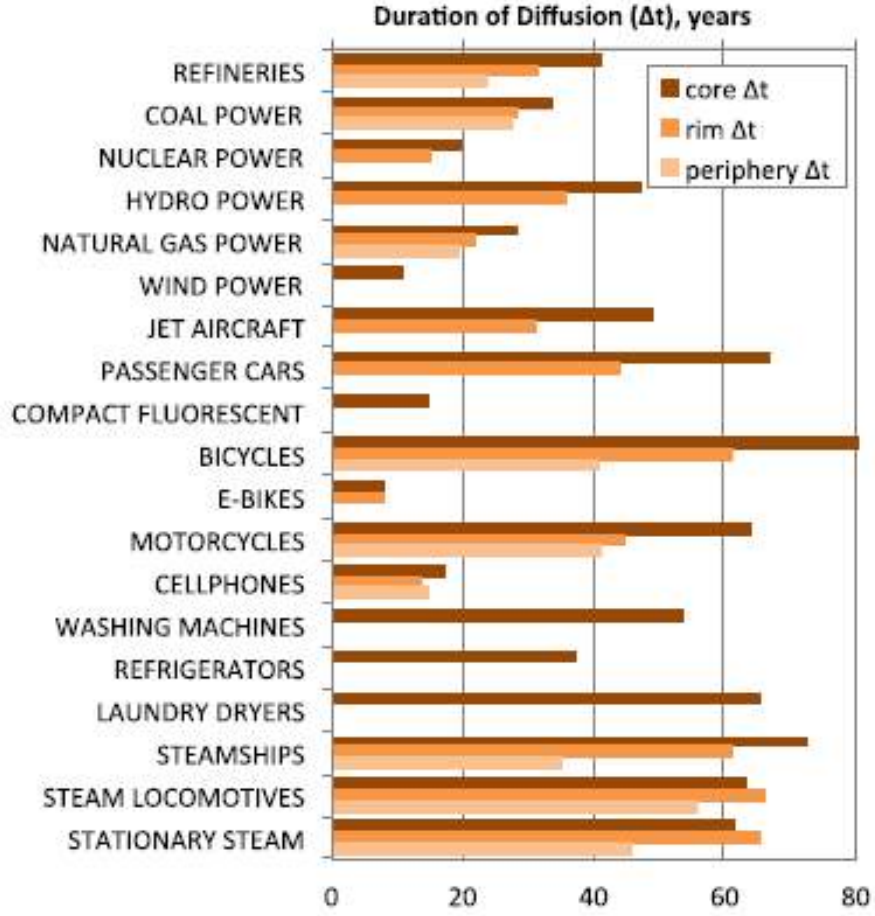
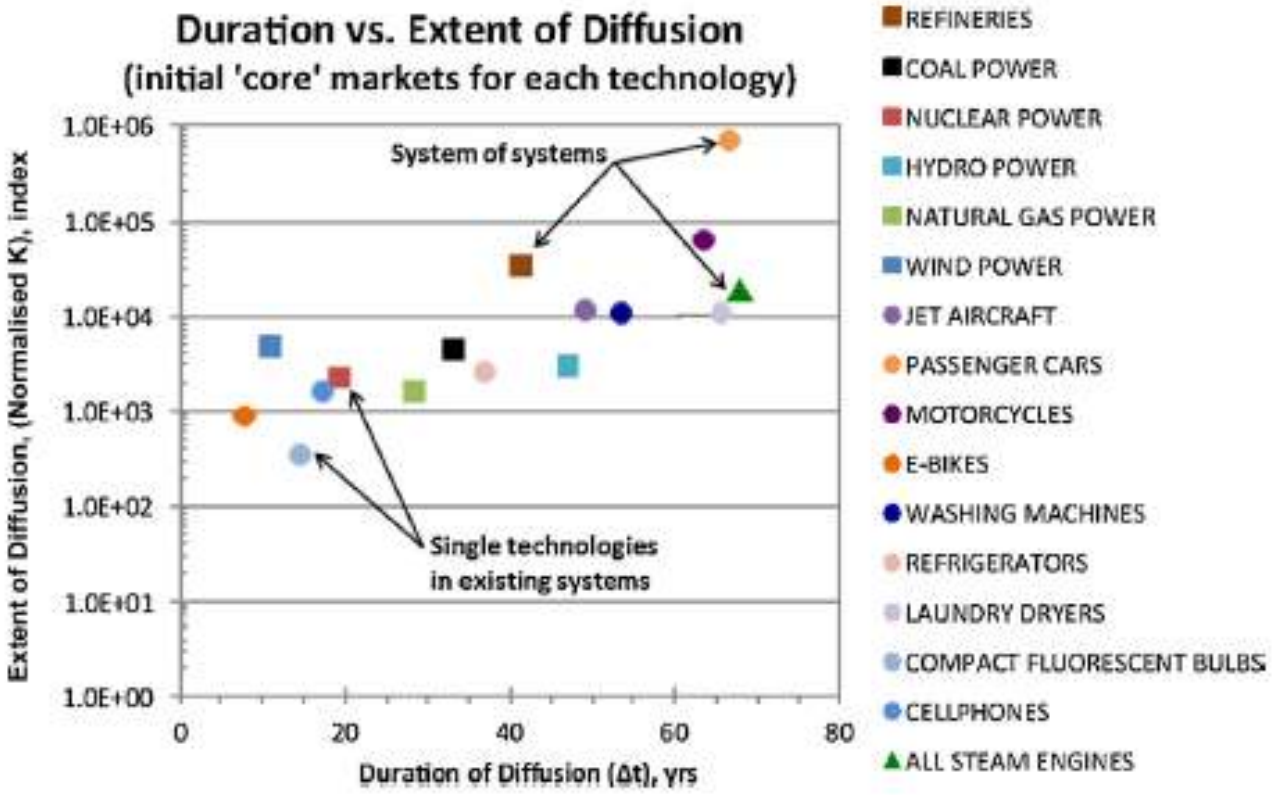


Fig. 2. Diffusion speeds accelerate as technologies diffuse spatially. Notes: Bars show durations of diffusion measured by cumulative total capacity installed, with historical data fitted via a logistic growth curve and the diffusion duration expressed as Δ t in years. 'Core' is typically within the OECD; 'Rim' is typically Asian countries; 'Periphery' is typically other world regions. For details and data, see: [42,3].

Source: **Grubler *etal.*, *Energy Research & Social Science*, 2016.**

Larger the scope of change, longer it takes…



…partly because:

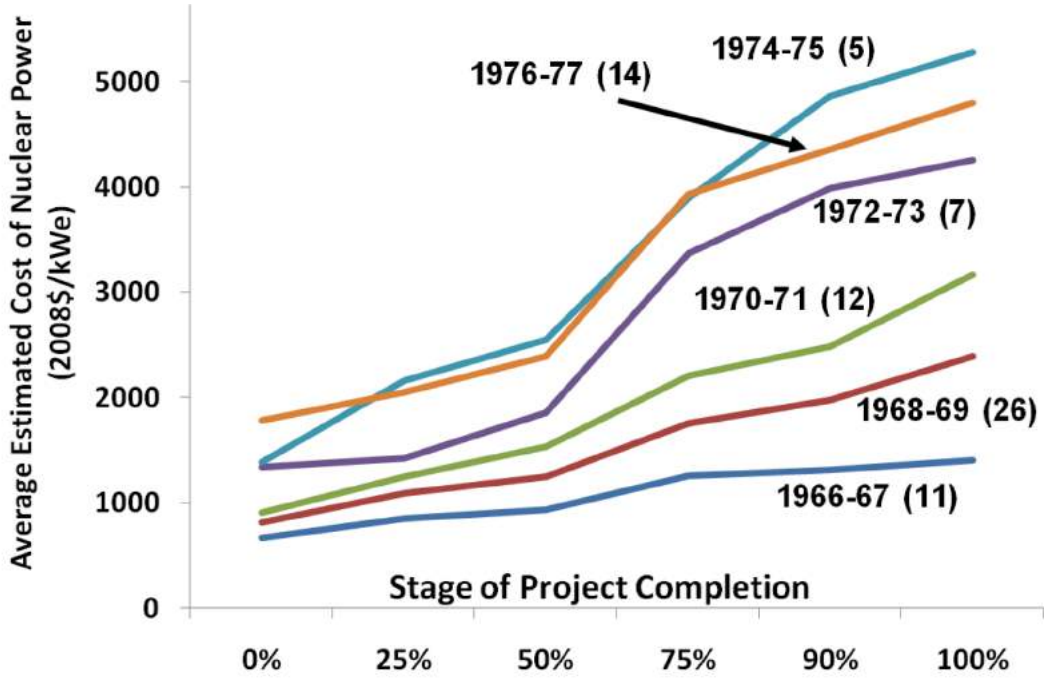
- **Diverse set of actors and institutions**: many competing ideas and stronger inertia
- Need for **integration with other parts of the system**

Source: **Grubler *etal., Energy Research & Social Science,* 2016.**

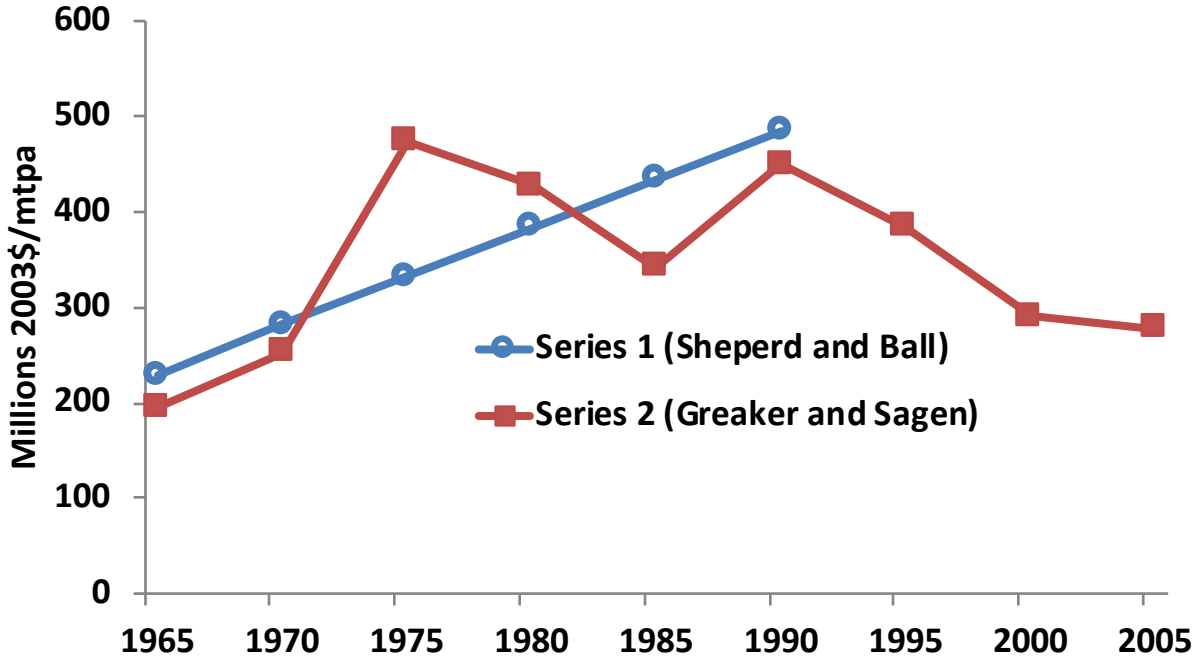
Diffusion durations scale with market size. Notes: X-axis shows duration of diffusion (t) measured in time to grow from 10% to 90% of cumulative total capacity; y-axis shows extent of diffusion normalized for growth in system size. All data are for 'core' innovator markets. Round symbols denote end-use

With increasing unit size, cost reductions may not automatically hold for capital intensive technologies

Average estimated cost of nuclear power



Unit cost of natural gas liquefaction plants

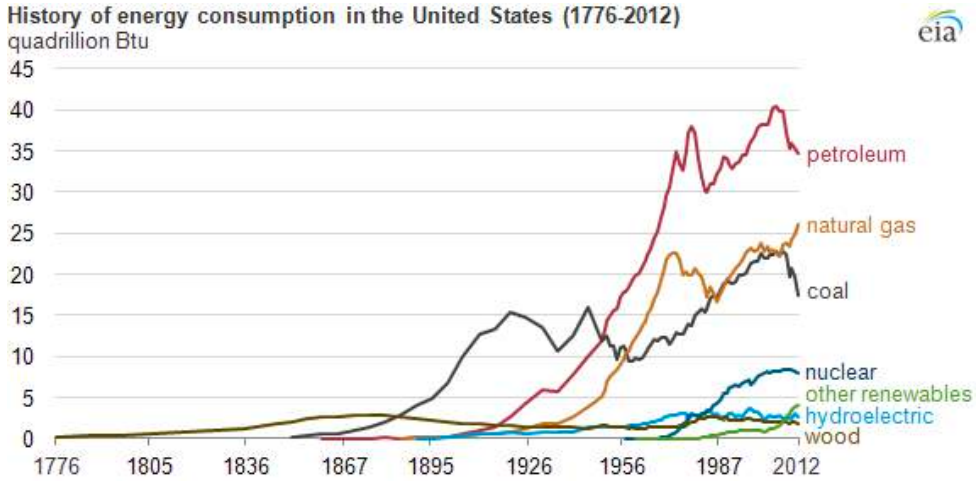


Cost increases due to: uncertainties and complexity in value chains; unanticipated technological and regulatory bottlenecks; market structure effects; and possible appraisal optimism or "low balling".

Source: "*Carbon capture and storage at scale: Lessons from the growth of analogous energy technologies*", Rai, Victor, & Thurber. Energy policy 38 (8), 4089-4098

Agents of Change, Changing Agents

- Large-scale energy transitions are expected to be long affairs. To speed things up abnormally, **need carefully designed & coordinated technology-push and demand-pull, coupled with transformed social norms**
- **Policy, regulatory, business, and public experience with actual deployment across markets critical**

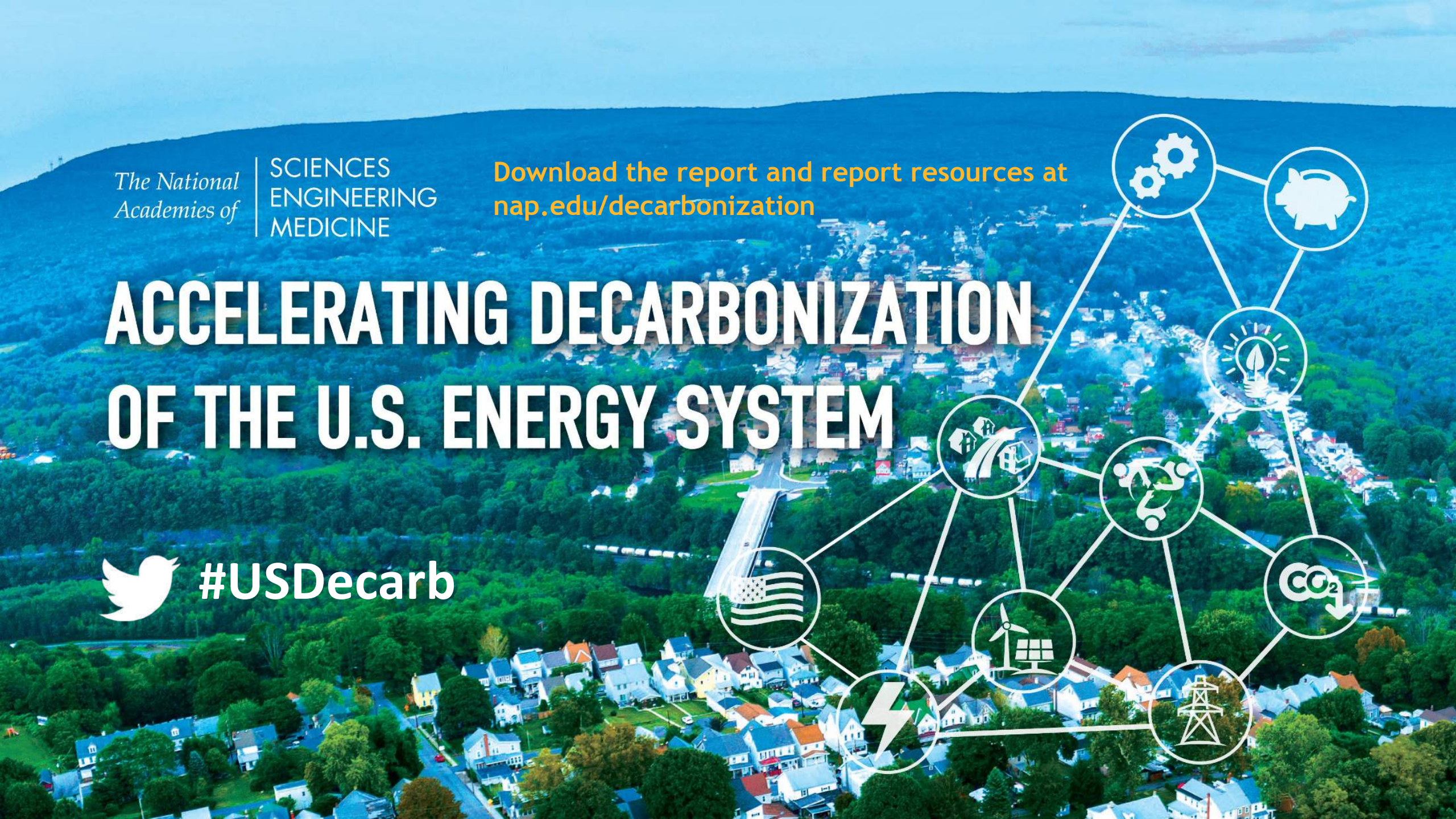


The National Academies of SCIENCES ENGINEERING MEDICINE

Download the report and report resources at nap.edu/decarbonization

ACCELERATING DECARBONIZATION OF THE U.S. ENERGY SYSTEM

#USDecarb



Decarbonization policies must ensure a fair and equitable transition with public participation in decision making

"…clean energy transitions should help to create future U.S. energy systems that are more just, equitable, and inclusive. This requires careful attention to ensure that both the ***processes*** through which decisions about energy transitions are made and the ***outcomes*** of clean energy transitions are more inclusive of the full array of voices of workers and communities with stakes in the future of U.S. energy and that these diverse communities are treated fairly and equitably."

Speaking at UT Energy Week 2021

Committee Roster





Stephen W. Pacala, Chair, Princeton University

Colin Cunliff, ITIF

- **Danielle Deane-Ryan**, Consultant

Kelly Sims Gallagher, Tufts University

- **Julia H. Haggerty**, Montana State University

Chris T. Hendrickson, Carnegie Mellon University

Jesse Jenkins, Princeton University

Roxanne Johnson, BlueGreen Alliance

Timothy C. Lieuwen, Georgia Institute of Technology

- **Vivian E. Loftness**, Carnegie Mellon University
- **Clark A. Miller**, Arizona State University

Billy Pizer, Duke University

- **Varun Rai**, University of Texas at Austin

Ed Rightor, American Council for an Energy-Efficient Economy

Esther S. Takeuchi, Stony Brook University

- **Susan F. Tierney**, Analysis Group

Jennifer Wilcox, University of Pennsylvania





Energy@UT

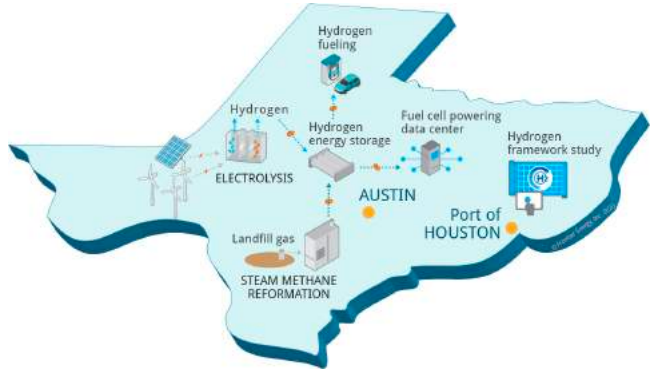
Taking a multi-faceted, integrated approach to Fueling a Sustainable Energy Transition

The depth and breadth of the research and innovation of our faculty and researchers enables UT to take a **balanced view of the global energy system.**

The **Energy Institute (EI) serves as a gateway to UT's world-class researchers** dedicated to solving the grand energy challenges facing society.

Fueling a Sustainable Energy Transition Initiative

H2@Scale Project Launched in Texas



Columbia & UT Austin Joint Workshop

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ENERGY WEEK 2021

WHAT STARTS HERE CHANGES THE WORLD

April 13th 10:30am – 3:00pm (Virtual)

Energy Transition: Past, Present, and Future	10:30 AM-11:30 AM CT
Technology Pathways: Fork in the Road?	11:30 AM-12:30 PM CT
Sustaining the Transition: A New Social Contract	1:00 PM-2:00 PM CT
Community Transitions: Enabling a Deep Change	2:00 PM-3:00 PM CT

April 14th 9:30am – 2:00pm (Virtual)

Getting There: Energy Leadership in Unprecedented Times	9:30 AM-11:00 AM CT
Funding the Transition: How Not to Break the Bank	12:00 PM-1:00 PM CT
Philanthropy in Energy Transition: The Visible Hand?	1:00 PM-2:00 PM CT

April 13th 5:00pm – 7:30pm (Virtual)

Student Research Competition

Research into the development of novel energy technologies, energy policy, and financial, economic, and legal solutions is a vital part of addressing key energy-related challenges facing humanity beyond 2021. To promote the development of energy research in the academic community, UT Energy Week hosts an interdisciplinary research competition for both undergraduate and graduate students at UT.

Review the research presentations here

Longhorn Energy Club brings you a showcase of student energy research here at the University of Texas at Austin. This year's competition features **27 students** from **10 academic departments**.

LONGHORN ENERGY CLUB

ENERGY TRANSITION: PAST, PRESENT, AND FUTURE