Strategic Energy Institute
Energy Policy Innovation Center
"EPICenter"

Introduction & Overview

Richard A. Simmons, PhD, PE

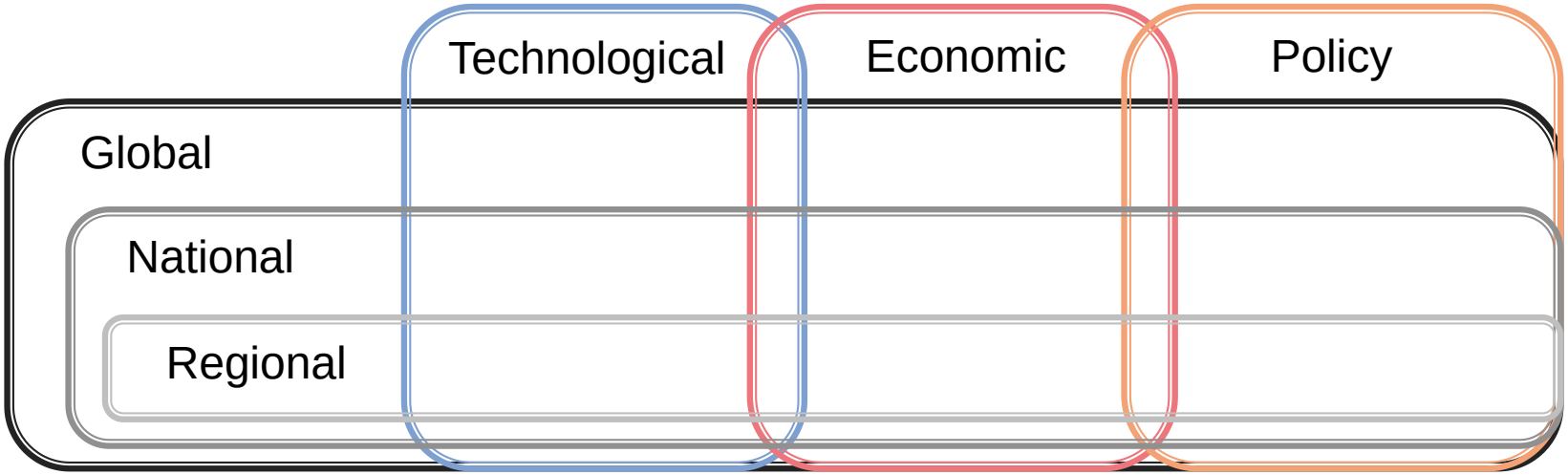
November 28, 2016

Outline

- Introduce the context for the GT-led energy policy center
  - Key SEI objectives
  - Regional approaches to energy R&D and collaboration
  - Distinctive aspects of energy in the Southeast
- Introduce the mission, scope & vision for the GT-led center
  - Mission and Scope
  - Objectives and Deliverables
  - Work Product Selection Methodologies
  - Organizational Concepts
  - Types of Partner Entities, and Engagement with External Advisors

SEI Objectives

- Define and Promote Cross Cutting Market Themes
- Define and Promote “Strategic Focus Areas”
- Foster the development of:
  - Integrated Techno-Economic Studies,
  - Systems Approaches,
  - Roadmaps & GT perspectives



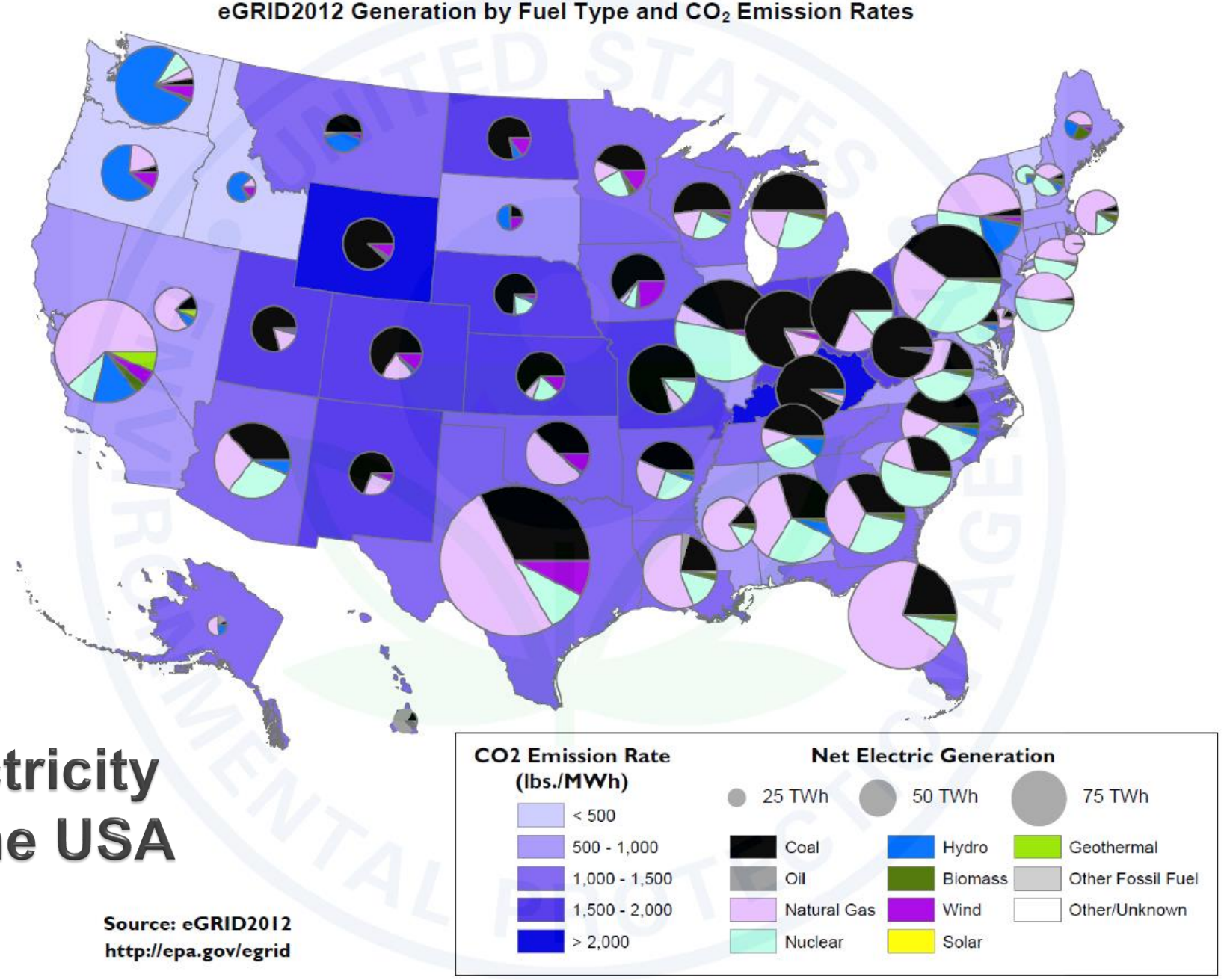
The center is a means to facilitate the integration of multiple, interrelated considerations.

Context for the Regional Center

- We see a compelling need to address national/global energy challenges at a regional level
  - Regional resource mix
  - Technologies that have found specific traction in the region
  - Technology demonstrators with global relevance and impact
  - Characteristic business and regulatory environments

- Federal leveraging
  - DOE Regional Clean Energy Innovation Partnerships
  - $110 million FY17 budget request for up to 10 regional centers
  - About 20 regional workshops have been convened since May
  - Resonant themes include:
    - Decarbonization
    - Public-Private Engagement
    - Synergies with U.S. Manufacturing Innovation & Competitiveness

Electricity in the USA



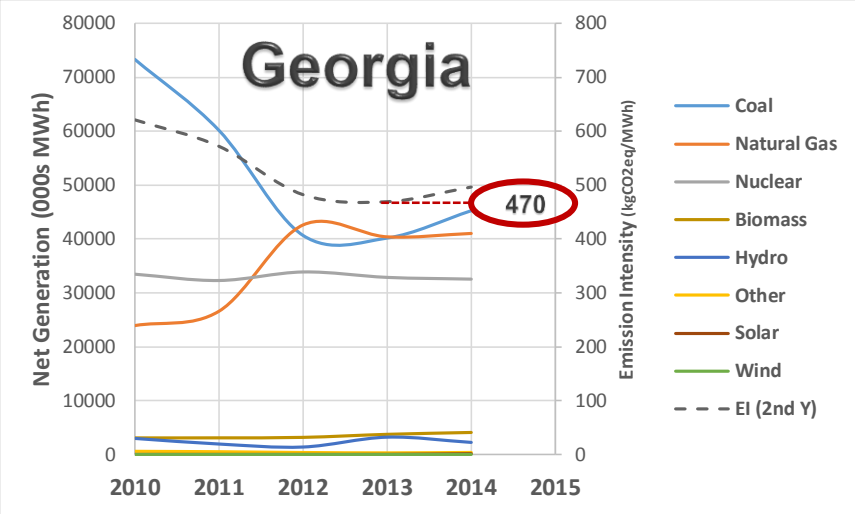
Source: eGRID2012
http://epa.gov/egrid

https://www.epa.gov/sites/production/files/2015-10/documents/egrid2012_summarytables_0.pdf

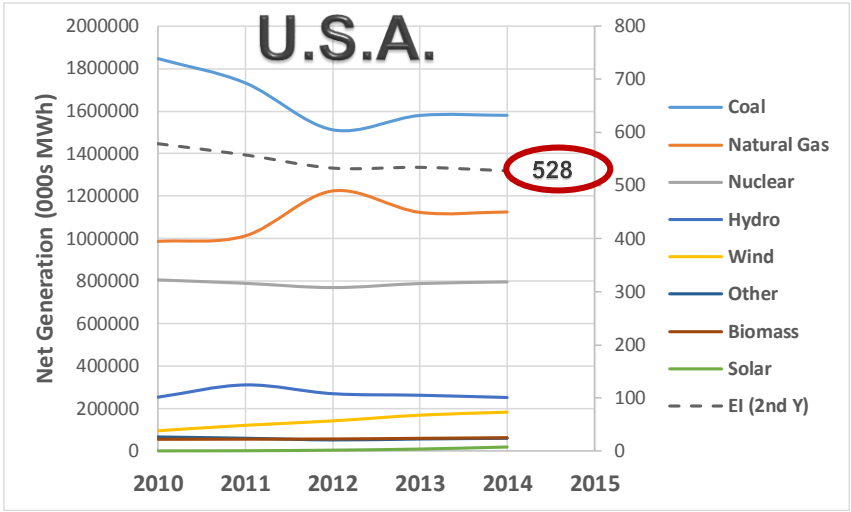
Distinctive aspects of energy in the Southeast

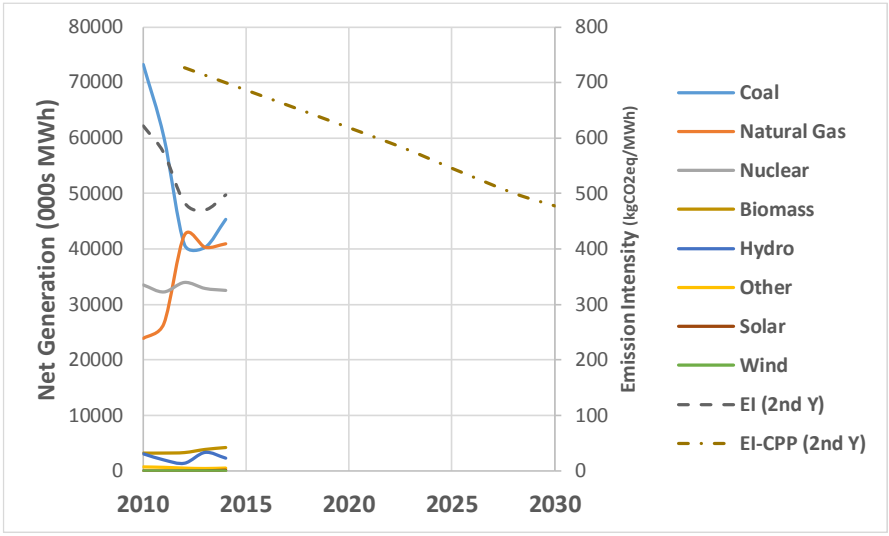
- SE electricity matrix is Diverse, Flexible, & Low Cost
  - **Nuclear Power**
    - Accounts for 25%, as compared to 20% nationally;
    - 6 GW new nuclear coming online by 2020 (GA, SC, TN)
  - **Natural Gas**
    - 28% growth since 2010, 2x the average U.S. rate
  - **Photovoltaics**
    - Growth at 1100% between 2010 and 2014;
    - Utility scale & Distributed generation
  - **Bioenergy**
    - Accounts for 3.3% of Georgia's electricity, vs. 1.6% nationally;
  - **Carbon Capture & Sequestration (CCS) R&D and Demonstration**
    - Kemper IGCC (Gasification);
    - Barry (Pulverized Coal)

Distinctive aspects of energy in the Southeast



- Presence of large, regulated, vertically-integrated utilities
  - Benefit of strategic and longer term planning
  - Increasing consolidation of natural gas and electricity markets





Energy in the Southeast (Cont.)

- Grid Modernization
  - GT NEETRAC (Electric Energy Testing, Research & Application)
  - Duke Energy eGRID (Wind Turbine Test Beds)
  - UNC-Charlotte EPIC (Energy Production & Infrastructure Center)
  - Clemson – SCG&E EIC (Energy Innovation Center)
  - R&D and Demonstration Pilots with Major Regional Utilities

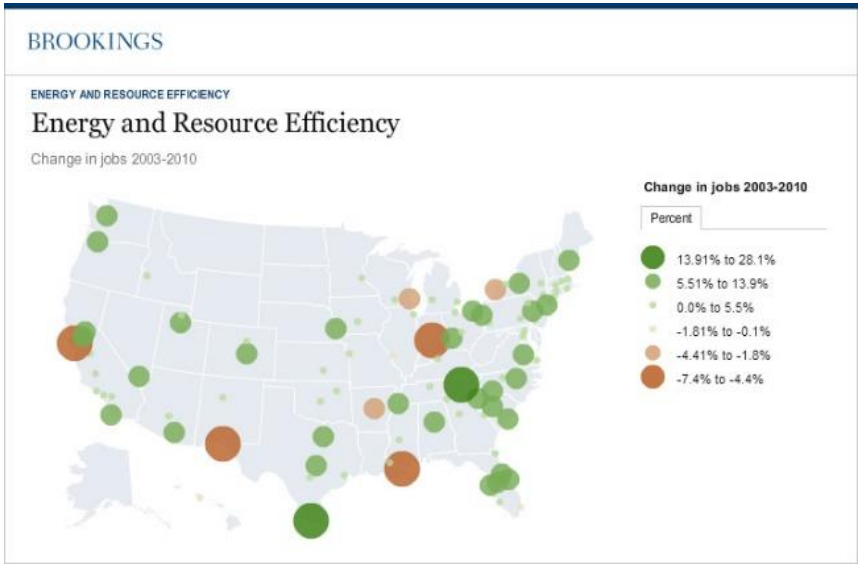
- Energy Utilization
  - Energy intensive industries
  - Nationally-directed energy efficiency initiatives
  - Demand side utilization, time –of-use pricing, transactive load control, etc.

- U.S. Leadership in Cross-cutting themes:
  - RD&D of key technologies (National Labs, EPRI, DOE EFRCs, Hubs)
  - Industrial Big Data & Analytics
    - Large concentration of remote monitoring & control of energy infrastructure
    - GE (330 GW) , NextEra (12 GW), Siemens, MHI, EPRI, etc.

- Resource: LOCATION!
- Investment Climate: LOCATION!
- Regulatory Framework: LOCATION!

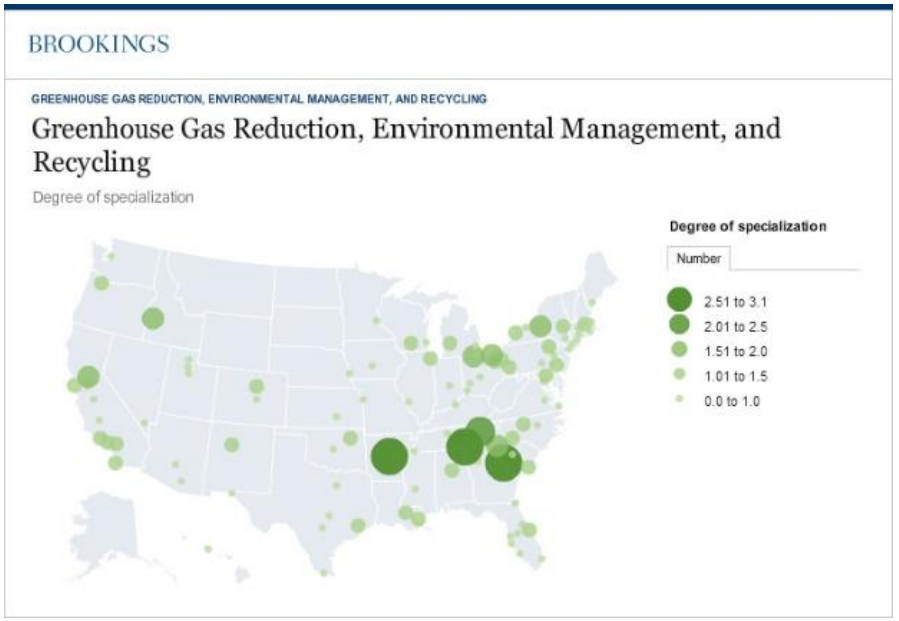
Energy in the Southeast (Cont.)

- Energy Jobs



Change in Energy Jobs, 2003-2010

- Clean Energy Education



GHG/Env./Recycl. Degrees, 2010

Source: Brookings, 2011. "Sizing the Clean Energy Economy. A National & Regional Green Jobs Assessment. https://www.brookings.edu/wp-content/uploads/2016/06/0713_clean_economy.pdf

Outline

- Introduce the context for the GT-led energy policy center
  - Key SEI objectives
  - Regional approaches to energy R&D and collaboration
  - Distinctive aspects of energy in the Southeast

- Introduce the mission, scope & vision for the GT-led center
  - Mission and Scope
  - Objectives and Deliverables
  - Work Product Selection Methodologies
  - Organizational Concepts
  - Types of Partner Entities, and Engagement with External Advisors

Center Mission

This Center is being conceived to specifically address

- characteristic resources, challenges, and capabilities;
- with regional expertise and perspectives; and to
- deliver pragmatic solutions with maximum impact.

This initiative is novel in its regional, collaborative and transparent approach to assess the interdependencies of energy policy and technology.

Georgia Tech Strategic Energy Institute

FOR IMMEDIATE RELEASE
CONTACT:
Jhai James, Georgia Tech Strategic Energy Institute
404.385.4198
jhai.james@energy.gatech.edu

Georgia Tech Announces
Development of Major Regional Energy Center
Center will explore intersection of
energy policy and technology innovation in the Southeast

ATLANTA (October 25, 2016) – Georgia Institute of Technology today announced the creation of a new, major regional energy center. The center will operate out of Georgia Tech's Strategic Energy Institute (SEI) and provide an unbiased and interdisciplinary framework for informing energy policy and systems analysis for the Southeast region.

Scope

The center will strive to accelerate a diversity of reliable, affordable and increasingly low-carbon energy options in the Southeast.

The center will put a premium on regional contributions that can enhance U.S. energy leadership and competitiveness.

The Center will investigate regional challenges in both:

- power generation

&

- transportation

By considering:

- Techno-economic,
- Social and
- Policy factors
- Near and longer term impacts

Key Objectives & Deliverables

Work Products:

- The Center will produce rigorous, fact-based policy studies that address southeastern perspectives on global, national and regional energy issues;

Events:

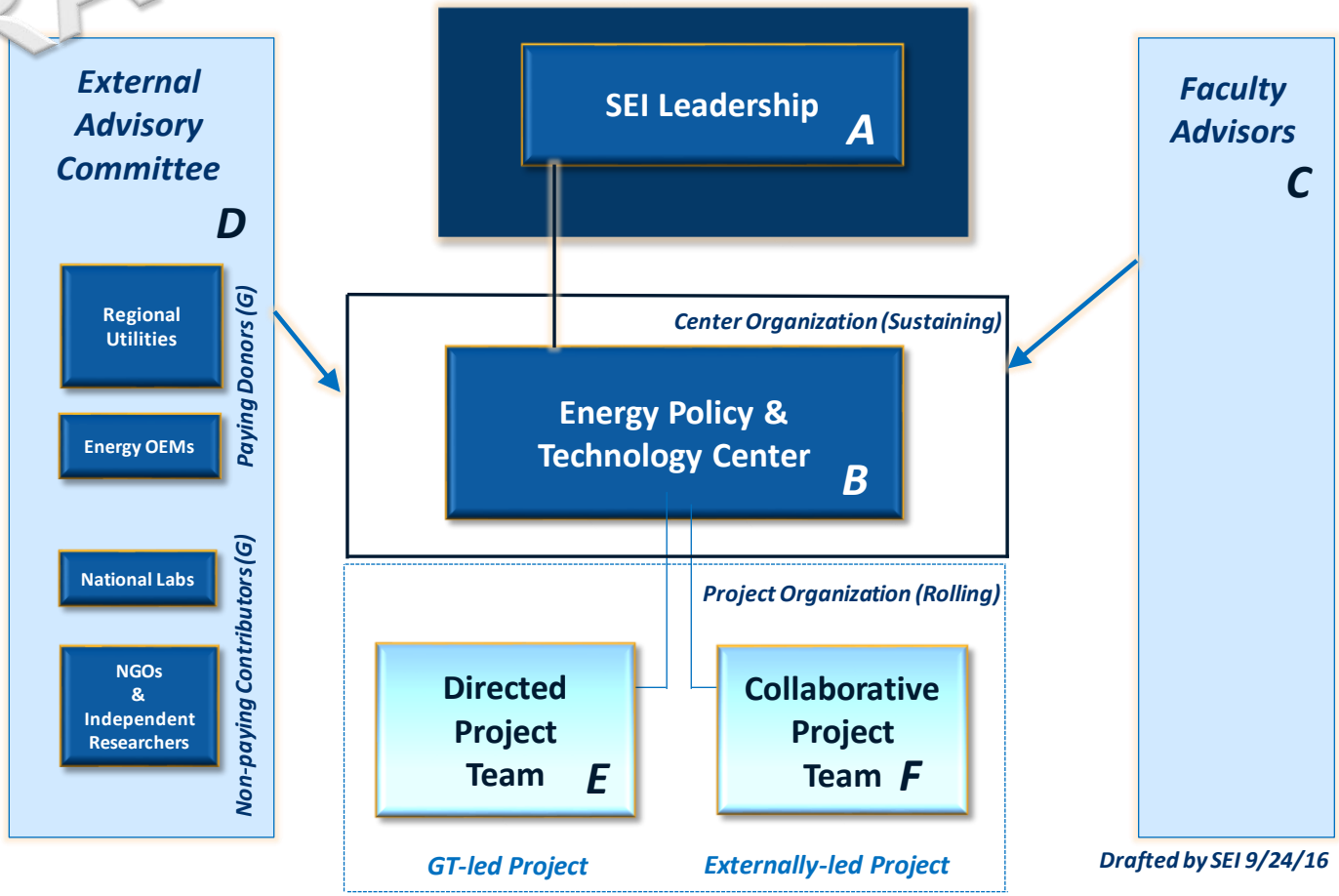
- The Center will host conferences and workshops on relevant energy issues, serving as a nonpartisan facilitator for academic, business and nongovernmental stakeholders;

Educational outreach and workforce development:

- The Center will provide opportunities for information exchange among students, faculty and visiting scholars.
- It will support workforce development with regional utilities and OEMs, facilitating collaboration and public-private partnerships.

Organizational Concept

Draft Organizational Structure, Yrs 1-2



Job Posting, November 2016

RESEARCH ASSOCIATE
Energy Policy Focus

Job Description:
Perform focused policy, economic, and techno-social analysis for a newly formed Energy Policy Center under Georgia Tech's Strategic Energy Institute.

Major Responsibilities:
- Oversee and conduct the preparation of reports
- Perform the foundational analysis
- Engage with technical experts
- Communicate the objective findings of center work products
- Facilitate stakeholder dialogues within the region

For public access via the University System of Georgia Applicant Clearinghouse
Posting runs from November 1 through 15.
https://apps.itos.uga.edu/ach/position/33888

EPICenter External Advisory Board

Entities from the following stakeholder categories may be invited to voluntarily participate:

- Regional Utilities
- Energy Original Equipment Manufacturers (OEMs)
- Financial Institutions
- Non-governmental organizations (NGOs)
- National laboratories
- Other research consultants
- Collaborating universities and energy research institutes

EPICenter Facts: Stakeholder Engagement

- How will external partners engage with the center?

  Partners may be invited to voluntarily provide:

  - Contributions of resources (funding, personnel time, facilities)
  - Input and recommendations for project selection
  - Review and recommendations for interim & final reports
  - Opportunities for collaboration and networking

EPICenter Facts: Work Products

- How will project topics be selected?

  Projects will first be identified based upon:

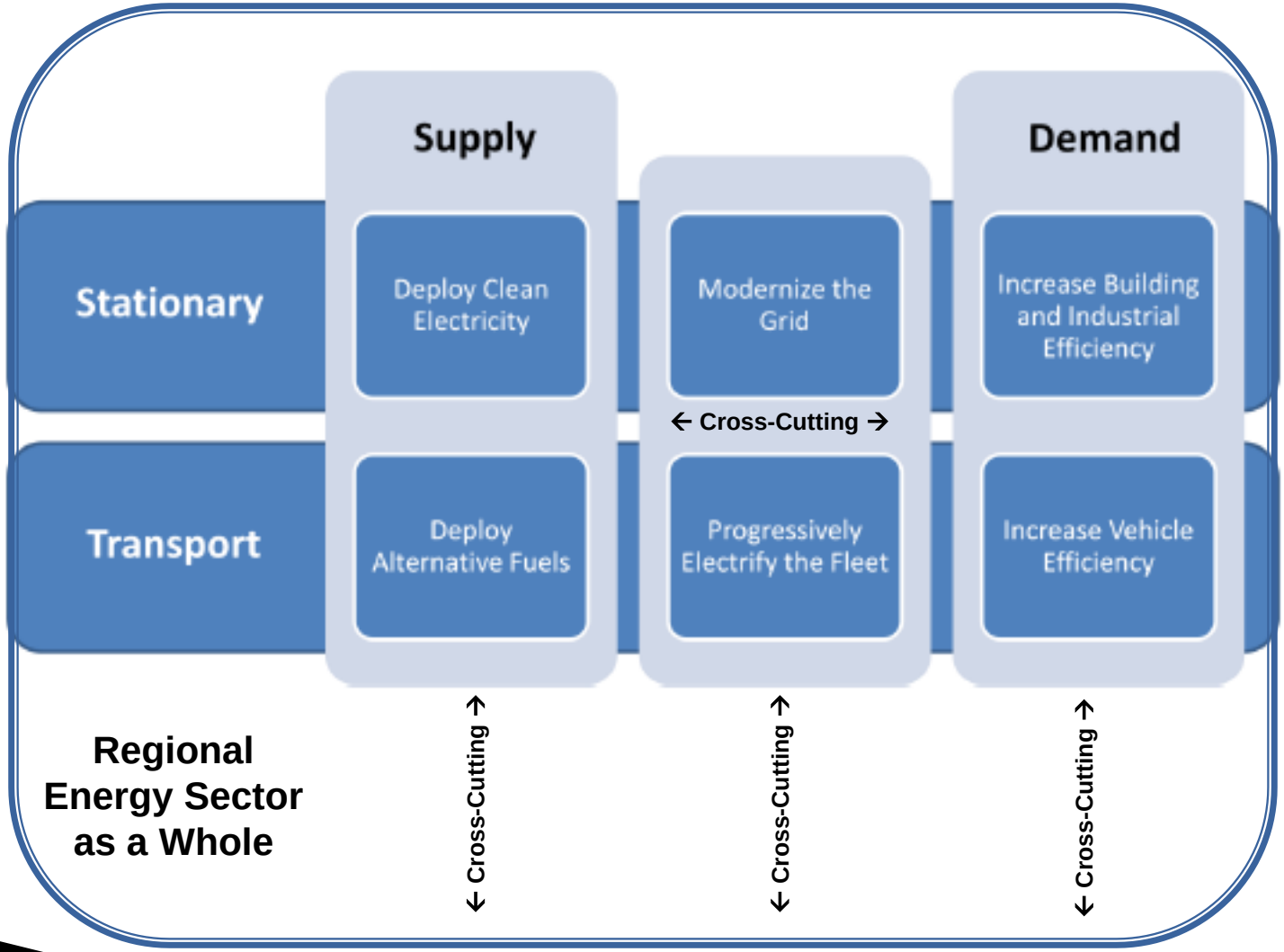
  - Existing literature, studies and regional context
  - Center focus areas, and strategic roadmaps
  - Recommendations from internal and external collaborators

- How will work products be reviewed, interpreted and disseminated?

  Transparent, rigorous, three-step methodology:

  - Internal & external interim review → Objective Findings
  - Statements, Scenario Simulations, Case Studies
  - Policy recommendations → Subjective Interpretations
    - Center-authored policy analysis, options & recommendations
    - Third-party suggestions and implications for policy

Notional framework for approaching study topic selection



Source: U.S. Department of Energy, Quadrennial Technology Review Framing Document, 2015

EPICenter Facts: Operations & Funding

- How will the center fund its operations?

  Funding (cash and in-kind) will derive from:

  - The voluntary contributions of donors
  - Potential leveraging of relevant federal RD&D energy initiatives

- What is the expected budget?

  - The center currently has seed funding of about $600k
  - The center aspires to a sustainable annual level of $1.5MM

- When will the center begin operations?

  - The center officially announced its creation on 10/25/16
  - A formal launch event is being planned for 4/4/17

Thank you!

Richard A. Simmons, PhD, PE
Senior Research Engineer & Fellow
Georgia Tech Strategic Energy Institute
richard.simmons@me.gatech.edu
404-385-6326

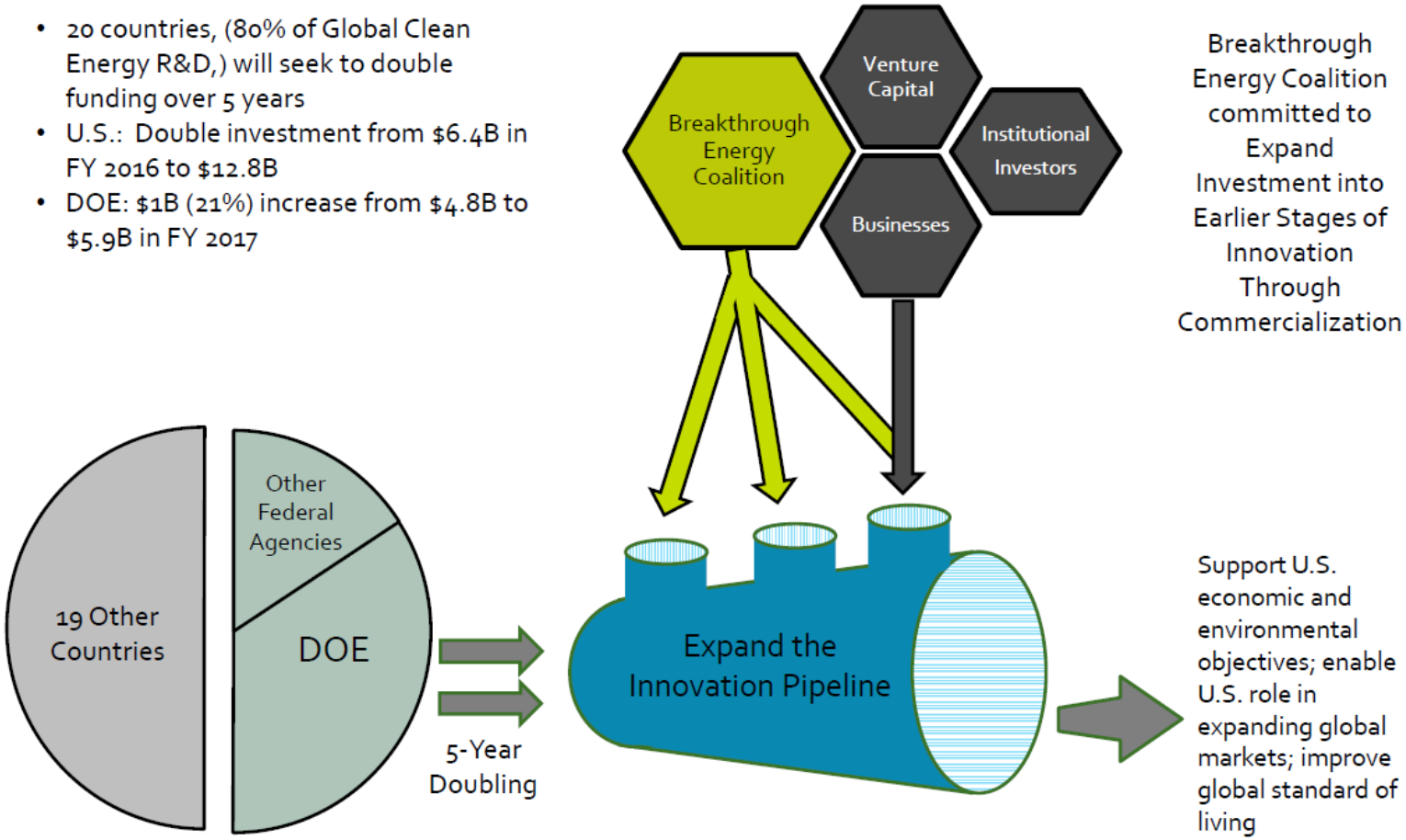
Back up slides

Link to EPICenter Fact Sheet

http://www.energy.gatech.edu/energy-policy-and-technology-center-georgia-tech

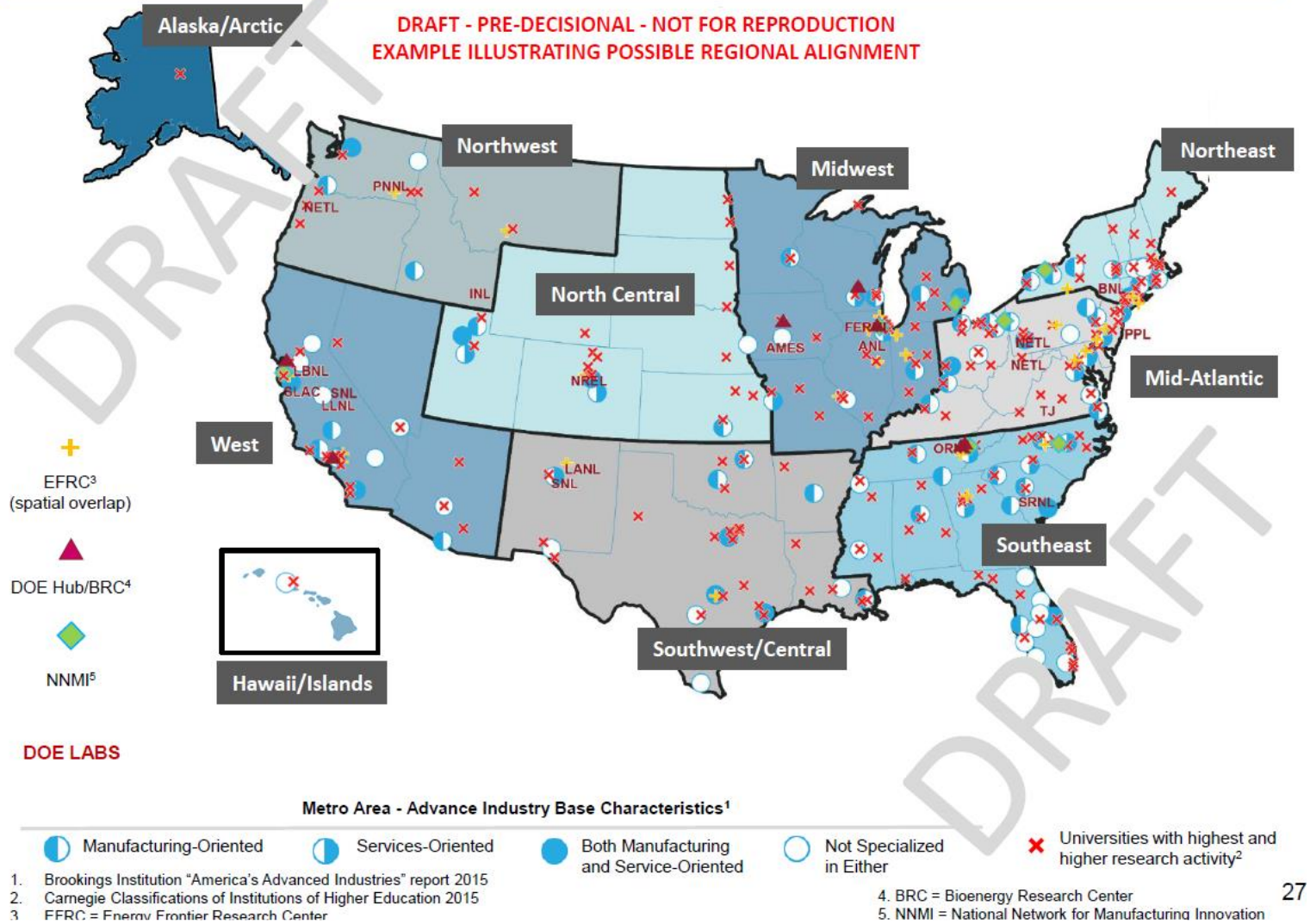
MISSION INNOVATION

- 20 countries, (80% of Global Clean Energy R&D,) will seek to double funding over 5 years
- U.S.: Double investment from $6.4B in FY 2016 to $12.8B
- DOE: $1B (21%) increase from $4.8B to $5.9B in FY 2017



Source: U.S. Department of Energy, Mission Innovation Colleges & Universities Roundtable, 3/18/16

Notional Clean Energy Innovation Partnership Regions



Source: U.S. Department of Energy, Mission Innovation Colleges & Universities Roundtable, 3/18/16