CLUSTERS
"THE POWER OF COLLABORATION"

08 July 2010

The New Brunswick Energy Ignition Summit

Delta Brunswick Hotel
Saint John, NB, Canada

Richard A. Bendis
President & CEO
Innovation America

The World Has Changed

- Convergence of Complex Challenges
- Loss of Jobs
- Growing US Trade Deficit
- Greater International Competition in manufacturing and service industries
- Competitive advantages are increasingly tied to human capital and innovation
- Economic growth is closely related to education/workforce, energy, climate change, environmental, natural resource and geopolitical issues
- "Clusters Matter"

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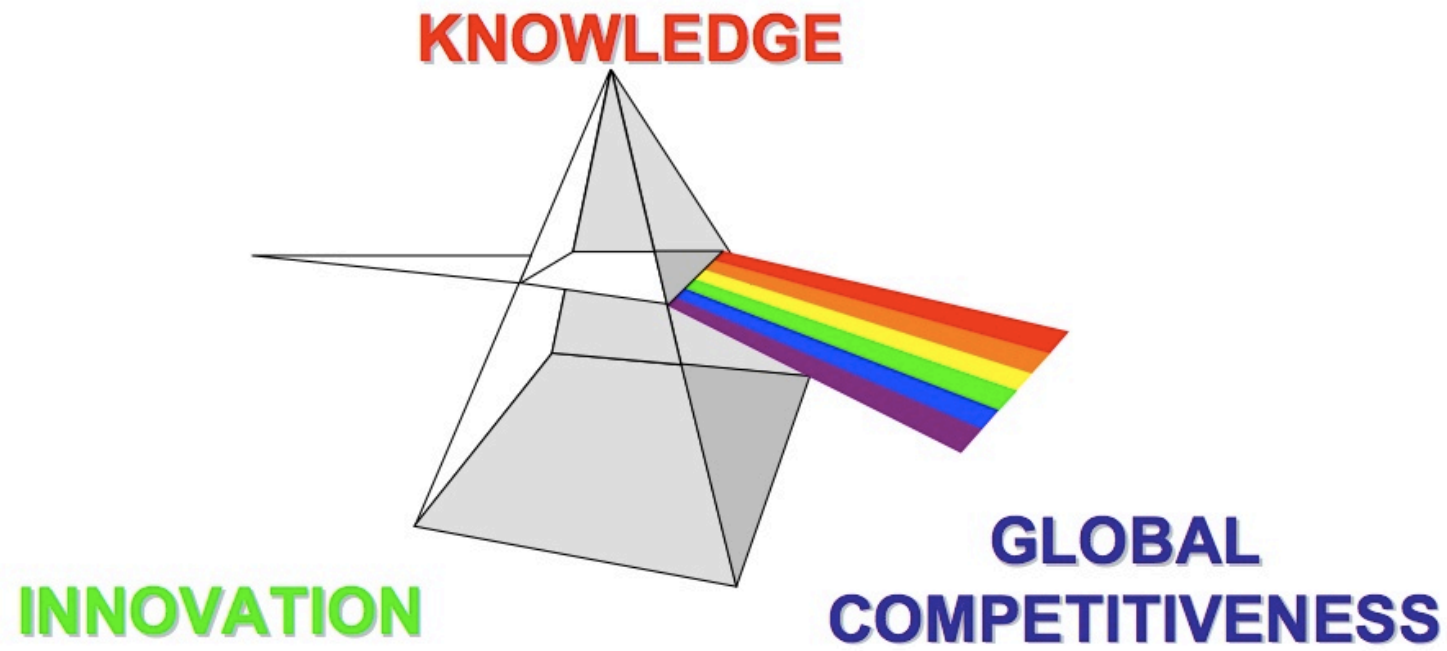
Innovation Economy



"If a man empties his purse into his head, no man can take it away from him. An investment in knowledge always pays the best interest."

--Ben Franklin

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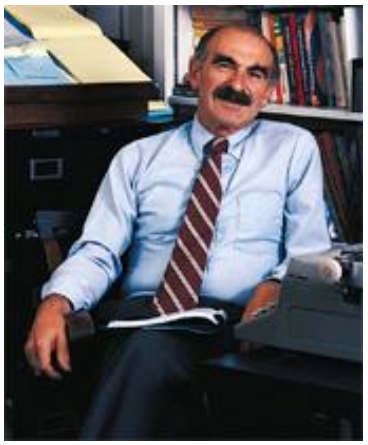
Why Is Innovation Essential?

"INNOVATION IS THE SPECIFIC INSTRUMENT OF ENTREPRENEURSHIP. THE ACT THAT ENDOWS RESOURCES WITH A NEW CAPACITY TO CREATE WEALTH."

-PETER F. DRUCKER

"INNOVATION DISTINGUISHES BETWEEN A LEADER AND A FOLLOWER."

-STEVE JOBS



"JUST AS ENERGY IS THE BASIS OF LIFE ITSELF, AND IDEAS THE SOURCE OF INNOVATION, SO IS INNOVATION THE VITAL SPARK OF ALL HUMAN CHANGE, IMPROVEMENT AND PROGRESS!"

-TED LEVITT

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Traditional & Innovation-Based Development

	Traditional		Innovation
• Competitive Basis	Natural resources Highways / Rail Proximity Costs **i.e. PHYSICAL**		Specialized talent Networks, information University research / professors Market understanding Global Reach **i.e. KNOWLEDGE**
• Key values / offerings	Business parks Incentives		Access to research Workforce competencies Lifestyle
• Lead Organization	Chambers / EDCs		**Innovation intermediaries,** Economic developers

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What is an Innovation Intermediary?

An Organization at the Center of the region's, state's or country's efforts to align local technologies, assets and resources to work together on advancing Innovation.

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21st Century Innovation Intermediary

Connectivity of Key Human & Institutional Players

Leverage & **Alignment** of Funding & Resources

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Research & **Marketing** of the Strengths of the Innovation Economy

Programs

Commercialization
Direct Investment
Angel Capital
SBIR Programs
Technology Mining / Intellectual Property Programs

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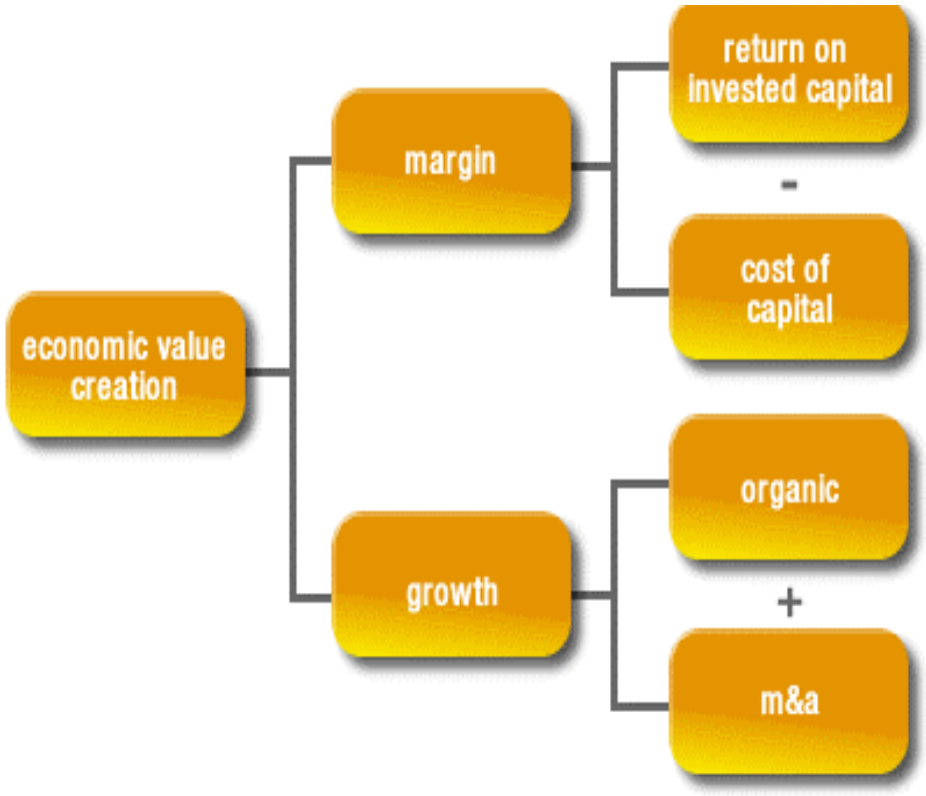
Innovation Paradigm Shift

PROOF OF CONCEPT

(Technological Feasibility)

PROOF OF RELEVANCE

(Market Pull)



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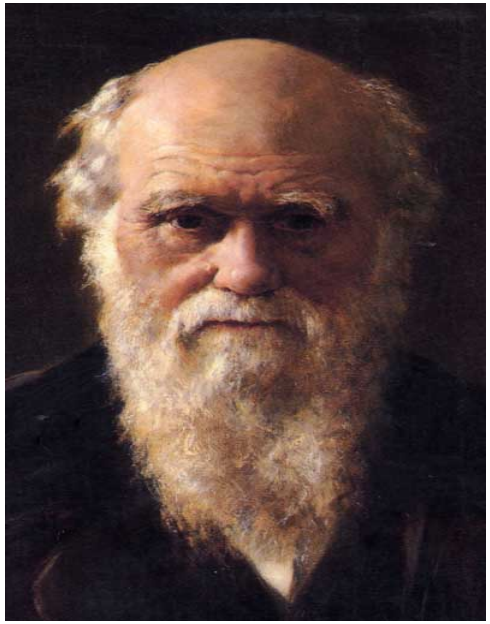
National Intermediary Best Practices

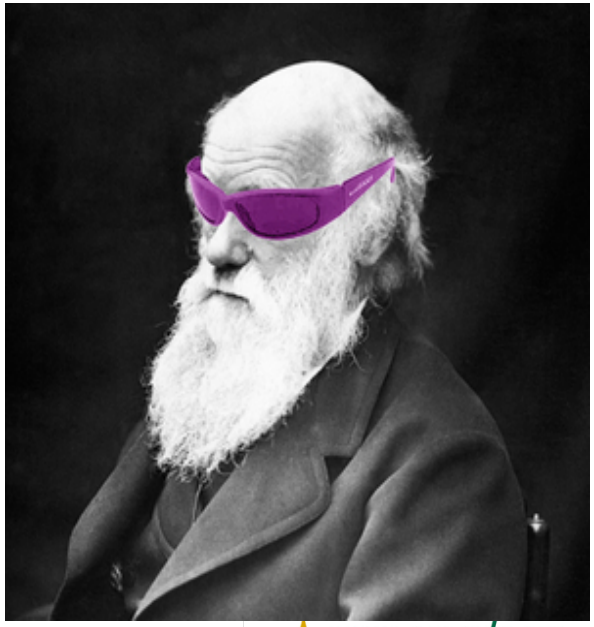
- Longevity
- Bipartisan Support & Champions
- Independent Organizations
- Continuous Reinvention
- Private Sector **LEADERSHIP**
- Understand Return On Investment
- Sustainability In Funding
- Accountable
- Innovative
- Effective Leadership

Change Is Inevitable

"It is not the strongest of species that survive, nor the most intelligent, but the ones most responsive to change."

-Charles Darwin





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Council on Competitiveness

Clusters of Innovation

- Concentrate Knowledge Assets
- Host Globally Competitive Firms
- Create High-Wage Jobs
- Attract Scarce Global Talent & Investment

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Clusters

Clusters represent a new way of thinking about national, state, and local economies, and they necessitate new roles for companies, government, and other institutions in enhancing competitiveness.

-Michael Porter

DO CLUSTERS WORK?

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KTEC

Kansas Technology Enterprise Corporation

www.ktec.com

KTEC Mission:

"To create, grow and expand Kansas enterprises through technological innovation."

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Kansas Strategic Technology Cluster Assessment and a Plan for the 21st Century

Purpose of the Study:

- Technology revolution affecting the economy.
- We must map our course in this new innovation economy.
- Focus our resources on strategic technology clusters in order to compete.

Published by The Kansas Technology Enterprise Corporation

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The Kansas Experience - 2009

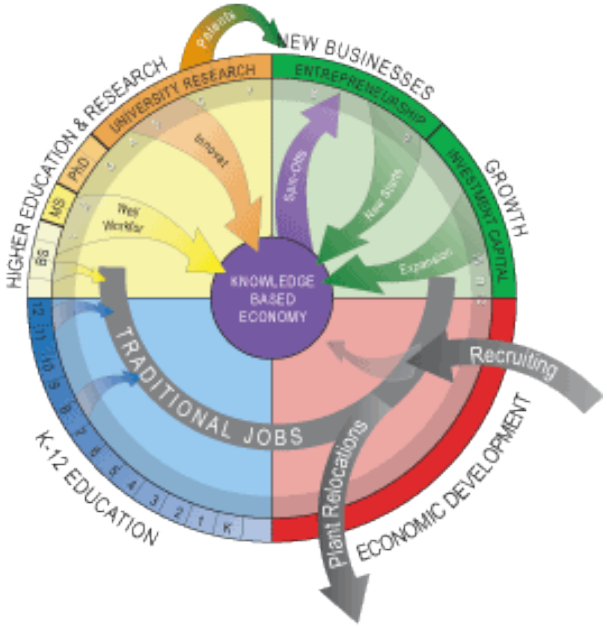
CLUSTER	ORGANIZATION	OUTCOMES
Human BioSciences	**Kansas BioScience Authority (KBA)** www.kansasbioauthority.org	•$581m Fund •Build world-class research capacity, growth of bioscience startups, expansion of the state's bioscience clusters and facilitate industrial expansion and attraction.
Value-added Agriculture and Ag Bio	**National Agricultural Biosecurity Center (NABC)** http://nabc.ksu.edu/content	•$650M Research Center •Focused on protecting America's agricultural infrastructure and economy from endemic and emerging biological threats.
Aviation	**National Institute for Aviation Research (NIAR)** www.niar.wichita.edu	24 year-old research and tech -transfer center established to advance the nation's aviation industries that may benefit from aviation-related technologies.
Information and Telecommunications & Computing	**Software and Technology Association of Kansas (SITAKS)** www.sitaks.com	Advocate for Kansas' software and information technology sector to help Kansas' software and IT companies grow and succeed.

Kansas Bioscience Authority (KBA)

- $581 million state-funded independent bioscience TBED organization
  - $75.5 million program budget; $3.5 million operating budget
  - 18 employees (8 “deal” people)

- Investment priorities
  - Expand the quantity and quality of bioscience research
  - Focus on the commercialization of bioscience discoveries
  - Foster formation and growth of bioscience companies
  - Position Kansas for international leadership in key clusters

- KBA is governed by an 11-person board of directors comprised
  of local and national leaders in industry and academia
  - Standing investment committee; all investments subject to board approval



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National Bio and Agro-Defense Facility (NBAF) - Kansas

- $650 million research facility
- Kansas Task Force includes a team of citizens, scientists, civic leaders, elected officials, industry leaders, farmers, and agricultural specialists working closely with the Kansas Bioscience Authority to provide seamless support to the federal government throughout the NBAF process.
- NBAF will feature state-of-the-art, bio-containment laboratories to research and develop diagnostic capabilities to assess and detect potential threats against humans and animals alike

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Cluster Partnerships

- Progress is promoted by strong industry, government, university & community leadership
- Sustained by dynamic public/private partnerships
- These leaders create new, responsive models of governance for the New Brunswick Energy Hub

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Defining The New Brunswick Energy Hub Cluster

- Network of organizations working together to provide world-class energy solutions for New Brunswick and beyond.

- **The Hub Model** is based on a proven economic driver known as a Cluster.

- **Defining a Cluster**
  - A cluster is comprised of a range of businesses---from entrepreneurial start-ups, to long-term large-scale commodity producers---to investors and professional service providers.
  - Each element of the Cluster has a specific role to play and by working together, each is more successful.

- **Core elements of a cluster:**
  - ***Industry—Government—Research & Training—Community***

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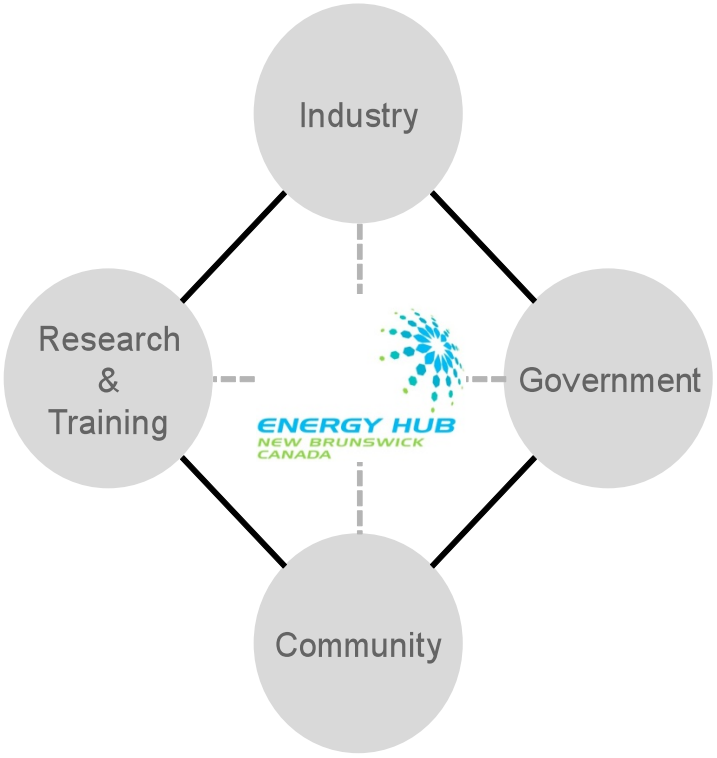
The Energy Hub Partners

- **INDUSTRY**
  - Requires energy to produce goods & Services in NB & competitive energy enables competitive businesses. Export NB Energy globally.
- **GOVERNMENT**
  - Government sets policy to enable the overall success of the Energy Hub.
- **RESEARCH & TRAINING**
  - These organizations generate the world-class ideas that lead to world-class solutions & they ensure an effective & productive workforce.
- **COMMUNITY ORGANIZATIONS**
  - Ensure that the Energy Hub is consistent with "public good" & the values of the communities within the hub.



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New Brunswick Cluster Desired Results

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- **SUSTAINABLE WEALTH CREATION**
- **THE WHOLE IS GREATER THAN THE SUM OF THE PARTS**
- **COORDINATED TACTICAL IMPLEMENTATION OF SHARED MISSION AND PROJECTS**

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Regional Innovation Clusters Initiative (RICs)

RICs are a geographically-bounded, active network of similar, synergistic or complementary organizations which leverage their region's unique competitive strengths to create jobs and broader prosperity.



Energy Regional Innovation Cluster (E-RIC)

•$129.7 million over five years to create an Energy Innovation Hub

•Focused on developing new technologies to improve the design of energy-efficient building systems.

•Regional research centers will develop new building efficiency technologies and work with local partners to implement the technologies in area buildings.

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Why Do RICs Matter?

- They create a transition path from unemployment or underemployment to high-skill jobs.
- On average, jobs within clusters pay higher wages.
- Regional industries based on inherent place-based advantages are less susceptible to off-shoring.
- Create many new job opportunities for American workers.
- They connect disenfranchised communities to new career and educational opportunities.
- They stabilize communities by re-purposing idle manufacturing assets, engaging underutilized human capital, and contributing to improvements in the quality of life.

Regional Innovation Clusters

- Implies bounded area characterized by inherent social, environmental, economic, and cultural assets
- Transcends socio-political boundaries
- May include **urban & rural**

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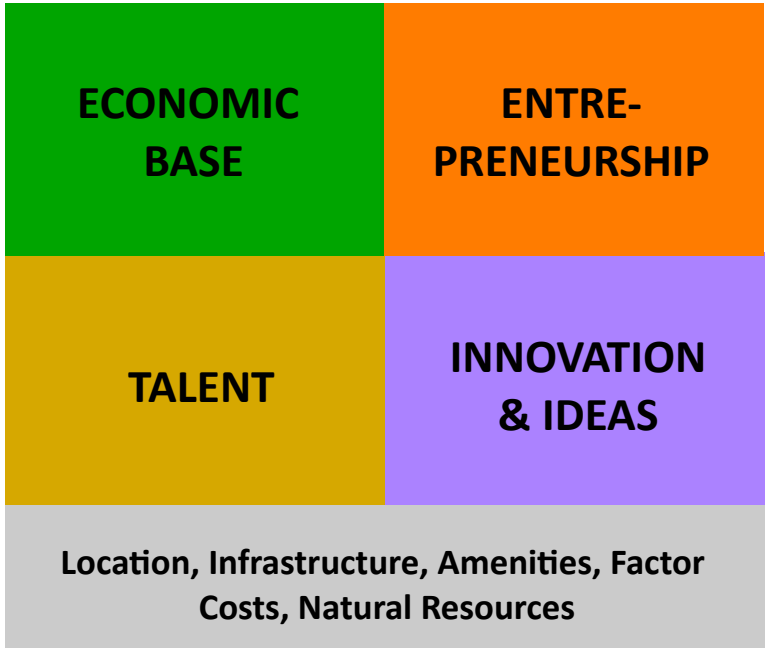
Regional Innovation Clusters

Five Key Components to Consider When Defining Unique Regional Assets

What you make, including your existing & prospective industry clusters

What you do: your workforce skills & human capital base



Your capacity to create companies wholly new or from existing firms

Your capacity to innovate and generate new ideas

The basic conditions defining the economic milieu of the region

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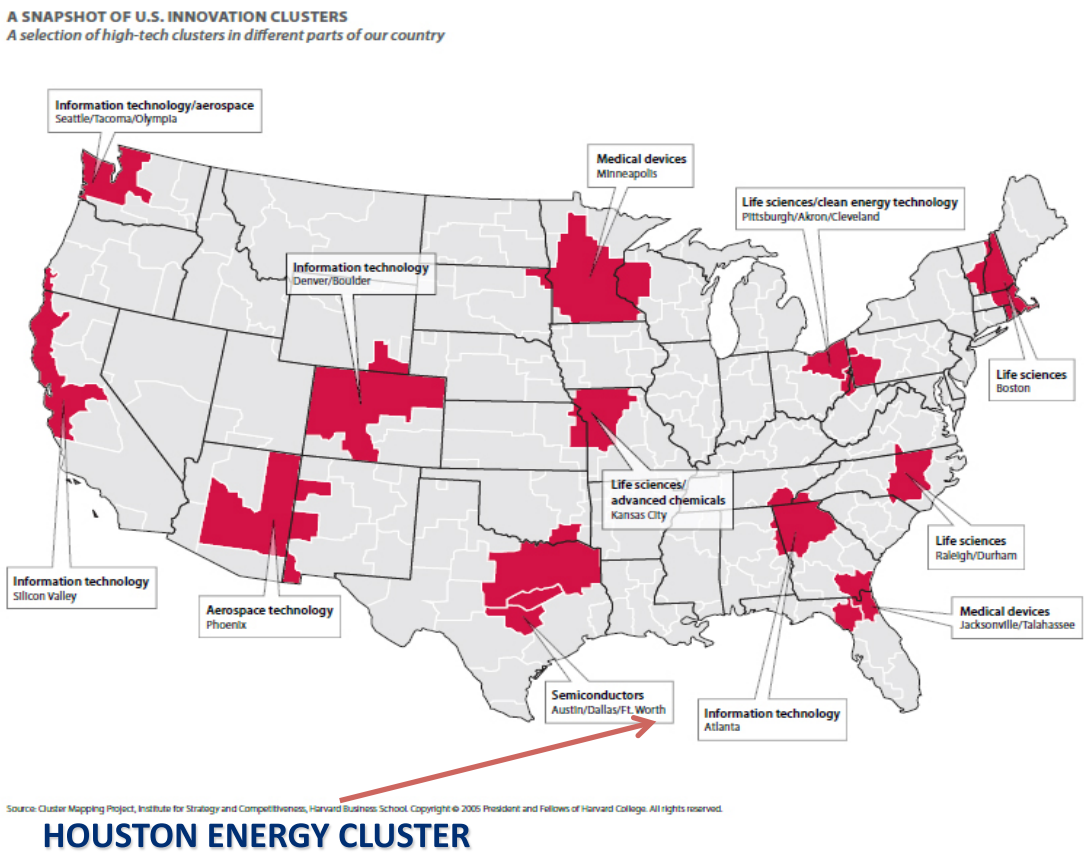
RICs Are Diverse

- All parts of the nation
- Can be in wide array of industries
- Vary in size, shape, and reach
- Often cross local, county, and state boundaries
- Urban and rural



HOUSTON ENERGY CLUSTER

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Best Practices in RIC Management

- **Regionally-Led** from existing networks & assets – bottom-up approach
- **Involve partnerships between private and public** at all levels (i.e. local, regional, state, and Federal)
- Unique **strengths of region are built upon** rather than trying to copy other regions (i.e. everyone can't support a biotech cluster)
- **Different strategies are developed for different clusters**
- Well-funded initially and **self-sustaining over the long-term**
- **Linked with relevant external efforts**, including regional economic development partnerships and cluster initiatives in other locations

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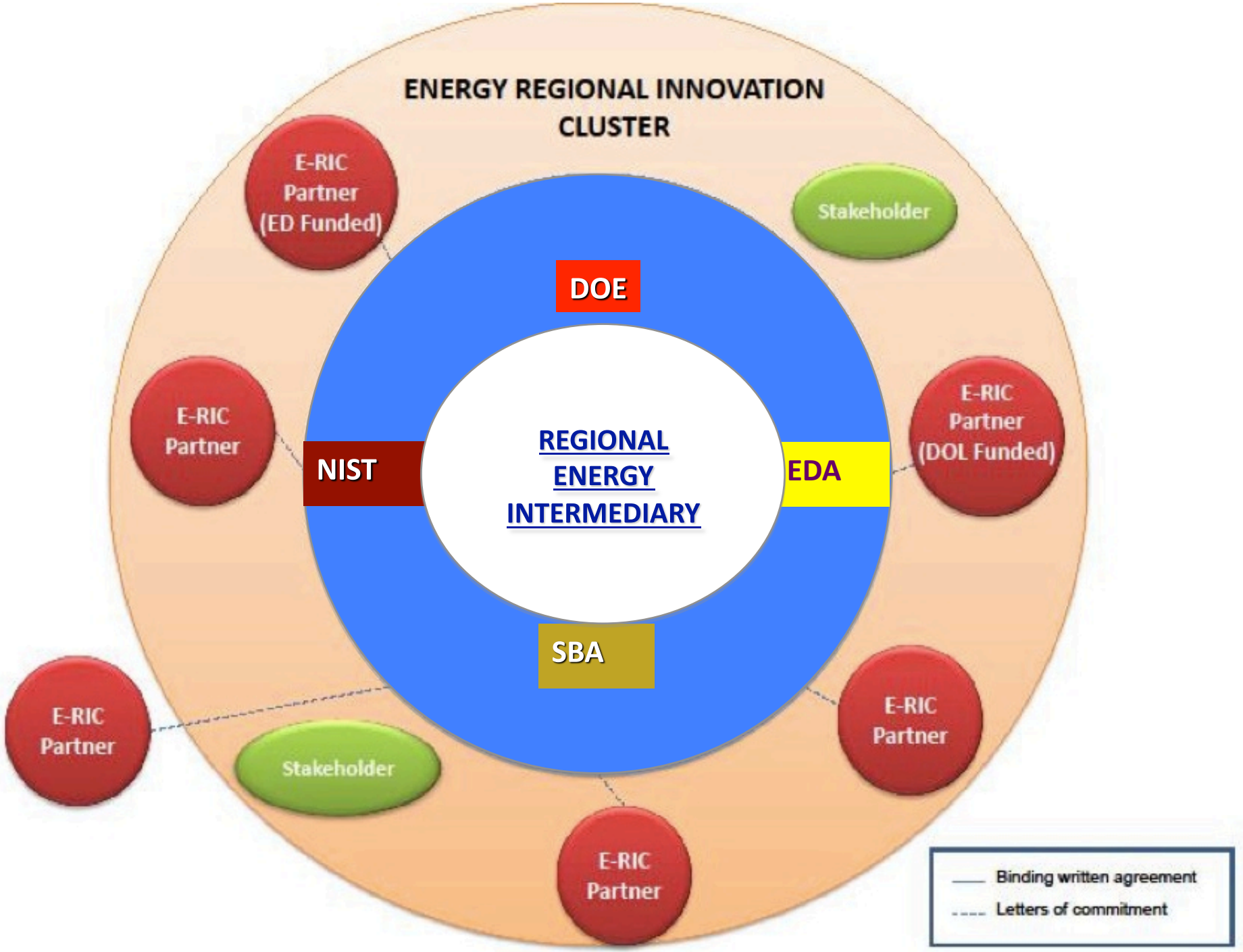
ENERGY REGIONAL INNOVATION CLUSTER
E-RIC Partner (ED Funded)
Stakeholder
DOE
E-RIC Partner
NIST
REGIONAL ENERGY INTERMEDIARY
EDA
E-RIC Partner (DOL Funded)
SBA
E-RIC Partner
Stakeholder
E-RIC Partner
E-RIC Partner
Binding written agreement
Letters of commitment

Wisconsin E-RIC Sample Proposal – Partnering Organizations

Center for Neighborhood Technology - IL

CNT Sustainable Communities Attainable Results

COWS center on wisconsin strategy
building a high road economy in Wisconsin and beyond.

UNIVERSITY of WISCONSIN UWMILWAUKEE

NorthStar Economics, Inc.

OFFICE OF OEI ENERGY INDEPENDENCE

EPA GREEN POWER PARTNER

WISCONSIN ENTREPRENEURS' NETWORK
The Smart Connection

WISCONSIN TECHNOLOGY COUNCIL

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Wisconsin E-RIC Strategic Framework

Put people back to work by:

- Moving new technology out of the lab and into buildings
- Accelerate residential and commercial retrofits through pilot projects and state and federal incentives and policies
- Reengaging under-employed expertise in architecture and engineering to focus on the efficiency challenge
- Working with the region's unmatched mix of existing manufactures of energy efficiency products in the region (windows, water systems, HVAC systems, lighting, etc.) to develop the next generation of products
- Reengaging the workforce that lost jobs in traditional manufacturing sectors that formerly dominated this region's economy, and refocusing them on this growing industry

Wisconsin E-RIC Strategic Framework

Shape markets by making the region an early adopter and leader through:

- State building code modifications
- Milwaukee as a mid-size city policy laboratory
- Consumer education

Reshape the building and design process through:

- Architect and engineering training in integrated building system design
- Focus on retrofitting supply of existing building stock while exploring cutting-edge new construction technologies

Collaborate nationally and internationally by:

- Use existing networks to work with global experts
- Create a “collaboration portal” connecting regions

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Wisconsin E-RIC Strategic Framework

Open global markets by:

- Developing and commercializing new technologies and products that are globally relevant
- Export construction, installation, after-market service expertise globally through existing regional companies

Manage the hub for action, nimbleness, and course correction by:

- Build Advisory Board with key partners and energy and innovation experts from outside the region
- Partnering academic research with private sector player and aggressively launch demonstration and pilot projects as new technology emerges
- Dramatically reduce the lag time between basic research and technology deployment
- Creating a central focal point for collaboration
- Integrate public and private sector researchers and cross-disciplines

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ENERGY & PROCESINDUSTRY
Rotterdam
Energy Port
Port of
Rotterdam

ROTTERDAM ENERGY PORT

Rotterdam Energy Port

Import primary energy in Rotterdam:

- OIL: throughput and destination
- COAL: throughput and destination
- GAS: LNG: importance and projects

Conversion primary energy in Rotterdam:

- FUELS: refinery products and biofuels
- POWER: power plants and plans in Rotterdam

Developments in Power generation

Developments in CO2-infrastructure

ROTTERDAM ENERGY PORT

ROTTERDAM ENERGY PORT

- one of the most densily populated areas in the world
- one of the world's largest port and industrial zones
- part of a ecological main axis in Europe
- very active environmental organisations
- outspoken and critical population

⇒ Realise the dual objective: Environment and Economy

⇒ 3 drivers of Rotterdam Energy Port:

Security of Supply:	reliable energy
Efficient markets:	affordable energy
Environment-friendly:	clean energy & clean industry

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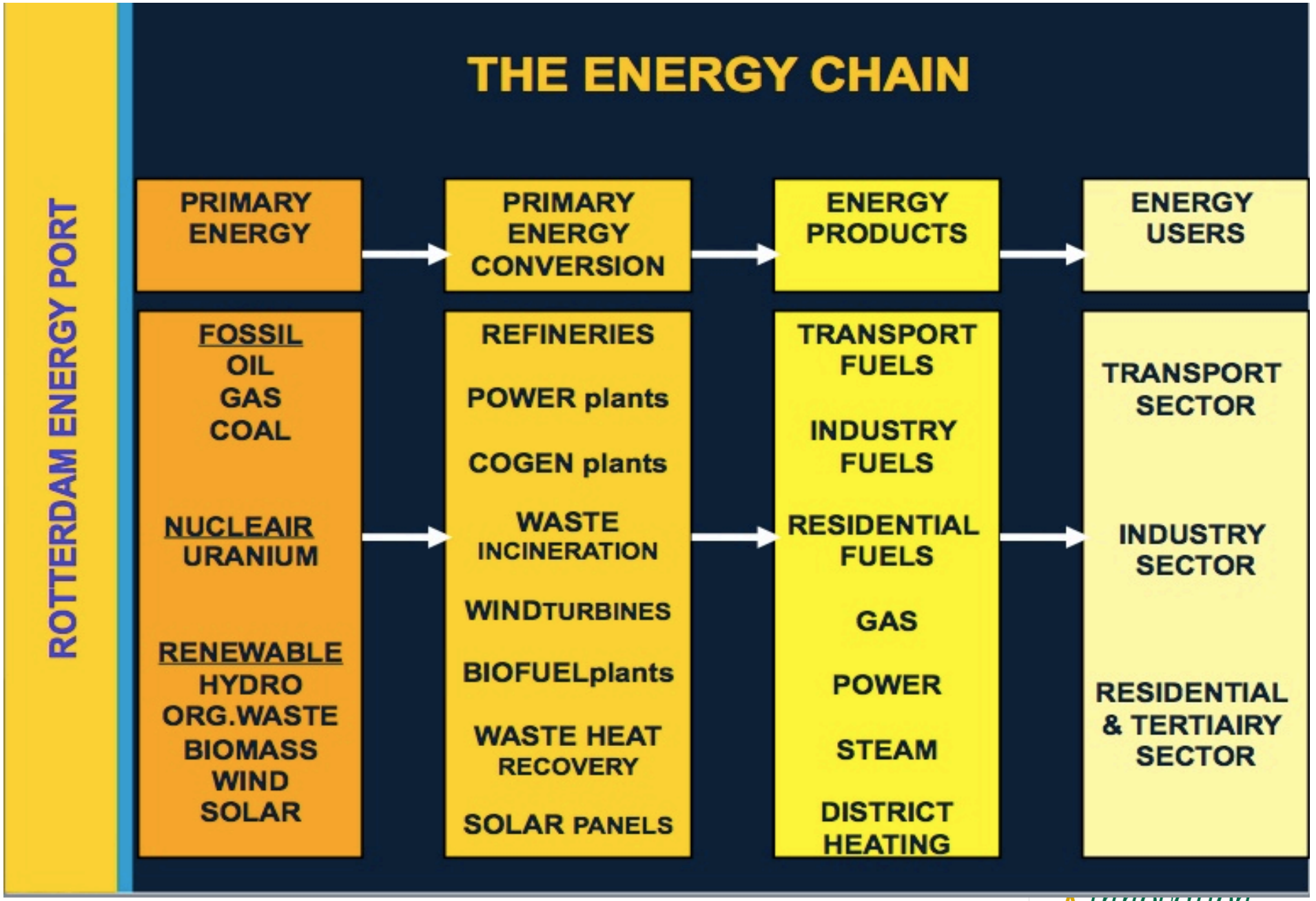

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ROTTERDAM ENERGY PORT

ROTTERDAM ENERGY PORT

Status:

Superior logistics for oil and coal

Large industrial centre for conversion into fuels and power

Trade and distribution centre for fuels

Port industrial cluster as large consumer of gas and power

Goals:

Further development of Rotterdam Energy Port:

Coal/biomass fired power plants + CO2 capture & storage

LNG as well as pipeline gas

European center for export refineries

Biofuels import and production

NB World-Class Case Studies

- Smart Grid
- Atlantic Hydrogen
- Canaport LNG
- Areva – Clean Energy Park

What Works for Effective Cluster Intermediaries

- **FOCUSED & INTEGRATED** Science & Technology Collaboration
- **PRIVATE** Sector Leadership and **COMMITMENT**
- Organization's function as a **BUSINESS**
- Successfully manage a technology investment portfolio for **ROI**
- Operational **FLEXIBILITY**
- **ACCOUNTABILITY** with measurable outcomes
- Experienced **PROFESSIONAL** team
- Focus on the **INDUSTRY CLUSTER** needs
- **SUSTAINABLE** Funding

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How Do You Measure Success?

- Stimulate creation and commercialization of strategic energy projects
- Foster productive interrelationships and linkages among New Brunswick institutions.
- Establish institutional arrangements to improve effectiveness of R&D.
- Expand and disseminate information and knowledge about energy innovation
- Promote consciousness about the importance of Energy Hub.
- Create new, high wage, high skilled job opportunities to avoid “brain-drain.”
- Make small and medium sized enterprises become more competitive.
- Build a financial-technical network willing to invest in and support energy-based enterprises.
- Provide incentives for foreign and domestic investment.

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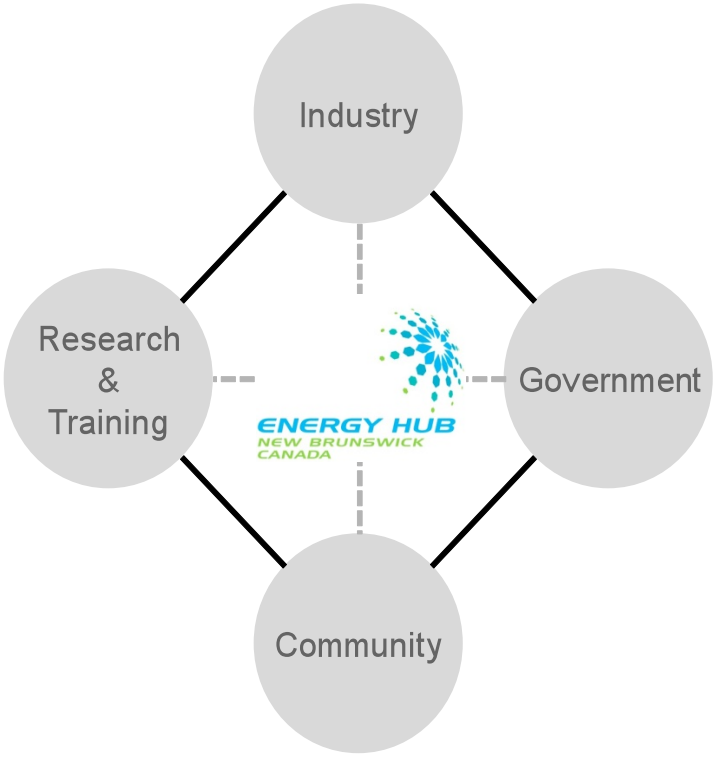

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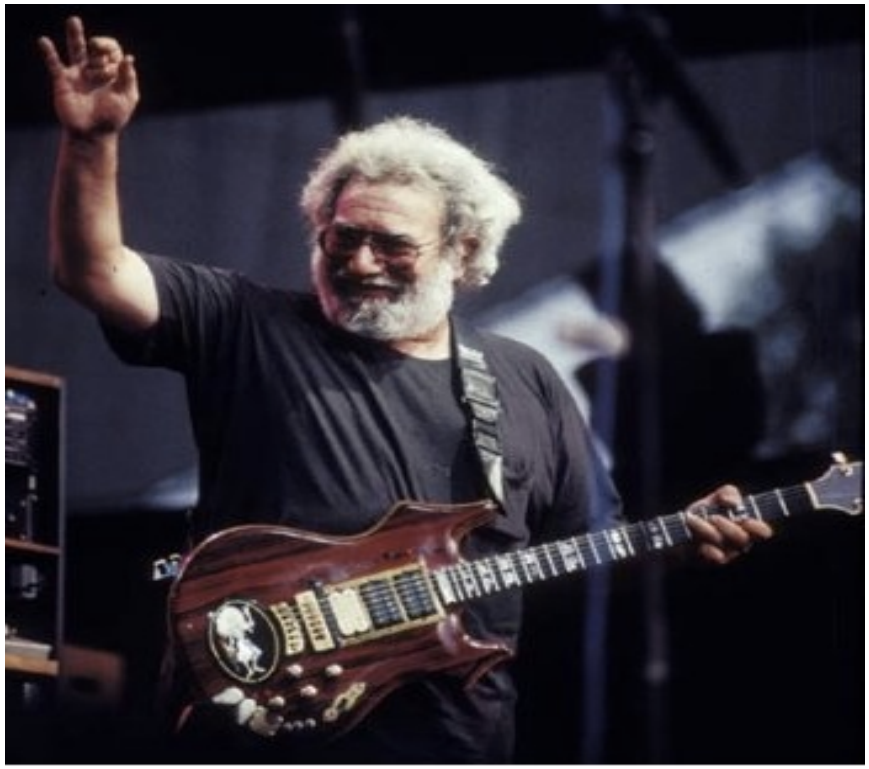
A Call to Action



"Somebody has to do something, and it's just incredibly pathetic that it has to be **US**."

--Jerry Garcia of the Grateful Dead

The US is YOU!

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Richard A. Bendis
President and CEO
Innovation America
2600 Centre Square West
1500 Market Street
Philadelphia, PA 19102
(215) 496-8102
rbendis@bendisig.com
www.innovationamerica.us
www.innovationamerica.us/daily