Renewable Energy Innovation

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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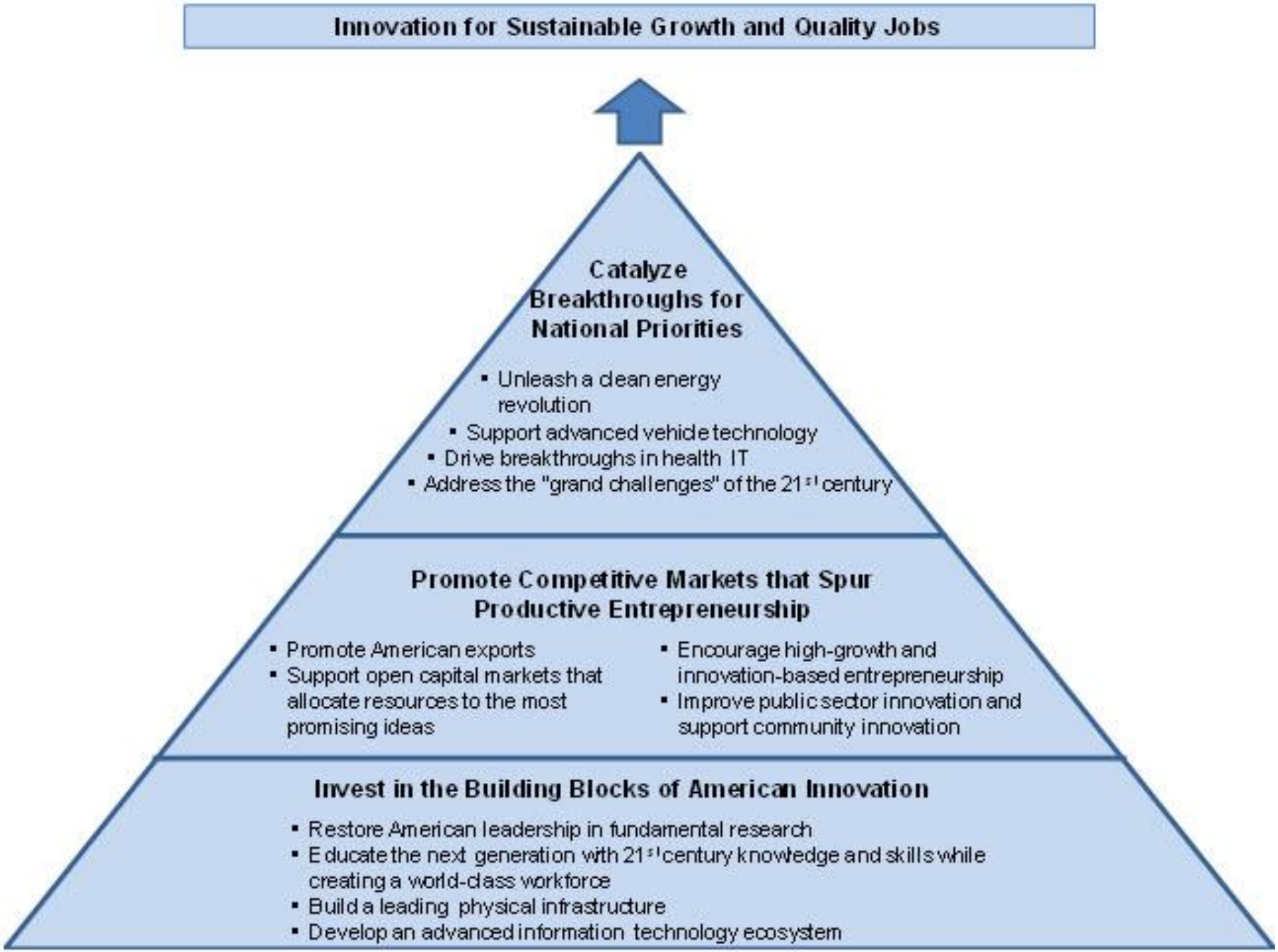
European Innovation Union

- Several Framework Programs led to SET-Plan
- European Strategic Energy Technology Plan
  - Multiple energy initiatives
  - SET-Plan Steering Group (SET-Group)
  - European Energy Research Alliance (EERA)
  - SET-Plan Information System (SETIS)
- Horizon 2020 is the Key Pillar in Innovation Union
  - 80 billion Euro decades long investment
  - Supported by EU Parliament to reach 2020 goals
  - SET-Plan one of the efforts sponsored within Horizon 2020
  - Collaboration across the Innovation Union to address the full range of societal needs from agriculture and environment to energy and IT

U.S. Innovation Strategy

- Established as Presidential initiative
  - National Economic Council
  - Council of Economic Advisers
  - Office of Science and Technology Policy
- Innovation critical to competitiveness
- Private Sector is America's innovation engine
- Government is a facilitator of innovation


Innovation for Sustainable Growth and Quality Jobs
Catalyze Breakthroughs for National Priorities
▪ Unleash a clean energy revolution
▪ Support advanced vehicle technology
▪ Drive breakthroughs in health IT
▪ Address the "grand challenges" of the 21st century
Promote Competitive Markets that Spur Productive Entrepreneurship
▪ Promote American exports
▪ Support open capital markets that allocate resources to the most promising ideas
▪ Encourage high-growth and innovation-based entrepreneurship
▪ Improve public sector innovation and support community innovation
Invest in the Building Blocks of American Innovation
▪ Restore American leadership in fundamental research
▪ Educate the next generation with 21st century knowledge and skills while creating a world-class workforce
▪ Build a leading physical infrastructure
▪ Develop an advanced information technology ecosystem

Major Administration Energy Goals

- **Reduce GHG emissions** in the range of 17% by 2020*
- **80% electricity from diverse clean energy** by 2035
- **Reduce net oil imports by 50%** by 2020
- **Double energy productivity** by 2030*

*Climate Action Plan Goal

EERE Investment Pathways

FY 2015 Budget Summary Table

Dollars in Thousands	FY 2013 Current	FY 2014 Enacted	FY 2015 Request	FY 2015 vs FY 2014
Transportation	**584,199**	**614,955**	**705,183**	**+90,228**
- Vehicle Technologies	303,165	289,737	359,000	+69,263
- Bioenergy Technologies	185,190	232,290	253,200	+20,910
- Hydrogen and Fuel Cell Technologies	95,844	92,928	92,983	+55
Renewable Electricity	**444,891**	**449,524**	**521,300**	**+71,776**
- Solar Energy	269,050	257,058	282,300	+25,242
- Wind Energy	86,129	88,126	115,000	+26,874
- Water Power	54,687	58,565	62,500	+3,935
- Geothermal Technologies	35,025	45,775	61,500	+15,725
End-Use Efficiency	**535,354**	**617,449**	**857,700**	**+240,251**
- Advanced Manufacturing	114,254	180,471	305,100	+124,629
- Federal Energy Management Program	28,265	28,248	36,200	+7,952
- Building Technologies	204,601	177,868	211,700	+33,832
- Weatherization and Intergovernmental Activities	188,234	230,862	304,700	+73,838
Corporate Support Programs	**208,889**	**231,513**	**237,779**	**+6,266**
Subtotal, Energy Efficiency and Renewable Energy	**1,773,333**	**1,913,441**	**2,321,962**	**+408,521**
- Use of Prior Year Balances	-81,576	-2,382	-5,213	N/A
- Rescission of Prior Year Balances	0	-10,418	0	N/A
Total, Energy Efficiency and Renewable Energy	**1,691,757**	**1,900,641**	**2,316,749**	**+416,108**

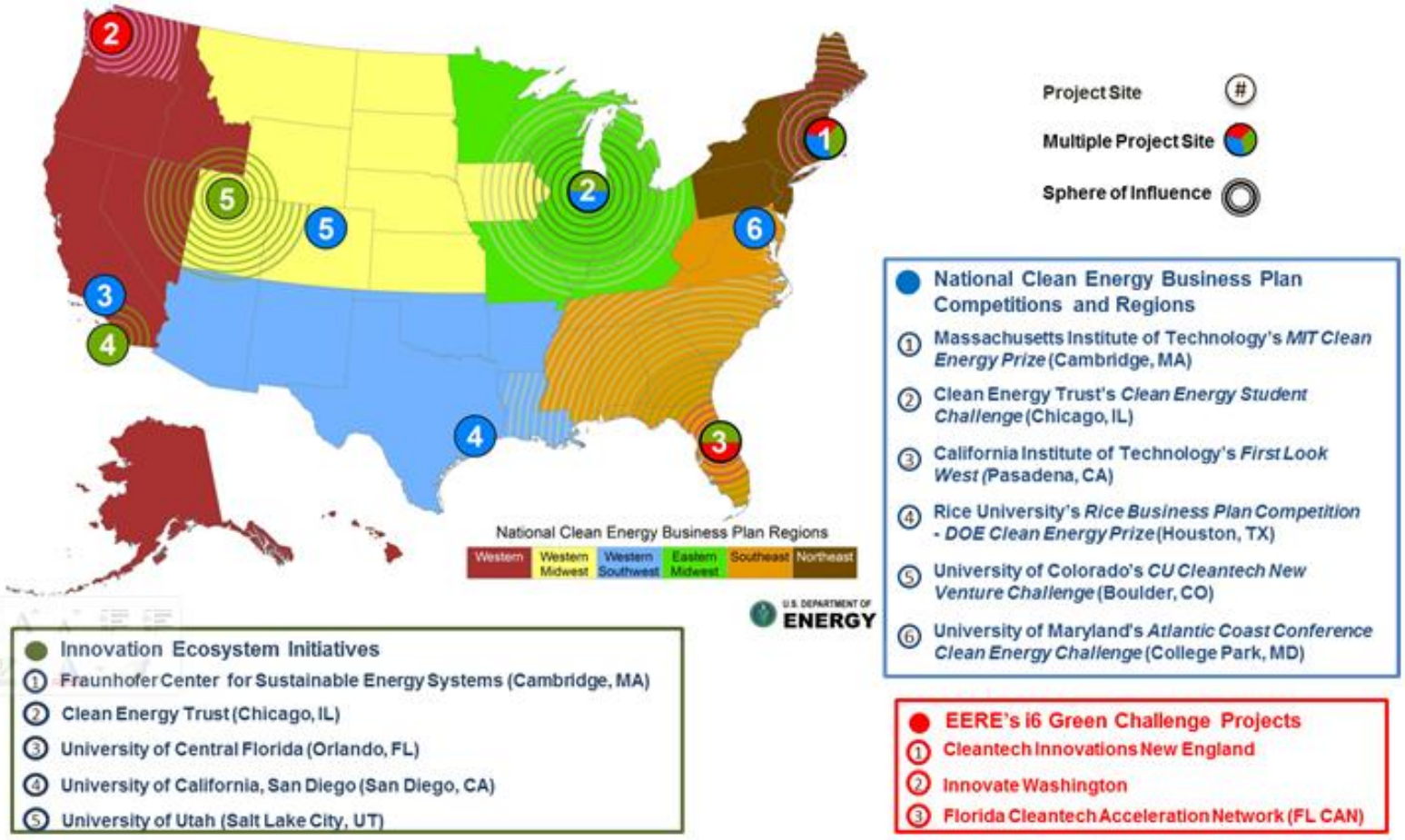
Enable Innovation, Integration, and Adoption

Reducing Investment Risk

- Basic and applied technology innovation
- Accelerate technology market introduction and adoption
- Integrate technology at scale
- Collaboration in unique research and testing “partnering” facilities
- Providing analysis and expertise to inform decisions

Energy Innovation Ecosystem

In 5 year 150 businesses supported with $120M in capital



National Clean Energy Business Plan Competition

How to participate

- Apply **regional competitions** across U.S.
- Plan applies to **EERE technology areas**
- Teams must be at least **50% students**
- Applications **December and March**,
- **2014 National Competition** in June 2014
- Sponsorship opportunities are available

About the NCEBPC

- **600 teams** involved in 2012-2013 NCEBPC
  - More than **57 startups** incorporated
  - **55 patents and disclosures** have been filed
  - **120+ jobs** created
  - More than **$25M** in follow-on funding
- Over **$600k in prizes** across the country for participants

NATIONAL CLEAN ENERGY BUSINESS PLAN COMPETITION
U.S. DEPARTMENT OF ENERGY

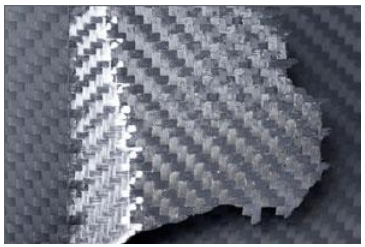
Clean Energy Manufacturing Initiative ($554M)

Offices across EERE
are collaborating in the
Clean Energy Manufacturing Initiative
to increase U.S. manufacturing competitiveness

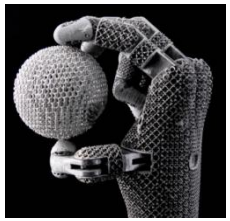
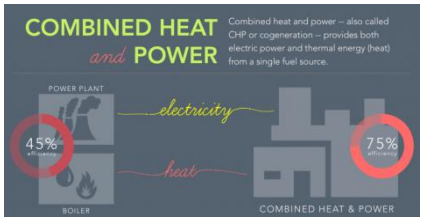
Objectives

1. **Increase U.S. competitiveness in the production of clean energy products**





2. **Increase U.S. manufacturing competitiveness across the board by increasing energy productivity**

Dollars in Thousands

Clean Energy Manufacturing Initiative Activities by Program Office	FY 2015 Request
Vehicles Technologies	35,000
Bioenergy Technologies	124,500
Hydrogen and Fuel Cell Technologies	4,000
Solar Energy Technologies	67,700
Wind Power Technologies	3,500
Water Power Technologies	4,000
Advanced Manufacturing	305,000
Building Technologies	10,000
Total, CEMI	**553,700**

Approach:

1. **R&D**
   - For developing processes to produce clean energy technologies
   - For developing cross-cutting manufacturing technologies
2. **NNMI Institutes & Other Facilities**
   - Institutes in the National Network for Manufacturing Innovation
3. **Technical Assistance**
   - For implementing Energy Efficiency in manufacturing
4. **Competitiveness Analysis**
5. **Partnerships and Engagement**

National Incubator Initiative for Clean Energy

- Early-stage companies requires a *broader set of business services*
- EERE can *help facilitate and unlock new sources of early-stage capital*
- *Nonprofit incubators are high-impact* and need government support
- Opportunity to *improve and coordinate existing incubators*.

NREL I.P.C. Key Activities

Innovation Culture

Foster a Culture of Innovation

NREL has a deep and pervasive culture of innovation in Clean Technology and Renewable Energy

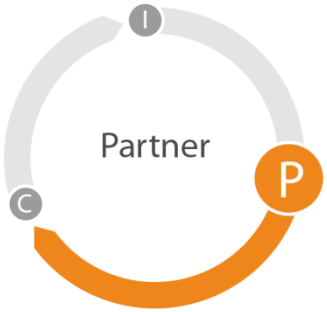
Service Excellence

NREL Technology Transfer and IEC provide best in class market information and service to its internal customers

Market Input

NREL proactively seeks feedback from partners and stakeholders to accelerate commercialization of key technologies

Strategic Partnering



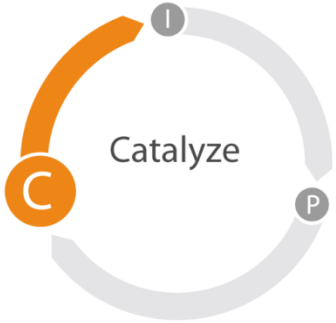
Partnering Excellence

NREL Technology Transfer provides best in expedient partnering service to its external customers using a broad suite of tools

"AccessNREL"

An NREL-led initiative to make the Lab accessible to outside organizations aiming to advance the state of RE/EE through partnering arrangements

Catalyst for Competition



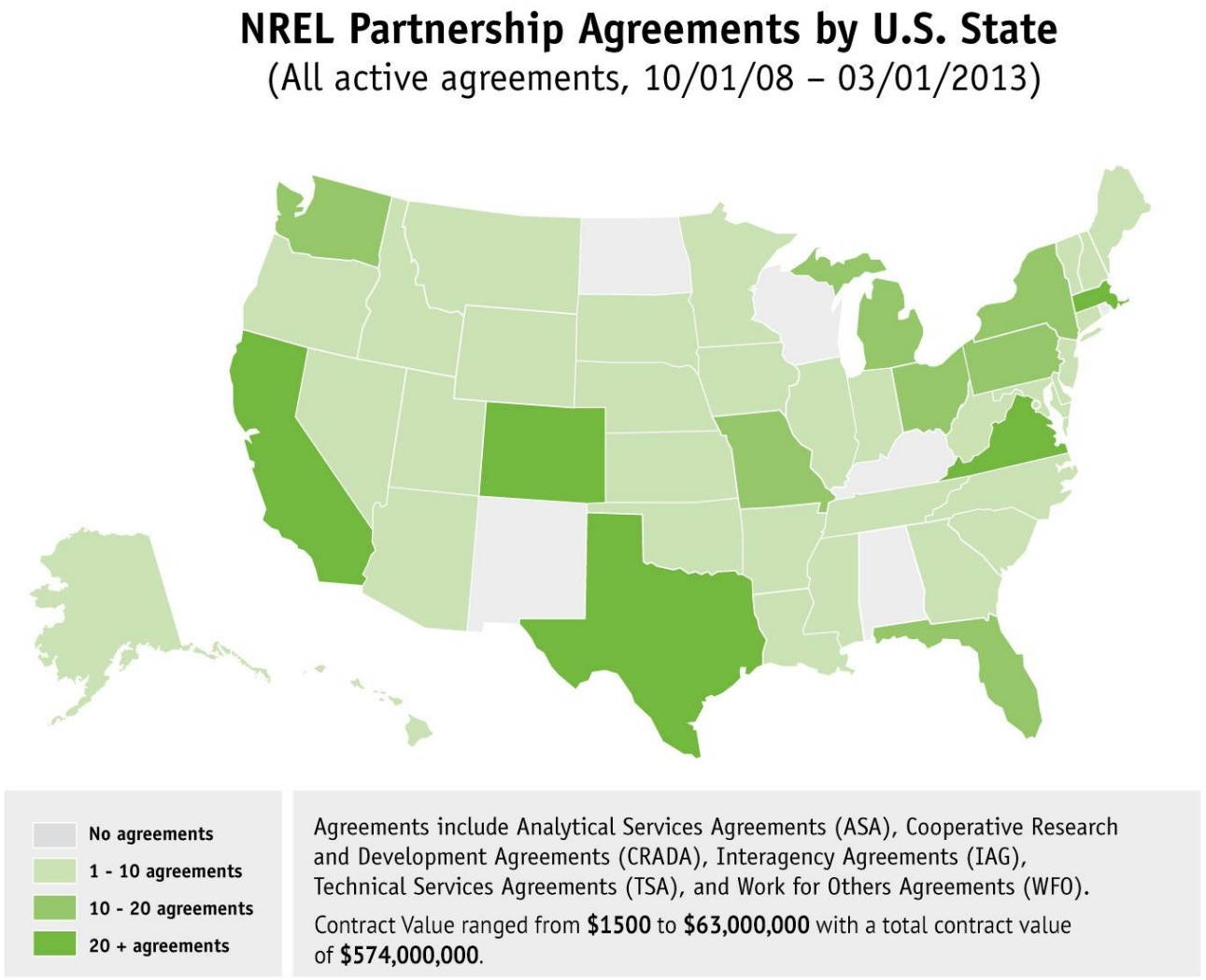
CREED 2.0

An NREL-led initiative to provide industry-wide support to RE/EE companies and startups with a focus on US mfg.

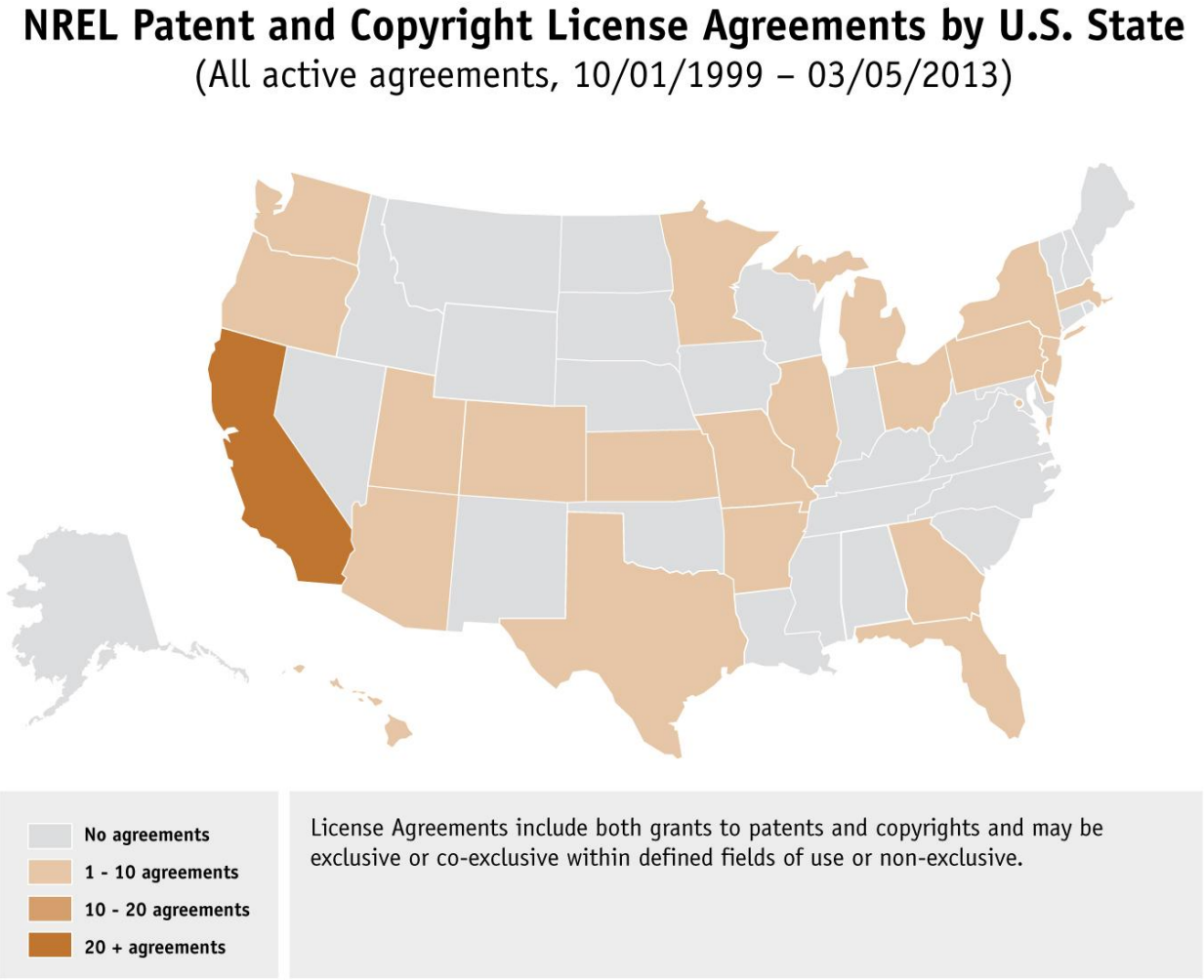
NREL Manufacturing Alliance

An NREL-led initiative to support U.S. competitiveness in clean tech manufacturing

Map of Partnership Agreements



Map of License Agreements



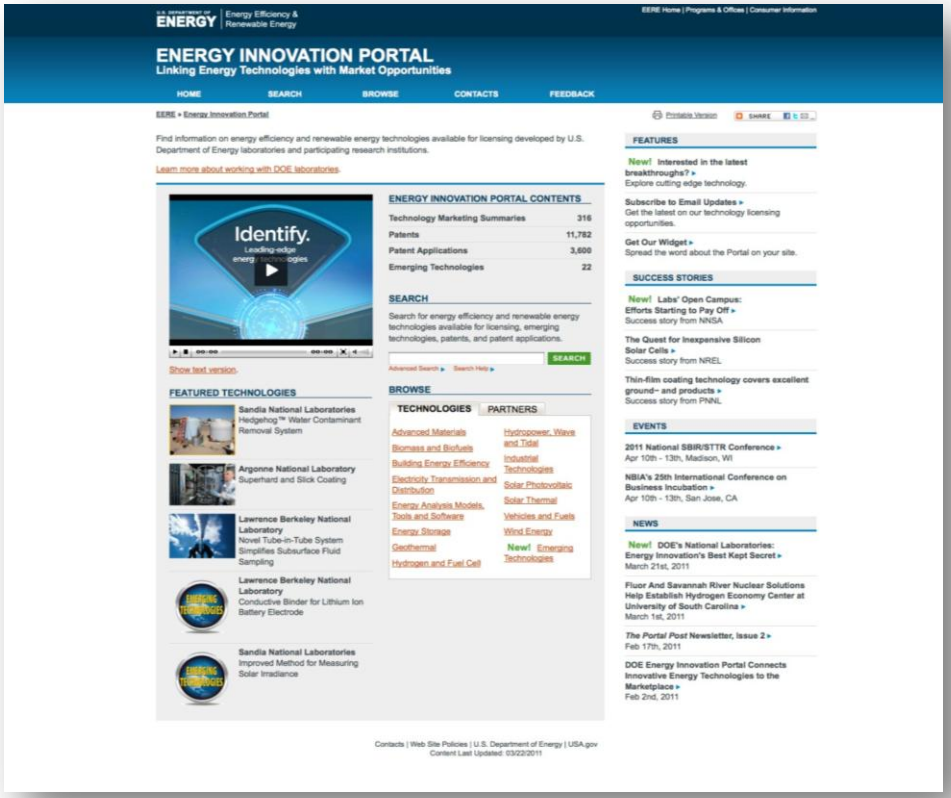
155 Active IP Agreements
-93 patent Agreements
-62 Software Agreements

304 granted patents in NREL portfolio

Energy Innovation Portal

Portal demonstrates DOE leadership in the energy field:

- 18,000+ patents from all labs
- 900+ business-friendly marketing summaries help investors and companies identify and license clean energy technologies.
- 2000+ direct licensing inquiries made to partner laboratories.
- The White House and DOE are using the portal to support their Start-up America initiative (a program focused on American entrepreneurship and new business creation).



http://techportal.eere.energy.gov

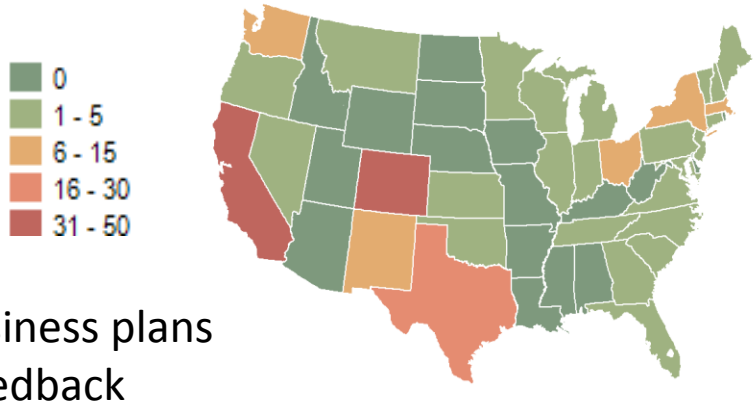
NREL Industry Growth Forum

27th Annual IGF
October 28 – 29th, 2014
Denver, CO

The NREL IGF facilitates access to financial capital and partnership resources for clean energy startups www.industrygrowthforum.org

Apply
- July -

- 200+ startups apply
- Startups receive a discounted registration to attend

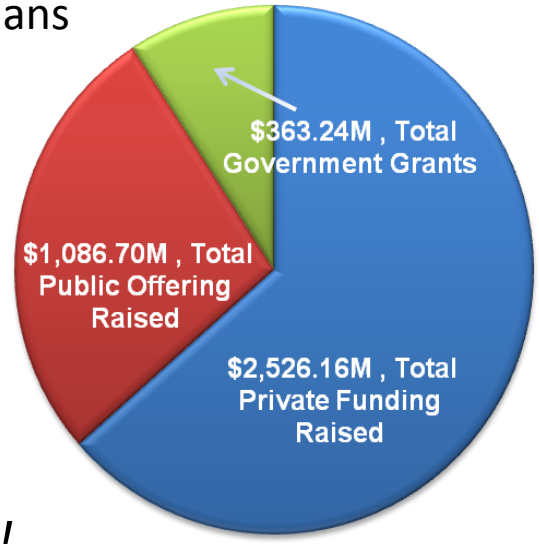


Select
- August-

- 100 investors screen startup business plans
- Startups receive constructive feedback
- Investors have access to all startup business plans

Forum
- October-

- 30 startups pitch, 500+ attendees
- 50 investors, corporations, agencies, and stakeholders are available for dedicated 1:1 meetings



Since 2003, the presenting cleantech startups have collectively raised nearly $5 billion in growth financing!

CREED Stakeholders

Innovation Pipeline	Hands-On Management/ Coaching	Access to Capital	Access to Skilled Workforce	Policy Impact	Facilities for Scale up	Retain, Grow & Attract
CU - University of Colorado	Rocky Mountain Institute	Rocky Mountain Institute	Community Colleges (For Profit & Non-Profit)	RASEI – Renewable and Sustainable Energy Institute	SolarTac	CEO – Colorado Energy Office
CSU - Colorado State University	RMI2 – Rocky Mountain Innosphere	RMI2 – Rocky Mountain Innosphere	CCIA - Colorado Cleantech Industry Association	EEBC - Energy Efficiency Business Coalition	CSU Venture Lab	CCIA – Colorado Clean Industry Association
CSM – Colorado School of Mines	CSTI – Colorado Springs Technology Incubator	CSTI – Colorado Springs Technology Incubator	DU – University of Denver	CCIA - Colorado Cleantech Industry Association	NREL – National Renewable Energy Laboratory	JEC – Jefferson Economic Development Corp.
RASEI – Renewable and Sustainable Energy Institute	Grand Junction Incubator	CAMT – Colorado Association of Manufacturing and Technology	CU - University of Colorado	JEC – Jefferson Economic Development Council	ACE Park - Aerospace Clean Energy Manufacturing and Innovation Park	OEDIT – CO Office of Economic Development & International Trade
Colorado Energy Research Collaboratory	CAMA – Colorado Advanced Manufacturing Alliance	Rocky Mountain Innosphere	CSU - Colorado State University	Metro Denver EDC		Metro Denver EDC
CU – Deming School of Business	CAMT – Colorado Association of Manufacturing and Technology	Grand Junction Incubator	CSM – Colorado School of Mines	CEO – Colorado Energy Office		CCEC - CO Clean Energy Cluster
NREL – National Renewable Energy Laboratory	CU – Deming School of Business	CEO – Colorado Energy Office	CAMA – Colorado Advanced Manufacturing Alliance			CAMA – Colorado Advanced Manufacturing Alliance
		CSU Venture Labs	Colorado Workforce Development Council			
		NREL VC Advisory Board	Energy Efficiency Business Coalition			
		CSTI – Colorado Springs Technology Incubator				

Colorado Center for Renewable Energy Economic Development