Nuclear Innovation: Concept to Execution

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Sun Valley, ID

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Environment, Health, Prosperity

How do we help the world develop **sustainably**?

http://www.insidesources.com/wp-content/uploads/2015/11/bigstock-Energy-4298515-300x300.jpg

Global Nuclear Innovation

- The world is concerned with a lot of big things
- Nuclear energy can be an important part of a suite of solutions
- Our current model doesn't work as well as we'd like
- There are ways that our model could work better
- There are new opportunities for action
- We can build structures to capitalize on and expand those opportunities

We *Need* Cleaner Energy

- Nuclear's lifecycle emits very little CO_2 or air pollution

g CO_2 eq /KWh	Solar (PV / CSP)	Wind	Nuclear	Coal	Natural Gas
Min	5 / 7	2	1	675	290
Max	271 / 89	220	220	1689	930

- Nuclear energy is an important component, it
  - Exists and is large scale
  - Is reliable / always on
  - Uses little land
  - Can be an economic boon

http://srren.ipcc-wg3.de/report/IPCC_SRREN_Annex_II.pdf

What's Not Working?

…But it's not perfect

- Rate of change
- Poor public communication
- Small range of products
- Innovative mindset?
- Economic viability
- Capital intensity
- Used fuel and waste / long-term fuel supply
- Safety and security

We must *shift* **how we think** about nuclear energy and nuclear innovation

What If?

- National and international scientific resources are leveraged
- An inspired, innovative workforce is available
- Regulation is fast and responsible
- Policy supports global cooperation and market health
- Communication is clear
- Technology needs are met
- Big improvements become viable

Companies are rewarded for new motivations

But How Do We Get There?

Examples of Broader Motivation

http://www.gatesfoundation.org/What-We-Do/Global-Health/Malaria

Breakout Labs

NA

Y Research

YCR is a non-profit research lab.

http://www.mission-innovation.net/

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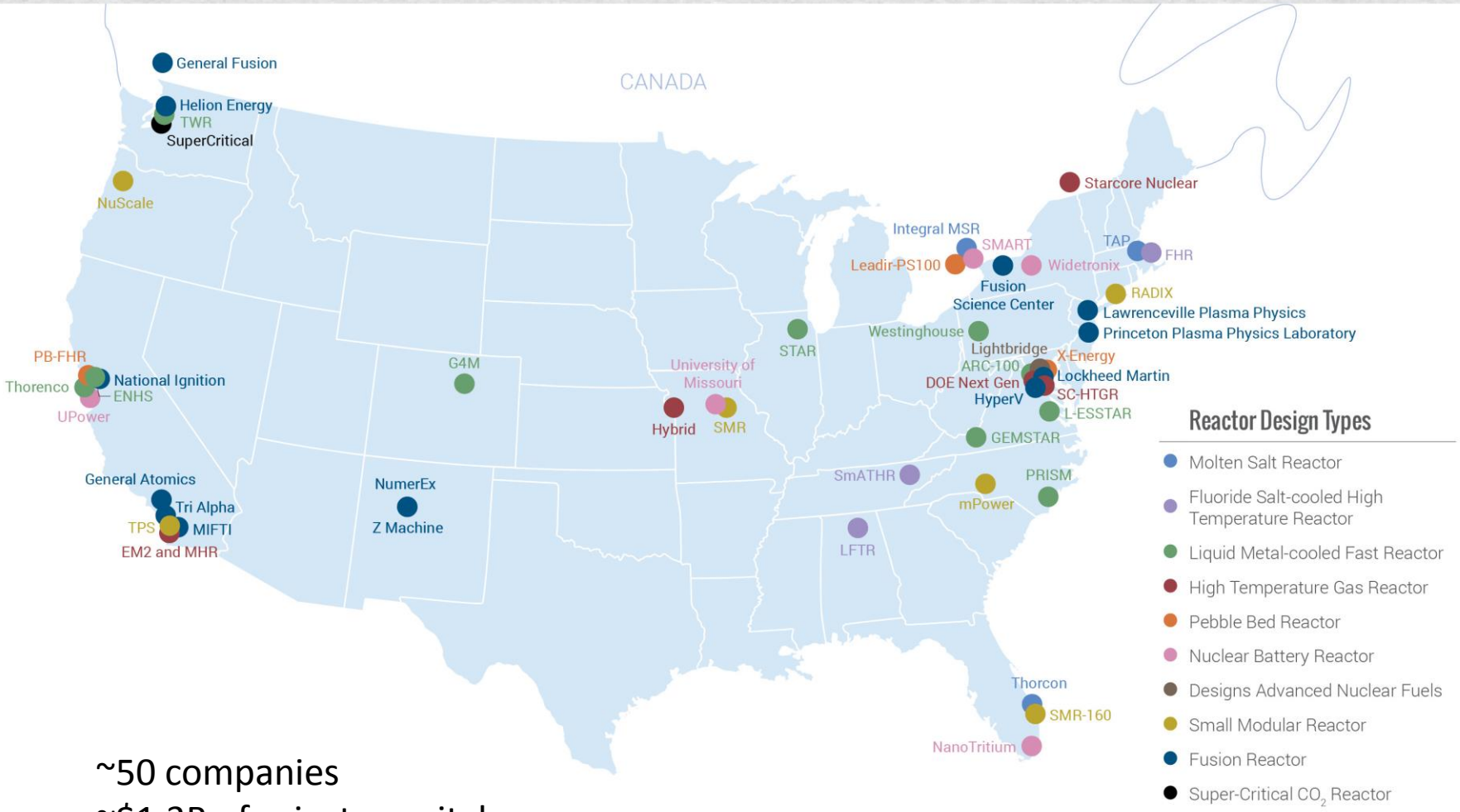
Introducing the Advanced Nuclear Industry

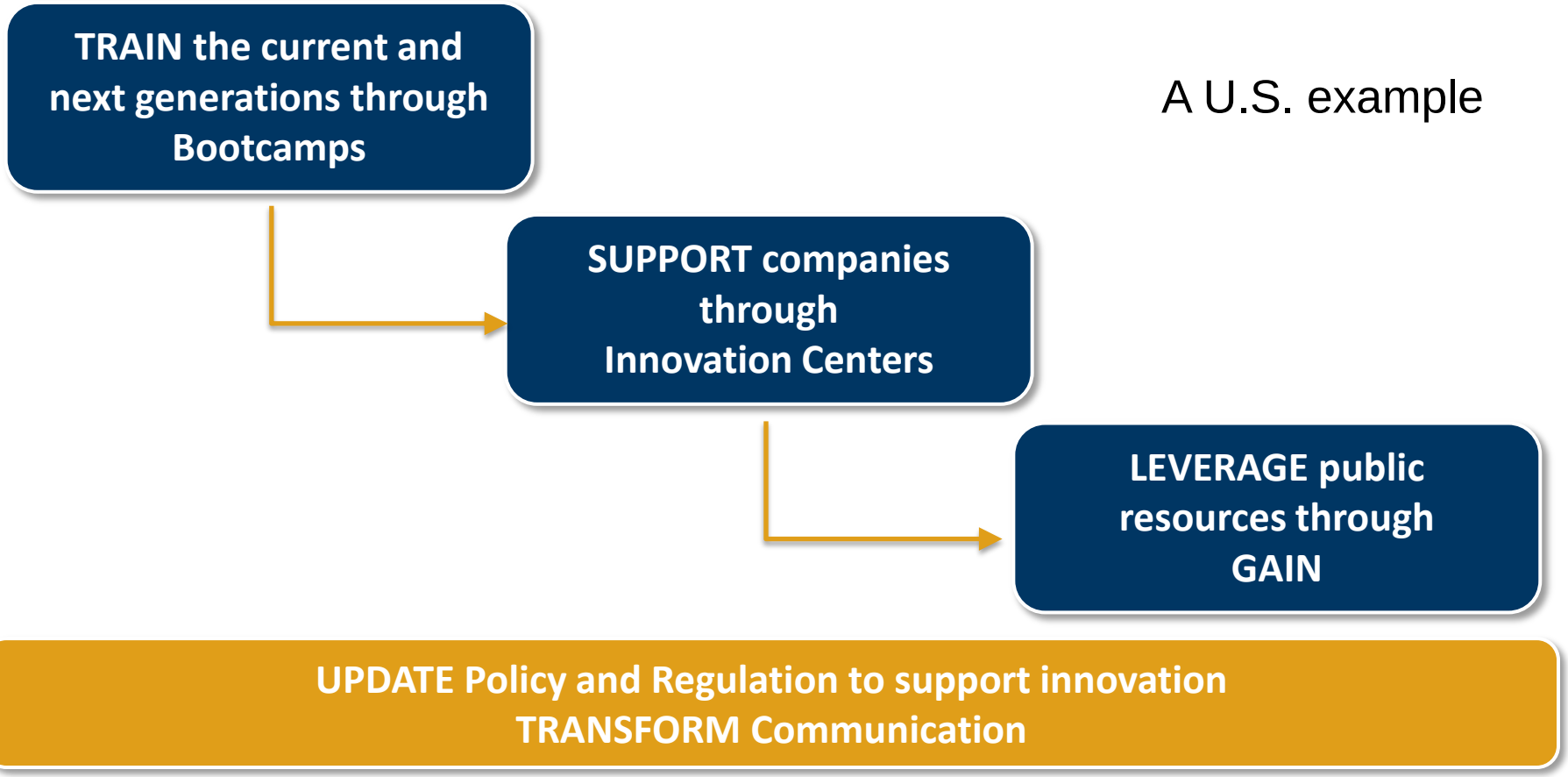


~50 companies

~$1.3B of private capital

third way
fresh thinking

Build A Pipeline



A U.S. example

Nuclear Innovation Alliance

- The NIA's mission is to lead advanced nuclear energy innovation by addressing:
  - Regulatory Pathways
  - Testing and Development
  - International Cooperation
  - Financial Support
- Assemble companies, investors, experts, stakeholders, students
- Find ways to bring new ideas to market more efficiently

GAIN: Public-Private Leverage

GAIN
Gateway for Accelerated Innovation in Nuclear

New DOE-NE Initiative within the Clean Energy Initiative

Integrated institute managing a distributed test-bed and demonstration platform, dedication to innovation in Nuclear Energy

Public-private partnership including Industry, Entrepreneurs, National Laboratories, and Academia

Headquartered at the Idaho National Laboratory

- Tens of $B in DOE and partner assets (experimental and computational)
- More than $1M in yearly investments for R&D and infrastructure
- $12.5B in loan guarantees
- $10M in SB vouchers
- Expertise and intellectual infrastructure

Innovation Centers

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Regulator

GAIN

Test Bed

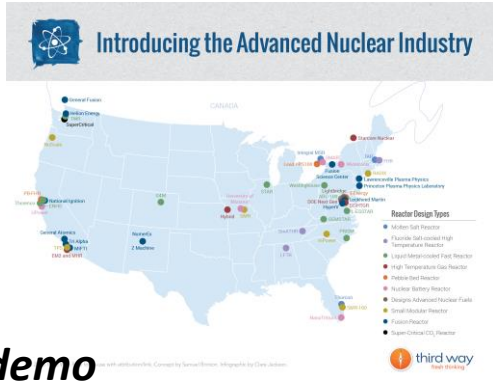
Key Physical Capability

Core Innovation
(Reactor Concept, Fuel, Communications, Regulation)

Key Intellectual Capability

Investment Community

Developers



- Seeded with Federal Funds
- Fungibility of Staff to Core Institutions
- Aggressive Innovation

- ***Can have Centers at early innovation and at demo***

Nuclear Innovation Bootcamp

http://www.nuclearinnovationalliance.org/bootcamp

- Teach students *how* to innovate:
  - Entrepreneurship
  - Nuclear aspects
  - Non-traditional material
- Two week pilot program August 1-12
- Team design projects
  - Teams have non-technical member
- Large company involvement
- Experts teach and mentor
- Judged completion

How Do I Get Involved?

Apply! (or have your best students apply) **by May 11**

Mentor!

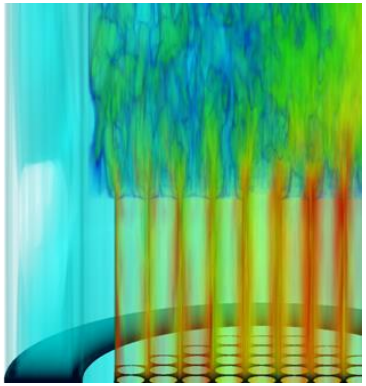
NuclearInnovationBootcamp@gmail.com

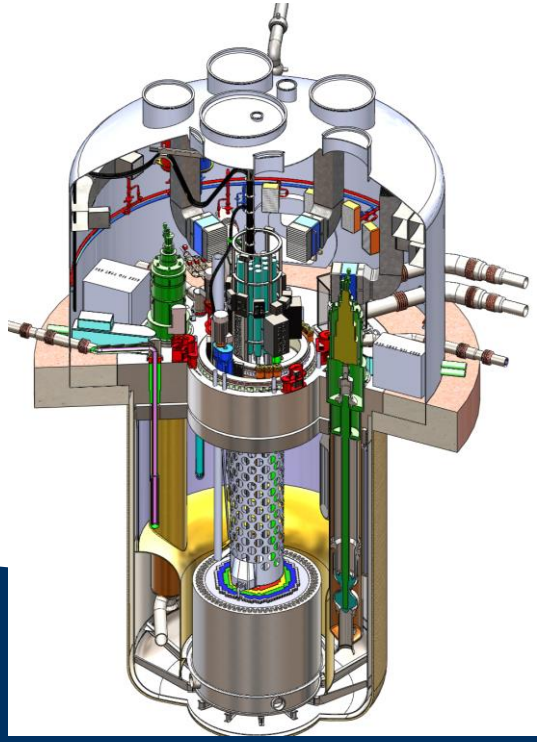
- Spot mentors:
  - Provide expertise on specific issues
  - Define your terms of availability
  - Can be virtual
- Continuous mentors
  - Work with a team more closely through the program
  - Can be virtual, some in-person encouraged

Sponsor!

Nuclear Innovation Bootcamp

- Full program Summer 2017
- Deeper content
- Expand to include professionals





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Nuclear Innovation Pipeline

- Goal: reduce the non-technical barriers while enabling technical breakthroughs

- Global participation; expand model
- Beyond GAIN: need a coordinated interagency (U.S.) and international strategy for global deployment

Global Nuclear Innovation

Now is the time

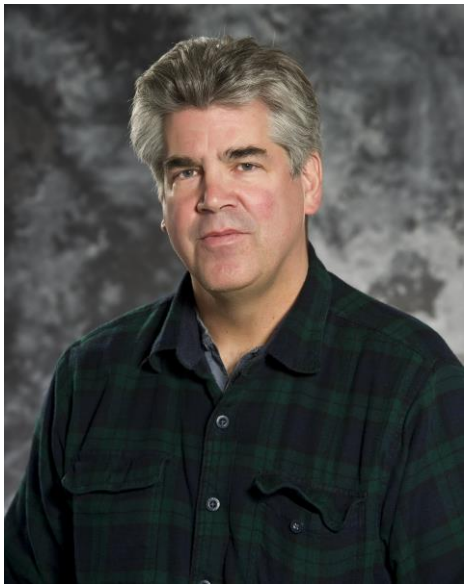
Motivated by Global Health, Prosperity, and Environment, we have the opportunity to **reinvent** the way we do things

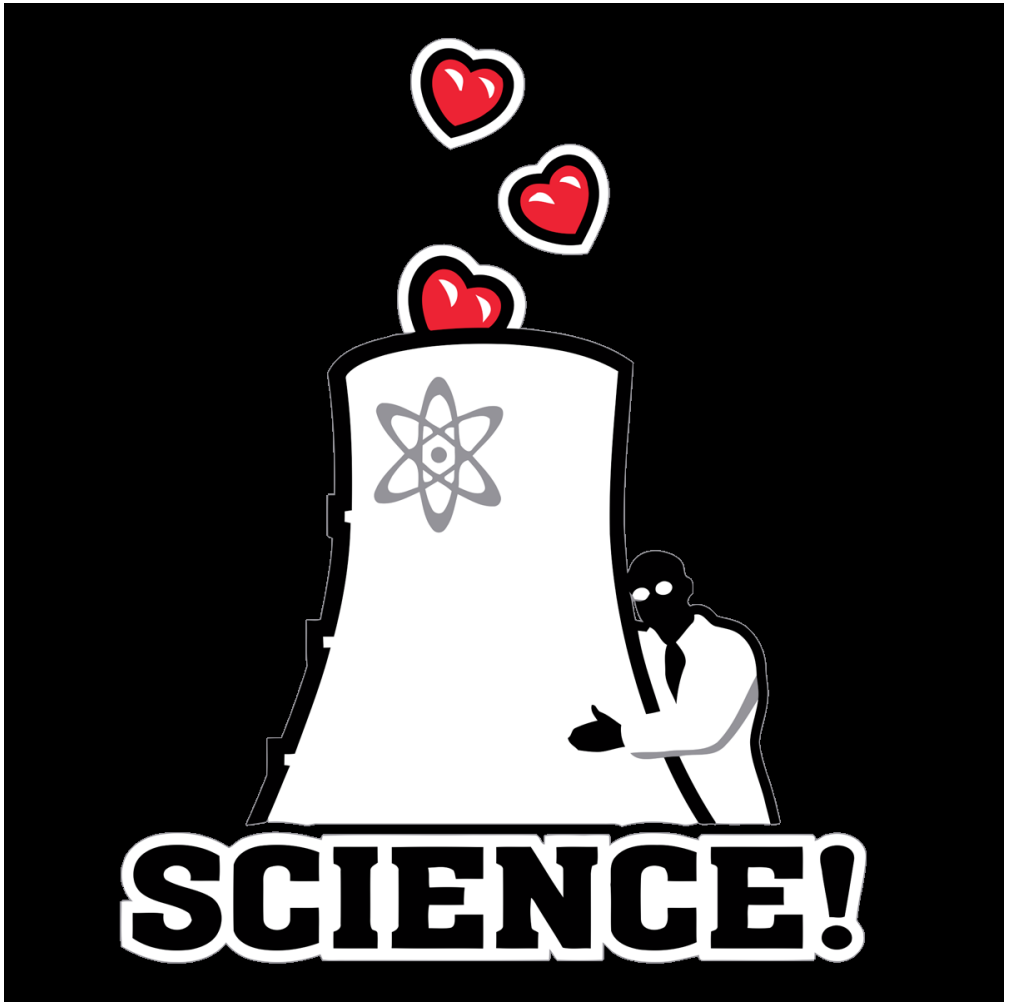
What do we want the world to look like?

Thank You

http://www.nuclear innovationalliance.org/bootcamp

NuclearInnovationBootcamp @gmail.com





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