Battelle
The Business of Innovation

Public Investments in R&D

The ROI of Federal Investments in R&D

D. Drew Bond
Vice President, Public Policy / Co-Chair, Battelle Commercialization Council
Battelle Memorial Institute

bondd@battelle.org / 202-646-5041

Battelle's Beginnings

- Founded in 1920 by Will of Gordon Battelle as a non-profit, charitable trust to provide "the greatest good to humanity"

STRATEGIC INTENT

To be a major force in ***scientific discovery and technology development***

and in the ***translation of knowledge into innovative applications***

that have ***significant societal and economic impact***

in order to be a benefactor for ***education and charitable enterprises.***

Purposes outlined in the Will:

- "Creative and research work"
- "Making of discoveries and inventions"
- Better education for employment
- Societal and economic impact

Battelle Today

Battelle United Kingdom
Ongar, United Kingdom

Corporate Headquarters
Columbus, Ohio

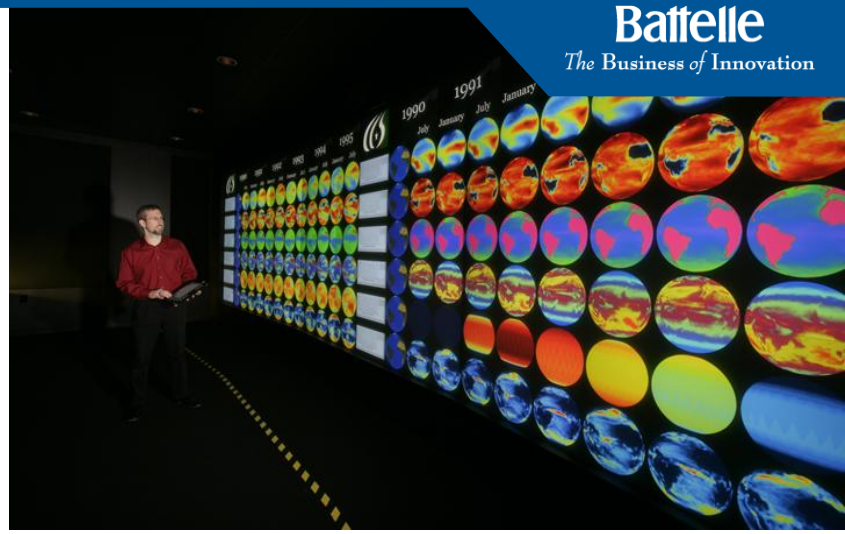
Battelle Eastern Science and Technology Center
Aberdeen, Maryland

Battelle Ocean Sciences Laboratory
Duxbury, Massachusetts

Battelle West Jefferson
West Jefferson, Ohio

Battelle is 20,000 people strong, spanning the globe in 130 locations and together managing $6.5 Billion annually in R&D.

We apply science and technology through *Global Businesses*



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National Security

- Chemical and biological defense
- Advanced materials
- Undersea technology
- Cybersecurity

Health and Life Sciences

- Public health
- Medical devices
- Next-generation diagnostics and therapeutics
- Bio-preparedness
- Crop sciences

Energy, Environment and Material Sciences

- Bio-energy and fuel cells
- Nuclear power and energy infrastructure
- Oil and gas processing

We're driven to deliver scientific outcomes AND economic impact

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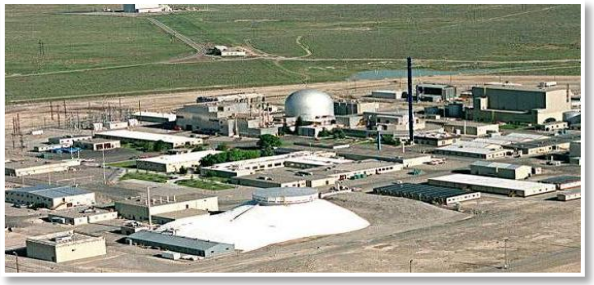
Pacific Northwest National Laboratory
Richland, Washington – 1965

Brookhaven National Laboratory
Long Island, New York – 1997

National Renewable Energy Laboratory
Golden, Colorado – 1998

Oak Ridge National Laboratory
Oak Ridge, Tennessee – 1999



Idaho National Laboratory
Idaho Falls, Idaho – 2004

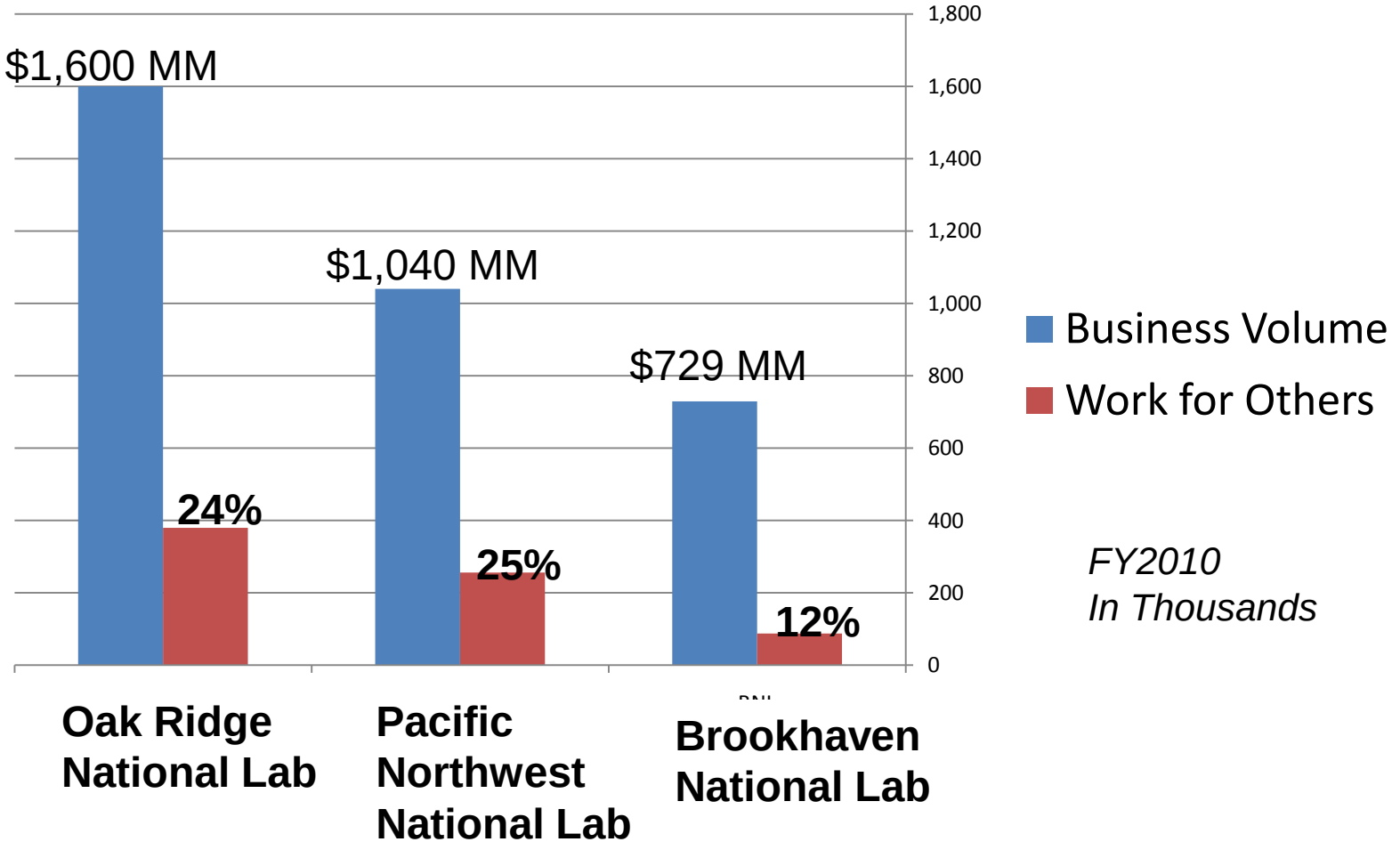
National Biodefense Analysis/Countermeasures
Frederick, Maryland – 2006

Lawrence Livermore National Laboratory
Livermore, California – 2007

United Kingdom National Nuclear Laboratory
Sellafield, United Kingdom – 2009

Battelle Memorial Institute
Columbus, Ohio

Battelle-managed National Labs seek to provide value to multiple partners



Battelle's National Labs are leading innovators in technology transfer

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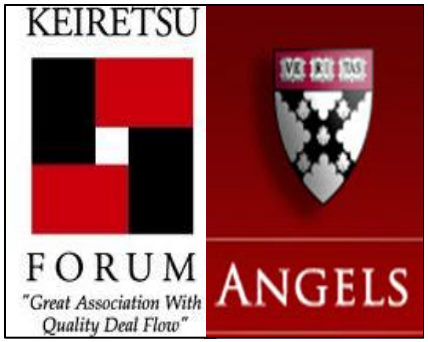
Engaging with Industry

- Agreements for Commercializing Technology (ACT)
- Building relationships with key partners (e.g. DuPont, GE)
- Core Capabilities Catalogue



Igniting Entrepreneurship and Start ups

- Kieretsu partnership
- "America's Next Top Energy Innovator"
- Energy Innovation Portal
- "Accelerating Innovation" Webinars
- Entrepreneurship programs

Promoting Systemic Innovation

- Support of Tech Transfer Coordinator
- National Labs Licensing Guide
- Collaborate with other federal agencies (e.g. Commerce, NIST, USPTO, ARPA-e)

Translational Initiatives & Proof-of-Concept Centers

- ORNL's Carbon Fiber Technology Center & Mfg Demonstration Facility
- NREL Process Development & Integration Laboratory
- LLNL Open Campus

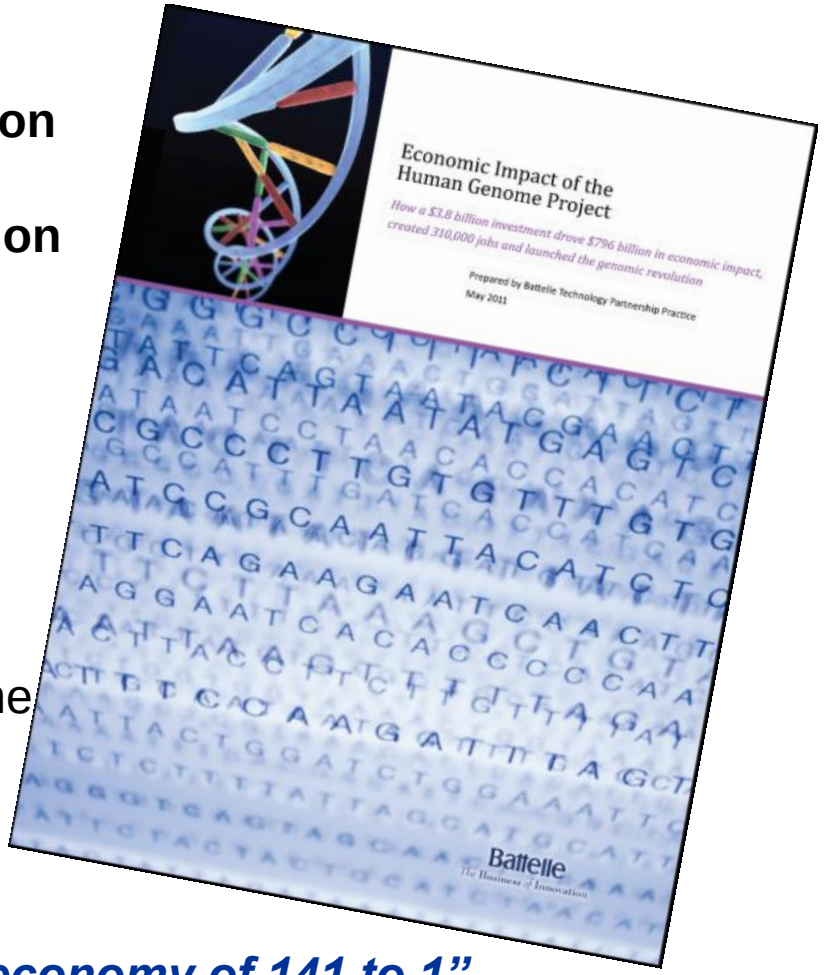
The economic impact from the research we manage provides substantial ROI

- Together with our labs, we represent about 5% of total Federal spending on R&D
- $300 Million in commercial R&D transactions annually
- 250 patents issued annually to Battelle institutions
- Over 100 spin-off companies in the last 10 years from Battelle-managed labs

Overall, the annual economic impact of technologies licensed from Battelle and our labs is about $500 MM

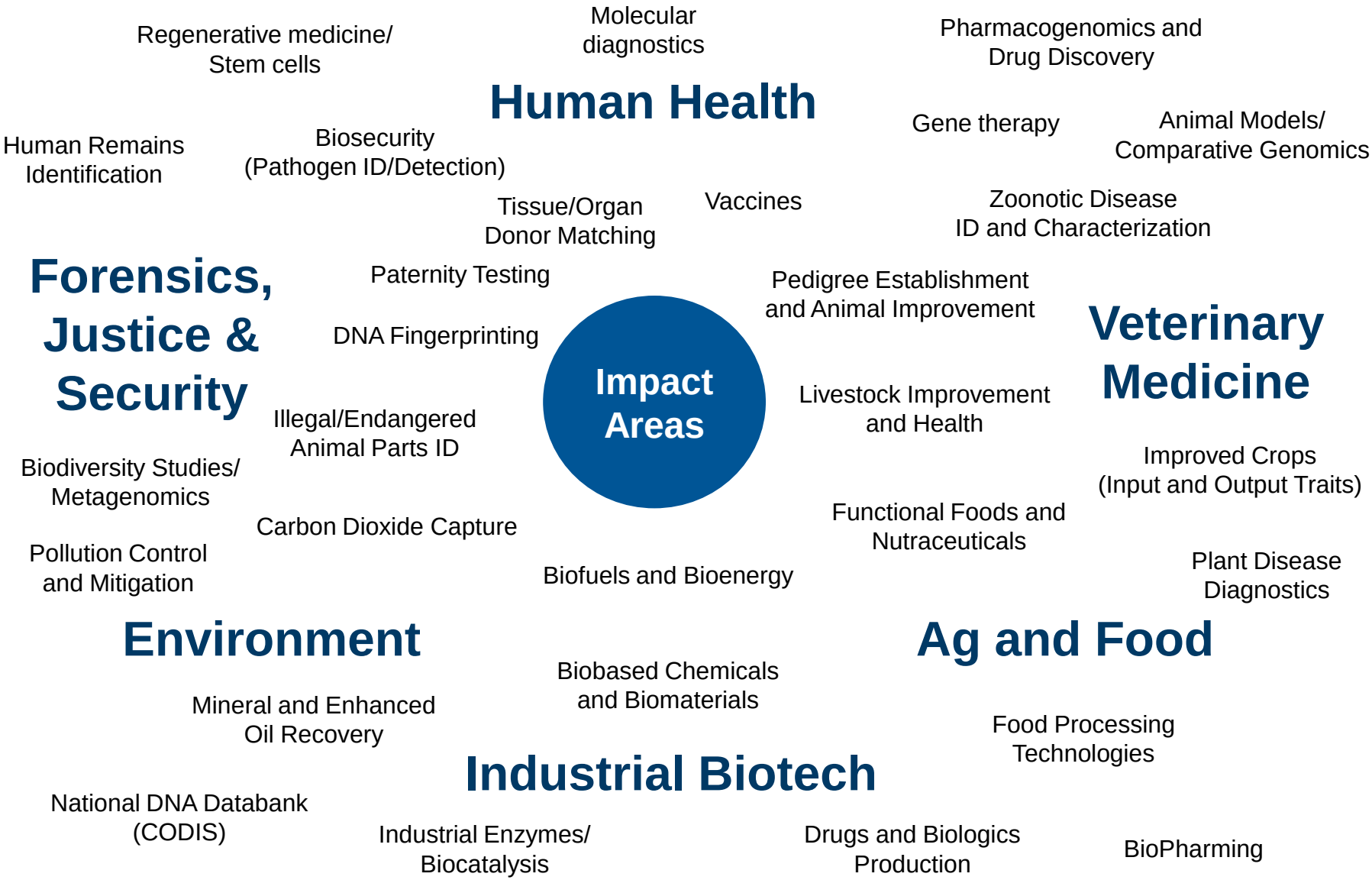
The financial ROI of the Human Genome Project is significant and ongoing.

- Total Federal Investment: (1988 – 2003) **$3.8 Billion**
- Total Economic Impact: **$796 Billion**
- Total Personal Income: **$244 Million**
- In 2010 alone:
  - $67 Billion in U.S. economic output
  - Supported 310,000 jobs
  - Produced $20 Billion in personal income
  - $3.7 Billion in federal taxes



"… a return on investment (ROI) to the U.S. economy of 141 to 1"

The societal ROI of the HGP is expansive and virtually immeasurable.



Tech transfer at DOE labs has multiple modes

and strong record of successes that Battelle seeks to replicate

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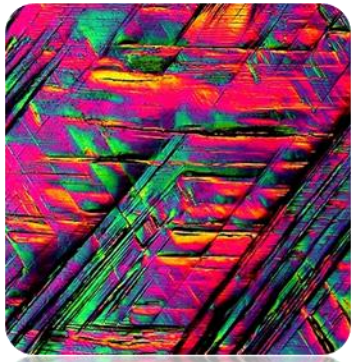
Serendipitous technology transfer from mission-driven research

- **Micropower Impulse RADAR**
- Outgrowth of the world's fastest solid-state digitizer, designed to measure sub-nanosecond events generated by fusion experiments on the LLNL's Nova laser
- 11 licensees, e.g., GE

Basic & applied research oriented toward eventual tech transfer

- **Advanced alloys and materials**
- "Fills a critical gap in private sector R&D capacity"
  - *Carpenter Steel*
- Licensees include Caterpillar and DuPont
- A hallmark of DOE National Laboratory capabilities

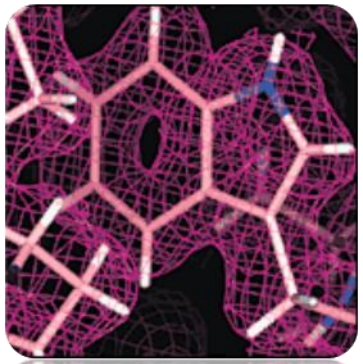


Technology transfer with large economic return on research

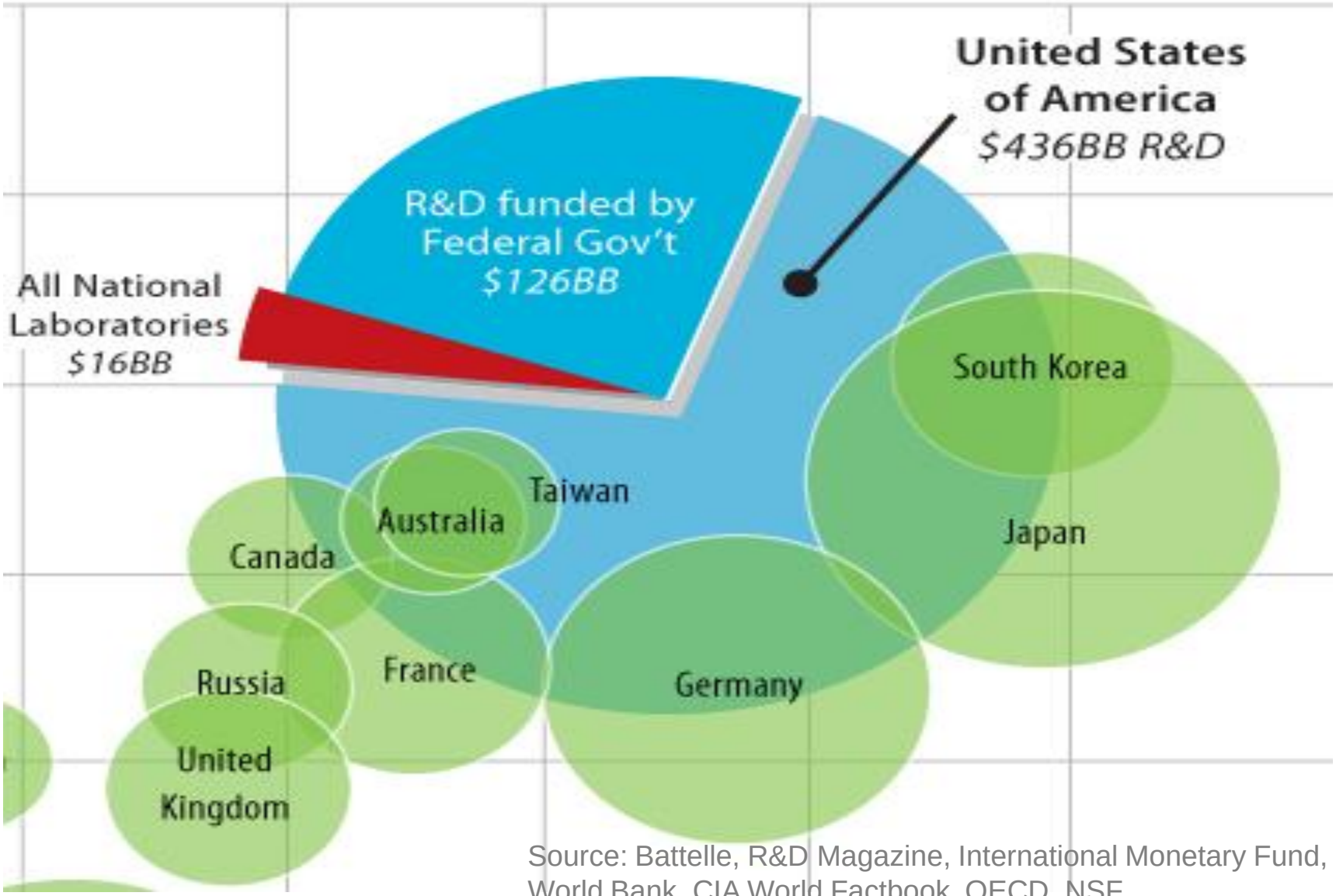
- **Efficient Oil Burner Systems**
- Award-winning industry collaboration for tech transfer (Honeywell, B&W, ConEdison, etc)
- Since 1980, this research has resulted in estimated savings of over $25 billion in fuel costs to U.S. consumers

Technology transfer directly from unique "big science" user facilities

- **Drug target characterization**
- Protein structures determined at National Synchrotron Light Source and Spallation Neutron Source provide bases for design of new drugs
- Large commercial & societal value from machines only accessible at national scale (also doing basic science)

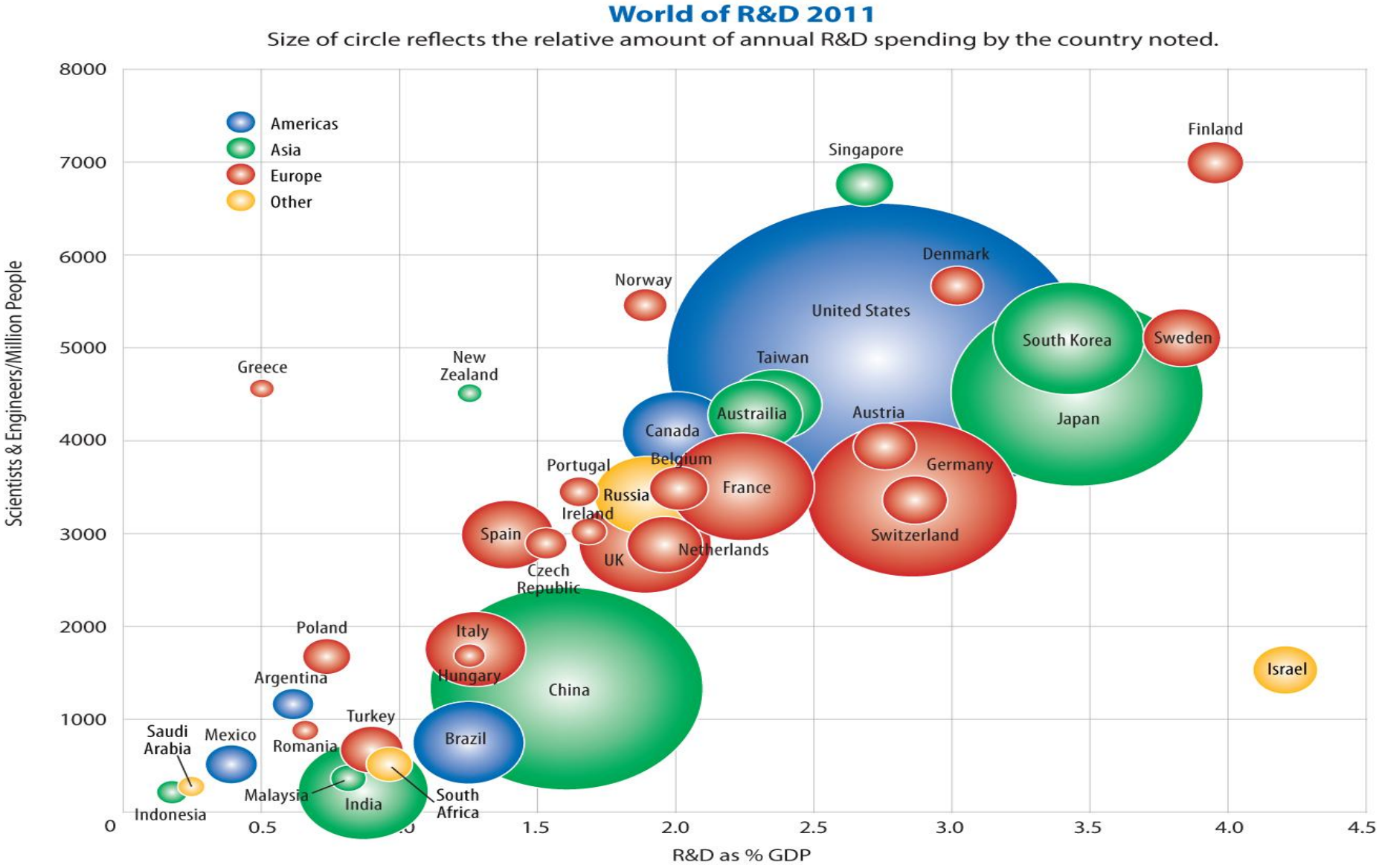


U.S. global lead in R&D is a strong basis for economic growth



Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA World Factbook, OECD, NSF

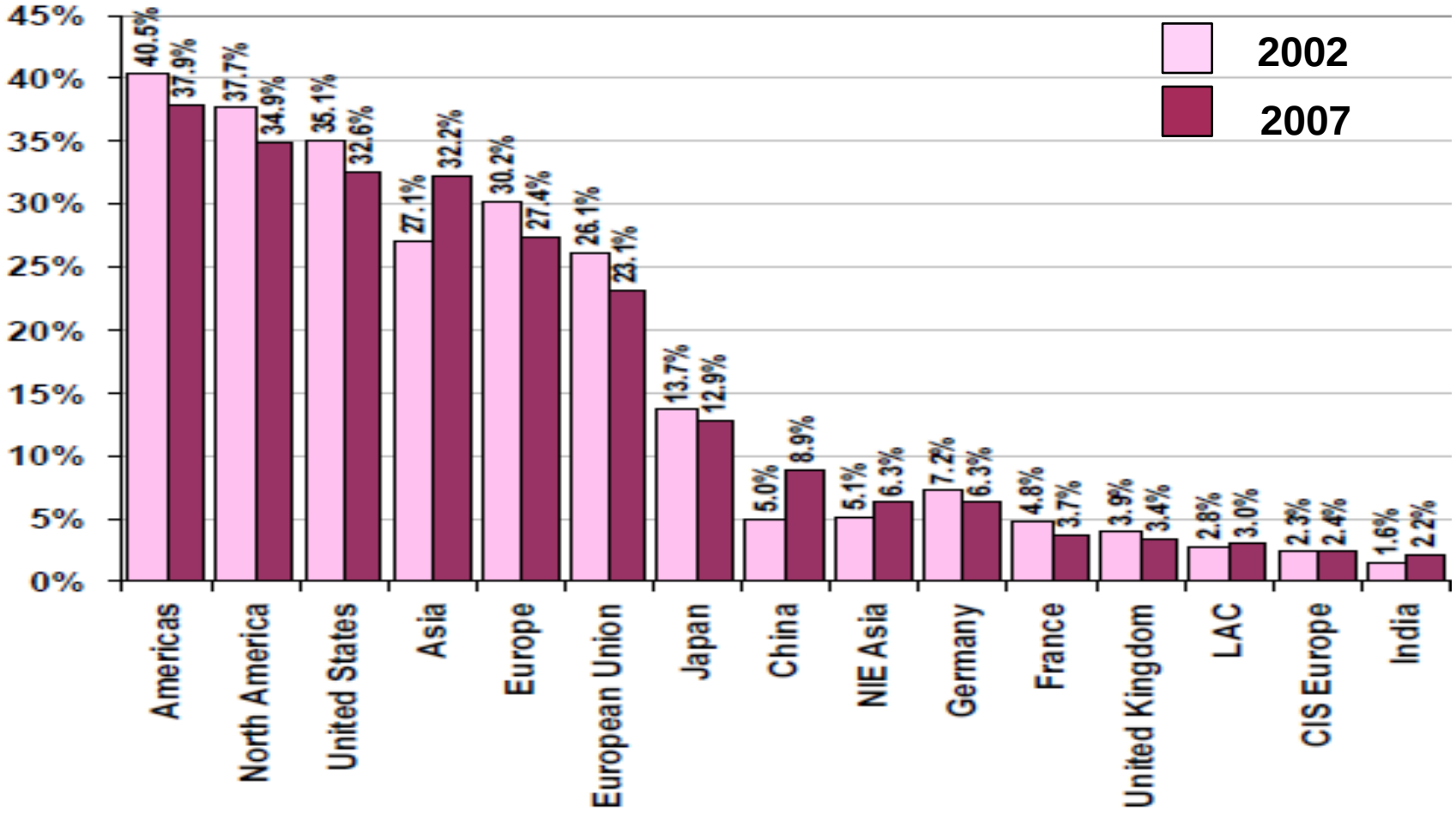
China, for one, is gaining ground on our R&D competitive advantage



Source: Battelle, *R&D Magazine*, International Monetary Fund, World Bank, CIA World Factbook, OECD

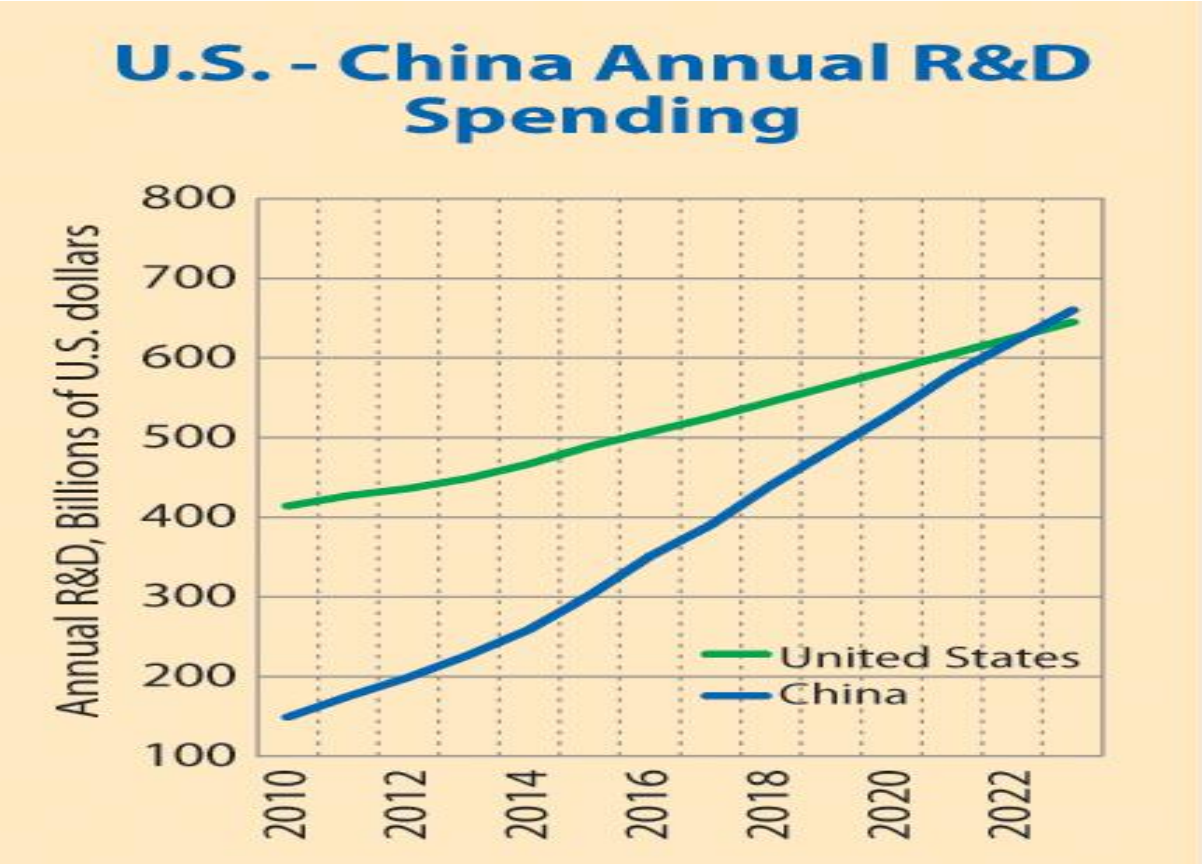
ROI should also be a measure of "Risk Of Ignoring" the competitive trends

Shares of world R&D expenditure by regions/countries



Source: UNESCO Institute for Statistics estimates, August 2010

China is projected to surpass the U.S. in R&D investments just more than 10 years from today



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Limited-edition commercialization enabling the next generation of scientific exploration