MISSION INNOVATION
Accelerating the Clean Energy Revolution

Accelerating Clean Energy Innovation in India

सत्यमेव जयते

Workshop on Awareness and Capacity Building Carbon Capture and Utilization

August 29-September 1, 2018, New Delhi

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Ministry of Science and Technology

Government of India

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Launch of MI

- Mission Innovation (MI) is a global initiative of 23 countries and the European Union
- To dramatically accelerate global clean energy innovation
- First announcement November 30, 2015, in Paris to undertake ambitious efforts to combat climate change.

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Global Scope

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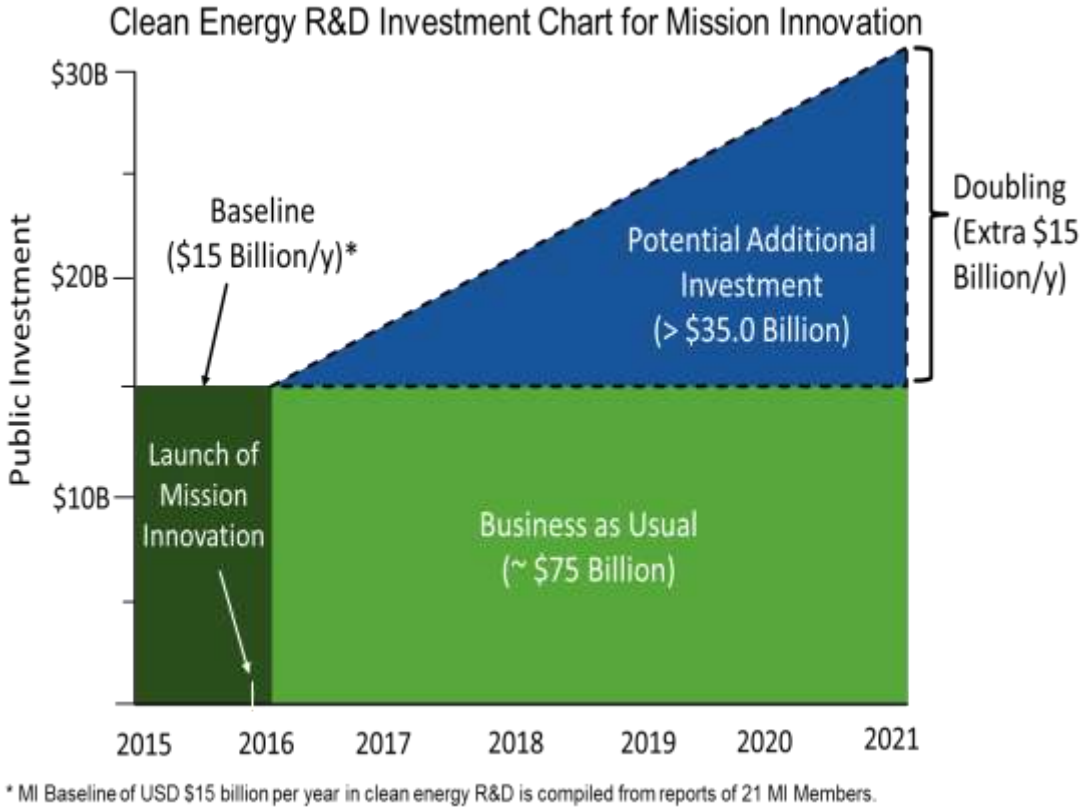
Clean Energy R&D Investment



* MI Baseline of USD $15 billion per year in clean energy R&D is compiled from reports of 21 MI Members.

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Clean Energy R&D Funding Baseline

Country	Baseline (Million currency as declared, per year)	Baseline Amount (Million US Dollars per year)
Australia	104 AUD	78
Brazil	600 BRL	150
Canada	387 CAD	295
Chile	4.1856 USD	4
China	25,000 RMB	3,800
Denmark	292 DKK	45
European Union	989 EUR	1,111
France	440 EUR	494
Germany	450 EUR	506
India	4700 INR	72
Indonesia	16.7 USD	17
Italy	222.6 EUR	250
Japan	45,000 JPY	410
Kingdom of Saudi Arabia	281.3 SAR	75
Mexico	20.71 USD	21
Norway	1132 NOK	140
Republic of Korea	490 USD	490
Sweden	134 SEK	17
United Arab Emirates	10 USD	10
United Kingdom	200 GBP	290
United States	6415 USD	6,415
TOTAL		14,690

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Status so far

- First MI Ministerial held in San Francisco, 1-2 June, 2016
  20 Member countries- Joint Statement, Investment commitment

- Innovation Challenges launched at COP22 in November 2016

- India is founding member of Mission Innovation and part of the Steering Committee besides co-lead of innovation challenges on smart grids, off grids and sustainable bio-fuels.

- Third Mission Innovation Ministerial was held in Malmö, Sweden, on 23-24th May, 2018 -22 countries and the European Union

- MI India Workshops being organized by DBT and DST.

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3rd MI Ministerial

India announced setting up of First International Incubator for clean energy in public-private partnership at a total investment of around US $ 5 million in Delhi.

Objective of Innovation Challenges

What are Innovation Challenges?

These are global calls **to action** aimed at accelerating **Research, Development, and Demonstration (RD&D)** in technology areas:

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Innovation Challenges

1. Smart Grids Innovation Challenge
2. Off-Grid Access to Electricity Innovation Challenge
3. Carbon Capture Innovation Challenge
4. Sustainable Biofuels Innovation Challenge
5. Converting Sunlight Innovation Challenge
6. Clean Energy Materials Innovation Challenge
7. Affordable Heating and Cooling of Buildings Innovation Challenge
8. Renewable and Clean Hydrogen Innovation Challenge

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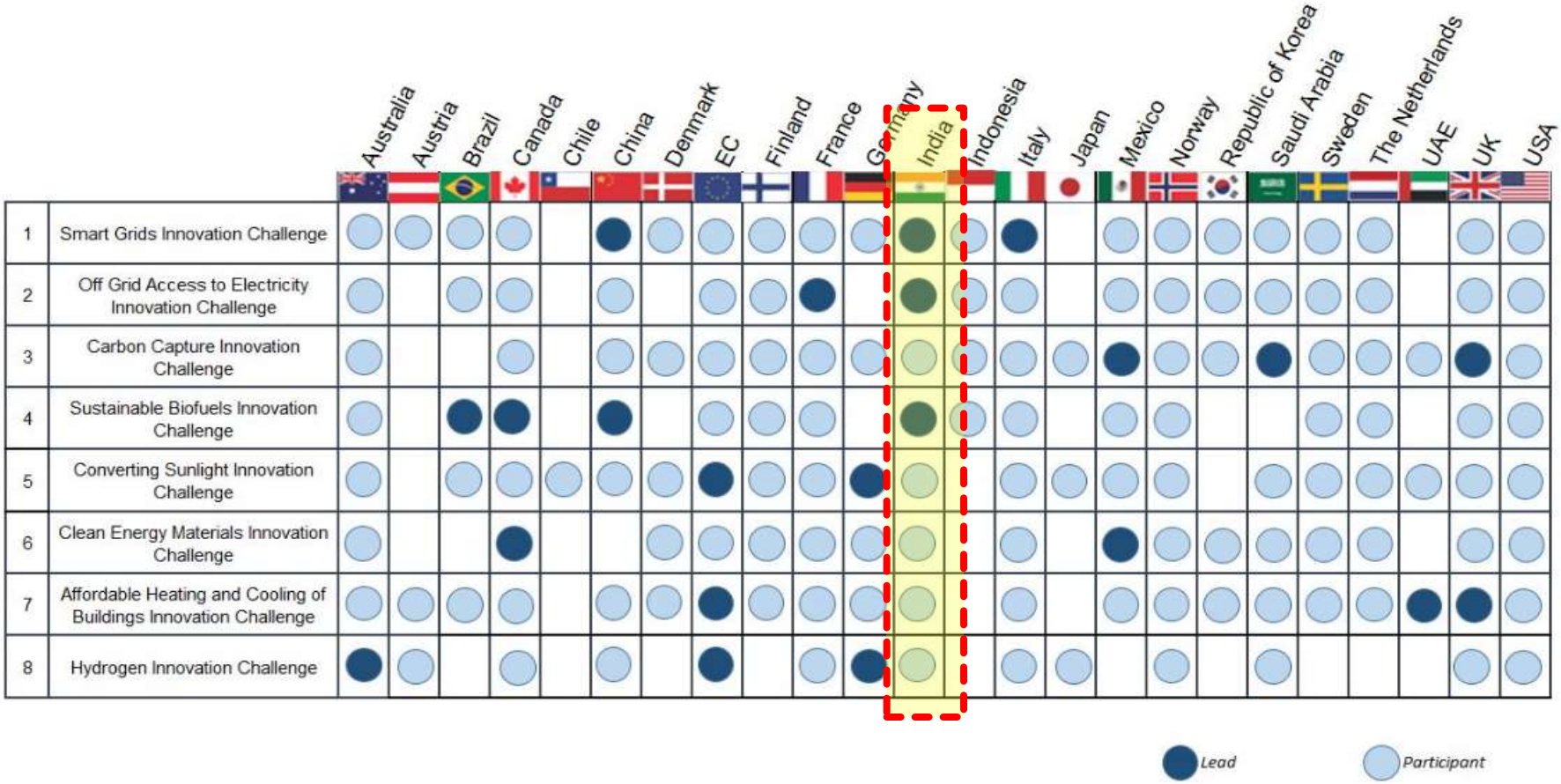
Lead and Participant Countries



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Carbon Capture

Objective:

To enable near-zero CO_2 emissions from power plants and carbon intensive industries

Organization:

Co-leads: Mexico, Saudi Arabia and United Kingdom.

Approach:

- Efforts focused on research and development to enable new and novel carbon capture technologies.
- Fundamental research in areas of advances in gas separation and geologic storage of CO_2.
- Parallel efforts to utilize CO_2 exploring the use of captured CO_2 to create plastics or algal biofuels, carbonate materials etc. Address CO_2 emissions from all fuels, including coal, natural gas, and biofuels, and developing new technologies to enable CCUS integration with industrial processes.

Gap Areas:

- Lack of Industry-academia interactions
- Bench scale processes need industry involvement for value addition and cost economics
- Development of efficient, higher life & capacity and regenerative absorbants

Projects needing attention:

- Value addition through fuel additives
- CO_2 dry reforming
- CO_2 to methanol and polymers
- Membranes for separation of CO_2 and water vapours
- Bench studies on CO_2 storage
- CO_2 use in EOR

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Funding Opportunities

Funding Opportunity Announcements

- Funding Opportunity Announcement (FOA) in Carbon Capture Innovation Challenge (IC#3) jointly by Department of Biotechnology & Department Science and Technology, Ministry of Science and Technology, GOI

Research priority areas include: *CO_2 capture as absorption, adsorption, membrane based; Hybrid model of two technologies; Development of efficient and low cost absorbants for solvent based CO_2 absorption;*

Enzyme (biomimetic) assisted solvent mediated CO_2 capture; membrane based CO_2 capture; Sequestration by enhanced oil recovery; Cost economics evaluation and industry evaluation for CO_2capture; carbonates synthesis and dry reforming of CO_2; CO_2 value addition to chemicals and value-added products; Electrochemical /Photochemical transformation of CO_2.

Funding Opportunity Announcement (FOA) in Sustainable Biofuels Innovation Challenge (IC#4) by Mission Innovation India Unit, set up by Department of Biotechnology, Ministry of Science and Technology, GOI

- Funding Opportunity Announcement (FOA) in Converting Sunlight Innovation Challenge (IC#5) Jointly by Department of Biotechnology & Department Science and Technology, Ministry of Science and Technology, GOI

Mission Innovation Workshops:

Innovation Challenge #1 – Smart Grids, May 2017
Innovation Challenge #2 – Off Grid Access to Electricity, May 2017
Innovation Challenge #3 – Carbon Capture and Utilization, September 2017
Innovation Challenge #4 – Sustainable Biofuels, October 2017
Innovation Challenge #5 – Converting Sunlight, September 2017
Innovation Challenge #6 – Clean Energy Materials, August 2017
Innovation Challenge #7 – Affordable Heating and Cooling of Building, August 2017
Stakeholder's meet on Public-Private Cooperation for Clean Energy Innovation 2017
International Conference on Sustainable Biofuels 2018

Websites:

http://mission-innovation-india.net

http://www.dbtindia.nic.in/