



Activities and Budget Update

**Jim McMillan (NREL), Jack Saddler
and Mahmood Ebadian (UBC)**

**IEA Bioenergy Task 39 Virtual Business Meeting
2-4:15 PM CET, 23 & 24 November 2020**

The IEA Bioenergy Technology Collaboration Programme (TCP) is organised under the auspices of the International Energy Agency (IEA) but is functionally and legally autonomous. Views, findings and publications of the IEA Bioenergy TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

Meeting Agenda

Monday, 2.00-4.15 PM CET, 23 November 2020

15 min	General Introduction; Update on Task 39 projects, activities, budget, ExCo, etc. (Jim McMillan, Jack Saddler and Mahmood Ebadian)
10 min	Update on Biofuture Platform (Adam Brown)
20 min	Introduction and overview of India's ongoing biofuels activities and projects (Ravi Gupta)
20 min	Update on biofuels in marine shipping report/Issues affecting utilisation of advanced biofuels in the marine sector (Sune Tjalfe Thomsen and Tor Ivan Simonsen)
20 min	Biofuels production and use status in non-IEA Bioenergy countries/emerging economies (Glaucia Mendes Souza, Rubens Maciel Filho and Pablo Silva Ortiz)
15 min	Successes and lessons learned for conventional/advanced biofuels deployment (Franziska Müller-Langer and Tomas Ekbom)
15 min	LCA, sustainability of biofuels pathways to identify key metrics beyond GHG reduction, spanning both feedstocks and conversion technologies (Adrian O'Connell and Don O'Connor)
20 min	General Discussion

Meeting Agenda

Tuesday, 2.00-4.15 PM CET, 24 November 2020

20 min	Update on biojet fuel/SAF/decarbonization of the aviation sector (Susan van Dyk and Jack Saddler)
20 min	Feedstock-to-biofuel(s) supply chain analysis. Focus on CAPEX and OPEX cost reduction opportunities for advanced biofuels - proposed project for 2021 (Ravi Gupta and Alok Satlewala)
10 min	Update on Biofuels Demonstration Plants database (Dina Bacovsky)
15 min	Update on Implementation Agendas report comparing biofuels policies (Mahmood Ebadian)
15 min	Review existing/proposed certifications schemes used for oleochemical and lignocellulosic-based biofuels supply chains and identify improvement opportunities - proposed project for 2021 (Paul Sinnige and Timo Gerlagh)
10 min	Update on potential of co-processing to reduce the carbon intensity of transportation fuels/drop-in fuels (Jianping Su, Susan van Dyk and Jack Saddler)
10 min	General Discussion
10 min	Proposed future Task 39 business meetings in current triennium 1) Denmark, 21-23 April, 2021 (virtual?) [same week as ExCo87] 2) Australia for late 2021, in combination with IEA Bioenergy end of triennium meeting (virtual?) Planning for newsletters to be published in 2020/2021: Late 2020 – India; Early 2021 - Ireland? Mid 2021 - Norway? Late 2021 - volunteer?
15 min	Possible Task 39 new project ideas for next triennium (2022-2024) - Group Discussion
10 min	Concluding remarks and wrap up (Jim McMillan and Jack Saddler)

1) IEA Bioenergy Task 39's activities since June 2020 virtual business meeting

- **June:** Jointly with the BC-SMART Biofuels Consortium, hosted a panel webinar, “Crystal ball gazing: How do we decarbonise long distance transport during/after COVID-19?”. The panel included members from the oil refining, aviation, marine, rail/trucking and feedstock sectors. 180 participated worldwide.
- **June/July:** Submitted proposal for Lessons Learned Biofuels T39/T40/T45 InterTask project funding which ExCo approved (\$25K in Task 41 funding)
- **August:** Submitted “Questionnaire to Task Leaders - Preparing the programme for the next triennium (2021-2023)” to IEA Bioenergy ExCo.(copy in attachments)
- **September:** Peer-review manuscript, “Biofuels policies that have encouraged their production and use: An international perspective”, published in the journal Energy Policy. This paper elaborates on the previous Implementation Agendas report's executive summary.

2) IEA Bioenergy Task 39's activities since June 2020

- **September:** Summarized Task's recent publications and information dissemination activities for **IEA Bioenergy Newsletter**.
- **September:** Completed and submitted Task progress report and budget spreadsheet for **the (virtual) ExCo86 meeting in Oct 2020**.
- **October:** Published newsletter Issue #55.
 - ✓ “From the Task” section summarized Task 39's June 2020 virtual meeting and joint workshop with BC SMART and other dissemination activities
 - ✓ The feature article was “**Sweden** targets world's highest biofuel blending”
 - ➔ Thanks to **Tomas Ekblom** and **Cecilia Higa** for drafting this feature article!!!

3) IEA Bioenergy Task 39's activities since June 2020

- **October:** Task leaders participated in ExCo86 meeting(s)
- **October:** Contributed to Task 41 funded Special Project:
 - **Completed three chapters** for the report, “The contributions of advanced renewable transport fuels to transport decarbonisation in 2030 and beyond”:
 - ✓ **Role of Biofuel Policies**
 - ✓ **Future Feedstock Availability and Costs**
 - ✓ **Future GHG Emissions of Advanced Biofuels**

This report is a joint effort of the IEA Bioenergy and Advanced Motor Fuels (AMF) TCP and the project is being led by Dina Bacovsky; IEA Bioenergy webinar launch held 17 Nov 2020.

Upcoming Meetings and Newsletters

Meetings

- First half of 2021: Denmark, 21-23 April (virtual?)
- Australia late 2021, in combination with IEA Bioenergy's end of triennium meeting and conference (virtual?)

Newsletters

- December 2020: Lead article by India. (Thank you!!)
- Early 2020: Lead article by Ireland?
- Mid 2020: Lead article by Norway?

Task 39 Annual Budget - 2020

Task 39 Annual Budget 2020	(US\$)
Contributions from Member Countries in 2020	\$240,000
Less contribution to Strategic Fund in 2020**	\$24,000
Sub total***	\$216,000
Funds carried forward from 2019****	\$80,418
Budget for	\$296,418

* based on 16 member countries x US \$15K

** 10% contribution

*** US \$126,000 actual funds received as of March 2020

**** 2019 carry over includes \$7500 for "Advanced Biofuels - Potential for cost reduction" InterTask project which was completed in 2019 but the fund payment was received in 2020.

Task 39 Budget Breakdown - 2020

Category	Sub-categories	Budget 2020	Committed 2020	Spent as of 7/30/2020
Administration				
Task Management				
	<i>Jim McMillan-Lead</i>	\$52,906.00	\$19,206.48	\$33,699.52
	<i>Jack Saddler-Co-lead</i>			
	<i>Mahmood Ebadian- Task Coordinator</i>			
	<i>Gladys Tecson- Project Account</i>			
Materials / supplies		\$0		
Travel				
	<i>Task 39 business meetings</i>			
	<i>Conferences to present Task 39 reports and projects</i>	\$4,500	\$34	\$4,466
Other expenditure	<i>Subscriptions & publications, rental-Telephone equipment, food & beverage, bank charges and FX difference</i>	\$2,500	\$1,390	\$1,110
Overhead	<i>Forestry Administration (overhead based on 2020 Available funds)</i>	\$21,957	\$12,622	\$9,335
Projects	<i>Jim McMillan (NREL) Updated TSA \$12K (w/ \$8K advanced in 2018)</i>	\$4,000	\$4,000	
	<i>Techno-economic analysis (TEAs) of advanced biofuels (Akporiaye, Ekbom and McMillan) \$25K</i>	\$0	\$0	
	<i>Assess successes and lessons learned for conventional/advanced biofuels deployment (Müller-Langer and Ekbom) (\$20K 2020 + \$25K 2021)</i>	\$45,000	\$0	\$45,000
	<i>Analyze biofuels production and use status in non-IEA countries/emerging economies (Mendes Souza, Filho and Cassinelli) \$30K (\$15K 2020 + \$15K 2021)</i>	\$30,000	\$0	\$30,000
	<i>Update of drop-in biofuels (Su and van Dyk) (\$10k 2019, \$10K 2020 and 5\$K 2021)</i>	\$20,000	\$8,333	\$11,667
	<i>Update of biojet fuel/SAF, decarbonization of the aviation sector (van Dyk, Su) (\$10k 2019, \$10K 2020 and 5\$K 2021)</i>	\$20,000	\$14,167	\$5,833
	<i>Update of Biofuels in Marine Shipping (Tjalfe Thomsen and Rodgers) \$45K (20K 2020 + \$25K 2021)</i>	\$45,000	\$45,000	
	<i>Conduct feedstock-to-biofuel supply chain analysis to identify CAPEX and OPEX cost reduction opportunities (with Task 43/Feedstocks) (possibly now led by India) \$25K</i>	\$0	\$0	
	<i>Review existing/proposed certifications used for oleochemical- and lignocellulosic-based biofuels supply chains (Sinnige, Knijn and Gerlagh) (\$30K 2021)</i>	\$0	\$0	
	<i>Update demoplant database (Bacovsky)</i>	\$15,000	\$0	\$15,000
	<i>Sustainability assessment of biofuels pathways; Identify key metrics beyond GHG reduction; span both feedstocks and conversion technologies (O'Connor, O'Connell, Staples, Bonomi, Wang) \$40K (\$20K 2020 + \$20K 2021)</i>	\$20,000	\$20,000	
	<i>Implementation Agendas- Compare and contrast biofuels policies (Ebadian)</i>	\$25,000	\$10,417	\$14,583
Total		\$305,863	\$135,169	\$170,694

GANTT Chart of Task 39 Deliverables Status

Project No.	Topic	Status	% Work completed	2019				2020				2021				Alarm
			See Note 1	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
T39-T1	Network administration: overhead, website, newsletter, annual reports, enquiries, meetings, etc	Planning	50%													
		Actual														
T39-T2	Assess successes and lessons learned for conventional/advanced biofuels deployment	Planning	25%													
		Actual														
T39-T3	Review existing/proposed certifications used for oleochemical- and lignocellulosic-based biofuels supply chains; identify certification scheme improvement opportunities	Planning	25%													
		Actual														
T39-T4	Update on biofuels in marine shipping report/Issues affecting utilisation of advanced biofuels in the marine sector	Planning	25%													
		Actual														
T39-T5	Assessment of large-scale demonstration plants (with Bioenergy 2020+)	Planning	50%													
		Actual														
T39-T6	Analyze biofuels production and use status in non-IEA countries/emerging economies	Planning	25%													
		Actual														
T39-T7	Conduct feedstock-to-biofuel(s) supply chain analysis to identify CAPEX and OPEX cost reduction opportunities (with Task 43/Feedstocks)	Planning	10%													
		Actual														
T39-T8	Update of the drop-in biofuels report	Planning	25%													
		Actual														
T39-T9	Update of biojet fuel/SAF, decarbonization of the aviation sector	Planning	50%													
		Actual														
T39-T10	Sustainability assessment of biofuels pathways; Identify key metrics beyond GHG reduction; span both feedstocks and conversion technologies	Planning	25%													
		Actual														
T39-T11	Update on country policies and implementation agendas	Planning	50%													
		Actual														
T39-T12	Techno-economic analysis (TEAs) of advanced biofuels (including feedstock/technology pathways)	Planning	0%													
		Actual														

Task 39-Task 44 Joint Workshop

3:00-5:00pm CET Wednesday 25 Nov 2020

“Role of biofuels producing biorefineries in grid balancing”

Abstract: Due to increasing production of electricity from fluctuating renewable sources like wind and solar, the role of bioenergy in the electricity sector has to be more flexible for grid stabilisation and secure supply. On the other hand, surplus power can be used in biofuels production and biorefinery processes to increase conversion rates and fuels output. Several concepts to produce heat, electricity, fuels and other products in single high-efficiency processing plants are under development. The aim of this workshop is to provide an overview on the flexibility options, get insights into concepts for more flexible biofuel and biopower production, and discuss the challenges and success factors to implement these concepts in energy systems with high shares of renewables.

Agenda:

- Task 39 intro (5 min) and 2 presentations (10-15 min + Q&A each) by FML/DBFZ and GR/Borregaard
- Task 44 intro and 2 presentations (similarly structured, speakers identified)
- Group discussion/brainstorm ideas on collaborative project for next triennium

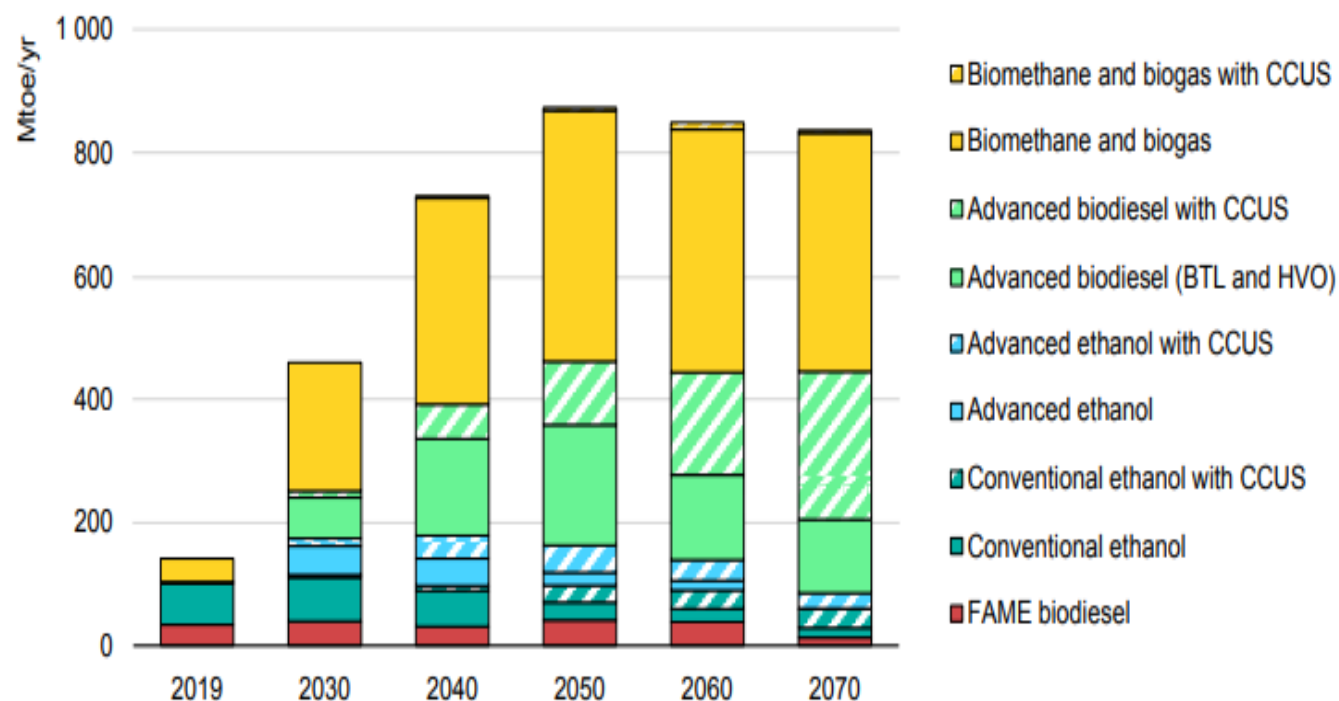
Moderators: Jim McMillan (T39) and Jaap Kiel (T44).

IEA Bioenergy Task 39 Meeting, 23 November 2020

Progress with Biofuture Platform

Adam Brown

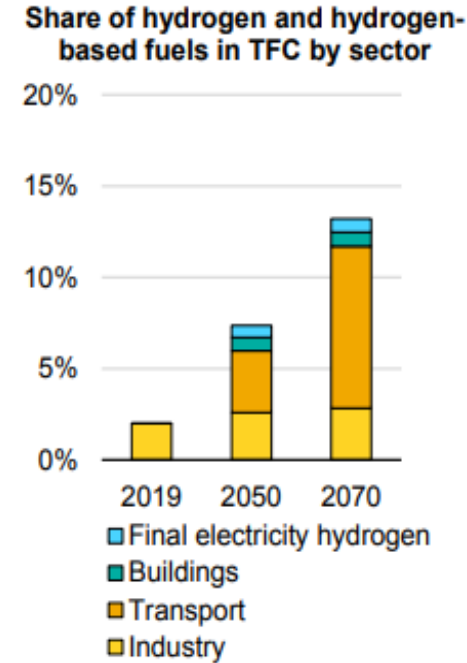
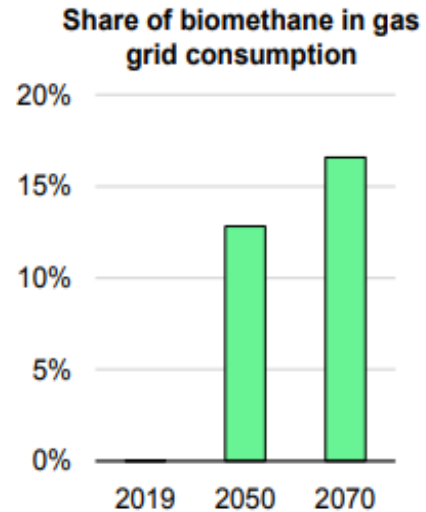
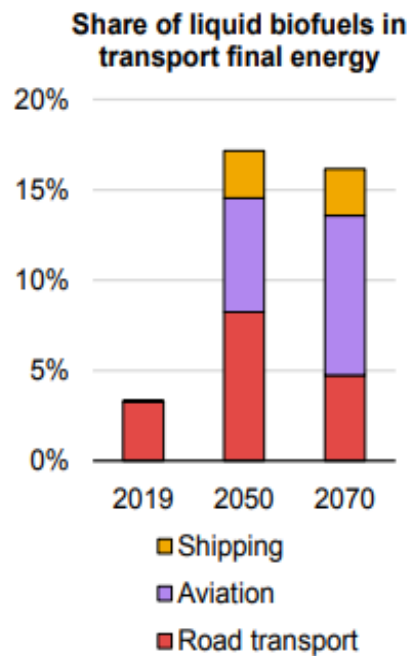
ETP 2020 - updates modelling of rôle of biofuels in future sustainable transport....



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Source: IEA ETP 2020

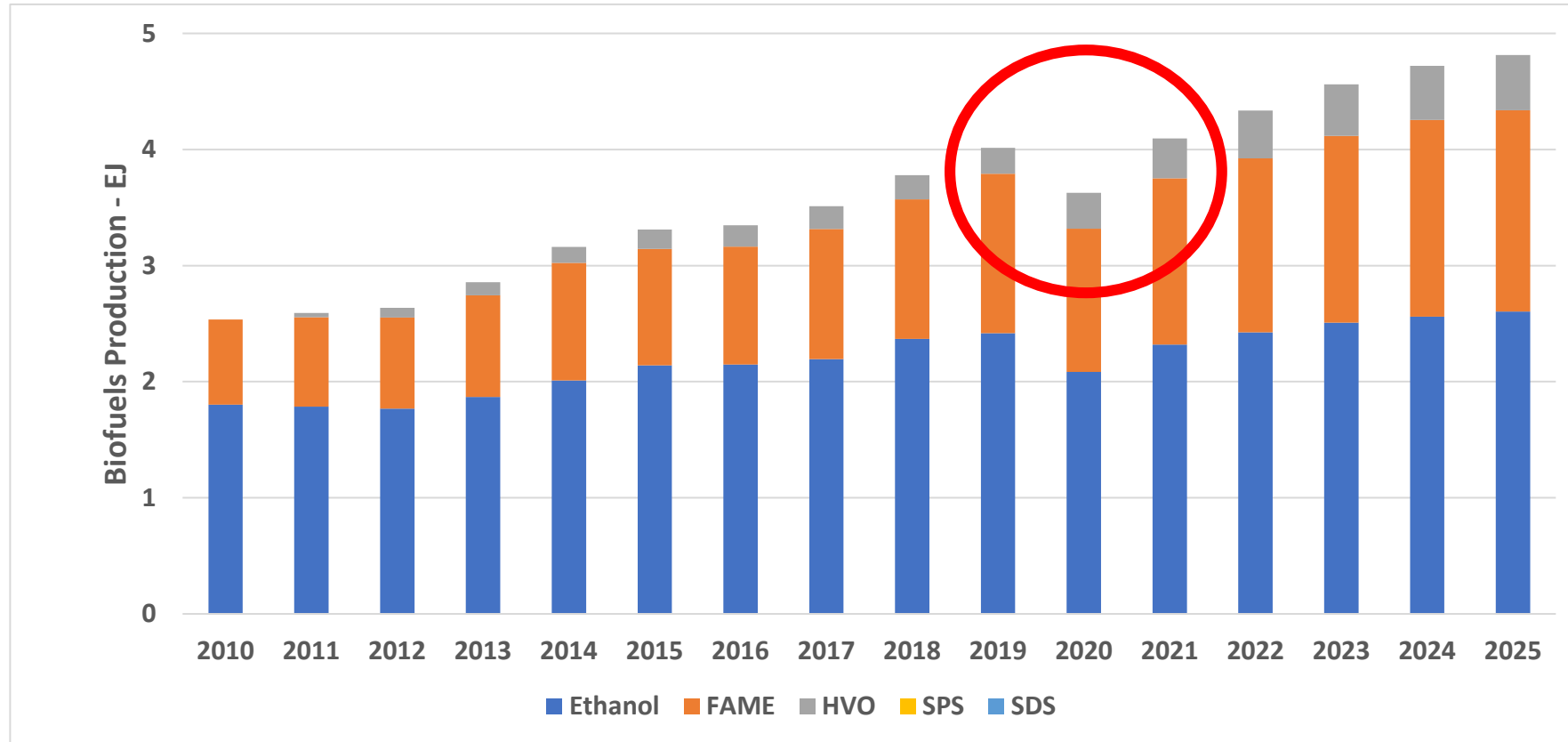
..along with other options including hydrogen based fuels, electricity etc.



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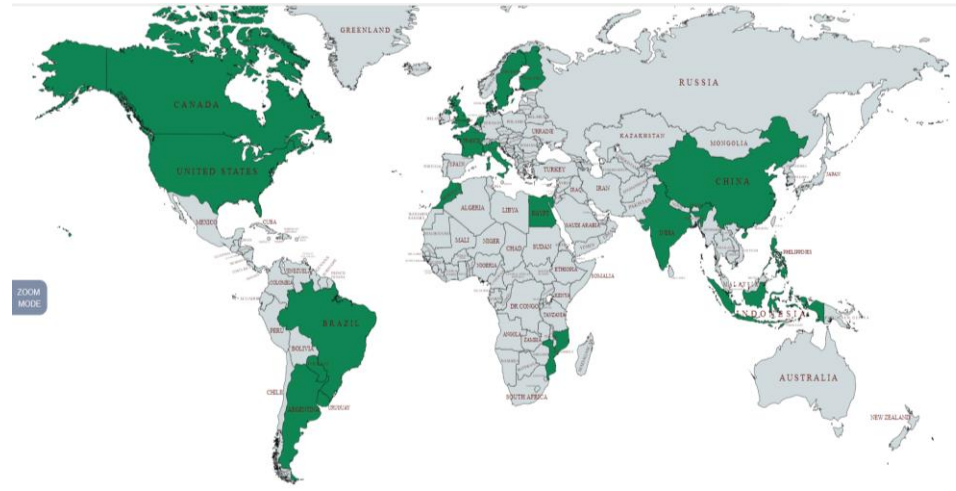
Source: IEA ETP 2020

Renewables 2020 – published November 10



12% drop in biofuels production in 2020 projected due to COVID

Biofuture Platform



Argentina	Brazil
Canada	China
Denmark	Egypt
Finland	France
India	Indonesia
Italy	Morocco
Mozambique	Netherlands
Paraguay	Philippines
Sweden	United Kingdom
United States	Uruguay

Becomes the CEM Biofuel Platform Initiative

- More membership and industry engagement

BFP – 5 COVID Principles

1. Do not backtrack

- Ensure continuity and long-term predictability of bioenergy, biofuels, and bio-based material targets and existing policy mechanisms that have proved successful

2. Consider short-term COVID support for producers

- Where appropriate, address short-term challenges for bioenergy and bio-based materials industries in the context of relief packages related to COVID-driven economic losses

3. Reassess fossil fuel subsidies

- Take advantage of a low oil price environment to reassess fossil fuel subsidies for a fairer playing field

4. Build Back Better with Bio

- Where appropriate, integrate the bioeconomy sector as part of broader recovery programmes,

5. Reward sustainability

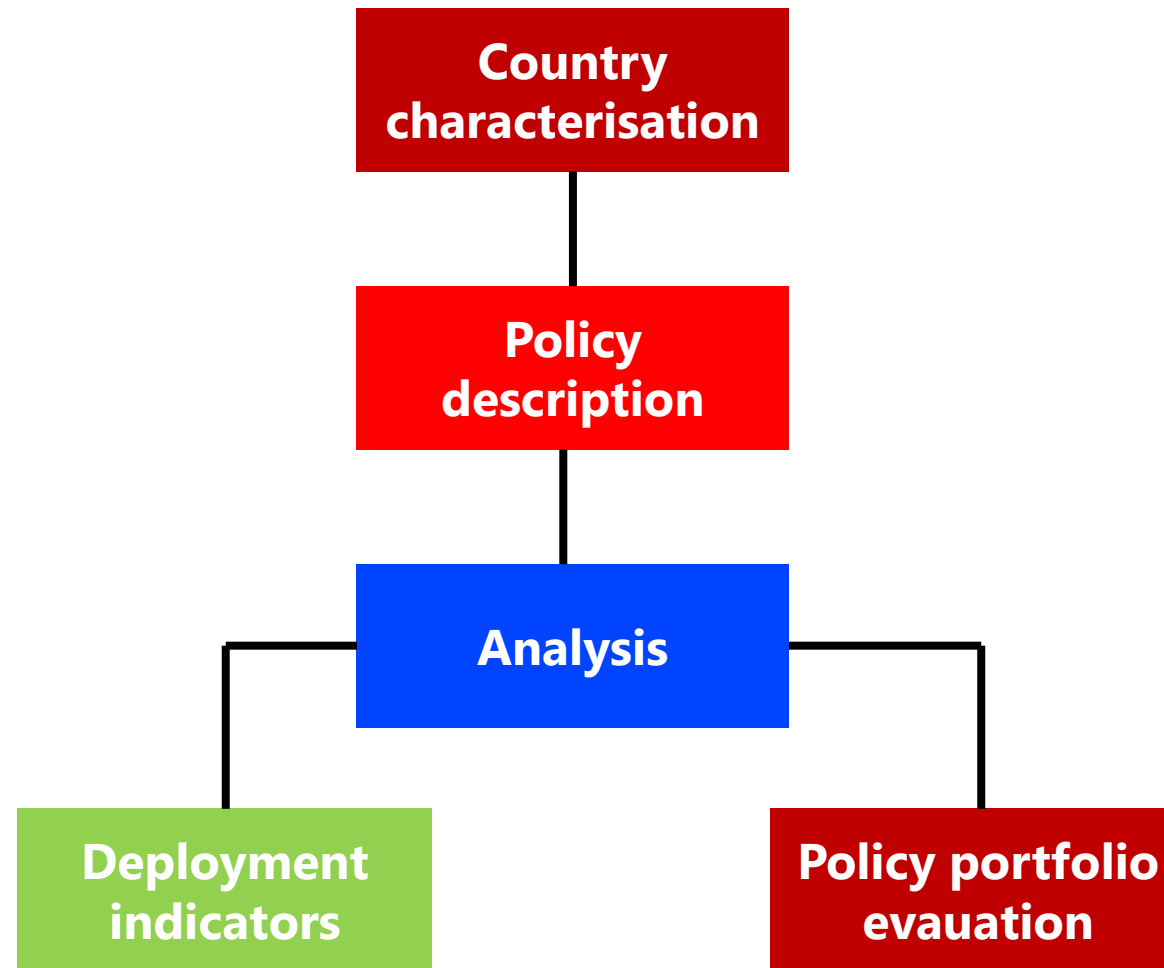
- Integrate sustainability rewarding mechanisms into policy frameworks, promoting positive externalities in the production and use of bio-based fuels, chemicals and materials

BFP – Policy Blueprint

- **Develop and use a methodology for a critical review of bioenergy policies in order to:**
 - Assess progress in developing bioenergy
 - Identify best practice policy principles and examples
 - Highlight need for more ambition
- **Pilot phase**
 - Focusses on biofuels for transport
 - Detailed analysis of policies in three countries
 - USA
 - Brazil
 - Netherlands



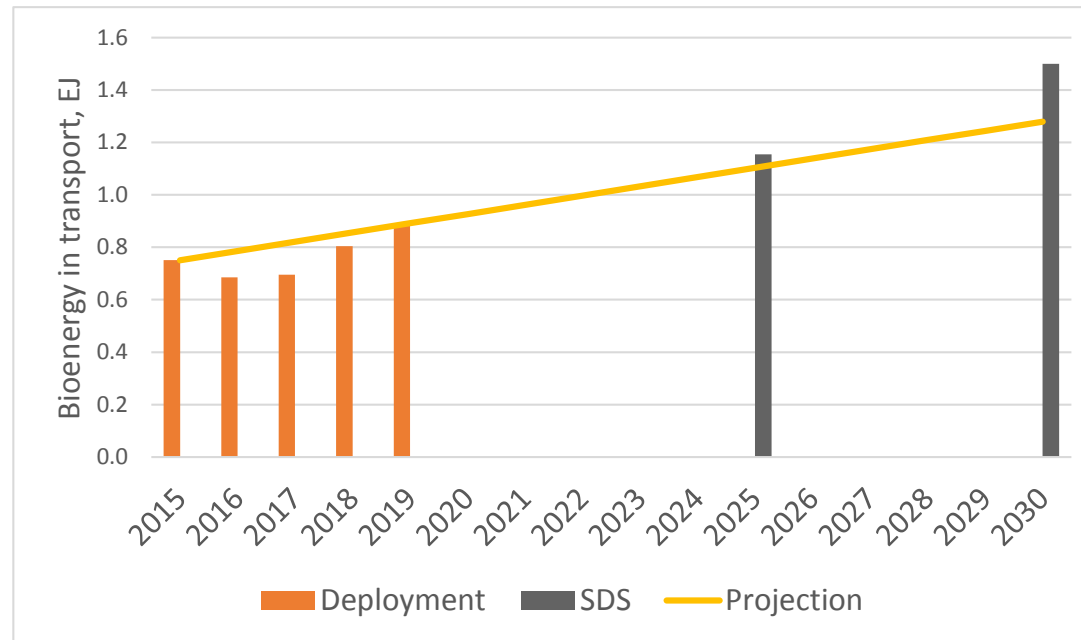
The BFP Policy Blueprint - Country Profiles



The BFP Policy Blueprint - Impact status indicators

- **Four key indicators**

- % bioenergy in final energy consumption
- % bioenergy in transport energy
- GHG savings
- Deployment rate compared to that needed to be on track for IEA SDS 2030



The BFP Policy Blueprint - Analysis

Strategic priority

- Strategic Priority – what importance is given to bioenergy in future energy planning and are targets for deployment in line with the IEA SDS for 2025 and 2030.

Policy clarity and certainty

Do policies provide a secure long term basis to promote deployment and investment?

Market access

Do policies provide ready market access for biofuels?

Financial support

Do incentives make investment in biofuels production and use viable?

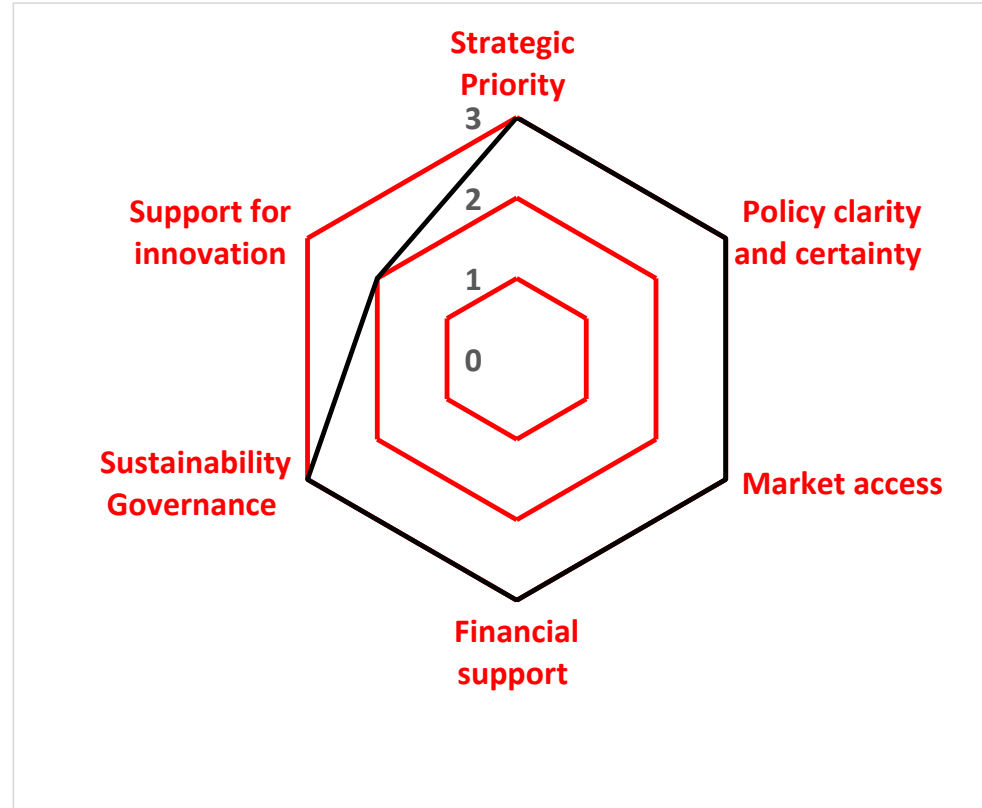
Sustainability governance

Are measures in place which ensure that biofuels meet sustainability requirements?

Innovation support

Is there support for development and commercialisation of new fuels and processes?

Allows identification of stronger and weaker policy areas



BFP Policy Forum - 30 November

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Introduction and Overview of India's Biofuels Activities

Ravi P Gupta, General Manager (Bioenergy)

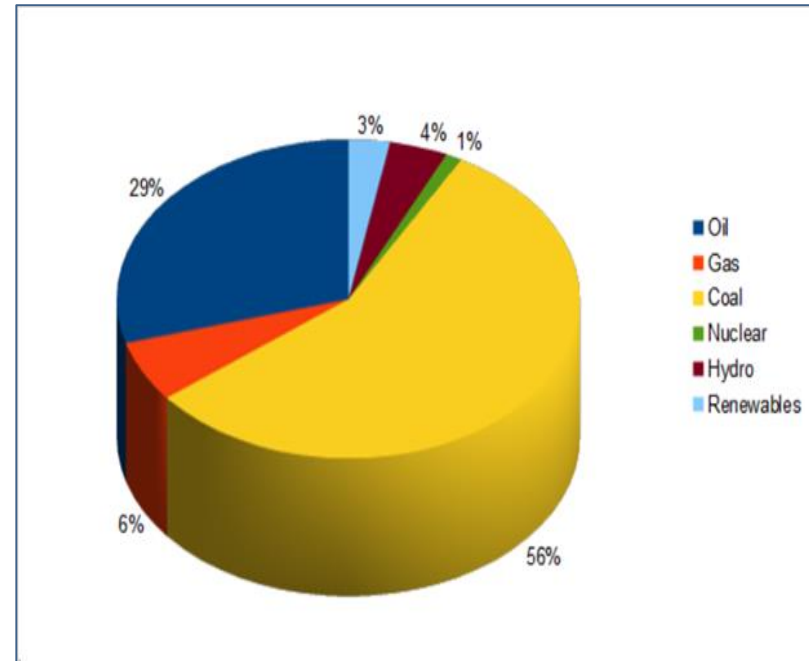
Indian Oil Corporation Limited, R&D Centre

23rd November 2020

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India's Total Primary Energy Demand

- India's share of total global primary energy demand is set to roughly double to ~11% by 2040, underpinned by strong population growth and economic development
- India accounts for more than a quarter of net global primary energy demand growth between 2017-2040
- 42% of this new energy demand is met through coal, meaning CO2 emissions roughly double by 2040
- Gas production grows but fails to keep pace with demand, implying a significant growth in gas imports

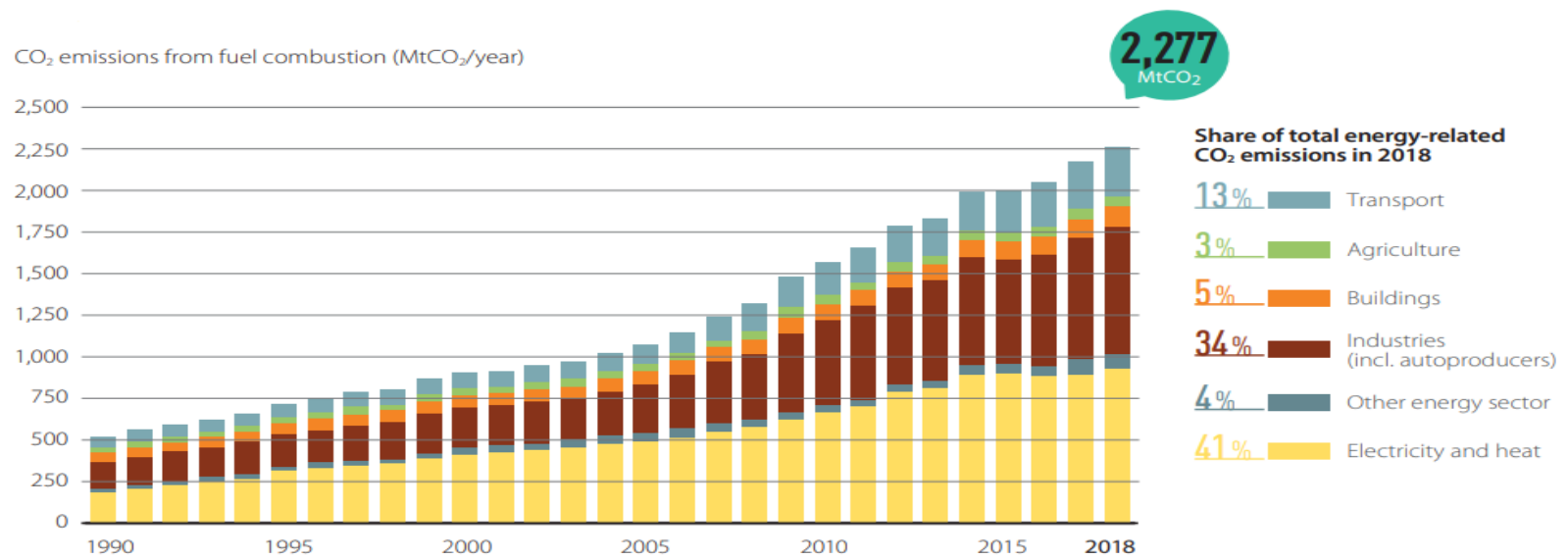


Primary consumption in India
(Source: BP energy Review)

India is one of the fastest growing economies and the 3rd largest consumer of primary energy in the world after US and China

India's Historical GHG emissions inventory data

- GHG emissions by India are the third largest in the world and the main source is coal
- India emits about 3 gigatonnes (Gt) CO₂eq of GHG each year ~ half the world average
- Both the energy and emission intensities of India's GDP have decreased by more than 20% over the past decade.
- Represents commendable progress even as total energy-related CO₂ emissions continue to rise.
- India's per capita emissions today are 1.6 tonnes of CO₂, well below the global average of 4.4 tonnes, while its share of global total CO₂ emissions is ~ 6.4%



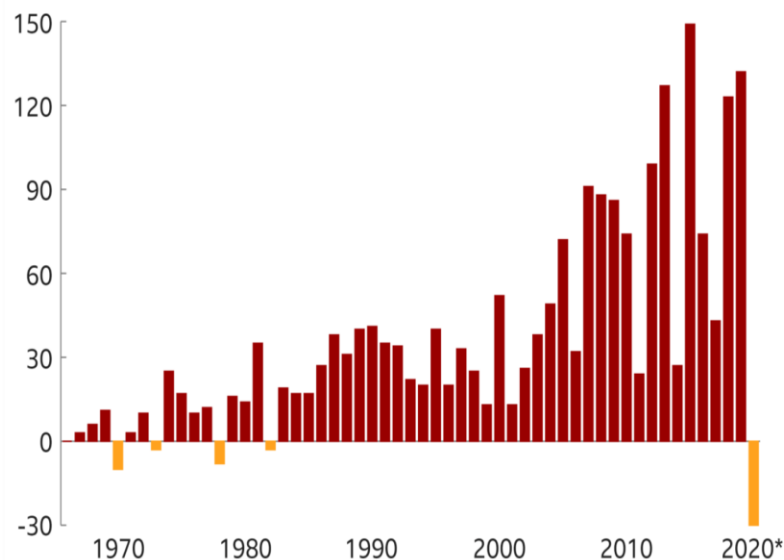
Sources: Enerdata 2019, Brown To Green: The G20 Transition Towards A Net-zero Emissions Economy 2019 Report

Steps taken by India for reducing GHG emissions

- Government of India has target of reducing import dependence i.e. usage of fossil fuels by 10% from current levels by the year 2022
- Target will be achieved by adopting a five pronged strategy which includes- Increasing Domestic Production, Adopting biofuels & Renewables, Energy Efficiency Norms, Improvement in Refinery Processes and Demand Substitution.
- Envisages a strategic role for biofuels in the Indian Energy basket.
- Taken significant steps to improve energy efficiency, which have avoided an additional 15% of annual energy demand and 300 MMT tonnes of CO₂ emissions over the period 2000-18

India's CO₂ emissions fall for the first time since 1982

Millions of tonnes of CO₂



Note: Figure is an estimate for financial year ending March 2020

Source: Centre for Research and energy for clean air

As of 2014, India's carbon intensity per GDP was twice the world average.

The Paris Agreement commitments included a reduction of this intensity by 33-35% by 2030

National Biofuel Policy 2018

National Biofuel Policy 2018



National Policy on Biofuels 2018

Salient features

 An indicative target of 20% blending of ethanol in petrol and 5% blending of biodiesel in diesel is proposed by 2030.	 With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of Rs.5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.	 Categorization of Biofuels into Basic Biofuels - First generation(1G) Bioethanol & biodiesel and "Advanced Biofuels"- Second Generation(2G) ethanol, drop-in fuels, algae based Third Generation(3G) Biofuels.	 Increase scope of raw material for ethanol procurement by encouraging Intermediate (B-Molasses), Sugarcane Juice, other Sugar containing materials and damaged as well as surplus food grains.
 Develop National Biomass repository by conducting appraisal of biomass across the Country.	 Bio diesel production to be encouraged from non edible oilseeds, used cooking oil, short gestation crops and development of supply chain mechanisms.	 Thrust on research, development and demonstration in the field of Biofuel feedstock production, advanced conversion technologies from identified feedstock.	 Setting up of National Biofuel coordination committee (NBCC) under Ministry of Petroleum & Natural Gas and Working Group on Biofuels.

- Government of India has a plan to increase ethanol blending in gasoline from 4.3% now to 8-10 % by 2020-21.
- For 10 % ethanol blending, India will require about 4.5 billion litres of it in a year, about ₹23,000 crore (**US\$ 3 billion**) in terms of value.
- In order to augment feedstock availability and promote Bio-Fuels, MoP&NG, notified the National Policy on Biofuels-2018 on 8th June 2018.
- **Indicative Target by 2030**
 - 20% ethanol blending in petrol
 - 5% biodiesel blending in diesel

Salinet Features of National Biofuels Policy 2018

- The Policy categorises biofuels as "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, Bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- The Policy expands the scope of raw material for ethanol production by allowing use of Sugarcane Juice, Sugar containing materials like Sugar Beet, Sweet Sorghum, Starch containing materials like Corn, Cassava, Damaged food grains like wheat, broken rice, Rotten Potatoes, unfit for human consumption for ethanol production.
- Policy allows use of surplus food grains for production of ethanol for blending with petrol with the approval of National Biofuel Coordination Committee.
- Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of Rs. 5000 crore (US \$ 675 million) in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.
- The Policy encourages setting up of supply chain mechanisms for biodiesel production from non-edible oilseeds, Used Cooking Oil, short gestation crops.

Major programs for implementation of Biofuels

List of Funding Agencies & Major Program :

- Department of Biotechnology (DBT) , Ministry of Science & Technology, Government of India
- Centre for High technology (CHT) , Ministry of Petroleum & Natural Gas, Government of India
- Ministry of New & Renewable Energy (MNRE) , Government of India

List of major programs supporting the development of biofuels production and use in India :

- Viable Gap funding (VGF) for Commercial scale 2G ethanol plants under Pradhan Mantri JI-VAN Yojana from CHT, MoP&NG
- Financial Assistance for Demonstration Scale 2G Integrated Bioethanol under Pradhan Mantri JI-VAN Yojana from CHT, MoP&NG
- Grant for Research & development from DBT to five Centre for Excellence in Bioenergy Area

MoP&NG has taken major initiative for setting up of 12 no. of 2G Ethanol commercial plants from agriculture waste across eleven states at an estimated cost of Rs 14,000 crore (US\$1.9 billion)

Dedicated DBT Bioenergy Centres for Biofuel Research

1. **DBT-ICT Centre** for Energy Bioscience-
Mumbai-2008
2. **DBT-IOC Centre** for Advanced Bioenergy
Research – Faridabad (in *Partnership
Indian Oil Corporation Ltd*)-2011
3. **DBT-ICGEB Centre** for Advanced
Bioenergy Research – New Delhi 2012
4. **DBT-Pan IIT Centre** for Bioenergy –
Virtual Center with 5 IITs - 2014
5. **DBT-TERI Centre** of Excellence on
Integrated Production of Advanced
Biofuels and Biocommodities - 2018

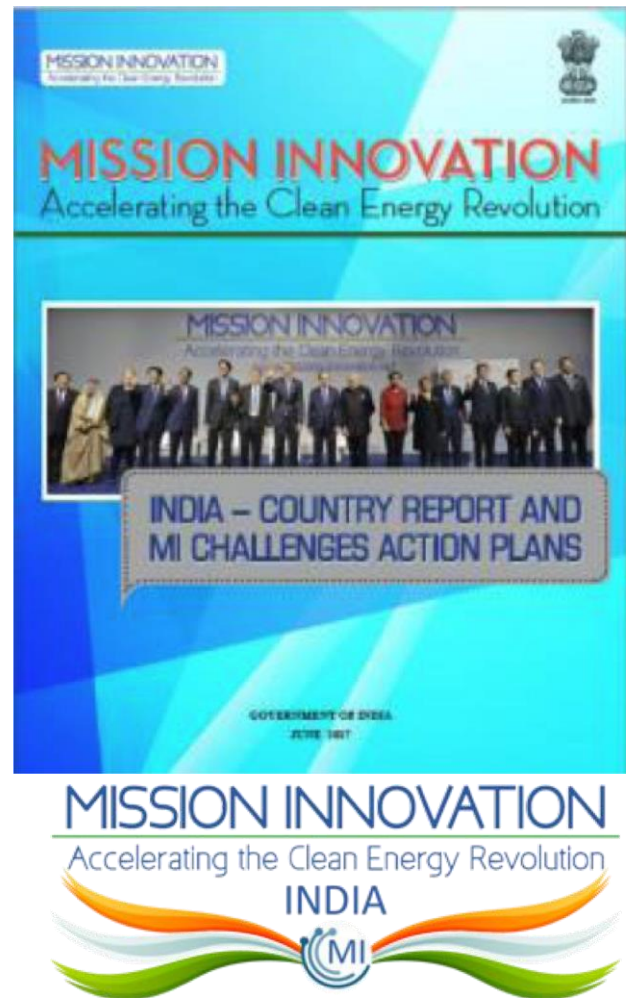


India's Contribution to Mission Innovation

- Member of Steering Committee
- Country Document and Action plan
- Participating in all 8 Innovation Challenges
- Co-Lead of Smart Grid, Off-Grid and Sustainable Biofuel (IC#4) Challenges.



Participants of MI-India Workshop on Sustainable Biofuels



Existing plants /Proposed Plants in India

Name of company	Status (planned; operational; closed)	Technology	Production capacity (ML/year)
Indian Glycols Kashipur/ 2016	Operational	Demo/ Cellulosic ethanol/ DBT ICT Technology	0.75
Praj Biofuels/2017	Operational	Demo/ Cellulosic ethanol/Praj	1.0
Shell Bangalore/2018	Operational	Demo/ Drop-in fuels/Shell	0.6
NRL Numaligarh/2018	Planned	Commercial /Cellulosic ethanol/Chempolis, Finland	60
IOCL Panipat	Planned	Commercial /Cellulosic ethanol/Praj	30
BPCL Bargarh	Planned	Commercial /Cellulosic ethanol/Praj	30
HPCL, Bhatinda	Planned	Commercial /Cellulosic ethanol/Praj	30
IOCL Panipat	Planned	Demo/Cellulosic ethanol/DBT-IOC, IOC R&D	0.75
CSIR-IIP, Dehradun	Operational	Pilot/ HEFA Biojet/CSIR IIP	0.01
IOCL Panipat	Planned	Commercial/3G ethanol/LanzaTech, USA	33

DBT IOC Centre for Advanced Bioenergy Research at IOCL R&D

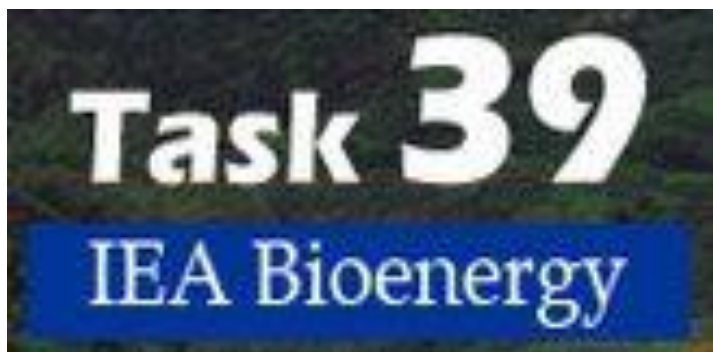
- **Development of economic and scalable cellulosic ethanol technology**
 - ✓ Low OPEX and low CAPEX, Multifeed
 - ✓ Technology meeting LCA criterion
 - ✓ 2G Ethanol technology developed at Pilot scale : 0.25 ton/day
- **In house enzyme development capability**
 - Scaled-up to 5KL & demonstrated at 2G ethanol demo plant
- **10 TPD Demo plant with integrated enzyme production planned at Panipat in 2021**



Pilot facility for pretreatment of Biomass at IOCL R&D Centre with assistance from NREL USA

THANKS

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