

India CEO Forum for Clean Air

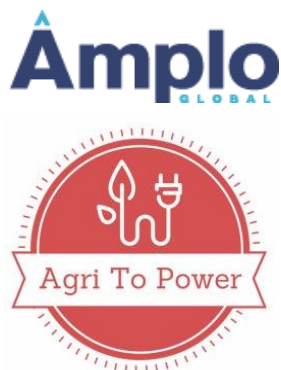
Industry Working Group (WG) on Biomass Co-Firing in Thermal Power Plants

23 May 2024

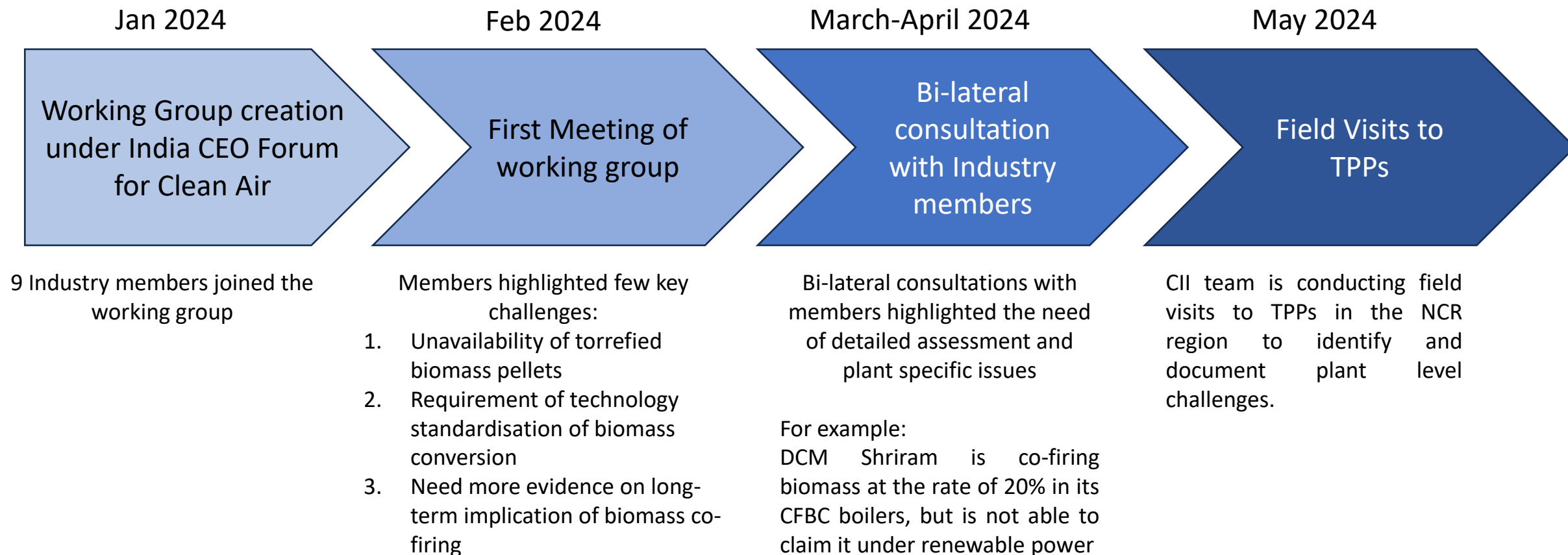
New Delhi

Working Group Members

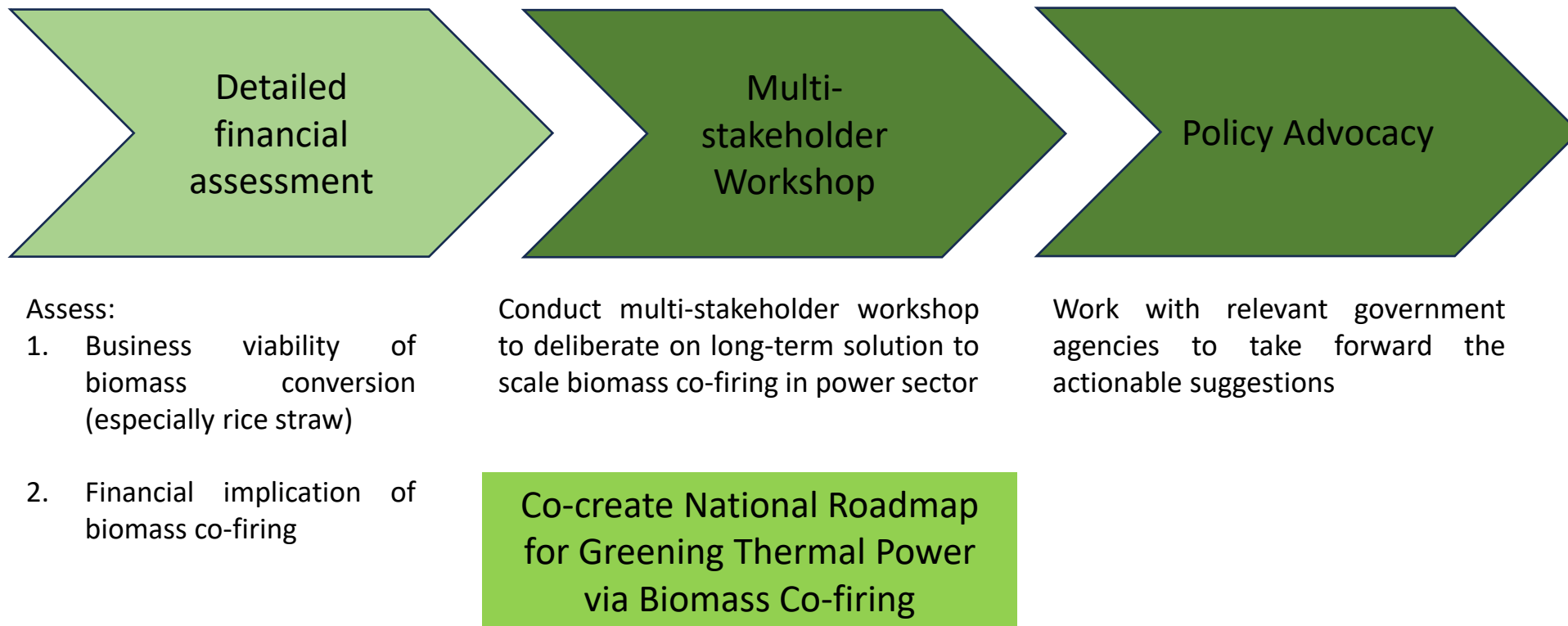
As of 20th May 2024



Working Group Activities



Activities Planned Ahead



Biomass Co-firing Learnings

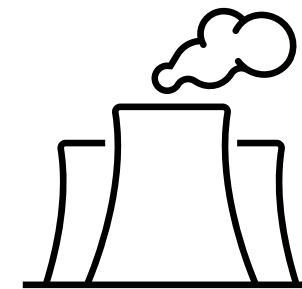
- PF boiler, biomass is fed along with coal in single feed line. Biomass and coal is milled together with strict temperature control.
- CFBC boiler, separate feeding is possible for biomass (loose biomass is not feed). Both biomass pellets and briquettes can be directly fed through separate feed line, and higher co-firing can be achieved.
 - Cost of briquettes and coal is comparable, while the cost of pellets is 20%-50% higher the cost of coal.
- Biomass supply and unloading is a major concern, as in case dumper truck the transport cost increases, else manual unloading add on to the cost.

Capex

- **Covered storage space** with Fire hydrant, gas monitoring, and other infrastructure
- **Biomass quality control** infrastructure
- **Feed line** for biomass

Opex

- **Raw material cost** biomass pellets are INR 7-7.5 /kg as compared to coal INR 5.5-5.6 /kg
- **Loss of plant efficiency**, increase in aux power use
- **Addition maintenance cost** in case of bed agglomeration



Captive Power Generation
Capacity: 240 MW

3 boilers (2 CFBC and 1 PF boiler)

Co-firing achieved till now:
2-3% in PF Boiler
20% in CFBC Boiler

Milling technology:
Pressurised Roller Mill

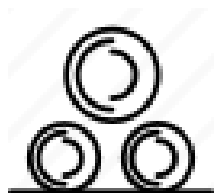
Mixed biomass is used
comprising of rice straw,
rice husk, ground nut shells

Key Identified Challenges

Biomass Supply chain



Seasonal procurement of raw material i.e. rice straw leads to a **high upfront working capital requirement**. While **material insurance** along with **huge land requirement** becomes a major barrier for small eco-entrepreneurs.



Lack of standardisation for pellet manufacturing of biomass leads to number of issues including **frequent breakdowns**, **highly variable capital cost** for similar capacity of pellet plant.



Pellets are supplied to the power plants over a wide range of distance, varying from **200–600 kms**, (where **cost will increase Rs. 0.35/kg every 100 km**). Benchmark price provide advantage to local pellet producers.

Biomass co-firing



Biomass pellets qualities include:

- Hygroscopic nature, where moisture content of pellets is generally higher (>14%)
- High volatile content, ranging from 60-66%
- Low ignition temperature – 240C

Thus, biomass need **dedicated management system** equipped with **fire & methane gas detection**



Biomass being highly volatile fire safety is a major concern, thus temperature at every processing step including blending, milling and feeding need to be carefully monitored and controlled to ensure plant/boiler safety.



Impact on **station heat rate and auxiliary power** consumption need to be carefully studied to understand the overall impact on plant efficiency