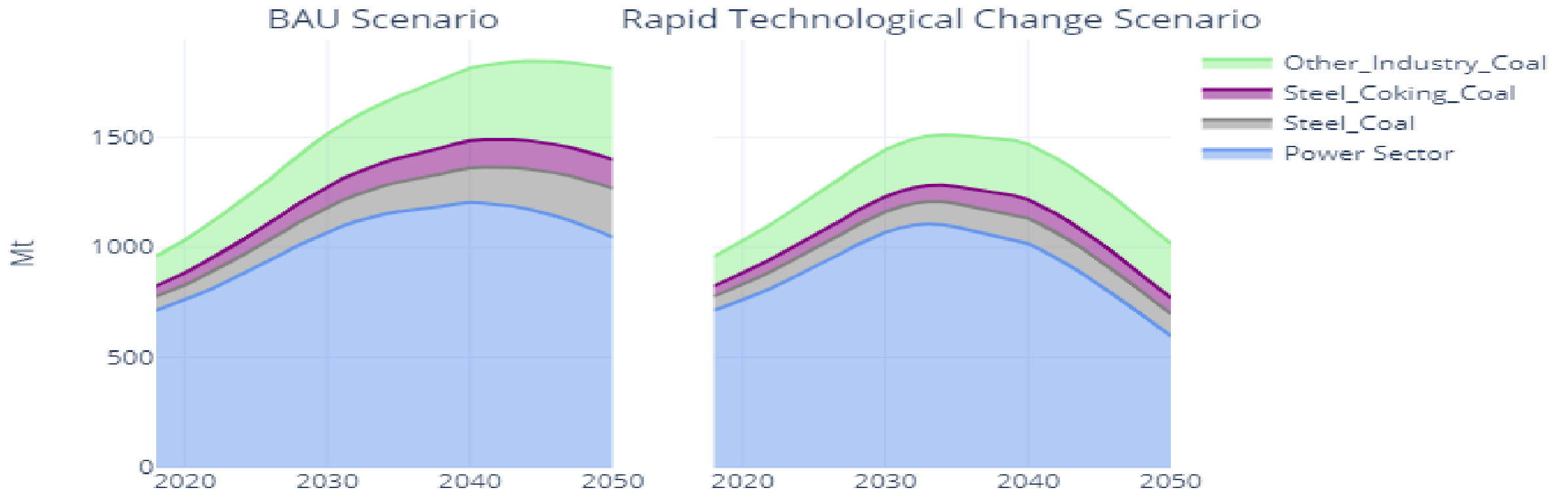




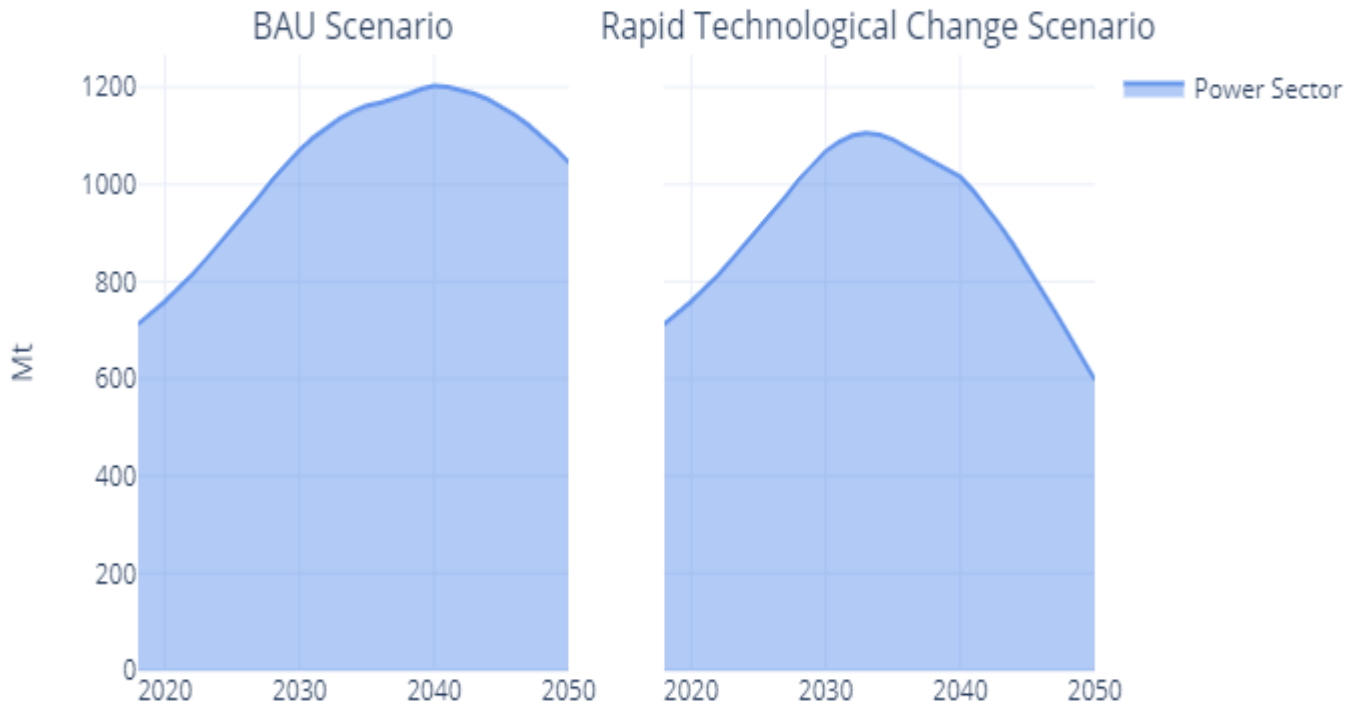
The Future of Coal In India: Some Scenarios and Key Drivers

Dr. Ajay Mathur, Director General, TERI
dg@teri.res.in

Under What Conditions Could India's Coal Consumption Peak Around 2030? (Draft – to be modified)



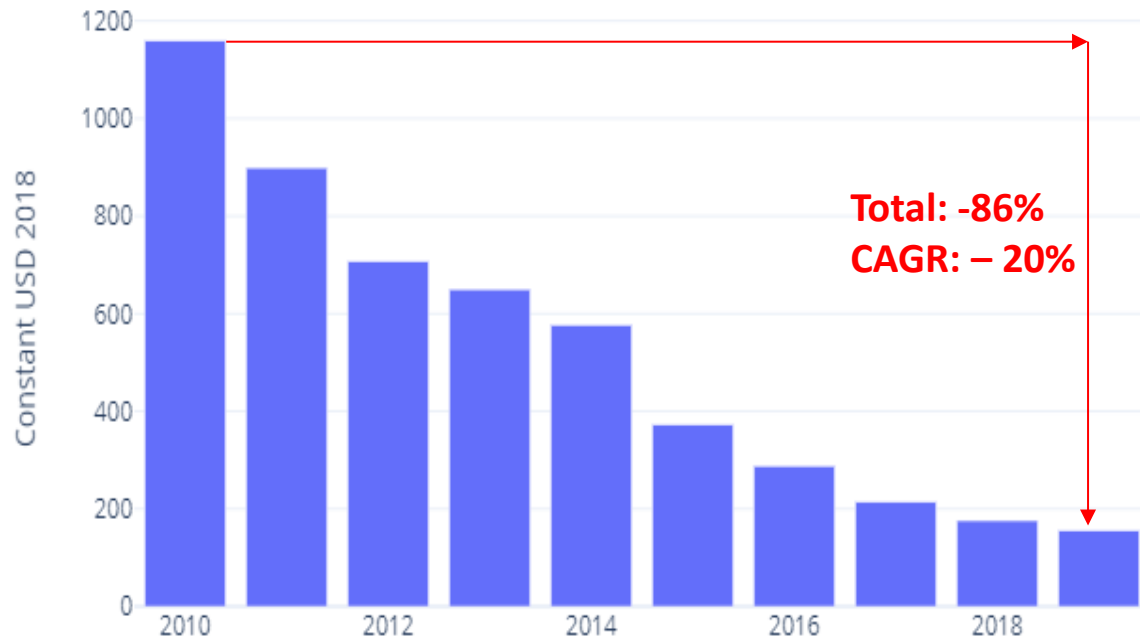
Focus on the Power Sector (Draft – to be modified)



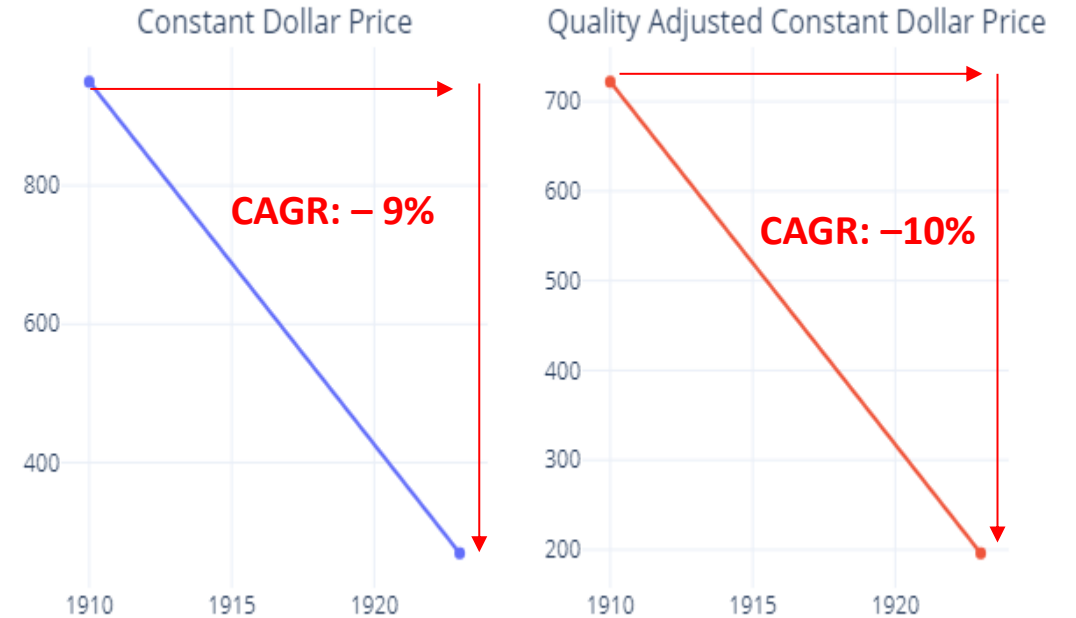
- Key assumptions in the Rapid Technological Change Scenario:
 - By 2040, 4 hour battery storage investment costs reduce from 200 USD/kWh in the BAU scenario to 120 USD/kWh.
 - This lowers the levelized cost of solar plus storage to less than that of coal, even without a carbon price.
 - BY 2040, the value adjusted LCOE of solar plus storage would be 40 USD/MWh compared to 54 USD/MWh for coal.

Is it Reasonable to Expect the Cost of Batteries to Come Down So Fast?

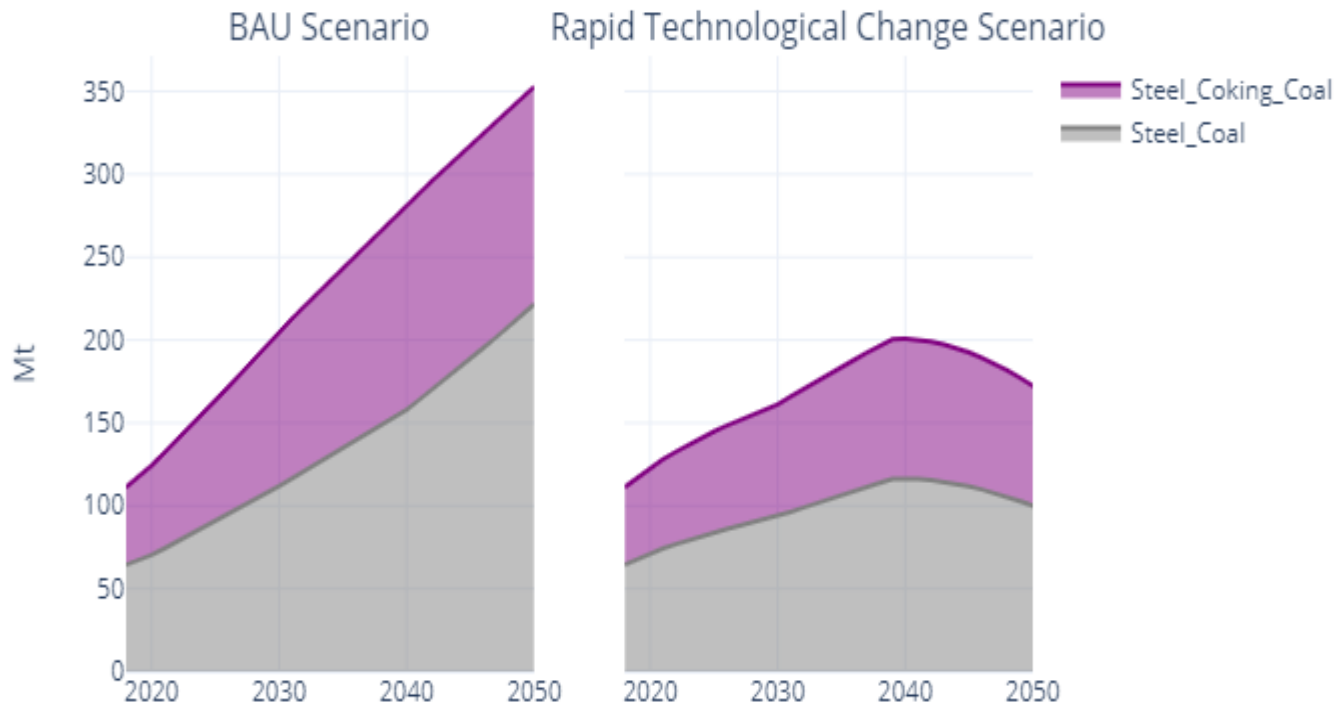
Unit Cost of Battery Pack
N.B.Excludes BOS and Inverter



Constant Price Unit Cost of the Ford Model T
1910-1923



Focus on the Steel Sector

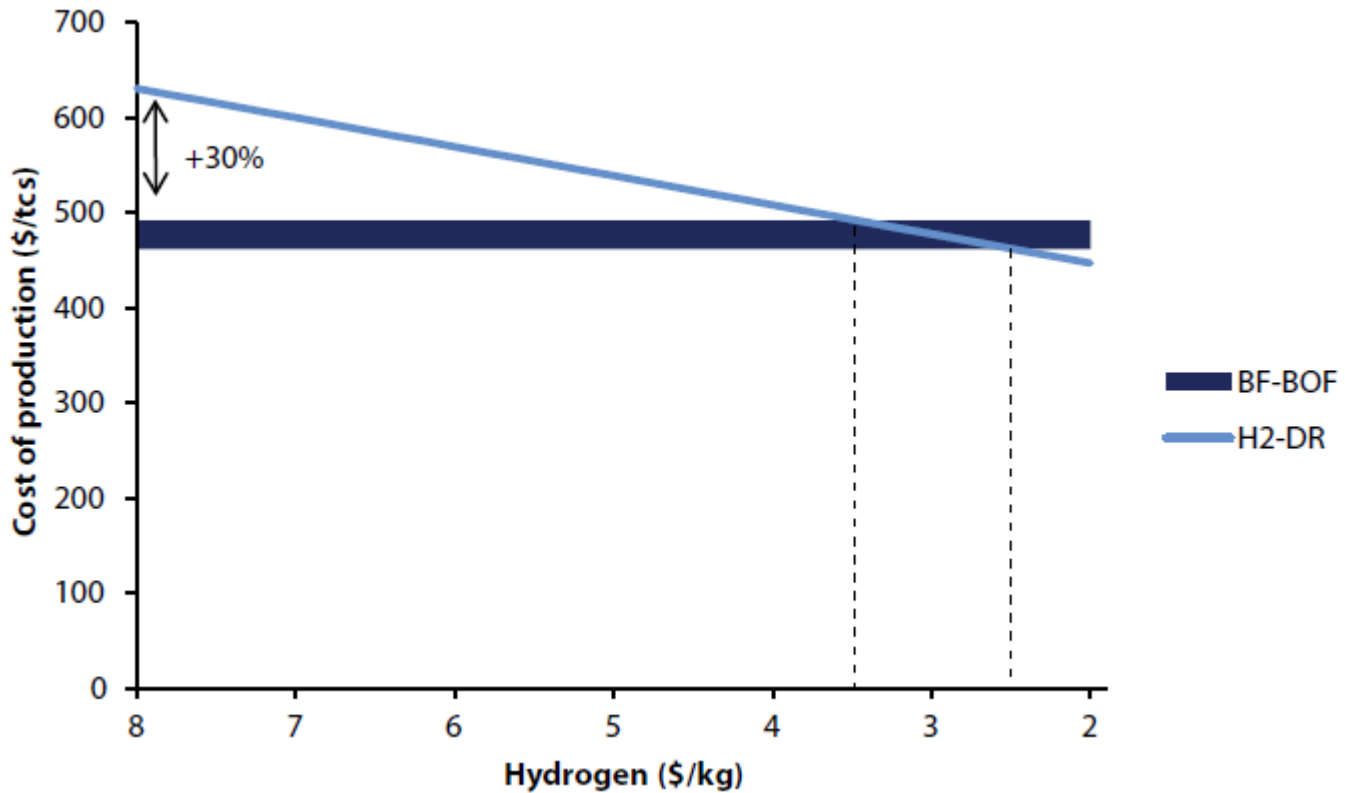


Key assumptions in the Rapid Technological Change Scenario:

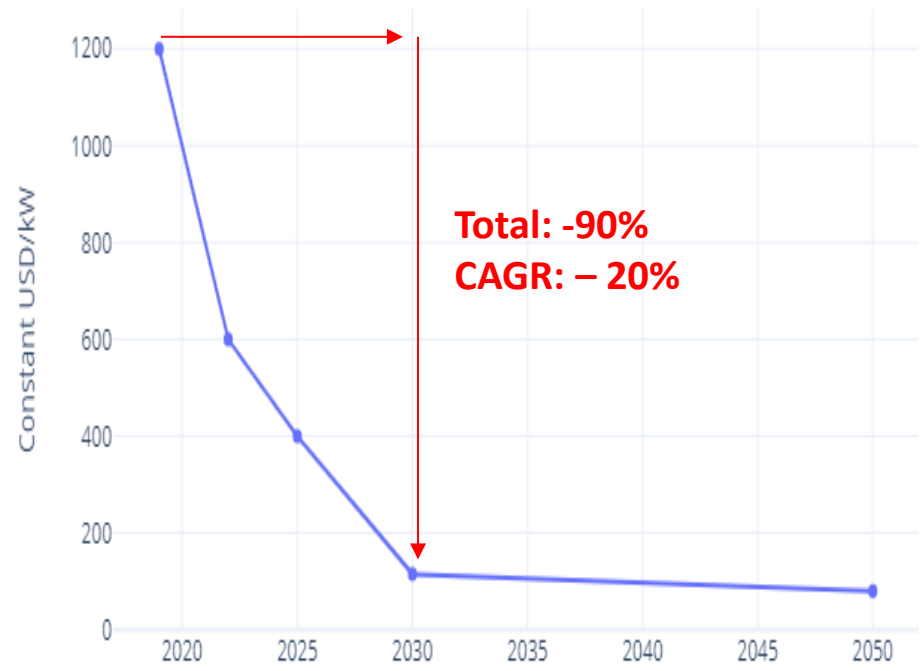
- BAT implemented to improve energy efficiency in steel plants and maximization of scrap usage.
- Structural change and policy reduce the material intensity of the economy, in particular through existing trends like shared mobility.
- By 2040, H2 based steel production is economically competitive with the fossil based alternatives (BF-BOF).
- This is predicated on electrolyzer costs falling to 400 USD/kW and zero carbon electricity to around 30 USD/MWh.

Is it Reasonable to Expect that H2 Steel Would Become a Feasible Option?

Reduction in Electrolyzer Costs Required to Make H2-DRI Competitive with BF-BOF Steel

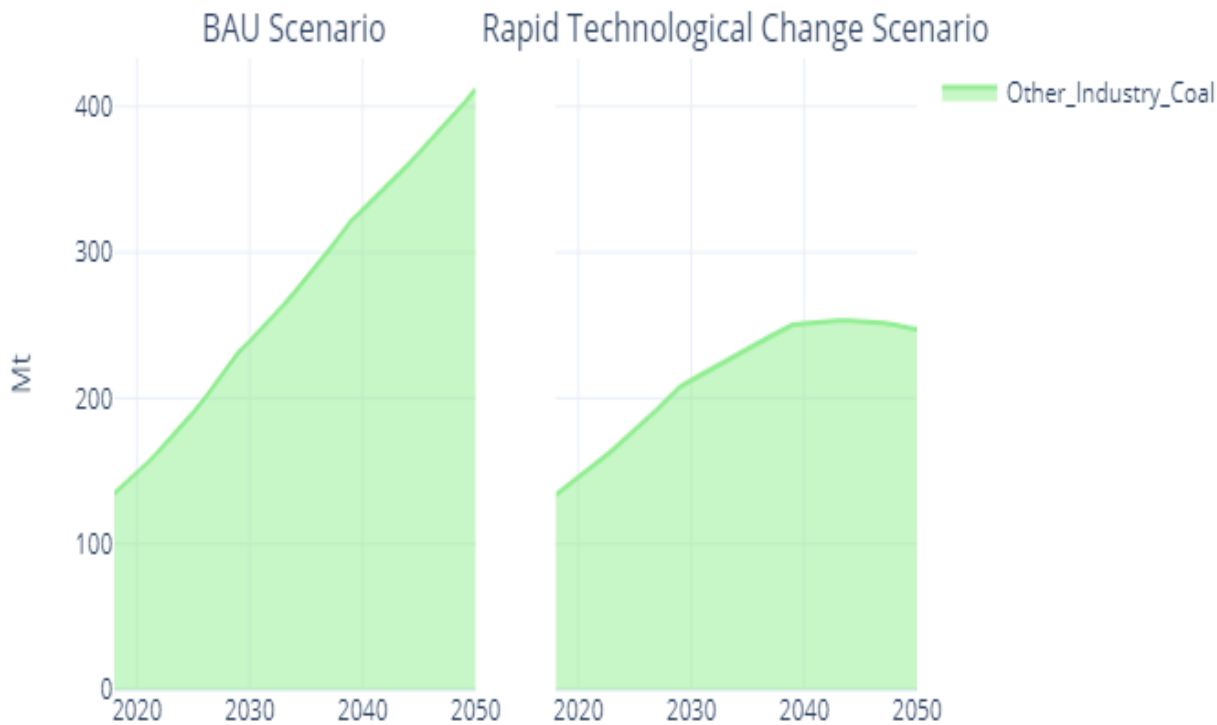


Projected Capital Costs of Alkaline Electrolyzers



Source: TERI analysis and modelling based on data from Hall, Spencer and Kumar (2020), and BNEF (2019)

Focus on Non-Steel Industry Coal



Assumptions in the Rapid Technological Change Scenario:

- In the BAU scenario, the non-steel coal intensity of industrial value added continues to fall as per its historical trend, from about 45 t/mUSD2015 PPP to about 32 t/mUSD2015 PPP
- This is consistent with the trajectory of a country like the Czech Republic (highly industrialized, relatively coal intensive).
- In the Rapid Technological Change Scenario the non-steel coal intensity of industrial value added falls to 20 t/mUSD2015 PPP of industrial value added.
- This would take India closer to the level of higher VA / alternative energy carrier industry sectors like Germany, Japan, United Kingdom, or USA, with non-steel intensity in a range of 3 – 10 t/mUSD2015 PPP of industrial value added.



Thank You