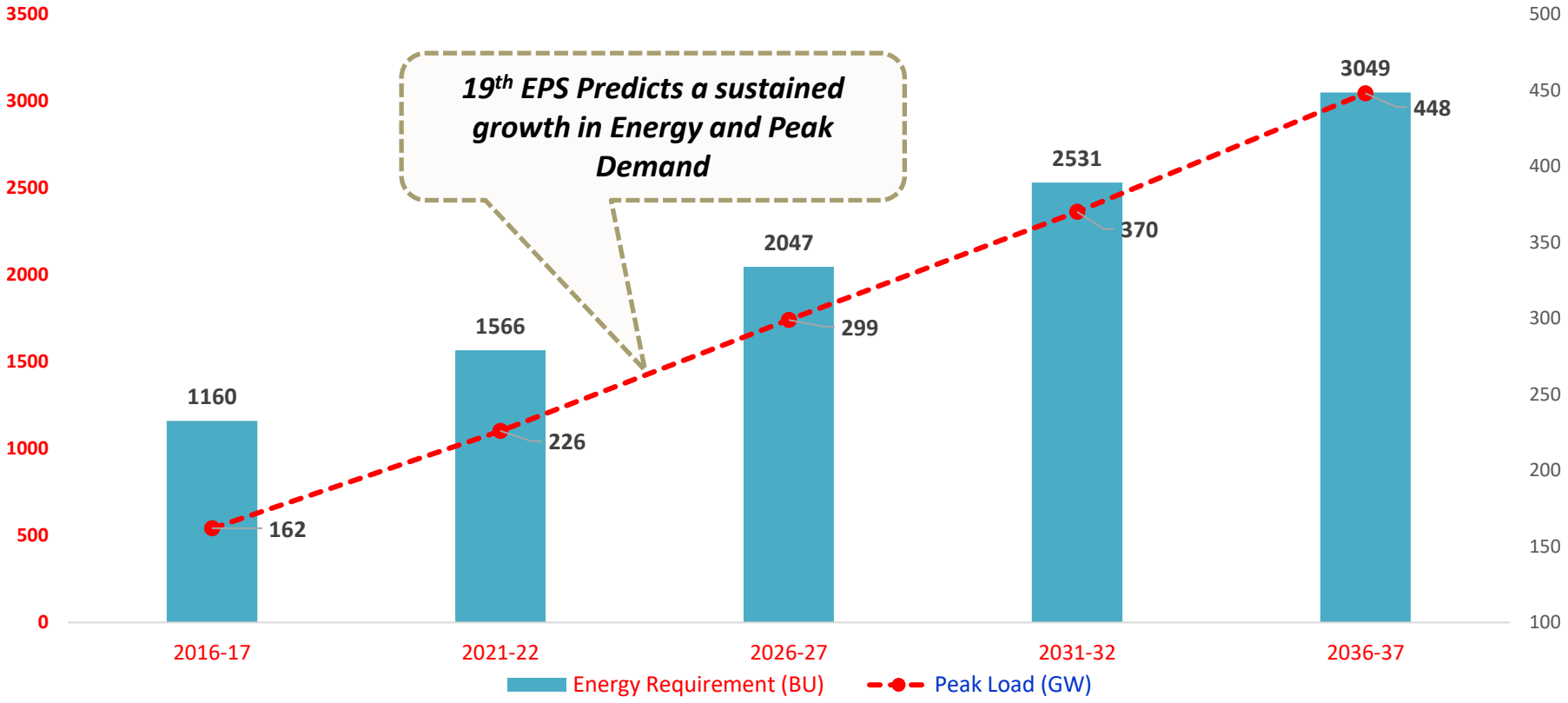
COAL TO GAS REPOWERING

SOLUTION FOR EMISSION REDUCTION

Presented by:

Ethical Energy-Petrochem Strategies Pvt. Ltd.
Ahmedabad

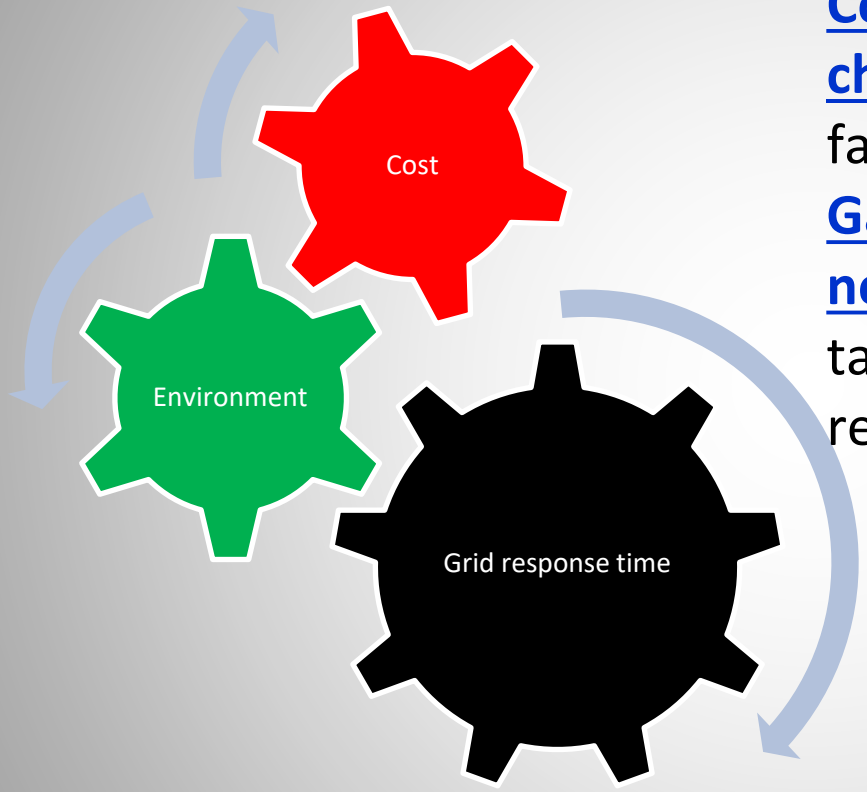
TREND IN INDIA'S PEAK & ENERGY DEMAND



India's peak demand to double in next 15 to 20 years
Current generation capacity about 370 GW
Additional capacity required app. 400 GW (accounting for old plants, loss reduction)
All this cannot be renewable. Hence large thermal capacity unavoidable

Classical Dilemma

Additional thermal capacity based on coal or gas????



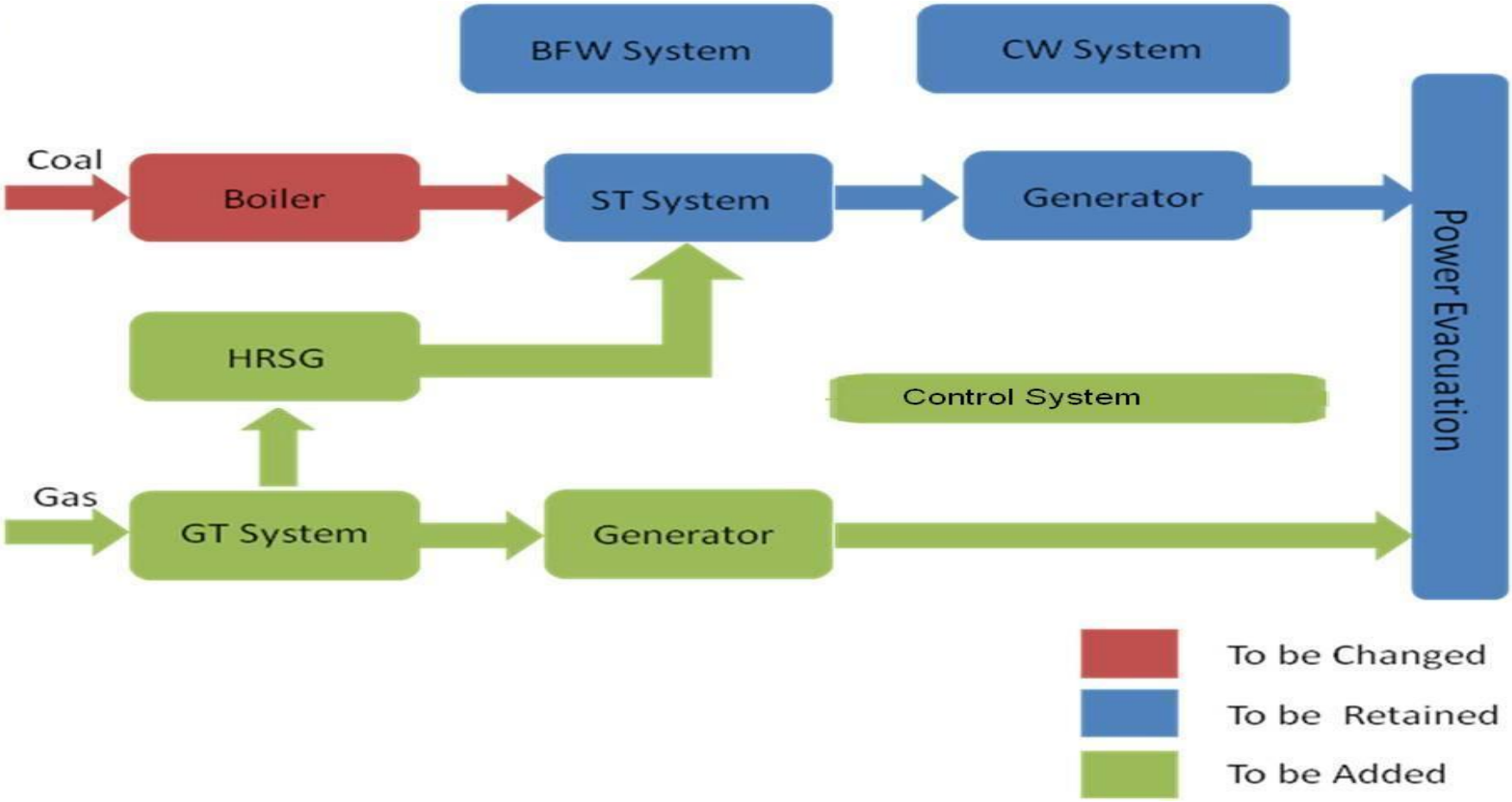
Coal based power appears to be **cheaper** at current pricing without factoring environmental cost

Gas based generation required **necessary** for meeting emission targets and meet with grid response time requirement

EQUILIBRIUM REUIRED FOR SUSTAINABILITY

STRATEGY REQUIRED TO MAKE GAS BASED GENERATION COMPETITIVE

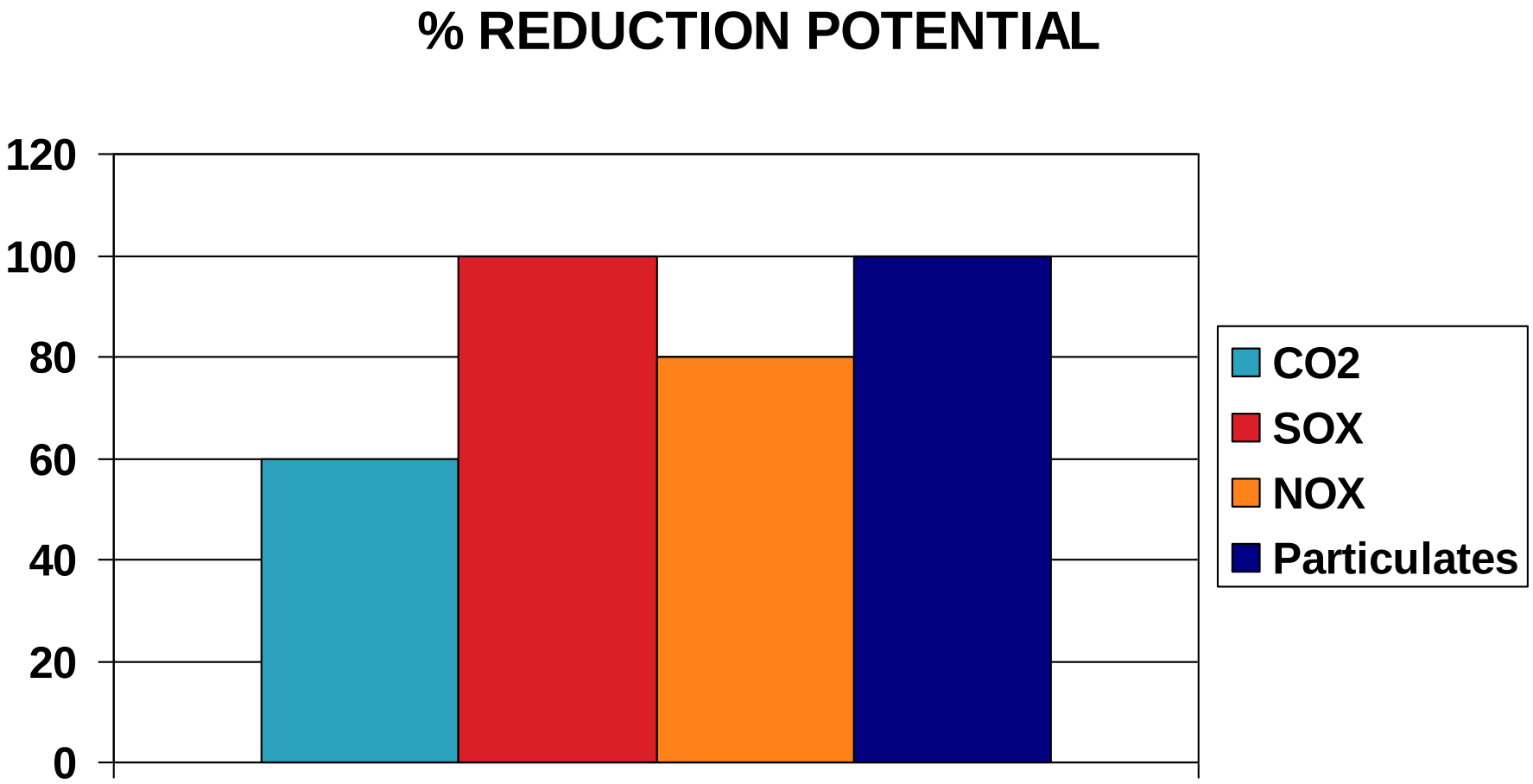
COAL TO GAS REPOWERING CONCEPT
SUGGESTED STRATEGY



ADVANTAGES SUUGGESTED STRATEGY

Capacity addition	• Possible to add 200% of existing coal based capacity at same location
Capital cost	• Possible to leverage existing assets and infrastructure • Capital cost can be 60 to 70% of new gas based plant
Energy efficiency	• Thermal efficiency can be increased upto 60%
Emissions	• Possible to reduce GHG emission by 60% per kwh
Funding	• It may be possible to source cheap funding from international agencies and ESG focussed investors

EMISSION REDUCTION POTENTIAL



FEW INTERNATIONAL REFERENCES

Repowering Plant Name	Location	Fuel Used Before Repowering	Fuel Used After Repowering	Capacity Before Repowering	Capacity After Repowering
Noblesville Power Plant	Noblesville, Indiana, USA	Coal	Natural Gas	90 MW	300 MW
Urquhart Power Plant	Beach Island, South Carolina, USA	Coal	Natural Gas	150 MW	450 MW
Senoko Power Station	Singapore	Furnace Oil	Natural Gas	120 MW	360 MW
EnW – KWG AG	Karlruhe Rheinhafen, Germany	Coal	Natural Gas	100 MW	360 MW
Fort Myer's Power Plant	Fort Myer's, Florida, USA	Furnace Oil	Natural Gas	540 MW	1500 MW
Astoria Generation Station	Queens, NY, USA	Furnace Oil	Natural Gas	740 MW	1800 MW
Bayside Power Station	Florida, USA	Coal	Natural Gas	1200 MW	1800 MW
Thomas B. Fitzhugh Generating Station	Arkansas, USA	Furnace Oil	Natural Gas	59 MW	171 MW
Port Washington Power Plant	Milwaukee, Illinois, USA	Coal	Natural Gas	400 MW	1090 MW
Stanford Power Plant	Fanford, Florida, USA	Furnace Oil	Natural Gas	400 MW	938 MW

POSSIBLE CONVERSION PARAMETERS

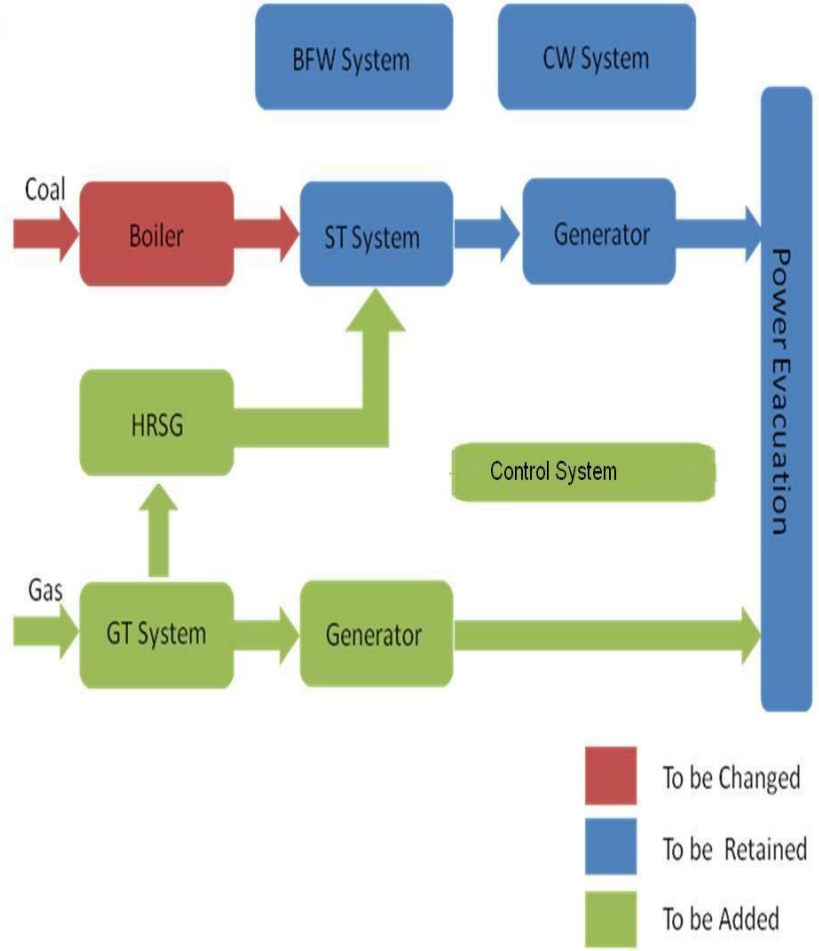
Sr.	Parameter	Value in case of	
		Old plant	On conversion
1	Generation capacity	1	2.5-3
2	Thermal efficiency	30-35%	53-60%
3	Auxiliary consumption,%	8-10	2-2.5
4	Capacity turndown to match grid demand	Limited and high response time	Quick response possible without limitation
5	Investment required compared to new grassroot gas based capacity creation, %	-NA-	60-70%

WAY FORWARD

We have done extensive work on this concept with a state utility and we are very confident of offering workable solution

If you are interested in coal to gas repowering solution offer for your operations, you can contact us through our website link of

‘Contact us’



We thank you for your time and attention.

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