A Better Way Forward for Electrification in Bangladesh

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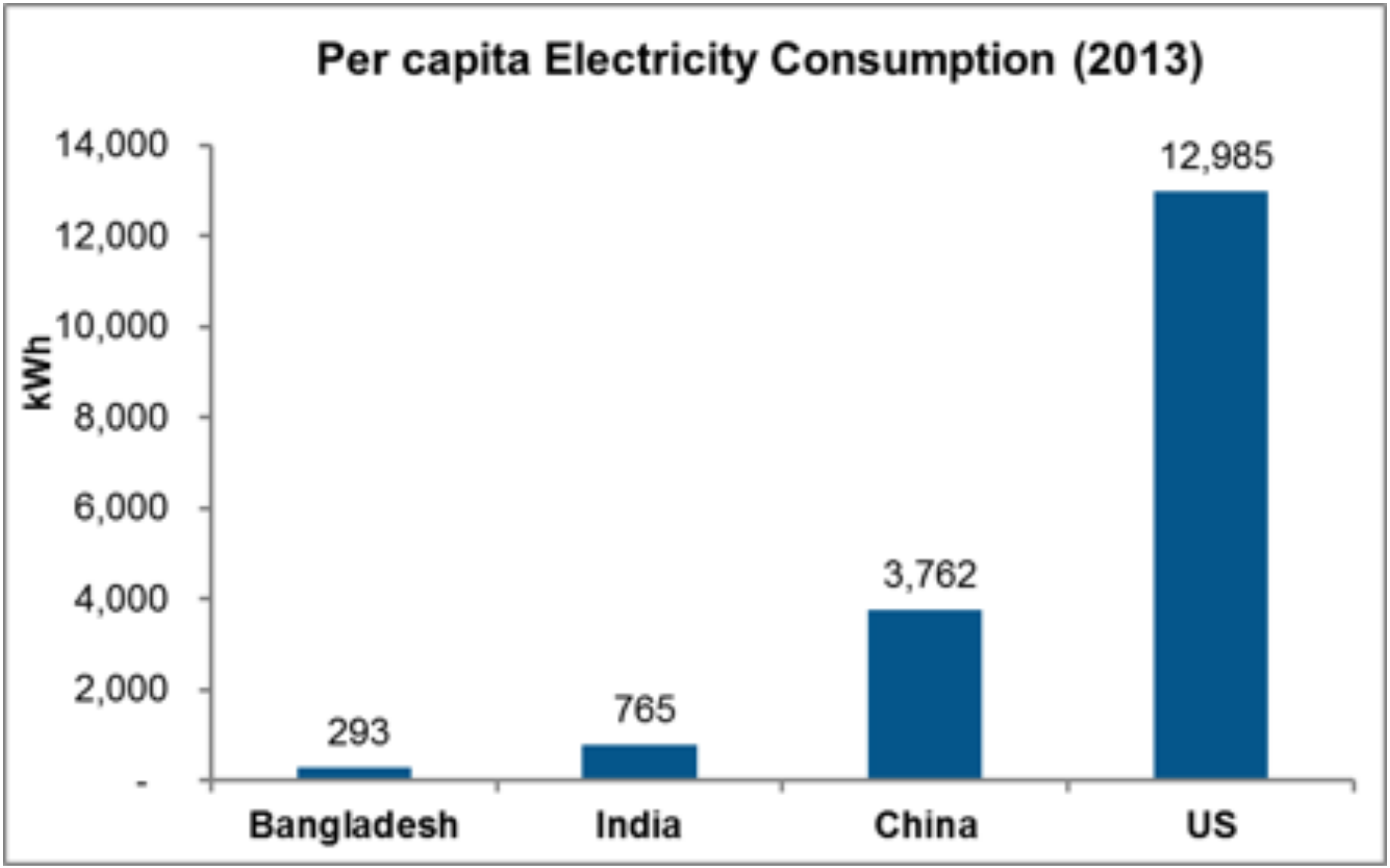
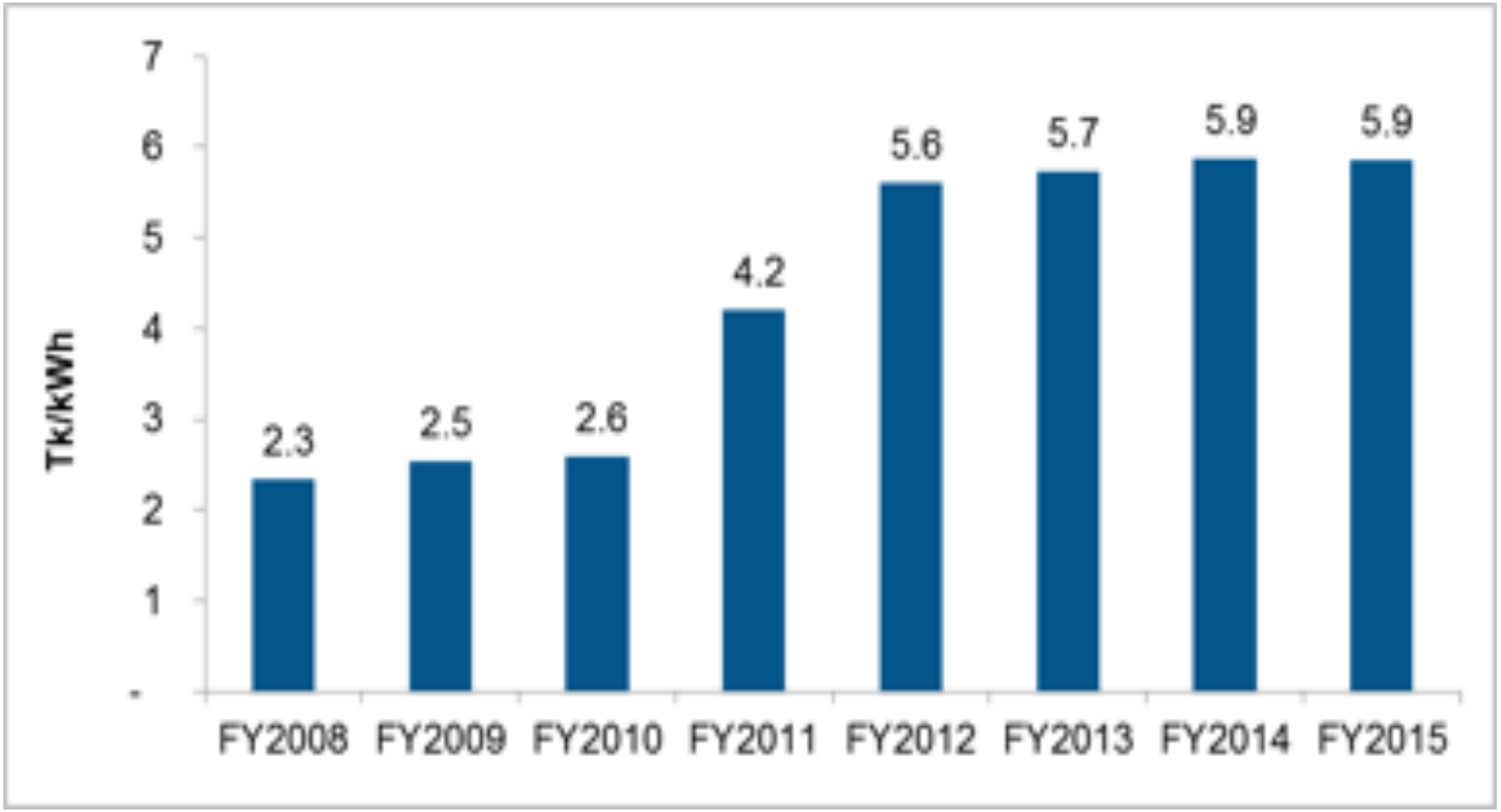
IEEFA Reports on Bangladesh

- *Risky and Over-Subsidised: A Financial Analysis of the Rampal Power Plant.* March 2016.
  - Available at http://ieefa.org/step-backward-bangladesh/
  - Jai Sharda (Managing Partner, Equitorials) & Tim Buckley (IEEFA)
- *Bangladesh Electricity Transition: A Diverse, Secure and Deflationary Way Forward*. November 2016.
  - Available at http://ieefa.org/better-electrification-way-forward-bangladeshsh/
  - Tim Buckley, Simon Nicholas & Sara Jane Ahmed (IEEFA)

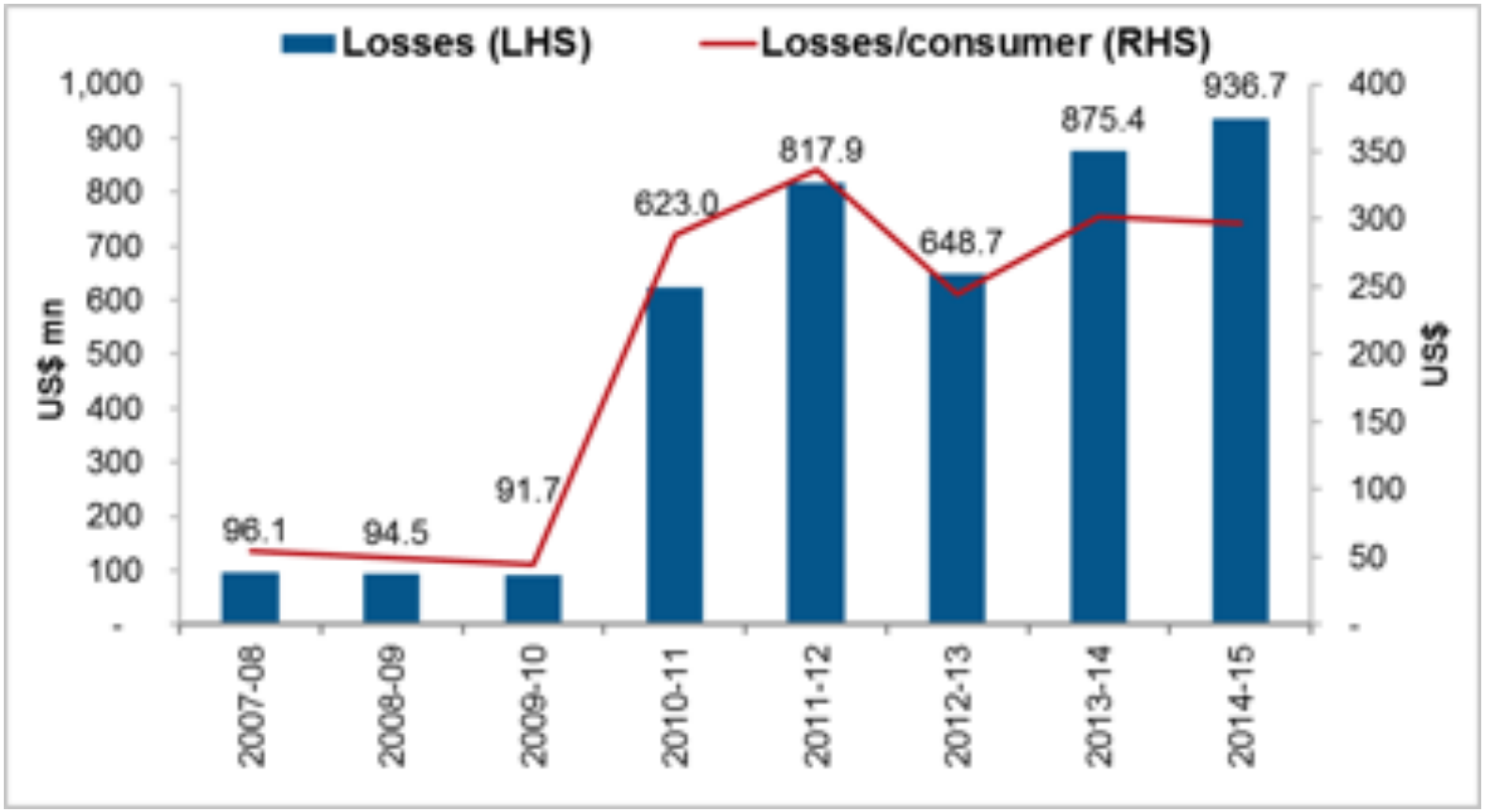
Bangladesh Per Capita Electricity Consumption is ~2% of the U.S. (2013)



Average Cost of Electricity Generation in Bangladesh has Increased Significantly



Bangladesh Power Development Board Has Been Plagued by Massive Losses



Bangladesh's Dependence on Natural Gas (as of 2016)

Capacity	MW	% of total
Coal	200	1.6%
Gas	7,529	61.5%
Hydro	230	1.9%
Wind	2	0.0%
Utility scale solar	-	0.0%
Distributed rooftop solar	161	1.3%
Furnace Oil	2,627	21.4%
Diesel	1,499	12.2%
Domestic Installed Capacity	12,248	100.0%
Imports - India	600	
Total Generation Capacity	12,848	

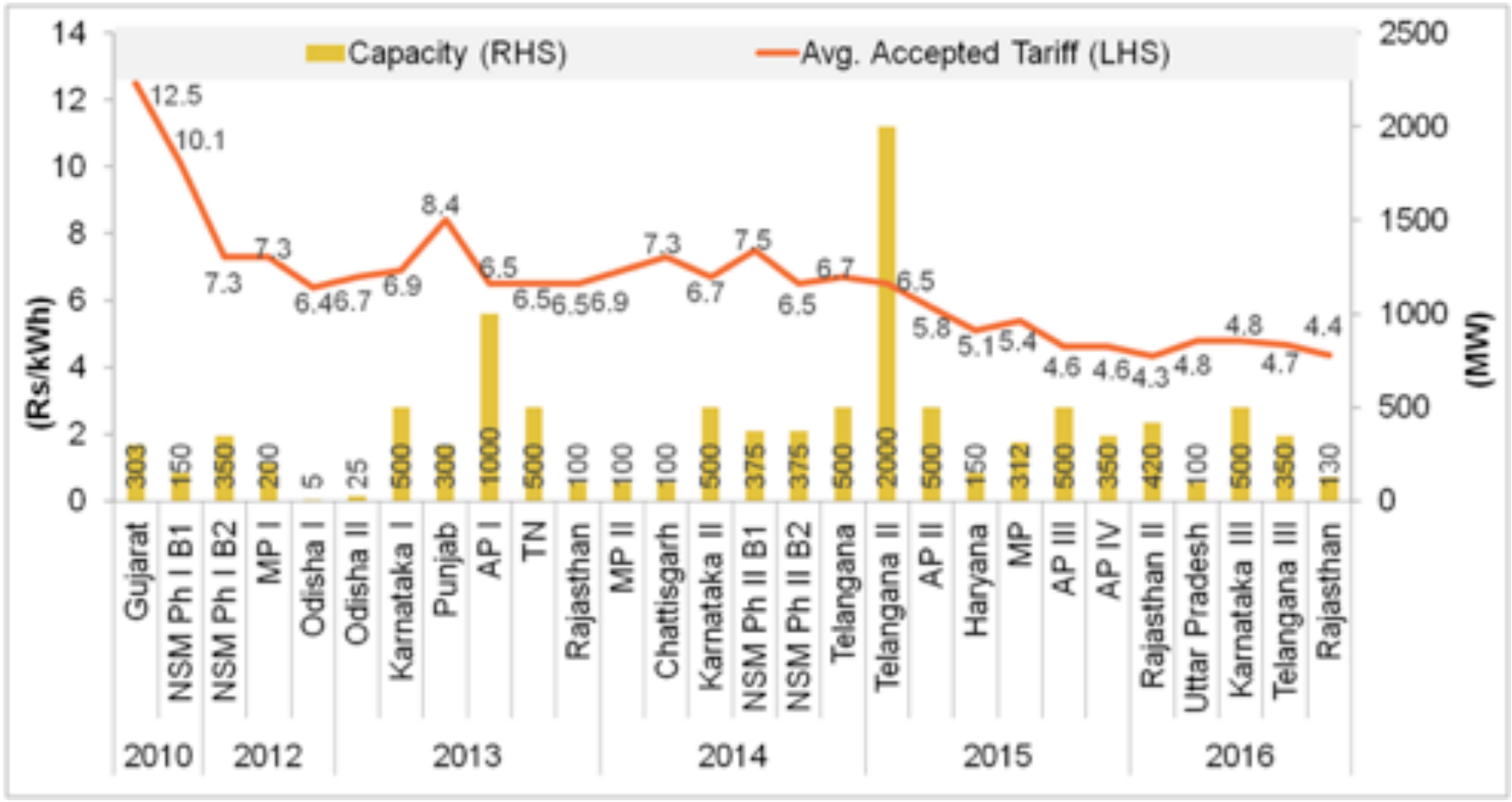
Main Conclusions in *Risky and Over-Subsidised*

- The Rampal Plant will lead to higher electricity rates in Bangladesh – its true cost is being hidden by 3 subsidies worth more than US$3 billion.
- Delays and further capital cost increases are all but inevitable.
- The Rampal Plant faces major community opposition.
- The proposed Plant site is near the Sundarbans World Heritage site and is in the “Wind Risk Zone” and Within the Path of Storm Surges.
- The Bangladesh electricity system already is losing nearly US$1 billion a year, an unsustainable situation Rampal will probably make worse.

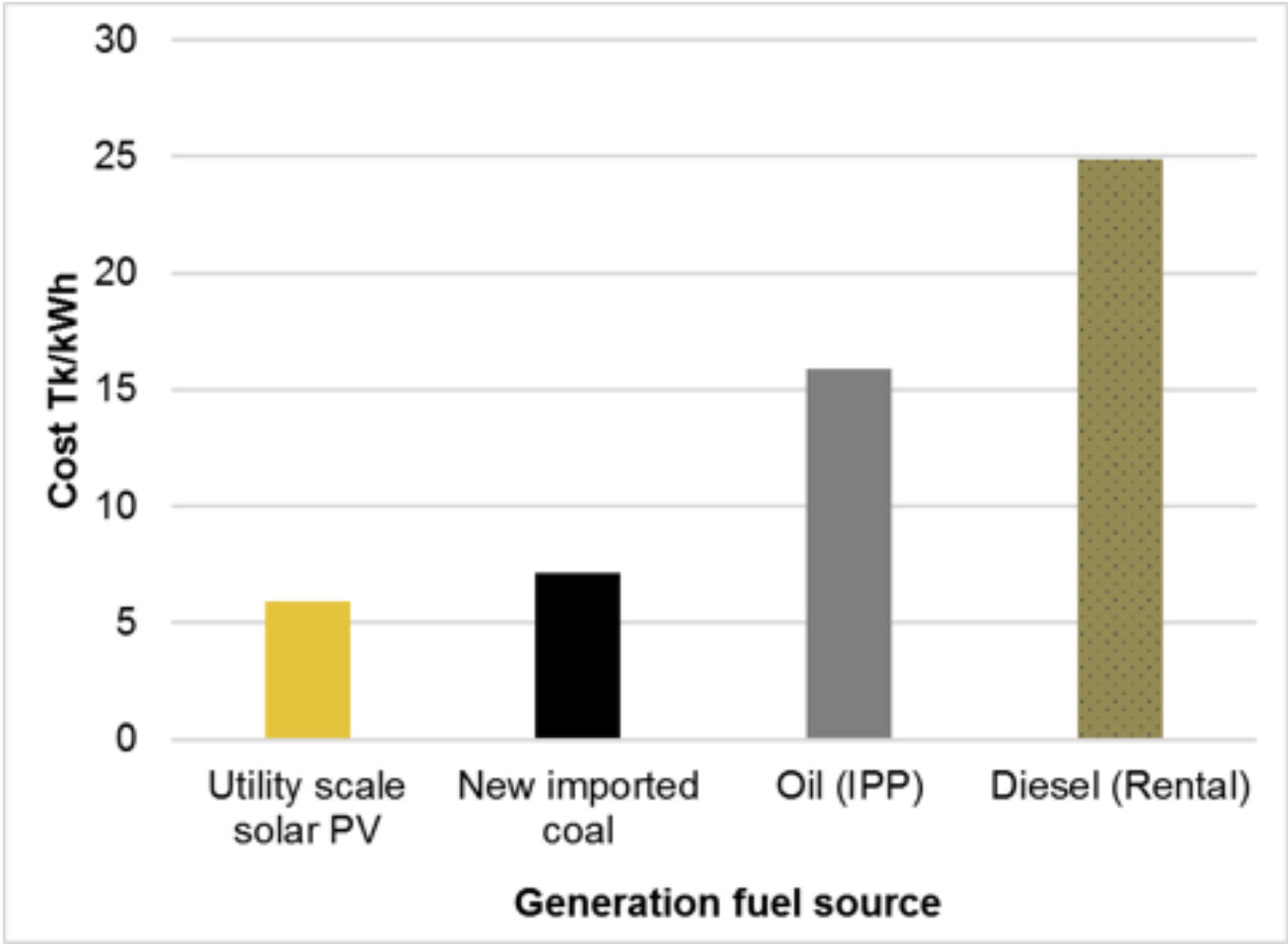
Renewable Energy – Especially Solar – is a Commercially Viable Alternative to Rampal

- Bangladesh has the proposed to generate 380 TWh a year through solar PV – Utility scale solar should be the focus of policy makers. Gov't's goal is 1.GW of solar capacity by 2021 and 6 GW by 2030.
- Bangladesh has one of the most successful distributed rooftop solar programs in the world. Over 4.3 million households, or 10% of the country's total households, have installed Solar Home Systems, and investments continue to grow.
- Bangladesh can benefit from declining solar costs.
- Solar brings expanded access to capital from global financial institutions.

India's Dramatic Solar Expansion Has Seen a 2/3 Decline in Tariffs Since 2010



Cost of Utility Scale Solar vs. Fossil-Fired Generation



Main Conclusions in *Bangladesh Electricity Transition: A Diverse, Secure and Deflationary Way Forward* (1)

- Bangladesh has an excessive dependence on natural gas-fired power generation – currently accounts for 62% of total electricity capacity.
- Fossil fuel subsidies and electricity-sector losses are a growing drag on economic growth.
- Bangladesh's plan to double fossil fuel generation capacity to 24 GW by 2021 would install a long-term dependence on fossil fuel imports (rising to 60-70% of capacity) which would lead to more national debt, devaluation of the currency, and an increase in inflation, all of which would destabilize the Bangladesh economy.

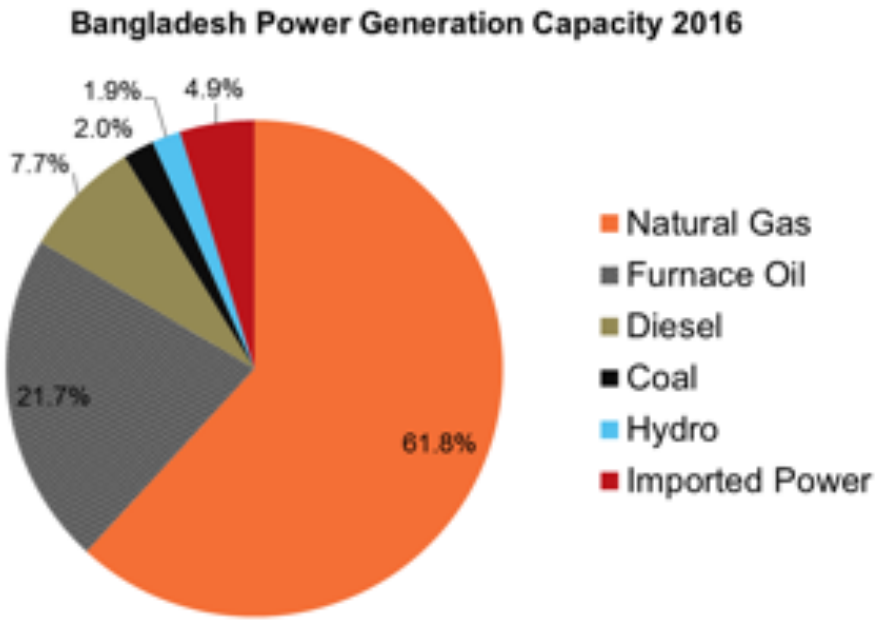
Main Conclusions in *Bangladesh Electricity Transition: A Diverse, Secure and Deflationary Way Forward* (2)

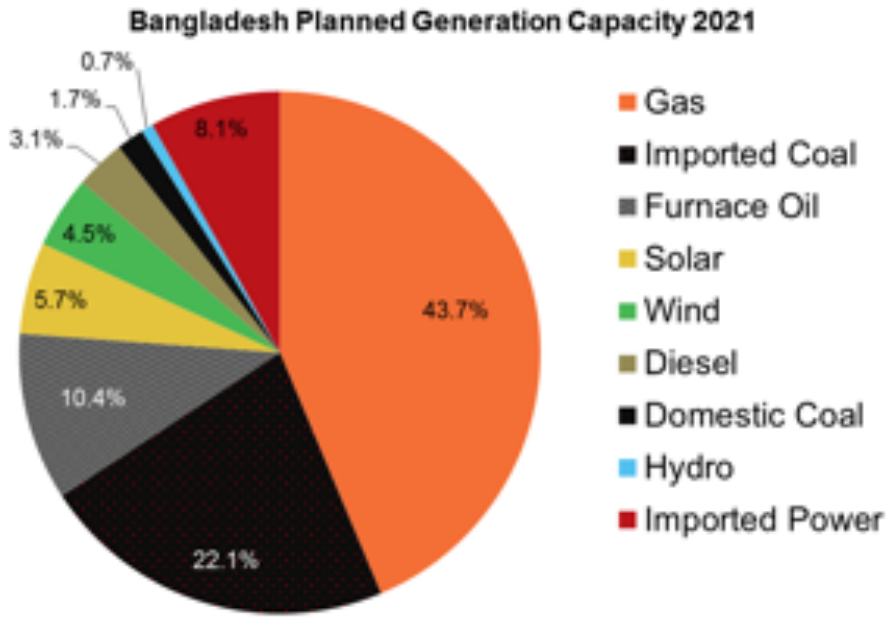
- 2016 Bangladesh Power System Master Plan would raise the energy security risk of relying on fossil fuel imports, as well as expose the energy system to the risk of price increases for imported coal similar to what is currently being experienced by India.

An Alternative Plan for Bangladesh

- Bangladesh has the world's largest and most successful base of solar home systems, installed on approximately 4.5 million off-grid residences – there is scope to accelerate this program and significantly expand the number of installed units in order to cost-effectively and rapidly deliver on the government's program of electricity for all by 2021.
- There is significant scope for distributed rooftop solar in urban areas, as well as on commercial & industrial buildings.
- Bangladesh also should immediately target a 1 GW annual utility-scale installation program that would result in 10 GW cumulative capacity operational by 2024/2025.

The Government's Plan for Capacity Transformation 2016-2021 (MW)

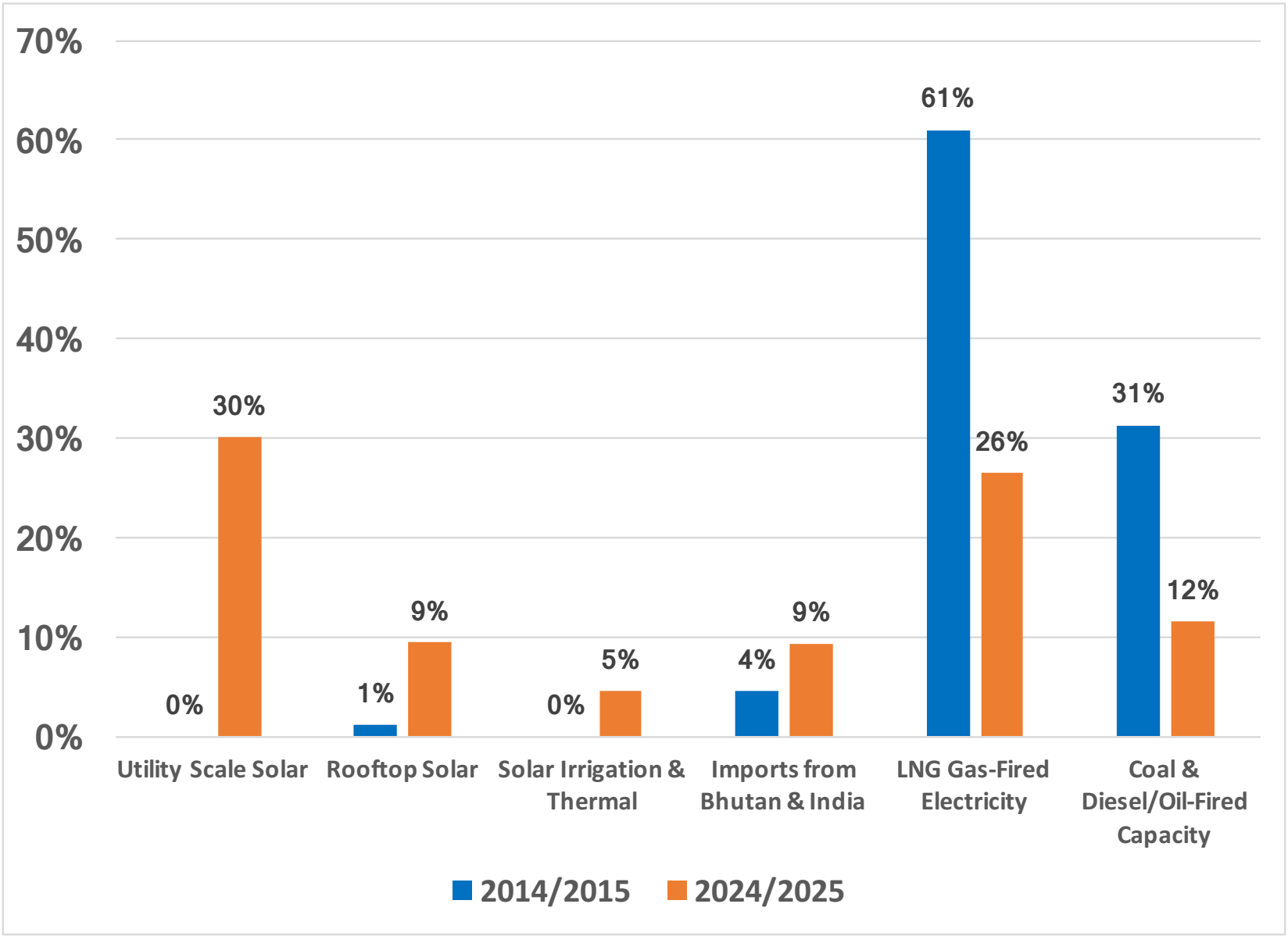




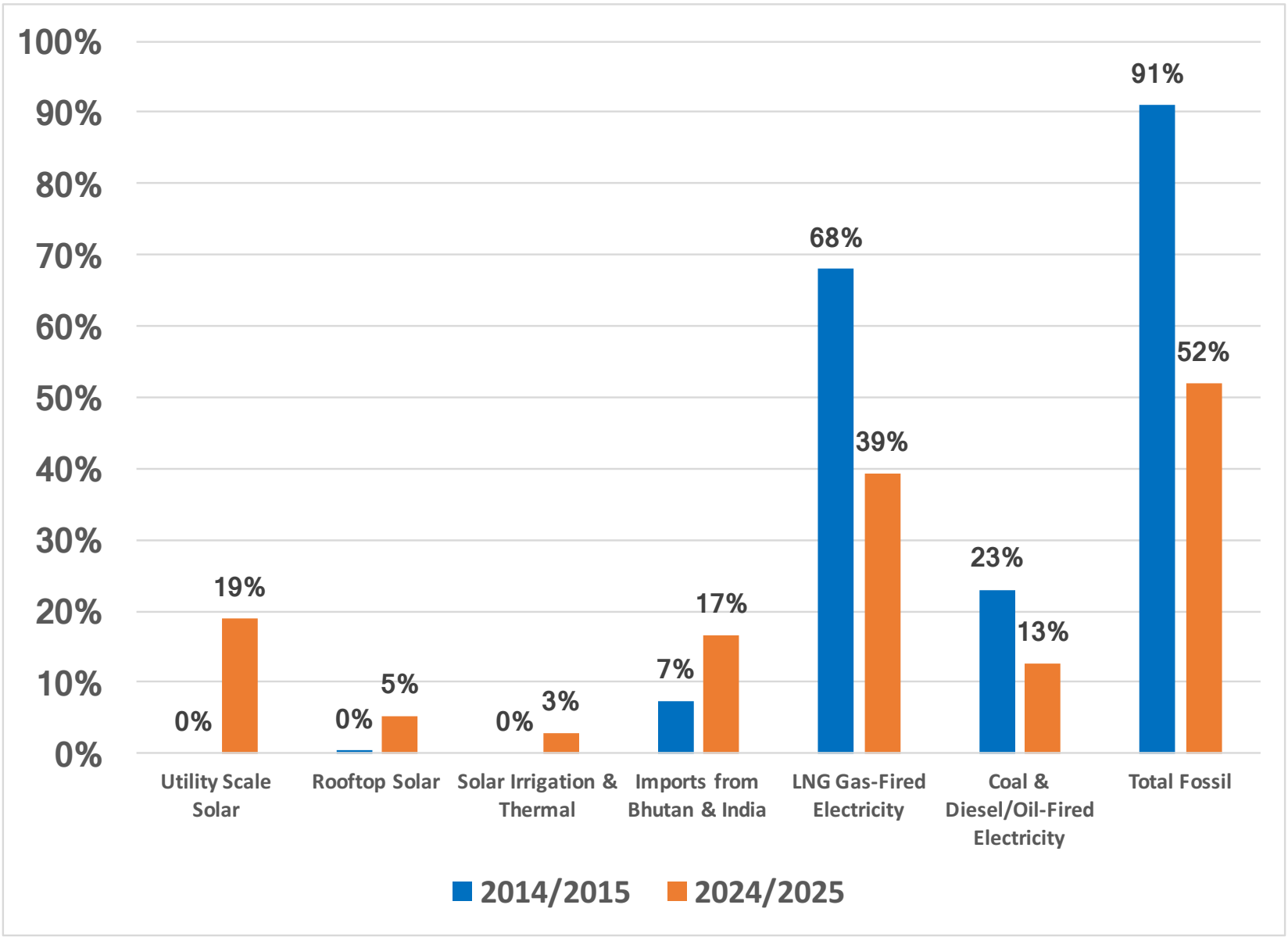
IEEFA Modeled Alternative Plan - 2014/2015 to 2024/2025

Bangladesh Electricity Technology type	2014/15 Capacity MW	2024/25 Capacity MW	2014/15 Capacity %	2024/25 Capacity %	2014/15 Production TWh	2024/25 Production TWh	2014/15 Utilisation Rate %	2024/25 Utilisation Rate %
Utility scale solar	-	10,000	0%	30%	-	17.52	n.a.	20%
Rooftop solar - Residential	125	1,563	1%	5%	0.18	2.46	16%	18%
Rooftop solar - C&I	-	1,563	0%	5%	-	2.46	n.a.	18%
Solar irrigation pumps	-	1,000	0%	3%	-	1.75	n.a.	20%
Solar thermal	-	500	0%	2%	-	0.88	n.a.	20%
Wind energy	2	302	0%	1%	0.00	0.48	n.a.	18%
Biomass / Biogas generation	-	600	0%	2%	-	2.10	n.a.	40%
Large & ROR hydro electricity	230	480	2%	1%	0.57	1.47	28%	35%
Hydro imports from Bhutan	-	1,000	0%	3%	-	3.50	n.a.	40%
Electricity imports from India	500	2,100	4%	6%	3.38	11.83	64%	64%
LNG/gas-fired electricity	6,781	8,783	61%	26%	31.16	36.36	52%	47%
Coal-fired electricity	250	1,500	2%	5%	0.99	6.85	45%	52%
Diesel/foil-fired electricity	3,228	3,828	29%	12%	9.57	4.84	34%	14%
Total Gross Generation	**11,116**	**33,218**	**100%**	**100%**	**45.84**	**92.51**		

IEEFA Modeled Alternative Plan - 2014/2015 to 2024/2025. Capacity Mix (as % of total MW)



IEEFA Modeled Alternative Plan - 2014/2015 to 2024/2025. Bangladesh Fuel Mix (as % of total MWh)



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