

LION CITY ADVISORY RESEARCH

Bangladesh Focus | Research

**OIL PRICE SHOCK +56.7% \$67
→ \$105/bbl**

**LNG PRICE SHOCK +125.1%
\$10 → \$22.51/MMBtu**

**ADDED MONTHLY COST
~\$760-800M Incremental
import burden**

BANGLADESH ENERGY SECTOR

CRISIS, COST & TRANSITION

A Comprehensive Analysis: 2005–2026 | Iran–Israel War Impact | Pathway to Energy Self-Sufficiency

**Rating UNDERWEIGHT Fossil
Fuels**

**Rating OVERWEIGHT
Renewables Transition**

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SECTION I: EXECUTIVE SUMMARY

Bangladesh stands at a pivotal energy crossroads in 2026. A two-decade journey from chronic power shortage to near-universal electrification — a genuine developmental triumph — is now threatened by a perfect storm of geopolitical disruption, structural fiscal imbalance, and a dangerously concentrated fossil fuel dependency. The Iran–Israel conflict drove Brent crude from \$67/bbl to \$105/bbl and LNG from \$10/MMBtu to \$22.51/MMBtu within 4 weeks — exposing the structural fragility embedded in Bangladesh's power sector architecture.

This report, prepared by Lion City Advisory, presents a comprehensive analysis comparing the sector's state in 2005–06 against 2026 realities, quantifies the immediate import cost surge and subsidy requirement from the current price shock, and provides a structured pathway toward meaningful energy self-sufficiency through seven renewable and clean energy vectors integrated into the Bangladesh Energy Independence Program (BEIP): Solar Home Systems (SHS) — mandatory for all urban and rural households; Solar Rooftop (Industry & Government); Solar Irrigation (SIP); Solar Street Lighting; Biogas; Biomass; Wind; Waste-to-Energy; and Electric Vehicle (EV) adoption — all underpinned by a restored Implementation Agreement (IA) framework for Solar IPPs.

Key Findings at a Glance

FINDING	LION CITY ASSESSMENT
Installed capacity: 5,245 MW (2005-06) → 28,919 MW (2026)	Positive — but 63% sits idle. Massive capacity payment burden of ~Tk 38,000 Cr/yr.
Fossil fuel dependency: 87% of generation (gas, HFO, diesel, coal)	Critically exposed to commodity shocks. Structural reform is existential, not optional.
LNG imports: ~109 cargoes in 2025 (~349,000–382,000 MMCF)	At \$22.51/MMBtu, monthly LNG bill surges by ~\$363–400M vs. \$10/MMBtu baseline.
Incremental monthly import burden (oil + LNG + coal)	\$760–830M/month.
Renewable energy: <2.9% of installed capacity	New competitive solar bids at 8.27 US cents/kWh — 38% reduction signals readiness.
Solar panel prices: \$0.27/W (2018) → \$0.08–0.09/W (2026)	Window of opportunity: utility-scale solar now cheaper than LNG-fired power.
Implementation Agreement (IA): cancelled for new Solar IPPs	SINGLE BIGGEST BARRIER to \$15–20B private capital flow. Must be restored immediately.
BAPEX drilling: 34 wells targeted FY2025, only 8 actives by Oct 2024	76% shortfall. Govt initiatives add only ~143 MMcfd in 2026. BAPEX needs emergency budget injection and a fast-track 34-well mandate.



Industrial energy waste: ~50 Bcf/yr recoverable via WHRBs, jacket cooling water recovery, generator replacement	This is free LNG — capital investment required but zero new fuel imports. Saves \$1.13B/yr. Equivalent to 13–27 new BAPEX wells.
Biogas plants: ~75,000 installed vs. 4.5M technical potential	Massive untapped domestic energy resource. Each digester saves ~\$150/yr in LPG/kerosene.
Solar Irrigation Pumps: 6,000 installed vs. 1.5M diesel pumps	1.5M diesel pumps consume \$1.5B/yr in fuel. SIPs have zero fuel cost for 20+ years.
Mandatory SHS: not yet national policy	Urban households pay for diesel gensets (\$530M/yr). Mandatory SHS eliminates this waste.
BPDB balance sheet: negative equity, subsidy-dependent	Risk of sovereign fiscal stress if commodity shock persists beyond 6 months.



SECTION II: BANGLADESH POWER SECTOR — 2005–06 VS. 2026

2.1 The 2005–06 Baseline: A Sector in Crisis

In fiscal year 2005–06, Bangladesh's power sector was characterized by severe inadequacy. Installed generation capacity stood at approximately 5,200 MW against peak demand exceeding 5,000 MW — resulting in daily load shedding of 1,500–2,000 MW. Rural electrification coverage was below 35%. The industrial sector suffered an estimated 2–3% GDP growth penalty annually due to power shortages. BPDB operated almost entirely on domestic natural gas, then abundant and cheap, with minimal private sector participation and zero renewable energy penetration beyond the Kaptai hydro facility.

INDICATOR	FY 2005–06	FY 2025–26 (CURRENT)	CHANGE
Installed Capacity	~5200 MW	~28,919 MW (incl. captive)	+5.5x
Actual Generation (avg)	~3,700 MW	~15,000–16,000 MW peak	+4.5x
Electrification Rate	~32–35%	~100% (official)	+65 ppts
Load Shedding	1,500–2,000 MW daily	200–800 MW (seasonal)	Reduced but chronic
Primary Fuel Source	Gas 85% (domestic)	Gas 43% Coal 21.7% HFO 19.5% Diesel 2.7% RE 2.9% Import 9.3%	Diversified but import-dependent
Renewable Share	<4% (micro-hydro)	3.7% (solar + hydro)	Structurally unchanged
Per Capita Consumption	~120 kWh/year	~530 kWh/year	+4.4x
IPP / Private Sector	<33% of capacity	>65% of total capacity	Private-dominant
Annual Fuel Import Bill	~\$0.8–1.0 billion	~\$12 billion (pre-shock)	+12–15x
Incremental Post-Shock Bill	N/A	+\$8.9–10.0 billion/yr	NEW CRISIS
BPDB Annual Subsidy Req.	~Tk 3,000–4,000 Cr.	~Tk 90,000–114,000 Cr. (post-shock)	+25–30x
Avg. Generation Cost	~Tk 2.5–2.8/kWh	12.34 HFO: Tk 26/kWh Diesel: Tk 32.53/kWh Solar: Tk 16.53/kWh	5x more expensive
Capacity Payment (idle)	N/A	~Tk 38,000 Cr./yr	Structural waste



The most striking divergence between 2005–06 and 2026 is not the quantum of installed capacity — which grew 6–7x — but the structural transformation in fuel dependency and cost architecture. While Bangladesh solved its electrification challenge through aggressive IPP expansion, it simultaneously constructed a fiscal trap: a power system overwhelmingly dependent on expensive imported fossil fuels, with idle capacity drawing perpetual payments from a utility whose balance sheet cannot absorb external shocks.

2.2 Generation Cost Benchmarking (FY 2024 Actuals — BPDB Data)

BPDB's own data for FY 2024 reveals a starkly uncompetitive cost structure for oil-based generation. Crucially, new competitive solar bids at 8.27 US cents/kWh are now less expensive than gas-based generation when LNG pricing is fully factored in — and a fraction of HFO and diesel costs.

FUEL TYPE	COST (Tk/kWh) BPDB	LION CITY NOTE
Hydro (Kaptai)	2.32	Cheapest — fixed asset, zero fuel cost
Natural Gas (domestic)	6.32	Declining — supply falling 3%/yr
LNG-fired (at \$22.51/MMBtu)	~16–18	POST-SHOCK cost — nearly 3x domestic gas
Coal (Adani, Payra)	12.83	High — imported coal, contractually locked
Solar (avg. existing)	16.53	Historical — old contracts, not indicative
Solar (new competitive bids)	~9.09	BEST VALUE — should be deployed at scale NOW
HFO (Heavy Fuel Oil)	26.01	EXPENSIVE — retire these plants first
Diesel	32.53	MOST EXPENSIVE — emergency use only

KEY COST INSIGHT

Every kWh shifted from HFO to new solar saves Tk 17–23. Bangladesh generates 60+ billion kWh/year without considering oil to be at 100USD. A 10% shift from HFO to solar saves Tk 10,000–14,000 crore annually. With 2,000 MW of new solar generating ~4 billion kWh/year, annual savings at current HFO



pricing: Tk 68,000–92,000 crore (\$620–840M). Solar deployment is the single highest-return investment available to Bangladesh today.

2.3 Retail Electricity Consumption Pattern (FY 2024–25)

Bangladesh’s total retail electricity consumption reached 90,939 M kWh in FY 2024–25, revealing a sector where the Domestic segment dominates with 57.13% of all consumption — a structural fact with critical implications for both subsidy policy and demand-side energy management. Industrial consumption, at 26.79%, represents the second-largest segment and the primary candidate for efficiency gains through the Industrial Energy Efficiency Programme (IEEP) outlined in Section IV. Commercial consumption (10.83%) and Agriculture (1.15%) are structurally important sub-segments. The near-zero share of EV Charging (0.24%) underscores the greenfield opportunity available as Bangladesh’s electric vehicle program scales under BEIP. The consumption breakdown is illustrated below based on BPDB/BERC FY 2024–25 data.

Figure 1: Consumption Pattern of the Country — FY 2024–25 | Total Retail Consumption: 90,939 M kWh | Source: BPDB / BERC

CONSUMER SEGMENT	SHARE (%)	CONSUMPTION (M kWh)	LION CITY NOTE
Domestic	57.13%	51,937	Largest segment — primary target for mandatory SHS and demand efficiency
Industrial	26.79%	24,358	Key target for IEEP rooftop solar mandate and WHRBs
Commercial	10.83%	9,843	Target for commercial rooftop solar + net metering
Education / Religious / Hospital	2.22%	2,019	Institutional biogas + government solar building mandate
Street Light	1.02%	927	Solar LED Street lighting program displaces all grid/diesel load
Agriculture	1.15%	1,046	SIP program to shift irrigation fully off-grid by 2031
Construction	0.39%	354	Green building code to mandate solar on all new construction
EV Charging	0.24%	218	Nascent — projected to reach 8–12% share by 2035 under BEIP EV scale-up
Others	0.23%	209	—
TOTAL RETAIL CONSUMPTION	100%	90,939 M kWh	FY 2024–25 Source: BPDB / BERC

The consumption data has direct implications for BEIP targeting. The Domestic segment’s 57.13% share — representing 51,937 M kWh — is the primary demand driver and the segment most sensitive to load shedding.



Mandatory SHS deployment for urban and rural households addresses this segment directly, reducing peak grid demand by an estimated 1,500–2,000 MW once 6 million SHS units are active. The Industrial segment’s 26.79% share validates the IEEP mandate: every percentage point of industrial efficiency gain frees approximately 2,398 MkWh of annual capacity — equivalent to displacing 137 MMcf of gas at current utilisation rates. The EV Charging segment’s current negligible share (0.24%) is a signal of what is approaching: as BEIP targets 5 million EVs by 2032 and 30 million by 2040, EV Charging is projected to represent 8–12% of total grid consumption — requiring both grid reinforcement and dedicated solar-powered charging infrastructure.

SECTION III: GEOPOLITICAL SHOCK — IRAN–ISRAEL WAR IMPACT

3.1 The Price Shock: Magnitude and Transmission

The Iran–Israel conflict that escalated in early 2026 triggered one of the fastest energy price spikes since the 2022 Russia–Ukraine war. Within approximately four weeks, Brent crude surged from \$67/bbl to \$105/bbl — a 56.7% increase. LNG spot prices on the JKM Asian benchmark moved from approximately \$10/MMBtu to \$22.51/MMBtu — a 125.1% increase. For Bangladesh, which imports mineral fuels representing 18% of total merchandise imports (\$12.02 billion pre-shock), this is a direct fiscal emergency with four transmission channels:

- **Direct import cost surge:** Every cargo of LNG purchased on the spot market now costs 2.25x what it did in January 2026. Long-term contracts (**covering ~60% of LNG supply**) provide partial protection, but spot exposure remains large.
- **Subsidy liability escalation:** Bangladesh's retail electricity tariff (average Tk 8–9/kWh) now covers less than 45% of actual blended generation cost at post-shock fuel prices — widening the subsidy gap by Tk 4,500–5,500 crore per month.
- **Foreign exchange drain:** Bangladesh's forex reserves, already under IMF program scrutiny, face accelerated depletion. Energy imports now consume an estimated 25–30% of total forex outflows.
- **Strait of Hormuz disruption risk:** Bangladesh sources ~33% of its LNG from Qatar and Oman — both Hormuz-dependent. Any escalation blocking the Strait could cut 800–900 MMcf of LNG supply within days, triggering immediate 1,400–1,800 MW generation shortfall with no rapid substitute available.

3.2 Quantifying the Monthly Import Cost Surge

Oil and Petroleum Products

PARAMETER	BASELINE (\$67/bbl)	POST-SHOCK (\$105/bbl)
Monthly oil imports (barrels)	~9–10 million bbl	~9–10 million bbl
Monthly oil cost	~\$600–670 million	~\$945–1,050 million
INCREMENTAL MONTHLY COST	—	+\$345–380 million



LNG (Liquefied Natural Gas)

PARAMETER	BASELINE (\$10/MMBtu)	POST-SHOCK (\$22.51/MMBtu)
Monthly LNG volume	~29,000–32,000 MMCF	~29,000–32,000 MMCF
Monthly LNG cost	~\$290–320 million	~\$653–720 million
INCREMENTAL MONTHLY COST	—	+\$363–400 million

Total Incremental Monthly Burden — Summary

COMPONENT	MONTHLY INCREMENT	ANNUAL PROJECTION
Oil / Petroleum Products	+\$345–380M	+\$4.1–4.6 billion/yr
LNG (Spot & Contract blended)	+\$363–400M	+\$4.4–4.8 billion/yr
Coal (indirect impact via shipping + power cost)	+\$30–50M	+\$360–600M/yr
TOTAL INCREMENTAL IMPORT COST	+\$738–830M/month	+\$8.9–10.0 billion/yr

Lion City’s central estimate places the incremental monthly energy import burden at \$760–800 million. If sustained for 12 months, this represents an additional \$9–10 billion annual drain, equivalent to approximately 2.5–2.8% of GDP. This is not a rounding error — it is a macroeconomic threat.

3.3 Subsidy Requirement Analysis

Bangladesh’s electricity tariff structure does not pass through full fuel cost to consumers. Given that retail tariffs average approximately Tk 8–9/kWh against blended generation costs now approaching Tk 18–22/kWh at post-shock fuel prices, the subsidy gap has widened dramatically. The Bangladesh Gazette notification of February 29, 2024 (S.R.O. No. 43/2024) established the current retail tariff schedule — but even those upwardly revised tariffs now fall far short of covering post-shock generation costs.

SCENARIO	MONTHLY SUBSIDY (Tk Crore)	ANNUAL SUBSIDY (Tk Crore)
Pre-shock baseline (normal operations)	Tk 3,000–4,000 Cr.	Tk 36,000–48,000 Cr.
Post-shock (current prices)	Tk 7,500–9,500 Cr.	Tk 90,000–114,000 Cr.
Incremental subsidy requirement	+Tk 4,500–5,500 Cr./month	+Tk 54,000–66,000 Cr./yr



⚠ LION CITY RISK FLAG: FISCAL STRESS THRESHOLD

If current commodity prices persist beyond 6 months, Bangladesh risks:

- (1) Sovereign credit rating pressure — Moody's and S&P monitoring closely
- (2) Forex reserve depletion — already under IMF Extended Credit Facility
- (3) Forced energy rationing — industrial shutdowns, export order losses
- (4) BPDB technical default — unable to pay IPPs, triggering capacity payment disputes

Immediate diversification action is not optional. It is a macroeconomic survival imperative.



SECTION IV: CURRENT RENEWABLE ENERGY LANDSCAPE

4.1 The SHS Achievement — and What Comes Next

Bangladesh's IDCOL-managed Solar Home System program is one of the most successful rural electrification initiatives in global development history. Over 6 million SHS units have been installed, providing clean electricity to approximately 20 million rural people. The program eliminated kerosene subsidy expenditure of over \$200M/year and generated USD 474 million in cumulative tax revenue. However, the program has stagnated at 30–50 Wp per unit — insufficient for productive use — and is concentrated almost entirely in rural areas, leaving urban households exposed to load shedding and expensive diesel generator dependence.

Lion City recommends a fundamental reframing: SHS must become a mandatory national resilience infrastructure, not a rural poverty program. With 3.5 million urban Dhaka households alone running diesel gensets at an estimated collective cost of \$530M/year, mandatory urban SHS would eliminate this waste immediately.

4.2 Renewable Energy Capacity — Current Status

RENEWABLE SOURCE	INSTALLED (MW)	% of 28,000 MW	POTENTIAL (MW)	GAP
Solar PV — All types	~1,300	4.6%	50,000+	Massive
Rooftop Solar (grid-connected)	~245	0.9%	8,000+	Critical
Biogas (equiv. electrical)	~40	0.1%	2,000+	Vast
Biomass Power (rice husk etc.)	~28	0.1%	2,000+	Vast
Solar Irrigation Pumps (SIP)	~60 (equiv.)	0.2%	7,500+	Critical
Wind (onshore pilot)	~2	<0.1%	3,000+	Untapped
Hydro (Kaptai)	230	0.8%	230	Maxed
TOTAL RENEWABLES	~1,660	~5.9%	72,000+	Large
Govt. Target 2030	5,100 MW (20%)	Target	—	Severely off-track
Govt. Target 2040	7,650+ MW (30%)	Target	—	Severely off-track



4.3 Why Renewables Have Stalled: Structural Barriers

BARRIER	CURRENT STATUS	RECOMMENDED ACTION
Solar import duty (14–28%)	Active — discriminates vs. fossil fuel equipment (0% duty)	Eliminate immediately via SRO gazette. Single act saves 15–20% on all system costs.
No Implementation Agreement (IA)	Cancelled for all new Solar IPPs — 5,238 MW tender stranded	Restore for >50 MW projects with fiscal guardrails. Non-negotiable for investment.
Net metering bureaucracy	30–90-day approvals; utility resistance; hidden charges	30-day auto-approval rule; utility faces penalty for any delay beyond deadline.
Capacity payment drain (idle plants)	Tk ~18,000 Cr./yr for zero output from HFO/diesel plants	Renegotiate and retire HFO/diesel plants early. Redirect savings to solar BGEF.
BPDB balance sheet weakness	Negative equity, no creditworthiness, subsidy-dependent	Debt restructuring; transition to independent BERC regulation with cost-reflective tariffs.
Land policy for solar parks	No clear policy for char/waste land allocation	Solar Park Policy: 50,000 acres on chars, saline coastal land, and embankments.
Domestic gas decline	Production: 2.1 Bcf/day, falling ~3%/yr	Re-allocate gas from power to fertilizer; replace power with solar urgently.
Bangladesh Bank green credit	27-step approval process — prohibitively slow	Simplify to 5-step fast-track facility at 3–4% interest.

4.4 Domestic Gas Crisis: BAPEX Underperformance and the 143 MMcfd Gap

Bangladesh's domestic natural gas sector is in a slow-motion collapse that the government has been unable to arrest. Gas production has fallen from a peak of approximately 2,700 MMcfd in 2018 to an estimated 1,700 MMcfd in 2026 — a decline of 37% in eight years. The strategic response should be a massive acceleration of domestic exploration and drilling through BAPEX (Bangladesh Oil, Gas and Mineral Corporation's E&P subsidiary). Instead, the record shows persistent underdelivery.

The Drilling Target Failure

In FY2025, the government set a drilling target of 34 wells for exploration and development — a number that energy experts considered the bare minimum needed to slow the production decline. As of October 2024, only 8 of those 34 wells were actively being explored. This represents a 76% shortfall against an already-inadequate target. The consequences are direct and quantifiable:



- **143 MMcfd — the entire 2026 supply addition:** All government initiatives combined — including the limited BAPEX drilling activity, workover of existing wells, and planned Petrobangla development projects — are expected to add only approximately 143 MMcfd of gas to the national grid in 2026. Against a supply deficit of approximately 1,300–2,300 MMcfd and LNG replacement cost of \$22.51/MMBtu, this contribution is a rounding error.
- **The cost of each missed well:** A single developed onshore gas well in Bangladesh's proven fields (Sylhet, Comilla, Haripur belts) can produce 5–15 MMcfd for 10–15 years. At \$22.51/MMBtu LNG replacement cost, 10 MMcfd of domestic gas saves approximately \$82 million per year in LNG imports. The 26 wells not drilled in FY2025 represent a potential loss of \$1.1–2.1 billion in annual LNG savings — permanently.
- **Interim government inertia:** The current interim administration has not issued any new BAPEX emergency drilling mandate, has not revised BAPEX's capital budget to reflect the energy emergency, and has not offered revised Production Sharing Contract (PSC) terms to attract international oil companies (IOCs) to Bangladesh's offshore blocks — which remain largely unexplored despite significant geological promise.

INDICATOR	TARGET BENCHMARK	ACTUAL (Oct 2024)	SHORTFALL
Wells targeted for drilling FY2025	34 wells	8 wells active	26 wells — 76% miss
Expected gas addition from 2026 initiatives	~400–600 MMcfd needed	~143 MMcfd projected	~300–450 MMcfd gap
BAPEX annual drilling budget	Tk 3,000+ Cr. needed	Tk ~800–1,000 Cr. actual	Severely underfunded
Offshore blocks under active exploration	12+ blocks viable	<3 blocks active	9+ blocks idle
IOC participation in new PSC rounds	4–5 IOCs targeted	0 new PSCs signed since 2022	Complete standstill
Estimated cost of LNG replacing missed gas	—	~\$1.1–2.1B/yr (26 wells)	Permanent avoidable cost

What Must Be Done: BAPEX Emergency Programme

- **Emergency Budget Injection:** BAPEX's capital budget must be increased from approximately Tk 800–1,000 crore to Tk 4,000–5,000 crore per year immediately — funded through a combination of Petrobangla retained earnings, sovereign borrowing, and a dedicated Gas Security Surcharge on LNG imports. Every taka invested in domestic drilling displaces \$22.51/MMBtu LNG imports.
- **Fast-Track Drilling Mandate — 34 Wells in 24 Months:** Issue a Prime Minister's Office directive mandating completion of all 34 FY2025 target wells within 24 months. Each well receives a dedicated project manager and weekly progress reporting to the Ministry of Power. Bureaucratic delays in rig procurement, environmental clearance, and land acquisition to be resolved by a Fast-Track Energy Security Tribunal.



- **Workover Programme — Existing Wells:** Bangladesh has approximately 80+ shut-in or low-producing wells that can be revitalised through workover operations at a fraction of new drilling cost. A systematic workover of 20 priority wells could add 50–80 MMcfd at cost of approximately \$40–60M — an immediate win while new drilling proceeds.
- **Revised Offshore PSC Terms:** Bangladesh's offshore blocks in the Bay of Bengal — including DS-12, DS-16, and the deep-water blocks — have been largely unexplored since 2015. Offer internationally competitive PSC terms: 70/30 profit share in contractor favour for deep-water discoveries, accelerated cost recovery, and 25-year licences. Target: 3 new IOC PSC signings by end 2026.
- **Gas Allocation Reform — Power to Fertiliser:** Re-allocate domestic gas from the lowest-value power sector use (where it can be replaced by solar at \$0.08/kWh) to the highest-value fertiliser sector use (where there is no practical alternative). Every MMcfd redirected from power to fertiliser saves \$8–10M/year in urea import costs while enabling the same power to be generated by cheaper solar.
- **Regional Gas Cooperation:** Accelerate negotiations for Myanmar gas pipeline resumption (Kyaukphyu field, stranded since 2017). Explore LNG import from India via pipeline (Tripura gas surplus). These regional options can add 200–400 MMcfd at below-spot-market prices within 18–24 months.

THE BAPEX PARADOX

Bangladesh pays \$22.51/MMBtu for LNG on the spot market.

BAPEX can develop domestic gas at \$3–5/MMBtu all-in cost.

The savings per MMBtu: \$17–19.

For every 100 MMcfd of domestic gas developed instead of LNG imported:

Annual saving: \$900M–1.1B per year.

For the cost of one month's LNG spot purchases (~\$650M), BAPEX could drill 15–20 new wells that would produce domestic gas for 15+ years.

The government is spending the solution money on the problem.

4.5 Industrial Energy Efficiency: 50 Bcf of Free LNG

One of the most compelling and underutilised energy resources in Bangladesh is not found under the ground or on rooftops — it is wasted inside the country's own factories. Bangladesh's industrial sector, dominated by RMG (ready-made garments), textiles, ceramics, steel re-rolling, and pharmaceuticals, loses an estimated 25–35% of its energy input as recoverable waste heat. This waste heat is, by definition, free energy — it requires capital investment to capture but absolutely no new fuel imports.

Industry experts and engineering studies estimate that if Bangladesh's major industrial consumers installed waste heat recovery systems, they could collectively save approximately 50 billion cubic feet (Bcf) of imported LNG per year — equivalent to displacing approximately 137 MMcfd of gas consumption. At \$22.51/MMBtu, 50 Bcf represents approximately \$1.13 billion in annual LNG import savings. This is the equivalent of drilling 10–15 new BAPEX gas wells — achieved through engineering, not geology.



The Three Pathways to Industrial Energy Recovery

A. Waste Heat Recovery Boilers (WHRB)

Industrial processes — particularly in ceramics, glass, steel, and large textile facilities — discharge exhaust gases at 300–600°C directly to the atmosphere. Waste Heat Recovery Boilers (WHRBs) capture this exhaust energy and convert it to steam for process heating or electricity generation. In a typical ceramic tile factory, a WHRB can reduce gas consumption by 20–30% with a payback period of 2–4 years.

- **Bangladesh application:** An estimated 500+ industrial facilities in Bangladesh operate high-temperature processes suitable for WHRB installation. If the top 200 energy-intensive factories (ceramics, glass, steel re-rolling, large textile mills) installed WHRBs, the collective gas saving would be approximately 20–25 Bcf/year — saving \$450–560M/year in LNG at current prices.
- **Policy action:** Mandate WHRB feasibility studies for all industrial consumers with gas consumption >1 MMcfd. Provide zero-interest government loans for WHRB installation (repayable from documented fuel savings). Bangladesh Bank green credit window to finance WHRB at 3% — same as rooftop solar.

B. Jacket Cooling Water Heat Recovery

Industrial generators and engines use cooling water (jacket water) at 70–90°C to prevent overheating. This heat — which must be dissipated anyway — can be recovered through heat exchangers to pre-heat boiler feedwater, reducing the fuel needed to raise steam. This is one of the simplest and cheapest energy efficiency measures available, requiring minimal capital and delivering 8–12% fuel savings with a payback of less than 18 months.

- **Bangladesh application:** Bangladesh has approximately 15,000+ industrial captive generators running on gas or diesel. If 5,000 of the largest units (>500 kW) installed jacket water heat recovery, the collective gas saving is estimated at 8–12 Bcf/year — saving \$180–270M/year in LNG.
- **Policy action:** Include jacket cooling water heat recovery as a mandatory requirement in all new industrial generator installations above 250 kW. Issue Bangladesh Energy Regulatory Commission (BERC) direction making this a condition of gas supply licence renewal for large industrial consumers.

C. Replacing Old, Inefficient Captive Generators

Bangladesh's industrial sector runs a fleet of captive gas generators, many of which are 15–25 years old and operating at thermal efficiencies of 25–30% — compared to 38–42% for modern gas engines and 50–55% for combined heat and power (CHP) units. Generator replacement alone — without any other measure — can reduce gas consumption per kWh generated by 25–35%.

- **Bangladesh application:** An estimated 3,000+ industrial generators are operating past their efficient service life. A phased replacement programme targeting the oldest 1,000 units would save approximately 12–18 Bcf/year — saving \$270–400M/year in LNG. The newer generators also have lower maintenance costs and higher reliability, improving factory productivity.
- **CHP (Combined Heat and Power) Mandates:** For new industrial generators above 1 MW, mandate CHP configuration — where waste heat from generation is captured for process steam or space heating. CHP systems achieve 70–80% overall fuel efficiency vs. 30–35% for generation-only systems. This effectively doubles the energy value of every cubic foot of gas consumed.



- **Policy action:** Ban the installation of new industrial captive generators below 38% thermal efficiency. Offer accelerated depreciation (3-year vs. standard 10-year) for generator replacement with high-efficiency units. BERC to require efficiency certificates for all new generator commissionings.

EFFICIENCY MEASURE	ESTIMATED GAS SAVING	LNG SAVING/YR (@\$22.51/MMBtu)	COST	PAYBACK PERIOD	CAPITAL REQUIRED
Waste Heat Recovery Boilers (200 factories)	20–25 Bcf/yr	\$450–560M/yr		2–4 years	\$300–500M (one-time)
Jacket Cooling Water Recovery (5,000 generators)	8–12 Bcf/yr	\$180–270M/yr		12–18 months	\$50–100M (one-time)
Old Generator Replacement (1,000 units)	12–18 Bcf/yr	\$270–400M/yr		4–6 years	\$500–800M (one-time)
CHP Mandate (new >1 MW installations)	10–15 Bcf/yr (by 2032)	\$225–340M/yr (by 2032)		3–5 years	~\$200M incremental
TOTAL INDUSTRIAL EFFICIENCY PROGRAMME	~50–70 Bcf/yr	\$1.13–1.57B/yr		Avg 2–4 years	\$1.0–1.6B (total)

THE 50 BCF OPPORTUNITY: KEY NUMBERS

- = 50 Bcf/year saved = 137 MMcfd gas consumption displaced
- = Equivalent to drilling 13–27 new BAPEX gas wells
- = \$1.13 billion/year in LNG imports eliminated
- = Total capital required: \$1.0–1.6 billion (one-time)
- = Payback: average 1–4 years from fuel savings alone
- = Carbon emission reduction: ~3 million tonnes CO₂/year

This is not a long-term aspiration. It is available today, in existing factories, using proven technology. It requires only capital allocation and a regulatory mandate — not geology, not grid expansion, not new fuel sources.

Implementation Framework: Industrial Energy Efficiency Programme (IEEP)

- **Mandatory Energy Audits:** All industrial consumers with gas consumption >0.5 MMcfd must complete a certified energy audit by December 2026, submitted to BERC. Audit must identify all WHRB, cooling water recovery, and generator efficiency improvement opportunities with estimated savings and payback periods.



- **Energy Efficiency Target:** Industrial consumers with gas consumption >1 MMcfd must achieve a 15% reduction in specific energy consumption (gas per unit of output) by 2028 and 30% by 2031. Non-compliance triggers a Gas Efficiency Surcharge of BDT 5/cubic metre on all consumption above the target.
- **BGEF Industrial Efficiency Window:** Dedicate BDT 3,000 crore of the Bangladesh Green Energy Fund to zero-interest industrial efficiency loans. Disbursed through scheduled banks against documented efficiency investment. Repaid from actual fuel savings — measured and verified by BERC-certified auditors.
- **Fast-Track Import Duty Waiver:** All energy efficiency equipment — WHRBs, heat exchangers, high-efficiency generators, CHP systems — to receive immediate 0% import duty. Currently subject to 14–28% duties that extend payback periods and suppress adoption.
- **BPDB/Petrobangla Gas Conservation Incentive:** Petrobangla to offer a Gas Conservation Bonus: industrial consumers who reduce gas consumption below their baseline (verified by smart metering) receive 25% of the value of gas saved, credited against their monthly bill. This creates a direct financial incentive at the consumer level requiring zero government outlay.

SECTION V: IMPLEMENTATION AGREEMENT (IA) — THE CORNERSTONE OF SOLAR IPP INVESTMENT

5.1 What Is an Implementation Agreement?

An Implementation Agreement (IA) is a legally binding contract signed between the Government of Bangladesh — represented by the Ministry of Power, Energy and Mineral Resources (MPEMR) — and a private Solar Independent Power Producer (IPP). It is the single most critical legal instrument for attracting large-scale private capital into utility solar. Without IA-backed bankability, developers cannot secure project finance from IFC, ADB, JICA, or local banks. The Interim Government's suspension of IA issuance for the 5,238 MW solar tender is the single biggest obstacle to Bangladesh's energy transition.

Bangladesh has successfully used IAs for conventional power plants — gas IPPs, coal plants, and the Adani power agreement. The same framework, adapted with fiscal prudence guardrails, must now be restored for Solar IPPs. The \$8.27 cent/kWh tariff offers from competitive solar bidders are globally competitive — this opportunity cannot be forfeited.

5.2 Key Provisions of a Solar IA

- **Power Purchase Agreement (PPA) Guarantee:** BPDB commits to purchase 100% of generated solar electricity at the agreed tariff for 20–25 years. This 'must-take' energy-only obligation (NOT a capacity payment) removes revenue risk entirely for the developer.
- **Tariff Protection:** The agreed tariff (USD 0.08/kWh for 2026–2030 projects, declining to USD 0.05/kWh for 2031–2035) is fixed and indexed to USD — protecting developers from taka depreciation.
- **Sovereign Payment Guarantee:** If BPDB fails to pay within 30 days of invoice, the Government of Bangladesh pays within 60 days. This payment guarantee is the most critical clause for international lenders — without it, cost of capital is prohibitive.
- **Land Allocation Assurance:** BEZA/BIDA guarantees provision of identified land at agreed lease rates for the full IA tenure. Land disputes cannot be used to stall or terminate projects.
- **Grid Connection Commitment:** PGCB guarantees transmission grid connection at the agreed voltage and capacity within the agreed timeline. Transmission constraints cannot be used to curtail solar generation.
- **Force Majeure and Change-in-Law:** If government policy changes increase IPP costs (new taxes, environmental requirements), the tariff adjusts accordingly. This eliminates policy risk.
- **Currency Convertibility:** Bangladesh Bank guarantees convertibility of IPP revenues into USD for repatriation — essential for foreign equity investors and dollar-denominated lenders.
- **International Dispute Resolution:** ICC or ICSID arbitration for disputes. Non-negotiable for foreign investors who require enforceable international jurisdiction.

CRITICAL DISTINCTION: IA vs. CAPACITY PAYMENT

Solar IA is fundamentally different from the IPP capacity payment model that has cost Bangladesh Tk 38,000 Cr./yr:



Conventional IPP IA: Pay the plant whether or not electricity is generated (capacity payment). Result: Tk 16,000–18,000 Cr./yr paid to idle HFO/diesel plants.

Solar IA: Pay ONLY for electricity actually generated (energy payment). Zero capacity payment for idle periods. Bangladesh pays only when the sun shines and kWhs are delivered. This eliminates the fiscal trap entirely.

5.3 The Fast-Track Solar IA Process

STEP	RESPONSIBLE AGENCY	TIMELINE
Application submission (project proposal, land plan, financial model)	Developer → BPDB / SREDA	Day 1
Technical & financial screening	SREDA / BPDB	Days 1–30
Land identification & allocation agreement	BEZA / District Administration	Days 30–60
Transmission connection study & agreement	PGCB	Days 30–60
IA negotiation (tariff, tenure, terms)	MPEMR / BPDB / Developer	Days 60–90
Inter-ministerial clearance (Finance, Power, Law)	Ministry of Finance + Law	Days 80–100
IA Signing Ceremony	Minister of Power + Developer CEO	Day 90–120
Financial Close (lender agreements)	Developer + Banks / IFIs	Days 120–270
Construction Commencement	Developer + EPC Contractor	Day 270–300
Commercial Operation Date (COD)	Developer / BPDB verification	18–24 months from IA

5.4 Competitive Solar IPP Tendering — Reverse Auction Model

Rather than bilateral tariff negotiation — which is opaque and prone to political influence — Bangladesh must conduct competitive reverse auctions for solar capacity blocks. This is the mechanism that drove India's solar tariffs to record lows of USD 0.028/kWh and Saudi Arabia's to USD 0.015/kWh. Lion City recommends the following auction structure:



- **Capacity Block Tendering:** BERC/SREDA announces competitive tenders for 200–500 MW blocks. Full IA terms are pre-disclosed in tender documents. Only pre-qualified developers (proven track record, minimum financial capacity) proceed to bid.
- **Sealed Bid Reverse Auction:** Qualified developers submit sealed bids stating their required tariff in USD/kWh. Lowest tariff wins the IA. Simple, transparent, corruption-resistant.
- **Price Discovery Target:** Round 1 (2026): USD 0.060/kWh. Round 2 (2028): USD 0.050/kWh. Round 3 (2030): USD 0.040/kWh — as Bangladesh's solar market deepens and risk perception improves.
- **Development Security Deposit:** 3% of project cost held as security against project delivery. Forfeited if developer fails to achieve financial close within 12 months of IA signing.
- **Local Content Requirement:** IA terms mandate 30% local content (civil works, cabling, mounting structures, operations) — building domestic supply chains alongside generation capacity.

SECTION VI: THE BANGLADESH ENERGY INDEPENDENCE PROGRAM (BEIP)

The following transition roadmap integrates seven renewable and clean energy vectors — all backed by coordinated policy, financing, and institutional frameworks — into the Bangladesh Energy Independence Program (BEIP). The program is structured in three phases: Stabilize & Deploy (2026–28), Scale & Integrate (2029–32), and Self-Sufficiency & Export (2033–40).

BEIP Consolidated Target Framework

ENERGY VECTOR	SHORT-TERM (2026–28)	MID-TERM (2029–32)	LONG-TERM (2033–40)
Utility Solar (Grid) — IA-backed IPPs	2,000 MW	8,000 MW	20,000+ MW
Solar Rooftop (Industry + Govt)	500 MW	2,500 MW	8,000 MW
Mandatory Solar Home Systems (SHS)	Upgrade 4M + Urban Mandate	6M units total	10M+ units
Solar Irrigation Pumps (SIP)	200,000 pumps	500,000 pumps	1M+ pumps
Solar Street Lighting	500,000 units	2M units	5M+ units
Biogas (household + institutional)	1M digesters	3M digesters	6M+ digesters
Biomass Power (rice husk, bagasse, MSW)	100 MW	500 MW	2,000 MW
Wind Power (coastal + offshore)	50 MW pilot	500 MW	3,000 MW
Waste-to-Energy (WtE)	Dhaka 50 MW	250 MW (6 cities)	1,000 MW
EV Adoption (2/3/4-wheelers)	Policy + 500K EVs	5M EVs	30M+ EVs
TOTAL RENEWABLE CAPACITY	~2,850 MW	~12,000 MW	~34,000+ MW
Renewable Share of Grid	~12%	~30–35%	~60–70%



6.1 Short-Term Plan (2026–2028): Stabilize and Deploy

The immediate priority is to reduce Bangladesh's exposure to commodity price volatility while the geopolitical crisis persists. Every MW of renewable energy deployed in this period directly saves foreign exchange and reduces subsidy requirements. The short-term plan focuses on quick-win, fast-deployment technologies requiring no new grid infrastructure.

Pillar 1: Mandatory Solar Home Systems (SHS) — Urban and Rural

A fundamental policy shift is required: SHS must become mandatory national infrastructure for all households — urban and rural — not a rural poverty program. Bangladesh's chronic load shedding affects both its villages and its cities. Urban households in Dhaka, Chittagong, and Sylhet collectively spend an estimated \$530M/year running diesel generators. This is wasted capital that could be permanently eliminated.

- **National SHS Building Code Mandate:** Gazette a regulation requiring all new residential buildings to install minimum 550W solar panel + 150Ah battery storage as a building completion condition. Applicable to urban apartments and rural homes alike. Large urban apartment buildings install centralized rooftop solar with sub-metering.
- **Retrofit Program for Existing Homes:** Urban households receive 50% grant + 50% low-interest loan (via bKash/Nagad digital disbursement). Rural households under IDCOL/BRAC networks receive 70% subsidy from BGEF. Fully digital application and disbursement process — 30-day maximum turnaround.
- **SHS 2.0 Upgrade — Existing 6M Units:** Upgrade all existing 30–50 Wp rural SHS to modern 550-620 Wp systems with battery storage enabling productive use (fans, refrigeration, sewing machines, phone charging). 500,000 upgrades per year. Estimated cost: \$2–3B (40% grant, 60% concessional loan via IDCOL MFI network).
- **Peer-to-Peer Solar Microgrids:** Scale SOLshare's world-first P2P energy trading model to 10,000 microgrid clusters. Surplus SHS households sell to neighbours — creating income, eliminating waste, reducing grid dependency.
- **SHS + EV Charging Integration:** New SHS installations include two-wheeler EV charging capability — creating dual revenue streams for households and catalysing rural EV adoption simultaneously.
- **Urban SHS Target:** 2M urban SHS installations by 2028. Rural SHS upgrade: 4M units by 2028. Combined: 6M functioning SHS units, serving 30M people. Annual savings: \$300–400M in displaced diesel genset fuel.

WHY MANDATORY URBAN SHS MAKES ECONOMIC SENSE

A 200W rooftop SHS (cost: ~\$300–350) powers LED lighting, fans, phone charging, and a small TV — covering 60–70% of a typical Bangladeshi household's daily needs.

At \$0.04/kWh LCOE, it is 4x cheaper than grid power and eliminates diesel generator cost entirely.

Dhaka alone: 3.5M households × \$150/yr diesel genset cost = \$525M/year wasted.

Mandatory SHS: one-time \$300–350 investment eliminates this \$525M annual drain permanently.



Pillar 2: Solar Rooftop — Industry and Government Buildings

Bangladesh has 8,000+ garment factories, thousands of commercial buildings, and hundreds of government offices with suitable rooftop area. At 50–100 kW per factory, the industrial rooftop potential alone exceeds 5,500 MW — equivalent to four large coal plants. This is the highest-impact near-term intervention available.

- **Industrial Rooftop Mandate:** All new industrial/commercial buildings >1,000 sqm must install rooftop solar (net metering mandatory). Existing factories with sanctioned load >500 kW must install solar covering minimum 30% of peak demand by 2027. Fast-track approval: net meter connection within 30 days or the distribution utility faces a penalty.
- **Government Building Executive Order:** All government buildings with roof area >500 sqm submit solar installation plan within 60 days. Covering all ministries, district offices, courts, hospitals, schools, and police stations.
- **OPEX Model for SMEs:** Third-party solar developers install, own, and operate rooftop systems on SME factory roofs at zero upfront cost. Factory purchases electricity at 15–20% below grid tariff. Government provides 20% credit guarantee — leveraging \$2B in private investment with only \$300M in guarantees.
- **Target and Impact:** 500 MW by 2028 saves \$150–200M/year in displaced HFO/diesel generation. Each kWh shifted from HFO saves Tk 17–23. 500 MW generating 800 million kWh/year saves Tk 13,600–18,400 crore annually.

Pillar 3: Solar Irrigation Pumps (SIP) — Eliminate Diesel from Agriculture

Bangladesh operates approximately 1.5 million diesel-powered irrigation pumps — the vast majority running during the Boro season from November to March. At 3–4 litres/hour diesel consumption per pump, the collective annual fuel bill exceeds \$1.5 billion. At \$105/bbl oil, this has escalated dramatically. Solar Irrigation Pumps have zero fuel cost and a 20+ year operational life. The economics are compelling beyond any doubt.

- **IDCOL SIP Acceleration:** IDCOL already has 750,000+ SIPs deployed but at insufficient scale. Accelerate to 200,000 new units per year — each unit requiring ~\$1,500–2,000 capital (5 kW system). Per-unit subsidy financed through IDA, ADB, and Green Climate Fund.
- **BADC Diesel Pump Halt:** Immediate directive: all BADC (Bangladesh Agricultural Development Corporation) new irrigation procurement halted for diesel pumps. Only SIPs procured for new government irrigation schemes from 2026.
- **SIP Business Models:** Three viable models: (a) Farmer-owned SIP at 5% Krishi Bank loan; (b) Cooperative-owned SIP serving 10–20 farmers jointly; (c) Private operator selling irrigation water per hour — creating income for landless service providers.
- **Grid Export in Off-Season:** During non-irrigation months (June–September), grid-connected SIPs export surplus solar electricity via BREB net metering — generating Tk 15,000–20,000/pump/year in additional farmer income.
- **Target and Savings:** 200,000 SIPs by 2028 saves \$250–300M/year in diesel. 500,000 SIPs by 2031 saves \$625–750M/year — equivalent to eliminating Bangladesh's entire annual jute export earnings in diesel waste.

SIP FARMER ECONOMICS

Diesel pump annual fuel cost: Tk 75,000–90,000/year.

Solar pump annual fuel cost: ZERO.

SIP capital cost (5 kW): Tk 3.5–4.5 lakh. Payback at 5% loan: 5–6 years.

Net saving after payback: Tk 75,000/year permanently.

Off-season grid export income: Tk 15,000–20,000/year.

Total annual benefit per farmer: Tk 90,000–110,000 — transformative for small landholders.

Pillar 4: Solar Street Lighting

Bangladesh has approximately 25,000 km of national and regional highways, plus extensive urban road networks. Conventional street lighting consumes approximately 900 MW of grid electricity annually — much of it from HFO and diesel pikers. Standalone solar LED street lights require zero grid extension and have a 7–10-year payback.

- **National Highway Program:** Replace 500,000 diesel/grid-powered street lights with solar LED units by 2028. Cost: \$300–400M (at \$600–800/unit). Financed through municipal bonds, LGED budget, and ADB urban infrastructure grants.
- **Smart Street Lighting:** Incorporate motion sensors and IoT connectivity — reducing energy consumption by 40–60% vs. constant-on systems. Adaptive lighting also reduces urban crime and improves road safety metrics.
- **Upazila Market Coverage:** Partner with Local Government Division for solar street lighting in all 495 upazila headquarters and growth centre markets — extending safe evening economic activity to rural commercial hubs.
- **Annual Savings:** \$50–80M/year in diesel and grid power costs. Additionally extends lighting to ~2,000 off-grid market areas — boosting rural commerce by an estimated Tk 5,000 crore/year.

Pillar 5: Biogas — From Agricultural Waste to Clean Energy

Bangladesh's agricultural economy produces massive quantities of cow dung (~150M tonnes/year), poultry waste (~12M tonnes/year), and municipal organic waste (~7,000 MT/day in Dhaka alone). These waste streams are a largely untapped renewable energy resource. A 2–4 cubic metre household biogas digester (installed cost: \$100–200) provides enough gas for a family's daily cooking, displacing LPG and firewood. The 4.5 million additional biogas plants technically feasible in Bangladesh could displace USD 800M/year in LPG imports.

- **Household Biogas Scale-Up:** Scale existing IDCOL biogas program 4x — from 75,000 to 1 million digesters by 2028, 3 million by 2032, 6 million by 2040. Financing: 50% GoB subsidy + 50% microcredit at 6% through MFI network. IDCOL subsidy restored to BDT 20,000/plant immediately.
- **Institutional Biogas Plants:** Install medium-scale biogas plants (10–50 kW equivalent) at all government hospitals, universities, and large schools. Biogas fuels kitchens and generates electricity for lighting — reducing grid demand by 50 MW equivalent nationally.



- **Biogas-to-Electricity Upgrade:** Upgrade existing IDCOL biogas plants with small generator sets. A 50m³ biogas plant generates 5–8 kWh/day — enough for a rural household's full electricity needs, eliminating SHS requirement for households with cattle.
- **Slaughterhouse Biogas Mandate:** Mandatory biogas installation at all registered slaughterhouses processing >50 animals/day — generating estimated 20 MW equivalent nationally from previously wasted organic streams.
- **Community Digesters:** Retail biogas hubs in upazila markets — community digesters serving 20–50 households each — piloted in 500 locations by 2028. Creates shared clean fuel infrastructure for peri-urban households without cattle.
- **Biomethane Grid Injection Pilot:** Purify biogas to biomethane (99% CH₄) standard and inject into national gas grid at selected Sylhet and Rangpur points — displacing natural gas with renewable gas using identical pipeline infrastructure.
- **Target and Savings:** 1M digesters by 2028: LPG import savings \$80–100M/year. 6M digesters by 2040: equivalent to 800 MMcfd of natural gas production — 47% of current total domestic gas output.

Pillar 6: Biomass Power — Agricultural Residue to Baseload Electricity

Bangladesh produces 30+ million tonnes of rice straw, jute stalk, sugarcane bagasse, and mustard stalks annually — the majority burned openly in fields, causing severe air pollution while wasting an enormous energy resource. Dedicated biomass power plants (5–20 MW scale) can convert this agricultural waste into reliable baseload electricity that complements intermittent solar generation.

- **Rice Husk Gasifier Plants:** Deploy 200 community-scale rice husk gasifier power plants (100–500 kW each) in major rice-milling clusters of Rangpur, Rajshahi, and Dinajpur divisions by 2028. Each plant supplies electricity to the surrounding village grid and thermal energy to the rice mill simultaneously.
- **Biomass Briquette Industry:** Support 500 biomass briquette enterprises converting agricultural waste into standardised solid fuel for industrial boilers — displacing 200,000 tonnes of coal and 50M litres of furnace oil annually.
- **Sugarcane Bagasse Cogeneration:** Mandate bagasse cogeneration at all 15 sugar mills — estimated 80 MW generation during crushing season with surplus fed to the grid under the IA framework.
- **Waste-to-Energy (WtE) — Urban Centers:** Dhaka alone generates 7,000+ metric tons of MSW daily. A 50 MW WtE plant processing 1,500 MT/day is proven technology (demonstrated in Pune, Bengaluru, India). Target: Dhaka 50 MW by 2028; extend to Chittagong, Rajshahi, Sylhet, Khulna, and Cumilla by 2032 — 250 MW total, scaling to 1,000 MW by 2040.
- **Target and Savings:** 100 MW biomass + 50 MW WtE by 2028. 500 MW biomass + 250 MW WtE by 2032. Double benefit: reduces agricultural open burning (air pollution) and generates clean baseload power for the grid.

6.2 Mid-Term Plan (2029–2032): Scale and Integrate

The mid-term phase builds on the infrastructure and policy foundations of Phase 1. The focus shifts from emergency deployment to systematic scale, grid integration, and market deepening. By 2032, Bangladesh targets 30–35% renewable share in its installed capacity mix — a genuine structural transformation of the power sector.

MID-TERM PLAN 2029–2032		
Initiative	Action Required	Expected Impact
Utility Solar — 8,000 MW via IA	Complete 5,238 MW BPDB tender program. Add 2,762 MW via new IA-backed competitive auctions. Establish 2–3 dedicated solar industrial parks (200–500 acres) on chars and degraded land.	Displace 40% of HFO/diesel generation. Save \$3.2B/yr in fuel imports.
BAPEX Domestic Gas Drilling Programme	Complete all 34 FY2025 target wells by 2027. Commission 25 additional wells by 2031. Launch offshore PSC round: 3+ IOC signings. Systematic workover of 20 shut-in wells.	Add 300–500 MMcfd domestic gas. Save \$980M–1.6B/yr vs. LNG replacement cost. Slow the production decline curve.
Industrial Efficiency — 50 Bcf Target	WHRB mandate for top 200 factories. Jacket cooling water recovery for 5,000 generators. Replace 1,000 old generators with high-efficiency/CHP units. BGEF BDT 3,000 Cr. efficiency window fully deployed.	Save 50 Bcf/yr LNG (\$1.13B/yr). Zero fuel imports required. Reduce industrial CO2 by 3M tonnes/yr.
Grid-Scale Battery Storage (4,000 MWh)	Commission BESS at major substations. Partner with Samsung SDI, LG Energy, CATL, and ADB. Mandate BESS alongside all new solar parks >100 MW to handle intermittency.	Enable stable integration of 8,000 MW variable solar. Eliminate peaker plant requirements.
Wind Power — 500 MW	Pilot 50 MW onshore wind in Cox's Bazar by 2027. Scale to 500 MW by 2032 in coastal belt (Cox's Bazar, Feni, Noakhali, offshore chars). Commission offshore wind pre-feasibility by 2027.	First domestic wind generation. Diversifies renewable mix beyond solar.
Industrial Rooftop Solar — 2,500 MW	Extend mandatory rooftop solar to all factories with sanctioned load >100 kW. OPEX model nationwide. All EPZs to achieve 50% self-supply from solar by 2032.	Save \$900M/yr. Reduce RMG electricity cost by 25%, improving export competitiveness.

SIP Scale-Up — 500,000 Pumps	Continuous 200,000 SIPs/year procurement. BADC replaces all remaining diesel pump government schemes. Net metering for off-season grid export fully operational.	Save \$625–750M/yr diesel. 8 million farming households benefit.
Biogas — 3M Digesters	3M household biogas units by 2032. Institutional biogas at all hospitals, universities. Community digesters in 5,000 upazila market locations. Biomethane grid injection pilot operational.	Displace 400 MMcfd of natural gas. LPG import savings \$250–300M/yr.
Biomass Power — 500 MW	Scale rice husk plants, bagasse cogen, and WtE. Target 500 MW baseload renewable by 2032 in agro-processing zones.	Clean baseload complementing intermittent solar. Eliminates agricultural open burning.
Capacity Payment Renegotiation	Negotiate phased exit from idle HFO/diesel plant capacity payment contracts. Early retirement incentive: BPDB buys out contracts at NPV of remaining capacity payments.	Free up Tk 16,000–18,000 Cr./yr. Redirect to solar BGEF and grid modernisation.
Green Hydrogen Pre-Feasibility	Commission pre-feasibility studies for green hydrogen production using surplus daytime solar for fertilizer plants. Export framework with Japan and South Korea under bilateral energy agreements.	Diversification beyond electricity sector. Future export revenue opportunity.
EV Scale-Up — 5M Vehicles	Phase out new diesel bus registrations in Dhaka, Chittagong, Sylhet. Procure 2,000 electric BRTC buses. V2G capability in EVs adds 10,000+ MWh of distributed grid flexibility.	Reduce diesel transport imports by 30%. Eliminate urban air pollution.

6.3 Long-Term Plan (2033–2040): Self-Sufficiency and Export

By 2040, Bangladesh's energy system must be fundamentally transformed: 60–70% renewable share in power generation, near-elimination of oil in transport through EV fleet, domestic energy security through diversified supply, and potential clean energy export to India and regional neighbors.

LONG-TERM PLAN 2033–2040		
Initiative	Action Required	Expected Impact
20,000+ MW Solar — Grid Backbone	With solar panel prices potentially falling to \$0.05/W by 2030, utility LCOEs of 4–5 cents/kWh are achievable by 2035. AI-driven smart grid manages predominantly variable renewable dispatch.	40% of generation mix. Displace \$4B/yr in fossil fuel imports. Lowest-cost electricity in Bangladesh's history.
3,000 MW Wind (Coastal + Offshore)	Offshore wind at Sandwip, Hatiya, Bhola. Coastal wind at Cox's Bazar and Feni. Diversifies renewable supply and provides generation when solar irradiance is low (monsoon season).	Complements solar seasonally. 24/7 near-zero-carbon grid achievable.
6M Biogas Digesters	Full 6M digester rollout. Biomethane grid injection at scale. Biogas-to-electricity nationwide in rural areas. Virtual elimination of LPG imports.	Displaces 800 MMcf/d gas equivalent. LPG imports eliminated. 20M rural households with clean cooking.
1,000 MW Waste-to-Energy	6 major cities + 20 secondary cities. Eliminates landfill crisis. Provides firm renewable baseload.	Urban waste eliminated as a problem. 1,000 MW reliable baseload power.
30M+ EVs — Transport Electrification	All new vehicle sales 80% electric by 2040. Full CNG auto-rickshaw electrification. All public buses electric. Bangladesh's diesel transport import (\$2B/yr) reduced by 70%.	Reduce oil import bill by \$1.4B/yr. Eliminate urban air pollution. V2G adds 30,000 MWh distributed storage.
10,000 MWh Energy Storage	Pumped hydro in Chittagong Hill Tracts (1,000–2,000 MW feasibility study by 2028). Grid-scale BESS at major substations. Eliminates fossil peaker plant requirement entirely.	Fully flexible, dispatchable grid. No need for gas or oil backup.
Regional Energy Export	Reverse Bangladesh–India power flow: export surplus solar to India's northeastern states. SAARC Regional	Bangladesh becomes net clean energy exporter.



	Power Exchange participation. Revenue: \$500M–1B/year from clean power exports.	Geopolitical and economic security dividend.
Green Hydrogen Export	Green hydrogen for industrial fertilizer + export to Japan and South Korea. 50,000 tonnes/year target by 2040.	Eliminate LNG in fertilizer sector. New export revenue stream \$500M+/yr.
Domestic Solar Manufacturing	Solar panel, inverter, and battery manufacturing in EPZs. 2,000 MW/year domestic production by 2038. Eliminates solar equipment import bill.	50,000 manufacturing jobs. Bangladesh joins global clean energy supply chain.
Rooppur Nuclear Integration	Commission Rooppur NPP Units 1 & 2 (2,400 MW). Integrate with smart grid for baseload complement to variable renewables.	24/7 clean baseload. Gas dependency eliminated.



SECTION VII: FINANCING FRAMEWORK — MOBILISING \$50–70 BILLION

The BEIP program requires an estimated \$50–70 billion in clean energy investment over 2026–2040. This is a large number — but it is less than the cumulative energy import bill Bangladesh will pay over the same period at current fossil fuel prices. At \$105/bbl oil and \$22.51/MMBtu LNG sustained for 15 years, Bangladesh's fossil fuel import bill would total \$180–200 billion. The BEIP investment case: spend \$50–70B to avoid \$180–200B. Net gain: \$110–150 billion over 15 years.

7.1 Capital Mobilization Framework

FINANCING SOURCE	INSTRUMENT	ESTIMATED QUANTUM	PRIORITY USE
World Bank / IDA	Concessional loan + grant	\$5–8 Billion	Grid solar, storage, SHS
Asian Development Bank (ADB)	Project finance + TA	\$4–6 Billion	Wind, WtE, EVs, SIP
Green Climate Fund (GCF)	Grant + concessional	\$2–3 Billion	SHS, SIP, biogas, SHS Urban
Islamic Development Bank (IsDB)	Sukuk / project finance	\$2–4 Billion	Biomass, rural energy, biogas
JICA / Japan Bilateral ODA	ODA loans (0.5–1% interest)	\$3–5 Billion	Offshore wind, green hydrogen
Private Equity / Solar IPPs (IA-backed)	Project finance + equity	\$15–20 Billion	All utility solar categories
Sovereign Green Sukuk	5–10-year USD bonds	\$3–5 Billion	Grid infrastructure, BESS
Bangladesh Bank Green Credit Line	3–5% refinancing window	\$5–8 Billion equiv.	Rooftop solar, SHS, EVs
Carbon Credit Revenue (Paris Art. 6)	Verified carbon unit sales	\$2–4 Billion	BGEF capitalisation
Fossil Fuel Import Levy (BDT 2/litre)	Earmarked surcharge	\$1–2 Billion	BGEF + SHS subsidy
TOTAL ESTIMATED MOBILISATION	Blended finance	\$42–65 Billion	2026–2040

7.2 Three Critical Financing Reforms



- **Restore the Implementation Agreement (IA):** Without IA for large solar projects, \$15–20B in private capital will not flow. This is the highest-priority single reform. The revised IA template must include fiscal prudence guardrails (energy-only payment, no capacity payment) but restore full bankability for developers.
- **Eliminate Solar Import Duties Immediately:** The 14–28% import duty on solar equipment functions as a tax on Bangladesh's own energy independence. A single SRO gazette eliminates this distortion — reducing system costs by 15–20% and immediately catalysing private investment.
- **Simplify Bangladesh Bank Green Refinancing:** The current 27-step approval process is prohibitively slow and bureaucratic. Simplify to a 5-step fast-track facility at 3–5% for all BEIP-category investments. Target: BDT 50,000 crore in green credit disbursed by 2028.

7.3 Bangladesh Green Energy Fund (BGEF)

Establish a dedicated BGEF capitalised at BDT 15,000 crore (~USD 1.35B), funded through: (a) Fossil Fuel Import Levy: BDT 2/litre surcharge on petroleum products, generating BDT 4,000–5,000 crore/year; (b) Capacity Payment Savings: as idle HFO/diesel plants are retired, 30% of freed capacity payments redirect to BGEF; (c) Carbon Credit Revenue: 20 million tonnes CO2 credits/year by 2040 at \$20/tonne = \$400M/year; (d) Green Climate Fund anchor grant of USD 500M.

BGEF disburses via five windows: (1) Mandatory SHS Urban Retrofit Grants (40% grant); (2) SIP subsidy (50% capital grant per pump); (3) Biogas digester subsidy (BDT 20,000/unit); (4) Industrial Rooftop Solar Credit Guarantee (20% guarantee fee waiver); (5) EV Transition Concessional Loans (5% interest for 3–10 years).

SECTION VIII: RISK MATRIX AND SCENARIO ANALYSIS

RISK	PROBABILITY	IMPACT	MITIGATION
Oil/LNG prices remain elevated >12 months	HIGH (60%)	CRITICAL	Emergency solar deployment; LNG contract renegotiation; rationing protocol for non-essential industrial use.
Forex reserve depletion	MEDIUM (45%)	SEVERE	IMF program continuation; prioritise energy import substitution; accelerate BEIP for FX savings.
Solar financing gap — no IA restoration	HIGH (70%)	HIGH	Restore IA immediately. Partial sovereign guarantee model as interim bridge.
Domestic gas supply collapse (<1.5 Bcf/day)	MEDIUM (40%)	SEVERE	Accelerate gas well drilling (25 new wells); demand management; replace power sector gas with solar urgently.
Strait of Hormuz blockage (LNG cut-off)	MEDIUM (35%)	CATASTROPHIC	Maintain 45-day LNG strategic reserve; diversify to Atlantic LNG (US, Nigeria); accelerate domestic solar to reduce LNG dependency.
BPDB technical default (IPP non-payment)	MEDIUM (40%)	SEVERE	Debt restructuring with IMF/World Bank TA; partial GoB guarantee for BPDB arrears; retire idle plant contracts.
Political resistance to subsidy reform	HIGH (65%)	HIGH	Targeted lifeline tariff for lowest income quintile; transparent public communication of savings; phase gradually.
Grid instability from rapid solar scale-up	MEDIUM (35%)	HIGH	Mandate BESS alongside all >100 MW solar. AI-driven grid management system. PGCB transmission upgrade.
Climate change — cyclone damage to solar/wind	LOW (20%)	MODERATE	Resilient design standards for coastal installations; insurance; geographic diversification of solar parks.
SHS/biogas adoption resistance (rural)	LOW (25%)	LOW	Community mobilisation through BRAC, Grameen network; subsidise aggressively; demonstrate productive use cases.



SECTION IX: ECONOMIC IMPACT ANALYSIS

9.1 Investment Requirements by Phase

PROGRAM	INVESTMENT REQUIRED	TIMEFRAME	PRIMARY FINANCING
Mandatory SHS — Urban + Rural (10M units)	\$1.5–2.0 Billion	2026–2033	GCF, IDCOL, BB green credit
Solar Street Lighting (500K → 5M units)	\$350M → \$3B	2026–2040	LGED, Municipal bonds, ADB
Government Building Rooftop Solar	\$300–400M	2026–2028	GoB budget, World Bank
Industrial Rooftop Solar (2,500 MW)	\$1.8–2.2 Billion	2027–2032	Bangladesh Bank, OPEX model
Biogas (6M digesters)	\$800M–1.2B	2026–2040	IDCOL, IsDB, GCF grants
Biomass Power (2,000 MW)	\$2.0–2.4 Billion	2027–2040	IsDB, GCF, JICA
Solar Irrigation Pumps (1M pumps)	\$1.0–1.5 Billion	2026–2033	ADB, GCF, Krishi Bank
Utility-Scale Solar (20,000 MW via IA)	\$18–22 Billion	2026–2040	Private IPPs (IA-backed)
Floating Solar (1,000 MW)	\$1.2–1.5 Billion	2028–2035	ADB, IFC, private
Wind Power (3,000 MW)	\$4.5–6.0 Billion	2027–2040	JICA, private, ADB
Waste-to-Energy (1,000 MW)	\$1.6–2.4 Billion	2028–2040	PPP, ADB ICT Fund
Grid-Scale BESS (10,000 MWh)	\$6.0–8.0 Billion	2028–2040	ADB, World Bank, private
EV Fleet Transition	\$3.0–5.0 Billion	2026–2040	BB green credit, private
Smart Grid + Grid Modernisation	\$1.0–2.0 Billion	2026–2032	World Bank, ADB
TOTAL (15-year BEIP program)	\$42–65 Billion	2026–2040	Blended finance

9.2 Savings, Returns, and Payback Analysis

- **Utility solar (20,000 MW):** Displaces 3.6 billion Bcf/year of LNG and HFO equivalent. Saves \$8B/year in fuel costs by 2040 at current prices. Payback on \$18–22B investment: 2.5–3 years at current fuel prices.
- **Solar Irrigation (1M SIPs):** Displaces 1.3 billion litres/year of diesel. Saves \$1.3–1.6B/year for Bangladesh's 15M farming households. Eliminates Tk 12,000 crore in annual agricultural fuel subsidies.



- **Mandatory SHS (10M units):** Eliminates \$530M/year urban diesel genset cost. Reduces grid peak demand by 2,000 MW — eliminating need for that much expensive peaker generation.
- **Biogas (6M digesters):** Displaces 800 MMcf/d gas equivalent by 2040. Eliminates LPG imports (\$400M/yr). Clean cooking for 30M rural people — eliminates kerosene health costs (\$200M/yr in avoided medical costs).
- **EV fleet (30M+ vehicles):** Reduces petroleum transport import by 70% (\$1.4B/yr savings). V2G adds 30,000 MWh distributed grid storage worth \$1.5B in equivalent BESS investment.
- **Carbon credit revenue:** 20M tonnes CO₂/year credits at \$20/tonne = \$400M/year. Under Paris Agreement Article 6, Bangladesh can monetize credits from all BEIP programs.
- **Total annual BEIP savings by 2040:** \$10–12 billion/year in fuel import displacement, subsidy elimination, and carbon revenue. Against total 15-year investment of \$42–65B: payback under 6 years at 2026 fuel prices.

BEIP PROGRAM	ANNUAL SAVINGS BY 2040	JOBS CREATED
Utility Solar (20,000 MW)	\$8.0B/yr fuel displacement	150,000 direct
Solar Irrigation (1M SIPs)	\$1.3–1.6B/yr diesel	80,000 rural technicians
Mandatory SHS (10M units)	\$530M/yr diesel genset	200,000 installation/maintenance
Biogas (6M digesters)	\$400M/yr LPG + kerosene	120,000 operators/technicians
Biomass + WtE (3,000 MW)	\$500M/yr fuel displacement	80,000 plant operators
EV Fleet (30M vehicles)	\$1.4B/yr petroleum	200,000 manufacturing/service
Solar Street Lighting (5M)	\$150M/yr grid/diesel	30,000 maintenance
Grid Modernisation + Smart Grid	\$300M/yr efficiency gains	60,000 engineers/technicians
TOTAL BEIP IMPACT	\$12.3–12.9B/yr by 2040	920,000+ direct jobs

SECTION X: STRUCTURAL BARRIERS AND POLICY PRESCRIPTIONS

Successful BEIP implementation requires dismantling seven structural barriers that have held Bangladesh's energy transition back for a decade. The following policy actions are prioritised by urgency and impact.

10.1 Immediate Actions — Within 90 Days (This Quarter)

- **SRO Gazette:** Remove all import duties on solar panels, inverters, batteries, biogas digesters, biomass gasifiers, and solar irrigation pump equipment. Single highest-impact immediate action.
- **MPEMR Directive:** Restore Implementation Agreement (IA) for Solar IPPs >50 MW. Issue revised IA template with energy-only payment structure (no capacity payments). BPDB authorised to sign Solar IAs within 90 days of application.



- **Building Code Amendment:** Mandatory SHS (minimum 550 Wp panel + 150Ah battery) for all new residential construction. Both urban apartments and rural homes. Gazette as building completion condition.
- **BERC Direction:** Net metering approval timeline — 30 days maximum. Automatic approval if no utility response within deadline. Utility faces BDT 50,000/day penalty for delay beyond 30 days.
- **BADC Directive:** Halt all diesel pump procurement for government irrigation schemes. Only solar irrigation pumps procured from FY2026-27 onward. Existing diesel pump subsidy redirected to SIP capital cost.
- **IDCOL Circular:** Reinstate household biogas digester subsidy at BDT 20,000/unit. Target 100,000 new digesters by end FY2026-27. Streamline approval: 15-day application turnaround.
- **BAPEX Emergency Mandate:** Immediately increase BAPEX capital budget from ~Tk 800–1,000 crore to Tk 4,000–5,000 crore. Issue PMO directive mandating completion of all 34 FY2025 target wells within 24 months. Weekly reporting to Ministry of Power. Gas Security Surcharge on LNG imports to fund BAPEX.
- **BAPEX Workover Programme:** Fast-track workover of 20 shut-in or underperforming wells — cheapest and fastest available gas addition. Can add 50–80 MMcfd within 12 months at cost of \$40–60M.
- **Offshore PSC Reform:** Issue revised Production Sharing Contract terms for offshore blocks — 70/30 contractor-favourable profit share for deep-water discoveries, accelerated cost recovery, 25-year licences. Target 3 new IOC signings by end 2026.
- **Industrial Energy Audit Mandate:** All industrial gas consumers >0.5 MMcfd must complete certified energy audit by December 2026. Submits WHRB, jacket cooling water, and generator efficiency opportunities to BERC. Non-compliance: gas supply suspension.
- **BERC Direction — Energy Efficiency Rules:** Ban installation of new industrial generators below 38% thermal efficiency. Mandate CHP configuration for all new generators >1 MW. 0% import duty on WHRBs, heat exchangers, high-efficiency generators, and CHP units with immediate effect.

10.2 Medium-Term Policy Framework (6–24 Months)

- **National Solar Acceleration Act:** Comprehensive legislation creating SREDA as the lead implementing agency with real authority, fast-track land clearance powers, and penalty mechanisms for utility non-compliance.
- **Carbon Pricing Framework:** Introduce BDT 500/tonne carbon price on electricity generation from fossil fuels, rising to BDT 2,000/tonne by 2031. Revenue funds BGEF.
- **Renewable Purchase Obligation (RPO):** Mandate all industrial consumers with sanctioned load >1 MW to source minimum 20% of electricity from renewables by 2028, rising to 50% by 2035.
- **Solar Park Policy:** Designate 50,000 acres on chars, saline coastal land, and degraded agricultural land for utility solar parks with pre-approved environmental clearance and fast-track land lease.
- **BPDB Debt Restructuring:** Establish BPDB Debt Resolution Mechanism with IMF/World Bank technical assistance. Retire idle HFO/diesel plant contracts. Redirect saved capacity payments to BGEF.
- **Bangladesh Bank Green Credit Simplification:** Reduce green refinancing approval from 27 steps to 5 steps. Target BDT 50,000 crore in green credit disbursement by 2028 at 3–5% interest.
- **BRTA EV Mandate:** All new two-wheeler registrations battery-electric from January 2027. Eliminate import duty on EV components. BIDA-certified charging station franchise model nationwide.

10.3 Institutional Strengthening



- **SREDA Empowerment:** Transfer real regulatory and implementing authority to SREDA with adequate budget, staffing (double current headcount), and enforcement powers. Current underfunding is a critical bottleneck.
- **One-Stop BEIP Investment Centre:** Dedicated window within BIDA for solar and clean energy investors — all approvals within 45 days. Single point of contact for land, environmental, grid connection, and IA.
- **National Energy Data Centre:** Centralised, publicly accessible energy data repository enabling evidence-based policy, investor due diligence, and real-time grid analytics.
- **Bangladesh Energy University:** Dedicated postgraduate institution for energy engineering, grid analytics, and energy finance — building the human capital pipeline for a 15-year energy transition. First graduates: 2029.



SECTION XI: PETROLEUM PRODUCTS PLAN & ERL EXPANSION (ISDB-FUNDED)

Bangladesh’s petroleum product supply chain — covering petrol (mogas), high-speed diesel (HSD), and octane — is the invisible backbone of the national economy. From CNG auto-rickshaws in Dhaka to irrigation engines in Rangpur, from fishing trawlers in Cox’s Bazar to long-haul trucks on the Dhaka–Chittagong corridor, these three refined products underpin transport, agriculture, and industrial activity for 170 million people. Yet Bangladesh’s refining infrastructure has remained frozen in a 1968-era architecture: a single, ageing refinery — the Eastern Refinery Limited (ERL) — processing a fraction of national demand, with the remainder imported as finished product at premium cost. This section presents a comprehensive Petrol, Diesel, and Octane Supply Plan and an ERL Expansion Programme, the latter anchored by Islamic Development Bank (IsDB) financing, as an integrated complement to the Bangladesh Energy Independence Program (BEIP).

11.1 Current Petroleum Product Supply: The Import Dependency Crisis

Bangladesh consumes approximately 7–8 million metric tonnes (MMT) of petroleum products annually. Of this, ERL processes only 1.5 MMT of crude oil — meeting roughly 18–20% of domestic refined product demand. The remaining 80–82% is imported as finished product (petrol, diesel, octane, jet fuel, furnace oil) by Bangladesh Petroleum Corporation (BPC) at international spot and term contract prices. At \$105/bbl crude, this dependency is a direct fiscal haemorrhage. The Iran–Israel war shock drove BPC’s monthly petroleum import bill from approximately \$600–670M to \$945–1,050M — a structural vulnerability that only domestic refining capacity can address sustainably.

Current Demand Breakdown by Product (FY 2025–26 Estimates):

PRODUCT	ANNUAL DEMAND	IMPORT DEPENDENCY	ANNUAL IMPORT COST (@\$105/bbl)
High-Speed Diesel (HSD)	~3.8–4.2 MMT/yr	~85% imported	~\$3.2–3.7 billion/yr
Furnace Oil / HFO (Power)	~1.6–1.9 MMT/yr	~90% imported	~\$1.2–1.5 billion/yr
Petrol / Motor Spirit (MS)	~0.8–1.0 MMT/yr	~75% imported	~\$700–900 million/yr
Octane (Premium / RON 95+)	~0.3–0.4 MMT/yr	~95% imported	~\$290–380 million/yr
Jet Fuel (ATF) + Others	~0.4–0.5 MMT/yr	~100% imported	~\$350–450 million/yr
TOTAL ALL PRODUCTS	~7.0–8.0 MMT/yr	~80–82% imported	~\$5.8–6.9 billion/yr

11.2 Petrol, Diesel, and Octane: Strategic Supply Plan (2026–2035)

Lion City Advisory recommends a three-pillar strategy for petroleum product supply security: (1) maximise domestic refining through ERL expansion; (2) secure long-term term contracts for remaining import requirement at pre-negotiated ceiling prices; and (3) accelerate demand-side substitution through EV adoption and solar-powered alternatives, reducing petroleum demand organically over the 2026–2035 horizon.

A. Diesel (High-Speed Diesel — HSD): Priority Supply Security

Diesel is Bangladesh’s most strategically critical petroleum product. It powers irrigation pumps serving 8 million farm households during the Boro season, fuels the 1.5 million transport vehicles on national highways, runs



captive generators in factories and hospitals, and drives marine vessels across the Bengal coast. At \$105/bbl, diesel imports cost Bangladesh approximately \$3.2–3.7 billion per year. The supply strategy has three components. First, ERL expansion (detailed below) targets domestic production of 1.2–1.5 MMT of diesel annually by 2030 — reducing import dependency by 30–35%. Second, BPC must negotiate 3–5-year term contracts with Saudi Aramco, ADNOC (UAE), and Kuwait Petroleum Corporation covering 60% of remaining import volumes at pre-agreed ceiling prices with price corridors, reducing spot market exposure. Third, the BEIP solar irrigation and EV programmes will organically displace 300,000–500,000 MT of diesel demand by 2030, reducing the import bill by \$250–420M annually without any supply-side intervention.

B. Petrol (Motor Spirit / MS): Transition Management

Petrol consumption in Bangladesh is concentrated in private cars, motorcycles, and a residual segment of non-CNG auto-rickshaws. Demand currently runs at 0.8–1.0 MMT per year and is structurally in transition: the nationwide CNG conversion program has already shifted a large share of auto-rickshaws and taxis away from petrol, and BEIP’s electric vehicle mandate will accelerate this substitution through 2030. Lion City projects petrol demand to peak at approximately 1.1 MMT by 2028 and decline to 0.6–0.7 MMT by 2035 as EV penetration rises. The supply strategy focuses on three actions: ERL expansion to produce 0.3–0.4 MMT of domestic petrol/MS annually; bilateral agreements with Indian refiners (IOC, HPCL) for pipeline-connected or coastal tanker petrol supply at regional parity pricing; and a blending mandate requiring E10 (10% ethanol blend) in all petrol sold at retail outlets by 2028, reducing net crude-derived petrol demand by 8–10% while supporting domestic sugarcane ethanol production.

C. Octane (RON 95+ Premium Fuel): Quality Upgrade and Domestic Production

Octane — RON 95 and RON 97 premium motor fuel — is currently almost entirely imported (95%+ of the 0.3–0.4 MMT annual demand), commanding a price premium of 12–18% over regular petrol. ERL’s existing configuration cannot produce on-spec octane without a catalytic reformer unit, which is a core component of the planned ERL Phase II expansion. The ERL expansion will add a 40,000 bpd catalytic reformer, enabling domestic RON 95 octane production of approximately 120,000–150,000 MT per year — covering 35–45% of current octane demand domestically and eliminating the price premium currently paid for fully imported octane. Import specifications must also be upgraded: Bangladesh Bank and BPC to jointly mandate Euro-IV equivalent sulphur standards (<50 ppm) for all imported octane and petrol by 2027, improving urban air quality and reducing engine wear costs for the national vehicle fleet.

11.3 Eastern Refinery Limited (ERL) Expansion Plan — IsDB-Funded

The Eastern Refinery Limited (ERL), located at Patenga, Chittagong, is Bangladesh’s only operational crude oil refinery. Commissioned in 1968 with an original capacity of 33,000 barrels per day (bpd), it has undergone limited modernisation and now operates at approximately 34,000–36,000 bpd nameplate capacity — equivalent to 1.5–1.6 MMT per year of crude throughput. Against a national petroleum product demand of 7–8 MMT, ERL’s contribution is structurally inadequate. The refinery also lacks secondary processing units (catalytic reformer, hydrocracker, coker), meaning its product slate is heavily weighted toward lower-value products (naphtha, straight-run diesel, residual fuel oil) rather than high-value petrol, octane, and Euro-standard diesel.



ERL Expansion: Phase-by-Phase Plan

PHASE	KEY UNITS / SCOPE	NEW CAPACITY	TIMELINE	CAPEX (USD)
Phase 0: Immediate Debottlenecking	Revamp crude distillation unit (CDU) internals; replace heat exchangers; upgrade instrumentation and process controls to digital DCS; repair jetty infrastructure for VLCC offloading	36,000 → 42,000 bpd (+17%); improved yield recovery	2026–2027 (18 months)	\$180–220M
Phase I: Secondary Processing Addition	New 40,000 bpd catalytic reformer (for RON 95+ octane/petrol); hydrotreater for Euro-IV diesel; vacuum distillation unit (VDU); sulphur recovery unit (SRU)	ERL total throughput: 80,000 bpd (4.0 MMT/yr); domestic octane production begins; Euro-IV diesel output	2027–2030 (36 months construction)	\$1.2–1.5B
Phase II: Capacity Scale-Up to Full National Demand Coverage	New 100,000 bpd crude distillation train (CDT-2) adjacent to existing ERL site or new greenfield Mirsharai EPZ refinery site; FCC (fluid catalytic cracker) for maximum gasoline yield; petrochemical integration for naphtha-to-polymer conversion	Total national refining capacity: 180,000 bpd (9.0 MMT/yr); covers 100%+ of 2035 demand; petrochemical export revenue begins	2031–2035 (48 months)	\$3.5–4.5B
TOTAL ERL PROGRAMME	Full refinery modernisation + secondary processing + capacity expansion	36,000 bpd → 180,000 bpd by 2035; 95%+ domestic supply self-sufficiency	2026–2035	\$4.9–6.2B total

11.4 IsDB Financing Framework for ERL Expansion

The Islamic Development Bank (IsDB), headquartered in Jeddah, Saudi Arabia, is a multilateral development bank serving 57 member countries including Bangladesh. IsDB has an established track record in infrastructure financing across the energy sector — including refinery upgrades in Malaysia, Nigeria, and Senegal — and utilises Shariah-



compliant financing instruments that are particularly well-suited to large-scale government infrastructure projects. Bangladesh, as an OIC member state and long-standing IsDB partner, is an eligible borrower across all IsDB lending windows. As noted in the existing Financing Framework (Section VII), IsDB has been identified as a \$2–4 billion contributor to BEIP through sukuk and project finance. The ERL expansion is the natural flagship anchor for IsDB’s Bangladesh energy portfolio, offering a bankable, sovereign-backed, strategic infrastructure project with strong development impact credentials and a clear return profile.

Proposed IsDB Financing Structure for ERL Phases 0 and I (\$1.4–1.7 Billion):

INSTRUMENT	AMOUNT	RATE / TERMS	USE / NOTES
IsDB Ordinary Capital Resources (OCR) Loan	\$600–750M	LIBOR/SOFR + 0.8%; 20-year tenure; 5-year grace	Phase 0 debottlenecking + Phase I CDU expansion civil works and equipment procurement
Istisna’a (Manufacturing Finance)	\$400–500M	Fixed profit rate 3.5%; 15-year repayment	Procurement and installation of catalytic reformer, hydrotreater, VDU, and SRU units; Shariah-compliant manufacturing contract structure ideal for EPC procurement
IsDB Infrastructure Fund Co-Investment	\$200–300M	Equity / quasi-equity; preferred return 7%	IsDB Infrastructure Fund takes minority equity in ERL Phase I SPV; catalyses private co-investment from GCC sovereign wealth funds and regional development institutions
Technical Assistance Grant (IsDB TA)	\$15–25M (grant)	Non-repayable grant	Pre-FEED and FEED engineering studies; refinery management system upgrade; training for ERL technical staff; environmental and social impact assessment (ESIA) to international standards
TOTAL IsDB COMMITMENT (Phases 0 + I)	\$1.22–1.58B	Blended; 2026–2030	Covers ~80% of Phase 0 + Phase I capital requirement; balance from GoB equity injection and commercial bank co-financing

IsDB Engagement Pathway and Conditions Precedent:

The IsDB engagement should proceed through the following pathway: First, the Ministry of Power, Energy and Mineral Resources (MPEMR) and BPC submit a formal Project Identification Note (PIN) to IsDB’s Energy and Infrastructure Division by Q2 2026. Second, IsDB Technical Assistance grant (\$15–25M) is approved to fund pre-FEED engineering and ESIA — enabling full project bankability by end 2026. Third, IsDB OCR loan and Istisna’a instruments are structured against a sovereign guarantee from the Ministry of Finance, consistent with Bangladesh’s existing IMF program parameters. Fourth, ERL is corporatised from a department of BPC into an independent joint-stock company (ERL Ltd.) with IsDB and GoB as equity co-holders — improving governance, enabling international audit standards, and facilitating future private co-investment. Fifth, EPC contractor



selection follows IsDB procurement guidelines (competitive international tendering) with preference for bidders offering technology transfer components.

IsDB Precedent and Strategic Rationale:

IsDB has directly financed refinery infrastructure across multiple member states, including the Kaduna Refinery rehabilitation in Nigeria (\$300M Istisna’a), the PETRONAS downstream refinery infrastructure in Malaysia (OCR loan), and the SAR refinery complex in Senegal. Bangladesh benefits from IsDB’s Category A borrower status — the most favourable lending terms — given its OIC membership, LDC status, and IsDB’s strategic goal of energy security in South and Southeast Asia. The IsDB financing is particularly advantageous for the ERL expansion because: (a) Istisna’a financing is specifically designed for manufacturing and construction contracts, matching the EPC procurement model for a refinery; (b) the 20-year OCR loan tenure with 5-year grace aligns with the long payback horizon of refinery infrastructure; (c) IsDB’s political risk mitigation function — as a multilateral institution — provides comfort to commercial co-financiers and EPC contractors; and (d) IsDB’s GCC membership network facilitates crude oil supply arrangements with Saudi Aramco and ADNOC under IsDB’s Oil Facility window, which provides concessional crude to member states.

11.5 Economic Impact of ERL Expansion and Petroleum Supply Plan

IMPACT METRIC	POST-PHASE I (2030)	POST-PHASE II (2035)	LION CITY NOTE
Domestic refining throughput	80,000 bpd (4.0 MMT/yr)	180,000 bpd (9.0 MMT/yr)	2x and 5x current ERL throughput
Annual forex savings (vs. finished product import)	\$1.2–1.5B/yr	\$3.0–3.8B/yr	Crude oil cheaper than finished product by 15–22%
BPC subsidy bill reduction	Tk 10,000–12,000 Cr./yr	Tk 30,000–40,000 Cr./yr	Direct fiscal space creation for health/education
Direct employment (ERL + downstream)	8,000–12,000 skilled jobs	25,000–35,000 skilled jobs	Petrochemical integration adds high-wage technical employment
Petrol/Diesel/Octane import dependency	Reduced to ~50%	Reduced to ~5–10% (near self-sufficient)	Structural energy sovereignty achieved

SECTION XII: CONCLUSION — THE IMPERATIVE OF NOW

Bangladesh's energy story is one of extraordinary achievement and structural vulnerability existing simultaneously. The nation that struggled to keep the lights on in 2006 now has near-universal electrification, 28,000 MW of installed capacity, and a proven track record of mobilising private capital for power infrastructure. That achievement must be acknowledged.



But the architecture of that achievement — built on cheap imported fossil fuels, politically connected IPPs drawing capacity payments for idle plants, and a state utility whose balance sheet cannot withstand any external shock — is now the crisis. The Iran–Israel war and the resulting \$105/bbl oil and \$22.51/MMBtu LNG prices are not aberrations to be waited out. They are a preview of the structural reality facing any emerging economy that defers energy transition.

The good news — and this is genuinely good news — is that Bangladesh has every element needed to build a resilient, self-sufficient clean energy system: 300+ days of sunshine annually, a 710 km coastline for wind, 170 million people generating massive biomass and waste streams, 6 million SHS units already deployed as proof of mass renewable adoption capability, 1.5 million irrigation pumps ready to be replaced by solar, and the world's most competitive solar tariffs now emerging from open bidding. The technology is ready. The economics are compelling beyond any reasonable dispute. The need is existential.

LION CITY FINAL RECOMMENDATION

IMMEDIATE (This Quarter): Remove solar import duties via SRO. Restore IA for Solar IPPs. Issue mandatory SHS building code. Halt diesel pump procurement. Reinstate biogas subsidy. Commission 2,000 MW solar under revised IA.

SHORT-TERM (2026–28): Deploy 500 MW rooftop solar in EPZ/industrial zones. Scale SIPs to 200,000/year. Launch 1M biogas digesters. Solar street lighting in all 495 upazilas. 50 MW wind pilot. Mandatory urban SHS rollout.

MID-TERM (2029–32): 8,000 MW utility solar via IA + 500 MW wind + WtE in 6 cities + 5M EVs. BESS 4,000 MWh. Bangladesh Bank green credit at 3%. Early retirement of HFO/diesel IPPs. Biogas 3M digesters.

LONG-TERM (2033–40): 20,000+ MW solar, 3,000 MW wind, 1,000 MW WtE, 30M EVs, green hydrogen, 6M biogas digesters, 1M SIPs. Bangladesh becomes a net clean energy exporter with \$500M–1B/yr in regional power trade.

The question is not whether Bangladesh can afford the energy transition. At \$105/bbl oil and \$22.51/MMBtu LNG, Bangladesh demonstrably cannot afford NOT to transition. Every month of delay costs \$760–800 million in incremental import bills. Every megawatt of solar deployed is an act of economic sovereignty. Every biogas digester installed is a household freed from LPG import dependency. Every solar irrigation pump commissioned is a farmer liberated from the tyranny of diesel prices set in Texas and Rotterdam.

DISCLOSURES AND IMPORTANT INFORMATION

This report has been prepared by Lion City Advisory Research for informational purposes only. It is based on publicly available data including BPDB annual reports, Petro Bangla LNG import statistics, IDCOL program data, Bangladesh Bank trade statistics, IEA World Energy Outlook, IRENA global renewable capacity data, and the Bangladesh Gazette (S.R.O. No. 43/2024 — retail electricity tariff schedule). All cost estimates are approximations based on current market data and are subject to revision. This report does not constitute investment advice. Energy price projections are illustrative and subject to significant uncertainty. Lion City Advisory makes no representations regarding the accuracy or completeness of forward-looking statements. Past performance of energy markets does not guarantee future outcomes.

