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Securing Bangladesh's Nuclear Future: Is the Regulated Asset Base Model the Answer to Address Project Corruption?

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ABSTRACT

Bangladesh's goal of achieving high-income status by 2041 requires dependable, low-emission, and affordable energy. With near-universal grid coverage and increasing demand, nuclear energy is a strategic asset for long-term baseload supply. However, the existing financing model, typified by the country's most expensive $12.65 billion Rooppur project which is 90% Russian loan funded, creates national fiscal strain, inflated costs, and systemic corruption risks. The regulated asset base (RAB) model, a framework in utility regulation, offers a viable alternative. By distributing a small levy among Bangladesh's roughly 37 million electricity bill payers, the RAB model can mobilize significant low-cost capital. This reduces reliance on foreign debt and enforces disciplined, transparent project management from the start. This perspective article expects that implementing a RAB model for future nuclear projects in Bangladesh would potentially reduce corruption risks, attract healthy international competition, and lower the ultimate cost of electricity. Our analysis references global examples, specifically the United Kingdom's Sizewell C and Thames Tideway Tunnel projects, and presents a Bangladesh-specific framework. Strengthening the capacity and independence of local regulator (Bangladesh Energy Regulatory Commission [BERC]) is essential to this shift, acting as the guarantor for both investors returns and consumer protection. The RAB model provides Bangladesh an alternative path to energy security, fiscal prudence, and clean power, provided immediate regulatory reform is adopted.

1 | Introduction

Bangladesh is on an accelerated growth trajectory and urgently needs affordable, reliable baseload power to support its Vision 2041 high-income goal. According to World Nuclear Association [1], electricity demand is rising at roughly 7% per year, and installed capacity has increased significantly, from about 5 GW in 2009 to over 26 GW in 2024. Yet, nearly all power today comes from fossil fuels, which makes the system costly, import dependent, and highly sensitive to fluctuating international market prices. Although grid coverage now exceeds 99% of households, load shedding and voltage fluctuations remain routine problems. According to Alam [2], annual expenditure recently increased by roughly 40% compared to revenue growth. This resulted in a $2 billion loss incurred by the national operator, highlighting an energy finance crisis that could potentially negatively affect economic growth by further increasing the price of electricity.

As highlighted in Greene [3], nuclear energy provides large, low-carbon baseload power together with grid resilience, which offers a strategic path forward for the country. But nuclear power plants (NPPs) are capital intensive and risky to finance. Bangladesh's first NPP project, Rooppur (2×1200 MW Rosatom VVER-1200 units), illustrates the downside of the traditional model: a $12.65 billion project, 90% financed by a Russian loan, leaving taxpayers responsible for most of the cost (and up to $8 billion in interest). This large, one vendor debt structure eliminates competitive

pricing pressure, invites cost inflation, and imposes a substantial sovereign debt burden on future budgets. To break this cycle of high fiscal risk and poor governance, Bangladesh may consider a fundamentally different financing mechanism to fund such large projects.

Out of the various currently available financing models for NPPs (*cf.* tab. 1 in Weibezahn and Steigerwald [4] for a comprehensive list), this article explores the regulated asset base (RAB) model. For details about this model, interested readers may consult [5]. This model enables investors to earn a predictable return on infrastructure capital while the project is being built, financed by a small, regulated charge on consumer bills. This approach secures low-cost private funding, reduces government debt reliance, and mandates stringent financial oversight. A well-designed RAB financing model can be considered an effective path for Bangladesh. The core strength of this model lies in the "math of scale": it strategically leverages Bangladesh's massive customer base, its 37 million electricity bill payers, to mobilize capital.

In practice, a token levy of Tk 10–20 (≈$0.08–$0.1.6) per month spread across millions of bill payers generates substantial, immediate funding for construction. For comparison, the weighted average retail electricity price is Tk 7.48 per kWh. Importantly, this early, low-cost consumer investment avoids the large build-up of interest on massive foreign loans, thereby slashing the ultimate cost of the project and significantly reducing the weighted average cost of capital, which is the average rate a company expects to pay to finance its assets through a mix of debt and equity. Our position is that RAB-funded nuclear projects will be demonstrably cheaper, more transparent, and better protected from the conditions that give rise to corruption than the current high-debt approach. The path forward involves immediate regulatory reform to implement this approach.

2 | Methodology

This analysis uses a comparative regulatory finance methodology, drawing from empirical documentation of RAB implementation in regulated utilities and energy infrastructure. The UK examples have been selected due to their transparent regulatory datasets, well-structured governance frameworks, and publicly documented cost-control mechanisms. Data is drawn from UK regulatory publications, OECD material on RAB structures, World Nuclear Association data for Bangladesh's nuclear program, Bangladesh government budgetary and tariff records, and international literature on infrastructure financing models. The methodological intent is not to replicate UK institutional culture but to identify transfer-ready mechanisms including cost disallowance, consumer-investor risk sharing, tariff-indexation, and mandatory public disclosure, and so on. These mechanisms can be adapted to Bangladesh's regulatory context for future NPP and other large infrastructure projects.

3 | The Ghost of Rooppur: The Case for a New Model

The Rooppur NPP project perfectly illustrates the nation's outdated energy financing model: heavy foreign debt with minimal domestic risk sharing. The $12.65 billion project was 90% covered by a Russian state loan. Although the terms appear favorable, repayment of the principal plus interest is projected to cost the country up to $8 billion in interest alone. This debt structure forces Bangladesh into a single vendor relationship, eliminating price competition and placing all financial and operational risk squarely on the taxpayer without any mechanism for cost overrun insurance. Importantly, the sheer scale of the sovereign debt crowds out other domestic spending priorities, making the energy sector a "major burden for the foreign exchequer."

This traditional, opaque, loan-based model creates fertile ground for financial mismanagement and graft. The notorious "Rooppur Pillow Scandal" (*cf.* https://corruption-tracker.org/case/the-rooppur-power-plant-scandal), where housing goods were purchased at wildly inflated prices, and ongoing investigations into alleged embezzlement of up to $5 billion (*cf.* Financial Times https://www.ft.com/content/bcc8d624-3234-47f8-b386-56de1e41a612), demonstrate the risks inherent in weak oversight. Because the government's obligation to the lender (Russia) was secured by a state-to-state agreement, local procurement and auditing controls were functionally bypassed. This structure created a fiscal black box where inflated costs and corruption thrived.

The RAB model offers a structural remedy to these failures. Under RAB, project cash flow and expenditures are governed by a real-time, public regulatory framework. Only costs deemed "efficiently incurred" are allowed to enter the RAB and be recovered from consumer levies, as highlighted in Makovsek and Veryard [5]. This process changes the incentive structure. Suppliers cannot dump waste onto the state by padding invoices. Furthermore, RAB funding, drawn from millions of consumers, inherently involves shared risk. The regulator sets predictable tariffs, and while consumers contribute a small levy, private investors are required to absorb some losses in case of construction delays or overruns, preventing the government from shouldering all the risk alone. This realignment of incentives is the built-in anti-corruption and fiscal prudence mechanism that Bangladesh needs.

4 | Conceptualizing the RAB Model for Nuclear Power in Bangladesh

4.1 | Mechanics and Cost Benefits

The RAB model is a financing structure where a project company recovers its invested capital (plus a regulated return) via customer tariffs during both construction and operation. In practice, the regulator grants the nuclear project a license to charge a small levy on electricity bills, which flows into the RAB account. In return, the regulator guarantees recovery of efficient capital expenditures plus an approved rate of return. Investors supply the capital (equity and debt) and receive reliable, inflation-linked revenue from the RAB as the project progresses. Key benefits include:

- **Lower cost of capital**: The RAB model is designed to tackle the massive financing costs of nuclear projects, which often exceed material costs under traditional structures that create massive, long-term interest burdens. The RAB model lowers this burden by collecting revenue during construction via modest consumer bill levies, thereby avoiding the compounding of interest. Since the model shifts construction and financing risk to consumers, regulators grant greater

investment certainty and set the allowed return based on a lower, "risk-free" profile. This reduced risk translates directly into a lower weighted average cost of capital (WACC), typically compressed from a conventionally financed 8%–10% range down to the 4%–6% range of regulated utilities. According to a recent analysis by a group of researchers from the University of Cambridge [6], the RAB model will result in a levelized cost of energy of £53/MWh. In contrast, a conventional financing model that places the full burden on the company would result in a strike price of £96/MWh for the contract-for-difference method. The UK government estimates that adding "less than £1" to an average bill during a 5-year build can ultimately save consumers a minimum of total £30 billion [7]. The Thames Tideway Tunnel project also saw a roughly 30% reduction in WACC compared to the average sector-wide WACC [8].

- **Sovereign debt reduction**: Under the RAB model, consumers effectively become lenders. From the outset, their contributions significantly reduce the need for external borrowing, resulting in minimal interest accrual on loans. With 37 million customers, a small, evenly distributed fee (e.g., Tk 24/month—equivalent to 3 extra kWh of electricity/month) can generate over $87 million annually. The project thus "borrows" from a shared public fund at a subsidized, regulated rate. This is a radical departure from the status quo, where Bangladesh often borrows nearly the entire cost at market (albeit concessional) rates. For comparison, Bangladesh is expected to pay $500 million per year over a 20-year period to cover the total financing cost of Rooppur.

Beyond cost of capital reduction, the RAB model redistributes financial responsibility by aligning incentives between consumers, regulators, and investors. The regulated return applies only to costs verified as "efficiently incurred" which prevents speculative overspending and opportunistic procurement. Under such a framework, the Rooppur pillow scandal, where pillows for site accommodation were allegedly purchased at more than 20 times the market price, would have been structurally difficult to execute because unjustified expenditures would simply not be recoverable through the RAB mechanism.

Tariff adjustments are predefined, rules-based, and publicly documented. They allow modest inflation-linked revisions while protecting end users from sudden price shocks. This creates predictable revenue streams during construction, which in turn increases investor confidence and stabilizes the financing environment.

International experience validates these strengths. In the UK's Thames Tideway Tunnel project, investors absorbed a portion of cost overruns and delay-related losses, which promoted realistic budgeting and careful vendor oversight [9]. Likewise, at Sizewell C, strict eligibility rules determine which expenditures may be recognized into the RAB, preventing improvised budget expansions. These cases illustrate how a well-designed RAB regime disciplines spending, strengthens accountability, and reduces long-term financing burdens.

4.2 | Attracting Investment and Enabling Competition

The RAB approach significantly sweetens the deal for foreign investors and vendors, addressing common emerging-market risks like political instability and policy uncertainty with a stable regulatory environment and revenue guarantee.

Revenue certainty: RAB grants revenue certainty that is highly attractive to Bond investor and pension funds. The regulator fixes the levy rate and allows indexation, providing investors with a predictable annual cash flow independent of spot power markets. Importantly, the levy is backed by law and collected from all consumers, shifting the financial obligation from the government budget to the stable consumer base. This reduces the project's sovereign risk, as lenders can recover funds from steady utility receipts rather than relying on future taxpayer bailouts. This certainty means equity investors can accept a lower return, thereby attracting capital on better terms.

Reduced exposure and greater bankability: By sharing risk with the consumer base and insulating the project from political volatility, RAB improves bankability and expands the available pool of capital. Because cost recovery begins during construction, the need for a large traditional sovereign guarantee is lowered. The reduced credit risk attracts a wider set of financiers, including development finance institutions, pension funds, and green bond markets, which have historically favored RAB-type models. Furthermore, de-linking the project from sovereign balance sheets invites official financing, export credits, and guarantees from countries like the United States, France, and South Korea, as the project's credit risk rests on the reliable RAB-cashflow, not the nation's debt ratios.

RAB opens the door to competition in equipment supply. Unlike the old system tied to a single vendor via a dedicated loan, a future RAB framework can issue an open tender for reactor units. Because financing terms and guaranteed returns are clear, qualified vendors (e.g., Westinghouse, EDF, KHNP, CNNC, and even Rosatom) can bid based on performance and cost. This democratized procurement breaks monopolies and potentially cuts prices or shortens lead times.

4.3 | How RAB Mitigates Corruption Risk

Evidence indicates a strong link between corruption and elevated construction costs for power plants in Bangladesh, with the mean project cost roughly double the global average [10]. RAB reduces the opportunities for cost manipulation by embedding accountability into the financing and regulatory process rather than relying primarily on episodic enforcement. Key mechanisms and how they work:

- **Mandatory cost validation:** Every cost item must be submitted with supporting documentation and independently verified before it is eligible for recovery, which blocks retroactive or informal cost inflation.
- **Disallowance of inflated or unjustified expenditures**: The regulator can refuse to recognize costs that lack justification, which means project owners and vendors cannot pass inflated charges on to consumers or the state.
- **Accountability for inefficiency related losses**: When inefficient or fraudulent spending is disallowed, shareholders and creditors absorb the loss, creating strong private incentives for cost control.

- **Open competitive tendering:** Competitive procurement reduces single-vendor lock-in and creates market pressure against overpricing and collusion.
- **Continuous regulatory oversight**: Regular, scheduled reviews during design, procurement, construction, and commissioning keep project decisions under ongoing scrutiny rather than allowing hidden cost drifts.
- **Transparency and public disclosure**: Regular publication of RAB values, contracts, and audit reports invites media, civil society, and independent auditors to examine project expenditures in real time.

In contrast to Rooppur's state-backed, intergovernmental loan structure, which effectively insulated cost flows from domestic scrutiny, a RAB-financed nuclear project operates within a domestic legal and regulatory framework designed for transparency and accountability. By forcing prior justification and continuous disclosure of costs, RAB closes the fiscal blind spots where procurement inflation and opaque spending have historically flourished.

For RAB to achieve these anti-corruption effects in Bangladesh, the regulator must be empowered with clear legal authority to validate and disallow costs, access to independent technical auditors, and legal backing to enforce procurement rules and sanctions for noncompliance. Public access to audited reports should be mandated so that oversight is both institutionalized and visible.

5 | The Regulatory Requirement: Building the Trust Framework

5.1 | The Regulator as the Guarantor of Integrity

The success of the RAB model hinges entirely on a strong, independent energy regulator that acts as the custodian of both investor and public interests. The regulator (whether the existing BERC or a new specialized body) must fulfil a dual mandate. First, it protects investors by guaranteeing an agreed rate of return only on capital that has been prudently and efficiently spent. This requires aggressive, early-stage vetting: the regulator must scrutinize project plans, budgets, and procurement strategies before construction begins, and conduct periodic reviews to ensure ongoing costs are justified. This preemptive scrutiny is a powerful anti-graft measure, forcing project partners to adhere to approved budgets or risk having the cost disallowed.

The regulator is explicitly mandated to protect consumers by ensuring the project delivers "value for money." This means capping the allowed capital base at the level of the least-cost, safest project plan. Any cost overruns due to inefficiency or malfeasance would not be passed through to consumers; at most, the project's owners would simply earn a lower return. This symmetric risk allocation (guaranteed returns only on good expenditure) squarely realigns incentives toward efficiency and cost control. For Bangladesh, this requires significantly strengthening regulatory independence and technical expertise to challenge powerful developers, establishing clear licensing conditions, and defining "efficiently incurred" costs at the legal level. A clean, predictable regulatory process is the cornerstone of any credible RAB scheme.

5.2 | The Transparency Mandate

To guarantee integrity, transparency must be mandated for every step of the RAB regime. All spending decisions, contracts, and progress reports should be publicly disclosed. Similar to mature RAB markets where regulators publish detailed RAB value schedules and price-control decisions, Bangladesh should require quarterly disclosures of capital costs incurred and performance metrics, all open to public audit. This "sunshine" approach, which includes public consultations when setting initial allowances, transforms secretive government guarantees into visible, accountable line items, ensuring that the media and consumers can scrutinize project funding. The example of large, complex RAB-financed projects like the UK's Thames Tideway Tunnel and Sizewell C proves that, with proper regulatory oversight, consumers' interests can potentially be safeguarded even as billions are spent on public infrastructure.

To operationalize transparency, Bangladesh should implement legally binding disclosure schedules for RAB allocations, publish independent audit reviews, and archive historical RAB valuations for longitudinal oversight. Continuous public visibility functions as a standing deterrent against corruption.

6 | Conclusion

The Rooppur experience, which is also the country's most expensive infrastructure project, exposes the dangers of opaque, debt-heavy infrastructure development. Ballooning costs, foreign currency liabilities, and procurement scandals underscore the need for systemic change. The regulated asset base model offers Bangladesh a powerful alternative: a system that spreads costs, attracts investment, enforces transparency, and lowers final power prices. Most importantly, it uses the strength of Bangladesh's massive consumer base (despite having a very low taxpayer base) to fund clean, secure energy infrastructure without overburdening the national budget or exacerbating the debt-to-GDP ratio, which has increased significantly in recent times. Given the nation's tax-to-GDP ratio of below 8%, the RAB model would indeed bring a paradigm shift to large infrastructure financing in Bangladesh.

To realize this future, policymakers must act. Legislation should authorize the RAB framework, regulators must be empowered, and public engagement mechanisms must be created. With political will and institutional reform, Bangladesh can break the cycle of inflated costs and unreliable megaprojects.

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