PUBLIC UTILITIES
REGULATORY COMMISSION

REGULATORY BRIEF

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Consumer Acceptance of Time of Use (TOU) Tariff Structure in Ghana: Evidence from a Discrete Choice Experiment-Brief Report

JANUARY 2026

KEY HIGHLIGHTS

- **Strong Overall Acceptance of TOU tariffs**

Consumer acceptance of TOU tariffs is strong, par-ticularly among industrial users and lower-income residential households, with income level and set-tlement type shaping responsiveness to price sig-nals.

- **Distinct Sectoral Perceptions and Constraints**

Industrial consumers view TOU tariffs mainly as a cost-reduction and competitiveness tool, while resi-dential consumers value both financial savings and greater control over energy use. Commercial con-sumers perceive fewer benefits due to fixed operat-ing hours and limited flexibility to shift electricity demand.

- **Strategic Alignment with the 24-Hour Economy**

TOU tariffs can support Ghana's 24-hour economy by incentivising off-peak industrial activity and night-time production.

- **Key TOU Adoption Barriers**

Among residential consumers, perceived tariff com-plexity, inconvenience, and concerns about higher bills are the main barriers to adoption, while commercial consumers face structural constraints that limit their ability to shift demand.

- **Largely Positive and Stable Utility Revenue**

TOU tariff simulations indicate potential revenue in-creases utilities, particularly, ECG and EPC, alongside reduced quarterly revenue volatility when supported by smart metering. However, more modest gains and higher volatility for NEDCo suggest the need for utili-ty-specific TOU designs and targeted regulatory safe-guards.

1. Policy Context And Rationale

Ghana's electricity sector faces increasing pressure from rising supply costs, sustained demand growth, and the need to support extended-hours economic activity under the Government's 24-Hour Economy agenda. In this context, electricity tariffs play a central role in shaping consumption behaviour, ensuring utility financial sustainability, and improving overall system efficiency. While tariff reforms introduced since 1997 have enhanced cost recovery and access in the electricity sector, ongoing population growth, urbanization, and industrial expansion continue to strain generation, transmission, and distribution systems.

Against this backdrop, the prevailing tariff structure applies uniform prices across all hours of consumption, despite substantial variations in system costs between peak and off-peak periods. Peak demand typically relies on higher-cost generation and places greater stress on the grid, while off-peak periods offer opportunities for lower-cost and more efficient supply. This pricing mismatch weakens incentives for efficient electricity use and limits effective demand management. Time-of-Use (TOU) tariffs address this mismatch by differentiating prices across defined time bands, typically, peak, shoulder, and off-peak, sending clearer signals that encourage consumption shifts to lower-cost periods. International experience shows that well-designed TOU tariffs can reduce peak demand, improve system reliability, defer capital investments, and support the integration of renewable energy.

In light of the foregoing, this regulatory brief synthesises findings from a comprehensive study undertaken by the Public Utilities Regulatory

Commission (PURC), in collaboration with allied agencies, and assesses the relevance and feasibility of TOU electricity tariffs in Ghana. The accompanying main report provides detailed analysis, methodology, and supporting evidence underpinning the findings and conclusions summarised in this brief.

2. Study Objectives

Consistent with the policy context outlined above, the study was undertaken to support evidence-based regulatory decision-making on the potential introduction of TOU electricity tariffs in Ghana. Specifically, the study sought to:

- Identify the key factors influencing consumer acceptance and willingness to adopt TOU electricity tariffs across residential, commercial, and industrial customer segments;
- Assess consumer awareness, understanding, and perceptions of the benefits and potential burdens associated with TOU pricing; and
- Estimate the potential impact of TOU tariff implementation on utility revenues, revenue adequacy, and revenue stability under alternative consumption and load-shifting scenarios.

3. Methodological Overview

To achieve the study objectives, a nationally representative cross-sectional survey was conducted using a two-stage stratified sampling approach across five regions namely, Greater Accra, Ashanti, Western, Northern, and Bono/Bono East. These regions were selected based on electricity customer concentration. A total of 1,431 valid responses were collected, comprising residential (65.3%), commercial (24.7%), and industrial (10.0%) electricity consumers, using Computer-Assisted Personal Interviewing (CAPI).

The survey incorporated a Discrete Choice Experiment (DCE) to assess consumer willingness to adopt TOU tariffs under two policy scenarios: a modest incentive scenario with narrow peak-off-peak price differentials, and a strong incentive scenario with wider differentials designed to induce greater load shifting. Survey data were complemented with secondary billing and consumption records from ECG, EPC, and NEDCo. Utility revenue impacts were subsequently simulated using adjusted consumption profiles reflecting estimated consumer load-shifting behaviour under each scenario.

4. Key Findings

4.1 Consumer Acceptance and Willingness to Adopt TOU Tariffs

Consumer acceptance of TOU tariffs is generally high but varies across socio-economic and customer groups.

- **Industrial consumers** exhibit the strongest willingness to adopt TOU tariffs, driven by clear cost-reduction incentives and greater operational flexibility.
- **Residential consumers** also show substantial willingness, particularly among lower-income households and metropolitan residents.
- **Commercial consumers** demonstrate comparatively weaker willingness, reflecting fixed operating hours and limited flexibility to shift demand.

Statistical analysis shows that income level and settlement type are the only significant determinants of willingness to shift electricity use. Higher-income households are less responsive to TOU pricing due to perceived inconvenience, while education level and household size have no independent effect.

4.2 Perceived Benefits of TOU Tariffs

Perceived benefits differ markedly by consumer group:

- **Industrial consumers** primarily view TOU tariffs as a tool for reducing electricity bills and improving cost competitiveness.
- **Residential consumers** perceive both financial benefits and non-financial gains, including greater control over energy use and alignment with conservation values.
- **Commercial consumers** report the weakest perceived benefits, largely due to structural and operational constraints.

4.3 Perceived Burdens and Adoption Barriers

Key concerns also vary across sectors:

- **Industrial users** are most concerned about higher peak-period costs.
- **Commercial users** cite limited operational flexibility as the main constraint.
- **Residential consumers** identify tariff complexity, inconvenience, and fear of higher bills as the dominant barriers to adoption.

These findings indicate that price incentives alone are insufficient to ensure widespread adoption, particularly among households.

4.4 Utility Revenue and System Impacts

Simulation results suggest that TOU tariffs can enhance both revenue adequacy and revenue stability for Ghanaian utilities, subject to effective implementation.

- ECG and EPC show substantial projected revenue gains and reduced quarterly revenue volatility.
- NEDCo records a modest revenue increase but slightly higher volatility, reflecting differences in customer mix and load profiles.

TOU tariffs also contribute to smoother demand profiles, reduced peak demand, and improved load factors, benefits that translate into avoided capacity investments, reduced system losses, and enhanced grid reliability.

5. Policy Implications

The findings confirm that TOU tariffs are a viable and strategically important instrument for demand-side management in Ghana. They also have the potential for improving grid efficiency, strengthening utility finances, and supporting Ghana's transition toward a resilient, inclusive, and 24-hour economy policy. With careful design, phased implementation, and strong regulatory oversight, TOU tariffs can play a pivotal role in the sustainable development of Ghana's electricity sector. Thus, when embedded within a coherent regulatory framework, TOU pricing can help align consumer behaviour with system costs, reduce peak demand pressures, and improve overall system performance.

However, realizing these benefits will depend on deliberate policy choices. Effective TOU implementation requires carefully differentiated tariff design, strong consumer protection and communication measures, and the deployment of enabling infrastructure such as smart metering and billing systems. A phased and utility-specific approach, supported by robust regulatory oversight, will be essential to ensure that TOU tariffs are implemented equitably and contribute meaningfully to the long-term sustainability of Ghana's electricity sector.

6. Policy Recommendations

This section sets out some policy recommendations for the Public Utilities Regulatory Commission (PURC), as the economic regulator of Ghana's electricity sector, with relevance to the Energy Commission, Government, and electricity distribution utilities.

6.1 Recommendations Targeted at the Public Utilities Regulatory Commission (PURC)

The PURC, in its role as the economic regulator should:

a. Adopt a Phased and Differentiated Implementation Strategy: Commence with a phased introduction of TOU tariffs, beginning with industrial consumers and large metropolitan residential users where responsiveness and system benefits are greatest, followed by a gradual expansion to other customer groups.

b. Approve Sector-Specific TOU Tariff Structures: Avoid a one-size-fits-all approach. Industrial, commercial, and residential consumers require differentiated TOU designs reflecting their elasticity, operational constraints, and welfare considerations.

c. Strengthen Consumer Protection and Transparency: Introduce simplified tariff schedules, bill impact simulators or reckoners

on TOU, and transitional bill protection mechanisms such as shadow billing or temporary bill caps.

d. Strengthen Consumer Education and Engagement: Implement targeted education campaigns to improve tariff literacy and reduce perceived complexity, particularly among residential consumers.

e. Address Utility-Specific Revenue Risks: Allow flexibility for utility-specific TOU adjustments, particularly for NEDCo, and link TOU-related revenue gains to measurable efficiency improvements.

f. Facilitate Financing and Incentives for Load-Shifting Technologies: In addition to the energy efficiency campaigns and adoption efforts spearheaded by the Energy Commission, the technical regulator with the support of PURC could also promote financing mechanisms and incentive schemes to encourage the adoption of energy-efficient appliances, automation, and storage solutions that enable consumers to respond effectively to TOU price signals.

6.2 Recommendation Targeted at the Distribution Utilities

a. Accelerate Deployment of Enabling Technologies: The distribution utilities, ECG, NEDCo, and EPC, in collaboration with the Energy Commission and PURC, should accelerate the deployment of smart meters, billing system upgrades, and automation technologies to help accelerate and support TOU pricing implementation

6.3 Recommendation Targeted at Policy Makers/Government

a. Align TOU Tariffs with the 24-Hour Economy Policy: The 24-Hour Economy secretariat, in collaboration with the Ministry of Energy and Green Transition should ensure that TOU tariff implementation is explicitly integrated into the Government's 24-Hour Economy agenda by promoting off-peak industrial production, extended commercial activity, and staggered work schedules in priority economic zones.

7. Conclusion and Next Steps

To address rising system costs and demand pressures, the PURC should proceed with the phased introduction of TOU electricity tariffs, starting with industrial and responsive metropolitan residential consumers. This should be supported by differentiated tariff designs, strong consumer protection and education measures, and accelerated deployment of smart metering and billing infrastructure by distribution utilities. At the policy level, TOU implementation should be explicitly aligned with the 24-Hour Economy agenda to incentivise off-peak economic activity.

Building on this foundation, the next edition of the regulatory brief will focus on the regulatory and policy imperatives of transitioning to TOU electricity tariffs in Ghana, with detailed attention to household and business-level transition challenges and implementation requirements.

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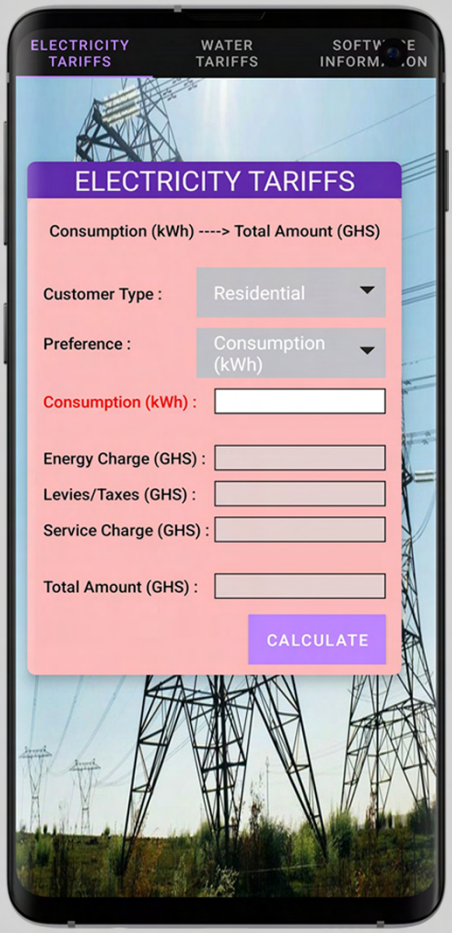

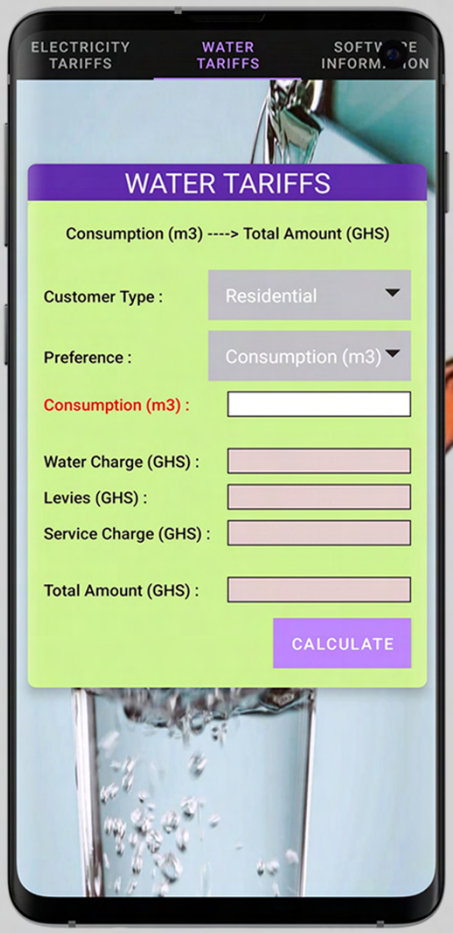

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