

Study Committee C5

ELECTRICITY MARKETS AND REGULATION

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Transmission Regulation: The Economic Regulation Applied for Oman Electricity Transmission Network

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Motivation

- Oman is moving forward with the privatizations plan of the energy sector, one of the challenges facing the regulator is to provide protection against uncertainty in pricing and licensing to maintain the attraction of new investors, especially during the reforming period till the stability of the sector.
- The study focus on research of incentive regulation for electricity transmission system and identify the challenges associated with different regulation approaches.
- Explore the possibility of benchmarking and suggest further improvement in the regulation methodology used by the regulator in Oman.

Discussion

- The limitation of commonly used regulation methods as they encourage overinvestment in capital and lacks incentivizing utilities on minimizing cost motivated the regulatory reforms which resulted into enhanced and matured models to provide utilities with incentives to improve their investment and operation efficiency.
- The incentive regulation is the result of evolution of the approaches of economic regulatory implementations which were considered traditional and not in line with the consumers benefit from the efficiency gain.
- Incentive regulation measures the performance of the utility with reference to predefined targets.
- The development of incentive regulation was an inevitable progression to respond to the inefficient previous models that are attributed to the absence of competition, hence, different models emerged such as: Revenue Cap, Price Cap, Partial Cost Adjustment, Yardstick Competition, Sliding Scale, Targeted Incentives, and Hybrid Schemes.
- In Oman, the RPI-X type price controls are implemented through Charge Restriction Conditions within each of their respective licenses. Price controls remunerate the regulated utilities for efficient capital and operating expenditure with a reasonable return on capital.
- RPI-X also provides efficiency incentives where the firm retain benefits from operating more efficiently than the regulator's forecast but also incurs losses if operating less efficiently.

Approach

- Application of Performance Based Regulation during privatization of electricity network entities imposes tough budget restrictions on regulated utilities and incentivize them to improve service quality and offer reduced prices.
- Exploring different models of economics regulations that applied to regulated electricity transmission network, highlighting the implications of natural monopoly features, and looking into specifically the UK experience in the energy sector in following the incentive regulation demonstrated that implementation of incentive regulation would impact prices, expenses, energy losses and the quality of service.
- Learning from these experiences, methodologies can differ, however their successes is subject to many factors according to the surrounding conditions. Therefore, we cannot state that there is an ideal approach to achieve desired outcomes.

Conclusion

- Application of incentive regulation mechanisms to the transmission utilities can result in a rapid decrease on return of investing on network constrains and the costs of maintaining and operating a reliable network.
- The development of system performance incentive mechanisms is essential to meet the target cost control, to improve and maintain a reliable supply and enhancing the performance.
- The regulator should emphasis and support the utilities in innovation investment that will drive the energy sector into being smarter in term of technology and more sustainable.
- Regulator should consider the introduction of different benchmarking approaches based on actual calculated and measured values or by using average and mean values of similar utilities to be compared with to advocate for enhanced performance and set more realistic targets as it is undeniably beneficial for all utilities involved.
- The regulator should consider adopting RIIO approach for longer price control periods and with adjustments and review sessions in between.

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Different economic regulation approaches

- The Rate of Return (ROR) is the traditional approach used for monopoly regulation and it is defined as the return that the investors are allowed to earn for any unit of investment.
- Cost of Service (COS) model determines the revenue requirement the utility needs to collect in order to recover the cost of the services and earn a return which is considered reasonable. This method has its limitation and it's not commonly used.

Evolution of Incentive Regulation

- Revenue Cap: This model regulates the maximum allowed revenue of the utilities. The regulator in this method maximizes the profit of the utility by minimizing the cost and allowing the utility to maintain the cost saving reached and given incentive on that basis.
- This method can take the structure of revenue per customer regulation which is equal to average revenue per customer.
- The advantage of this method is that it aligns with the Demand Side Management measures.
- The downfall is that it could limit the potential incentives to increase the sale and competition hence, it is labeled as inefficient.
- Price Cap: a regulation model aimed to separate the profit from the costs by setting a price ceiling. For each period, normally 3-5 years, there is a price cap based on the retail Price Index (RPI) and an efficiency factor X. The prices are fixed for each year of the price control period.
- Regulation is anticipated to maintain the competitive market burdens between regulated entities.
- Keeping up the competitive forces will boost the utilities to improve their productivity and to pass their gains on to the consumers with lower prices with consideration to any inevitable increases in the expenses.

Benchmarking methods

- Regulators engaging in the benchmarking of the transmission and distribution utilities as it deemed important for periodic price and revenue reviews.
- Benchmarking technique adopted by the regulators for incentive regulation are either "linked" or "unlinked" to performance and behavior of individual utilities or could be classified as best "Frontier" practice or Representative "average" performance.
- Frontier Benchmarking: This type of benchmarking method uses statistical techniques or linear programming techniques to identify, assess and compare the performance with the utilities. Frontier benchmarking measures the efficiency on the relative performance. Main frontier techniques used are Stochastic Frontier Analysis (SFA), Corrected Ordinary Least Square (COLS) and Data Envelope Analysis (DEA).
- Frontier approach is not being used by many regulators as the data required to benchmark are significant and the models used are complicated.
- Average and Mean Benchmarking : This approach is different from the frontier as it takes mean or average performance.
- The technique used in this approach is Ordinary Least Square (OLS) that takes an average of the cost function of the utility
- Performance can be compared against the estimated performance with relation to the input, output, and environmental data available.

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Oman Electricity Transmission utility regulation

- The RPI-X type price control regulation applied to Oman's transmission utility is targeted to ensure that the revenue of the utility may gross for a set period.
- This incentivizes the utility to lower its costs to earn a greater level of return. RPI-X approach aim to provide incentives for better productivity performance.
- Regulator monitor the cost of delivering the services and resets the prices for the following price control period based on the information provided.
- The regulator mechanism ensures that the capital investments are efficient and economic.
- It assesses the capital projection and execution as part of the Price Control allowances set during the review process.
- The price control period changes the allowed revenues and are limited from year to year to general inflation less by a specified X factor, with the X factor reflecting the expected improvements in productivity. The setting for 'X' is therefore an important parameter for determining the revenue outcomes for Transmission in Price Control Review.
- This objective achieved by assuming the regulated utility can control its level of costs. Some costs are beyond a business's control and therefore, it is not reasonable to expect productivity improvements in these areas.
- Incentives such as the X factor should only be applied to controllable costs, if applied at all. If the X factor continues to be set at a relatively high level against revenue when transmission can only make the savings from controllable costs, then as the controllable costs represent a small proportion of total revenue the % savings against controllable cost is significantly higher than the X factor.
- Efficiency gains will be squeezing the business and it will likely manifest itself negatively in several areas such as service quality or the financial position of the company.

Oman Electricity Transmission utility regulation

- RIIO- Revenue Incentives Innovation Outputs
- RIIO approach main aspired outcomes include better engagement with stakeholder, transparency with regards to incentives and penalties and the introduction of innovation incentive to projects that are successfully implemented to encourage delivering sustainable energy sector.



- Revenue: Constraint set up front to ensure timely and efficient delivery, Network companies are financeable, Transparency and predictability and balance between costs faced by current and future consumers.
- Incentive: Delivery outputs efficiently overtime with X year control, rewards and penalties and upfront efficiency rate.
- Innovation: Technical and commercial innovation encouraged through core price control incentive and innovation packages.
- Outputs: sets out in clear contract reflecting expectations of current and future consumers.

Challenges of Transmission regulation benchmarking

- Transmission utilities and Regulators are not commonly operating in different jurisdiction indicating that the transmission utility benchmarking experience is limited.
- Considering international benchmarking is difficult while comparing utilities that are operating at different scales, environment, and financial capabilities.
- For benchmarking purposes, adjustments required to be done to data to ensure comparability and comparability is possible. Things to consider are exchange rate, inflation, prices of equipment, cost of labors and separate activities.