

# Impact of regulatory environments on investment decision in transmission

Efficient operation and investment in electricity transmission plays a critical role in energy markets by enhancing the reliability of supply, reducing risks of trade and enhancing competition. Transmission companies should therefore have strong incentives to account for their impacts on the energy market and invest to an adequate level in the network. An appropriately conceived incentive framework combined with a regulatory framework that provides certainty crucial to achieving these outcomes.

Transmission companies are natural monopolies and are therefore regulated by the local, regional or national regulator. Economic regulation of such companies seeks to create the same outcomes as delivered by competitive markets;

- The demands of customers should be met at the lowest possible price.

- Firms that are more efficient should be rewarded through higher profits, while customers ultimately benefit through lower prices and better service as these higher profits are competed away, over time.

A regulatory design must be sufficiently robust to meet both the goals of providing sustained incentives for firms to improve efficiency whilst also providing sustained and demonstrable benefits to consumers. A truly effective and sustainable regulatory regime therefore seeks to *align*, rather than trade-off, the interests of consumers and regulated companies.

With the liberalisation and re-regulation of electricity supply industries worldwide, investment decisions in the transmission network have to take into account the expectations and regulations set by Governments and Regulators. Planners need to take into account the expectations of

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customers in terms of quality of supply and reliability of supply and the expectations of generators to provide unconstrained access, ensuring that the regulatory authorities are satisfied with the efficacy of the proposed investments while meeting the expectations of the various shareholders/stakeholders in terms of rates of return and profits. Transmission Planning requires a mix of engineering, financial, economic, legal and political skills. CIGRE Study Committee C1 set up a working group, C1.6 to investigate the impact of regulatory environments on investment decisions.

In order to understand the impact of regulatory environments on investment decisions, a questionnaire

was developed requesting feedback on the following points:

- Identify the changes in the capital/revenue expenditure regulatory environment in various parts of the world and the impact this has had on the capital available for system development.
- Identify any shortfall between the capital/revenue expenditure requested and that allowed, the reasons for any shortfall and the type of projects not allowed.
- Identify the changes in system investment planning guidelines to respond to changes in the regulatory environment.
- Identify the impact that these changes have had on:
  - revenue available for developing/managing the system
  - system investment incentives
  - system maintenance incentives
  - customer satisfaction
  - level of system security/reliability

- transmission design

A questionnaire was developed and sent out to various countries. Thirteen countries responded to the questionnaire. Some of the key findings from the questionnaire were:

There seems to be a trend to move towards incentive based regulation as some companies are moving over to either the price cap or revenue cap regulation. The companies which are currently regulated via the price/revenue cap typically have a 3-5 year regulatory period, whilst those subject to the rate of return regulation have a one year regulatory lag period.

Twelve of the countries which responded indicated that the transmission companies were regulated.

The following is a list of the key findings of the main report;

- Most of the regulated transmission companies have a regulatory framework under which the regulator reviews and approves investment in transmission. Many companies believe that the regulators and their consultants do not share the same detailed knowledge and expertise as the transmission planners when making decisions regarding prudent capital expenditure. This has in many instances caused a delay in the timing of investments.
- Many companies also believe that the regulators do not allow adequate returns on their assets and thus the company's investment planning guidelines have had to be revised (e.g. account for losses for those not done so before) to ensure adequate return on investments. This also creates additional strain on the transmission company's which need to raise capital to fund new projects.
- The non-recovery of stranded assets has created additional financial risk to the transmission companies, thus making the transmission planning process to be more thorough in the evaluation of proposed projects.
- In countries where the regulator has clearly defined the future course of regulation, the transmission companies find it relatively easy to raise capital for new projects and the planning guidelines are revised to fall in line with the regulatory framework.
- When the regulator decides to reduce the level of capital allowed for new projects, refurbishment projects are the ones most likely to be postponed, which has an impact on the future transmission plans. Postponement of refurbishment leads to higher operating expenditures.
- It is critical that changes in the capital/revenue expenditure regulatory framework create the correct

signals for investment in the transmission network, which is why the treatment of capital expenditure by the regulator is important. Transmission companies, whose capital expenditure is treated as a pass-through during the regulatory period, generally do not have any problems making investments and their projects are seldom postponed since any under or over-expenditure does not form part of their allowed revenue. Unplanned transmission investments poses additional financial risk to the transmission company concerned, especially in the case where transmission investment is not treated as a pass-through. Transmission planning guidelines have thus had to become much more robust and flexible to account unplanned investments.

- Regulation has resulted in the planning guidelines becoming more transparent with clearly stated analysis and justification techniques. Long term strategic direction and investment principles must also be clearly stated especially where restructuring of the electricity industry is being considered. Regulatory decisions are reflected in the transmission planning guidelines through compliance with reliability and quality of supply targets as set out by the regulator.
- Transmission planners need detailed information on the timing, magnitudes and locations of new generating units. The co-ordination between generation and transmission planning, especially in the liberalised industries, has been reduced although in some countries this has brought the transmission and operational planning closer together. This has created greater emphasis on transmission planners;
  - ✓ to obtain accurate data and perform detailed sensitivity analysis
  - ✓ consider the best cost effective solutions to connect generators and customers as fast as possible
  - ✓ ensure that the transmission plans are practical
  - ✓ to provide public sound information on the optimal siting of generation from the transmission system point of view.
  - ✓ the need for probabilistic planning techniques.
- Regulatory pressure to reduce losses and eliminate congestion, has resulted in a re-evaluation of existing investment planning criteria. The regulator has created incentives such as allowing additional capital expenditure and setting target levels for transmission losses. Congestion costs were never thought of before liberalisation.
- There is currently no regulatory framework that can effectively govern transmission investment. The development and application of performance indices coupled with formal investment criteria as well ●●●

as considerable regulatory judgement is an inevitable component of a sound regulatory process.

## Conclusion

The paper has discussed the impact of regulatory decisions on levels of transmission investment. Economic regulation produces benefits for transmission customers because it aligns asset owners' incentives with the goals of increasing the efficiency of investment decisions. It motivates transmission companies to take steps to protect the recovery of the investments by finding economic solutions to grid problems and to meeting reliability standards and growth in the demand for transmission capacity.

Regulation should therefore ensure that a transmission company is both efficient and financially sustainable. The regulators in the various countries make decisions based on external factors such as social, political and environmental challenges faced in each country. Even though all of the transmission companies which responded to the survey are at various stages of the liberalisation process, they are still affected by regulatory decisions. Efficient transmission investment is also a key ingredient in the success of a competitive electricity industry.

The existing economic regulatory framework's used by regulators raises the question of whether regulatory decisions have resulted in efficient levels of transmission investment. The fact that regulatory frameworks are imperfect means that the transmission company and the regulator in each country has no choice but to draw on

available experience and regulatory tools to develop and apply the best feasible regulatory frameworks. One component of such a regulatory framework is to have greater information sharing between the utility and the regulator. The planning process has also allowed for achieving greater coordination between the relevant stakeholders as well as being able to cater various scenarios for achieving the desired reliability.

Increased commitment and transparency of regulators has increased the ability to finance new projects. External forces such as public opposition which are beyond the regulator's control also impact planning criteria and sometimes delay investments. ■

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