

Study Committee C5

Changes to markets to enhance reliability and resilience

Paper 10964_2022

New Intraday Market Schemes and Binding Dispatch in Colombia

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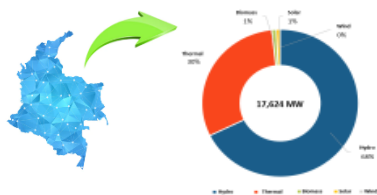
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 Colombia

Motivation

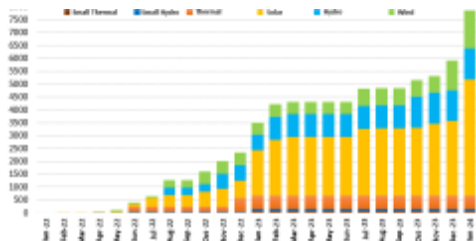
- The Energy and Gas Regulatory Commission of Colombia is expected to enact new rules for the short-term energy market to facilitate large intermittent renewable generation deployment. The new market design will focus on the intraday market with binding commitments.
- International experiences show that a short-term energy market that negotiates near real-time operation facilitates the integration of intermittent resources. Intraday markets –discrete or continuous– are energy markets that complement the day-ahead market and trade during the operational day. They are well implemented in Europe, and their design provides elements that can be incorporated in Colombia.
- This paper explains the *main aspects that a short-term energy market, i.e., an intraday and balancing markets, should consider from the system operator's point of view in Colombia.*
- This paper constitutes *an input for the regulator to formulate an energy policy related to the new short-term market design* and for countries that are in the process of revising their power markets.
- This paper also serves as *a reference for other countries that are in the process of reforming their electricity market* – as part of the energy transition – and that face a considerable penetration of stochastic renewable resources, especially in Latin America.

There is a need for an intra-day market to facilitate the integration of intermittent resources.

Installed generation capacity in Colombia in 2021



Approximately twenty-five percent of the installed generation capacity will be intermittent by 2024.



Main flaws of the current Colombian electricity market design

- The forecasts of the production of intermittent renewable resources of the current design will have to be made – for some operating periods – with a temporal horizon of more than 24 hours.
- The market doesn't have binding dispatches so that the deviations of the commitments are assumed – pro rata – by the demand.
- The impossibility of changing positions – changes in the offers of energy or reserve – of a participant during the operating implies that the positions based on new information that originates after the gate closure of the DAM cannot be balanced.
- The market doesn't have price signals in real time due to the fact that these are calculated ex-post day.

Additional drivers for an intraday market



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New Colombian spot market design: considerations and principles

Considerations

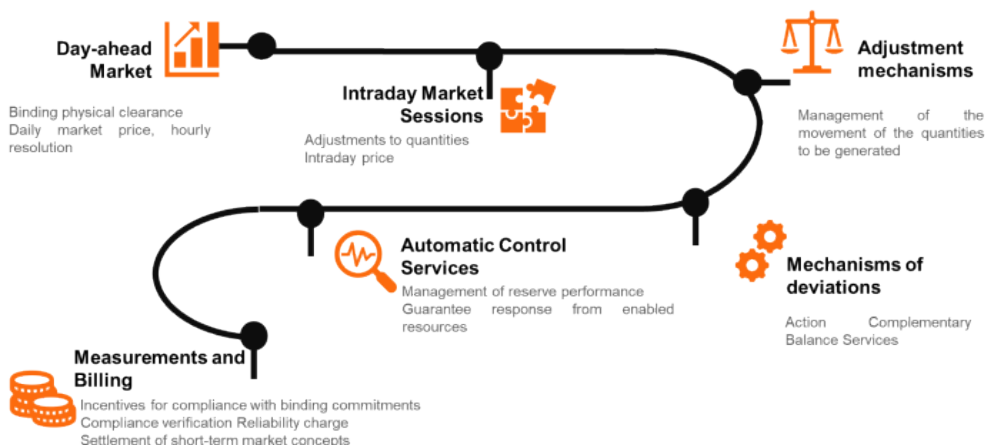
- The Colombian system operator (X.M. S.A) is conducting an internal analysis that focuses on the main aspects that the short-term market should consider. The results are expected to assist the final design of the market regulator.
- The market design must avoid market power market. Hence, all available generations must be offered for each intraday session.
- There must be rules and incentives that guarantee a reliable operation of the system.
- The previous recommendations must be aligned with the principles explicitly established in the Colombian regulation, that is, efficiency, flexibility, and security, and they need to be preserved in any market reform.

Principles

Efficiency is related to different aspects such as price formation, gas market coordination, non-conventional renewable generation integration, demand response participation, etc.

Flexibility refers to the need to "bring" the market closer to the operation in real-time; that is to say, have market mechanisms to assist the operator in operating the system in real-time.

Security refers to the need to maintain a safe and reliable system operation regardless of generation type. This aspect becomes relevant to the imminent integration of intermittent generation, distributed energy resources, and demand response capabilities. It also implies improving forecast techniques to reduce system operation uncertainties and improve information exchange technologies among market participants.



X.M's recommendations for intraday market settlement, adjustment mechanisms, and deviations are presented in this paper. It is proposed that three financial settlements :

- ✓ Settlement for intraday markets
- ✓ Settlement for the secondary frequency regulation service
- ✓ Settlement for mechanisms of adjustments and deviations

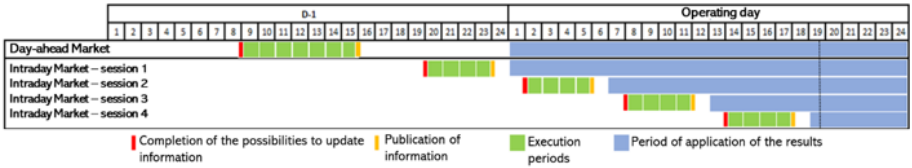
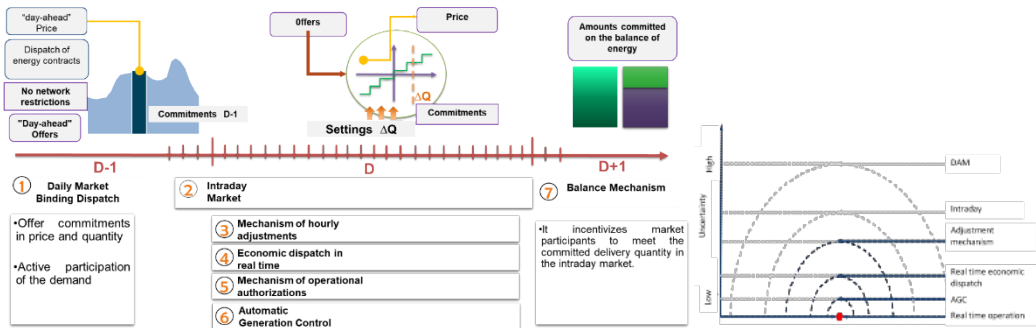
According to specialized literature, multiple settlement schemes linked to the day-ahead market improve the efficiency of electricity markets, thereby providing adequate price signals to the market.

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The short-term and intraday market design proposes in this paper



Market design highlights

- Co-optimized energy and reserve instead of sequential allocation
- Four discrete sessions
- A balance mechanics instead of a system reserve
- Financial binding dispatches
- Ex-ante power market mitigation

Conclusions

- This paper describes the main aspects that need to be taken into consideration for the new short-term and intraday market design. Quantitative results that back up the design are presented in a forthcoming paper.
- Market efficiency, flexibility, and security of the system are the main principles of the design.
- This paper emphasizes the importance of providing the system and market operator with the technological tools to efficiently manage the new short-term and intraday market.

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