

# Chilean Experience on Long-term Electricity Auctions: Changes and Challenges Ahead

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## Introduction

Auctions of long-term contracts (LTC) for electricity supply have become an important energy policy instrument in the past decade.<sup>1</sup> In particular for developing countries, where electricity markets tend to be very volatile and risky to support the construction and financing of new plants that can supply in a rising demand scenario. Undoubtedly, auctions for long-term contracts had become a sustainable form of electricity expansion and a key element of sufficiency of the system. More than a decade of experience in LTC auctions can bring us ideas on how to make this instrument work efficiently and also what are the challenges ahead. Chilean experience can be useful for developing countries in similar conditions but also for developed economies that can use auctions as a powerful tool to replace existing capacity in a sustainable way.

## LTC electricity auctions from 2006 to 2013

Chile introduced auctions for LTC in 2005. Until then, all contracts with distribution companies for regulated customers had prices fixed by the National Commission of Energy (CNE). The regulatory change was introduced after Argentina decided to reduce their exports of natural gas to Chile. At that time, natural gas represented one third of electricity generation. Investors in generation faced a type of uncertainty that the market itself could not solve. If it was decided to make an investment in a gas-fired power plant, and no more natural gas came in the future or at very high prices, that investment would be unprofitable. Similarly, if an investment in a coal-fired power plant were decided, and cheap natural gas came in the future, the investment would not be profitable either. This situation caused a lag in the normal generation investment process of the country. For that reason, the government introduced a regulatory reform that replaced contracts under price regulation with LTC auctions with the intention of fostering capacity expansion and optimizing risk allocation.

LTC auctions in Chile were designed in a particular way, very different if we compare it to the Brazilian case, according to Moreno et. al. (2010). Bustos-Salvagno (2015) describes the main features of the process. First of all, contracts are allocated by minimum price in a discriminatory first price sealed bid auction. The average weighted winning bid of the auction becomes the power price for all distributors' customers. Even though the prices remain fixed during the entire length of the contract, their value is adjusted with indexes of input prices. Second, the amount of

power auctioned does not imply a "take or pay" contract. The amount of power supplied by generators is the one effectively demanded.

From 2006 to 2014, there were other contract considerations in place. A publicly known ceiling price was established for each auction by the CNE. Also, LTC auctions have to be done at least 3 years in advance, in order to foster competition among new entrants and incumbents. Contracts could not be longer than 15 years. Finally, there was a particular setting in the Chilean case. Each distributor had to decide the size and length of each contract to be auctioned. To foster competition, distribution companies coordinate to implement a unique allocation mechanism for each auction where all contracts have to be auctioned. However, the contracts were different between companies in terms of duration, size and supply conditions. Since it was not possible to sum all the demands in a unique supply contract, distribution companies coordinated on a single mechanism for different contracts that allocates the minimum bid for each contract for each distributor. A generator could bid different prices to different contracts, even if they belong to the same distributor. Finally, since several contracts with different distributors were auctioned at the same time, CNE allowed generators to define a limit for the amount of power that they can win in all the blocks auctioned simultaneously.

## The importance of regulatory changes at the proper time

Although the original purpose of electricity auctions for long-term contracts (LTC) was to attract investment in new capacity, auctions have helped to create competition in the generation market. However, more competition didn't happen immediately in the majority of cases. In the case of Chile, from 2006 to 2013, there were 6 LTC auctions. Over this period, the average price grew from 53.1 USD/MWh to 128.9 USD/MWh and the average participation rate was 3 bidders in each auction and some processes didn't have any bidder at all.

Even though the adequacy mechanism that auctions provided was working well – according to CNE, installed capacity grew from 10,238 MW to 16,688 MW over this period – electricity prices were going up at a fast

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See footnote at end of text.

rate. Moreno et al (2010) pointed out that “although this mechanism is generally seen as a significant improvement in market regulation, there are questions and concerns on auction performance that require careful design”. For this reason, a regulatory reform was implemented in 2014. This reform changed several auction’s conditions:

The reserve price for the auction was kept under secret to increase competition.

Now LTC auctions have to be done 5 years in advance to bring barriers down to new entrants. Also, if the new entrant faces problems in building her project, the initial date can be postponed.

Contracts can be for 20 years to facilitate access to project finance

To reduce transaction costs, all demand is auctioned

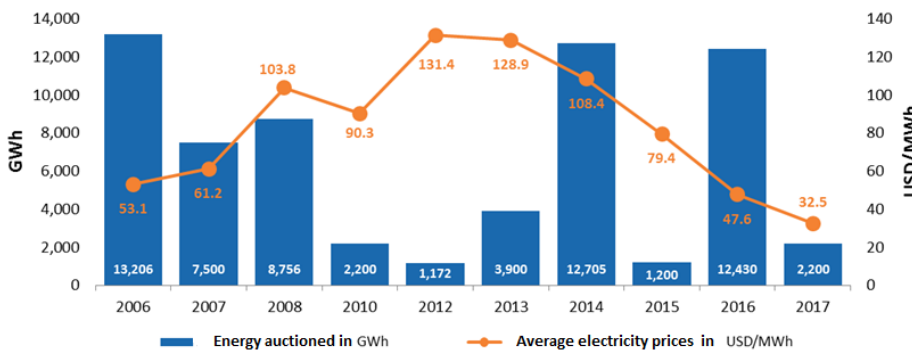


Figure 1: Energy auctioned and average prices in Chile from 2006 to 2017

Source: Ministry of Energy, Chile

by the CNE.

Results of this regulatory changes can be seen in Figures 1 and 2. Prices peaked in 2012 and from 2013 to 2017, average winning prices dropped 75%, reaching levels even below the 2006 auction.

Competition increased to levels never seen in Chile. From an average of 3 bidders in 2006-2013 period to an average of 41 bidders in 2014-2017 period. It is important to remember that renewable cost also dropped over this last period, in particular solar PV and wind turbines.

For that reason, it is not possible to say that all the success in terms of prices is due to more competition. However, it would not have been possible to take advantage of this drop in cost without the regulatory changes that were introduced at that time. In 2015, bidding conditions changed from the standard 24-hour block to three time-blocks with certain amount of energy. This is a more suitable

scheme for intermittent power generation from non-conventional renewables like wind or solar. The major reduction in renewables’ cost led to 2017 auction winners to be only renewables. In conclusion, it is important to do regulatory changes at the proper time to take advantage of technological change.

### Remaining issues of LTC auctions and future considerations

As the Chilean experience shows, LTC auctions can be a powerful energy policy mechanism. From one part, it attracts investment on capacity and on the other, it allows an increase in competition in the generation market. In general, new capacity auctions have attracted the interest of both domestic and foreign investors. Potential suppliers have included a wide range of technologies, fostering technological change. Although the use of LTC auctions cannot fully mitigate price volatility, it gives investors the opportunity to control part of the risks by setting the volume contracted and the price. As a result, it is possible to have a market-based mechanism that provides adequacy at competitive prices.

The experience shows that it is better to have

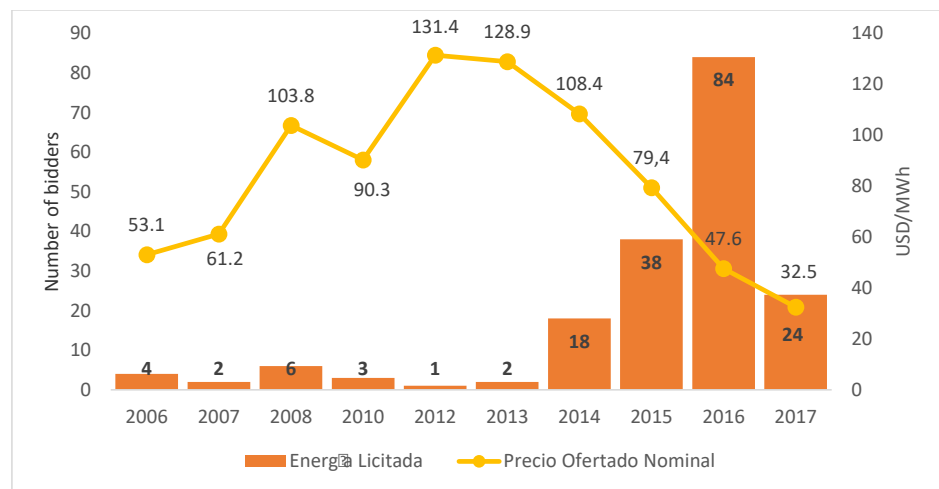


Figure 2: Number of bidders and average prices in Chile from 2006 to 2017

Source: CNE, Chile

centralized auctions, with homogeneous products and rules that reduce barriers to entry. However, the devil is in the details. In this section I will focus in some of the key issues that LTC auctions have to consider, in particular, for the case of Chile, but with important lessons elsewhere.

First of all, conditions that reduce uncertainty to bidders reduce offered prices. For this reason, the possibility to delay the initial date of a contract can be very important for a new entrant. However, in the case of Chile LTCs are not “take-or-pay” contracts. This introduces demand uncertainty to potential bidders if auctioned demand is not in line with the real or effective demand. This is an increasing problem in Chile. For customers between 500 Kw and 2 Mw it is optional to be a regulated customer or a “free” client that can have a direct contract with a generator or a distributor. Since regulated prices have remained over the free clients’ average price, plenty of consumers in this range have opted to move from regulated to free contract conditions. This effect has exacerbated the demand uncertainty for new entrants in future auctions. It is efficient that the agent that can mitigate the uncertainty has to face it in order to internalize it. Since generators, in particular new entrants, cannot cope with this kind of demand uncertainty, it is important that the regulator can establish conditions where the value of the contract is not diminished because of a sudden reduction in expected demand.

The problem of demand uncertainty led us to the second issue: how LTC auctions can live with a retail market. Auctions were designed as an adequacy tool that can bring competitive prices to the contract market. Retail markets are introduced to increase competition in the distribution sector and allow for new services to final customers. If electricity prices are determined in LTC auctions, that left a small room to retail companies if they want to compete in prices. In the case of Chile, where the introduction of retailers is under discussion, the CNE acts as a large buyer that minimize the transaction cost of contracting supply for the long term. As experience shows, when distributors were in charge of auctioning LTC results were disappointing. How to bring the best of both instrument to the electricity sector? It is likely that the best combination is to keep an LTC auction mechanism to supply the minimum amount of adequacy to the system and introduce retail in the form of medium and short-term contracts. A well-designed transition period is key for the success of this policy and having the opportunity to introduce changes along the way.

A third problem, in the case of Chile is related to the characteristics of the new renewable technologies. Since LTC auctions were design to increase competition, they have to be done with

years in advance to effective supply. However, since technological change had made solar PV and wind very competitive, they are winning all recent LTC auctions and the amount of time needed to install them does not require more than two years. For that reason, renewable developers are betting on what could be the development cost of these technologies in five more years. If there is any kind of “winner’s curse”, some of these developers can go bankrupt and projects will not be built. It is necessary to have a good balance between a mechanism that reduces barriers to entrants but does not increases market uncertainty.

Also, the arrival of intermittent renewables at low cost have displaced baseload technologies in LTC auctions. As the share of these renewables grow, auction design will have to consider more features than just minimum price since a rising demand for flexibility in the electricity systems could not be covered by LTC auctions.

In sum, LTC auctions have been proven as a useful tool for current problems in electricity markets. How to have an efficient amount of adequacy at competitive prices is one of the most difficult problems that electricity regulation has to face. However, as technology changes and policy challenges appear, it is important to re-think its design. There is no doubt, that LTC can be a powerful mechanism in a decarbonization strategy where old units are replaced by renewables that need contracts to finance their investment. However, auctions have to be compatible with the decentralization process we are living at the distribution level as well as to cope with the new developments in terms of technologies for electricity supply, in particular non-conventional renewables.

#### Footote

<sup>1</sup> Maurer and Barroso (2011) give a good description of the auction experience in different countries before the renewable boom

#### References

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