CHILE: The Renewable Energy Factory

Julio Fiol
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H.E. Mr. Julio Fiol was assigned as Ambassador to Japan in December 2018 with a 34 year career in the diplomatic service. Before his arrival was appointed as DCM in Washington D.C. and serving as Consul in New York and Miami. His assignments have represented Chile to Italy and Mexico, the Social Division of the UN, the hemispheric Security Conference, the Academy of International Law in The Hague, and the Committee on Constitutional and Legal Affairs at FAO. In Santiago he was Chief of Staff of the Directorate General of Consular and Immigration Affairs and National Director of Frontiers and Borders of Chile under the Chilean Foreign Ministry and later Vice Director General for Disarmament Affairs and International Security. He is a graduated lawyer and added courses at the Institute of International Studies, both from the University of Chile.

I am sure most of you are familiar with Chile, a relatively small however interesting country with its singularities. Monetary interest rate and inflation have been under control for at least the last 3 decades. Sovereign ratings are only comparable to fully developed OECD economies.

Our performance lays on strong institutional pillars: Rule of law, solid institutions, clear government politics & macroeconomic stability. Global rankings continue considering Chile as the leading economy in Latin America in terms of Economic Freedom[1], just below Germany as for Business Environment, according to EIU[2]. Best Countries for Doing Business[3] and WEF[4] has been ranking Chile as the #1 most competitive nation in Latin America for the last 20 years !!!

Our high standard Sovereign Ratings[5], including since this year the JCRA[6], have set us for a long time as reliable partners in an attractive investment environment which has defined a strong inward FDI of abt 20 billion USD (annual average). In a global point of view a healthy, stable world class economic performance country for at least the last 3 decades. Stability and not volatility is in the core of our country policy.

Our country was born naturally isolated, with the Andes on our back, the Atacama desert in the North, Antarctic icelands in the South and our common Pacific Ocean in the west. As so, the focus had to be shifted to be driven for years by recognizing and connecting opportunities on our external sectors. In this case is sharing the investment opportunities in the new energies sector, specifically the electric sector and its relation with world's SDGs[7], a critical strategy for the planet.

The basic concept of our electric market has been called "active transparency" in a cost efficiency structure. This is enforced by the ministry of Energy by means of it's regulatory and control institutions: the National Energy Commission (CNE) and the Superintendency of Electricity and Fuels (SEC). They relate to the overall regulation and standards.

The third key player is directly involved with the operation of the system in its whole acting. It is the National Independent Electric Coordinator, known as Coordinator. It coordinates 442[8] generation & transmission companies in a joint operation at minimum cost. In the short term defines capacities on demand, determines on line spot transaction tolls among generation companies on instant marginal costs and in the long run it develops studies and reports about expansion needs and future trends which will be called in public tenders whenever needed. This is its mandate: to assure sufficiency and security of the national electric system, guaranteeing access to all transmission systems for everyone who requires it, providing full, open on line information for everybody in order to guarantee transparent decisions.

Public tenders are called to supply energy to the

regulated sector[9]. Prices of these tenders have been falling the last years significantly and, according to the last figures, it was roughly over USD 32/MWh. This is one of the most competitive prices of energy in the world.

As for those clients, whose connected power exceeds 5000KW[10], the law provides full price freedom, assuming their negotiation power and the possibility of providing electricity on a self-generation base or with direct supply from generators.

Strictly speaking there is a mid condition in this group of free clients. When connected capacity is greater than 500KW and under 5000KW, they can choose which regime to subscribe (free or regulated), for a period of 4 years. During the last 2 years regulated clients have increasingly migrated due to the free system. Lower generation costs coming specially from solar farms have allowed this trend which is expected to continue increasing.

Generation segment is an attractive open marketplace

The matrix of our national electric system is mainly based on a thermo - hydro generation. Total installed capacity (May 2019)[11] is 25.1GW and anual growth rate has been in average about 3%. Gross generation cummulated during 2018 was 75.541GW with an anual growth rate of 2%. As per May 2019, 47% of our matrix is coming from renewable sources, almost 27% from hydropower, part as traditional big reservoirs and the rest in many run-off or by pass generation companies, 10.4% solar, 7.7% wind and 1.8% biomass energy, geothermal energy is minimum.

The other two main sources are non renewable : coal (22%) and LNG[12] (19.4%). Diesel or oil derivated fossil fuels have been decreasing, however they still represent 11.4% of the grid, basically in some more isolated areas of our territory or as backup.

Regarding new renewable sources, private investors make decisions based on signals, information and business environment. It is widely known that it has been steadily growing and now represent almost 20% of our national grid. It grew 3 times during the last years. In 2014 only 6% of our grid came from solar. In 2018 over 13% of our energy comes from solar sources.

If we only concentrate on projects under construction, the next chart illustrates their estimated singularities in terms of timings to be operating, investment figures and unitary costs[13].

Solar and wind projects accomplish over 85% of the total renewable power pipeline[14]. They also have shorter construction timings to operate and lower gross investment figures.

The highest investment is still solar thermal generation (CSP & other) however these sources have other conditions that make it a very favorable option. They operate as a large electricity storage systems which avoid, at a low cost, the intermittency of non conventional renewable energies.

The first CSP project in South America (Cerro Dominador) will start operating in the next years with CSP-tower technology that flattens energy supply, solar during the day and thermal during the night. Asian and multilateral funding is considered in it's finantial strategy. Another thermal-solar plant (Valhalla), a pumped hydro storage plant will operate a 600MW PV[15] solar during the day to pump seawater that is returned for generating hydro energy during the night. This is now considered one of the most innovative infrastructure projects in the world.

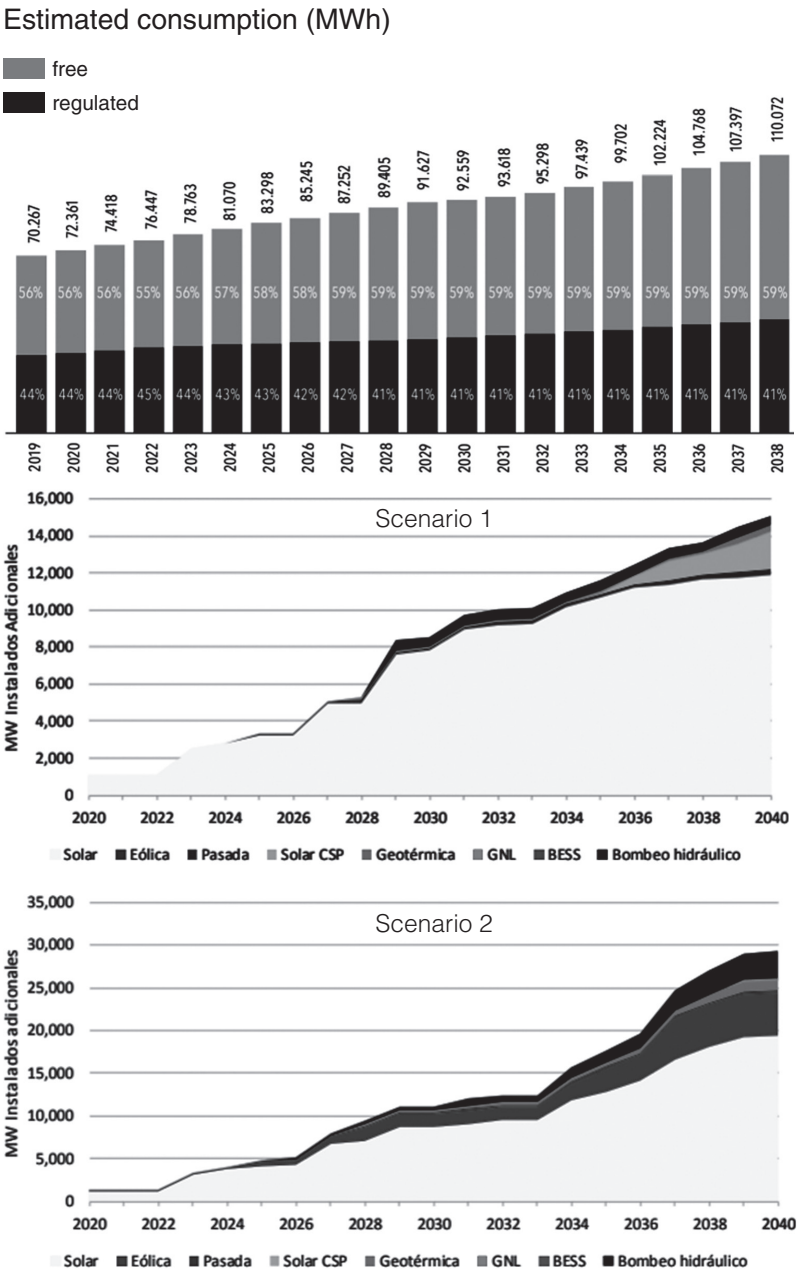
Decarbonization strategy will lead future trends for investment

Last June President Sebastian Piñera announced the initial phase for decarbonization of our national grid. No more coal based plants will be opened and the first 1.047MW, about 20% of the actual grid will be gradually closed starting this year with 2 old plants.

This process has placed a special pressure to assure future demand. Last outlooks carried on by the National Electric Coordinator indicate that in 2038 demand will have increased around 57%, mainly guided by the increase of free clients growth.

As it can be seen the main additional sources considered in this forecast are solar and wind. In a highly dependant hydro grid, 2 main scenarios are considered for climate and specially low precipitation situations. By 2030, in the normal situation (Scenario 1) additional solar penetration is estimated to be between 6.5GW to 11GW and wind power between 2GW to 5GW. For the climate stressed scenrio, additional supply must be doubled reaching additional supply of about 30GW. All this must be carried with a competitive insertion of storage technologies, the next technological revolution to allow this massive growth, and one of the "biggest private mportunity in all of history"[16].

These renewable sources will help cleaning footprints for mining industry processed in Chile, and this will be the key element for electromobilty revolution. Green energy for green copper and green batteries for electric vehicles.



1 Heritage Foundation (2018)
2 Economist Intelligence Unit
3 Forbes (2018)
4 World Economic Forum
5 Moody (A1 stable); S&P (AA- stable); Fitch (A stable); JCRA (AA- stable)
6 Japan Credit Rating Agency (2019)
7 Sustainable Development Goals (in relation to Environment)
8 CNE: Monthly report ; May 2019
9 SMEs and residential customers; End users whose connected power is less than or equal to 5000 KWh
10 Free clients
11 Gigawatt = 1,000 MW = 1,000,000 KW
12 Liquified Natural Gas
13 Fuel cost not included
14 CNE: Monthly report ; May 2019
15 Photovoltaic solar plant
16 Al Gore (1975)

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