

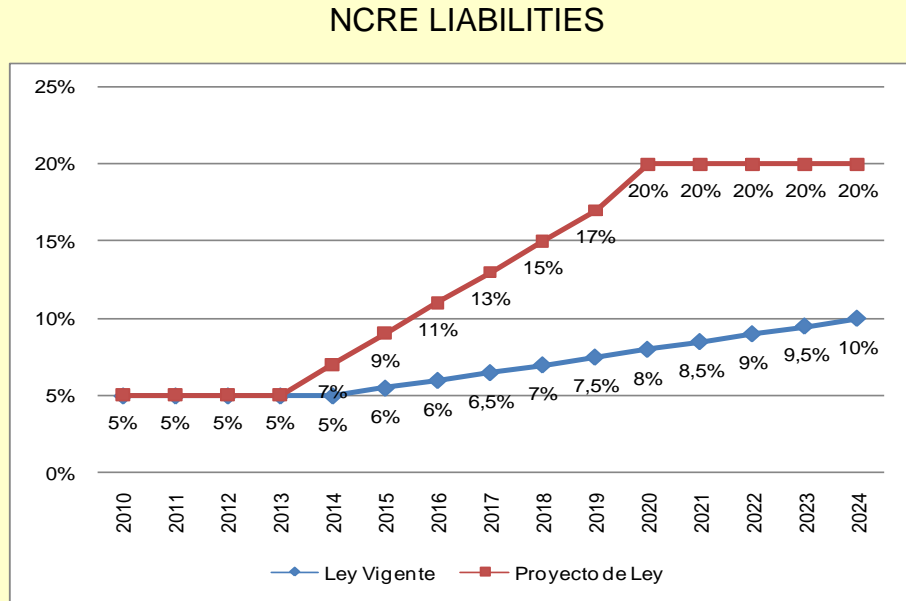
Energy Matrix: Blindness of the Bill 20/20

A reasonable energy policy should avoid the development of economically and environmentally expensive projects. On the contrary, a country like ours, endowed with plenty of hydric resources should foster their use, since it is a clean, safe and inexpensive generation source. In fact, this is what developed countries have done.

Recently, the Senate unanimously passed the bill which “promotes the extension of the energy matrix through non-conventional renewable sources”, known as Bill 20/20.ⁱ This bill, inspired on the President’s announcement regarding the achievement of the 20% goal in Non-Conventional Renewable Energies (NCRE) by 2020, establishes a legal obligation to guarantee the fulfilment of this commitment, through the amendment of article 150 bis of Law 20,257.

Currently, the Law obligates the electric companies to certify that 5% of the equivalent annual energy, under agreements subscribed after August 2007, comes from NCRE, a proportion that gradually increases starting 2015 in order to achieve the 10% goal in 2024. The bill 20/20 reduces these terms and increases the requirements (Chart 1). Moreover, it imposes other conditions, since it stipulates that (i) once published, all the contracts, renewals, extensions or other subscribed agreements, including supply contracts signed before the present amendment, shall be liable to the fulfilment of the whole liability; (ii) at least 50% of the authorized withdrawals shall correspond to injections made in the respective electric system; and (iii) the liability shall not be considered discharged by the payment of a ceiling charge, it shall rather be fulfilled on the following year. Likewise, the approved bill introduced public biddings twice a year for the injection of energy blocks derived from non-conventional renewable generation means by primary energy source, with prices guaranteed for 12-year terms.ⁱⁱ

Chart 1



Source: Prepared by LyD

Considering the bill's draft as it is today, it is possible to assert that the new legislation is going in an erroneous direction, which could entail a significant cost increase and an important rollback in the operational reliability of the electric system, which would strike both the residential customers and the productive activity. In this scenario, it seems surprising that the bill was unanimously passed in the Senate; therefore, we feel compelled to draw the attention on its consequences before the second constitutional proceeding in the Chamber of Deputies.

NCRE Availability and Costs Associated to the 20% Goal

It has been argued that the purpose of the bill 20/20 is to diversify the energy matrix and further develop clean generation. However, little has been said about the costs involved and the efficiency of the measure to achieve these goals.

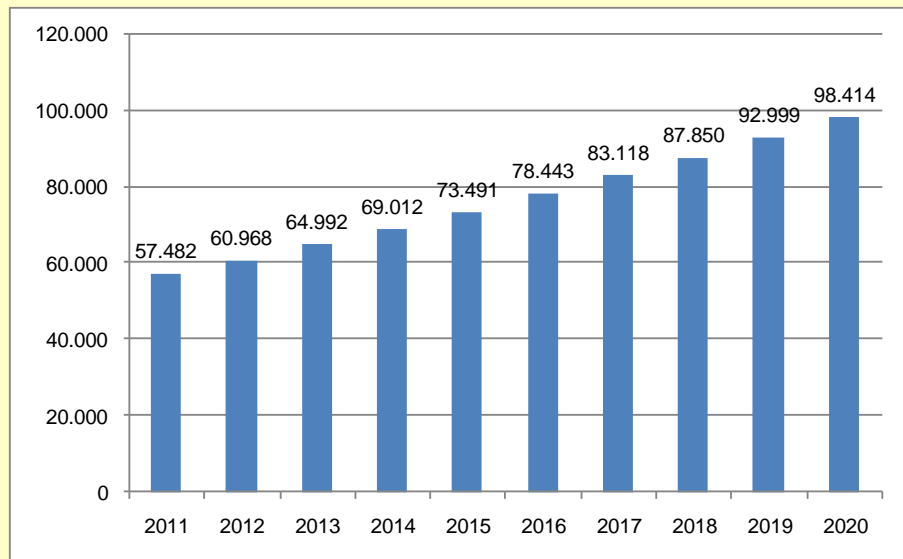
Thus, it is necessary to have some idea of the actual resources availability to generate electricity based on these technologies. It is not the same to have an endless NCRE generation capacity at low cost – in which case there would be no reason to force its introduction into the system, because they would enter in a competitive form -, than to be faced to increasing restrictions to

develop them, as a result of the gradual depletion of alternatives with easier access, exploitation and higher performance.

How much NCRE generation is needed to comply with the bill 20/20? According to the energy consumptions estimates by the National Energy Commission (CNE, in Spanish), the total electricity consumption in the main electric systems, SIC (Central Interconnected System) and SING (Electric Energy System of Norte Grande), would increase from 57,482GWh in 2011 to 98,414GWh in 2020, which means an average growth of 6.2% annualⁱⁱⁱ (Chart 2). So, the bill 20/20 would force the generation of more than 19,500GWh with NCRE by that date, which means to incorporate 5,000MW derived from non-conventional sources to the system between 2012 and 2020. It should be noted that the works plan of the CNE estimates for 2020 an additional installed capacity of NCRE of 1,345MW between SIC and SING (in relation to 2011), a substantially lower figure, which reveals that the introduction of NCRE should be strongly forced to achieve the expected goal.

Chart 2

DEMAND ESTIMATES, SIC+SING (GWh)



Source: Node Price Report, CNE (October, 2011)

The above numbers raise several questions concerning the potential higher costs involved in generation and transmission to achieve the goal 20/20, such as the surcharge for compensating CO₂ emissions,

if this were the objective.^{iv} This situation could be critical if the real potential for efficient development of existing NCRE projects is limited.

The analysis by C. Muñoz, from AES Gener, calculates the cost of meeting the 20% quota by 2020 in the SIC and SING.^v The survey incorporates the uncertainty of investment costs, plant factors and potential of each NCRE technology, by modelling probability distribution functions and making independent Montecarlo simulations in each variable, so as to cover all the potential scenarios. Considering four values of small hydro potential in the SIC (250, 300, 500 and 1,000MW), the model simulates an efficient offer on the basis of the restrictions of each scenario, with a total of 4x5,000 simulations, and it also allows the interconnection between SIC and SING. It obtains a distribution of possible results based on the different feasible scenarios, which allows comparing the costs' expected value with or without the approval of the bill 20/20.

The survey's results reveal a significantly higher supply cost if the 20% quota is approved by 2020; specifically, the surcharge expected value in relation to the total supply cost of the system without bill 20/20 will fluctuate, by 2020, between US\$443 million and US\$941 million annual, depending on the small hydro potential considered in the SIC, which is equivalent to a differential between 11% and 23% respectively. It should be noted that the model shows a fairly high standard deviation, which means that the surcharges could be considerably higher.

Another survey carried out by Alex Galetovic and others^{vi} reaffirms the aforementioned: the bill 20/20 would be too costly. In fact, the authors estimate that its implementation cost in the SIC would be around 0.25% of the annual GDP, a figure that could be even higher if separate biddings are implemented for energy coming from different technologies. It also indicates the existence of important redistributive effects. Specifically, the social loss of 0.25% of the annual GDP would entail a loss for the consumers amounting to 0.65% of the yearly GDP, which would be partially compensated by the profit of 0.45% of the GDP perceived by some generators (the owners of NCRE generation).

The reason explaining the higher costs associated to the bill 20/20 lies in the fact that the resources availability for NCRE projects is limited. According to the Galetovic survey, since the development costs are not linear (growing offer), only a limited number of NCRE

projects would be as efficient as the generation by conventional sources. Actually, no more than 5,000GWh of NCRE can be developed in an economically efficient manner at the price of charcoal generation (approx. US\$75/MWh).

From the environmental perspective, the bill 20/20 is not efficient either, because it is a fairly expensive way of contributing to the reduction of global emissions. Muñoz's survey concludes that the 20/20 quota mitigates the CO₂ emissions at an average cost between US\$66.5 and US\$105.4 per CO₂ ton, also with a high standard deviation; a figure many times higher than the cost paid by European countries, since the CER (Certified Emission Reductions) value is currently traded in the European markets at nearly US\$15 per CO₂ ton (and they have never exceeded US\$45/CO₂ ton).

Galetovic also agrees that Law 20/20 is environmentally inefficient. On the one hand, local emissions were successfully reduced through the Environment Assessment System, and was complemented by the recent Emission Standard for Thermoelectric Plants; we believe that this is the right way to handle this, - not a NCRE law. On the other hand, neither is the global emissions problem solved with the bill 20/20, since, as the authors indicate, the NCRE forced into the system would mainly replace base plants, especially conventional hydroelectric plants which are as clean as the former ones, so that the environment benefits would not be observed either.

An additional issue which deserves attention is that the bill 20/20 would entail the introduction of NCRE that would replace conventional generation sources in the following years at a speed that is clearly unfeasible. As a matter of fact, the works plan of the CNE points out that a new generation^{vii} capacity of approximately 6,550MW needs to be installed by 2020, from which nearly 80% corresponds to conventional sources. If a 20% goal is imposed by 2020, it would be necessary to install a generation capacity based on NCRE almost four times bigger than the estimated one. This means that in the next 8 years, more than 65% of new projects have to be based on these technologies, a rate that has not yet been seen in any part of the world.

The idea of bidding by primary source deserves special attention. It has been indicated that this would further increase the costs, while necessarily forcing the introduction of non-competitive technologies. The "advantage" of a quota system – if there is any – is that it allows these technologies to compete among themselves to generate at the

lowest cost, but when quotas by type of technology are awarded, this advantage is no longer there.

It is also worth stressing that the obligation to certify that energy comes from NCRE should not disappear through the ceiling charge. This liability “at all costs” could entail a limitless cost if NCRE projects are not carried out with due promptness or are faced with excessive development costs. It is foreseeable that the cost of certifying the obligation under these circumstances can be irrationally high, and inevitably, the final customers would end up paying this cost.

Furthermore, the bill imposes that the 20% quota should also be applied to the energy which is already committed in existing supply contracts. In this manner, the proposal infringes the contracts already signed, which only incorporate the cost of complying with the 10% requirement stipulated in Law 20,257 of April, 2008.

Another relevant risk source is that this bill forces the conventional generators, which draw energy from the point where energy is to be injected by the new NCRE project, to buy the energy of this project at all costs and at the price resulting from the NCRE biddings, without taking into account if the conventional generator already met its NCRE obligation.

The above proposals will incorporate an extra risk share to the supply agreements, thus hindering the generators’ participation in the conventional energy biddings, which actually attract investments in the big plants that the country needs.

Renewable Energy is what Matters

The environmental subject is crucial for energy policies, which require promoting the electric generation based on renewable resources. In fact, all sustainability discussions mention the commitment towards renewable energies, and the same happens in climate change debates. In this way, the Zero Draft, published by the Secretary General of the United Nations Conference on Sustainable Development (Rio+20), proposes the commitment of doubling the share of renewable energy in the global energy mix by 2030 through promoting the development and use of renewable energy sources and technologies in all countries.

Along these lines, Chile is an advantaged country because it has a matrix highly concentrated on renewable resources. Renewable energies have actually contributed with more than 45% of the electric

generation in the last decade, a scenario which should not greatly vary as long as new hydroelectric projects are added to the system, and new competitive NCRE projects are developed. Thus, the domestic situation is particularly favourable if compared at global level, where renewable energies account for scarcely 12% of the generation.^{viii}

A reasonable energy policy should avoid undertaking projects that are economically and environmentally expensive. On the contrary, a country endowed with plenty of hydric resources such as ours, should further develop their use, since it is a clean, safe and inexpensive generation source. This is what developed countries have done, which, once their traditional renewable sources have been exhausted, have explored new resources to increase the renewability of their matrices.

Meanwhile, NCRE should keep gradually developing as they turn more competitive through their costs reduction and/or technological improvements. Of course, measures that help fostering their development by way of eliminating obstacles can and should be taken; these obstacles concern the difficulty to access financing, the transmission networks' limitations and the delay in the proceeding of authorizations and permits, among others. This issues were discussed in the report of the Advisory Commission for Electric Development (CADE, in Spanish), and specific recommendations were presented so that truly competitive NCRE projects can be effectively developed, contributing to a cleaner and more diversified electric matrix.

Conclusions

The bill 20/20 is an example of bad public policy, since it could force to massively incorporate NCRE projects despite their inefficiency. The above raises several questions concerning the potential higher costs involved in generation and transmission to achieve this goal; the possible disregard of conventional projects and the risk associated to the base generation capacity; and the potential surcharge for compensating CO₂ emissions.

What is still worst, it is being legislated without much knowledge about the real potential of each source, which has entailed the underestimation of the surcharges involved in these measures. Surveys reveal that there is not enough potential of efficient NCRE to achieve the goal, which would increase the costs at levels much higher than those estimated to date, because it is assumed that the

costs of developing projects are constant and similar to the current ones, but the offer curve has actually a strongly positive steepness. Moreover, the mitigation costs for Greenhouse Effect Gases would also be extremely high.

An even more negative scenario would be that the obligatory introduction of NCRE is made through biddings differentiating by technology, instead of having them compete among each other, which would further increase the costs.

The way of promoting a clean, safe and inexpensive matrix is through the use of our hydric resources. The development of renewable energy has actually been the primary point in the discussion on sustainable development in the world, and no difference whatsoever has been made between conventional and non-conventional energies. Anyhow, it is convenient to progress in eliminating the obstacles for competitive NCRE projects.

In brief...

BILL 20/20 IS EXTREMELY COSTLY:

- The bill is drafted in such a way that the new legislation could entail a relevant cost increase and reduce the operational reliability of the electric system.
- Surveys estimate that the cost of implementing the initiative in the SIC could be close to 0.25% of the annual GDP, a figure that can further increase if separate biddings are implemented for energies derived from different technologies.
- Neither is the project efficient from the environmental perspective, since it is a quite expensive way of contributing to the reduction of global emissions.

ⁱ Introduced in September, 2010 in a motion presented by Senators Orpis, Allende, Rincón and Horvath (Bulletin N° 7,201-08).

ⁱⁱ A maximum price equal to the long-term average cost for developing the system's efficient expansion project is established in these biddings, which could be increased by an

additional 10%. It is additionally indicated that the spot price, in each bar of the system, should be the resultant of the weighted average, due to the injections of each bar, the instantaneous marginal costs and the energy fixed price derived from the NCRE awarded in the bidding process.

ⁱⁱⁱ Actually, approximately 100,000GWh must be generated, since transmission losses of the high tension network should be included.

^{iv} It should be noted that the Ministry of Environment is also designing another 20/20 aimed at reducing by 20% the greenhouse gas emissions by 2020, a goal which is surprisingly and completely dissociated from the NCRE 20/20.

^v The survey is based on the bill 20/20, fulfilling compliance restrictions at all costs of the NCRE quota, with at least 50% certified in each system. However, it assumes efficient NCRE biddings (by price), and no quotas being awarded by type of technology.

^{vi} Galetovic, A., Hernández, C. Muñoz, C. and Neira, L.M. "Los efectos ambientales y económicos de la ley de renovables 20/20", presented at the Regulation Workshop of Libertad & Desarrollo on January 18th, 2012.

^{vii} Including plants already being constructed, such as Santa María and Bocamina 2.

^{viii} The estimates of the World Economic Outlook point out that, in the best of cases – if more rigorous measures were applied to control GHGE emissions – this share could amount to 34% by 2035.