

Chronicle of a Crisis Foretold: Energy Sources in Chile

By Ricardo Raineri*

In 2006, Chilean per capita GDP reached almost \$ 9K (\$ 13K in PPP), and since 1980, GDP almost tripled with energy consumption following a similar trend (Figure 1). This tight relation between energy consumption and economic growth contrasts with the relation between GDP and energy consumption growth in more developed countries, where the increase in energy consumption lags behind the increase in GDP.¹

Chilean energy needs are satisfied from diverse primary sources like oil, natural gas, coal, hydroelectricity, wood and others (Figure 2). In the 1990s, and to satisfy the growing energy needs and because of the depletion of national fossil fuel resources, Chile increased its imports of oil, natural gas and coal (Figures 3 to 5). Today, Chile imports 68% of the energy consumed, with imports of 98% in oil, 73% in natural gas, and 88% in coal. A large share of these imports comes from Argentina, 73% of crude oil imports in 2002 and 37% in 2005 (Figures 6 and 7), and 100% of natural gas imports. Only hydroelectricity and wood are locally supplied.

In the early 1990s, 70% of the electric system installed capacity was hydraulic and highly exposed to adverse dry weather conditions, and it was only after an episode in the late 1980s when electricity supply was at risk that policy makers, investors and industry analysts convinced themselves on the need to diversify the energy mix to assure the supply of electricity independent from the prevailing weather conditions. At the time, the country also faced a growing demand for a clean and inexpensive source of energy which could provide a deep breath to the highly polluted capital. Both objectives seemed to have found an answer when the chance to import natural gas from Argentina became a reality. For that purpose, in 1995 Chile and Argentina signed a protocol that served as the institutional framework to backup the companies' private contracts between natural gas producers in Argentina and consumers in Chile. Under this scenario, private investors connected Chile and Argentina with large gas pipelines, from north to south.² In Chile the transportation infrastructure was complemented with large investments in natural gas power plants and natural gas distribution facilities, as well as infrastructure to substitute more expensive and less clean fuels in industrial processes and household consumption. In 2004, as a result of these large investments, Chile imported about 18.5 million m³ of natural gas per day from Argentina, representing almost 15% of Argentina's natural gas production. Roughly, one third of natural gas imports were used for electricity generation in the two largest electrical systems, one third was for the Methanol plant installed in the extreme south part of Chile (XII Region), and the remaining one third was for industrial, retail and household consumption, and the State-owned Oil Company refineries. The reliance of Chile on Argentinean natural gas evidenced its weakness in 2004, at a time when Chile imported 22% of its energy needs as natural gas from Argentina. At that moment, the severe price distortions and macroeconomic imbalances that affected the Argentinean economy caused its government to set stringent export constraints on natural gas, with disruptive results on natural gas exports to Chile. Thus, since 2004 Chile has faced an increasingly reduced supply of natural gas from Argentina, with the deficit of the restricted supply reaching peaks above 80% of the contracted supply with Argentinean producers (Figure 8).

The starting point of the energy shortage that affects the Chilean economy lays in the macroeconomic imbalances that affected the Argentinean economy that blew up in 2002 with the end of the fixed exchange rate regime (regime established in 1991 to deal

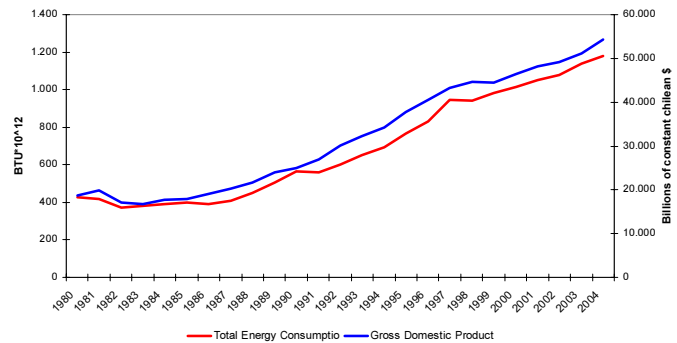


Figure 1
Chile Energy Consumption and Gross Domestic Product

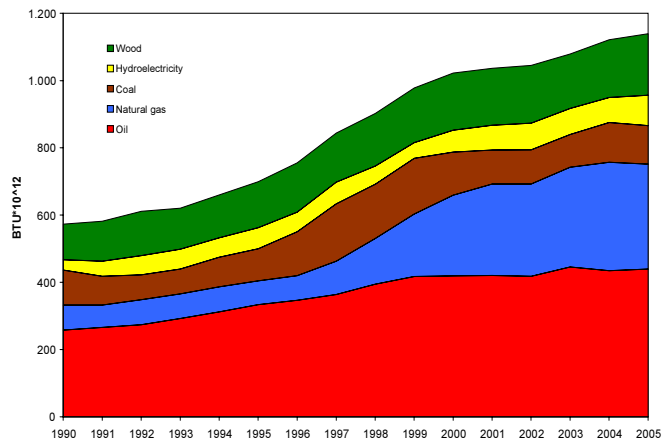


Figure 2
Primary Energy Consumption by Source

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See footnotes at end of text.

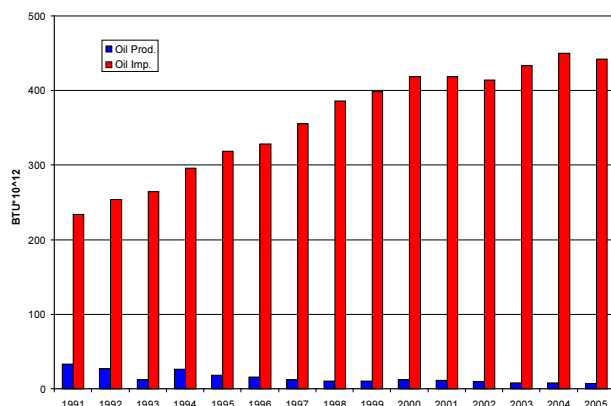


Figure 3
Crude Oil Production and Imports 1991-2005

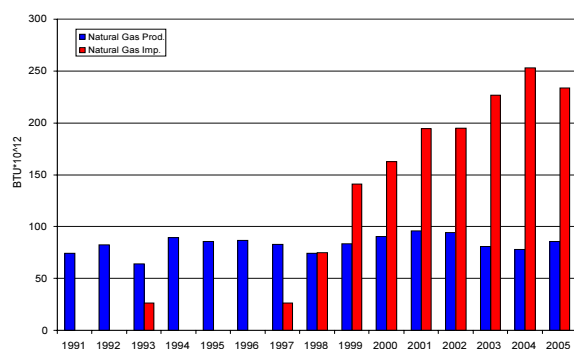


Figure 4
Natural Gas Production and Imports 1991-2005

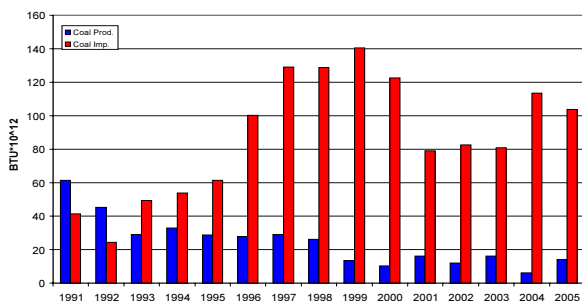


Figure 5
Coal Production and Imports 1991-2005

with hyperinflation; the exchange rate was set at one Argentinean peso for one American dollar).³ This triggered one of the deepest governance, political and social crisis in a Latin American country during the last decades. After the devaluation and in a short period of time, the Argentinean peso dropped to a rate of three pesos per American dollar.⁴ Misery is what best describes the immediate effects of devaluation. Devaluation resulted in huge changes in relative prices with dramatic effects on incomes and employment. According to World Bank studies, between October 2000 and October 2002, the percentage of the Argentinean population under the poverty line increased from 33% to 58%.⁵ After the devaluation, and as an attempt to control its adverse effects on the population and inflationary pressures, the Argentinean Government set price controls to contain inflationary pressures and pacify the increasing social distress. In particular, the natural gas price was set artificially low compared to other fuel prices and world market fossil fuel prices. After the worst part of the 2002 crisis began to yield and complemented by the artificially low domestic price for natural gas, the domestic demand of natural gas in Argentina increased, sharply decreasing the surplus available for exports. On the supply side, and resulting from the low prices received by Argentinean natural gas producers, the incentives to invest in exploration and development of new gas fields and facilities were eroded and the Argentinean natural gas industry started living based on past investments. As price distortions continued, spare capacity and reserves dried out, and in an effort to assure the domestic provision of natural gas in 2004, Néstor Kirchner's administration imposed constraints on natural gas exports, requiring natural gas producers to fulfil domestic consumption contracts, at the artificial low domestic prices, before satisfying their export contracts.⁶

The current shortage of natural gas that the Chilean economy is facing has adverse effects on the electric industry as well as residential customers and industrial processes. About 35% of the installed capacity corresponds to power plants intended to be fuelled with natural gas.⁷ Also in Chile, since the year 2000, due to the world markets' fossil fuel price increases and the restricted supply of Argentinean natural gas, electricity prices more than doubled, with additional increases expected because of the critical conditions for the electric system foreseen for 2008 and 2009. Currently, to deal with the high dependency that Chile faces on Argentinean natural gas imports, the State-

owned Oil company (Enap), the largest power electric generator (Endesa Chile), the main natural gas distribution company (Metrogas) and a foreign LNG supplier (BG) have decided to build an LNG importing plant. Unfortunately, it seems that this plant would not be in operation before 2010.

Following the trend of Chilean economic reforms since the 1970s, in the 1990s the political unrest, which used to characterize the Latin America region, gave way to more orthodox economic policies supplemented with large privatization programs of previous state monopolies. At the time, the renewed political orientation that followed free-market economic principles and a strict respect for property rights was the groundwork where Chile and Argentina agreed for a broader economic integration and an open trade of energy within both countries. However, this brief window of orthodox economic policies came to an abrupt end in the late 1990s, and today many Latin American governments have turned left.

President Hugo Chavez leads the more extreme positions, which tries to implement populist formulas that have failed in the past. President Chavez is heading radical reforms with provocative speeches, remembering that Latin America is a place where the old ideals of radical socialism, the Cuban formula, and the concept of the Welfare State are still attractive for a large share of the population who feels that

in the 1990s the liberal economic policies were unable to provide an answer to their social demands in a timely manner. Ludwig von Mises (The Freeman, May 4 1953) indicated that the core idea of the Welfare State was originally established by Ferdinand Lassalle (1825-1864), positing that the State has practically unlimited resources to make all the citizens happy and prosperous, that it should nationalize large companies, develop those projects for which there is no capital, redistribute national income, and provide all the citizens with health, social security, education and housing, from the cradle to the grave. Today this concept of Welfare State is a bright idea in Latin American countries.

South America has large oil and natural gas reserves (mostly Venezuela and Bolivia), as well as renewable energy sources, and there are large returns to complement their electricity, gas, oil and other fuels markets. However, under current geopolitical conditions, the integration should be analyzed carefully considering the political imbalances that may arise within exporting and importing countries. In the case of Chile, further integration of regional energy markets is not the way to solve its fossil fuels problem.⁸ Chile has a vivid experience of increasing its energy dependency on neighbouring countries, on oil and natural gas, where, after turning the corner, it was locked in a critical condition and in the short term is lacking inexpensive alternatives to solve the restricted natural gas supply problem without a major adjustment in domestic energy prices and the impoverishment of its population. Particularly, and at odds with what happened with oil imports from Argentina, where the country has more flexibility to substitute crude oil imports (see Figures 6 and 7), in the case of natural gas in which Chile was locked in, it had almost no alternatives to fuel the new natural gas power plants that represented most of the electrical system expansion since the late 1990s.

Chile has a history of conflicts with neighbour countries; therefore, there it would not find reliable energy sources to solve its long-term energy supply problems. Even though Chile has strongly supported the promotion of friendly relations with neighbouring countries, Chile must look for a solution to its energy supply problems within its internal boundaries and beyond neighbouring countries, within other American countries or world economies, who share the principles of free a market and a strict respect for property rights. To achieve the objectives of secure, clean, and affordable energy supply, Chile must progress further to:

- Increase market liberalization, particularly in exploration and exploitation of oil and natural gas;
- Promote reliable international alliances;
- Promote market mechanism for the efficient use of energy;⁹
- Remove market and bureaucratic barriers that slow down the introduction of new technologies and the development of large projects, like large hydroelectric power plants and transmission lines;
- Improve the procedures to speed up the environmental analysis of energy investment projects, without sacrificing environmental requirements;
- Develop the capabilities, legislation and regulation required to safely allow the development of all competitive sources of energy;
- Recognition for its high standards of legal certainty; and
- Work a flexible pricing mechanism to reflect the real energy costs such as real time pricing

Recently, the Chilean government announced a bill to promote renewable energies. This responds to President Michelle Bachelet's statement, where she stated that by 2010, 15% of the new generation capacity must be produced through renewable energy sources, including small hydroelectric power plants. For this objective, this bill requires from the generators that 5% of the energy sold¹⁰ must come from renewable energy sources for a period of 20 years starting in 2010. The companies that do not satisfy

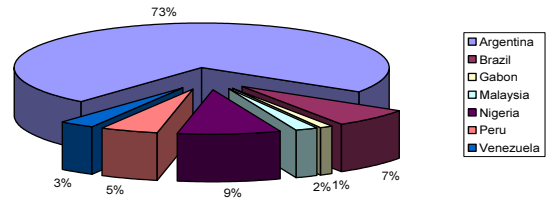


Figure 6
Crude Oil Imports by Country of Origin, 2002

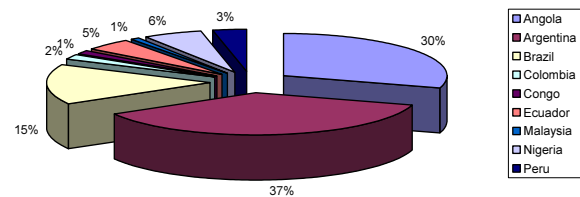


Figure 7
Crude Oil Imports by Country of Origin, 2005

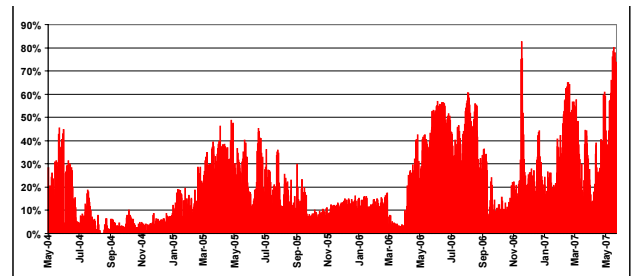


Figure 8
Constraints on Chilean Imports of Argentinean Natural Gas
(% respect to normal requirements)

that requirement must pay a fine for any MWh not certified within the 5% requirement. This penalty in principle makes renewable energies competitive with the conventional sources of energy. Today, renewable energies do not solve all the energy needs. They may be part of the solution for a diversified energy mix, but they will impose an additional charge on the already high energy prices that affect the Chilean population. This point is something that the Authority must carefully watch in the final design of its energy policy.

Footnotes

¹ See International Energy Outlook 2006, Energy Information Administration, DOE.

² Also, in the north of Chile a transmission line was installed to import electricity from natural gas power plants installed in the north of Argentina.

³ Bill on Public Emergency and Reform to the Exchange Regime 25,561, February 2002.

⁴ By mid 2002, there was an exchange rate that almost reached four Argentinean pesos per American dollar.

⁵ Argentina Crisis and Poverty 2003, World Bank Report N° 26127-AR, July 24, 2003.

⁶ Provision 27/2004, Fuels Undersecretary, NATURAL GAS. Approves the rationalization Program for natural gas Exports and Use of Transport Capacity.

⁷ 25% of the installed capacity in the SIC and 60% in the SING are fuelled by natural gas, even though today most of the natural gas power plants have been adapted to also run with oil. However, currently there are critical logistic and storage constraints to supply all the natural gas power plants with oil. The SIC electric system has 70% of the country installed capacity and serves 93% of the population, while the SING electric system has 29% of the country's installed capacity and serves the northern region of the country, where 90% of its electricity production goes to the large mining industry. Further, natural gas distribution utilities for household consumption lack enough backup capacity to substitute for the natural gas required. Thus, currently natural gas for household consumption, for heating and cooking, is under increasing risk because of the increasing restraint on Argentinean natural gas exports.

⁸ This, despite Hugo Chavez is promotion of a greater integration of the energy markets in Latin America. In fact that was clearly reflected in the First South America Energy Summit hosted by President Hugo Chavez in Venezuela's Margarita Island. One of the issues discussed is the ambitious project to build a 5,000-mile (8,000-kilometre) pipeline to deliver natural gas from Venezuela to Argentina, Brazil, Bolivia, Paraguay and Uruguay. Also, in the summit Brazilian President Luis Inacio Lula da Silva ratified his commitment to the expansion of ethanol, which he highlighted in previous talks with President George W. Bush. Other Latin America integration efforts have been supported within:

- SIEPAC in Central America, system that connects a total of six countries, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama with a 1,790 km transmission line with a capacity of 300 MW at 230 kV.
- Andean Community of Nations (CAN) (Bolivia, Colombia, Ecuador, Peru and Venezuela), which looks for electricity and natural gas integration. Current network interconnections exist within Venezuela-Colombia, Colombia-Ecuador and Ecuador Peru, where the largest interconnection reaches 260 MW of transmission capacity.
- Mercosur (Argentina, Brazil, Paraguay, Uruguay and recently Venezuela). Currently there are electricity and gas interconnections between some of these countries as well as between Argentina and Chile.

⁹ The Authority already has an Energy Efficiency Program to develop the policies which should contribute to a more efficient use of energy, and it is working on the development of a labelling program for household appli-

ances. This program has financial support from the The Global Environment Facility (GEF), and participants in the program are Chile, Argentina, Paraguay and Uruguay. <http://www.gefweb.org/>

¹⁰ This applies for energy supply contracts for 2010 on until 2029, for contracts signed since 2007 if the bill is approved.

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