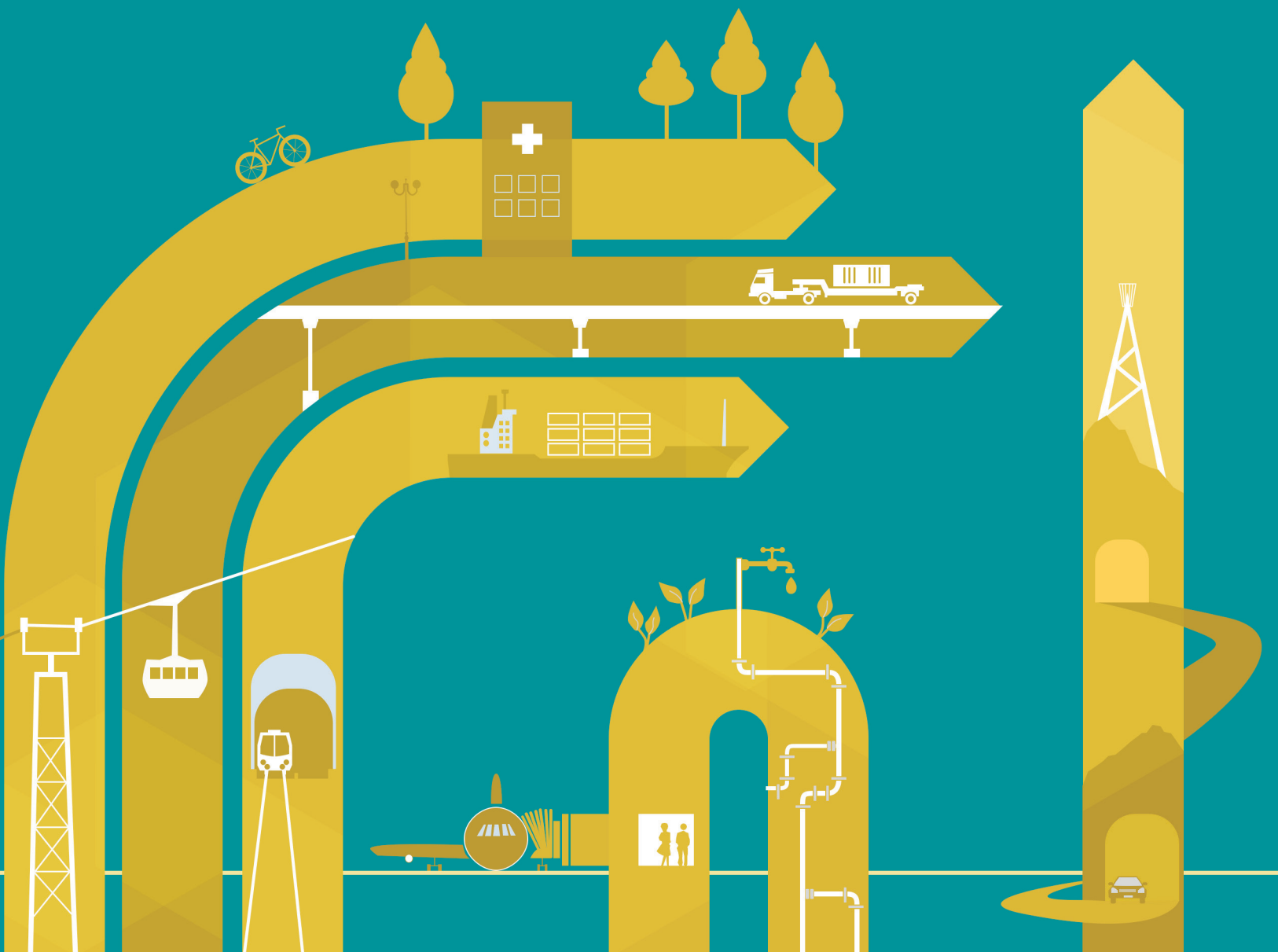
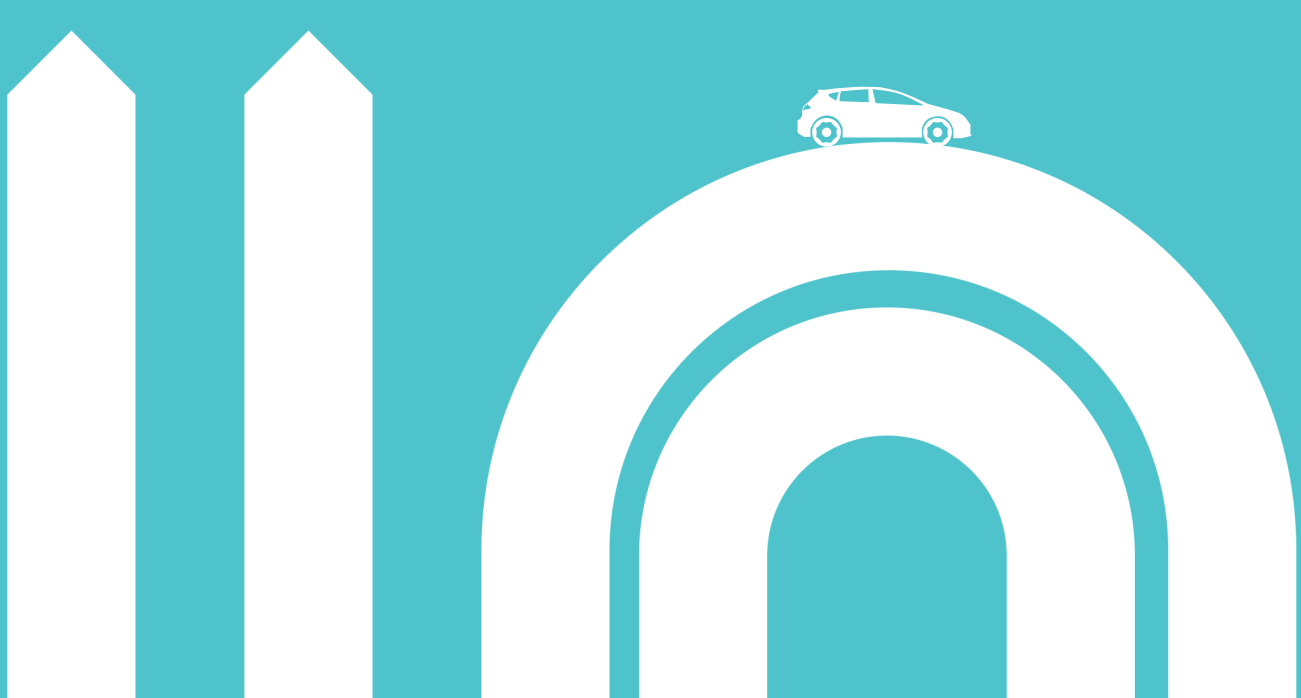
Consejo Políticas Infraestructura

INFRASTRUCTURE FOR OUR DEVELOPMENT

Building a better Chile

May 2017





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INFRASTRUCTURE FOR OUR DEVELOPMENT

Building a Better Chile

2017

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CENTENARIO JUNCTION
Photograph: courtesy of RCQ Ingeniería.

COUNCIL FOR INFRASTRUCTURE POLICIES (CPI)

The Council for Infrastructure Policies (CPI, for its acronym in Spanish) is an initiative that brings together people with a distinguished public and private career in the areas of analysis, design, and implementation of government policies involving public infrastructure and its associated services.

The objective of the Council, established in 2013, is to collaborate with those responsible for developing Infrastructure Policy in Chile, resulting from the dialogue and debate between different sectors of society. To this end, the Council seeks to establish the necessary conditions and contribute ideas to develop a long-term vision and guidance of the initiatives in this field, their expression in specific projects, and their timely materialization in a perspective that integrates economic and social considerations. These proposals aim at providing a framework for the governmental decisions and actions regarding infrastructure.

The CPI holds that Public Infrastructure is one of the main pillars of the social and economic development of nations.

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Chapter

II

PACIFICO SUR TERMINAL, VALPARAISO
Photograph: courtesy of CAMPORT.

INFRASTRUCTURE, KEY FOR DEVELOPMENT

Infrastructure is a central element in the fight against inequality and a catalyzing agent of economic growth. Having high quality infrastructure allows the attainment of objectives such as social integration, equitable and non-discriminatory access to the benefits of development, and increases in the productivity and competitiveness of private companies.

Projections show that in 2025 the population of Santiago will reach 7.5 million inhabitants. The increase in population will have a significant impact on the infrastructure of the city. Only in terms of transportation, it is estimated that on average, people will allocate almost one and a half hours every day to travel to and from work.

Almost 90 percent of Chileans live in cities. This scenario will be replicated, at different scales, in other regions of our country, where deficiencies in roads and connectivity, for example, not only impact the quality of life of people, but also the productivity of companies of all sizes.

The story could be different if we allow ourselves to imagine a different future. What would happen if the most populated areas had electric trams connecting to a modern bus system? If there were fast trains such as those in Europe and Asia, that run at speeds of 200 km/h, connecting cities such as Santiago with Valparaiso and Viña del Mar in just over half an hour? How would tourism flourish in areas of the country that are currently lagging behind due to the lack of paved roads? How many new private sector initiatives would be created if access was adequate?

If these and other conditions were met, it would also be feasible to turn words into actions and materialize aspirations that for decades have been present in private and public

> Infrastructure is a central element in the fight against inequality and a catalyzing agent of economic growth.

statements: that Chile, in addition to being a leader in mining, could become an agro-food power, a commercial and investment platform for Latin America and, why not, a center for business services in South America.

From the design stage to the operation of a large infrastructure project may take up to eight years. Therefore, whenever the urgency arises it is always too late. In dealing with infrastructure, it is necessary to take timely steps to ensure a certain level of investment, and that the investment decisions that are adopted continue to be implemented by succeeding administrations so that gradually bottlenecks that may compromise economic growth are eliminated.

How can we go about it? By developing a powerful public infrastructure investment policy by the State, that identifies projects and priorities that lead to wellbeing and opportunities for individuals and companies.

This "roadmap" would be useful in facing, for example, the inevitable process of population concentration in cities. Achieving such objectives involves having an efficient transportation system that reduces travel times and increases the opportunities of entering the labor market; a greater availability of public services; more leisure, sports, and green areas; and friendlier streets for pedestrians and cyclists.

At a productive level there are also specific impacts from more and better public infrastructure. To mention a few cases, when modern port terminals operate at lower costs, exporting companies increase their competitiveness; expeditious highways generate territorial equity by allowing entrepreneurs in the regions to get to the markets in less time and at lower costs.

For the Competitiveness Global Report of the World Economic Forum (WEF), the first pillar of a country's competitiveness are the institutions, and the second is infrastructure. According to Competitiveness Index, among the 151 countries analyzed between 2006 and 2016, Chile fell in the ranking from place number 35 to 44, declining in all the items that make up the infrastructure dimension.

This shows the need to monitor permanently the public infrastructure that Chileans need; develop public policies to deal with any shortfalls; ensure investment levels that support this policy; design an institutional framework to execute the necessary projects that at the same time provides the necessary feedback to ensure the adoption of the necessary corrections. To improve the diagnoses, the management of existing facilities, and the design of new projects it is essential to have strong information systems that enable continuous monitoring of developments.

Attaining those objectives requires a public sector with the professional and technical expertise to look ahead and make strategic plans, provide content to the plans with adequate projects, sustain the plans and investment programs over time, and ensure their delivery within the specified time and budget. Sadly, our public sector is currently far from these standards despite the efforts made by different governments. We are experiencing a failure of our institutional framework, which needs urgent attention.

To strengthen our institutional framework we need to develop, within the private and public sectors, a shared view of the public infrastructure that we need over the medium and long-term, that goes beyond the individual government in power.

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During the decade of the 90's, the country made a significant effort along these lines, by launching a system of Concessions that contributed to high average growth rates and to an increase in the availability and quality of the public services. The investment effort was lost by the middle of the past decade, and has not recovered.

Although citizens today perceive a shortage of infrastructure and criticize its consequences, there is no public policy to address this challenge. However, the debate that has opened up regarding subjects such as congestion in our cities, lack of health facilities and prisons, and the insufficiencies in our logistics system, have increased awareness regarding the consequences of delaying investment decisions and the costs for the Chilean development process.

The only way to address this subject, with a national vision, is for presidential candidates, who have the legitimate aspiration of reaching the La Moneda (Presidential Palace) in 2018, to commit themselves to our citizens to turn speeches into investment plans and programs that ensure a sustained effort over time, aimed at development and social integration, and with an agreement between the actors involved.

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INFRASTRUCTURE AND GROWTH

Chile was one of the fastest growing economies in Latin America during the past decade. However, after the growth spurt that occurred between 2010 and 2012, the economy has experienced a significant and sustained deceleration.

Recovering the belief that we can be a developed nation in a reasonable period of time, involves achieving a growth rate that is somewhere between 4-5 percent than closer to the 2 percent, which is optimistically estimated for 2017.

Infrastructure may contribute to increased growth by raising investment levels. If today investments in infrastructure reaches 2.5 percent of GDP, it is absolutely possible to reach 3.5 percent in a relatively short period of time. For this, it is necessary for the Government to commit to invest an amount that is close to the historic average of the past ten years, equivalent to approximately 2.1 percent of GDP, and the remainder may be absorbed by a greater private investment.

Empirical studies from international organizations, using data from 88 countries covering 40 years, estimate that the elasticity of output with respect to infrastructure investment fluctuates between 0.11 and 0.23[1]. That is, for every 10 percent increase in investment, production in Chile may be expected to grow between USD 2.97 billion and USD 6.21 billion annually. As infrastructure services are provided over many years, these production increases are really important. This means that investments in infrastructure "are paid for" with greater production in less than ten years, and the infrastructure continues to provide its services from then on.

Increasing investment in infrastructure is a key challenge facing the country, considering that it is a key component of economic development. It plays a vital role in strengthening the productive sectors by reducing transportation and communication costs, thus allowing a larger number of companies to take their products and services to the markets in a competitive manner.

In addition, infrastructure provides a large number of services that directly affect the quality of life of people, the equality of opportunities, and the possibility of enabling and taking advantage of their capacities. In addition, it strengthens social integration by facilitating mobility within a territory and between regions.

1 Rivera and Toledo, Banco Central de Chile (2004); Idrovo, Chilean Chamber of Construction (2012 and 2014).

As the standard of living increases, citizens demand more and better services. It is possible to offer more services by optimizing the use of the available infrastructure, and increasing it.

In our country, there is a significant deficit in this area. Some examples include: the congestion of many air passenger terminals; the need to build more reservoirs to accumulate water for the dry spells; the need to advance in the construction of new hospital facilities to meet health needs; the need to increase the transfer capacity of ports so that they do not become bottlenecks for exporters; etc.

In a small and open economy such as Chile, where most of our growth should come from the ability to compete in foreign markets, it is essential to have infrastructure that strengthens the country's advantages. Thus, it is crucial to have easy access to highways and to have quality ports and airports. The same applies to telecommunications: Internet and mobile telephony are currently an indispensable condition for the development of any company or activity.

In addition, to resume the path of higher growth rates, it is essential to continue expanding and improving our educational and health infrastructure, as well as the urban and interurban transportation network; improve connectivity with neighboring countries and the rest of the world; generate and save energy; expand irrigation; and promote equal opportunities in the regions, among others. All of this must be carried out maintaining high standards of fiscal and environmental sustainability.

By increasing the productivity of economic and social activities, investment in infrastructure raises potential output, that is, the country's production capacity, improving the conditions to transform the current growth effort into a process that is sustainable over time.

A long-term vision of infrastructure must consider the need to improve its quality and permanently optimize its use. For this, it is necessary to incorporate cutting-edge technology and adopt policies that promote innovation though research and development, with a strategic objective.

For this purpose, it is essential that the private sector contribute to the supply of infrastructure and its management, which may be paid, at least in part, with the direct benefits it generates to its users.

WHAT INFRASTRUCTURE DO WE NEED?

The development of new infrastructure requires thinking about the future, which is characterized by uncertainty. It is difficult to estimate, and even imagine the state of the key variables and conditions over long periods of time. However, the decisions made today will contribute to shape the country of the future, thus reducing those uncertainties.

What type of infrastructure will Chile need in the next 25 years? This is a question that the State must answer, establishing national goals for service quality, adopting decisions regarding the balance between environmental concerns and the construction of new infrastructure to supply social services, and between the need for greater social integration and the cost of the works.

Public-private participation also acquires great relevance over the long-term. There will be an increasing need to incorporate the resources and experience of the private sector to augment and improve the provision of public goods and services.

The strategies to be defined must address the demands of the community. Thus, it is a key priority to promote actions that address the key deficiencies that have been identified. One of them is the need to intervene in cities to end the existing socio-economic segregation both in physical terms as well as in the quality of the services provided.

Advancing in this direction will require implementing appropriate housing policies, creating efficient public transportation systems, generating high quality public spaces, adequate water drainage systems, and quality community friendly public buildings, among other measures aimed at improving the quality of urban spaces.

The expansion of Santiago into a mega-city is an example of the challenges that must be addressed. The integration of the inhabitants of the peripheral municipalities, for example, requires an efficient public transportation system that not only reduces costs and travel times, but also enables mobility toward business centers, thus facilitating access to the job markets.

A study prepared by the Fundación Techo[2], examining the relevance of public transportation as an element in overcoming socio-economic vulnerability, revealed that more than 70 percent of the existing shanty towns (campamentos) in the capital city have poor or very poor accessibility, and of these, 14 percent does not have access to public transportation.

There are, also, significant differences in other areas of infrastructure services that directly affect the quality of life of people. For example, the municipalities with the highest income per capita in the Greater Santiago area have more park surface per inhabitant than those with lower incomes. The municipality of Vitacura has 56.2 m2 /inhabitant, the highest figure, while El Bosque barely has 1.8 m2/inhabitant, the lowest in Santiago[3].

To overcome such conditions, current trends have to be drastically modified. To this end, investment in public infrastructure must aim at promoting socio-economic integration by providing a more equitable access to goods and services of all types.

2 Fundación Techo is a non-profit NGO whose objective is to provide housing solutions to low income families. The reference to the study is: Makito Shirahige and Juan Correa (2015). "La desigualdad en el acceso al transporte público en el área metropolitana de Santiago: Análisis mediante la aplicación del modelo PTAL en campamentos y villas de blocks".

3 Ministry of the Environment (2011). Informe del Estado del Medio Ambiente (Report on the Status of the Environment). The World Health Organization has established 9 m2/inhabitant as the minimum acceptable.

INSTITUTIONAL FRAMEWORK

Recognizing the long-term nature of decisions in the area of public infrastructure, addressing the demands for a better quality of life, requires agreement on a **State Policy on Public Infrastructure Investment** to guide long-term decisions and actions.

This State Policy must be based on an institutional framework that is able to identify strategic challenges, based on a forward-looking approach to the country›s future. It should be able to spell out the barriers to development, considering the demands of individuals and regions, while at the same time ensuring the availability of resources for the implementation of the plans and programs. Finally, the institutional set up should provide continuity in implementing the decisions to prevent circumstantial political changes from affecting long-term investment decisions.

Establishing the necessary institutional framework requires an in-depth discussion about the role played by each of the institutions involved in investment decisions regarding public infrastructure, whether they are financed with public resources or through Public-Private Association modalities (PPA). On that basis, complementary functions can be assigned to these institutions, the continuity of their proposals over time can be assured, and the focus on the objectives can be maintained.

Some countries have solved this challenge creating supra-ministerial bodies that advice the ultimate political authority of the State regarding policy proposals, follow up on the implementation by the executing agents, and propose corrections when necessary. This is the case of Australia, New Zealand, Canada, and the United Kingdom, with successful experiences in this area.

PROPOSALS OF THE COUNCIL FOR INFRASTRUCTURE POLICIES (CPI):

1 Short-term:

- Strengthen the technical and managerial teams of the ministries that participate in the generation of infrastructure plans, programs and projects, ensuring their continuity and permanent professional training.
- Strengthen the role of the Ministry of Public Works (MOP, for its acronym in Spanish). In this context, validate the joint MOP-OECD study regarding infrastructure for 2030.

- Strengthen the relationship between the MOP and the Ministry of Transportation and Telecommunications (MTT, for its acronym in Spanish), which is entrusted with logistic and transportation policies.
- Reactivate the Inter-Ministerial Committee for Public Works, with the General Secretariat of the Presidency as executive secretary.
- Coordinate the long-term planning activities of the line ministries with those of the National Council for Urban Development.
- Strengthen the planning and supervisory role of the National Commission for Logistic Development (Conalog, in Spanish), the inter-ministerial body with a private advisory council regarding regulatory decisions and investment in logistic systems and networks.
- Approve the law that creates the General Direction of Concessions within the MOP.
- Approve the law that creates the Infrastructure Fund (IF), after making all the necessary corrections to ensure that the capital generated during the past 25 years by investments made under concessions, is used to build more and better public works, expanding further the concession system.
- Discuss the best way to ensure that the Ministry of Finance will look at infrastructure in such a way that it separates the decisions concerning investments in public infrastructure from those related to current expenditure.
- Incorporate infrastructure Research, Development, and Innovation (R&D+i) as a permanent and continuous activity of the public infrastructure institutions.

2 Medium term:

- Have the Public Works Commission of the Senate approve a National Public Infrastructure Plan that includes long-term public financing proposals (multiannual budgets); generate a frame of reference to guide private investment initiatives; may be used to obtain validation from citizens and environmental organizations, in the perspective of the Strategic Environmental Evaluation. The implementation of the national plan should also be «audited» as often as needed.
- Advance in the design and development of a public-private supra-ministerial council to advice the Presidency on long-term planning of infrastructure.

FINANCING

Another key subject is how to finance the investment effort in infrastructure, without generating economic imbalances.

Achieving the level of investment we have proposed for public infrastructure, that is, 3.5 percent of GDP annually, cannot be financed with public resources only. The State's commitments in recent years regarding education, health, pensions, and public transportation, among others, are well known, making it difficult for investments in public infrastructure to be financed with public resources only.

For this reason, as CPI we have proposed that the State invest around 2.1 percent of annual GDP in public infrastructure. This is equivalent to the average the government has allocated for public investment during the past ten years. The remaining 1.4 percent of GDP of investment in infrastructure should be contributed mainly, although not exclusively, by the private sector based on the principle that "those who use it pay for it", especially regarding investments that provide an evident private benefit.

Thus, works that due to their nature it is difficult for users to make direct payments for the services provided, such as public schools, public hospitals, rural roads, etc., the State could make deferred payments for infrastructure that was initially financed by the private sector. Other works such as roads, urban highways, and railroads, must be paid mostly, if not wholly, by users to ensure the repayment of capital investments.

To advance in this respect, it is necessary to strengthen the different forms of public-private partnerships for investments in public infrastructure, an area in which Chile has a long track-record and ample experience.

The MOP's Concessions Program has enabled the accumulation of infrastructure assets mainly in roads, airports, and urban highways, for more than USD 27.75 billion (investment value) which, at the current user fees, have a very significant economic value.

To materialize investments quickly, it should not be difficult to build consensus regarding areas of collaboration and reach agreement on the distribution of the risks that are inherent to infrastructure investments.

To build consensus government authorities must be committed to invite the private sector to be a part of the most important investment initiatives. In the end, generating trust requires a shared effort with clearly allocated risks. The private sector, on its part, must generate more

transparent and auditable information regarding its operations, and comply rigorously with the mission entrusted by the country.

To achieve and maintain the goal of investing 3.5% of GDP in public infrastructure, both to satisfy the increasing demand as well as to implement projects that open new opportunities, long-term financing sources must be used, with costs that reflect the advantages offered by our country.

CPI PROPOSALS:

- Strengthen PPP's based on a review of the current legal and regulatory instruments, with the purpose of updating them, on the basis of accumulated experience. The following instruments should be considered:
  - Law and Regulation for Public Infrastructure Concessions
  - Law for Shared Urban Financing
  - State Railroad Law (EFE Law)
  - The powers of municipal governments to grant concessions
- Improve the quality of concession contracts to allow greater capacity to adapt to changing circumstances. For example, by including clauses allowing for new investments under the existing contracts, promoting the adoption of new technologies, and strengthening mechanisms to deal with controversies.
- Review the characteristics of the contracts for hospital and prison concessions to restore the contribution of the private sector to the provision of infrastructure in these two areas.
- Generate a portfolio of projects that leads to a long-term, achievable, and coherent program of international public tenders that will attract the major players in the world.
- Implement the Infrastructure Fund (IF) to provide guarantees and, eventually, co-financing for new infrastructure projects financed by the private sector. The Fund should also contribute to identify, design, and evaluate a portfolio of strategic projects to be executed in the medium and long-term. This combination of project identification, design, evaluation and financing may constitute a powerful incentive for private sector investment in public infrastructure.
- To strengthen the capital base of the Infrastructure Fund, it is essential to establish, by law, the criteria to be used in establishing user fees — preferably by economic sector— for the services provided by public infrastructure. User fees rationalize demand in the face of supply restrictions, disclose the economic cost of providing the services, and enable an adequate management of the resources.

ENVIRONMENT AND CITIZENRY

The planning and development of public infrastructure, whether financed by the public or the private sector, in addition to the variables associated to technical and economic factors must incorporate a set of components that need to be harmonized: the project, environmental protection, territorial planning, local communities in general, and the specific concerns of indigenous peoples.

In this area, one of the critical weaknesses in our institutional setup is the lack of a binding mechanism for territorial planning that offers the greatest possible certainty to the owners of projects regarding the use of the intended location, provides the environmental authority with criteria regarding locations while, at the same time, capturing the views of local communities.

A study from August 2016 by the Instituto de Derechos Humanos (Human Rights Institute) identified 102 socio-environmental controversies in the country. Among the most conflictive sectors are electricity, mining, port, and sanitary landfill projects.

There are some recent emblematic examples that confirm the importance of possible controversies, such as the Agrosuper pork plant in Freirina which, despite being operational, had to close due to citizen opposition, and the suspension of Hidroaysen, the hydroelectric mega project.

Unlike many countries of the OECD, currently environmental values in the territories are not defined or regulated at a national level. There are no regional mechanisms that establish the priority destinations of the territories in a democratic and participative manner. There are some legal instruments in force, such as the Strategic Environmental Evaluation, which have shown themselves to be insufficient and have not dissipated uncertainties regarding project locations.

Neither has it been possible to establish an associativity law, enabling local communities to participate in the benefits generated by projects located in their direct area of influence, as is the case in some developed economies.

The current environmental institutional framework, in particular the System for the Evaluation of Environmental Impacts (SEIA, for its acronym in Spanish) is perceived by project developers as an obstacle that delays public and private investment.

In this context, most of the conflicts faced by large projects are a consequence of the inadequacy of the environmental and territorial regulatory framework, and of the mechanisms to enable community consultation and participation.

CPI PROPOSALS:

- Make the Strategic Environmental Evaluation (EAE, for its acronym in Spanish), obligatory for public infrastructure policies, plans, and programs.
- Establish the Environmental Assessment of Alternatives as part of the SEIA for all public infrastructure projects, to validate the designs, locations, and scale of projects.
- Issue the regulations necessary to implement citizen consultation processes under Law Nº 19,253 (Indigenous Law), and ILO's Agreement 169, to facilitate agreements with communities affected by infrastructure projects.
- Modify the Organic Constitutional Law of Regional Governments to make binding the Regional Territorial Zoning Plans (PROT, for its acronym in Spanish). This would provide certainty and stability to project promoters, the communities, the SEIA process, and the public services that this entity coordinates regarding the areas that may be used for locating infrastructure and other works.
- Tu turn the SEIA into an opportunity and not a series of time consuming obstacles, it is necessary to streamline it, ensuring efficiency and timeliness, while providing a high degree of certainty to public and private actors regarding what can be done and how it should be done. Among the changes that could be implemented, the following stand out:
  - Establish monetary guarantees (insurance) for the implementation of the Environmental Rating Resolutions.
  - Implement a 30-day system for evaluations and issuance of certificates of conformity in the case of Environmental Impact Statements (DIA's, for its acronym in Spanish, used in smaller projects).
  - Establish fast track mechanisms to process on an urgent basis the Environmental Impact Studies (EIA, for its acronym in Spanish) for public service projects, reducing processing times by half.
  - Adopt national emission and environmental standards, including the definition of the environmental regulations that must be complied with in the framework of the SEIA.
  - Develop uniform guidelines for environmental evaluation, and their regular updating and dissemination.
  - Create an a priori negotiation mechanism between the authority and the developers to establish terms of reference regarding the contents and scope of the Environmental Impact Assessments.

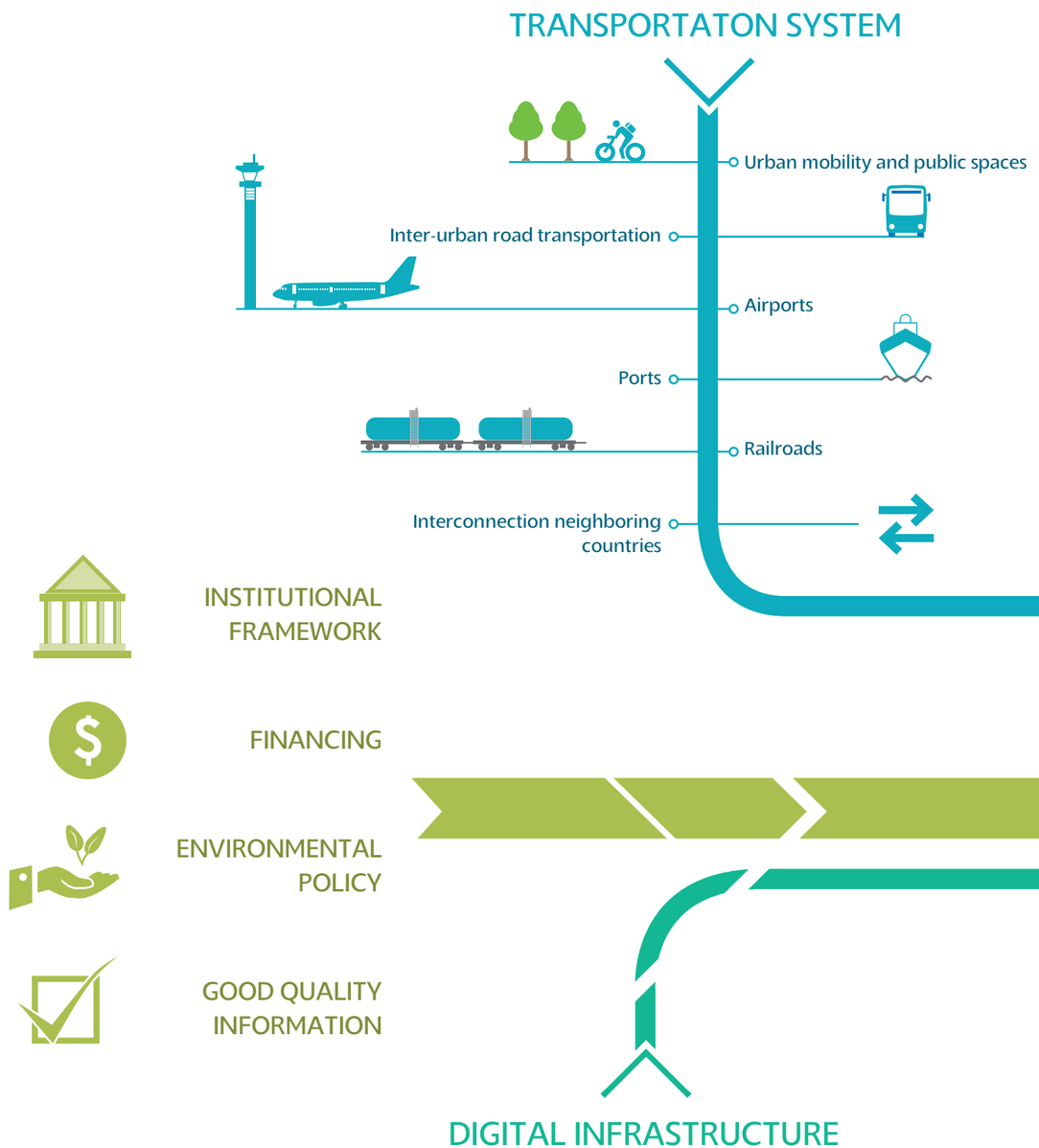
CONTINUOUS IMPROVEMENT THROUGH INNOVATION

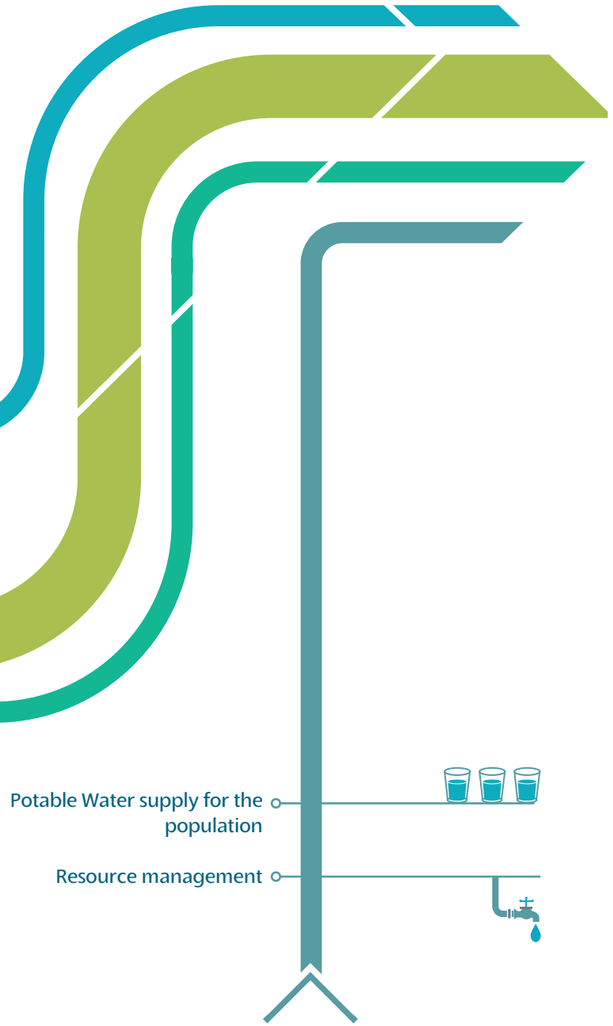
A long-term strategy of infrastructure development must include an institutional framework that ensures continuous improvements in project design and construction and the permanent optimization of the use of resources in the operation of public infrastructure. This can only be achieved through permanent and continuous innovation.

Research and development in infrastructure must be seen as a nationally strategic issue, whose objective is the continuous improvement of the quality of infrastructure and the optimization of the use of the existing infrastructure. It is necessary to establish a clear and institutional R&D+i policy for public infrastructure.

CPI PROPOSAL:

- In the new institutional framework that we propose, explicitly include the obligation to continuously improve the quality and optimize the use of public infrastructure, including by systematizing the research, development, and innovation (R&D+i) tasks in this area.


TRANSPORTATON SYSTEM
Urban mobility and public spaces
Inter-urban road transportation
Airports
Ports
Railroads
Interconnection neighboring countries
INSTITUTIONAL FRAMEWORK
FINANCING
ENVIRONMENTAL POLICY
GOOD QUALITY INFORMATION
DIGITAL INFRASTRUCTURE


EQUITY
QUALITY OF LIFE
COMPETITIVENESS
growth
PRODUCTIVITY
Potable Water supply for the population
Resource management
WATER RESOURCES

Chapter

III

EL YESO RESERVOIR
Photograph: courtesy of MANSARDA ESTUDIO.

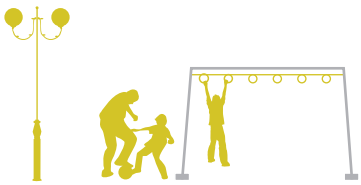
INFRASTRUCTURE POLICY PROPOSALS BY SECTORS

Delaying strategic decision making, such as those related to investments in infrastructure, bears a high cost for the citizens and the productive sector. That is why we are convinced that we have to transform the shared needs regarding this matter into public management priorities.

The CPI took on the commitment to prepare a **Public Infrastructure Policy Proposal** that contributes to the debate and may be a starting point for the development and materialization of the long-term vision that really contributes to the country's economic growth, and thus, to the wellbeing of its inhabitants.

Following is a summary of the main conclusions and policy proposals by sectors, which may be useful for the development of infrastructure and growth programs of the presidential candidacies:

1. Urban mobility and public spaces
2. Water resources
3. The transportation system in Chile
   - 3a Interurban road transportation
   - 3b Airports
   - 3c Ports
   - 3d Railroads
   - 3e Interconnection with neighboring countries
4. Digital infrastructure
5. Research, Development, and innovation in infrastructure



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Urban mobility and public spaces

Considering that in our country almost one out of ten inhabitants lives in urban areas, and eight cities have more than 250,000 inhabitants, quality of life in the cities is an expression of our development. In this context, the design, planning, construction, financing and better management of the urban public infrastructure are essential subjects. To continue advancing, it is of the utmost importance to establish criteria for planning, and institutional structures based on the works of the National Urban Development Council (CNDU, for its acronym in Spanish), that ensure the continuity and success of the policies aimed at achieving the desired results in these spaces.

In this manner, it will be possible to have an impact to improve mobility, which not only refers to public transportation (infrastructure and equipment), and cars (urban highways), but also includes the need to reinforce the use of bicycles and walking as options.

Among the investments to coordinate are those that complement urban planning, such as spaces and buildings for public use (from parks and parking spaces to hospitals), distribution of productive centers (whether industrial, commercial, distribution centers, or offices), and those buildings "that nobody wants in their back yard" (jails, landfills, bus terminals, or others), but which are essential for the functionality of cities.

All these measures considered together and implemented in agreement with certain agreed upon standards, will enable improvements in the quality of life of the people that live in the urban space, and end the social and economic segregation that affects many of our cities.

To advance in the solution of the subjects raised before, work is suggested on seven essential axes that are integrated in a long-term strategy for each one of the large cities in the country. In the short-term, it would be useful to concentrate efforts sequentially in the eight cities with more than 250,000 inhabitants, and in the medium-term, in the remaining cities that have more than 100,000 inhabitants.

Each city must undertake these challenges and adequately agree on the priorities and sequences with which it will be necessary to address the required investments according to the standards that have been established, the willingness to advance in public-private association modalities, and the existing urban institutional framework, among others.

CPI PROPOSALS

- **Strengthen the role of municipalities in the design of public policies for investment. In some of the cities with over 250, 000 inhabitants, different from Santiago, develop a metropolitan government pilot plan that enables the evaluation of the effectiveness of the mechanism to address problems such as the design and construction of transportation infrastructure.**
- **Design the projects, make the investments in infrastructure, and improve the management of high standard urban public transportation to ensure its quality and improve circulation speed, mobility safety, reduction of travelling times, and enable regular frequencies, according to needs.**
- **Materialize investments in infrastructure for private transportation, which are necessary to absorb the increasing option for this type of transportation among the inhabitants of the cities, and for an adequate compatibilization with other modes of transportation. This must include the possibility of having toll urban highways, road pricing, and other management alternatives that ensure an efficient use of automobiles.**

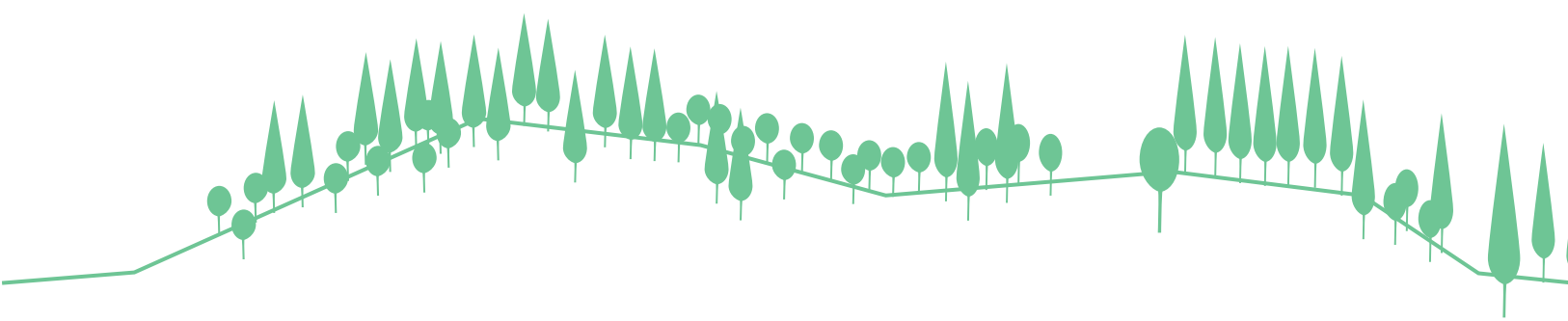
- **Advance in the subject of investment in digital infrastructure and the necessary regulatory changes to incorporate state-of-the-art technologies for a more efficient use of the available infrastructure.**

- **Coherently, and in agreement with the urban planning instruments designed by the CNDU, execute the necessary investments in public buildings, with private or public financing, as appropriate, that help adequately address the needs of the population. The provision of public infrastructure must include the following, among others:**

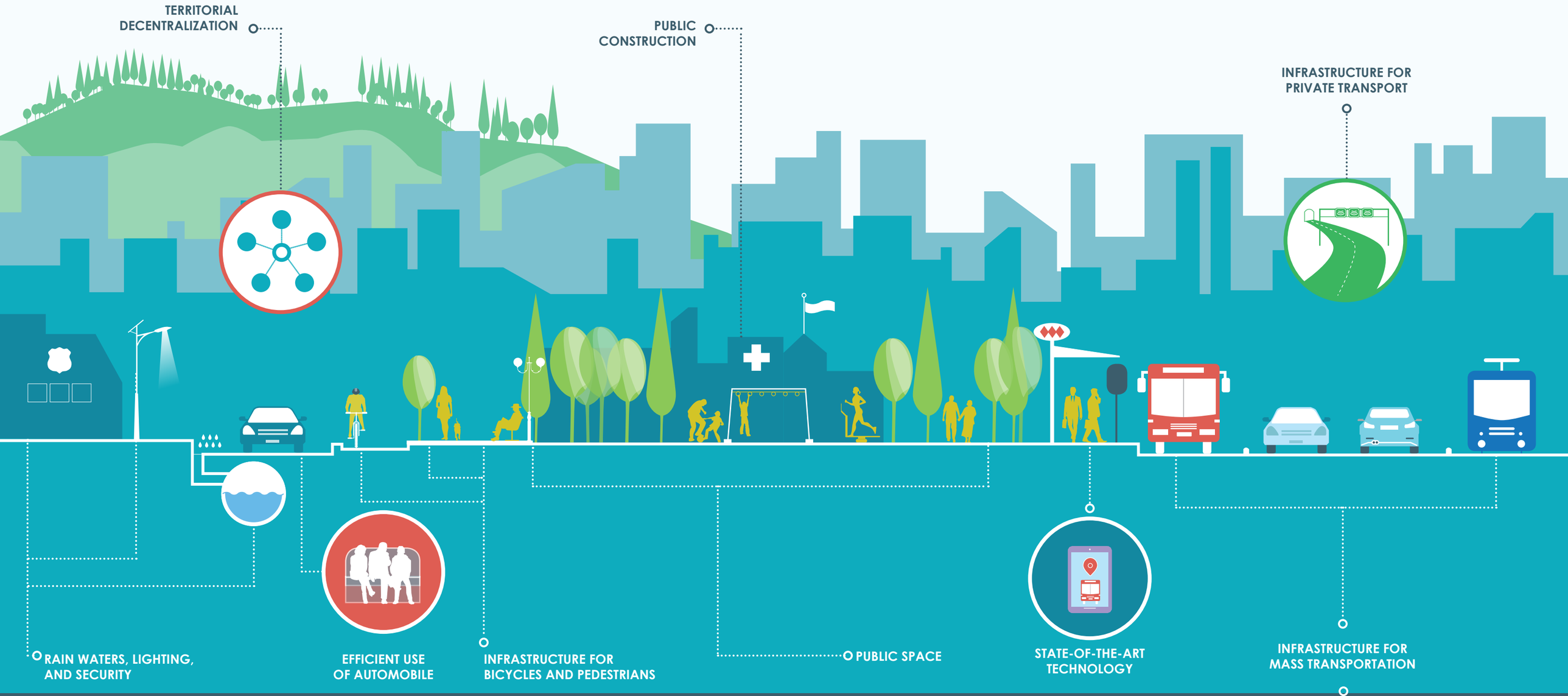
  - Hospitals
  - Educational establishments
  - Safety infrastructure, including lights and police squads and stations
  - Public services buildings
  - Control, channeling and use of rain waters
  - Green areas
  - Shops, stores, pharmacies, and supermarkets
  - Jail infrastructure
  - Sanitary landfills

- **Correct the deficits regarding control and channeling of rain waters, green areas, and safety infrastructure.**

- **Promote the construction of more special routes for bicycle transportation, spaces for public use, cultural and civic centers, etc., integrating them to the public transportation services.**



Urban mobility and public spaces



2

Water resources

In Chile, the distribution of water resources is very unequal throughout the 101 water basins identified by the Dirección General de Aguas (DGA)(National Water Bureau) of the MOP. In fact, the availability of fresh water varies between severe shortage in the North to almost unlimited availability in the South.

Looking ahead, global warming represents an enormous additional challenge. The greatest doubt is what will happen with the rainfall regime from the region of O´Higgins to the south, where the country's agricultural, forestry, and livestock activities concentrate. According to some studies, in the worst scenario in the next 30 years, these activities could decrease by 40 percent or more as a result of climate change. Simultaneously, there would be an increase in temperatures, reducing the accumulation of snow in winter, and increasing surface flows when it rains, with the resulting risks.

Between the regions of Arica and Parinacota and the Metropolitan region, the country is already facing a real challenge with respect to water availability. At the same time, the reduced precipitations in the central-south area contributed to the development of disastrous forest fires in the summer of 2017. Last but not least, Aysén, which in principle does not have problems relating to the availability of fresh water, suffered a serious

drought (70 percent rain deficit) during 2016, illustrating the problems generated by the annual variability of the rainfall regime at a national level.

It is precisely these kinds of variables that force us to have a long-term vision when considering water infrastructure policies.

CPI PROPOSALS

- **Climate uncertainty and insufficient knowledge regarding our water sources recommend gathering information about our current and prospective situation, especially related to underground water and the behavior of glaciers.**

- **Along the same line, it is essential to execute an investment strategy that allows for the storage of water when it is available, significantly improve distribution systems, and incorporate technologies to optimize the management of the available resource.**

- **At the same time, it is necessary to solve the problems of market organization in the basins, solve some regulatory problems, and strengthen the Rural Potable Water programs.**

- **In the beginning, economic and human activities must pay the cost of the infrastructure that enables the transportation of water from the sources or generation points (intakes) to the place where it is used (distribution networks).**

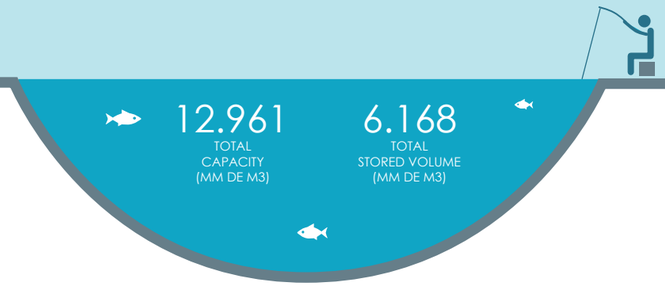
- **In cases where it is considered convenient to subsidize the construction of infrastructure for the generation or transportation of fresh water, the State must submit the projects to an adequate social evaluation to justify subsidies.**

- **In desert or semi-desert areas, large scale mining can use ocean water, as it currently successfully does, leaving greater availability of fresh water for human use, and for other productive and ecologic sectors.**

STORED VOLUME WITH RESPECT TO RESERVOIR CAPACITY

Selection of large size reservoirs **26**

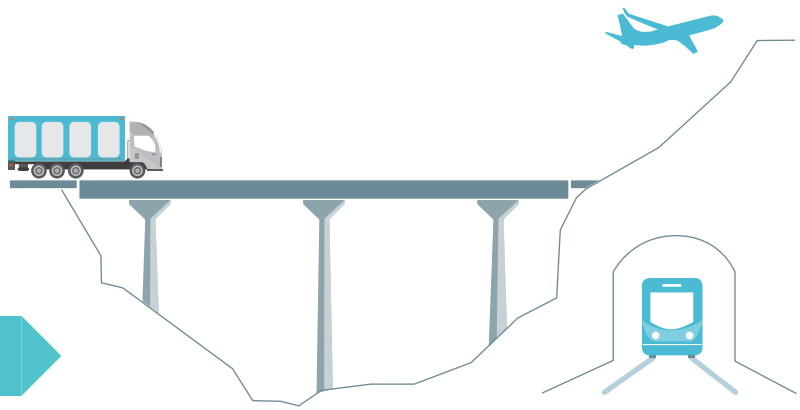
MACROAREA	CAPACITY (MM de M³)	STORED VOLUME TO (MM de M³)	%
MZ Norte	1.538	460	30%
MZ Centro	4.555	3.082	68%
MZ Sur	6.868	2.626	38%



ESTIMATED USE OF WATER BY MACROAREA OR BY ECONOMIC SECTOR

MACROAREA	AGRICULTURAL	POTABLE WATER	MINING	INDUSTRIAL
NORTH MA	72%	8%	15%	5%
CENTER MA	86%	8%	1%	4%
SOUTH MA	76%	9%	2%	13%
AUSTRAL MA	16%	6%	25%	53%

Source:
Atlas del Agua, Chile 23016
DGA, Ministry of Public Works.



3

Transportation system

There is a high correlation between the availability of infrastructure for public transportation, and the level of development of countries measured by per capita GDP.

Using this definition, is may be said that to have an economy that grows significantly and in a sustained manner, it is necessary to have transportation infrastructure that complies with four main objectives:

- Allow the flow of cargo and people in a swift manner, by safe means of the best possible quality.
- Integrate the farthest sectors of urban centers socially and economically.
- Promote the occupation of the territory, facilitating the decentralization of economic, social, and political activities.
- Connect the country with the rest of the world.

In Chile, the transportation infrastructure is mainly made up by the road network, a frankly reduced railroad network, deteriorated for the case of passengers, a group of ports and airports, and border crossings.

The internal transportation system mainly comprises roads, both for cargo and passengers, and is complemented at a lower scale by air transportation systems, railroads, and coastal shipping. On the other hand, international cargo transportation is carried out mainly by sea[4], (97 percent), while passenger transportation is mainly by air.

Transport means are interconnected and inter-dependent. Therefore, it is essential to consider transportation networks as a whole.

According to the Global Competitiveness Index developed by the WEF in 2016, in terms of infrastructure the country ranks 44th, surpassed by nations such as Panama and Barbados, and very far from the OECD average, which ranks 25th.

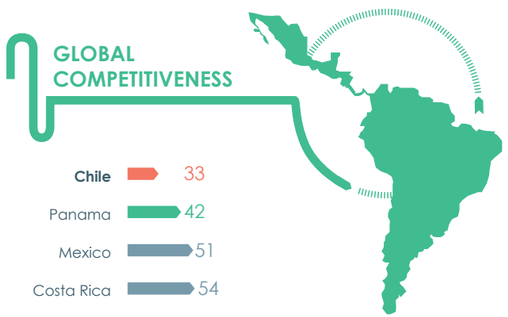
Between 2010 and 2016, the areas in which the country lost more ground are: quality of roads (-11 positions); quality of airports (-11); ports (-10); and railroads (-3), with the latter having the worst evaluation.

In other words, the infrastructure shortage has become an obstacle for the country's competitiveness, and has frustrated the legitimate aspirations to achieve better levels of quality of life for the population. Only the logistic cost at a national level represents 18 percent of the value of exports, compared with 9 percent average for the OECD countries.

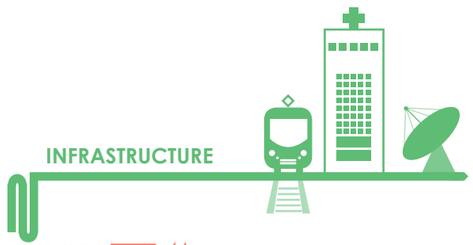
One of the problems that explains the transportation infrastructure lag is the difficulty to coordinate investment decisions in the different transport means and logistic nodes. Investment plans lack the operational coordination that makes their implementation feasible. Furthermore, in many cases there is more than one institution in charge of planning, evaluating, and deciding the investments of one area. In some situations, technical specifications have been modified, placing the success of the projects at risk.

Following is a diagnosis and proposals to strengthen public policies related to roads, airports, ports, cargo railroads, and connectivity with neighboring countries.

4 *Dirección General de Aduanas (National Customs Direction), 2014.*



Chile	33
Panama	42
Mexico	51
Costa Rica	54
Barbados	72
Uruguay	73
Brazil	81
Ecuador	91
Argentina	104
OECD Average	26



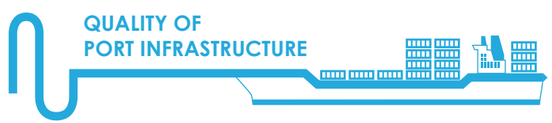
Chile	44
Panama	36
Mexico	57
Costa Rica	67
Barbados	30
Uruguay	47
Brazil	42
Ecuador	71
Argentina	85
OECD Average	25

Chile	35
Panama	48
Mexico	58
Costa Rica	125
Barbados	49
Uruguay	98
Brazil	111
Ecuador	24
Argentina	103
OECD Average	31

Chile	79
Panama	27
Mexico	59
Costa Rica	97
Barbados	-
Uruguay	106
Brazil	93
Ecuador	-
Argentina	87
OECD Average	26

Chile	48
Panama	31
Mexico	33
Costa Rica	109
Barbados	44
Uruguay	97
Brazil	69
Ecuador	43
Argentina	82
OECD Average	29

Chile	44
Panama	37
Mexico	69
Costa Rica	106
Barbados	25
Uruguay	87
Brazil	116
Ecuador	47
Argentina	109
OECD Average	25



Chile	35
Panama	5
Mexico	57
Costa Rica	102
Barbados	35
Uruguay	39
Brazil	114
Ecuador	40
Argentina	79
OECD Average	36

Chile	47
Panama	6
Mexico	61
Costa Rica	59
Barbados	32
Uruguay	66
Brazil	95
Ecuador	39
Argentina	87
OECD Average	31

Source:

Global Competitiveness Report, 2015-2016, WEF.

3a

Inter-urban road transportation

In comparative terms, Chile has the highest income per capita in Latin America, but not the largest transportation infrastructure density. For example, Mexico has 7.2 lineal kilometers of paved roads per 100 square kilometers of territory, compared with 5.6 kilometers in Chile which represents a 30 percent difference.

The comparison is even more challenging if the other members of the OECD are considered. On average, those countries have 102.5 lineal kilometers of paved roads per 100 square kilometers of territory. That is, they have a density of paved roads which is 18 times higher than that of Chile.

Part of the problem lies in the fact that at a national level, we have a low percentage of paved roads relative to the total available roads, reaching 25 percent.

These indicators contribute to the low productivity of our economy compared with OECD countries. Non-paved roads result in lower speed, with higher accident rates, which tend

to damage cargo and vehicles more, generating greater operational expenses and repairs.
From a social point of view, this also has negative effects. Dirt roads create difficulties for access to public services, education, health, as well as culture.

For the future, the figures are worrisome. Despite the fact that the MOP has been implementing an important pavement plan, the extension of the road and highway network is practically at a standstill. At the same time, the number of automobiles could more than double in the next 15 years if the current trend remains unchanged. Therefore, if the road network is not expanded, users would experience increasing levels of congestion in inter-urban roads and highways, and much more congestion in urban areas.

In this scenario, the road and highway network must necessarily adapt to the new demands to prevent becoming a "bottleneck" for growth.

CPI PROPOSALS

1 Short-term:

- **Increase the proportion of paved roads from the current 25 percent to at least 66 percent, as is the case in countries that are similar to Chile. Treatment and stabilizing systems may help in the transition toward increased paving.**
- **Ensure an alternative paved interconnection for all cities with more than 100 inhabitants in the country.**
- **Define and have in place complementary works for the routes (resting areas and frequency regulatory areas in accesses to ports and cities), integrated with technological platforms that enable the improvement of the system's global efficiency.**
- **Increase the dual road network. For example, start studies to join Arica with Quellon through a first rate highway, as proposed in the Chile 30.30 MOP Agenda.**

- **Develop a permanent toll policy for the concessioned network, to free public resources that enable the expansion of non-concessioned road system.**
- **In a short period of time, establish a non-stop payment system in inter-urban highways.**
- **Improve traffic and cargo information for a better management of the road network, and adjust their physical characteristics to the emerging needs.**

2 Long-term:

- **Expand our road network and, as an ambitious goal, achieve one half of the kilometers per surface that the OECD countries have.**
- **Build highways in certain specific sections and areas that allow for the use of high capacity and performance transportation equipment for cargo transportation.**
- **Establish a long-term plan to incorporate isolated areas to the economic and social development process through greater and better connectivity, facilitating the decentralization of the economic and population activity.**

Density of paved roads in Latin American countries

Interurban road transportation 3a

PER

BRAZIL

COLOMBIA

ARGENTINA

VENEZUELA

URUGUAY

CHILE

MEXICO

OECD

(Km of roads/100 km²) 1 2 3 4 5 6 7 8 102

3b

Airports

Our country has 15 airports distributed in 12 of the 15 regions. Of these, only seven are international, equipped to receive passengers with international destinations. The most important one is located in Santiago, Arturo Merino Benitez (AMB), which accounts for 99 percent of the passengers and more than 99 percent of the cargo with international destination. Of the total number of air terminals, 11 are concessioned.

It should be noted that passenger air traffic increased by 10.41 percent annually during the past five years, and the growth has been similar between national and international traffic.

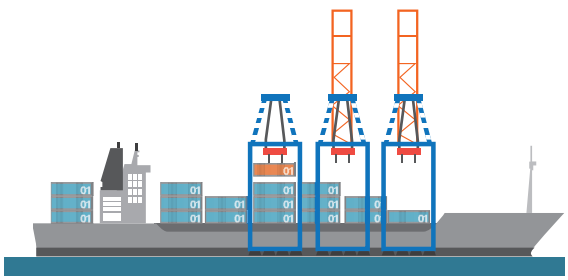
Data from the MOP's Airport Direction show that in 2016 Chilean airports moved approximately 19 million passengers (more than one trip per year per inhabitant). Demand projections show that in 2030, this amount will climb to 30 million trips/year, and for 2050, will reach more than 80 million.

With respect to cargo transported by air, the situation is very different. At a national level, it has lost participation in the past five years, reducing its total volume by 1.71% annually.

CPI PROPOSALS

- **Develop a long-term national airport strategy, with the participation of all the public (DAP, DGAC, JAC) and private entities involved in the air activity, to enable the identification of the necessary investments for infrastructure and their sequence over time. A central element must be the construction of an airport that is an alternative to AMB.**
- **Ensure the territorial spaces that are necessary to implement the designed strategy.**
- **Expand airports in a timely manner, without waiting for congestion to make it essential.**
- **Continue with the programs for airport concessions, including secondary airports, exploring new association formats (tender multiple airports in one area, include rolling tracks, hangars, buildings, hotels, etc. in the contracts).**
- **Strengthen the private airfield investment program that enables the use of its infrastructure for public services, ambulances and air tankers, airplanes belonging to the Air Forces, etc.).**
- **Reduce entry barriers to aeronautics, to improve air connectivity between smaller-sized cities, facilitate the operation of "low-cost" airlines, and flights between secondary cities.**

Source:
Direccion de Aeropuertos,
Ministry of Public Works.



3c Ports

It is estimated that 90 percent of the cargo volume at a world level moves through waterways. In the case of Chile, 97 percent of the total volume of cargo, exports plus imports, moves through ports.

Consequently, any improvement in the functioning of our ports, the logistic networks that supplies them and connects them with the consumption centers, directly affects competitiveness, that is, the costs of our foreign trade.

According to the registries of the Ministry of Transportation and Telecommunications (MTT, for its acronym in Spanish), at a national level there are 92 ports and terminals, of which 31 are state-owned or "public", 17 private ports and docks that enable access to third parties or "private for public use", and 44 "private for private use" ports and docks. The latter are not accessible for third parties because they are part of specific mining or industrial activities.

According to their relevance for the national economy, the most important ports are 31. Among them, 12 are managed by public companies created under law19,542; and private terminals, created under Decree 340 of 1960 regarding maritime concessions. They are located in Mejillones (Region of Antofagasta), Ventanas and Quinteros (Region of Valparaíso), Coronel and Lirquén (Region of Biobío).

This port structure has adapted to the strong increase in traffic demand in the past 25 years, which multiplied by three, from 48 million tons in 1990 to 139 million tons in 2015.

According to the evaluation of The World Bank's Logistics Performance Index (LPI), Chilean ports are among the most efficient in Latin America, but still far from the indicators of the more developed countries of the OECD or the more advanced Asian economies.

An element of concern is that according to the LPI, Chile's score in "quality of infrastructure for trade and transportation" has decreased from 3.06 to 2.77 in the past ten years. This indicator implied, for the same period, going from the 34th to the 63rd position, reflecting a great relative loss of competitiveness with respect to other countries, and particularly in the region, where Panama has emerged as a leader.

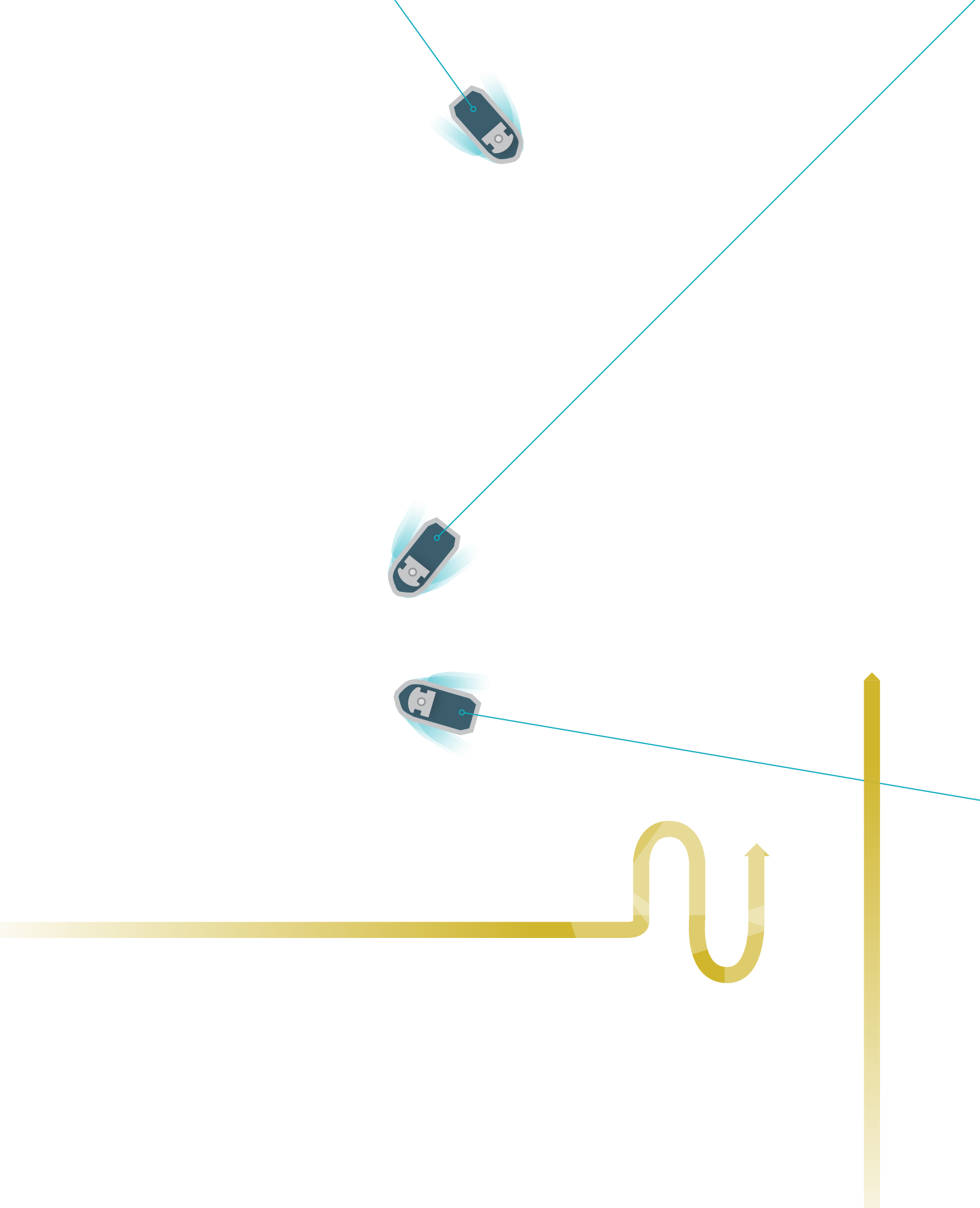
Technological developments at a world level, and the opening of the "second lane" of the Panama Canal, which has strengthened the inclination of shipping companies to operate with larger ships (Neo-Panamax and Super post-Panamax, which can transport more than 14 thousand 20 feet containers, TEUs), which undoubtedly affect the functioning of our ports and demand a change of paradigm to evaluate the national maritime port policy.

In view of these trends, our ports should be prepared in terms of dimensions, efficiency, continuity of service, and integration with other forms of cargo transportation, to face the challenges in a horizon of 10-15 years. The most important challenges include: developing a strategic vision; have better information to support a strategy; improve coordination in the public sector, as there are more than 30 institutions that intervene in port operations, as well as between the public sector and private agents; improve port-city relations; and design an institutional framework that enables addressing these tasks.

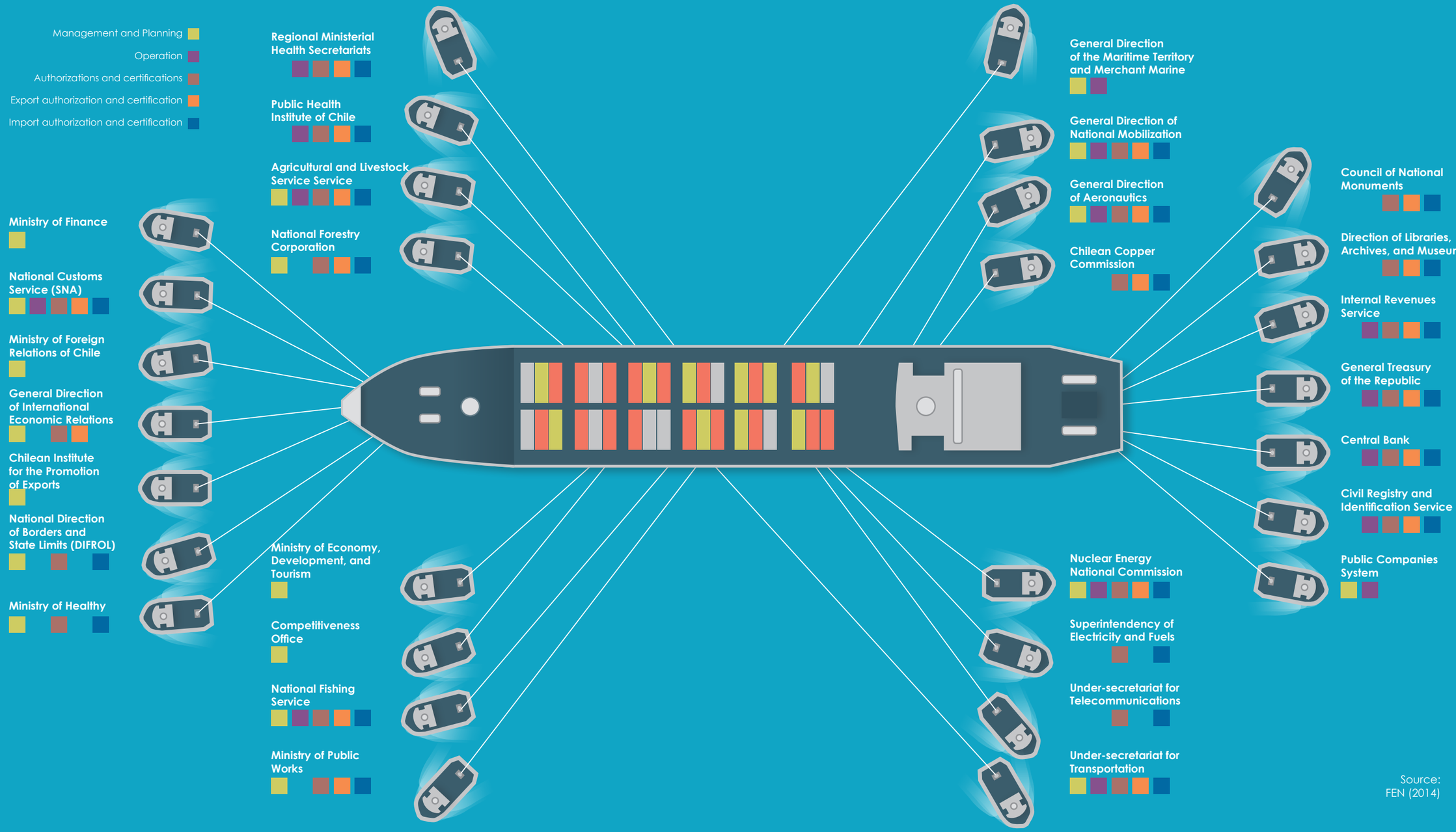
As these elements are duly addressed, the infrastructure challenges in the port sector will be approachable, allowing for its expansion with the active participation of the communities and the private sector in its design, operation, maintenance, and financing.

CPI PROPOSALS

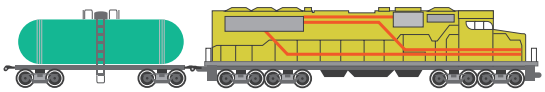
- **Move from an approach focused on infrastructure and port operation toward a systemic policy of logistic chains where Chilean ports are a node within an international logistic network.**
- **Establish a logistic port governance with the power to effectively coordinate the more than 30 public entities that affect the operation of the logistic networks and ports.**
- **Reserve bays and territories for port use and the logistic infrastructure required by them, key for the future growth of terminals.**
- **Create a Logistic Observatory at the MTT which, by law, gathers the information required to design public policies in the logistic sphere, constituting an advance in competition and competitiveness.**



Institutions that impact on Maritime Port activities



Source:
FEN (2014)



3d

Railroads

The growth of economic activity and projected revenues for Chile, and the increase in the number of trips, show that the existing road infrastructure will not be enough to satisfy the mobility demands of the population and cargo. Twenty years from now the Chilean economy could double in size. In that scenario, railroads acquire a relevant role as a transportation mode, complementing road transportation for cargo, local passengers in large cities, and inter-urban passengers.

Since the decade of the 60's, and more strongly since the improvement of highways, the railroad mode was not incorporated to the debate regarding transportation public policies.

The result is that Chile has a precarious railroad network which, according to the analysis of global competitiveness developed by the WEF in 2016, ranks us 80th in the Railroad category, the country's worst rating in the infrastructure variable.

Currently, the functioning of the railroad transportation system in Chile corresponds to a mixed model. In the north of the country, networks are mainly private property, that is, the main cargo carrier owns the network, and its use is related to private companies that generate cargo, specifically mining and port logistics.

On the contrary, from La Calera to the south, railroads are owned by the State Railroad Company (Empresa de Ferrocarriles del Estado) (EFE, for its acronym in Spanish), which operates with a management model that "separates the wheel from the rail" in the cargo business, while it is integrated for passenger transportation.

The EFE network has a penetration of 3.7 percent in cargo transportation, while in passenger transportation this figure is less than 1 percent. In the north, the railroad mode transports 40 percent of the cargo.

The railroad transportation system presents economies of scale, so an increase in its participation in cargo transportation would allow for a better use of its advantages. When market participation is low, as in the case of Chile, the mode losses competitiveness. In the case of EFE, the company estimates that, to be profitable, it needs to double the amount of cargo it mobilizes to about 20 million tons/year.

Repositioning this transportation mode requires a systemic view of the logistic network and of the role of the railroad mode; a long-term plan in the framework of a national mobility policy; investing in railroad infrastructure; ensuring financing, and, in the case of EFE, improve its management.

Reestablishing the importance of the railroad is convenient for the country, considering the advantages with respect to road transportation: reduction of travelling times; relief in highways that access cities; lower accident rates, and reduction of environmental pollution and emissions of greenhouse gasses, among others.

With respect to EFE's passenger transportation, in its latest plans the company has focused on suburban transportation projects and commuter lines in the areas of Concepción, Santiago, and Valparaíso, leaving behind medium and long distance passenger transportation. If we consider the geographic characteristics of Chile, the need to have transportation systems that are alternative to the road mode, and the need to generate resilience in the transportation network, this decision should be reviewed. However, as a result of the problems generated in the Rancagua Express project, the only initiatives that are being implemented are the expansion of the Merval network and the Rancagua Express project.

Once the difficulties and mistakes of the latter project are cleared and the corrective measures implemented, EFE will be able to consider other suburban projects and start considering larger projects such as long-distance inter-urban trains.

Longer distance trains would help strengthen the resilience of transportation networks in the country's central-south area. For this reason, in the medium term projects such as Santiago-Chillán/Concepción and Santiago-Valparaíso must be studied as part of an integrated transportation network and not just as a railroad project for passenger transportation.

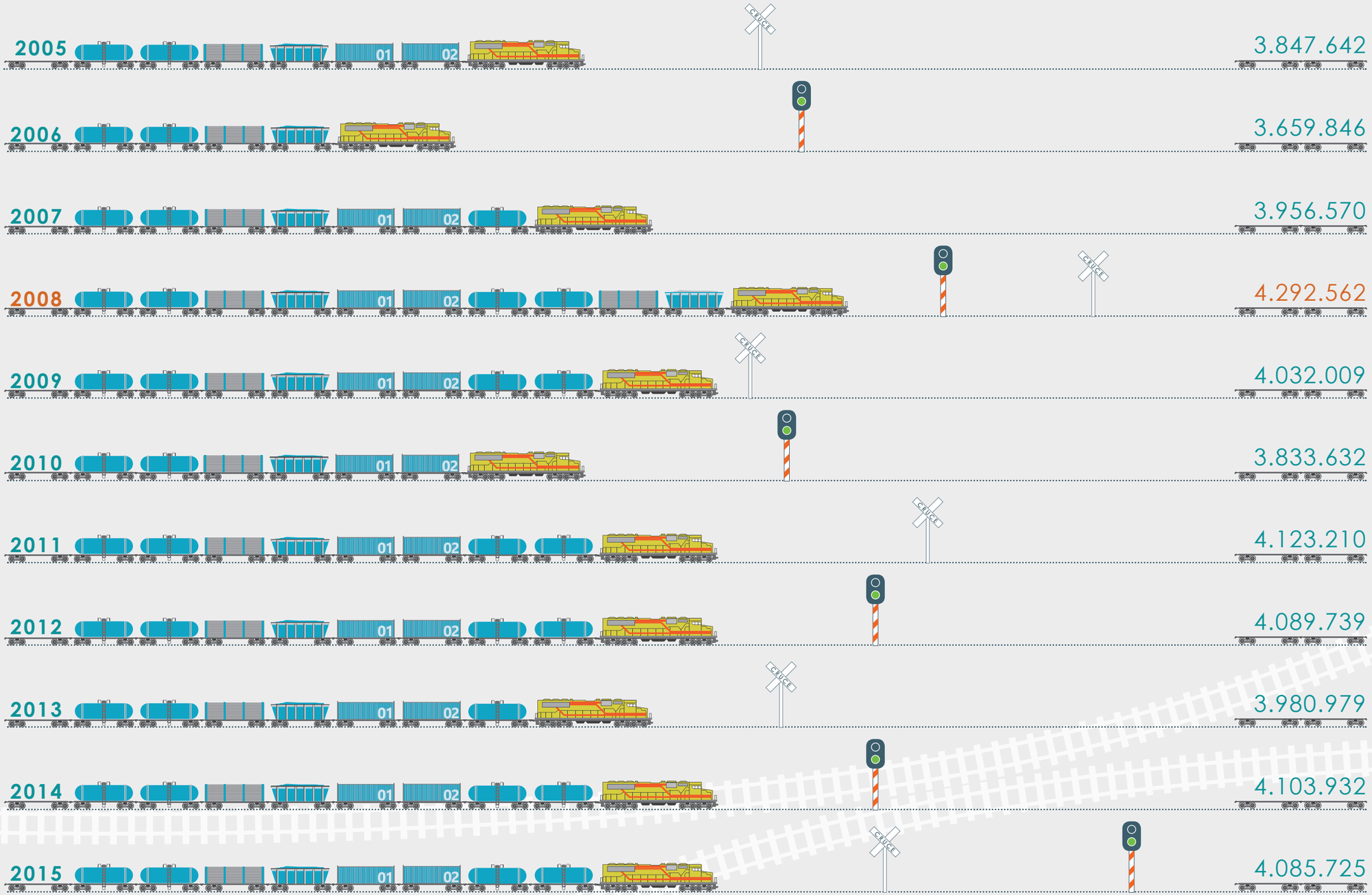
CPI PROPOSALS

- **Railroad transportation policy must be part of a national transportation and logistic policy. In that framework, it is necessary to update and provide continuity to the Plans to Promote Railroad Cargo. These plans must explain the short and medium term actions, objectives, and actions embedded in a long term vision.**
- **Strengthen EFE's institutional framework and corporate government, ensuring the continuity of the plans over successive governments.**
- **Establish financing alternatives for the investment program, emphasizing private participation.**
- **Legislate on the transportation of dangerous and high tonnage cargo, favoring the railroad mode because of its greater degree of safety and control.**
- **With respect to the center-south network, owned by EFE, the company must be instructed to propose plans that include:**
  - Duplicating the mobilized cargo for 2020.
  - Achieving 11 percent participation of the land cargo market in a 10-year period.
  - Increasing the number of mobilized passengers from the current 1 percent to 5 percent in five years.

- Develop a strategic plan for the development of railroad infrastructure that must consider at least the following aspects:

  - Create the basic network and improve the standards of railroad infrastructure, increasing the capacity, speed, and height to facilitate stacking containers and rectify the layout of the tracks to be used by longer trains than the ones currently used.
  - Improve traffic management, by modernizing and automating mobilization systems, improving and establishing detours and crossings, and making the use of the tracks for cargo and passengers compatible.
  - Generate the necessary solutions to connect the cargo that could be carried by railroads but has no access to the EFE network.
  - Install Modal Interchange Centers (CIM, for its acronym in Spanish) in the outskirts of cities to strengthen the bi-modal system.

Evolution of cargo transportation in Chile



Source:
INE

3e

Interconnection with neighboring countries

Chile's trade with its neighbors, Mercosur plus Peru, represents 12.3 percent of total trade, and close to 80 percent of this cargo enters and exits the country by land, mainly in trucks.

In this context, as a national objective is to promote trade and integration with neighboring countries, it is important to improve land connections, have good quality border crossings, border controls, and an efficient and low cost logistic network.

The Direction of Customs identified a total of 127 entry points in the country. Of these, 57 are maritime, including Easter Island and Juan Fernandez; 62 are land border crossings; 6 are airports; and 4 correspond to railroads (Arica-La Paz, Arica-Tacna, Antofagasta-La Paz, and Antofagasta-Salta).

Of the 26 controlled land border crossings with Argentina, 13 have been "prioritized" for improvements by the governments of both countries. Of those 13, 9 have been called "border complexes", that is, they would have all the services needed to control de entry and exit from both countries. In addition, there is a railroad crossing operating in Socompa, Region of Antofagasta. There are also three crossings for which bi-national entities have been created to build or improve them. These are: Agua Negra (Region of Coquimbo), Los Libertadores (Region of Valparaíso), and Las Leñas (Region of O'Higgins).

These accesses are strategic for trade and the movement of people. Socompa mobilizes international cargo throughout the "Capricorn Axis". Agua Negra opens the Port of Coquimbo for Argentinean traffic, as well as tourism for La Serena. Los Libertadores is the country's main connection for land traffic, with an average daily flow reaching 2,200 vehicles in 2015, and provides access to the Port of Valparaiso, the third largest port in Chile in terms of cargo movement. Las Leñas will offer a valuable alternative to Los Libertadores, and will provide expeditious access to the Port of San Antonio.

CPI PROPOSALS

1 Short term:

- **Finish the studies of the three prioritized projects for interconnection with Argentina: Agua Negra, Las Leñas, and Los Libertadores. The first two are an absolute priority. In addition, it is necessary to improve interconnection with Peru in the Arica-Tacna Corridor, which currently has high congestion levels, and improve the border crossings with Bolivia. .**

2 Medium term:

- **Strengthen the remaining border crossings to make the movement of cargo and people flow better. Among other things, we need to consider strengthening land connectivity with Bolivia. We currently have many uncontrolled crossings between the two countries, and it seems convenient to identify accesses that should be controlled to facilitate the traffic of goods and people. This may have the side effect of limiting smuggling.**

3 Long term:

- **As in the case of the Los Libertadores crossing, it is highly probable that opening three new crossings with Argentina will tend to increase the traffic of people and merchandise between the two countries, and between the border provinces and Asia. In this context, strengthening road and railroad routes should be considered, as well as the impact on our ports.**

Interconnection with neighboring countries

3e

Border crossings

4
RAILROAD CROSSINGS

6
AIRPORTS

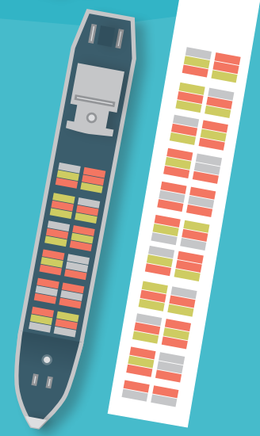
62
LAND CROSSINGS

3
BINATIONAL ENTITIES

- **AGUA NEGRA** (IV region)
- **LOS LIBERTADORES** (V Region)
- **LAS LEÑAS** (VI Region)

PRIORITIZED CHILE-ARGENTINA CROSSINGS

Border Crossing	Chilean Region	Connecting Argentinean Province
Las Leñas	Lib. B O`Higgins	Mendoza
Pichachen	Biobío	Neuquén
Icalma	Araucanía	Neuquén
Mamuil Malal	Arucanía	Neuquén
Carirriñe	Los Ríos	Neuquén
Huahum	Los Ríos	Neuquén
Rio Manso	Los Lagos	Río Negro
Futaleufú	Los Lagos	Chubut
Ingeniero Ibañes Pallavicini	Aysén	Santa Cruz
Jeinemeni	Aysén	Santa Cruz
Río Mayer	Aysén	Santa Cruz
Río Don Guillermo	Magallanes	Santa Cruz
Laurita Casas Viejas	Magallanes	Santa Cruz



57
MARITIME CROSSINGS

127
TOTAL
POINTS OF ENTRY

4

Digital infrastructure

Connectivity and quality access to internet are essential to keep up with the benefits of a digital economy: economic growth; productivity; job creation; more accessible public services; and dissemination of culture. A better digital connectivity translates into better opportunities to make businesses, increases in competitiveness, employment creation, and better access for remote areas or areas far from productive centers, and in the digital interconnection of objects and processes (the Internet of things), among others. Being connected and provide access to the advantages that these elements generate is essential for a country that aims to position itself in the center of global activity.

The telecommunications sector in Chile has been consolidating from a fixed telephone system that went from having 2.4 lines per 100 inhabitants in 1960, to reach 8.5 lines per inhabitant toward the end of the 1980's.

In 1987, telephony went back to the private sector and the State adopted an eminently regulatory role. Years later, the telephone system experienced one of its largest technological changes after the appearance of the first mobile telephony network.

The great technological revolution occurred with the arrival of internet and the possibility of connecting to the network through mobile devices, increasingly compact in size, a phenomenon that triggered an explosive growth of data traffic.

Thus, during past years telecommunications have registered a sustained growth in the country, reaching an annual growth that exceeded 7 percent during 2015, standing out as the sector with the highest growth in the national economy.

As indicated by the World Economic Forum (WEF), a 10 percent increase in the digitalization level of a country generates an increase of 0.75 percent in per capita GDP, and a reduction of 1.02 percent of the unemployment rate.

Although Chile is presented as a Latin American leader in terms of access, internet speed, and technologies, there is still a significant gap with respect to the averages of the group of more developed countries. The challenge is even greater if we consider that from now to 2020, the demand for data traffic will increase by a factor of 10 and the demand for mobile data traffic will increase by a factor of 6. Satisfying that demand with higher quality services will require numerous investments.

According to the latest Global Information Technology Report prepared by the WEF, in the 2013-2015 period Chile dropped four positions in the world ranking of global information technologies, reaching the 38th place. The lack of infrastructure to access internet was one of the main reasons for this fall. In effect, according to the same report, Chile is ranked number 54 with respect to its telecommunications infrastructure, pushing us downward in the general ranking.

The number of internet users in Chile has increased rapidly during past years, achieving a participation of 72 percent of homes. This growth is mainly due to the penetration of mobile devices such as smart phones and tablets. However, 28 percent of the homes, that is, about 900,000 homes and more than 3 million people, still do not have access to internet through a fixed line to broad band high speed internet[5].

This deficit could be explained by insufficient coverage in rural sectors and lack of participation of the lower income segments of the population. While 78 percent of the homes in the highest income quintile have access to fixed broad band, only 32 percent of the first quintile has it. At the same time, 54 percent of urban homes have this type of connection, in contrast to 4 percent in rural homes.

5 Seventh National Survey on Internet Access, Uses, and Users, Under-Secretariat of Telecommunications, February, 2016.

A recent study revealed that the penetration rate of mobile broad band in OECD countries reached 90.3% in 2015. Chile reached 55.7 percent penetration, and ranked 28 among the 34 members of the international group. However, the latest Subtel report indicates that internet penetration during 2016 reached 84 people with access per 100 inhabitants, mainly as a result of mobile broad band.

A determining factor of the digital gap is the cost of the service, specially for lower income homes. This cost is influenced by the cost of international connectivity and the low coverage and competition of high speed fixed networks. For the areas with low service coverage, access to the network is mainly through mobile internet, a connection that has consumption limits, lower speed, and higher prices. In effect, with respect to the entry prices of fixed broad band, Chile is close to USD 33 while the OECD average is USD 26.8[6].

In the case of mobile broad band, as shown by CEPAL, Chileans benefit from an access cost that is slightly lower than 2 percent of per capita income, among the lowest in Latin America, well below the 5 percent recognized as the accessibility threshold. Certainly, our country is among the leaders of Latin America, but it still has space to advance toward cost levels that are characteristic of developed nations such as Japan, France, Italy, or Portugal.

At the same time, by the end of 2016 Chile registered an average broad band speed of 8.6Mbps, 62 percent faster than the average in Latin America, but below the 10Mbps average of the OECD countries, and well below the 21.4 Mbps of the 10 best countries in the world.

The Chilean Chamber of Construction (CChC, for its acronym in Spanish) estimates that USD 26 billion are required in investments to strengthen all the components of the network: fixed broad band, mobile broad band, and backbone optic fiber, and deploy it where it does not exist, to achieve a faster and more competitive connectivity[7]. Committing investments of this magnitude requires clear and stable rules.

6 "Perspectivas de la OCDE sobre la economía digital 2015", Fee basket for fixed broad band, low use, >1.5/2 Mbps, USD PPP.

7 Cámara Chilena de la Construcción (2016), ***Infraestructura Crítica para el Desarrollo.***

CPI PROPOSALS

1 Short term:

- **Increase the capacity of the existing international optic fiber cables, to expand interconnection with the rest of the world.**
- **Expand and increase the capacity of the optic fiber backbone network existing in the country, which goes from Arica to Puerto Montt, and fulfill the goal of extending the network to Puerto Williams.**
- **Adopt the per capita data use as a standard measurement, as it better represents the demand for broad band.**
- **Install optic fiber connections in rural and urban sectors to improve the quality of the network in the "last mile".**
- **Advance in the creation of a National Broad Band Plan that promotes the deployment of the network under a public-private association financing scheme, as has been done in economies such as Uruguay, Singapore, New Zealand, and Colombia. Due to the installation cost of digital networks, the required concession periods must ensure private agents that they will receive returns on their investments.**

2 Medium term:

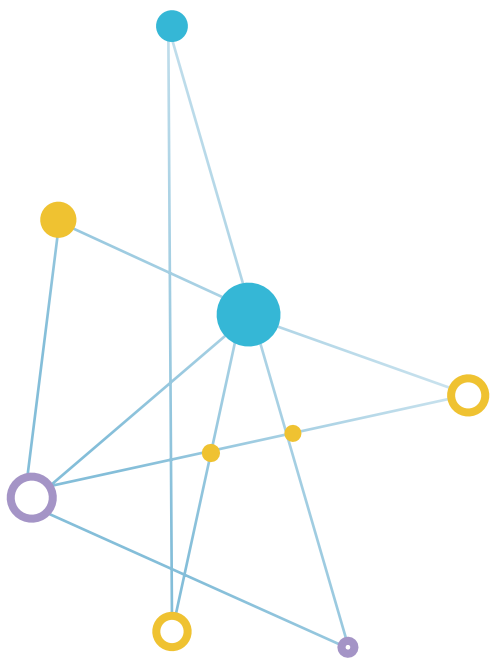
- **Establish, as a goal for 2025, that all schools in the country and 80 percent of homes will be connected to broad band.**
- **Increase the number of international optic fiber cables.**
- **Separate the provision of the optic fiber network from the sale of services offered through it.**

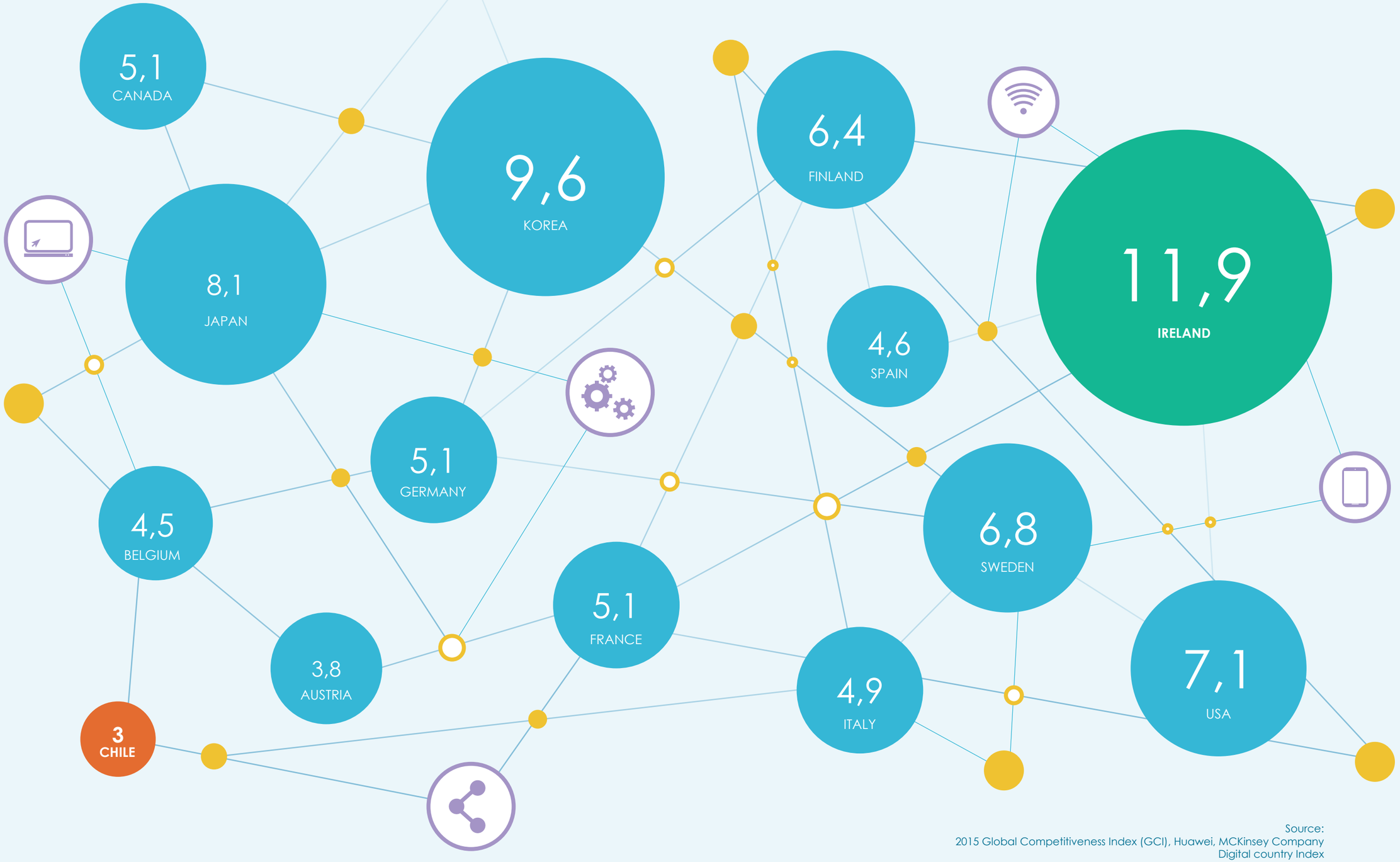
To further the Digital Economy, infrastructure plans must promote the development of information services and digitalization of the State processes, such as:

- **Health.**
  Advance toward a Centralized Single File at a national level, and extend the use of sensors to monitor chronic diseases and real time monitoring of people who require special assistance, such as the elderly.

- **Education.**
  Head toward the virtual classroom of the XXI century, consisting of a personalized follow-up of students in real time, to meet their needs or strengthen their weaknesses, and incorporate computer programming and robotics in the study curricula.

- **Transportation.**
  Move toward a more efficient traffic management, improving collection technologies to enable free flow of traffic in all highways, using the information from mobile devices, and improving the analysis of large volumes of data that enable, among other things, a permanent update of travel patterns.





Source:
2015 Global Competitiveness Index (GCI), Huawei, MCKinsey Company
Digital country Index

R+D+i

5

Research, Development and Innovation in Infrastructure

Infrastructure public policies must include an institutional framework that ensures a continuous improvement of infrastructure through research, development, and innovation that enables the incorporation of new technologies to improve its quality and optimize its use.

Strategic research and development for infrastructure refers to the efforts required to solve the specific challenges that our infrastructure places before us.

For example, when dealing with water resources, it is necessary to identify the possible scenarios of climate change, project the effects it will have on the availability of water resources, and develop a registry and permanent monitoring of the spatial availability of the resource. Specifically, models are required to predict climate change in diverse basins and climates, for high mountain and glaciers, for valleys and underground water, etc. Activities such as these cannot be entrusted to only one public entity, and they do not constitute a routine consultancy that can be contracted in the usual manner. Profound and essential works such as these must be carried out as a permanent research effort. The same is true for the development and identification of technologies for a better use and reuse of water. Examples such as these repeat themselves in the other sectors considered in this document.

CPI PROPOSALS

- **Institutionalize and formalize the infrastructure research, development, and innovation function to address the challenges and propose strategies to incorporate better technologies for the construction and management of public infrastructure.**

Research, Development and Innovation in Infrastructure

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