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13th International Congress on Water Management in Mining and Industrial Processes



Infrastructure Planning for Water Security in Chilean River Basins

Oscar López, Camila Matta, Diego Mena y Julio Faúndes

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SMIICEChile



Universidad
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de San Juan



GECAMIN

Program

1. National Public Infrastructure Plan 2025-2055
2. Background, objectives, and diagnosis
3. Strategic initiatives for water security
4. Conclusions

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1. National Public Infrastructure plan 2025-2055

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DESIGNING THE *FUTURE* OF CHILE

Chile is a country in constant construction. Each Project is part of our **history** and our **future**.

Today, with the **National Public Infrastructure Plan 2025–2055**, we are drawing up a **roadmap** that will enable us to face **the challenges of the 21st century**.

Building **infrastructure** to improve **people's quality of life** and build a more **equitable and resilient country** for all.

This is how we build the Chile we want.



Dirección de
Planeamiento
Ministerio de
Obras Públicas

Gobierno de Chile

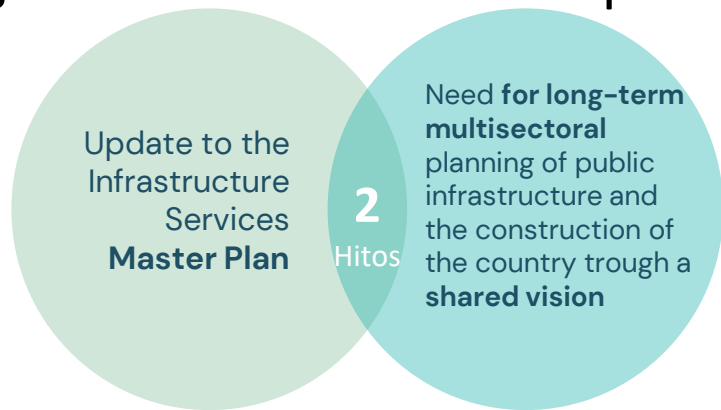


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Genesis: The National Plan as an opportunity for integrated and sustainable planning



01.

2000-2010



02.

2010-2025



03.

2025-2055



Scope:

Ambitious

Multisectoral and decentralized

Proposes public policies

Dynamic in future context

A collective and technical process that began over two years ago



A **roadmap** was developed based on a **national strategic visión**, drawn up with input from **regional, national, academic, and trade union stakeholders**.

COUNTRY VISION


2023-2024

- Meeting with Infrastructure Ministers
- Expert Advisory Committee (CEA)
- Meeting with public agencies and state-owned companies Incorporation of plans from other portfolios 113 Regional Participation

+

SUPPORTING STUDIES

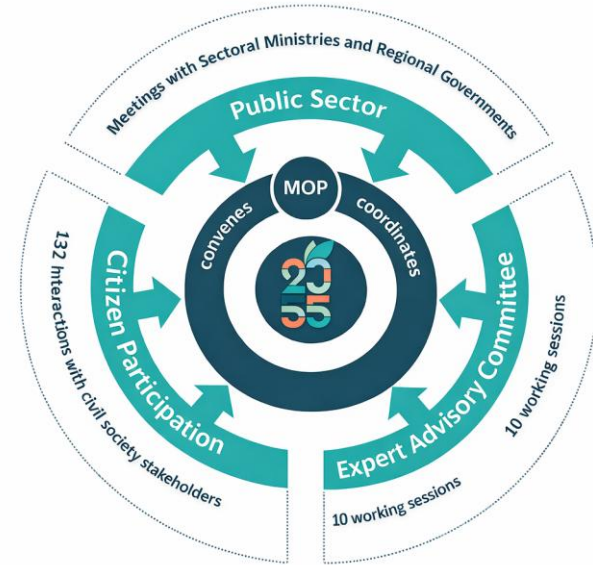
2023-2024

- Comprehensive Analysis:  PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
- Transport Infrastructure Analysis and Modelling: Cipres Consultores
- Infrastructure and Water Management Analysis: Hídrica Consultores

OBJECTIVES AND GOALS

INITIATIVES

- **PORTFOLIO TO 2055**
National and regional
- **MANAGEMENT AND PUBLIC INITIATIVES**



The agreed-upon Country Vision

“Chile in 2055 Will be consolidated, as and integrated, competitive and sustainable country”, guided by five principales:

Sustainability and climate action

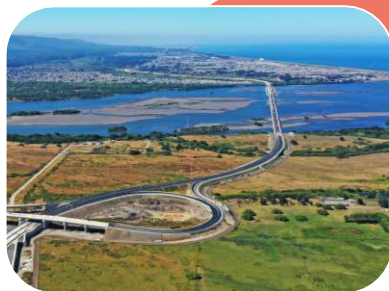
Social cohesion and quality of life

Competitive advantages and global integration

Decentralization and territorial development

Modern and agile state

Strategy



1. CONNECTIVITY AND TERRITORIAL INTEGRATION



2. HABITABILITY IN POPULATED CENTERS



3. WATER SECURITY



4. ENERGY SECURITY



El PNIP2055 is structured around four areas of action, which translate the principles of the Plan into specific planning and investment decisions.

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2. Background, objectives, and diagnosis.

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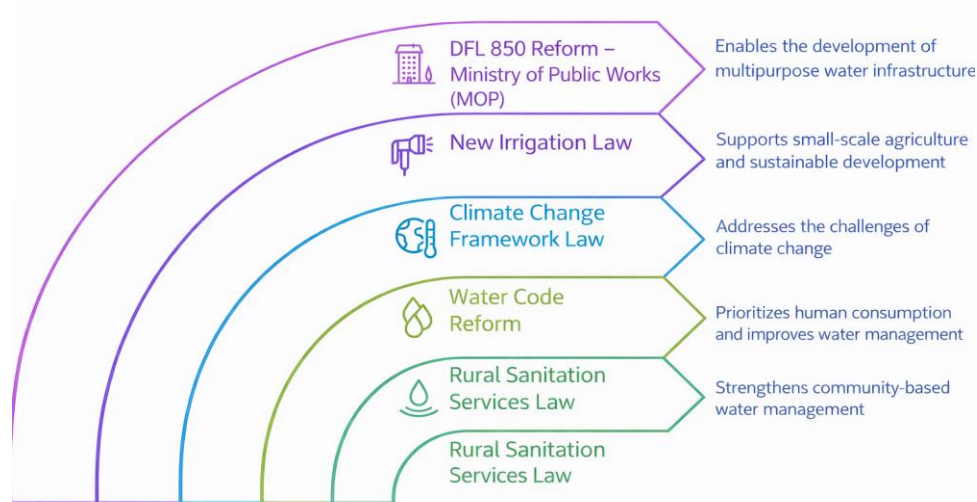
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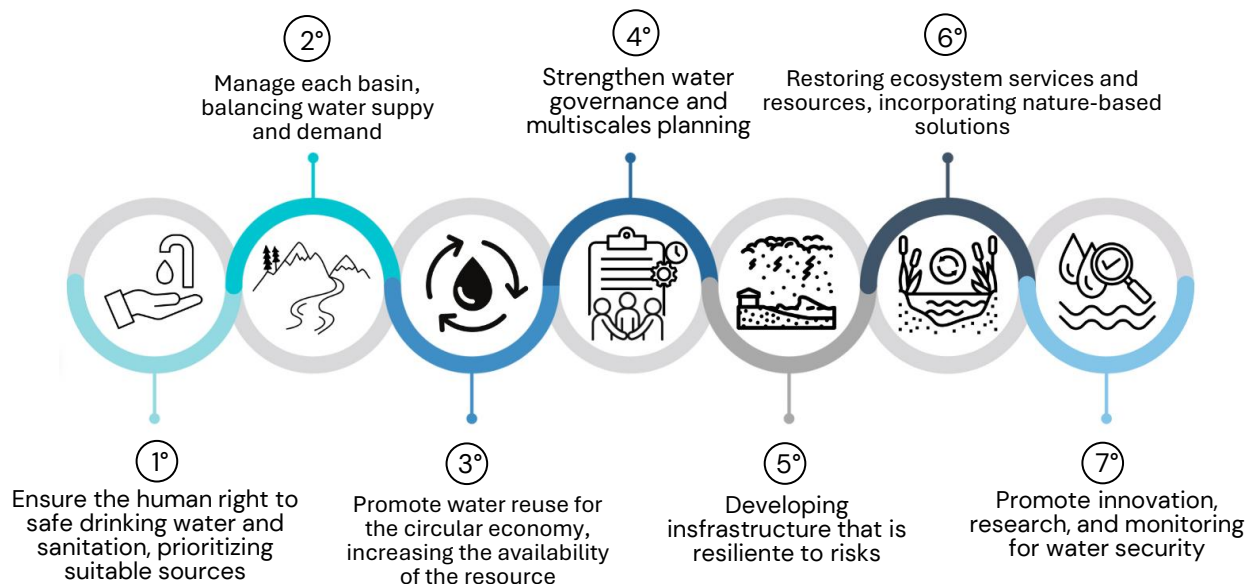
Background

Faced with the impacts of climate change, our institutions have begun to respond by enabling new power and public policy instruments.



Objectives

Ensure water availability and sanitation for all people, strengthen resilience, and seek to balance water supply and demand in each basin, based on sustainable productive developments that protect ecosystems.



Basin –scale diagnosis

Regional characterization:

- Geological
- Climate
- Hydrological
- Environmental
- Land use
- Socioeconomic factors
- Socio-environmental conflicts
- Existing water infrastructure
- Proposed water infrastructure in existing public portfolio
- Initiatives implemented in the period 2015-2023

Supply at sources and extreme events:

- **Water rights.** DGA.
- **Restrictions on water use.** DGA.
- **Current and projected supply at source.** DGA, 2022. National Water Balance.
- **Extreme events** Bibliography, SENAPRED, DGA, 2022. National Water Balance.
- **Water quality.** PEGH.

Current and projected demand:

DGA, 2017. Estimation of current demand, future projections, and characterization of water resource quality in Chile.

- Urban drinking water
- Rural drinking water
- Agricultural
- Electricity generation
- Mining
- Industrial
- Forestry production
- Livestock
- Aquaculture
- Reserve for environmental protection

All regions of Chile are projected to experience a significant reduction in their water supply, of up to 44% compared to historical levels.

Current demand by sector



Water Balance Indicator

Criterion 1:

It is compared with the Surface supply and updated demand.

Structural water deficit: Extrative demand exceeds Flow more than 50 % of the time (Q_{50})

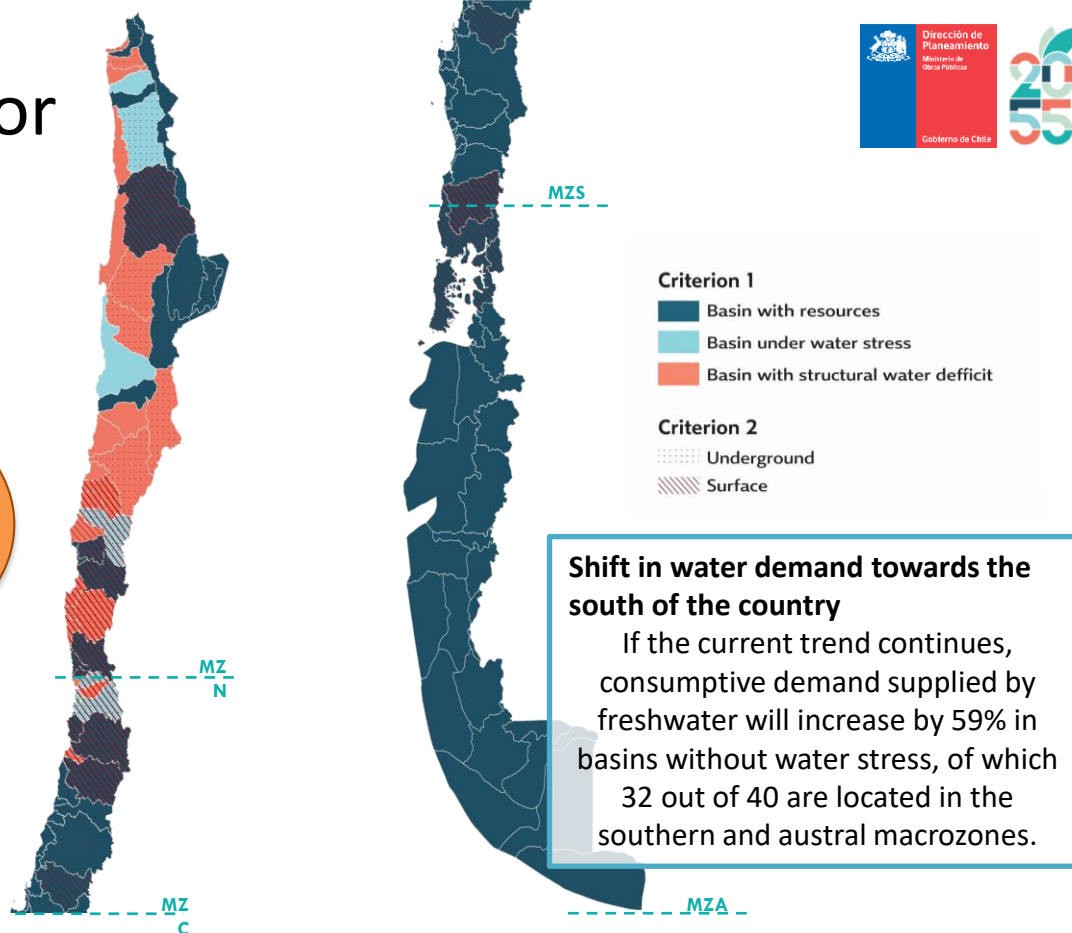
Water stress: Water extraction demand exceeds flow 85 % of the time (Q_{85})

With resources: Demand does not exceed the flow that exceeds 85% of the time (Q_{85})

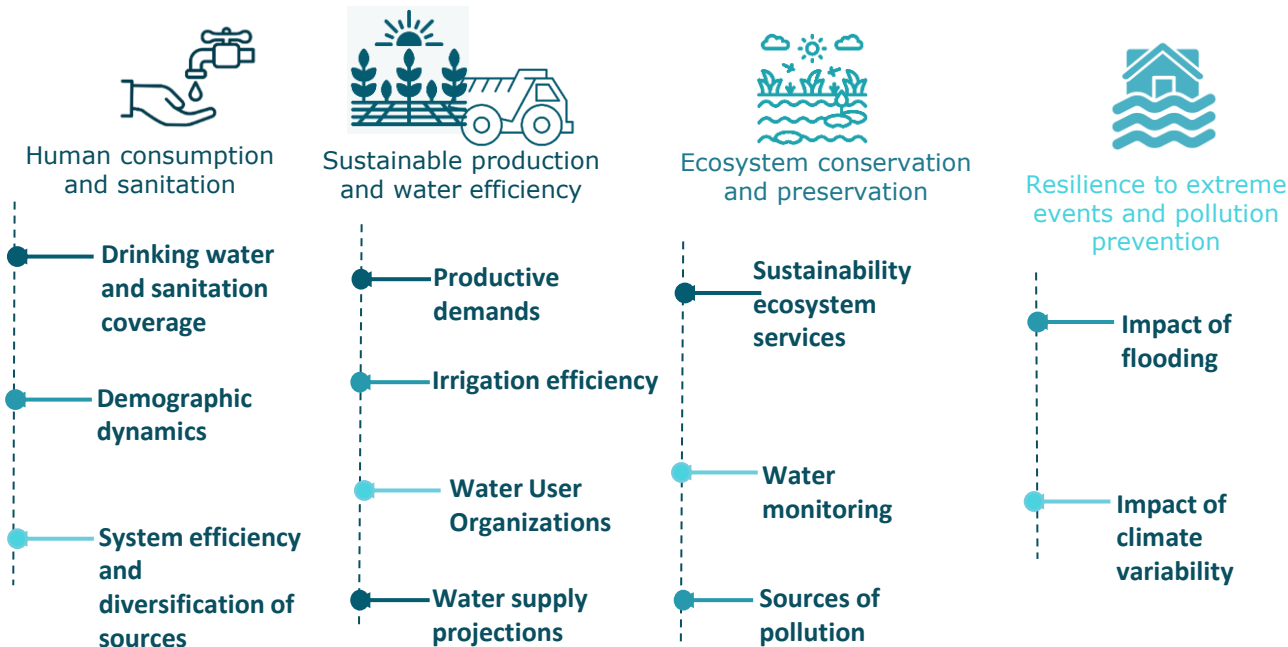
Criterion 2:

Restrictions on water use in the basin
Declarations of depletion, Decrees of scarcity
Restriction areas or prohibition zones

60
watersheds
face stress
or deficit



Water security challenges



29 indicators, for example :

85
watersheds

Less than 25% of their wetlands are under protection.

22
watersheds

Alta criticidad por escaso manejo de contaminantes y pasivos ambientales

34
watersheds

High criticality due to poor management of pollutants and environmental liabilities

55
watersheds

High risk of increased impact from flooding events associated with heavy rainfall

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3. Strategic initiatives for water security

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strategic initiatives

Goals for 2055

Benefits

Expansion, maintenance, and improvement of rural sanitation services

100%
urban and rural sanitation systems
(does not include isolated systems)

100%
urban and rural drinking water coverage (does not include isolated areas)

Universal access and efficient water management

Enabling sustainable and resilient sources of supply for human consumption and irrigation

+2,250 million m³/year
through managed recharge of aquifers

Savings of 980 million m³/year
through efficient irrigation (170,000 ha)

98 million m³/year Reuse of urban and rural wastewater

Ensuring a sustainable water balance in the country's watersheds

Implementation of a comprehensive watershed tracking and monitoring system

100% of watersheds with Strategic Water Resource Plans

From 4,200 to 7,400 Monitoring stations (glaciers, snow, lakes, rivers, groundwater)

Participatory governance in management to ensure the sustainability of resources

Works and measures for the protection and restoration of ecosystem services

+3.5 MM m³/year
through recharge by Nature-Based Solutions

Conservation of ecosystems that ensures water supply and environmental resilience of the territory

Comprehensive system of resilient infrastructure in riverbeds and ravines

+ than 120 cities
Advancing Stormwater Master Plans

61
River Channel Management Plans for protection against extreme events

Integrated management and protection of the territory against water risks



Water Security National Portfolio

5,797 Projects

\$41.2 Billion

→ \$18 billion (5,353 projects) identified in the study

→ \$23 billion (444 projects) identified subsequently



HUMAN RIGHT TO WATER AND SANITATION

1	Urban Drinking Water	355 Projects \$2.42 Trillion	3	Desalination for Human Consumption	26 Projects \$0.88 Billion
2	Rural Drinking Water	1,263 Projects \$2.23 Trillion	4	Sanitation and SSR efficiency	490 Projects \$4.63 Billion

SUSTAINABLE PRODUCTION

5	Obras de Riego	584 Projects \$5.26 Billion	7	Private Desalination	38 Projects \$20.64 Billion
6	Urban Reuse	34 Projects \$0.40 Billion	8	Rural Reuse	125 Projects \$0.49 Billion

ECOSYSTEM PROTECTION

9	Management and Oversight	398 Projects \$0.33 Billion	11	Monitoring and Tracking of the Hydrological Cycle	829 Projects \$0.66 Billion
10	Recuperación de Fuentes de Agua	136 Proyectos \$0,19 Billones			

RESILIENCE AND ADAPTATION

12	Plans Teachers and Studies	752 Projects \$0.34 Billion	13	Resilience	766 Projects \$2.6 Billion
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MANAGEMENT AND PUBLIC POLICY INITIATIVES

Management of Basin Organizations for the sustainability of water sources

New financing mechanisms: sources, infrastructure, and efficiency

Management Initiatives and Public Policy

Integrated Watershed Management

Implement cooperative governance for sustainable watershed management.

Institutional Adaptation and Climate Resilience

Updating standards, evaluation criteria, and promoting low water consumption production.

Reuse of Wastewater

Using treated water for productive purposes, reducing water scarcity.

Desalination Infrastructure

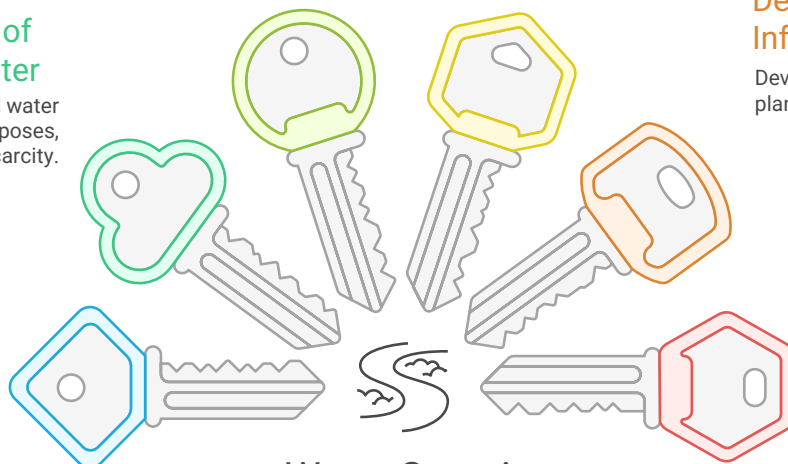
Develop multipurpose desalination plants to strengthen water resilience

Human Right to Water and Sustainability of Water Sources

Promote the protection and restoration of water sources to ensure human supply..

Financing of Water Sources

Establish sustainable financing schemes for innovative solutions..



Water Security

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4. Conclusiones

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Conclusions

- It offers an unprecedented diagnosis of the country's water situation, through the dimensions of water security.
- Flexible and strategic planning to anticipate disruptive changes.
- Dynamic, with regular updates and multiscale sequencing.
- Synthesizes and consolidates a national roadmap aligned with a long-term strategic vision that enables the realization of new institutional competencies.
- Identify new investment projects with a watershed approach, considering the entire life cycle of the infrastructure.
- Proposes public policies to enable new investments and synergy between projects.



An effort that goes beyond a political cycle, a roadmap for infrastructure and water management for the Chile of the future, **focusing on the well-being of the population and future generations.**



<https://infraestructura2055.mop.gob.cl/>

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