

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK  
MULTILATERAL INVESTMENT FUND

**CHILE**

**BSU INCREMENTAL SOCIAL HOUSING:  
REVERSING THE GROWTH OF INFORMALITY**

**(CH-T1266 AND CH-G1007)**

**DONORS MEMORANDUM**

This document was prepared by the project team consisting of: Carolina Carrasco (DIS/CCH), Luis Felipe Vera (CSC/HUD), Ana Castillo (DIS/CUR), Natalia Laguyás (LAB/IEN), Juan Pablo López Gross (MIF/MSM), Verónica Adler (CSC/HUD), Carolina Sepúlveda (CSC/HUD), Cristina Parilli (DSP/DFV), and Lorena Barrenechea (FML/LAB).

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## CONTENTS

### PROJECT SUMMARY EXECUTIVE SUMMARY

I.	THE PROBLEM AND OPPORTUNITIES .....	1
II.	THE SOLUTION .....	3
	A. Project description .....	3
	B. Project beneficiaries .....	5
	C. Project components .....	5
	D. Project impact, monitoring, and evaluation .....	8
III.	PROJECT ALIGNMENT, SCALABILITY, AND RISKS .....	8
	A. Alignment with the IDB Group and Sustainable Development Goals .....	8
	B. Scalability .....	9
	C. Project risks .....	10
IV.	COST AND FINANCING .....	11
V.	PROJECT PARTNERS AND IMPLEMENTATION STRUCTURE .....	14
	A. Description of the project executing agency .....	14
	B. Implementation structure and mechanism .....	14
VI.	FULFILLMENT OF MILESTONES AND SPECIAL FIDUCIARY ARRANGEMENTS .....	15
VII.	ACCESS TO INFORMATION AND INTELLECTUAL PROPERTY .....	16

## PROJECT SUMMARY

### CHILE

#### **BSU INCREMENTAL SOCIAL HOUSING: REVERSING THE GROWTH OF INFORMALITY (CH-T1266 AND CH-G1007)**

Around 80% of the population of Latin America and the Caribbean lives in urban areas with nearly one third of city households located in informal settlements with makeshift dwellings and limited access to basic services in areas exposed to natural disaster or pollution risks.

Although the Chilean housing policy includes measures aimed at solving this problem, the current triple gap in coverage, speed of construction, and standard of the housing has led to a steady rise in the social housing deficit. In the last two years, the number of informal settlements (known as “campamentos” [camps]) in Chile has increased 70%, such that 80,000 families are living in extreme sanitary conditions with little access to basic services. Migrants account for 27% of this population.

This project seeks to test how a technological and social model driven by the private sector can contribute to reversing these gaps by shortening the wait time for families living in informal settlements to access social housing of a dignified size that meets quality standards.

The proposal’s innovation is incorporation of the **incrementality** concept into social housing solutions using an open system approach known as the **Basic Services Unit (BSU)**, which can be built in a short time by the families themselves, enabling them to reach a final dwelling size of approximately 80 square meters. This solution allows families to move out of informal settlements within one year, instead of the current average 6.6 years.

The model, promoted by the firm Elemental S.A., will be tested in a pilot experiment involving 20 BSUs in partnership with Chile’s Ministry of Housing and the Techo Foundation, which has expertise in social and community support processes for populations living in conditions of extreme vulnerability.

Conceptually, once the pilot and its scalability strategy have been validated, the potential beneficiaries of BSUs will be 80,000 households currently living in informal settlements in Chile, which are part of the main challenge to MINVU’s housing policy, with millions of families living in similar conditions throughout the region. This operation leverages IDB Group synergies by building on the operations of the Bank’s Housing and Urban Development Division (HUD) in Chile: CH-L1163, CH-J0001, “Program for the Urban Integration of Informal Settlements,” which seeks to help the country reduce the number of people living in informal settlements and create conditions that would mitigate the likelihood of new informal settlements arising in the country.

Conservatively, the model is expected to be replicated under the project so that it reaches 1,500 families living in informal settlements within three years.

HUD’s support will also ensure that the lessons learned are used to scale the model in other countries of the region experiencing similar problems.

The project is aligned with the Bank’s Vision 2025 and country strategy with Chile.

## **ANNEXES**

Annex I	Results Matrix
Annex II	Itemized Budget
Annex III	iDelta

## **APPENDICES**

Proposed resolution

## **INFORMATION AVAILABLE IN THE TECHNICAL DOCUMENTS SECTION OF THE IDB LAB PROJECT INFORMATION SYSTEM**

Annex IV	Itemized budget
Annex V	Diagnostic assessment of integrity and institutional capacity (DICI)
Annex VI	Procurement plan
Annex VII	Preliminary milestones table
Annex VIII	Integrity analysis
Annex IX	Environmental and social action plan

## **ABBREVIATIONS**

BSU	Basic services unit
DIPRES	Dirección de Presupuestos [Budget Office]
IDB Lab	Multilateral Investment Fund
MINVU	Ministry of Housing and Urban Development
PUC	Pontificia Universidad Católica de Chile [Pontifical Catholic University of Chile]
SEP	Social Entrepreneurship Program
SERVIU	Servicios de Vivienda y Urbanización [Housing and Urban Development Services]

**CHILE**  
**BSU INCREMENTAL SOCIAL HOUSING: REVERSING THE GROWTH OF INFORMALITY**  
**(CH-T1266 AND CH-G1007)**

**EXECUTIVE SUMMARY**

<b>Country and geographic location:</b>	Chile		
<b>Executing agency:</b>	Elemental S.A.		
<b>Focus area:</b>	Inclusive Cities – Essential Infrastructure Services		
<b>Coordination with other donors/Bank operations:</b>	This operation builds on the related operations of the Bank’s Housing and Urban Development Division (HUD) in Chile: CH-L1163, CH-J0001, “Program for the Urban Integration of Informal Settlements,” which seeks to help the country reduce the number of people living in informal settlements (known as “campamentos”) and create conditions that would mitigate the likelihood of new informal settlements arising in the country.		
<b>Direct and indirect beneficiaries:</b>	The direct beneficiaries of the pilot will be 20 families living in informal settlements in Chile. Conservatively, the model is expected to be replicated under the project so that it reaches 1,500 families living in informal settlements <sup>1</sup> in three years, giving them an effective model for relocation to incremental housing.		
<b>Financing:</b>	Nonreimbursable technical cooperation:	US\$220,000	8%
	Contingent recovery investment grant:	US\$400,000	17%
	<b>Total IDB Lab contribution:</b>	<b>US\$620,000</b>	
	Counterpart:	US\$1,790,700	75%
	<b>Total budget:</b>	<b>US\$2,410,700</b>	
<b>Execution and disbursement period:</b>	Technical cooperation: 24 months for execution and 30 months for disbursement. Contingent financing: 24 months for execution and disbursement and up to 84 months for repayment.		
<b>Special contractual conditions:</b>	There will be special contractual conditions for the <u>contingent recovery grant</u> concerning the disbursement mechanism and triggering of the contingency. These conditions are described in the table of terms and conditions for the IDB Lab contingent recovery grant (see paragraph 4.4).		
<b>Environmental and social impact review:</b>	This operation was screened and classified as required by the IDB’s Environment and Safeguards Compliance Policy (Operational Policy OP-703) of 4 October 2021. The project has been classified as category “B,” since its risks can be mitigated through measures that can be feasibly implemented as part of the operation.		
<b>Unit with disbursement responsibility:</b>	The Bank’s Country Office in Chile (CSC/CCH).		

<sup>1</sup> In Chile, “campamentos” [camps] is the Spanish word used to refer to informal settlements. Chile’s Ministry of Housing and Urban Development (MINVU) defines “campamento” as “a human settlement of eight or more households with irregular land tenure and lacking at least one basic service, where the dwellings comprise a social/territorial unit. These neighborhoods are characterized by their lack of social/urban integration. At the urban level, they are not part of territorial planning and have uncertain land tenure that adversely affects the quality of life of their inhabitants.”

## I. THE PROBLEM AND OPPORTUNITIES

- 1.1 In addition to the increase in the percentage of the population living in cities (around 80%<sup>1</sup> in Latin America and the Caribbean), a number of challenges arise in providing urban services—infrastructure, water, housing, education, health, and safety, to name a few—that adversely affect the quality of life of their residents. In terms of housing, nearly one third of households in cities of the region are located in informal settlements (known as “campamentos” [camps] in Chile) with makeshift housing and limited access to basic services in areas exposed to natural disaster or pollution risks.<sup>2</sup>
- 1.2 Chile is no exception. Indeed, the country is experiencing a major housing crisis affecting some 500,000 households, whether through crowding or informality. This problem has worsened amid the health, economic, and social crisis in 2019, as well as ongoing migration in recent years, leading to the growth of informality that has reached emergency levels. Causes include the rise in the population living in vulnerable conditions and the country’s reaction speed to provide housing, which trails behind demand. For every two informal settlements that the Ministry of Housing (MINVU) formalizes by providing a housing solution, three new ones arise.
- 1.3 Migration flows have risen steadily in recent years. At year-end 2020, an estimated nearly 1.5 million migrants were living in Chile, representing 7.5% of the total population (4.4% at end-2017).<sup>3</sup> The difficulty in obtaining a formal lease, whether because of insufficient income or lack of a credit history or cosigner, forces many migrant families to live in informal settlements, where they make up 27% of the population there.
- 1.4 Informal settlements increased 70% last year, growing their population to more than 80,000 families, 55% of which have women heads of household, in approximately 1,000 settlements.<sup>4</sup> These families live in substandard sanitary conditions with limited access to electricity and other basic services. Approximately one fifth of these settlements are located in areas at risk of natural disasters.
- 1.5 The causes of this problem can be explained by the triple gap in Chile’s housing policy with respect to **coverage**, **speed of delivery**, and **standard**.
  - a. To bridge the gap in **coverage**, 90,000 units need to be built each year, but only 60,000 are being built.
  - b. As a result, the **wait time** for a family, which should not exceed three years, currently averages six years.<sup>5</sup> Excessive wait times and the lack of housing offerings, including for families that have been allocated subsidies, have forced

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<sup>1</sup> World Bank, urban population data, <https://data.worldbank.org>.

<sup>2</sup> <https://blogs.iadb.org/ciudades-sostenibles/es/desafios-y-oportunidades-ciudades-lac/>.

<sup>3</sup> Plataforma Migración en Chile, Servicio Jesuita de Migrantes [Migration Platform in Chile, Jesuit Migrant Service].

<sup>4</sup> Catastro Campamentos 2020-2021 [Campamentos Cadastral Survey 2020-2021], TECHO Chile.

<sup>5</sup> Informe Evaluación Programa de Campamentos [Evaluation Report on the Campamentos Program], DIPRES, 2019, [https://www.dipres.gob.cl/597/articles-189330\\_informe\\_final.pdf](https://www.dipres.gob.cl/597/articles-189330_informe_final.pdf).

many vulnerable families to squat and settle on land under extremely precarious and risky conditions.

- c. In terms of **standard**, social housing units should be around 80 square meters in size to prevent overcrowding.<sup>6</sup> However, with the public financing available,<sup>7</sup> the market is only able to build units measuring approximately 50 square meters, since there are not enough private offerings of social housing solutions of dignified size without sacrificing quality. The smaller area of the solutions delivered perpetuates a vicious circle of overcrowding<sup>8</sup> in social housing complexes,<sup>9</sup> which are inhabited by the lower-income quintiles. An estimated 500,000 housing units fit these conditions with more than one family per dwelling on average.<sup>10</sup>

- 1.6 Although public housing policies include a social housing subsidy strategy for families living in informal settlements and overcrowded conditions, the existing solutions are insufficient and far from effective enough to reverse the deficit.<sup>11</sup> Since the size of social housing units is not addressed as part of the solution, the beneficiary families expand the spaces through their own means, which weakens the structures (risk of collapse, as occurred in the 2010 earthquake), or build low quality solutions that degrade the neighborhood, habitability, and the family's asset, as well as relationships with neighbors. Therefore, the problem in the current circumstances is that all three gaps—coverage, speed, and standard of quality—must be addressed simultaneously: if only the size of the dwellings is increased, it will come at the cost of decreasing the annual quantity of units, which would further worsen wait times; alternatively, more units can only be built at the cost of making the dwellings even smaller.
- 1.7 Despite awareness and consensus about the need to find solutions that target the housing deficit, no innovative and cost-effective measures have been identified thus far that would reverse the trend. Country Commitment Roundtables were set up in 2018,<sup>12</sup> as an initiative of the Ministry of Social Development bringing together the public sector, private sector, and academia to contribute in 15 key areas where satisfactory solutions were not being found. One of those areas addresses informal settlements.

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<sup>6</sup> International standards recommend a minimum of 20 square meters per dwelling inhabitant.

<sup>7</sup> In Chile, the financing of social housing is governed by Supreme Decree 49 on “Programa Habitacional Fondo Solidario de Elección de Vivienda” [Housing Solidarity Fund Program for Housing Choice]. The subsidy is up to 950 development units, an accounting unit used to adjust for inflation (approximately US\$36,000).

<sup>8</sup> Overcrowding is where the number of people per bedroom in a dwelling is more than 2.5, or the dwelling has no bedrooms.

<sup>9</sup> Permanent affordable housing, intended to solve substandard housing problems.

<sup>10</sup> With overcrowding of 6 to 8 square meters per inhabitant.

<sup>11</sup> Until 2019, only 53 informal settlements were formalized per year, which is insufficient compared to the growth rate of these settlements. For every two families formalized, three new families arrive to live in informal settlements.

<sup>12</sup> <http://www.compromisopais.cl/>.



- 1.8 Additionally, the National Agreement for Housing and the City was signed between May and June 2021 in a decision with unusually broad support. This agreement was spearheaded by MINVU with the participation of academics, representatives of Congress, municipios, civil society organizations, and the private sector. The objectives were to identify more than 20 tangible measures that would facilitate access to housing, substantially reduce overcrowding and the number of informal settlements, and establish a long-term agenda that would ensure the continuity of the measures. One of the measures proposed in this agreement is to accelerate the implementation of pilot projects for progressive urban development and incremental housing.<sup>13</sup>

## II. THE SOLUTION

### A. Project description

- 2.1 The **project objective** is to test a scalable technological and social model based on the incremental housing concept, to reduce by 80% the wait time for families living in informal settlements (known as “campamentos”) in Chile to receive housing that meets quality standards enabling them to aspire to housing of dignified size in the short term.
- 2.2 **Intervention model.** The key to addressing the triple gap described above is to incorporate **incrementality** into the solutions and processes implemented for social housing projects. The proposal seeks to provide an open system that can be completed within a short time, initially prioritizing the construction of basic services (bathroom and kitchen) and the structure that will house the final livable area of the dwelling (approximately 80 square meters). The underlying principle is targeting public resources to what is essential for habitability, while creating community and ensuring that the home will appreciate in value. The benefits of this model have been documented in the [Manual de Vivienda Incremental y Diseño Participativo](#)<sup>14</sup> [Manual on Incremental Housing and Participatory Design] published by Elemental S.A.
- 2.3 The project has already constructed a functional prototype, developed in partnership with MINVU, the Pontifical Catholic University of Chile (PUC), and the Techo Foundation under the Third Country Commitment Roundtable: Informal Settlements, which was prefabricated in reinforced concrete using robotic technology.<sup>15</sup> The process used in the prototype will make it possible to confirm the technical and economic viability of the technology, determine whether potential users are willing to participate in a solution of this nature, and identify any technical improvements necessary for future scalability, as well as any regulatory gaps that should be remedied to make this modality part of public policy.

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<sup>13</sup> <https://www.minvu.gob.cl/noticia/noticias/dialogo-nacional-por-la-vivienda-y-la-ciudad-convocado-por-el-minvu-presenta-20-medidas-para-reducir-deficit-habitacional-en-el-corto-plazo/>.

<sup>14</sup> <https://www.archdaily.mx/mx/02-210329/elemental-manual-de-vivienda-incremental-y-diseno-participativo>.

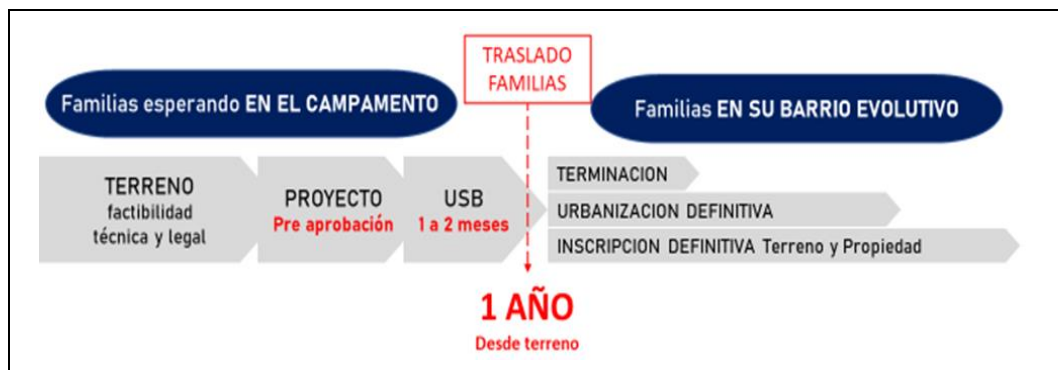
<sup>15</sup> <http://www.compromisopais.cl/mesa3.html>.

- 2.4 The next development stage, which is part of this proposal, has two phases: (i) pilot project in the Valparaíso region for 20 families living in an informal settlement; and (ii) groundwork for scaling throughout Chile and neighboring countries.

**Current process for a family living in poverty to access a social housing solution**



**Future process to access an evolving social housing solution**



- 2.5 **Innovation.** This innovative open system is called a Basic Services Unit (BSU). Its implementation will enable families living in informal settlements to quickly relocate to safe and healthy environments, where they are provided with the initial infrastructure for engaging in progressive housing construction processes, so that time works in their favor and not against them. The neighborhood infrastructure and building sequence represent two highly significant paradigm shifts for Chile's recent housing policy and an improvement vis-à-vis other initiatives based on the phased housing concept.<sup>16</sup>

<sup>16</sup> <https://publications.iadb.org/en/publication/11772/progressive-housing-program-chile-1990-2002>.

- 2.6 Behind this innovation is the conviction and empirical knowledge that self-build construction can be part of the solution, and not the problem, by giving vulnerable families the ability to invest, improve, and adapt. This conceptual approach has earned Elemental S.A. extensive national and international recognition.<sup>17</sup>

## **B. Project beneficiaries**

- 2.7 The direct beneficiaries of the pilot project are 20 families living in an informal settlement in the region of Valparaíso, who will be selected—both the informal settlement and its residents—by MINVU and the Techo Foundation (“TECHO”) under the current housing policy regulations.<sup>18</sup>
- 2.8 According to the Campamentos Cadastral Survey conducted by MINVU in 2019,<sup>19</sup> dwellings have an average of three people living in them, 55% have a female head of household, 27.4% are migrants, and 33% of this population are minors. The main occupation is salaried worker for male heads of household, and homemaker for women, with an average age of 43 and 40, respectively. In terms of the vulnerability conditions of this population, according to the multidimensional poverty analysis performed by MINVU, the existing deficits in school attendance, schooling, and employment are similar to those seen for the most vulnerable 20% of the country’s population. But the same cannot be said for overcrowding and access to basic services, where the rate is significantly higher in informal settlements than the average observed for the most vulnerable 20% of the country’s population.
- 2.9 Conservatively, the model is expected to be replicated under the project so that it reaches 1,500 families living in informal settlements in three years. Conceptually, once the pilot project and its scalability strategy have been validated, the potential beneficiaries of the BSU will be 80,000 households currently living in informal settlements in Chile that are part of the main challenge to MINVU’s housing policy.
- 2.10 This reality is replicated on a larger scale in all countries of the region as a whole, where the Chilean experience tends to serve as a role model for the development of new public housing policies.

## **C. Project components**

- 2.11 To achieve the objectives, the project will be structured into three components:

**Component 1: Incremental open system pilot  
(IDB Lab: US\$216,700; Local contribution: US\$1,626,000)**

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<sup>17</sup> Elemental’s housing work has been exhibited on various international platforms (MoMA, Venice Biennale of Architecture, United Nations, Louisiana Museum of Modern Art in Denmark, and others) and has received recognitions such as the Silver Lion in the Venice Biennale (2008), the AVONNI Prize for Innovation (2009), Index Prize (2011) in Copenhagen, Holcim Award for Sustainable Construction (2011), Zumtobel Award (2014) in London, Gothenburg Sustainability Award (2017, first time awarded to architects).

<sup>18</sup> <https://www.minvu.gob.cl/beneficio/vivienda/subsidio-para-comprar-una-vivienda-construida-de-hasta-950-uf-ds49/>.

<sup>19</sup> The detailed findings and sociodemographic profile can be found at: <https://www.minvu.gob.cl/catastro-de-campamentos/>.

- 2.12 The Basic Services Unit (BSU) is a structural system that addresses the critical needs of a family (which they cannot resolve on their own): initial habitable space, earthquake-proof structure, firebreaks, party-walls with sound insulation, vertical circulations, bathroom, kitchen, and sanitation and electrical facilities. At the same time, the BSU is designed to make the completion of the structure easier, less costly, and safer, and each family can adapt the “soft” parts of the house to accommodate their own needs, culminating in an 80-square-meter dwelling (the middle-class standard). The system thus integrates each family’s investment into a virtuous circle of appreciation in the value of the dwelling, which represents a family’s main asset.
- 2.13 Additionally, for the development of a pilot project that can be embedded into the regulatory, technical, and budgetary framework of Chile’s current housing policy, a “castling” of stages is proposed that enables families to relocate sooner, moving them out of their risky, makeshift conditions early in the process (not at the end) by leveraging temporary urban development solutions.
- 2.14 The following activities will be carried out: (i) based on the prototype already developed, optimization of the architectural design and structural calculation, including a version for persons with disabilities. This optimization reflects the comments and requests of potential users who evaluated the constructed prototype, and technical adjustments proposed by MINVU to facilitate approval of the pilot project; (ii) condominium projects and final urban development (water, sanitation, and electricity) corresponding to the spatial organization of BSUs as a neighborhood, to preserve the social fabric and promote harmonious coexistence among residents; (iii) temporary urban development project based on the parameters set by MINVU, enabling families to relocate early so that they can wait for the final urban development consolidation process in the BSUs (not in the informal settlement); and (iv) community support and technical assistance with a gender lens for incremental building of the dwellings and the neighborhood that distinguishes between degrees of technical and economic autonomy and the appropriate tools for each scenario.
- 2.15 The expected outputs of this component are: (i) 20 BSUs built and delivered to the families; (ii) housing committee (or equivalent group) set up and interested in participating in the project; (iii) public financing mechanism (MINVU) approved for building the BSUs; and (iv) approval of the pilot project, including final urban development, granted by the relevant authorities.

**Component 2: Identification and testing of new technologies  
(IDB Lab: US\$148,900)**

- 2.16 The industrialized production of BSUs generates exponential savings in terms of time because they can be built largely off-site and assembled quickly on-site. At the same time, production with robotic systems can achieve a high level of precision in the initial structure and connection points with future expansions, which facilitates self-build processes. For this methodology to be scalable, alternative materials besides reinforced concrete will be sought for the construction of BSUs that, without sacrificing any of its attributes (insulation, earthquake

- resistance, durability), could offer advantages in terms of logistical costs, carbon footprint, and potential for mass manufacture.<sup>20</sup>
- 2.17 The urban development process is the slowest and most uncertain stage in a traditional social housing project. To enable families to quickly move into BSUs, a temporary system must be installed that provides basic services to families (water, sewer, and electricity) while the final urban services are being authorized and built. To make this temporary system for delivering basic services more efficient and sustainable, innovative technological solutions will be identified for clean drinking water, sewer, and electricity systems that would strengthen all of the existing alternatives available at MINVU.
- 2.18 This open system also makes it possible to develop one or more prefabricated envelope and interior divider systems, address different scenarios and possible combinations. Thus, the most competitive lightweight construction systems available will be selected, to develop a self-build kit that facilitates the work of the USB beneficiary families.
- 2.19 The following activities will be carried out: (i) identification, selection, and evaluation of industrialized envelope systems for building out BSUs through self-build processes; (ii) identification, selection, and evaluation of innovative industrialized off-grid urban development systems; and (iii) identification, selection, and evaluation of construction systems and alternative materials for BSUs.
- 2.20 The expected outputs of this component are: (i) optimized BSU envelope design (baseline for the lightweight envelope system); (ii) preselection of industrialized lightweight envelope technology/technologies, completed; (iii) design of the industrialized envelope system, completed, (iv) design of the temporary urban development system (baseline for the temporary off-grid system), (v) preselection of innovative solutions for temporary off-grid services, completed, (vi) preselection of alternative industrialized technology/technologies for the fabrication of the BSU, completed, and (vii) preliminary design of the BSU adapted to other construction systems, completed.

**Component 3: Knowledge management and scalability  
(IDB Lab: US\$209,800; Local contribution: US\$30,000)**

- 2.21 The objective of this component is to develop knowledge products, based on the experience in Components 1 and 2, that will facilitate the replication and scaling of the incremental model and the incorporation of regulatory enhancements making it possible to include incremental housing as an alternative solution under the regulatory framework for social housing in Chile. It is thus essential to steer knowledge management not only toward the technological solution, but toward the required innovation in terms of social support for the families using this type of solution.

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<sup>20</sup> For example, the feasibility of materials such as wood, 3D printing, and recycled plastics will be analyzed.

- 2.22 Furthermore, the business model will be systematically documented under this component, based on the licensing of the BSU invention patent to different stakeholders in the production chain: MINVU, sponsors, construction firms, and manufacturing companies. The environmental and social policies of Elemental S.A. will be standardized for this pilot and future BSU projects.
- 2.23 The knowledge products to be delivered under this component are: (i) report on recommendations for the development of BSU and incremental urban development projects; (ii) documentation and standardization of the industrialized lightweight envelope; (iii) documented model for technical/social assistance to beneficiary families for incremental housing and neighborhood construction processes; (iv) recommendations for optimizing the approval process for BSU projects (DS49, OGUC, etc.) validated by MINVU; (v) comprehensive business model for scalability; and (vi) technical and social documentary video on the implemented project for regional dissemination.

#### **D. Project impact, monitoring, and evaluation**

- 2.24 **Impact.** The pilot project will validate an innovative and scalable model to help address the challenges faced by Chile's housing policy, which can be replicated in the region: coverage, speed of implementation, and standard of the social housing.
- 2.25 The project's expected outcomes in two years are: (i) the time (years) taken for a family to move from an informal settlement to an incremental housing unit (BSU) shortens from six years to one year; (ii) the usable space of a relocated family's dwelling increases from 50 to 80 square meters; (iii) the habitability and vulnerability conditions of 100% of pilot families relocated from an informal settlement improve; (iv) 80% of the pilot beneficiary families evaluate the construction solution (BSU) and associated services positively; and (v) 1,500 BSUs are built, replicating the model tested in the pilot.
- 2.26 **Monitoring and evaluation.** Elemental S.A. will be responsible for monitoring the project and delivering reports on the indicators agreed upon in the Results Matrix. Elemental S.A. will also deliver six-monthly project status reports (PSRs) via the IDB Lab platform established for such purpose.

### **III. PROJECT ALIGNMENT, SCALABILITY, AND RISKS**

#### **A. Alignment with the IDB Group and Sustainable Development Goals**

- 3.1 The project is aligned with the Bank's **Vision 2025 "Reinvest in the Americas: A Decade of Opportunities,"** which emphasizes that the COVID-19 crisis offers new opportunities that should be seized, giving special importance to new growth strategies conducive to sustainable and inclusive growth that promote social progress with actions such as access to quality basic services and coverage of social housing. Additionally, in line with Vision 2025, the project will offer opportunities to contribute via its major focus areas of gender and diversity (55% of households in informal settlements in Chile have a woman head of household) and digital technology (making use of new technologies for the design and construction of low-income housing).

- 3.2 The project is aligned with the **Institutional Strategy** since it promotes social inclusion by capitalizing on technology as an enabler for improving the lives of the poor and vulnerable population. Regarding IDB Lab's mandate, the project is aligned with the focus area of **Inclusive Cities** and the vertical of **Essential Infrastructure Services**.
- 3.3 The project is aligned with the **IDB Group Country Strategy with Chile 2019-2022** (document GN-2785) and its priority area to "Improve the quality of life for the population in the urban environment."
- 3.4 This operation builds on the related operations of the Bank's Housing and Urban Development Division (HUD) in Chile: CH-L1163, CH-J0001, "Program for the Urban Integration of Informal Settlements," which seeks to help the country reduce the number of people living in informal settlements and create conditions that would mitigate the likelihood of new informal settlements arising in the country. The project will serve as the first real pilot in Chile, contributing to the objectives of the loan operation, innovating in the delivery of housing solutions and social assistance for the beneficiary families, and giving rise to improvements that can be incorporated into low-income housing finance policies. The project also goes hand in hand with HUD operation CH-T1263, which seeks to build capacity for the monitoring and characterization of informal settlements in Chile.
- 3.5 The project is also aligned with **Sustainable Development Goal (SDG) 11** on sustainable cities and communities, specifically target 11.1 seeking to ensure access to adequate, safe housing. It is also aligned with SDG 9 on industry, innovation, and infrastructure, specifically target 9.1 on the development of quality, resilient, and sustainable infrastructure with a focus on equitable access for all.

## **B. Scalability**

- 3.6 The scalability of the solution will stem from its adoption by developers of social housing projects in Chile and the region. The BSU's intellectual property is registered to the Pontifical Catholic University of Chile (PUC), the institution that licensed its use for an indefinite time to Elemental, which can collect royalties for use of the technology in the manufacture of each BSU constructed. These revenues will not only be used to reimburse the contingent portion of this operation, but also for the improvement, innovation, and ongoing adaptation of the BSU.
- 3.7 In an initial scalability phase, new projects will be supported in partnership with MINVU and TECHO, which previously made it possible to prototype the BSU and establish regulatory, technical, social, and economic criteria for its implementation. Elemental will play a direct role in scalability initially, working with MINVU as principal, funding source, and regulatory authority, and with TECHO as sponsor with a presence in most of the informal settlements in Chile, as well as operations in several other countries of the region. The arrangements for implementing the second scalability phase are part of the strategy to be developed in the business model that will finance the project.
- 3.8 Additionally, to improve the scalability outlook and versatility of the BSU, the project will identify alternative construction systems besides the robotic reinforced concrete system, to be used in the pilot project. An example of this might be prefabrication using wood, recycled plastic, or 3D printing, in order to facilitate the

emergence of different business models for the development of social housing projects based on the BSU model that could be adapted to different contexts, and to optimize logistics, while seeking to minimize the carbon footprint without sacrificing the insulation, durability, and earthquake resistance features of concrete.

- 3.9 Conceptually, once the pilot project and its scalability strategy have been validated, the potential beneficiaries of BSUs will be the 80,000 households now living in informal settlements in Chile, which are part of the main challenge to MINVU's housing policy. This reality is replicated on a larger scale in the Latin American countries as a whole, where the Chilean experience tends to serve as a role model for the development of new public housing policies. The partnerships with TECHO and the IDB Housing and Urban Development Division (HUD) are extremely important for achieving this scale.

### **C. Project risks**

- 3.10 The project's principal risk relates to the upcoming change in government and potential changes to the housing policy, specifically the strategy for addressing informal settlements. This risk is not associated with technical variables but with political and communication factors. To address this challenge, two mitigating factors have been considered: (i) promote the execution of a cooperation agreement with MINVU and TECHO confirming the intent to replicate the pilot in new projects or for a specific period of time; and (ii) ensure that construction of the pilot begins before March 2022, so that the benefits for the families can be seen as soon as possible by the new authorities.
- 3.11 A second risk is that the beneficiary families of the pilot may not adapt to the incremental housing model. As a mitigating factor, during the construction of the BSU prototype prior to this project, focus groups were conducted with families in the informal settlements, who rated the solution positively and made suggestions for its optimization that will be considered in the development of the architectural plan for the pilot.
- 3.12 A third risk is that the beneficiary families may not properly install the envelope or complete the construction of their homes. As a mitigating factor, the project includes: (i) the development of an affordable paneling system for the envelope and interior dividers that can be installed using low-skilled labor; and (ii) a technical assistance plan for the families to help them implement the self-build processes, included as a permanent formula in the technical assistance programs provided by MINVU for families relocated from informal settlements.
- 3.13 Additionally, there is a risk that the proposed optimization of the BSU project approval process may not be incorporated into MINVU regulations. As a mitigating factor, MINVU will be an active counterpart during all phases of the project, including the formal proposal for regulatory optimization, which will be prepared in conjunction with the ministry's legal department.
- 3.14 Environmental and social policy risks. The project has been classified as category "B" under the IDB's Environment and Safeguards Compliance Policy (Operational Policy OP-703), since its environmental and social risks can be mitigated through available measures that can be feasibly implemented as part of the operation. Although Elemental S.A. does not perform construction work, rules



and manuals will be developed under the operation to ensure that future developers of BSU projects take the main risks and impacts identified for construction projects into consideration, such as: (i) worker and community safety and health; (ii) noise and environmental pollution; and (iii) waste management. Elemental S.A. currently has policies and procedures addressing these points, but they are not written down in manuals. With specialized consulting support, Elemental S.A. will prepare and implement, as part of the project, Operating Regulations and technical specifications for the construction of BSU projects and analysis of developer capacity, aligned with IDB environmental and social policies. The foregoing is detailed in Annex IX of the operation's technical files.

- 3.15 Regarding the integrity analysis of Elemental S.A., the project team, with the assistance of the Bank's Office of Institutional Integrity (OII), conducted the integrity due diligence process for the executing agency in accordance with the integrity due diligence guidelines (document OP-474-1) and found indicators of an integrity due diligence risk, as well as mitigating factors. The integrity and reputational risks of this project are considered to be within IDB Lab's tolerance for such risks. For more details, see Annex VIII in the operation's technical files.

#### **IV. COST AND FINANCING**

- 4.1 The project's total cost is US\$2,410,700, with US\$620,000 (26%) to be contributed by IDB Lab, and US\$1,790,700 (74%) by the local counterpart.
- 4.2 The IDB Lab financing will be contributed in the form of two financial instruments:
- a. Nonreimbursable technical cooperation funding of US\$220,000, which will be used to finance the innovation processes necessary to identify off-grid urban development solutions, new materials for the BSUs, and lightweight envelope panel systems.
  - b. A contingent recovery investment grant of US\$400,000, which will be used to implement the incremental housing pilot project, document the improvements identified in the prototype stage, incorporate the BSU model into the Chilean public housing policy, and develop the business model for scalability.

Summary budget table<sup>21</sup>

Expenditure categories	IDB Lab		Local contribution	Total
	Nonreimbursable CH-T1266	Contingent CH-G1007		
Component 1: Incremental open system pilot (BSU)	-	216,700	1,626,000	1,842,700
Component 2: Identification and testing of new technologies	148,900	-	-	148,900
Component 3: Knowledge management and scalability	60,700	149,100	30,000	239,800
Project administration	-	-	134,700	134,700
Contingencies*	10,400	34,200	-	44,600
<b>Total</b>	<b>220,000</b>	<b>400,000</b>	<b>1,790,700</b>	<b>2,410,700</b>
% of total	9%	17%	74%	100%

- 4.3 The IDB Lab additionality stems from its experience in supporting business models with a high social impact and the financing of innovation components not found in the current regulatory framework, making it very difficult to implement pilot initiatives that would make it possible to effect real change in the way the problems of coverage, speed, and standard are addressed in the Chilean housing policy.
- 4.4 The table below provides details of the principal terms and conditions for the IDB Lab contingent recovery investment grant.<sup>22</sup>

<b>Executing agency</b>	Elemental S.A.
<b>Objective</b>	<b>Scalable model for the development of incremental social housing</b>
<b>Use of resources</b>	The resources will be used principally for: (i) the technical and incremental social assistance necessary to develop the pilot project and innovation processes in prefabricated social housing envelope technologies; and (ii) documentation of the model and development of the business plan for scalability.
<b>Amount to be financed</b>	Up to US\$400,000
<b>Execution and disbursement periods</b>	The disbursement period will be 24 months with up to 84 months for repayment; both periods will run from the signature date the respective agreement.

<sup>21</sup> In keeping with the Operational Guidelines for Management of Milestones and Financial Supervision for IDB Lab and SEP Technical Cooperation Projects, the resources will be used for audits, evaluations, and/or contingencies required for the Bank's supervision in relation to monitoring the project's results, milestones, and financial performance.

<sup>22</sup> These terms and conditions are preliminary and subject to change following final negotiations with the executing agency.

<b>Disbursement mechanism</b>	The resources will be released in up to three disbursements. The first will be for up to US\$150,000.
<b>Conditions precedent to the first disbursement</b>	Conditions precedent to the first disbursement of the contingent recovery grant will be submission of the following: (i) Evidence of the selection and contribution of land for implementation of the pilot project; and (ii) Formal agreement of the beneficiary families to participate in the pilot project.
<b>Conditions precedent to the second disbursement</b>	Conditions precedent to the second disbursement of the contingent recovery grant will be submission of: (i) Supporting documentation for expenditures of at least 80% of the amount of the first disbursement. (ii) Construction agreement for the BSU pilot, signed by TECHO and MINVU.
<b>Conditions precedent to the third disbursement</b>	Conditions precedent to the third disbursement of the contingent recovery grant will be submission of: (i) Supporting documentation for expenditures of at least 80% of the disbursements pending justification. (ii) Certificate of delivery of the BSU to beneficiary families.
<b>Promissory note</b>	The conditions precedent to each disbursement will include the delivery of a promissory note issued by Elemental S.A. for an amount equal to each requested disbursement.
<b>Contingency triggers</b>	As part of the sustainability and scalability strategy, the project is expected to generate revenues for Elemental S.A. associated with royalties from registration of the intellectual property for the manufacture of BSUs. <sup>23</sup> The contingency mechanism will be triggered from month 13 to month 84 following the signature date of the respective agreement, along with the generation of revenues for Elemental S.A. from the construction, directly or by third parties, of new BSU social housing projects in IDB Group borrowing member countries. <sup>24</sup> Unless any of the events indicated in the "Other contractual conditions" section occurs, reimbursement to the Bank will not be required, if Elemental S.A. receives no royalty payments on the BSUs.
<b>Payment arrangements</b>	No later than 90 days after the close of each six-month period, <sup>25</sup> starting 12 months after signature of the respective agreement, Elemental S.A. will report the revenues received as royalties during the preceding six-month period to the Bank, by means of a notarized statement signed by its legal representative. Sixty percent of these revenues will be used to reimburse IDB Lab, until the entire contingent recovery amount has been reimbursed, or 84 months have passed since the execution of the contingent recovery technical cooperation agreement, whichever occurs first.

<sup>23</sup> The technical files for the operation include a copy of the agreement on the assignment of the right to use the license owned by the PUC to Elemental S.A. for an indefinite period of time.

<sup>24</sup> <https://www.iadb.org/en/countries/select-country>.

<sup>25</sup> These six-month periods will be calendar semesters ending on 30 June and 31 December of each year.

<b>Other contractual conditions</b>	<p>During the disbursement and repayment period, Elemental S.A. must inform the Bank in the event that:</p> <ul style="list-style-type: none"><li>(i) The agreement assigning the license owned by PUC to Elemental S.A. is changed with respect to any of the terms in force as of October 2021.</li><li>(ii) The company's board of directors or shareholders adopt an agreement to liquidate, dissolve, or sell the company to legal persons other than the current shareholders.</li></ul> <p>If the effect of either of these events results in the cessation or interruption of the business related to BSUs and the possibility of collecting royalty payments, the disbursed amount of the contingent recovery grant will in all cases be due and payable.</p>
<b>Key persons</b>	<p>The key persons at Elemental S.A. are Alejandro Aravena Mori, Gonzalo Arteaga Rozas, and Juan Cerda Costabal, who are the partners involved in the firm's operations and financial management.</p> <p>If any of the key persons cease to be actively involved in the company's operations and financial management, the Bank shall be immediately notified in writing, along with a succession plan, for consideration and approval. The individual proposed to replace the key person must have the same or a similar profile.</p> <p>If the executing agency fails to meet this obligation to notify the Bank, or the Bank objects to the succession plan and the matter cannot be resolved within a period of 90 days, any pending disbursement will be canceled and the total amount of the funds disbursed to the executing agency will be immediately due and payable to IDB Lab.</p>
<b>Applicable law</b>	<p>This contract shall be governed and construed under the laws of the State of New York, United States.</p>

## **V. PROJECT PARTNERS AND IMPLEMENTATION STRUCTURE**

### **A. Description of the project executing agency**

- 5.1 The execution agency for the project will be Elemental S.A., a closely held corporation formed in 2006. Its shareholders are Compañía de Petróleos de Chile (COPEC), which owns 40% of the shares; the Pontifical Catholic University of Chile (PUC), with 30%; and Elemental SpA, a corporation comprised of the professional staff responsible for the operation, with 30%.
- 5.2 The company is primarily engaged in the development and implementation of projects of high public interest and social impact. It incorporates participatory design processes where the architects work closely with clients and end users on the development of complex initiatives that require the coordination of multiple stakeholders. Elemental contributes an innovative, quality design to improve quality of life.
- 5.3 Elemental has developed more than 5,000 social housing units in Chile and other countries, based on the principle of incrementality to ensure that this family asset will appreciate in value, which has made its housing projects an effective vehicle for social advancement.

### **B. Implementation structure and mechanism**

- 5.4 Project execution will be the responsibility of Elemental S.A., which will appoint the individuals responsible for the supervision of activities, coordination, planning, monitoring, and coordination with the project's partners.

- 5.5 The project will have a management team that will design the project strategies to be approved by the Partners Committee.
- 5.6 The Partners Committee will be comprised of the Elemental partners appointed to it, and representatives of MINVU, TECHO, and the IDB Group. The purpose of this committee will be to provide ongoing advice and feedback to Elemental on the project strategies, risk management, and actions necessary to ensure the sustainability and scaling of the initiative. This committee is expected to meet regularly on a monthly basis during the first year of execution, in order to advise the company on the implementation of any necessary corrective measures.

## **VI. FULFILLMENT OF MILESTONES AND SPECIAL FIDUCIARY ARRANGEMENTS**

- 6.1 The executing agency will agree to IDB Lab's standard arrangements on results-based disbursements and the Bank's procurement and financial management policies applicable to the private sector, as set out in the Operational Guidelines for Management of Milestones and Financial Supervision for IDB Lab and SEP Technical Cooperation Projects.
- 6.2 The level of risk, as determined by the Diagnostic Assessment of Integrity and Institutional Capacity (DICI), was low, demonstrating that Elemental has a financial management system that is acceptable to IDB Lab and has a tracking and accountability reporting structure for submitting its institutional financial statements to the Bank.
- 6.3 Project **disbursements** will be determined according to liquidity needs, as agreed upon between IDB Lab and the executing agency, and will be subject to verification of the fulfillment of milestones, activities, and costs programmed in the annual planning exercise. The fulfillment of milestones does not release the executing agency from responsibility to achieve the agreed results.
- 6.4 Unless otherwise specified by the Bank during execution, the executing agency's policies will be used for **procurement**. The annual planning of procurements necessary for project execution and fulfillment of milestones will be submitted along with the annual work plan. IDB Lab may conduct an ex ante review of any technical aspects of procurement that it deems necessary, particularly those regarded as critical.
- 6.5 To conduct a community evaluation of the process and technical and social assistance actions for the families benefiting from the BSU pilot project during the self-build process, Elemental will engage the TECHO Foundation via single-source selection, based on its exceptional experience in past social and technical support processes for families relocated from informal settlements in Chile and the region. The terms of reference and draft contract, in an amount not to exceed US\$100,000, will be submitted to the Bank for its no objection.
- 6.6 The executing agency will deliver its **audited annual financial statements** to the Bank. With the contribution resources, the Bank may review the financial statements and make revisions to the use of the resources for the project, after verifying financial and procurement practices.

## VII. ACCESS TO INFORMATION AND INTELLECTUAL PROPERTY

- 7.1 **Access to information.** The information in this document is classified as public upon approval under the Bank's Access to Information Policy.<sup>26</sup>
- 7.2 **Intellectual property.** The intellectual property of all works and results of the project is owned by the executing agency. The executing agency will grant the Bank an irrevocable, worldwide, perpetual, free, and nonexclusive license to use, copy, distribute, reproduce, display, and publicly execute any knowledge product owned by the executing agency that derives from the execution of the project, as well as to develop derivative works. The Bank may grant sublicenses to third parties without requiring new authorizations or licenses from the executing agency.
- 7.3 The Bank may disclose, reproduce, and publish any information associated with the project and include the executing agency's name and logo in such information.

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<sup>26</sup> Link to the Bank's [Access to Information Policy](#).