

# Local Content in CSP/CST Projects: Assessment of the Chilean Industry

Felipe Cuevas<sup>1</sup>, Rodrigo Vásquez<sup>2</sup>, Rodrigo Mancilla<sup>1</sup>, Tomás Baeza<sup>1</sup>, Pablo Tello<sup>1</sup>

<sup>1</sup> Chilean Solar Committee - CORFO

<sup>2</sup> Senior Advisor of GIZ's Energy and Renewable Energy Program

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# ABOUT THE CHILEAN SOLAR COMMITTEE

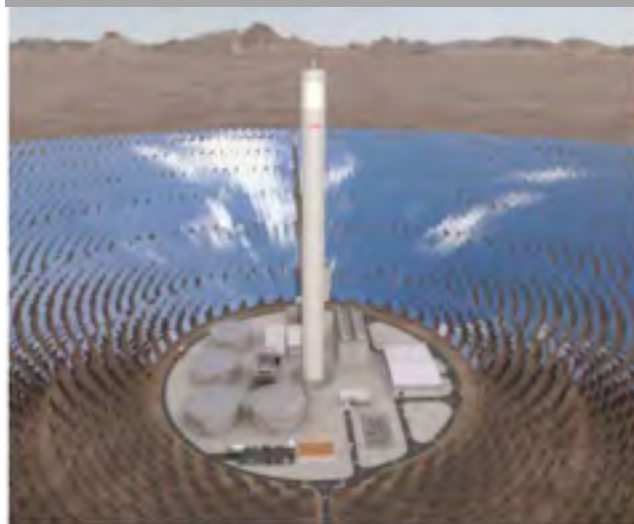
- Chilean Government Agency (Created by Corfo, Chilean Economic Development Agency)
- Promote the development of a national solar energy industry
- Increase the competitiveness, productivity, technological capabilities, and markets of the country
- Promote the characteristics of Atacama Desert and its great solar resource



# ABOUT GIZ

- German agency for international cooperation
- 28 years in Chile. Since 2004 with focus on energy
- Study within the scope of the 4e program: Renewable Energy and Energy Efficiency in Chile

Solar energy, CPS-CST and large scale PV 2014 - 2019



Self-Supply Renewable Energy in Chile 2015 – 2019



Cogeneration for industrial applications 2015 - 2019



Global carbon market 2017 - 2018



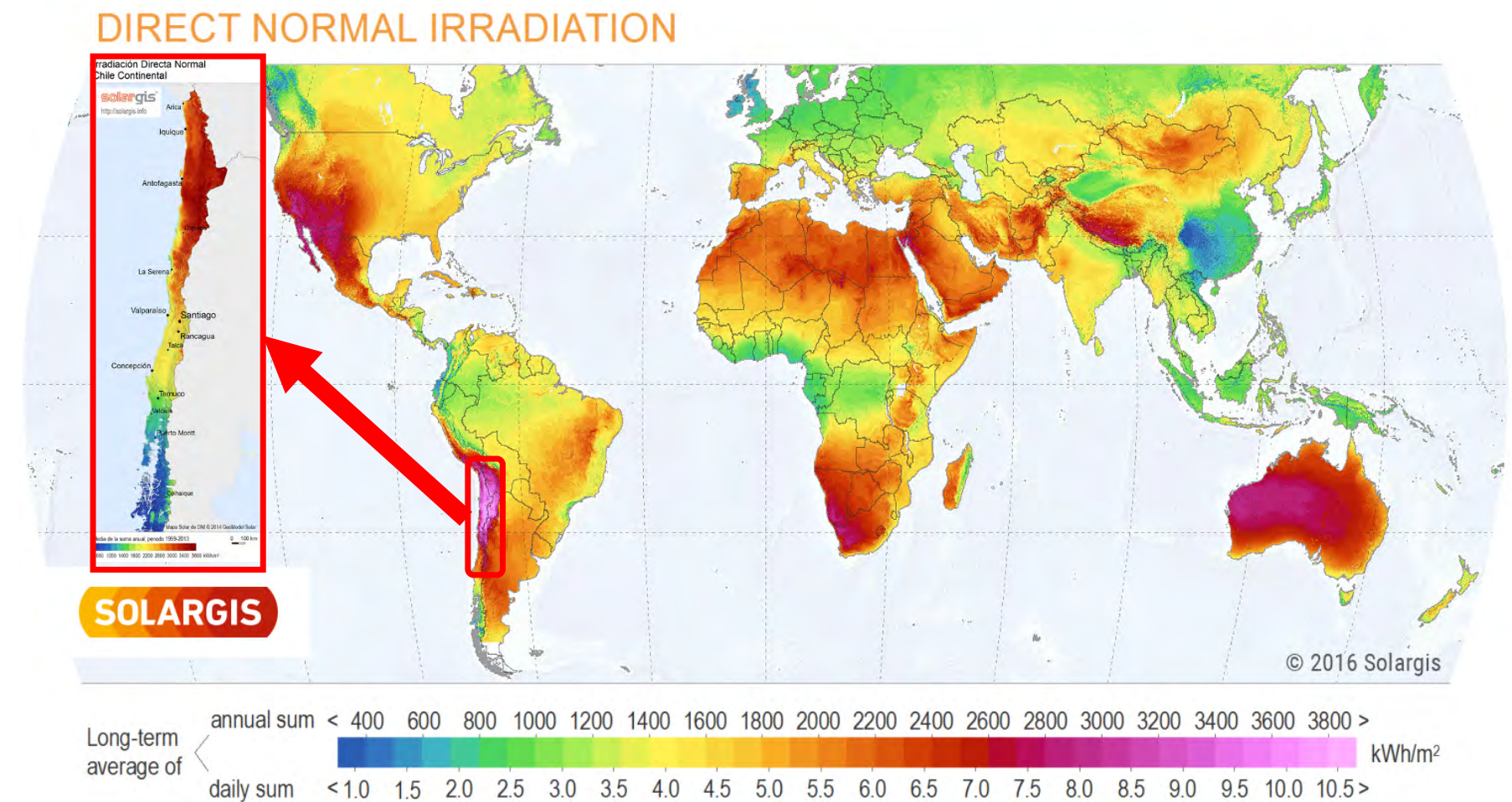


# MOTIVATION OF THE STUDY

Great solar energy resource in the northern part of the country

Presence of a mining sector, which has been the main driver of an industry development in the region

Is it possible to develop a solar concentration industry, able to provide services and components in Chile?



# CSP/CST PROJECTS IN CHILE

## Two projects in operation

### Minera Centinela (ex-Tesoro)

Antofagasta Region

PT-1 solar thermal system (Abengoa)

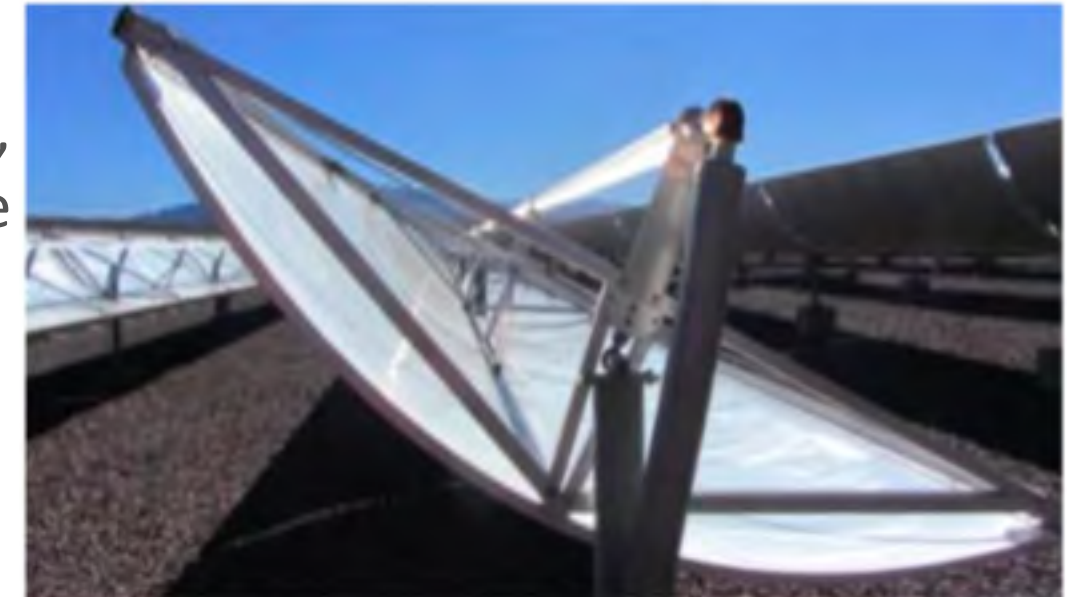
18,000 m<sup>2</sup> aperture, equivalent to 7 MW<sub>th</sub>

3 storage tanks, 120 m<sup>3</sup> each

Heat supply for electro-winning process

### Local content:

Civil works, collector assembly, cables, insulation, piping, storage tanks



### Jucosol

Valparaíso Region

LAT73 solar thermal system (3M)

700 m<sup>2</sup> aperture, equivalent to 500 kW<sub>th</sub>

1 storage tanks, 50 m<sup>3</sup>

Heat supply for grape juice production

### Local content:

Civil works, collector assembly, heat exchangers, cables, insulation, piping, storage tanks, flexible joints, anti-seismic design





# CSP/CST PROJECTS IN CHILE

One project under construction

## Cerro Dominador (110 MW)

Antofagasta Region

10,600 heliostats, 140 m<sup>2</sup> each (1,480,000 m<sup>2</sup>)

1 cold storage tank. 22,000 m<sup>3</sup> @290 °C. Carbon steel

2 hot storage tanks. 2 x 12,000 m<sup>3</sup> @560 °C. Stainless steel

Tower: 218 m height

Receiver: 32 m height

### Local content:

Tower structure. Anti-seismic design, assembly

50,000 ton solar salts

Heliostat assembly. Rioglass installed an assembly warehouse.

Local workers from the region

Civil works, raw materials for foundations.



Fuente: [www.cmigroup.com](http://www.cmigroup.com)



# CSP/CST PROJECTS IN CHILE

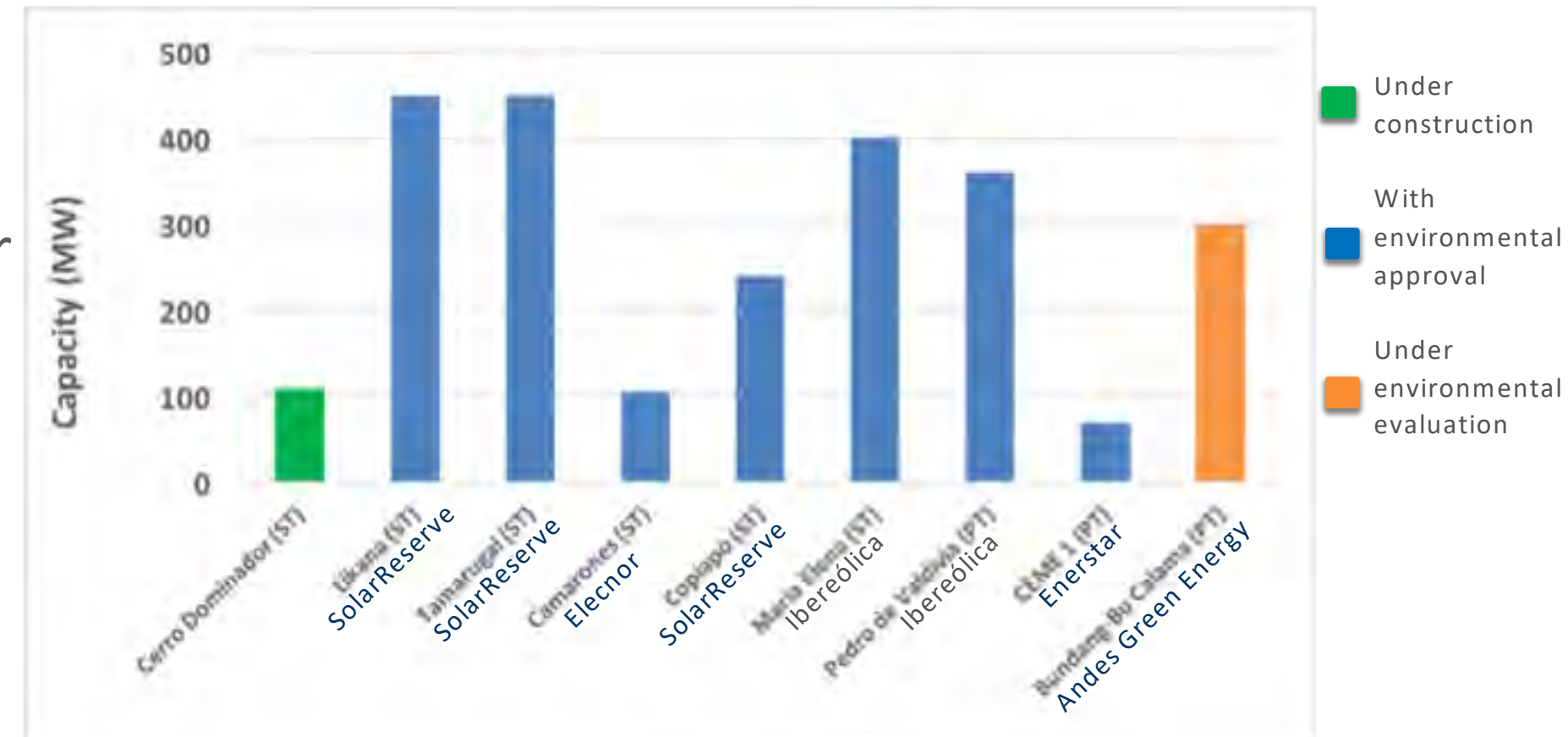
## Eight projects under development

- 7 projects, 2075 MW with environmental approval
- 1 project, 400 MW under environmental evaluation

## CSP technology development in Chile dominated by solar towers

- 5 solar tower projects, 1645 MW
- 3 parabolic trough projects, 730 MW

Each project with at least 10 hours of storage. Solar salts might be provided by local suppliers





# METHODOLOGY

- Identification of the value chain



- Information about components: raw materials, manufacturing process, synergies with other industries



# METHODOLOGY

- Interviews with companies that have been involved in existing projects
- Identification of the challenges they have faced.

- Interviews with companies that have the potential for providing either components or services
- Exhaustive search including companies sponsored by Corfo and databases from sectorial associations

ASIMET: Metallurgical and Metal-mechanic Industry Association

SOFOFA: Federation of Chilean Industry

ACERA: Chilean Association for Renewable Energy

AIA: Industry Association from the Antofagasta Region

# PUBLICATION

- Assessment has been published in a document (in spanish)  
Available online  
<https://4echile.cl/documentos/Potencial-industrial-de-Chile-para-industria-solar-web.pdf>
- Information about 25 companies willing to be part of the value chain of CSP/CST projects
- Barriers
- Proposal for actions







COMITÉCORFO

# TECHNICAL INFORMATION OF THE COMPANIES

## Publication of the technical information about the companies

Name and address

Contact

Main products

Machinery and  
manufacturing  
process  
available

2	<b>B.Bosch S.A</b> Sociedad Anónima Av. Américo Vespucio 2150 - Quilicura Santiago		
	Contato 1	<b>Nombre</b> Fernando Valderas	Actividad Económica SII
		<b>Cargo</b> Jefe Comercial	Tratamientos y revestimientos de metales.
		<b>Teléfono</b> +56 2 2620 8810	Fabricación de otros productos elaborados de metal
		<b>e-mail</b> fvalderas@bbosch.cl	
3	Productos principales	<b>Ingeniería y Construcción de Sistema de Potencia:</b> diseño y fabricación de estructuras de acero galvanizado para torres de transmisión eléctrica, torres de telecomunicaciones y subestaciones eléctricas	
		<b>Servicio Integral para la protección del acero</b> contra la corrosión mediante procesos de galvanizado	
		<b>Energía Solar:</b> fabricación de estructuras para el soporte de paneles solares	
		<b>Telecomunicaciones:</b> fabricación de estructuras para la soportación de antenas. Destacan las torres autosoportadas, monopostes, bridados, torres contraventadas y torres esbeltas	
		<b>Soluciones de estructuras galvanizadas</b> para la gran minería (Piperack, bandejas, estructuras varias)	
4	Equipamiento	● <b>Estructuras de Acero</b> Planta fabricación de acero. Capacidad: 12.000 Ton/año. Galvanizado	
		● <b>B.BOSCH Vespucio</b> Dimensiones Nominales del Crisol: 7 m de largo; 1,25 m de ancho y 2 m de profundidad. Capacidad Nominal: 6 ton/h, Santiago	
		● <b>B.BOSCH Centrifugado, Santiago</b> Dimensiones Nominales del Crisol: 4 m de largo; 0,9 m de ancho y 1,75 m de profundidad. Capacidad Nominal: 0,9 ton/h	
		● <b>GalvaB Coronel</b> Dimensiones Nominales del Crisol: 12 m de largo; 1,25 m de ancho y 2,75 m de profundidad. Capacidad Nominal: 9 ton/h	
		● <b>Galva Sur, Puerto Varas</b> Dimensiones Nominales del Crisol: 11 m de largo; 1,25 m de ancho y 2,75 m de profundidad. Capacidad Nominal: 12 ton/h	
5		● <b>Galva Buena Ventura Santiago</b> Dimensiones Nominales del Crisol: 13 m de largo; 1,4 m de ancho y 3 m de profundidad. Capacidad Nominal: 15 ton/h	
		● <b>B.BOSCH Galvanizado do Brasil</b> Dimensiones Nominales del Crisol: 13 m de largo; 1,8 m de ancho y 3 m de profundidad. Capacidad Nominal: 10 ton/h	

2	<b>B.Bosch S.A</b> Sociedad Anónima Av. Américo Vespucio 2150 - Quilicura Santiago	
	<b>Participación de Mercado</b>	50-60% del mercado nacional de galvanizado, 50% mercado nacional estructuras de transmisión y subestaciones eléctricas
	<b>Experiencia con empresas CSP/CST</b>	Cotizó estructuras de heliostatos para Cerro Dominador en alianza con empresa española MADE
	<b>Productos Similares Componentes CSP</b>	Productos Similares Componentes CSP Estructuras de soporte de acero galvanizadas
	<b>Componentes CSP/CST fabricados</b>	Sólo cotización
	<b>Componentes CSP/CST potenciales</b>	Tienen capacidad para fabricar los pedestales y estructuras de soporte galvanizado para heliostatos, cilindros parabólicos y colectores Fresnel, de acuerdo al proceso de galvanizado requeridos
	<b>Capacidad Producción Total</b>	12.000 Ton/año procesamiento acero 130.000 Ton/año galvanizado
	<b>Origen Materias Primas</b>	Acero: China, India y Turquía
Certificaciones	● ISO 9001:2008	
	<b>Grado Interés Detectado</b>	Alto interés, dispuestos a invertir en equipos para automatizar los procesos de soldadura, ante oportunidades de proyectos significativos para el desarrollo de tecnología
Experiencia	● Antigüedad en mercado : Desde 1960	
	● Cantidad trabajadores : 1.200	
	● Operación en extranjero : Sí, Brasil y China	
	● Proyectos relevantes : <ul style="list-style-type: none"><li>Más de 3.000 km de tendido de potencia construido en Chile</li><li>Estadio Municipal La Florida</li><li>Autopista Nororiente</li><li>Planta Celulosa CMPC Santa Fe</li><li>Aeropuerto El Tepual, Puerto Montt</li><li>Planta FV Luz del Norte: 141 MW Copiapó (10.000 Ton)</li><li>Planta FV El Bolero:146 MW Atacama (2000 Ton)</li></ul>	
Observaciones	Para proyectos solares de concentración que involucren más de 12.000 Ton, se realiza una programación de entrega de suministros. Para volúmenes mayores se puede considerar inversión para aumentar capacidad de planta. Para el proceso de galvanizado tiene capacidad de galvanizar 130.000 Ton	

Market share

Experience in CSP/CST projects

Sinergies with CSP/CST products

Potential CSP/CST products

Production capacity

Certifications

Level of willingness detected

Experience in other projects

Observations

# COMPONENTS FEASIBLE TO BE MANUFACTURED IN CHILE

Component	Production capacity	Unit
Steel structures	117,600	ton/year
Flat mirrors (4 mm)	700,000	m <sup>2</sup> /year
Stainless steel storage tanks	3,440	ton/year
Carbon steel storage tanks	25,400	ton/year
Power transformer	2,000	MVA/year
Thermal insulation (mineral wool)	12,000	ton/year
Hydraulic pumps	4,000	units/year



# BARRIERS

The demand for components depends on the number of CSP/CST projects implemented

Design diversity of some components

The decision to acquire components is made overseas

Lack of knowledge on CSP/CST technologies, their benefits and their potential component demand

# PROPOSAL FOR ACTIONS

Promote innovation and development of components

Support pre-investment studies

Promote associativity

Attract foreign technology providers

Dissemination of opportunities created by CSP/CST projects

Education and training



# PROPOSAL FOR ACTIONS

Promote innovation and development of components

## *Solarbosch*

Two fundings from Corfo granted

Development of a solar tower prototype  
Development of an air-cavity receiver



# CONCLUSIONS

Construction sector and manufacturing industry are capable of carrying out a significant part of the construction of CSP/CST plants.

Share of local components, plus construction and assembly might represent between 18 and 56% of total CSP costs, excluding O&M (DLR).

Share of storage systems could be significant, given that both salts and tanks can be provided in Chile.

Based on previous experience in the country, it is estimated that the share will be smaller at the beginning (+/- 20%) and increase as Chilean companies gain experience, knowledge and reputation.



Felipe Cuevas

[\*\*felipe.cuevas@codesser.cl\*\*](mailto:felipe.cuevas@codesser.cl)

[\*\*http://www.comitesolar.cl/english\*\*](http://www.comitesolar.cl/english)

Thank You

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