



TECHNOLOGY REVIEW WEBINAR - LATAM

**MSS LATAM.
MODULES AND SYSTEM SOLUTIONS GROUP**

21 -05 - 2020

**Subject Matter Expert:
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Toni Viladot, Product Manager Sales.
Canadian Solar, Inc.**

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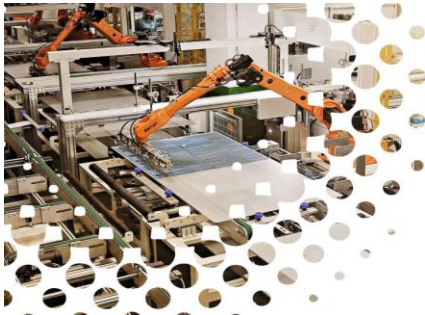
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**Modules,
System and
Solutions
Group**



**Energy
Group**

Founded in 2001 in Canada, Canadian Solar Inc. (NASDAQ:CSIQ) is one of the world's largest and foremost solar power companies. As a leading PV project developer and manufacturer of solar modules with over 16 GW of premium quality modules deployed around the world in the past **19** years, Canadian Solar is one of the most bankable solar companies worldwide.

Canadian Solar Overview

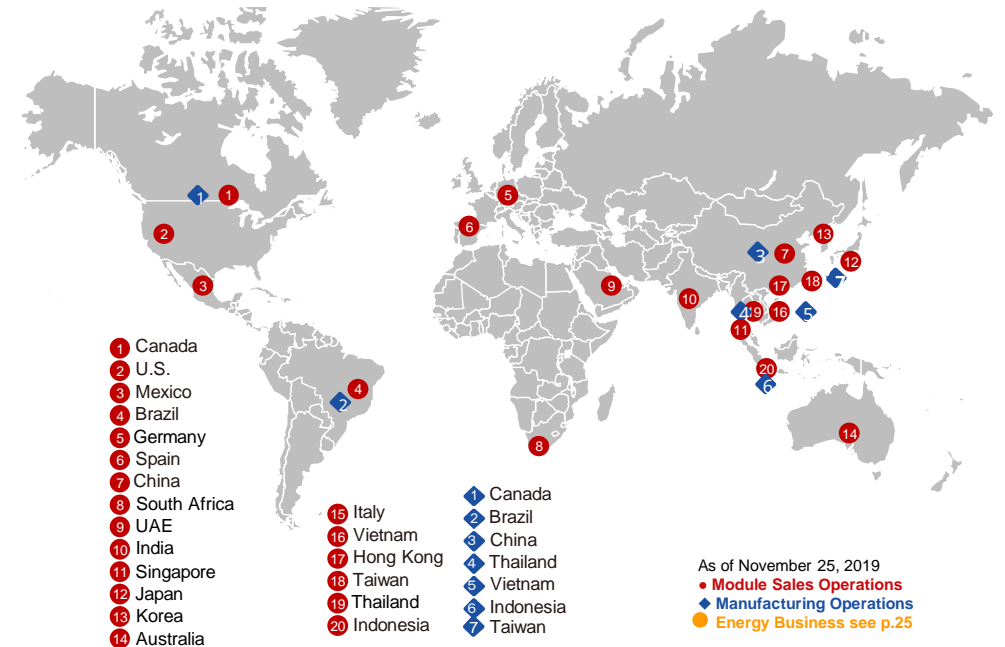
Leading solar module manufacturer and utility-scale solar developer with one of the world's largest solar project pipelines

- ❖ Founded in Ontario, 2001
- ❖ Listed on NASDAQ (CSIQ) in 2006
- ❖ Over 13,000 employees globally
- ❖ Presence in 23 countries / territories
- ❖ One of the world's largest solar module suppliers
- ❖ Over 40 GW modules shipped accumulatively
- ❖ Proven utility-scale project development track record

Module and System Solutions

- ❖ 2020 shipment guidance: 10-12 GW (2019: 8.6GW)
- ❖ Competitive cost structure
- ❖ Leading bankable brand with global reach

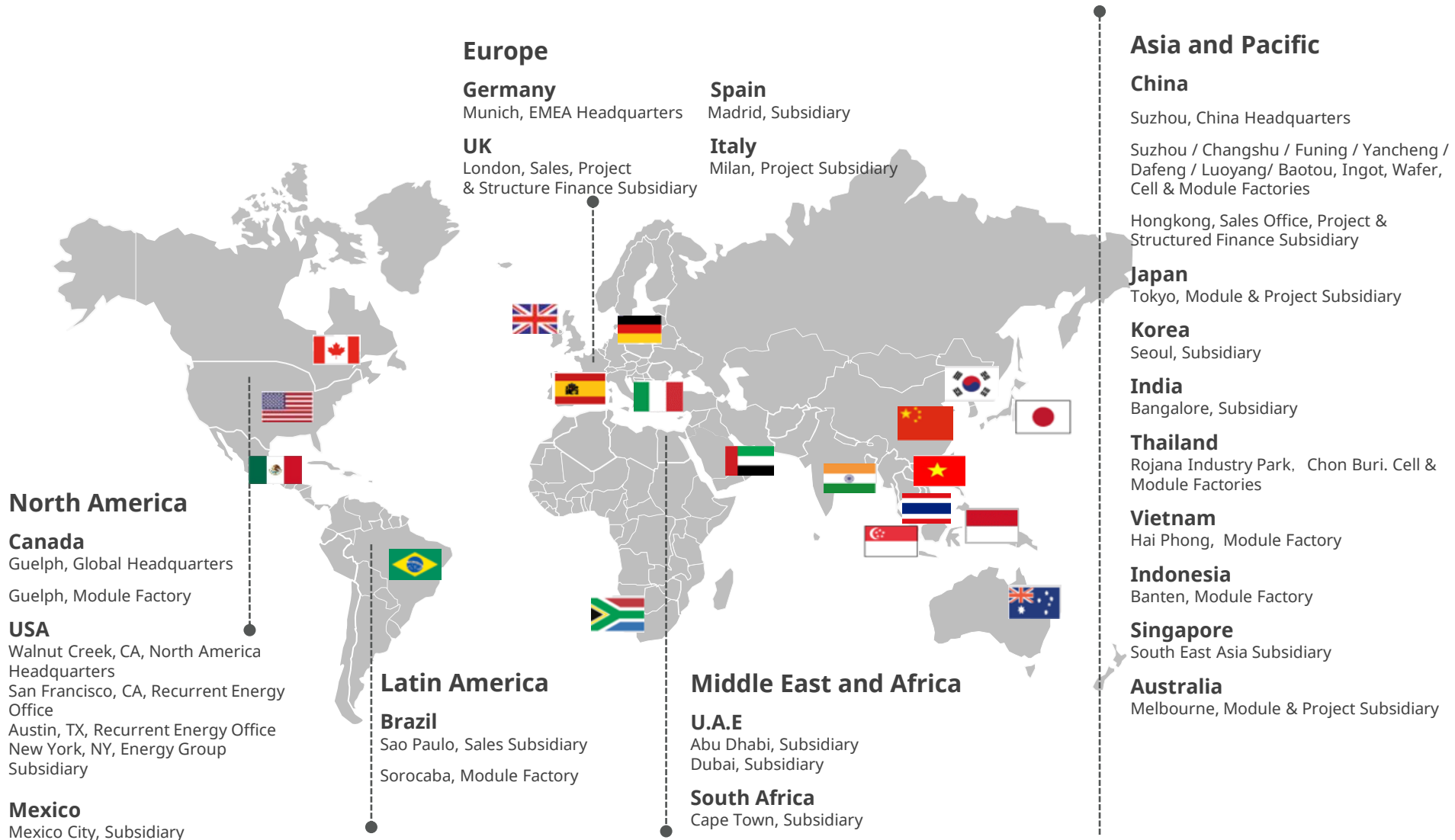
Global Footprint



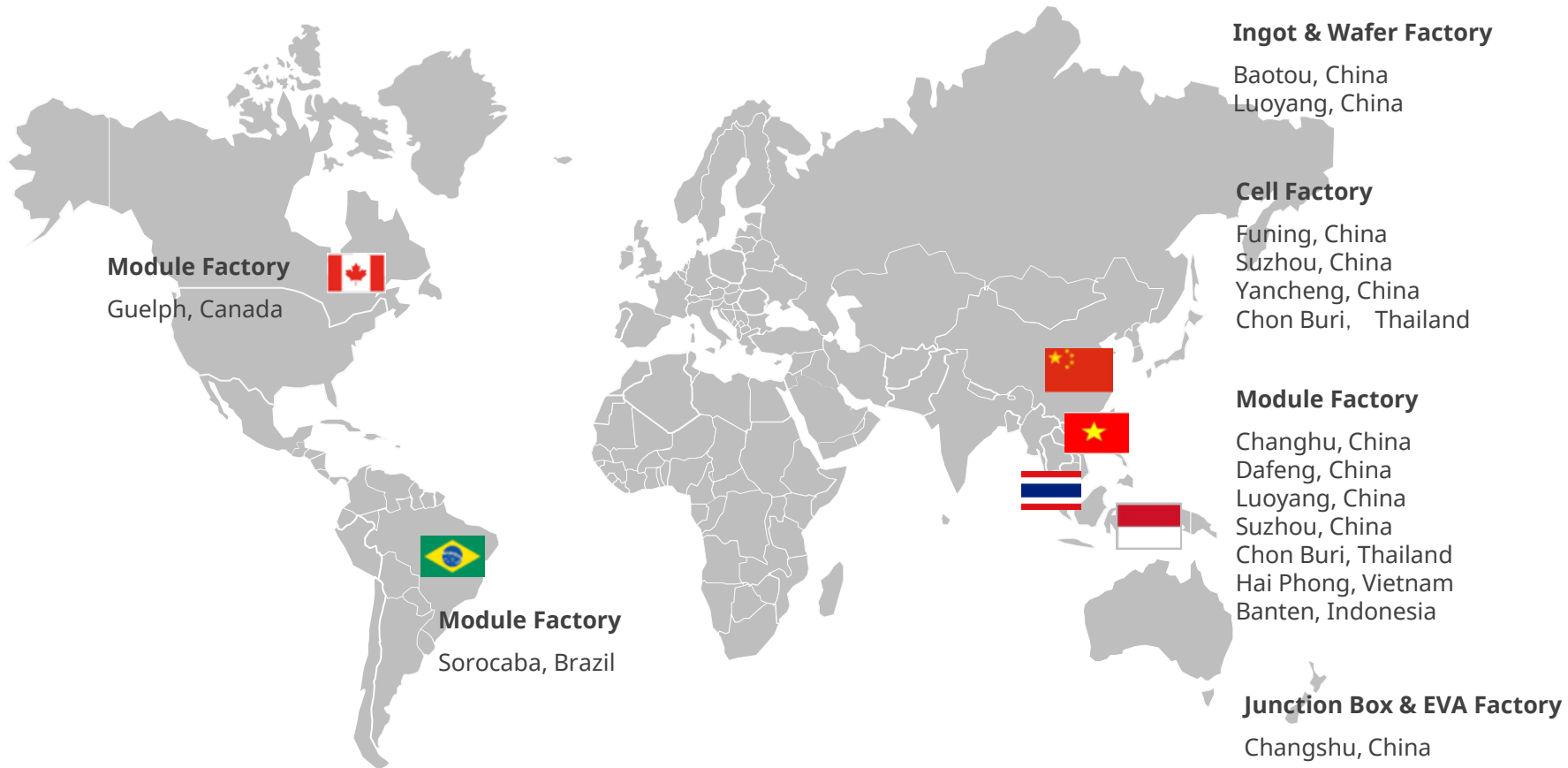
Energy Business

- ❖ Development and construction of utility-scale solar plants / projects primarily in North America, Asia Pacific, Latin America, Europe, Middle East and Africa

Global Presence in 19 Countries



16 Factories in 6 Countries



2 Ingot & Wafer Factories + 4 Cell Factories + 9 Module Factories + 1 Junction Box & EVA Factory

Module Capacity over 15 GW

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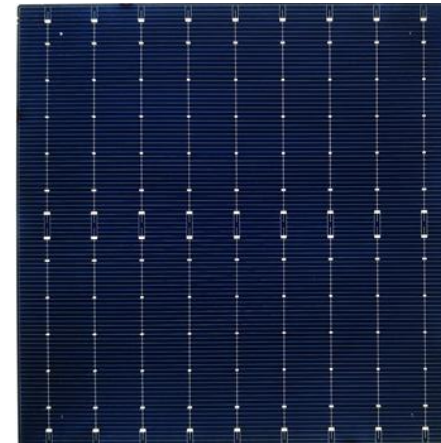
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New World Record on Cell Efficiency

P5 Cell

New world record of **23.81%** conversion efficiency tested and certified by Germany's Institute für Solarenergieforschung GmbH (ISFH) in Ontario, **March 6, 2020**.

157mmx157mm (area 246.44cm²) n-type P5 silicon wafer and PASCon (Passivated Contact) technology



Higher Energy Yield

CANADIAN SOLAR MODULE = MORE ENERGY PRODUCTION



The PTC rating is generally recognized as a more realistic measure of PV output because the test conditions better reflect "real-world" solar and climatic conditions.

Canadian Solar Ku series modules ranked highest PTC Rating among all of the silicon modules

	Modules	PTC Rating	PTC vs. Nameplate Power	
Bifacial Dual Cell	CS3W-430PB-AG	93,37%	401.5	430
	Tier 1 Product A	92,95%	362.5	390
	Tier 1 Product B	92,05%	372.8	405
Dual Cell Poly & Mono	CS3W-430P	93,33%	401.3	430
	Tier 1 Product C	92,86%	376.1	405
	CS3U-390MS	93,21%	363.5	390
	Tier 1 Product D	92,85%	371.4	400
	CS3U-370P	93,11%	344.5	370
	Tier 1 Product E	92,05%	340.6	370

- All of the similar modules are from the other Tier 1 solar companies.
- Resources: <https://www.gosolarcalifornia.ca.gov/> , 2019 Dec. updated

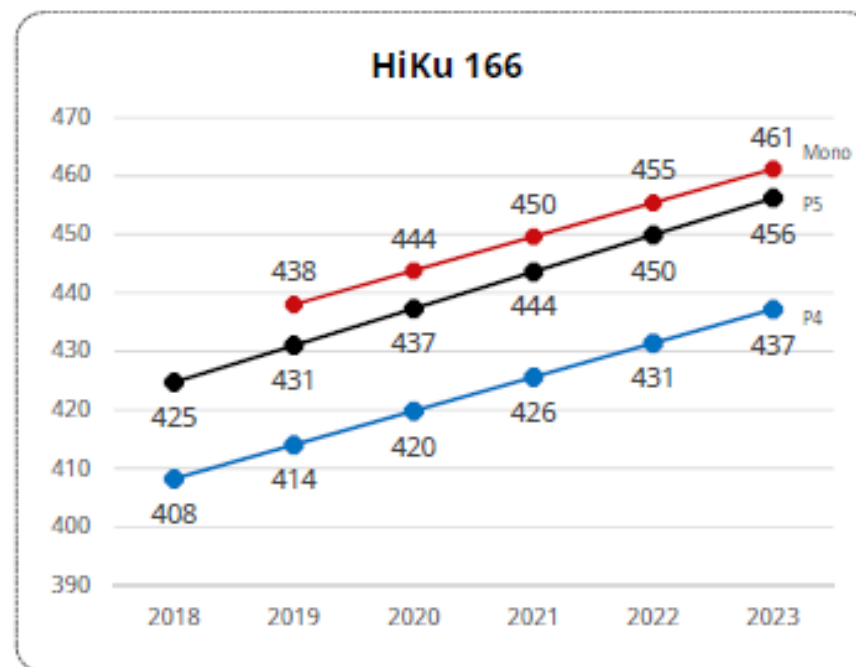
Leader in solar cell and module technologies, with homegrown innovation driving product differentiation

☀️ Among the first solar PV manufacturers to mass produce:

- ❖ Black silicon and diamond wire saw (DWS) poly wafers
- ❖ 5 busbar (5BB) and multi-busbar cells (MBB)
- ❖ Half-cut cells
- ❖ Large 166 mm wafers
- ❖ Double glass and bifacial modules

☀️ 100% capacity converted to PERC and half-cut cells

☀️ ~80% capacity in MBB cells



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Monofacial Module Portfolio

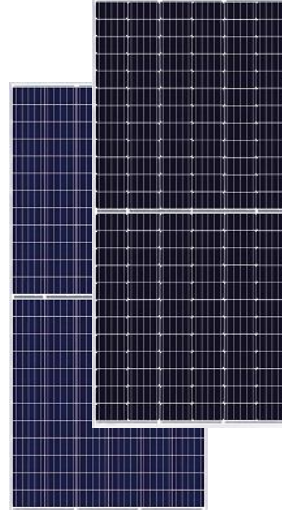
KU

KuPower(K)



120 Cells
CS3K (1675x992mm)
Mono PERC: 320-330W
Poly PERC: 295-305W

Ku-Max (U)



144 Cells
CS3U (2000x992mm)
Mono PERC: 380-390W
Poly PERC: 355-370W

* Available in Bifacial

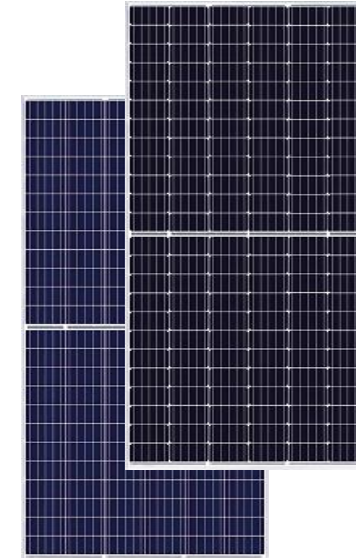
HiKu

Hi-Ku (L)



120 Cells
CS3L (1765x1048mm)
Mono PERC: 360-365W
Poly PERC: 350-360W

Hi-Ku (W)

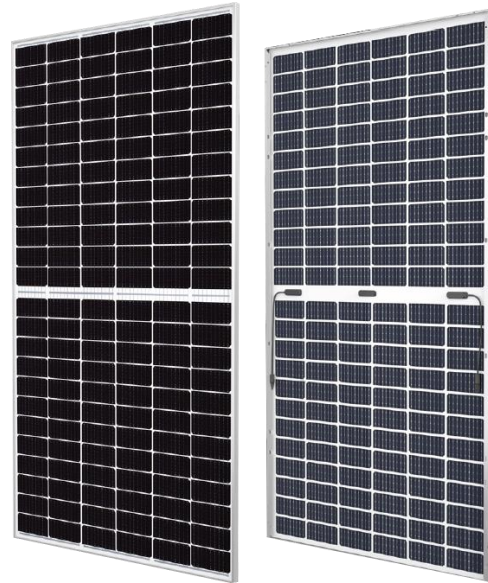


144 Cells
CS3W (2108x1048mm)
Mono PERC: 430-445W
Poly PERC: 405-430W

* Available in Bifacial

Bifacial Module Portfolio

BiKu



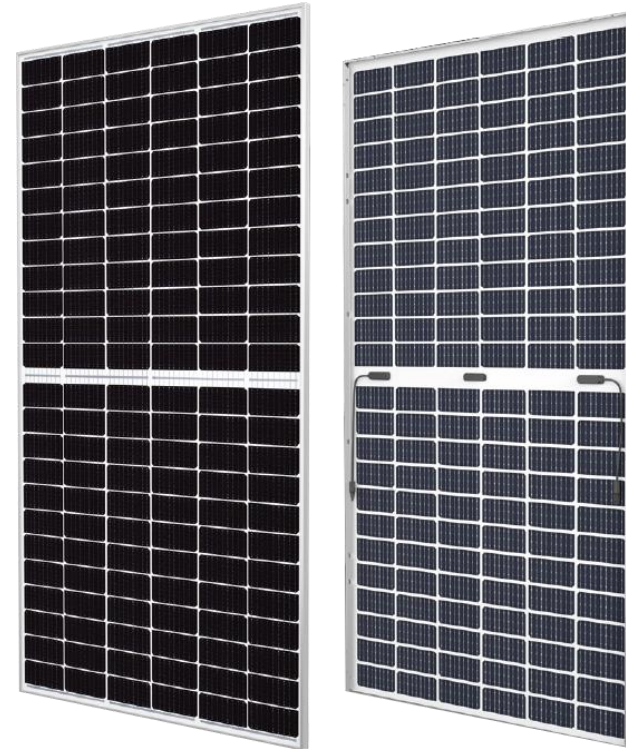
144 Cells

CS3U - XB

Mono PERC: 370-385W

Poly PERC: 345-360W

BiHiKu



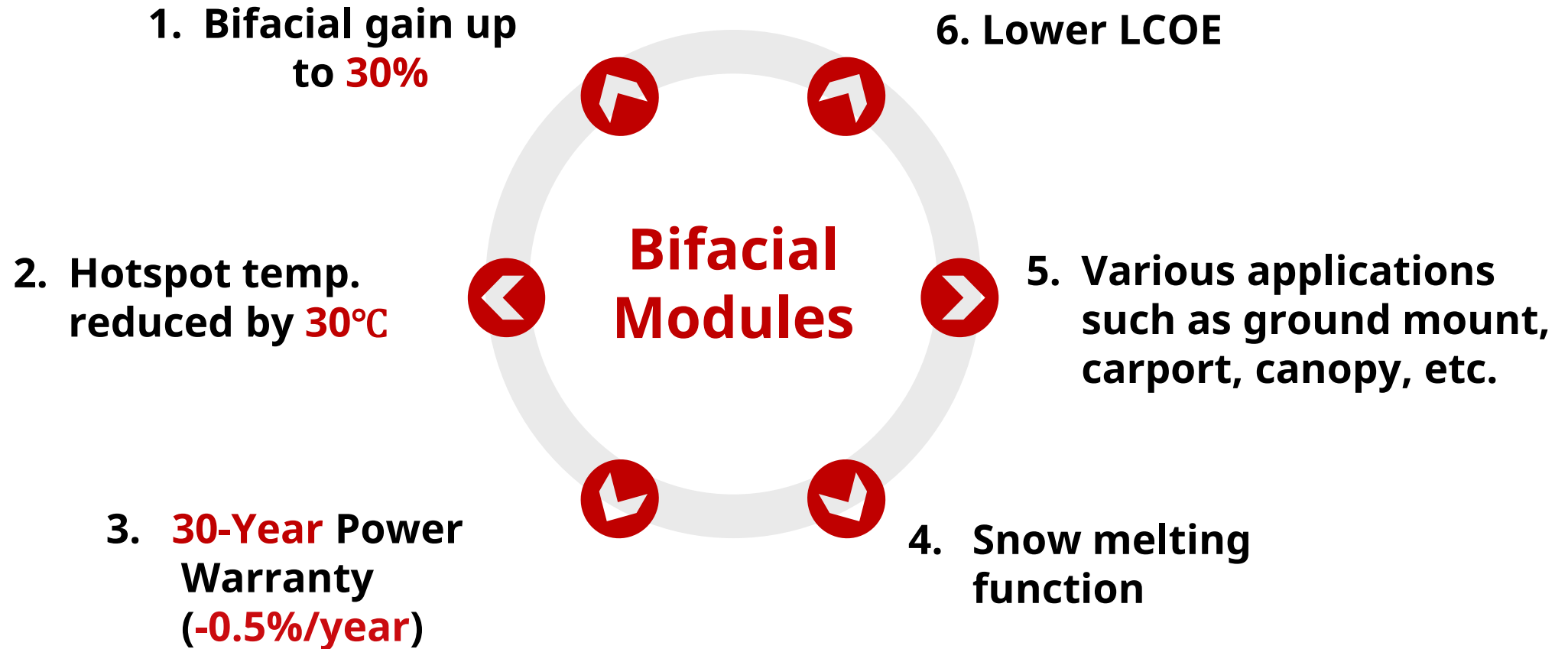
144 Cells

CS3W - XB

Mono PERC: 420-440W

Poly PERC: 400-420W

Six Benefits of Canadian Solar Bifacial Modules



Bifacial Array Optimization – Detailed Guidelines

- Contact your local Canadian Solar sales representative for detailed design guidelines
- 65-page document
- Available under NDA



The image shows the cover page of a technical guideline document. The background is an aerial view of a large solar farm with rows of bifacial solar panels. The sun is low on the horizon, creating a bright glow. In the top left corner, the Canadian Solar logo is visible. In the top right corner, there is a red-bordered box with the word "Controlled" in red text. The main title "TECHNICAL GUIDELINE FOR BIFACIAL SYSTEM DESIGN OPTIMIZATION-A3" is centered in large, bold, red capital letters. Below the title is a table with five rows, each with a red header and a white body. The table contains the following information: Author (System Technology Center, Canadian Solar Inc.), Released Date (20th Sep, 2019), Technical Contact (Yuanjie YU, Jean-Nicolas JAUBERT, Jianwei Xiao, Baohua HE, Ray.Zhao), Report Number (TGBF_20190920, CONTROLLED), and Intended Exposure (INTERNAL, EXTERNAL UNDER NDA). In the bottom right corner, the text "CSIQ NASDAQ" is visible.

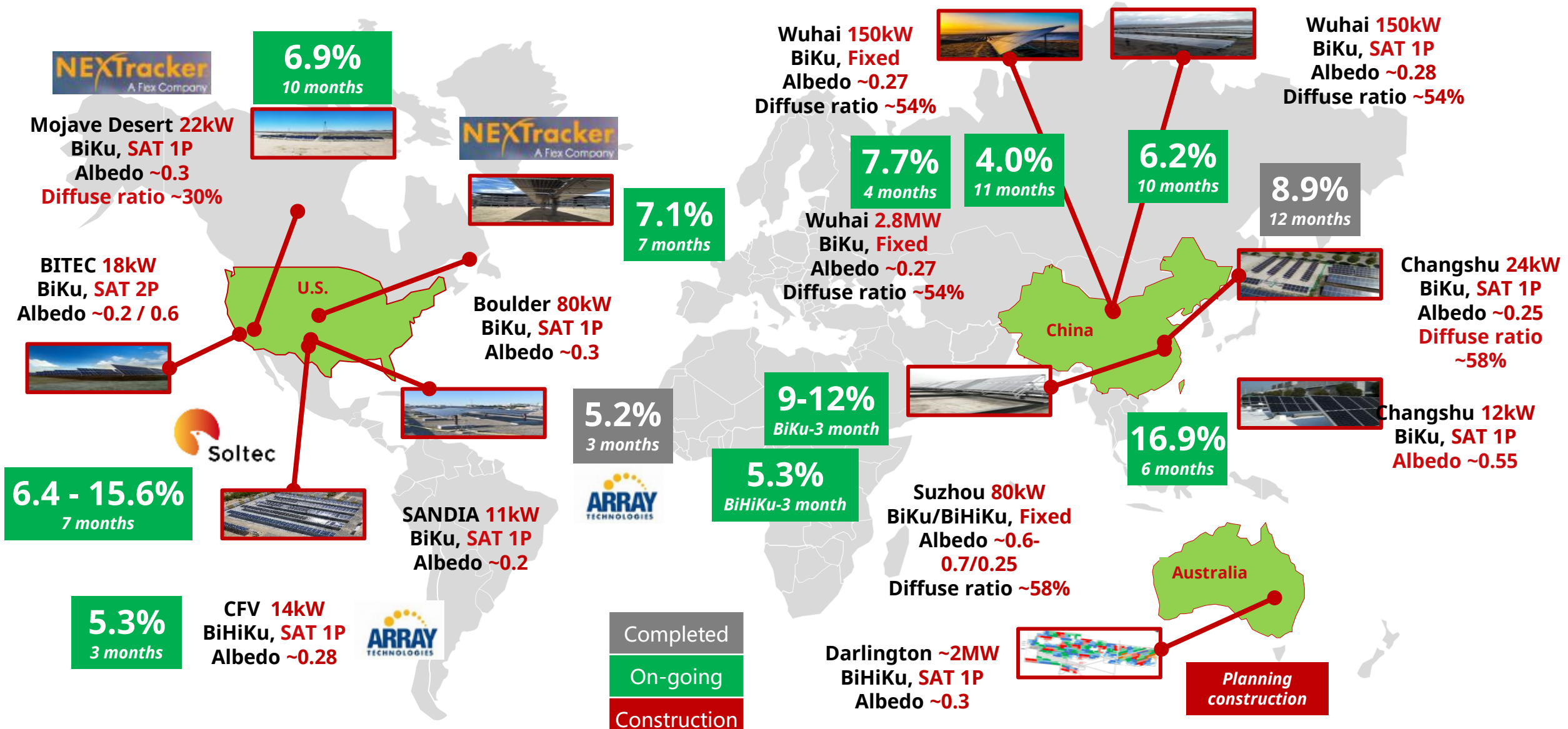
Controlled

TECHNICAL GUIDELINE FOR BIFACIAL SYSTEM DESIGN OPTIMIZATION-A3

Author	System Technology Center, Canadian Solar Inc.
Released Date	20 th Sep, 2019
Technical Contact	Yuanjie YU, Jean-Nicolas JAUBERT, Jianwei Xiao, Baohua HE, Ray.Zhao
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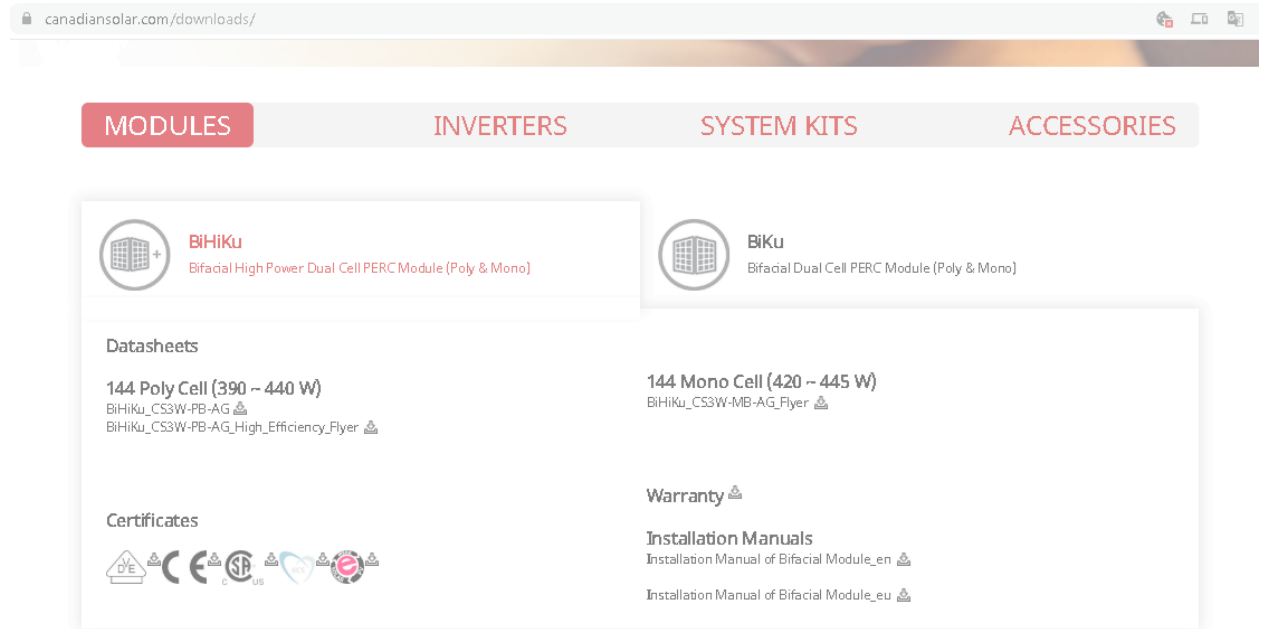
CSIQ NASDAQ

Canadian Solar Bifacial Testing Sites & Results – Bifacial Gains



Resources:

- Distributor: Local Market.
- Website: www.canadiansolar.com
 - Datasheets
 - Manuals
- Sales: pedro.torres@canadiansolar.com
- Channels: Youtube CanadianSolar Inc.



The screenshot shows the Canadian Solar website's product page for modules. The browser address bar displays "canadiansolar.com/downloads/". The navigation menu includes "MODULES" (highlighted), "INVERTERS", "SYSTEM KITS", and "ACCESSORIES".

Two product cards are visible:

- BiHiKu**: Bifacial High Power Dual Cell PERC Module (Poly & Mono). It features a "144 Poly Cell (390 ~ 440 W)" and lists datasheets: "BiHiKu_CS3W-PB-AG" and "BiHiKu_CS3W-PB-AG_High_Efficiency_Flyer".
- BiKu**: Bifacial Dual Cell PERC Module (Poly & Mono). It features a "144 Mono Cell (420 ~ 445 W)" and lists a "Warranty" and "Installation Manuals" (both in English and European versions).

Below the product cards, there is a "Certificates" section with various certification logos including D'E, CE, and others.



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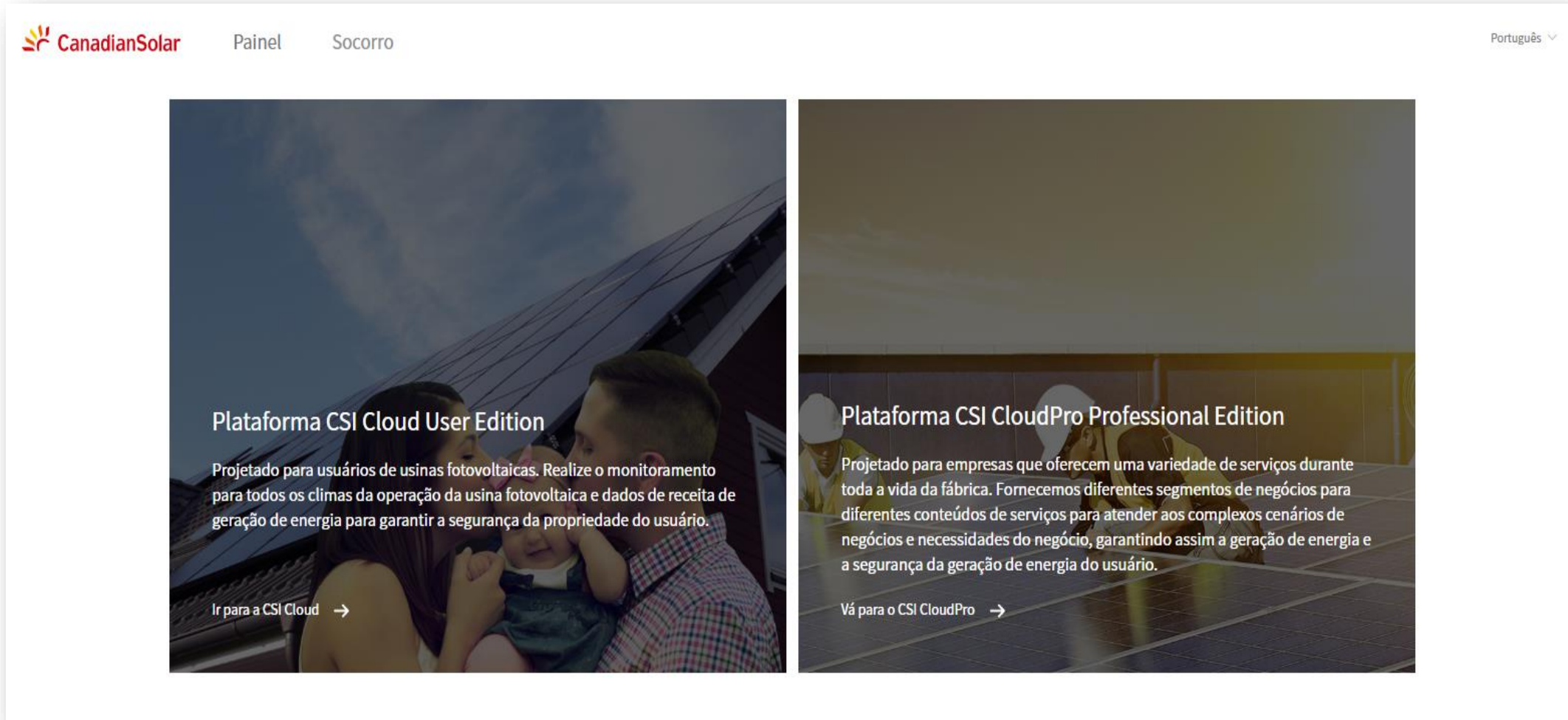
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Plataforma CSI Cloud User Edition

Projetado para usuários de usinas fotovoltaicas. Realize o monitoramento para todos os climas da operação da usina fotovoltaica e dados de receita de geração de energia para garantir a segurança da propriedade do usuário.

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Plataforma CSI CloudPro Professional Edition

Projetado para empresas que oferecem uma variedade de serviços durante toda a vida da fábrica. Fornecemos diferentes segmentos de negócios para diferentes conteúdos de serviços para atender aos complexos cenários de negócios e necessidades do negócio, garantindo assim a geração de energia e a segurança da geração de energia do usuário.

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- ✓ Visualización Simple de Produccion.

- ✓ Vista de todas las instalaciones
- ✓ Mayor Datos: Corriente, Tension, Potencia, PR (CA/CC).
- ✓ Utilización de nuevos Usuarios para O&M

GRACIAS

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Kathy Heilmann, Director of Marketing