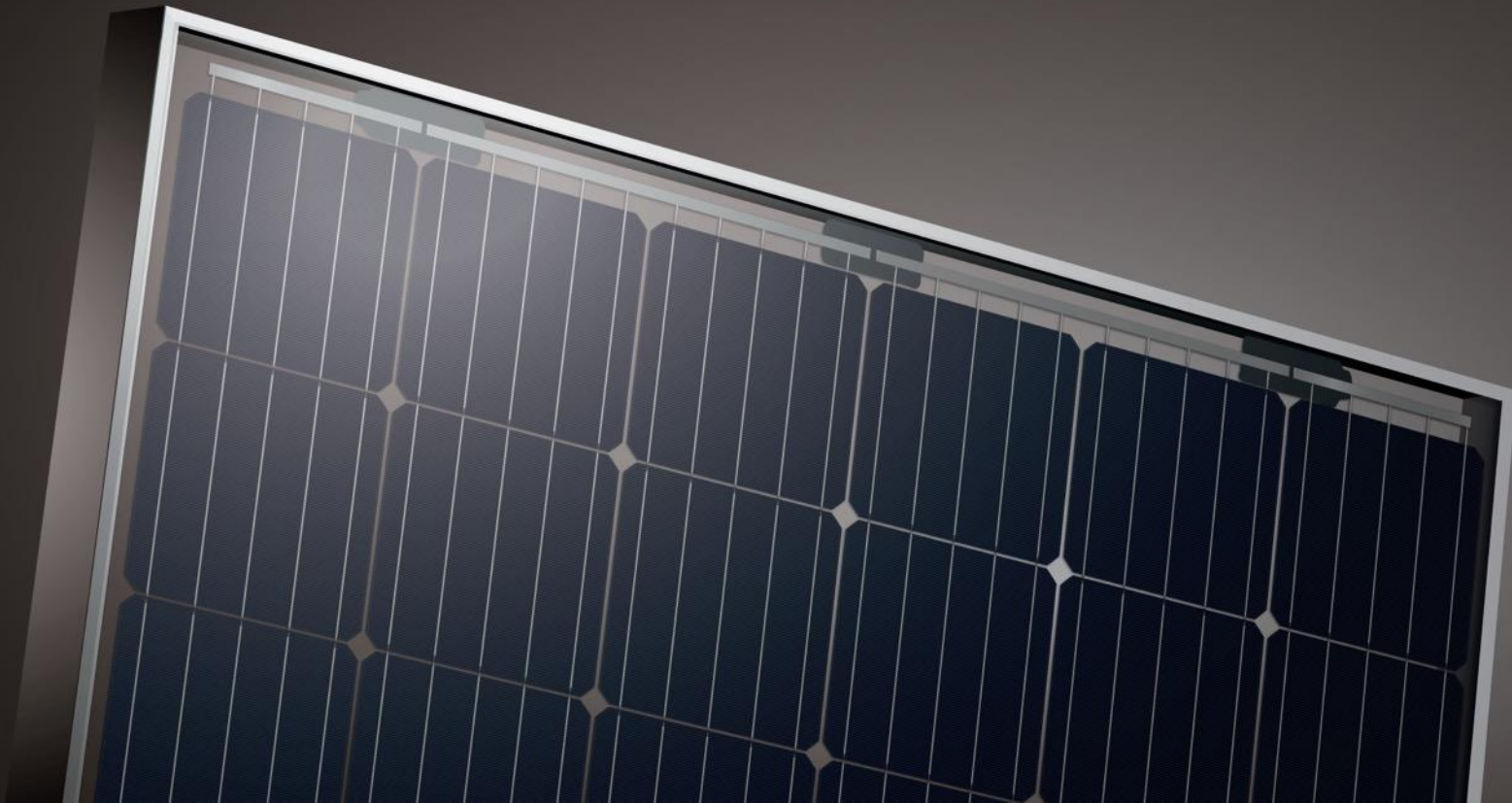
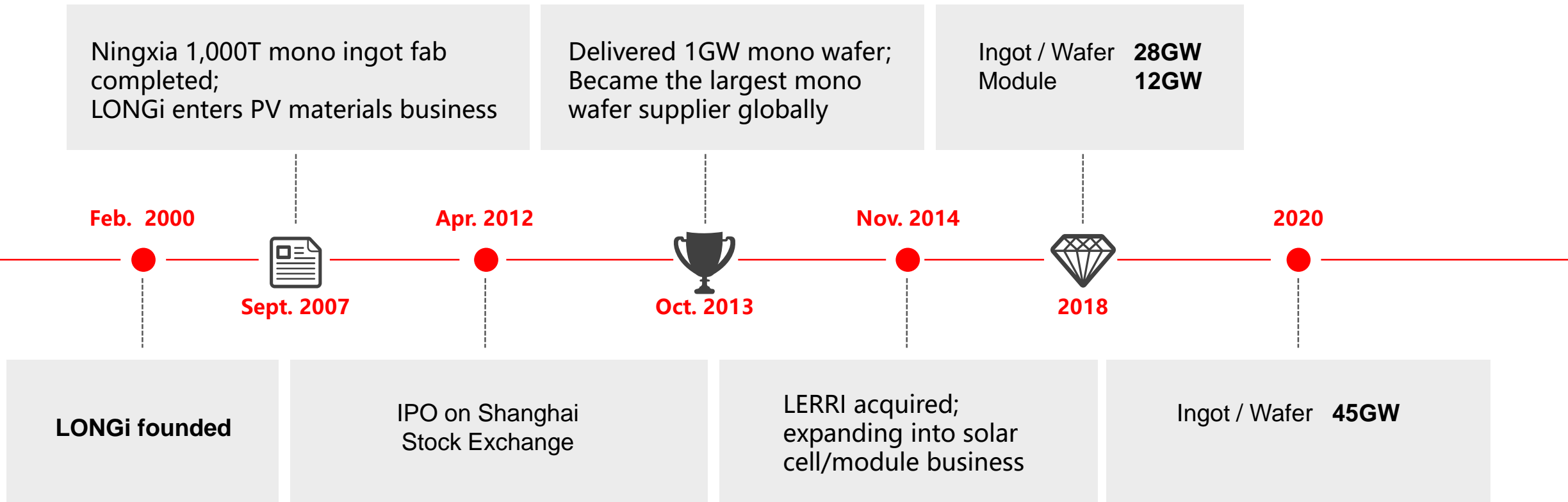


Solar Energy in Brazil

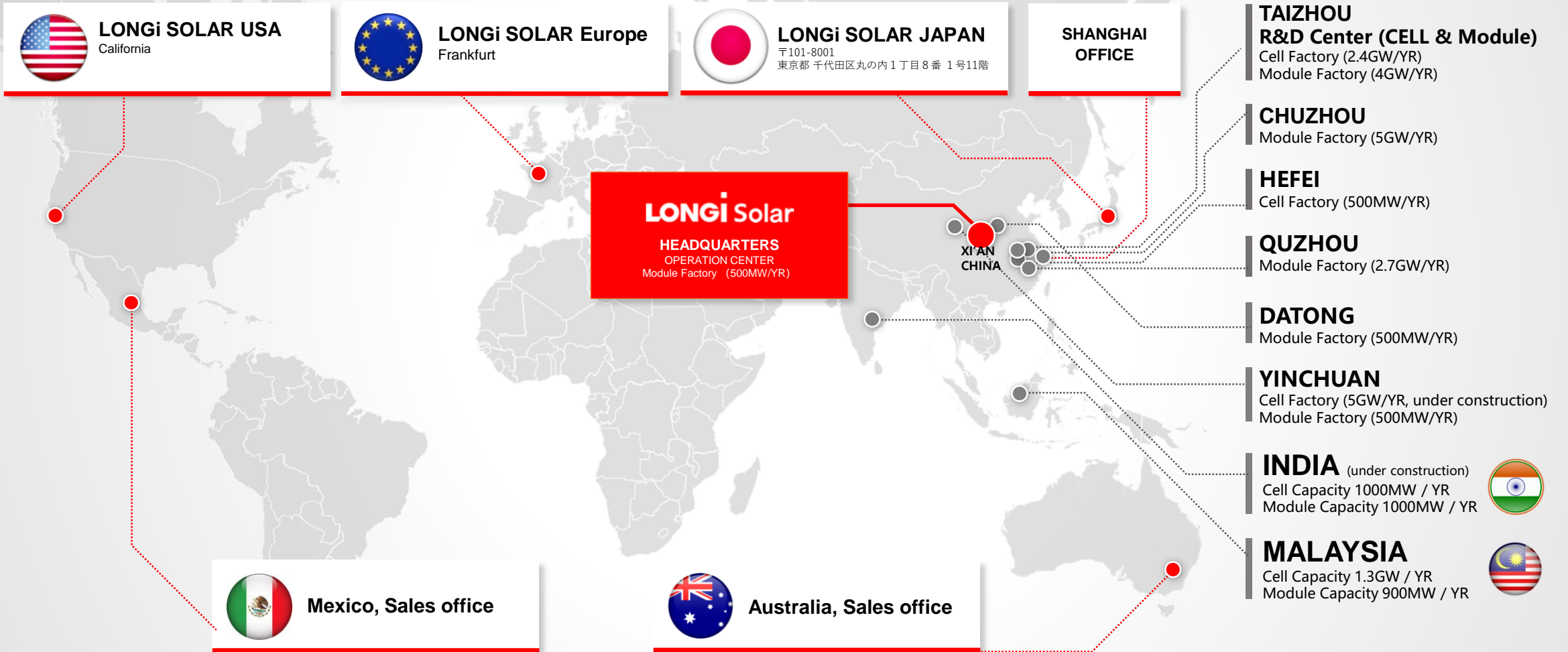


LONGi Milestone

Dedicated to Mono since **19 years**



Global Presence



Brazil: current situation

Utility scale PV projects in Brazil depend largely on government backed renewable energy auctions.

On 19 December 2017, the Ministry of Energy and Mines (MME) awarded 791 MWdc of PV projects at an average price of \$44/MWh. Just a few months later, the government awarded 926 MWdc of PV solar in the the A-4 April 2018 auction. The growth of utility-scale solar projects have been propelled by the country's energy auctions.

Despite going through a recession a few years ago, Brazil has installed over 2 GW of utility scale projects.

Private PPAs are still rare but could gain popularity in the coming years as an alternative to the auction scheme. Contracts between private entities face financing obstacles, as long-term financing in Brazil only extends from 2-5 years. Moreover, PV plants face competition with other, cheaper, energy sources.

C&I installations are being driven by large companies, but also by the education and government sectors. The net-metering scheme has resulted in 560 MW installations in both residential and C&I segments and is expected to continue growing at a rapid pace.

DG segment is expected to install an additional 500 MW by the end of 2019.

Brazil: Market entry barriers

Market entry barriers

Developers	<ul style="list-style-type: none">• Complex strategies needed for competitive bid prices• Growing project pipelines toughen competition• Locally present IPPs have a head start
EPC	<ul style="list-style-type: none">• Awarded projects concentrated in the hands of few developers• Early relations with developers needed to prepare for tenders
Manufacturers	<ul style="list-style-type: none">• High import duties• High costs to manufacture locally, but developers seek local content in order to obtain lower cost financing.

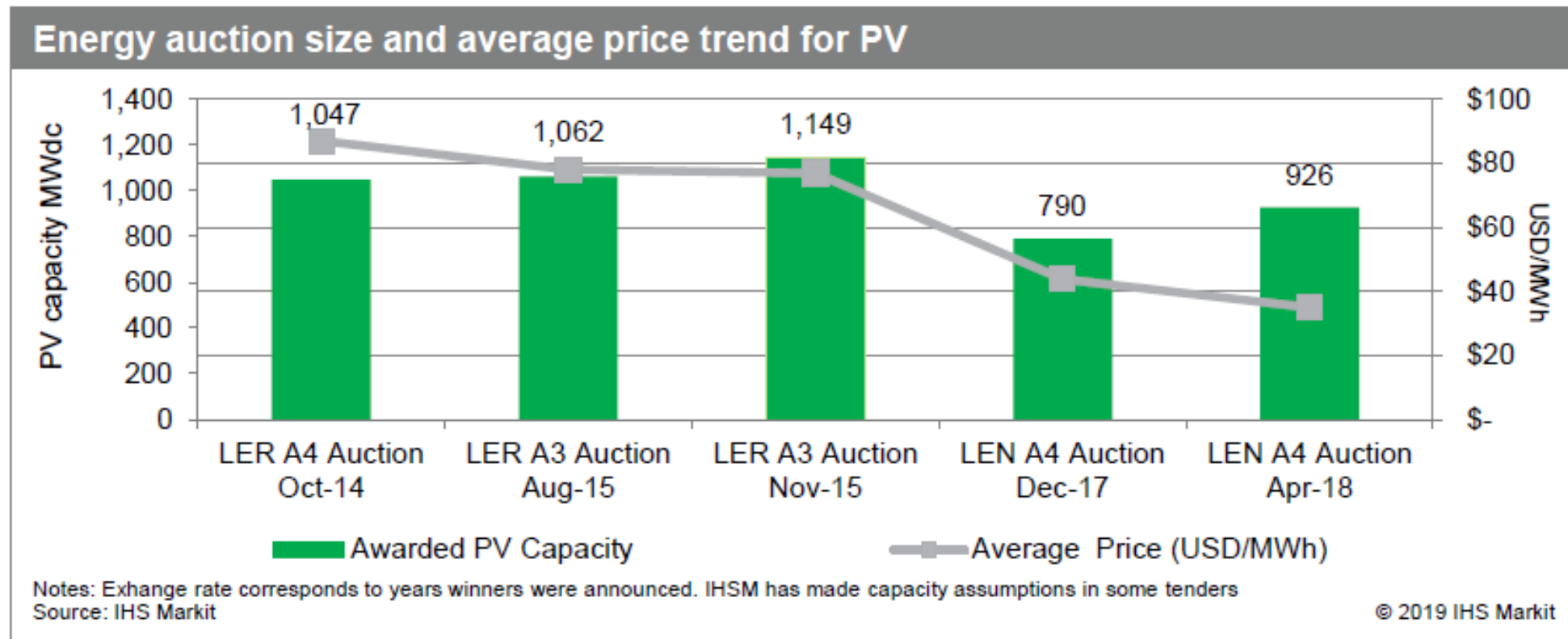
Source: IHS Markit

© 2019 IHS Markit

Brazil: PV drivers – Auctions

Brazil carries out 2 types of auctions:

1. New energy auctions (LEN)
2. Reserve auction (LER)



Brazil: PV drivers – Distributed Generation policies

- Distributed PV generation capacity has reached **560 MW** in the country (362 MW in 2018). The improved net metering law that increased the size limit for projects up to 5 MW and lower installation costs has driven growth in the DG segment.
- The rise in installers/EPC contractors has decreased installation costs and allowed for an increase in residential and C&I installations.
- BNDES has started to grant loans to individuals that are looking to install rooftop PV systems. In 2018, the bank lowered its interest rate on loans for large scale projects from 1.7% to 0.9%.
- Installations under 10 kW lead the country in terms of volume, with over 100 MW installed in 2018. Systems between 100 kW and 1 MW have also shown significant growth, with 47 MW installed, compared to the 15 MW installed in 2017.

Brazil: Final Comments

The Brazilian PV market saw a 7% growth in 2018, with over 1.4 GW installed.

- From 2019 to 2022, Brazil will install 6.5 GW of PV, primarily driven by **utility-scale projects** awarded from renewable energy auctions.

Projects from the December 2017 auction will have to be completed by 2020.

Similarly, projects from the April 2018 auction will have to be completed by 2022. There will be a decline in installations in 2019 due to limited contracted power.

- The **residential and commercial segment** has significantly grown from previous years as a result of the net metering scheme and a system size increase from 1 MW to 5 MW.

In 2018, the country installed 362 MW of DG, nearly a 200% increase from 2017. Brazil will install an over 500 MW of DG in 2019.

- The **distributed generation segment** will install 3.8 GW of residential and C&I installations from 2019 through 2022. This segment will continue seeing strong growth past 2022 barring any potential policy changes.

RELIABILITY CREATES VALUE

As certain as the sunrise

Thank You for Your Attention

ivan@longigroup.com

World's No. 1 monocrystalline module manufacturer • Solar's most bankable company • PV industry highest R&D investments • High power, high yield, high reliability