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VEF

The emerging market fintech investor

The solar opportunity in Brazil & VEF's investment in Solfácil

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Introduction

Throughout VEF's history we have invested across a broad spectrum of fintech verticals, including payments, credit, personal finance and investments. Secured credit is an area where we have built up significant expertise and experience, where our investment in Creditas has allowed us to deeply understand asset-backed lending in Brazil.

Over time, we leveraged this experience in our pipeline work to identify similar companies in other emerging markets (EMs), and subsequently invested in Rupeek, a gold-backed lender in India. Another great example of this was our March 2022 investment in Solfácil, Brazil's largest digital solar panel marketplace and financing platform. It is building a full ecosystem for solar energy adoption, which is still in its infancy in Brazil and across the EM world.

In this section of our annual report, one year on from our investment in Solfácil, we share an overview of the solar energy market opportunity in Brazil, focusing on the value proposition of solar and the potential market size of solar financing, and give special focus to VEF's investment in Solfácil, including an interview with the company's founder, Fabio Carrara.

Photo: iStock

The solar market opportunity in Brazil

Brazilian energy market – a global benchmark in renewable energy

Brazil has been recognised as a benchmark in clean and renewable energy for over 50 years. As of 2020, the share of renewables in Brazil's energy mix was 48%[1] – in comparison, just c. 14% of global energy supply is derived from renewable sources and 9% in the US. The country is home to 12% of the earth's fresh surface water, with one of the most extensive river networks in the world. As a result, Brazil has some of the world's largest hydroelectric power plants, with the majority of the country's renewable energy coming from this source, ranking behind only China in total installed hydropower capacity. It is also a pioneer in the use of biofuels, and currently stands as the second-largest producer of biofuel after the US.

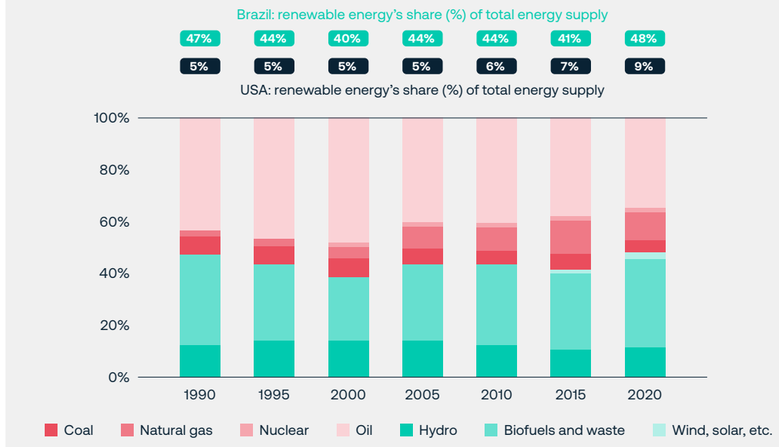
Brazil's medium-term priority to diversify renewable energy sources to wind and solar

Despite Brazil's green credentials, hydropower is cyclical in nature and heavily dependent on climatic conditions. Brazil's dependence on hydro has led to several energy crises historically.Investing in wind and solar generation not only diversifies the country's source of energy, but also allows better geographic dispersion, particularly with distributed solar, which provides energy generation at the site of demand and mitigates reliance on transmission network infrastructure.

Brazil boasts an immense coastline of more than 7,400 km with constant winds and relatively shallow waters as well as one of the highest levels of insolation[2] in the world.The high installation costs of wind and solar generation, the fact that they are intermittent sources, and the generation of which depends on meteorological variables, has made increasing its share in the energy mix (3% of total in 2020) a challenge. In addition, Brazil has historically had a series of political and regulatory vested interests in growing sources of fossil fuels, particularly through state-controlled Petrobras. Many of these trends seem to be changing.

Rapid growth in wind and solar generation in recent years points to the unlocking of this enormous potential. We look at this through the prism of solar energy, and its strong value proposition today.

Brazil: Total energy supply* (TES) by source (%)



* Total energy supply (TES) represents the total energy available in the country across all forms of energy (e.g. kerosene fuel for aviation, coal used in steel production or hydro electricity generation). Whilst hydropower accounts for only 12% of TES, Brazil's reliance on hydro is better contextualized by looking at the electricity mix specifically (a subset of TES), where hydro accounts for c. 65% of total installed electricity generation capacity (as of 2020).

1. Calculated based on the Total Energy Supply (TES).
2. Insolation is the amount of solar radiation received on a given surface in a given time period.

Sources: Government of Brazil, International Energy Agency (IEA), Al Jazeera, Reuters, AE Solar.

Strong value proposition of solar energy

Brazil is undergoing an energy transformation. As mentioned, part of this is a reaction to a recent energy crisis, where dry summers left hydro reservoirs at 20–30% of capacity whilst electricity demand from a burgeoning middle class was resilient.

The government is gradually realising it must increase and diversify its energy mix. A key pillar of this strategy is introducing attractive legislation to unlock investment and adoption of solar. In 2012, Brazil introduced net metering, a landmark regulation governing the economics of distributed energy systems. Under this system, owners of small distributed energy systems (e.g. residential) can sell surplus energy generated back to the grid in return for 1:1 billing credits – effectively using the national grid as a 'virtual battery' free of charge. In contrast, most other countries only allow excess electricity to be sold back to the national grid at a discount to the residential tariff the consumer pays when drawing electricity from the grid, which changes the economics and valuation proposition to consumers.

Since then, regulation has increasingly become favourable for renewable energy and in particular for solar. In addition, the government now has an explicit target of meeting 48% of its energy demand from wind and solar by 2027.

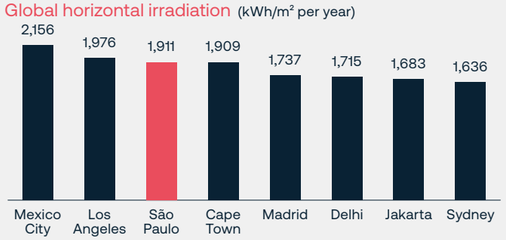
The value proposition of solar is strong and has been strengthening over recent years. This is due to:

1. Attractive climate & solar irradiance characteristics
2. High (and rising) electricity costs
3. Falling solar input costs.

1. Attractive climate & solar irradiance characteristics

The annual mean of daily horizontal global solar irradiation[3] in São Paulo is 1,911 kWh/m², comparable to cities such as Mexico City, Los Angeles and Cape Town, and is much greater than many other populous capitals across both developed and emerging markets including Madrid, Delhi, Jakarta and Sydney. Climate is such that the country experiences ideal sunlight hours for solar power generation. Brazil receives 4.25 to 6.5 sunshine hours on average each day and technological advances such as solar tracking systems further amplify the value of Brazil's idealistic climate, allowing optimal exploitation of solar resources.

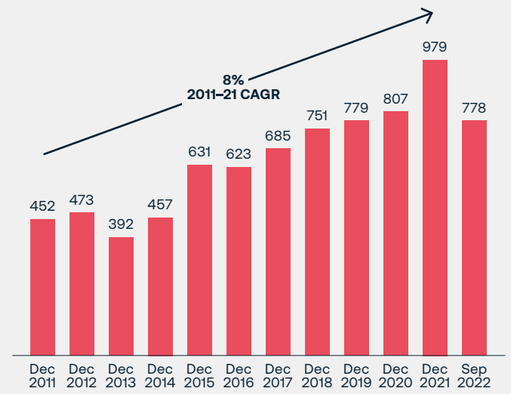
Global horizontal irradiation (kWh/m² per year)



2. High (and rising) electricity costs

Whilst electricity prices have been historically volatile in Brazil, domestic tariffs have continued to trend upwards over the past decade, growing at CAGR of c. 8%, almost doubling since 2011. When adjusted for per capita income, Brazil's energy costs are among the highest in the world.

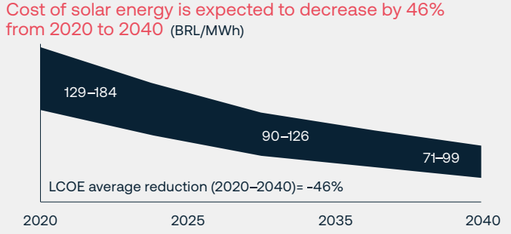
Spot rate residential electricity prices in Brazil (BRL/MWh)



3. Falling solar input costs

The cost of installing solar systems has fallen significantly over the past decade. This is in part thanks to technological advances – the efficiency of the new equipment has significantly increased, providing c. 30% more energy than five years ago, reducing unit costs (the cost of photovoltaic modules in Brazil fell c. 66% between 2013 and 2021. This has been coupled with an increase in technical proficiency and scale/competition amongst installers. This is expected to translate into a 46% reduction in the levelized cost of energy (LCOE) for solar generation and a 27% reduction for wind generation by 2040.

Cost of solar energy is expected to decrease by 46% from 2020 to 2040 (BRL/MWh)



3. Global Horizontal Irradiance (GHI) is the total amount of shortwave radiation received from above by a surface horizontal.

Sources: Intersolar South America, RatedPower, List Solar, McKinsey, Brazilian Ministry of Mines and Energy, Global Solar Atlas, Brazilian Report, Update Brazil, International Renewable Energy Agency (IRENA).

2023 Regulatory update

Brazil updated the solar regulatory framework publishing the long-anticipated Law 14.300 that came into force on January 1st, 2023. In broad terms, the law introduces a new framework for distributed generation in the country (>60% of installed grid-connected solar capacity), with a key feature lowering the eligibility criterion for net metering (to any solar PV systems below 5MW). The anticipation of this law has seen a recent surge in new small-scale solar project developments. The framework will remain in place until 2045, ensuring regulatory and legal certainty for owners of small-scale solar PV systems.

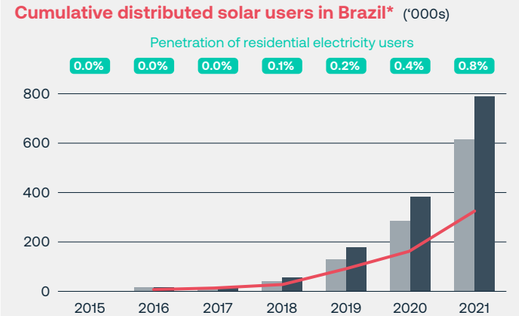
Attractive economic value proposition

The strong solar value proposition translates into a highly attractive economic proposition for the consumer over traditional options, given PV panels have a long useful life of 25–30 years.

We estimate the monthly cost of a solar PV to a residential home owner in São Paulo at USD 157 for the first 72 months. Thereafter, the cost drops to just maintenance of c. USD 12 monthly. This compares to a conventional electricity cost of USD 128 monthly, which likely increases with inflation at 4–6% annually. We believe a c. USD 6,000 solar panel installation will be NPV positive in less than 10 years with projected savings vs. conventional electricity of >USD 20,000 in 15 years and >USD 60,000 in 25 years.

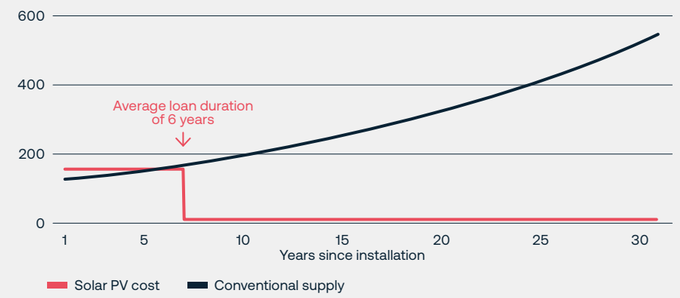
The strong and improving value proposition is evident in Brazil's rapid growth of installed solar capacity in recent years, yet this represented just 0.8% of residential electricity users in Brazil in 2021 and 1.4% in 2022f.

Cumulative distributed solar users in Brazil* ('000s)



* Distributed capacity refers to solar panels installed at the site of the electricity consumer (e.g. rooftop panels at a residential property, or on the farmland in the case of rural solar). Total users includes residential, commercial and rural.

Solar financing vs conventional supply (Monthly cost, USD)



Savings calculated based on:

- c. 6.5kWp solar system installed in a residential property in São Paulo
- Total project cost of USD 5.6k, financed across 6 years at c. 25% APR
- Annual solar system maintenance of USD 150
- 1:1 net metering on excess electricity generation
- Electricity tariffs escalating at 5% annual inflation

Sources: Brazilian Energy Research Office (EPE), VEF Estimate.

Residential solar financing

Financing is the main adoption hurdle to residential solar financing

The main hurdle faced by consumers who look to adopt solar power and take advantage of this opportunity is access to financing. This is a function of both demand and supply. On the demand side, it is estimated that only a minority of customers have enough savings to purchase solar systems outright. The majority of solar installations are financed as a result. However, the supply of solar financing is limited. Incumbent banks such as Banco Votorantim and Santander offer some form of solar panel financing though this is still nascent. The market for solar system installation in Brazil is highly fragmented and very much a local-market business, with manufacturers, distributors and installers all a commodity. In addition, with c. 10,000 installers operating throughout the country, project and identify verification is complex, leading to high fraud rates in loan origination.

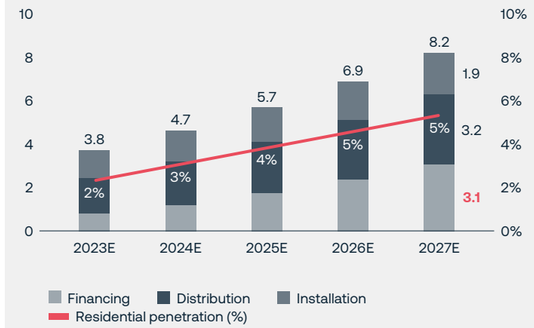
Total addressable market (TAM) is sizeable

We estimate the TAM for solar financing in Brazil at USD 3.1 bln. This assumes c. 5% residential penetration, and factors in gross revenues from 1) Loans originated at 18% APR 2) Origination fee earned up front (7%) and 3) Annual servicing fee of 0.5%. The broader distributed residential solar value chain is comprised of three main services: financing, distribution and installation. We estimate the combined total market will reach a gross revenue TAM of c. USD 8.2 bln by 2027, of which financing would represent 37%. The remaining 63% is heavily weighted towards solar PV distributors at USD 3.2 bln (39%) and the remainder allocable to solar installers at USD 1.9 bln (23%).

Fintechs help accelerate growth

In addition to the strong value proposition already outlined, increased financing is accelerating growth in part because fintechs like Solfácil emerge, disrupting the local bank model in three ways: 1) Building deep relationships with installers by providing access to financing through fully digital channels. 2) Providing tech platforms to digitise the distributed solar ecosystem (leveraging Internet of Things[4] (IoT) for monitoring & customer management). 3) Offering greater access and supply reliability through digital procurement marketplaces.

Distributed solar revenue TAM (USD bln)



Our calculations ignore lost gross interest income from amortisation. They also ignore marketplaces or other fee income from distribution.

4. The collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves.

Sources: World Economic Forum, VEF Estimate.

VEF's investment in Solfácil

Photo: Solfácil

In March 2022, VEF invested USD 20 mln into Solfácil, a leading ecosystem for solar solutions in Brazil, in a USD 100 mln Series C fundraise led by QED with participation from SoftBank LatAm Fund and Valor Capital Group.

Solfácil is building a full ecosystem for solar energy adoption in Brazil, offering the largest digital solar panel marketplace and financing platform to customers in the residential, commercial and rural sectors. The founder and CEO is Fabio Carrara, a focused and experienced entrepreneur who intimately understands the solar industry in Brazil and the pain points in the customer journey, having spent time working in both consumer banking and solar panel installation.

Solfácil's ecosystem consists of four main business units:

1. **Fintech:** Solfácil allows consumers to access financing for solar systems through a fully digital channel, leveraging a fragmented network of partner solar installers across the country to originate these loans.
2. **Marketplace:** It has recently launched a marketplace for solar equipment, working with distributors on the supply side.
3. **Services:** The company also offers additional services to customers on the platform such as maintenance, repair assistance and system insurance, driving increased stickiness of partner installers and recurring transactions of customers.
4. **Distributor:** Solfácil recently completed their acquisition of Solar Inove, a mid-sized solar distributor in Brazil. The distribution market is characterised by many sub-scale players who carry low inventory often leading to delays in solar kit deliveries (25–30 days for delivery on average). Bringing a distributor in-house allows Solfácil to take full control over distribution – maintaining good levels of inventory, ensuring their marketplace is competitive on price (whilst also improving Solfácil margins vs pure 3P model), and through managing fulfilment they can guarantee a reliable supply for installers.

Interview with Fabio Carrara, founder and CEO of Solfácil

Fabio Carrara is CEO and founder of Solfácil. He is an engineer by training and spent seven years as a consultant at BCG on projects at various telcos and FMCGs, and subsequently at large financial institutions where he focused on consumer finance, giving him a solid backdrop as an entrepreneur in this space.

Fabio's backstory in the solar energy world is very hands-on: post his MBA at Wharton and with some VC experience under his belt, Fabio had aspirations of becoming an entrepreneur. On discovering the macro opportunity that solar energy represents in Brazil, Fabio got his hands dirty and started his own solar panel installation company to learn the business before looking for a scale way to play the opportunity.

"We realized that the key pain point in the sector was that customers did not have the upfront capital to invest in a solar system"

What was the original idea behind Solfácil and how did it all come together?

We first started as a solar installer back in 2015. After three years, and having installed hundreds of systems all over Brazil, we realized that the key pain point in the sector was that customers did not have the upfront capital to invest in a solar system, and that installers, as a result, had low conversion from lead to sale. With that, we pivoted and launched the first fintech in the solar space to address that problem. Over time, we also realized that installers had low working capital capabilities, and we had to help them with sourcing, too. That was when we evolved from a fintech to an ecosystem and launched our ecommerce platform to help installers source solar kits. Finally, we added other products to enhance the stickiness of our ecosystem.

Photo: Solfácil

As an introduction, can you tell us a bit about Solfácil – what the company does and the value proposition for your customers, both installers and consumers?

Solfácil is a unique ecosystem where solar installers use our products and services to do business with their customers. We built an ecommerce platform where solar installers source the solar kits they offer to their customers. We built a fintech where the installer's customer can get a loan to finance the project, including the solar kit and the installation. We also offer insurance products that protect customers while improving installers' unit economics. More recently, we developed *Ampera*™, an IoT device that help installers take care of their customers – and increase their LTV. And we have *Solfácil+*, a program that rewards installers' loyalty to our ecosystem.

Help us frame the opportunity set for investors: how big is the solar financing and servicing opportunity in Brazil?

Brazil has become the world's largest distributed solar market in the world (excluding China) with more than 7.7GWp of new capacity deployed in 2022. The combination of high electricity tariffs (USD 0.19/kWh, or 2.2x this cost when adjusted to Brazilian purchasing power), high irradiation (ie. 4.24 hours of peak sun per day) and low turn-key installation costs (USD 0.84/kWp) make the value proposition of solar in Brazil outstanding, with an unleveraged IRR of 27%, which is much higher than the USA (3%), Germany (17%) and Australia (14%). Last year, more than BRL 30 bln was spent on new distributed solar projects, comprising BRL 18 bln in solar equipment (panels, inverters, cables) and BRL 12 bln on installation services. Of the BRL 30 bln, c. 50% was financed, creating BRL 15 bln in solar financing origination.

Photo: iStock

What is unique about Solfácil in terms of the product offering in Brazil today?

On the installer side, we are the only player in the market with all the solutions our partners need to run their businesses. Additionally, given we capture different profit pools of the value chain, we can offer bundled discounts for maximum perceived value. On the consumer side, we give end customers access to the solar energy opportunity via the provision credit – all while providing maximum convenience for both groups. After a recent acquisition in 2022, we are the only financing player that has distribution capabilities, and we are the only distributor that has in-house financing capabilities.

How have higher inflation and interest rates affected the business?

Higher inflation means less disposable income because of 1) inflation eroding purchasing power and 2) higher interest rates set by the Central Bank. This tends to reduce the demand for financing in general. However, on the other hand, electricity costs have also increased (which is one of the largest factors of high inflation), so to some extent the effect was partially offset and the value proposition to customers not altered. Despite those headwinds, after China, Brazil was the largest market for solar installations in the world in 2022.

What are the main ways you have adapted Solfácil's business, team and culture in this changing environment?

We have put a higher focus on unit economics, pricing, and profitability, and have become more disciplined in prioritization and trade-offs. Additionally, increasing organizational efficiency (ie. doing more with less) has been an important lever for us. Despite the changing environment, we've grown annualised revenue by 5x YoY to USD 160 mln, and now serve more than 65k customers across 4.2k active solar installers.

What are you most excited about for the future of Solfácil?

Knowing that we have barely started. That in the future, all households will electrify their houses, produce their energy, store it, use it for their EVs and leverage the intelligence of smart devices to make the most out of those assets. And that Solfácil will be at forefront of allowing that green revolution to happen.

Photo: Solfácil

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