

PAN AMERICAN FINANCE
INVESTMENT BANKING FOR THE AMERICAS



Financing for Solar PV Projects in Chile

CIREC WEEK
Green Power Conferences

October 2015

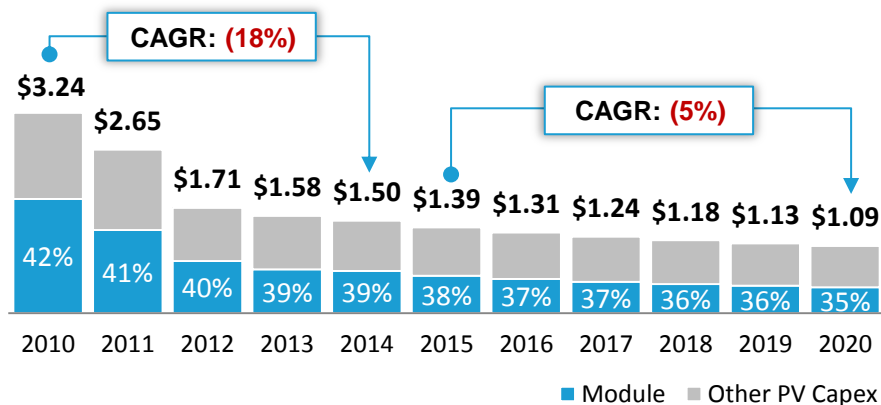
Financing for Solar PV Projects in Chile

- Pan American Finance (“PAF”) has conducted research on sources of debt and equity capital for solar PV projects in Chile for the period January 2010 to September 2015
- During this period, Chile has emerged as the Latin American country with the fastest growth in solar PV
 - From 2012 to 2014, solar PV installed capacity grew over 200x in Chile, versus less than 2x in the rest of Latin America
- Since 2010, 41 new solar PV projects representing 1.7GW of new capacity and total investment of ~US\$4.5 billion
- PAF identified 19 solar PV projects that have secured debt and equity financing since 2010 representing 1.1 GW of new capacity and a total investment of ~US\$2.7 billion, of which ~US\$2.1 billion (~75%) was financed with debt and ~US\$0.7 billion (~25%) with equity²

Source: Bloomberg New Energy Finance, Chilean National Energy Commission

¹ Figures in 2014 US\$/W; ² Excludes 9 projects totaling 417 MW and ~US\$736 million funded on balance sheet and the Cerro Dominador solar PV project due to insufficient data to differentiate between the solar PV and concentrated solar plant (“CSP”) portions

Global PV Capex Evolution (US\$/W)¹



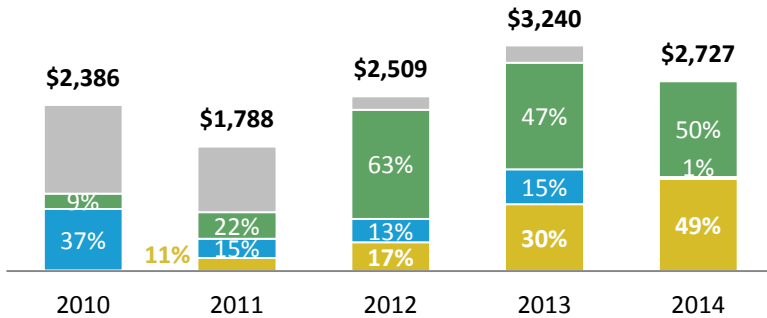
Global Irradiation



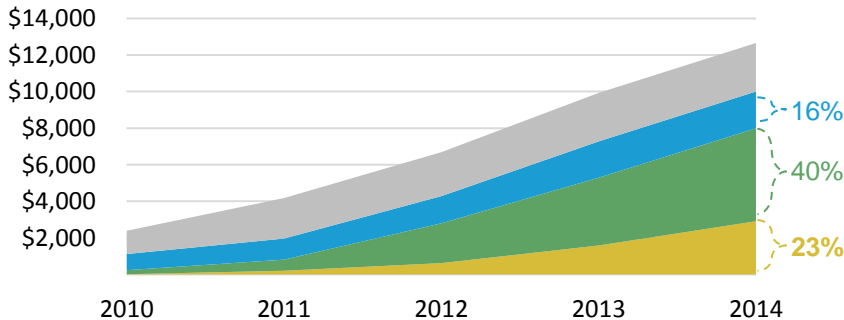
Solar PV and wind are the technologies of choice for renewable energy investment in South America (excluding Brazil) – and solar PV is growing fast

NCRE investment: Solar PV & Other NCRE

Periodic investments (US\$ in millions)

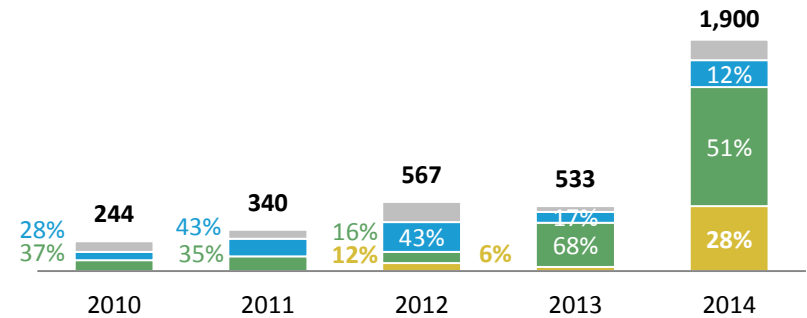


Cumulative investments (US\$ in millions)

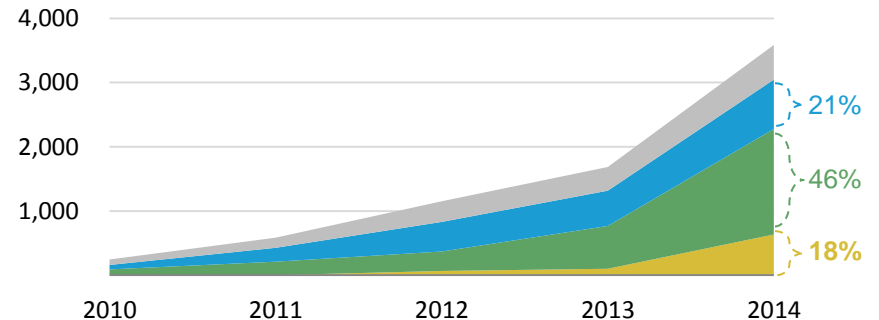


NCRE additions: Solar PV & Other NCRE

Periodic additions (MW)



Cumulative additions (MW)



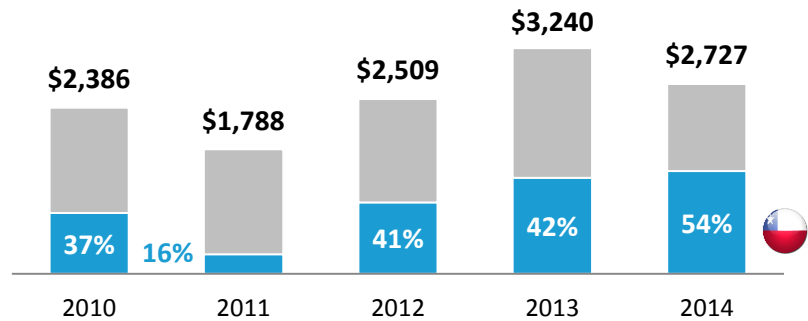
■ Solar ■ Hydro ■ Wind ■ Other NCRE

Source: Bloomberg New Energy Finance; Definition: NCRE (non-conventional renewable energy)

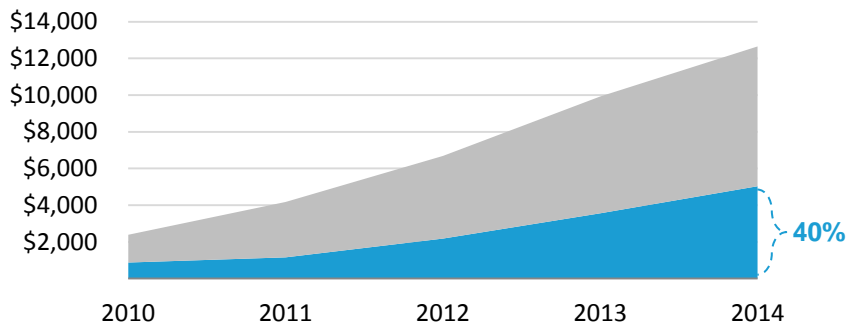
Chile has become the target country for renewable energy investment in South America (excluding Brazil), representing ~40% of NCRE investment since 2010

NCRE investment: Chile & ROSA

Periodic investments (US\$ in millions)

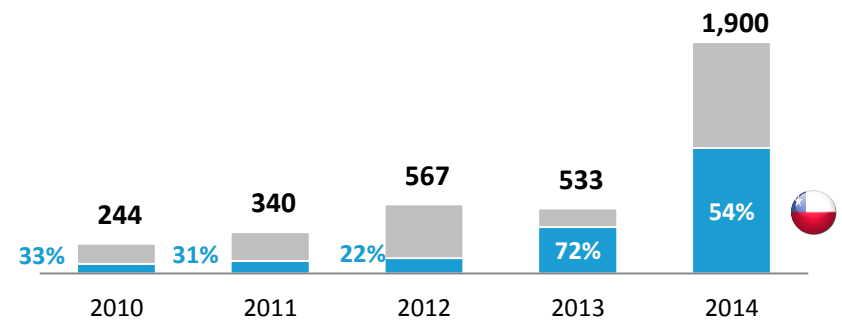


Cumulative investments (US\$ in millions)

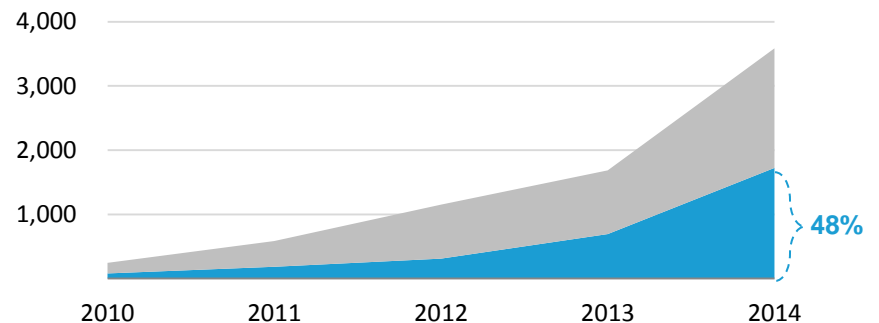


NCRE additions: Chile & ROSA (MW)

Periodic additions (MW)



Cumulative additions (MW)

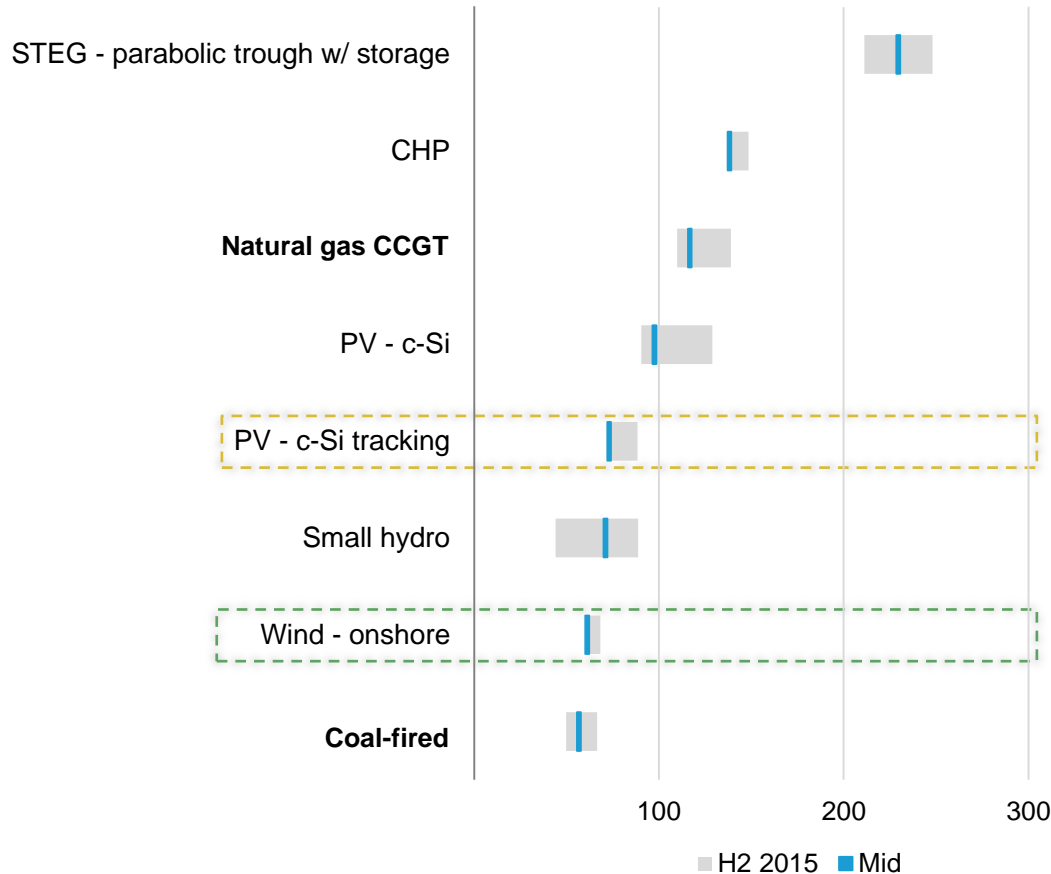


■ Chile ■ ROSA

Source: Bloomberg New Energy Finance; Definition: NCRE (non-conventional renewable energy), ROSA (rest of South America, excluding Brazil)

The levelized cost of energy (“LCOE”) of solar PV in Chile is less than natural gas CCGT and approaching parity with wind, small hydro and coal-fired technologies

LCOE in Chile as of September 2015 (US\$/MWh)



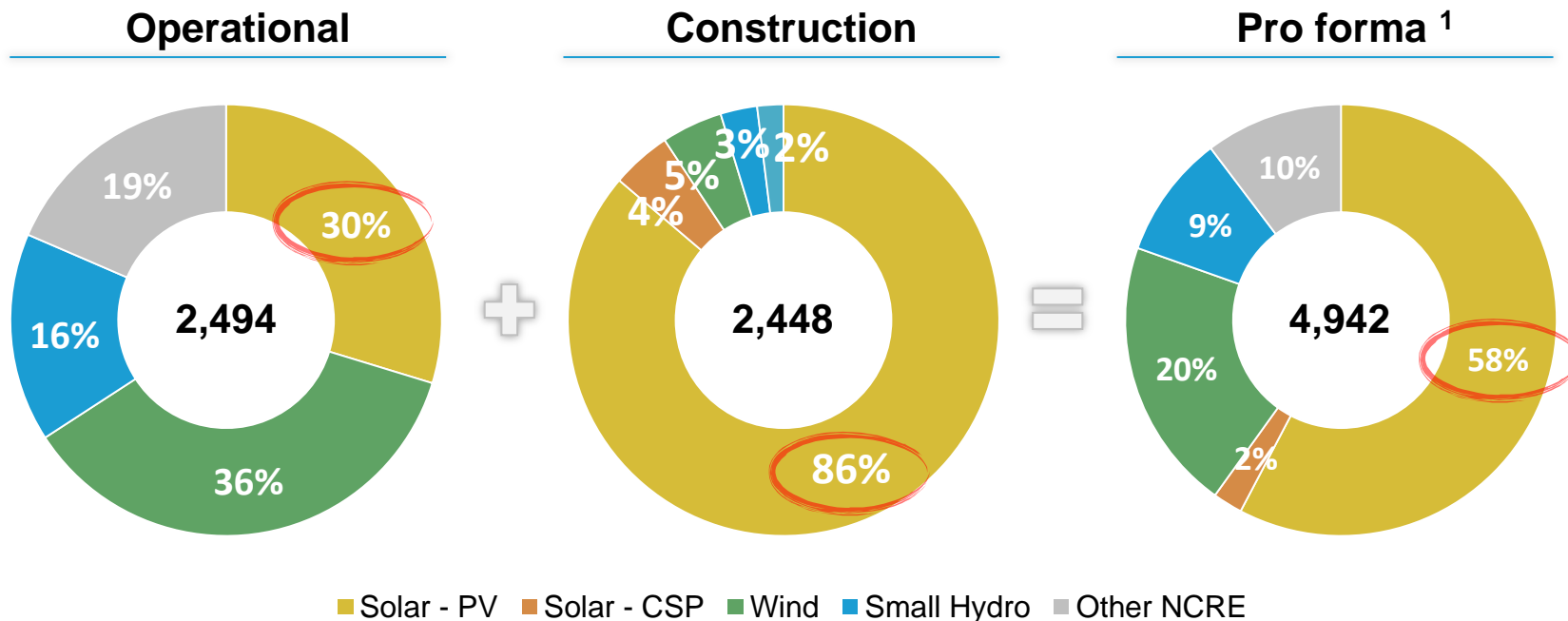
- Wind and solar PV technologies are competitive with traditional thermal generation in Chile
- Both wind and solar PV technologies have LCOE lower than natural gas CCGT technology and are almost at parity with coal-fired technology
- The LCOE for wind and solar PV technologies is expected to continue declining as they become more efficient
 - Wind: taller and more efficient turbines
 - Solar PV: price reduction in modules

Source: Bloomberg New Energy Finance

Definitions: Solar Thermal Electric Generation (“STEG”), Combined Cycle Gas Turbine (“CCGT”); Crystalline Silicon (“c-Si”); Co-generating Heating Plant (“CHP”)

Solar PV is expected to become the largest source of renewable energy in Chile after current construction projects are completed in mid-2017

Renewable energy projects by stage (MW)



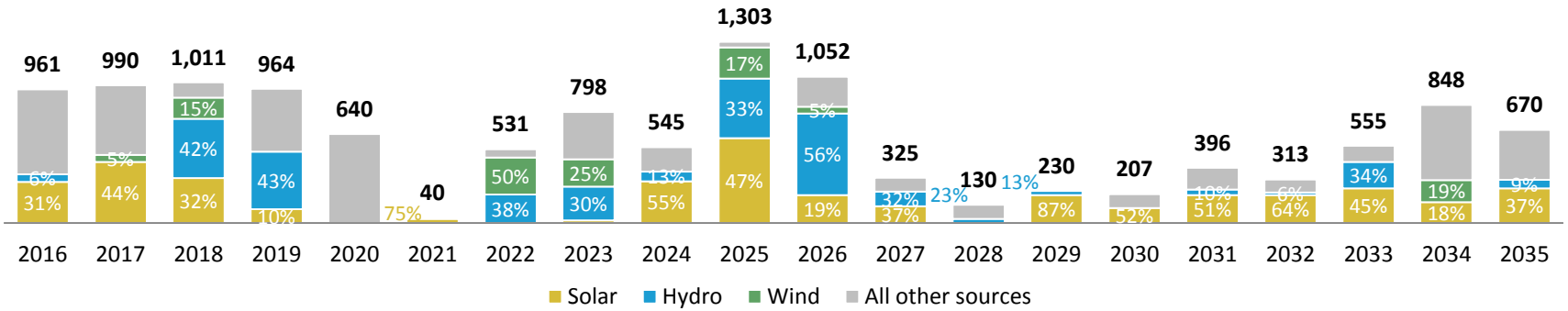
Furthermore, solar PV is expected to represent 60% of an additional 28.0GW of renewable energy projects that are in pre-construction stage ¹

Source: Chilean National Commission of Energy as of October 2015; Definition: NCRE (non-conventional renewable energy)

¹ Includes projects that have obtained approval for EIS (15.2 GW), as well as projects under evaluation (7.6 GW)

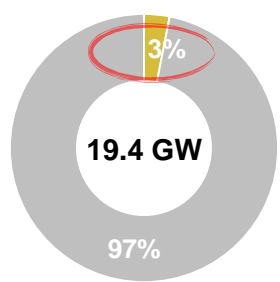
Solar PV is expected to remain single largest technology of choice for renewable energy investment in Chile, adding over 4.2 GW to the system by 2035

Expected total yearly capacity additions in the SIC & SING (MW)

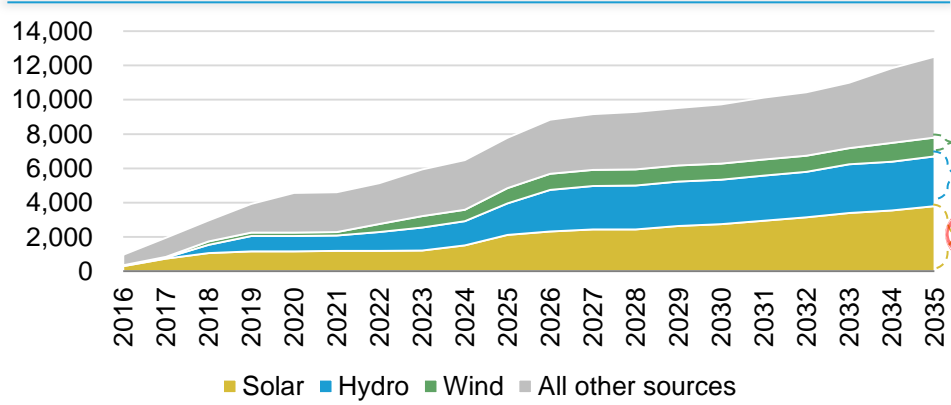


Cumulative new capacity additions in the SIC & SING (MW)

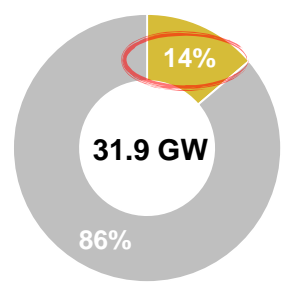
Current Mix – 2015



Cumulative capacity additions (MW)



Pro Forma Mix – 2035



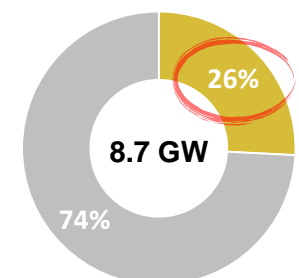
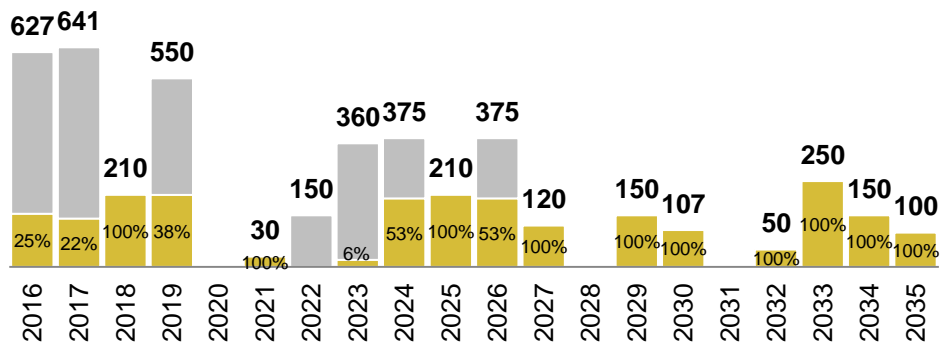
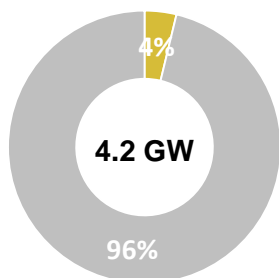
SING-SIC Solar PV installed capacity is expected to grow from ~3% to ~14% by 2035

Source: Chilean National Energy Commission as of October 2015

Although solar PV capacity additions will primarily take place in the SING, they will significantly impact the energy mix of both the SIC and SING grids

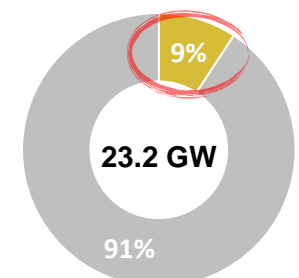
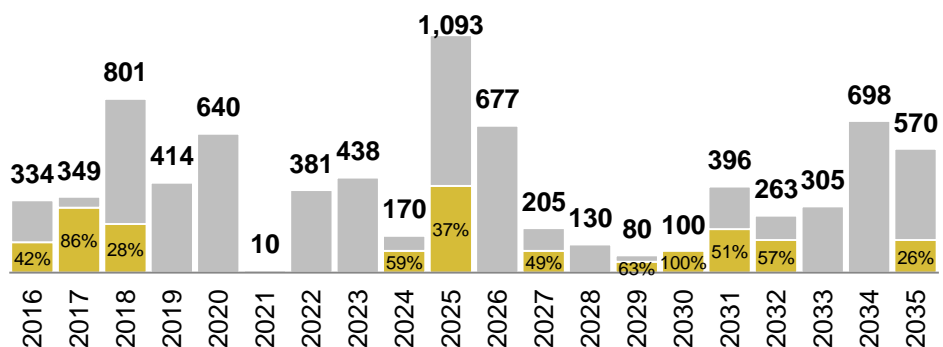
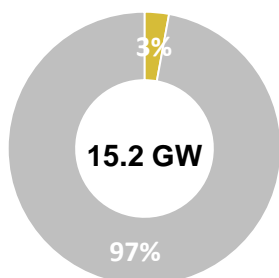
Current Mix 2015	Expected capacity additions (MW)	Pro Forma Mix 2035
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SING



■ Solar PV ■ All other sources

SIC

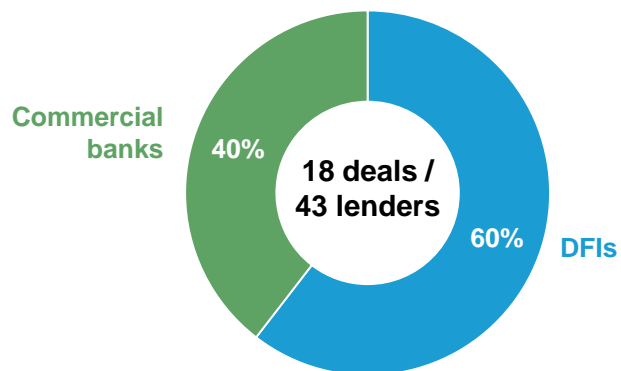


■ Solar PV ■ All other sources

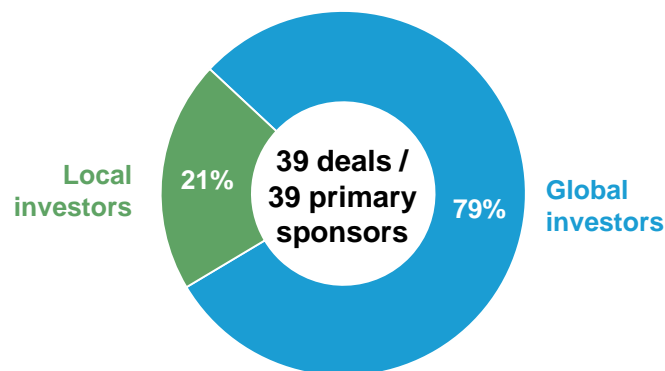
Source: Chilean National Energy Commission as of October 2015

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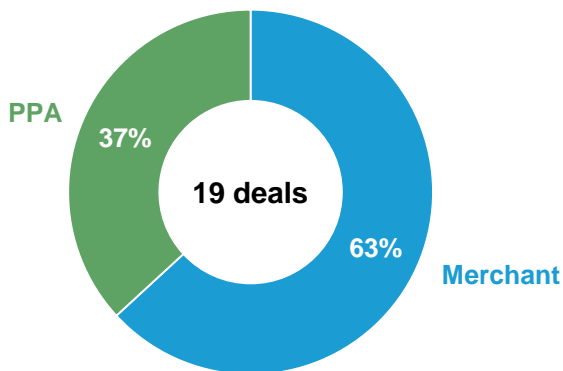
Debt sources by participant type (2010-2015)^{1,3}



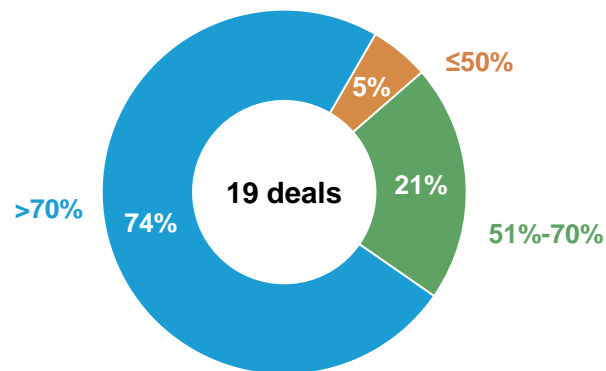
Equity sources by sponsor type (2010-2015)^{1,2}



PPA vs Merchant (2010-2015)^{1,3}



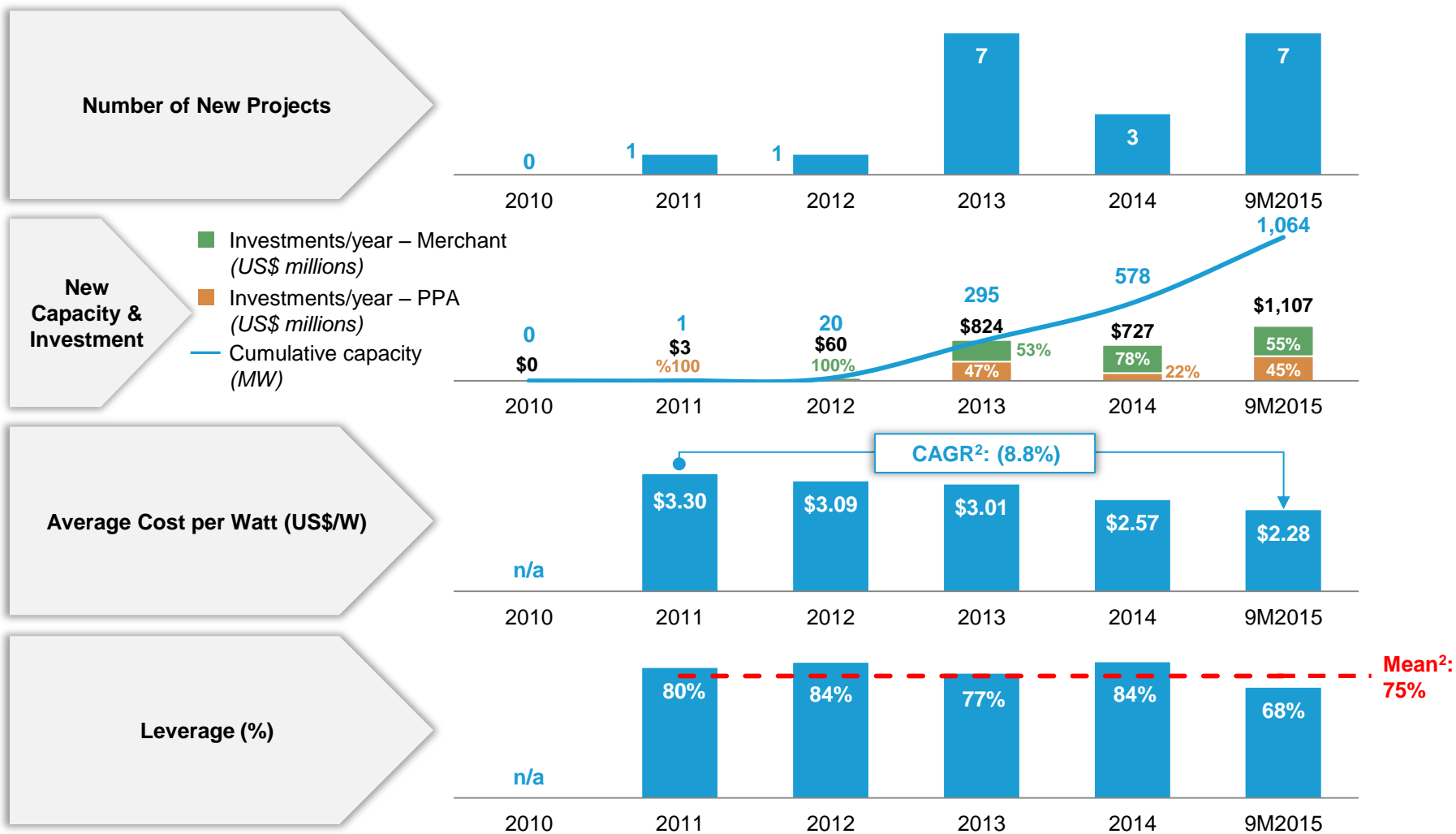
Leverage (2010-2015)^{1,3}



Source: Bloomberg New Energy Finance; Press Releases; Pan American Finance data

¹ Statistics based on transactions for which information was publicly available; ² Reflects primary sponsor; ³ Excludes 9 projects totaling 417 MW and ~US\$736 million funded on balance sheet

Financing for Solar PV Projects in Chile¹



Source: Bloomberg New Energy Finance; ¹Based on 19 solar PV projects that have secured debt and equity financing (excludes the Cerro Dominador solar PV project due to insufficient data to differentiate between the solar PV and concentrated solar panel ("CSP") portions); ² Based on 2011-2015

Attracting Financing to Chilean Solar PV Projects

Key Takeaways:

- **Solar PV projects remain bankable despite lower energy prices**
 - Price declines in PV modules and other PV capex components result in lower required investments
 - Properly structured projects can generate strong debt service coverage even at energy prices below US\$50/MWh – given high solar irradiation and energy yield
- **Merchant projects remain viable despite lower energy prices**
 - In the last two years alone, 9 merchant solar projects have been financed
 - The SIC-SING interconnection (expected by 2018) will bring solar power generation to the main consumption areas of the country, reducing price volatility
- **Loan tenor is highly important to returns**
 - Don't focus only on interest rate and spread
 - Increased loan tenor has a significant positive impact on equity returns
- **Experienced and financially strong sponsors do matter**
 - Financial strength can mitigate completion and operating risks associated with a project
 - Availability of new capital is important when problems arise

Pan American Finance

- Pan American Finance provides M&A and capital raising financial advisory services in Latin America
- In the last five years, our firm has advised on over US\$1.0 billion in renewable energy M&A and capital raising transactions
 - US\$85 million Phase I refinancing and US\$160 million Phase II long-term project financing for Polaris Energy Nicaragua's 72 MW San Jacinto Geothermal Power Project in 2010
 - Acquisition of certain assets of Conergy, German EPC contractor and solar PV developer, by Kawa Capital Management in 2013
 - Joint venture between Sonnedix Solar and JP Morgan Asset Management's Infrastructure Investments Fund; over €300 million in new equity commitments by the JV partners in 2014
 - Acquisition, US\$100 million bridge financing and US\$300 million long-term project debt financing for InterEnergy Holding's 215 MW Penonomé Wind Project in 2014
- Pan American Finance is currently advising on a US\$140 million financing for a >100 MW solar PV project in Chile
- Our firm has gained extensive experience in the power and renewable energy sector and has worked with numerous debt providers and equity investors
 - Development finance institutions
 - Local, regional, and global commercial banks
 - Strategic and financial equity investors

Pan American Finance

Pan American Finance has completed over US\$1.0 billion in transaction value for renewable energy projects worldwide, including for geothermal, solar and wind

■ Transactions:

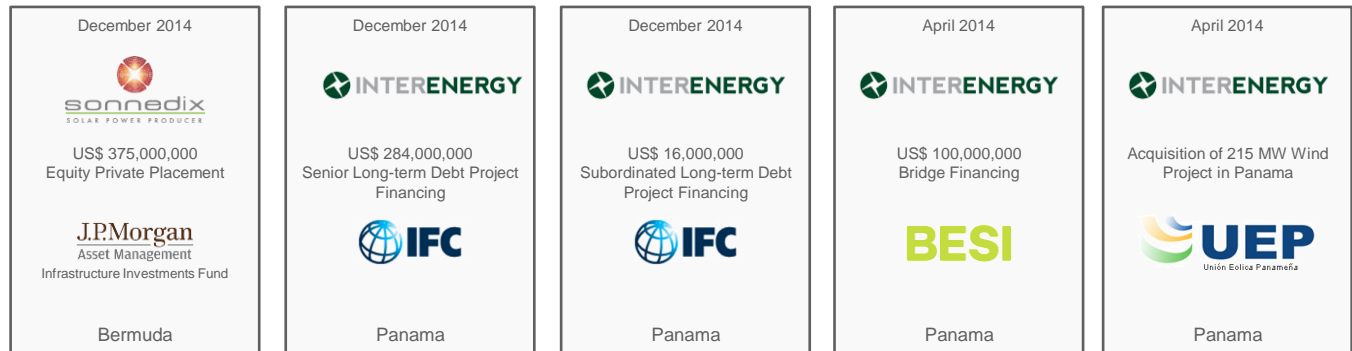
- M&A
- Restructuring
- Senior Debt
- Subordinated Debt
- Equity

■ Technologies:

- Solar
- Wind
- Geothermal

■ Geographies:

- Latin America
- Europe
- Asia
- South Africa



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