

Sun to Market Solutions



IFC – ESMAP – Renewable Energy Training Program
Solar Module

Case Study

June 16 – 18, 2014 IFC Washington, DC



PV Technology Overview, Market Analysis, and Economics

PV Project Development, Implementation, and Financing

Case Study

Case Study

Guatemala electricity market

Tender

Contractual structure

Development

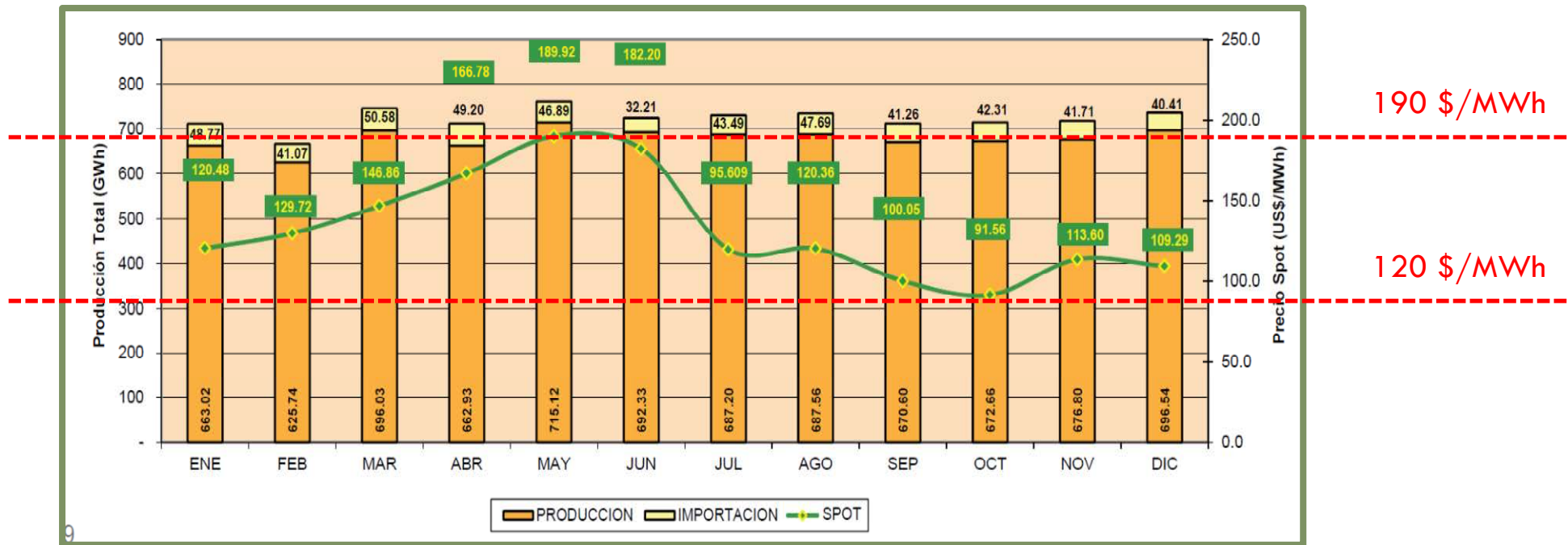
Business model



Case Study: Guatemala electricity market

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The total power generation for the 2011 were 8672 GWh. 8147 GWh were locally generated and 525 GWh were imported from the Regional Electricity Market. The installed system capacity was 2187.83 MW (1798.34 MW for "No Zafra EXPLAIN " situation).



Guatemala electricity spot market 2013

OS2m Tender: Energuate - EEGSA

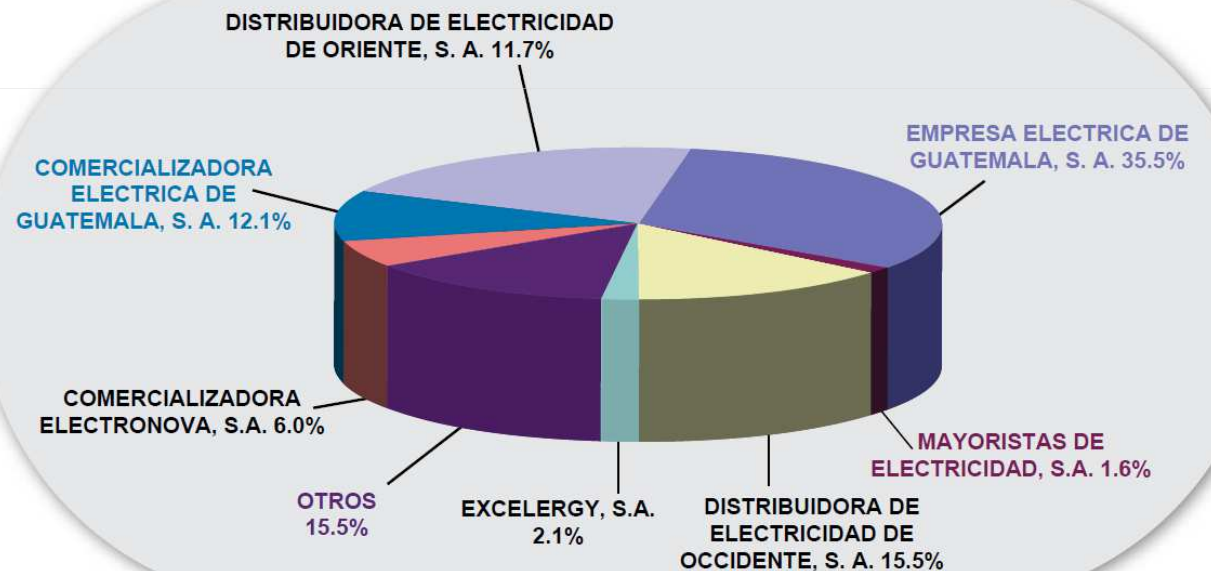
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Energuate (Actis Group, UK) is the electricity distribution company supplying electricity to 20 of the 22 departments in Guatemala, covering 94% of the land mass and serving the country's large rural population.

Company objectives: Supply contract of 600 MW at competitive and long term guaranteed prices.

Main Data:

- 600 MW Power Guaranteed
- PPA for 16 years from May 1, 2014
- Rate in USD U.S. PPI inflation



Guatemala electricity distribution companies 2013



GRUPO GRANSOLAR [GRS], a Spanish company, created an investment vehicle specialized in Renewable Solar Energy projects.

By December 2013, GRS had successfully completed the construction of 32 plants for a total 133 MW capacity, 150 MW under construction, and has further secured 250 MW pipeline for 2014-2015.



2013 Revenues: 98 MUSD
Employees: 125

GRANSOLAR
 DEVELOPMENT
 EPC CONTRACTOR
 OPERATIONS & MANAGEMENT

INGENIA
 ENGINEERING DESIGN
 QUALITY CONTROL
 CONSULTING



PVHardware
 SUPPORT STRUCTURE
 TRACKING SYSTEMS
 CONTROLLERS



- In the O&M business line, **GRS** operates 150 MW.
- In order to become **vertically integrated** GRS incorporated:
 - **INGENIA Solar Energy [ISE]**, a specialized engineering firm with equipment testing facilities.
 - **PVHardware [PVH]** in the US design and manufacture support structures and trackers to solar plants.
- **International footprint**



Italy Manduria (5,3MW) and Spain Arico (10,0 MW)



United States Hyder II (24 MW) Axone tracker

SIBO S.A. a special purpose vehicle (SPV) was created for this project, as usual in Project Finance. This special purpose entity are owned by Gransolar and others local partners.

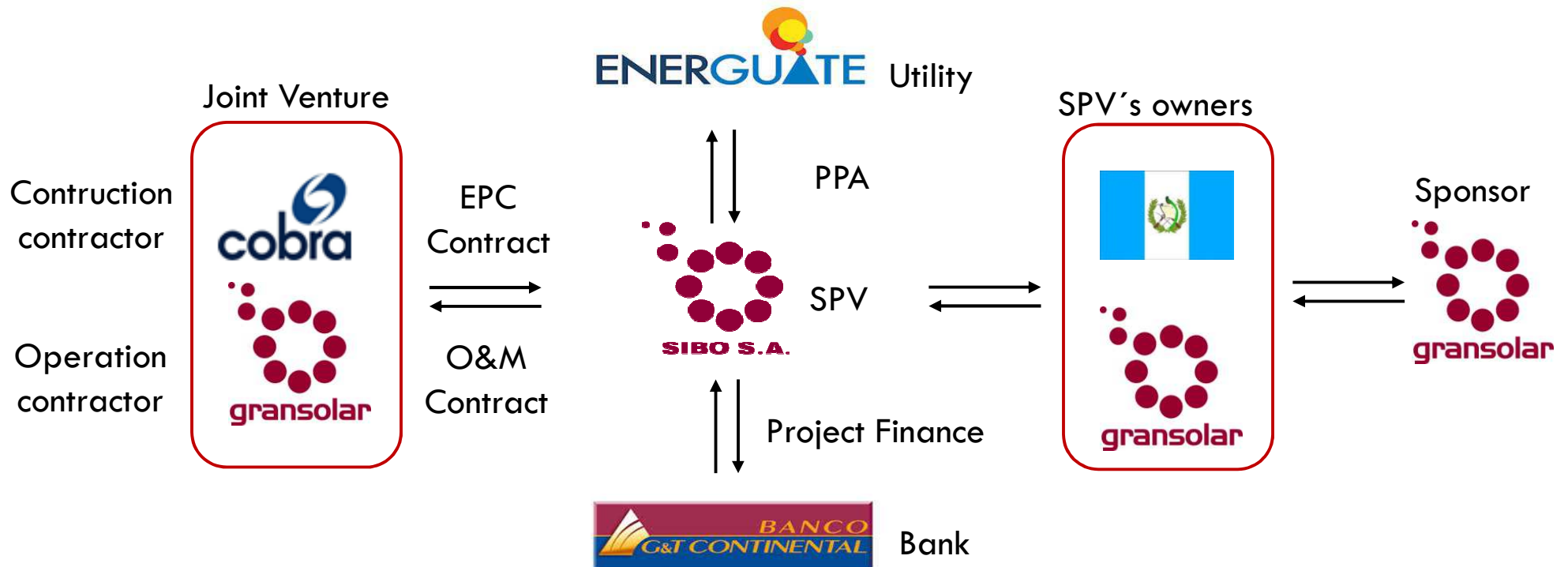


Sibo S.A. awarded 5 MW (138 \$ / MWh)

OS2m Contractual structure

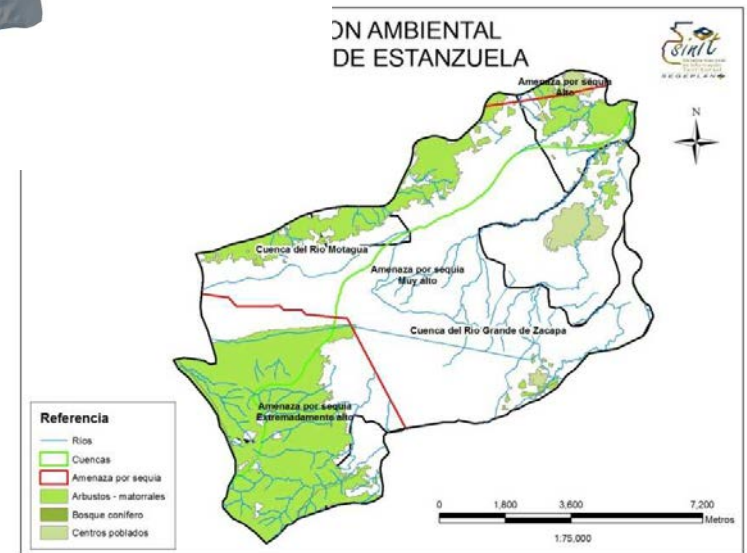
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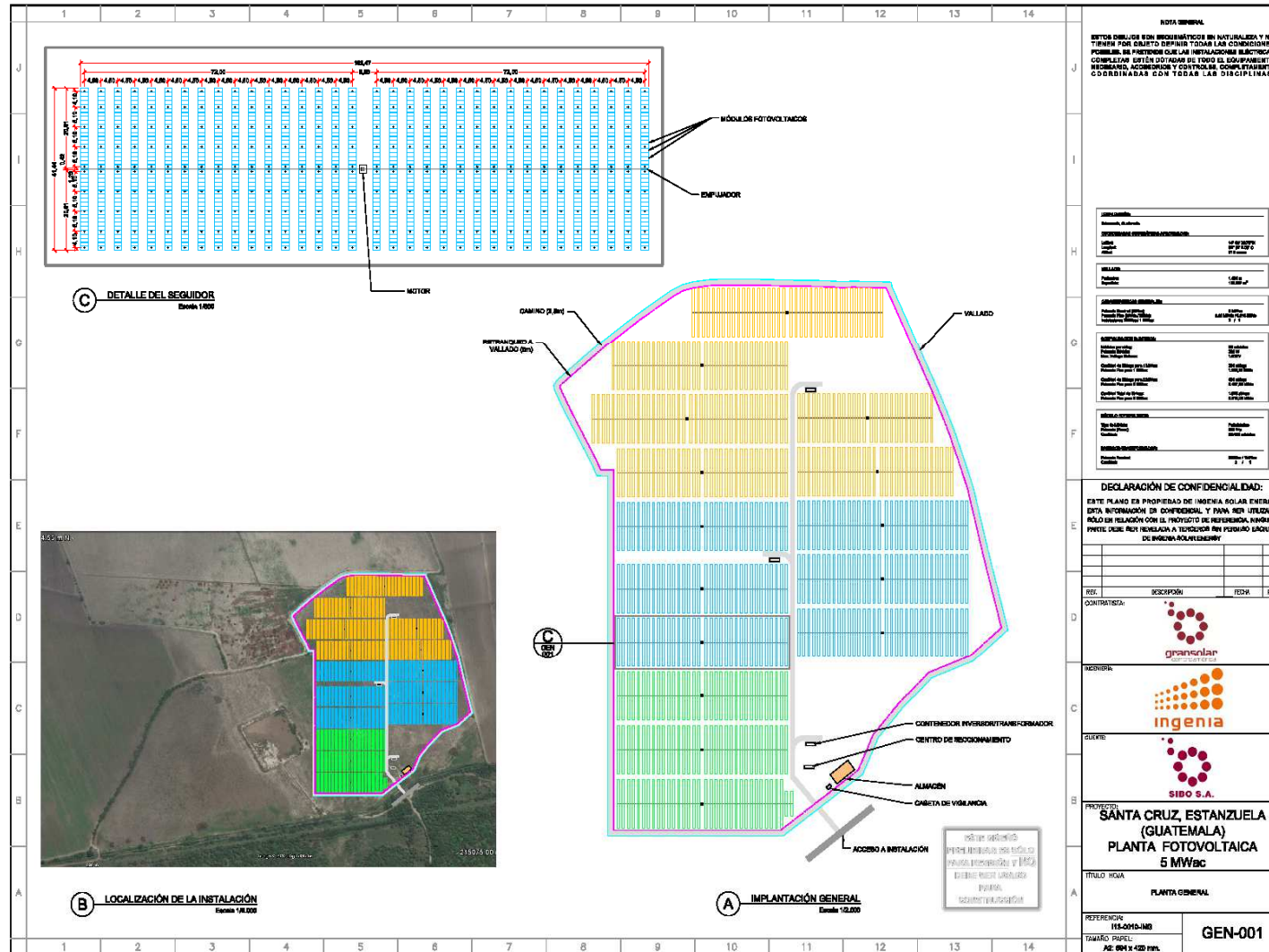
“This is the first example of **project finance** being applied in the utility-scale solar sector in Guatemala (also Central America), which we hope will pave the way to the build out of additional solar and clean energy infrastructure in Guatemala and the greater region,” said Banco G&T’s head of structured finance, Christian Kummerfeldt.



OS2m Project site

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OS2m Project

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OS2m Project

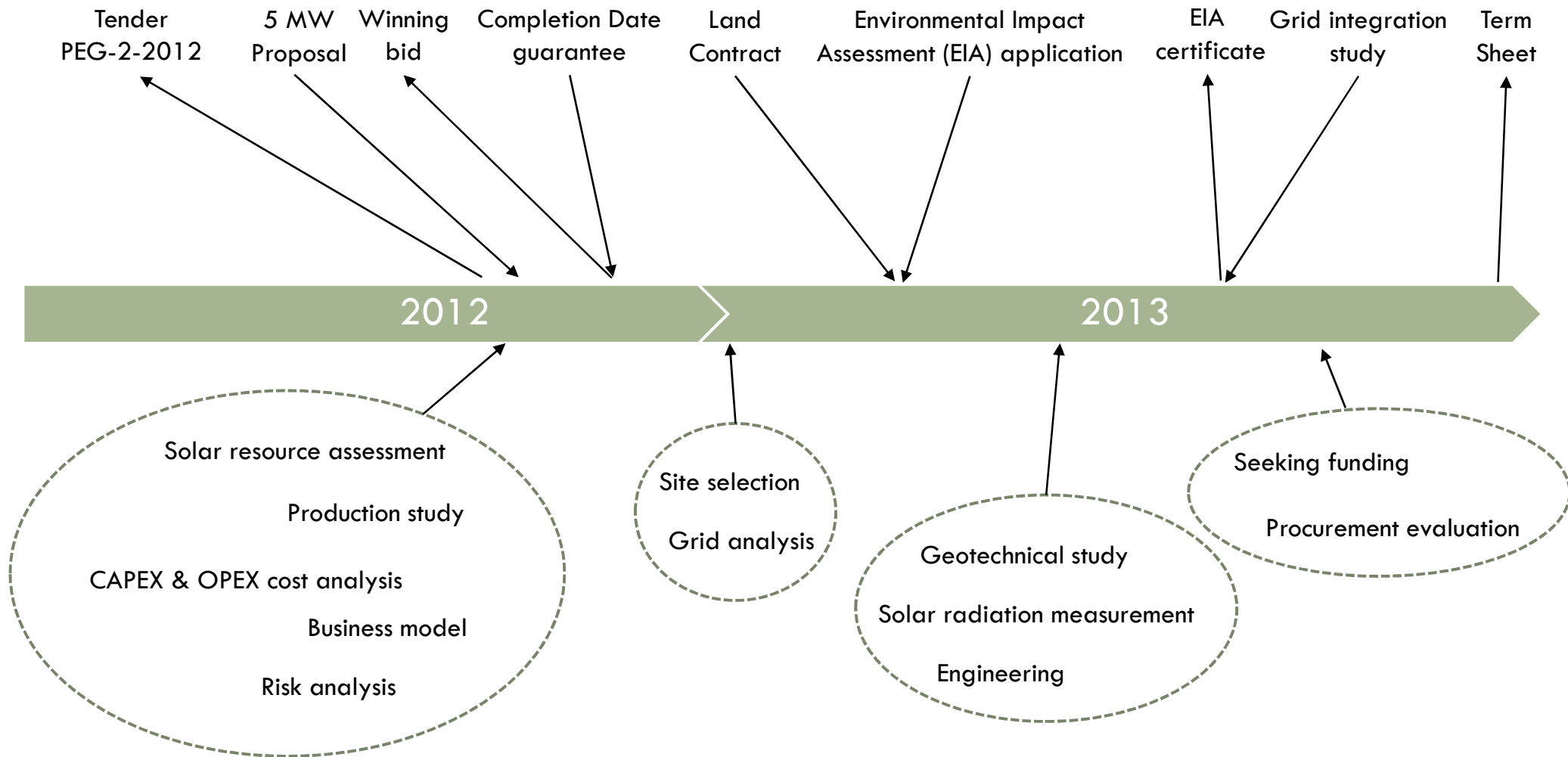
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Project Datasheet	
Global Horizontal Irradiance / year	2,120 kWh/m ²
Nominal Power	5 MWe
PV Panel Peak Power	6.1 MWp
Generation / year	12,956,736 kWh
kWh / KWp	2145
Performance Ratio	80
Panels	Hanwha 300 (c-Si)
Inverter	Ingeteam
Tracker	Single – axis PV Hardware



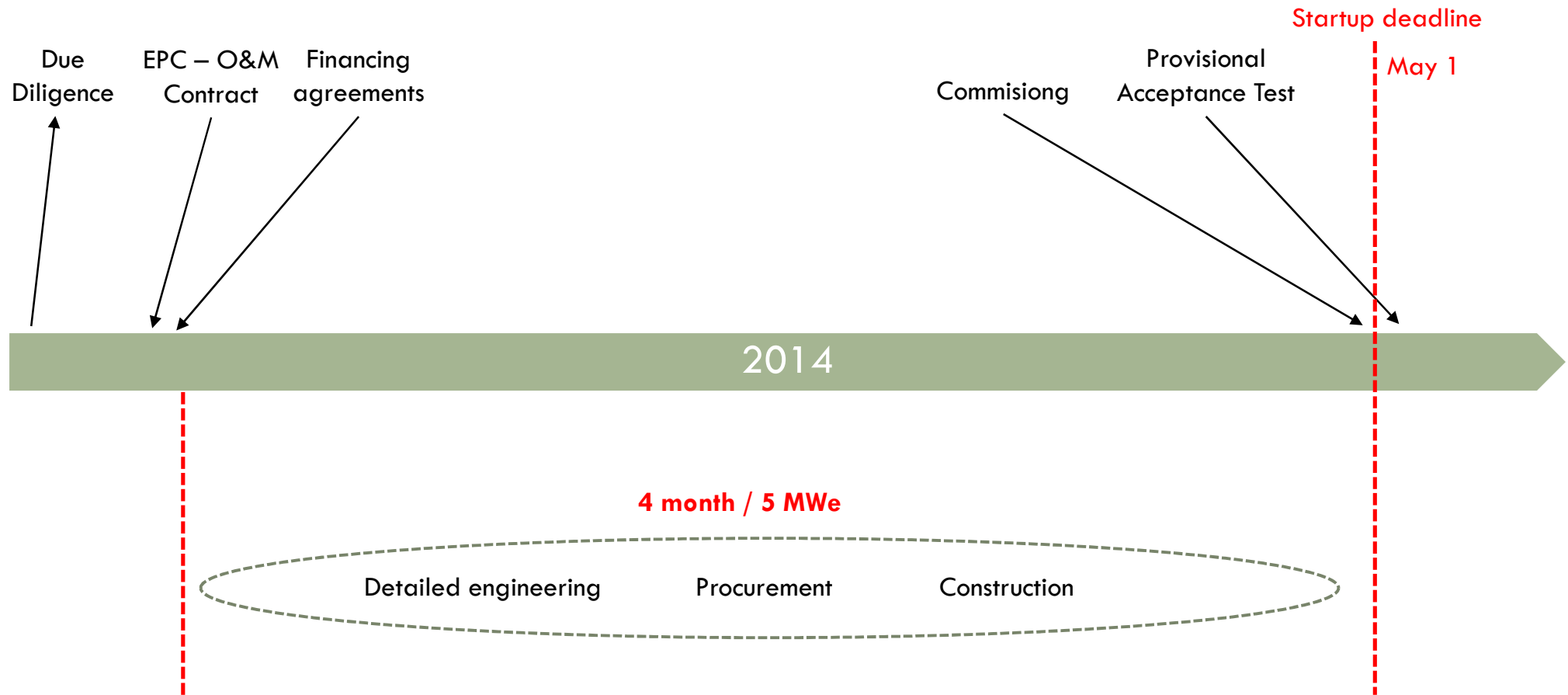


Development



OS2m Development

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Business model

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CAPEX	US\$ MM
Development	1.5
EPC	12
Grid connection	0.5
TOTAL	14

OPEX	US\$ MM
O&M	0.13
Management	0.08
TOTAL	0.21

REVENUES	
Production (MWh/year)	12,956
Electricity cost (US\$/MWh)*	138

(*) indexado al índice anual de Precios al Productor(PPI) para bienes industriales sin combustibles (Annual Producer Price Index Industrial commodities less fuels – WPU03T15M05) de Estados Unidos de América, publicado por el “U.S. Department of Labor, Bureau of Labor Statistics” . (Variación interanual máxima del 2.248% y mínima del 0%).



Business model

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FUNDING ASSUMPTIONS	
Equity / Debt (%)	30/70
Term (years)	12
Debt service coverage ratio	1.3
Interest	6.75 % (years 1-5) → Libor 6 M ⁽¹⁾ + 475bps (years 6-12)
Guarantee	Trust fund

Main Data:

- Commercial EPC (guarantee values, provisional acceptance test, 2 years guarantee until final acceptance test, warranties, etc)
- O&M contract for guarantee term
- Rate in USD U.S. PPI inflation

Key success factors

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- Gransolar: experience, international capability, flexibility and efficient management
- The same quality on management, documentation, etc. allowed, for such a big project, a fast administrative process
- Financial closure in a month: bank-sponsor worldwide culture, same language, young people with international education
- Construction in 4 months: international experience and capability
- Administrative management: local experience and local presence
- EPC from manual (good equipment, contracts, guarantee, etc)
- PPA with a private company (big UK found), not with the government (US\$ as currency)
- Local investors appear, bank trust.
- Same shareholder - same contractor
- Good opportunity for the bank to invest
- A GIBO 5 MW project that has the same requirements (structure, contracts, quality, etc) than the big ones (50 – 100 MW)