



# **STAR ENERGY GEOTHERMAL**

## **Geothermal Energy Development in Indonesia & Clean Development Mechanism**

United States Energy Association Luncheon Talk  
Washington D.C., 20 September 2011





Wayang Windu Geothermal Power Station – West Java

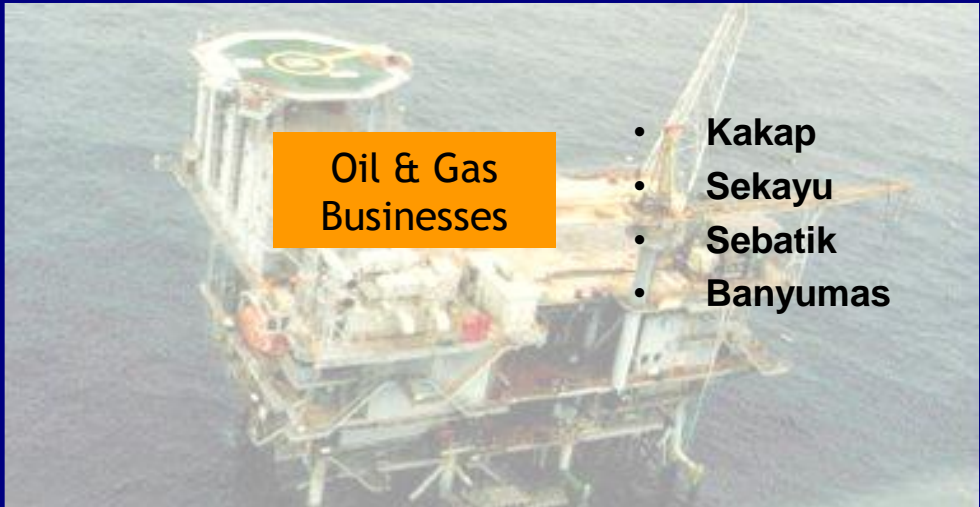
## Introduction

- **The Star Energy Group**
- **Geothermal Development in Indonesia**
- **Clean Development Mechanism (CDM)**
- **Wayang Windu Experience**

# Star Energy Group Companies

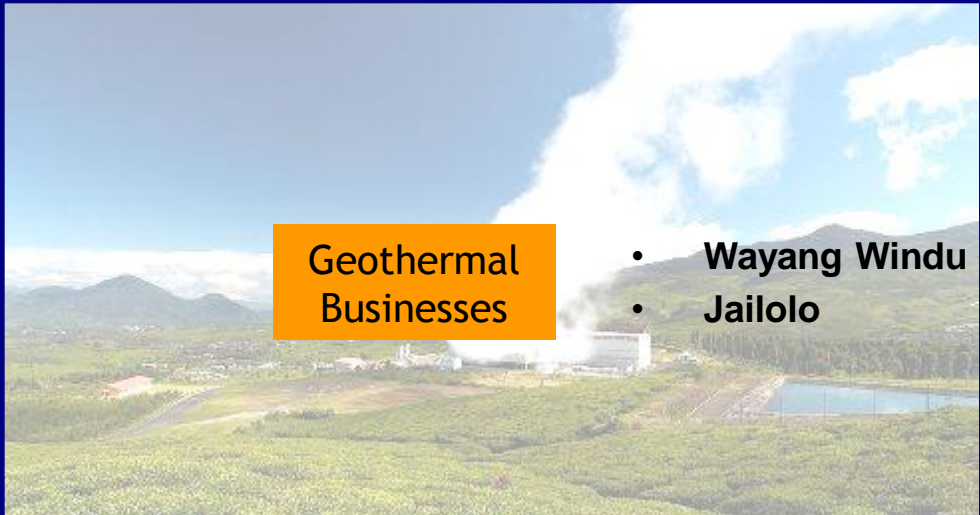


***Privately held  
Majority  
Indonesian  
Ownership***



**Oil & Gas  
Businesses**

- Kakap
- Sekayu
- Sebatik
- Banyumas



**Geothermal  
Businesses**

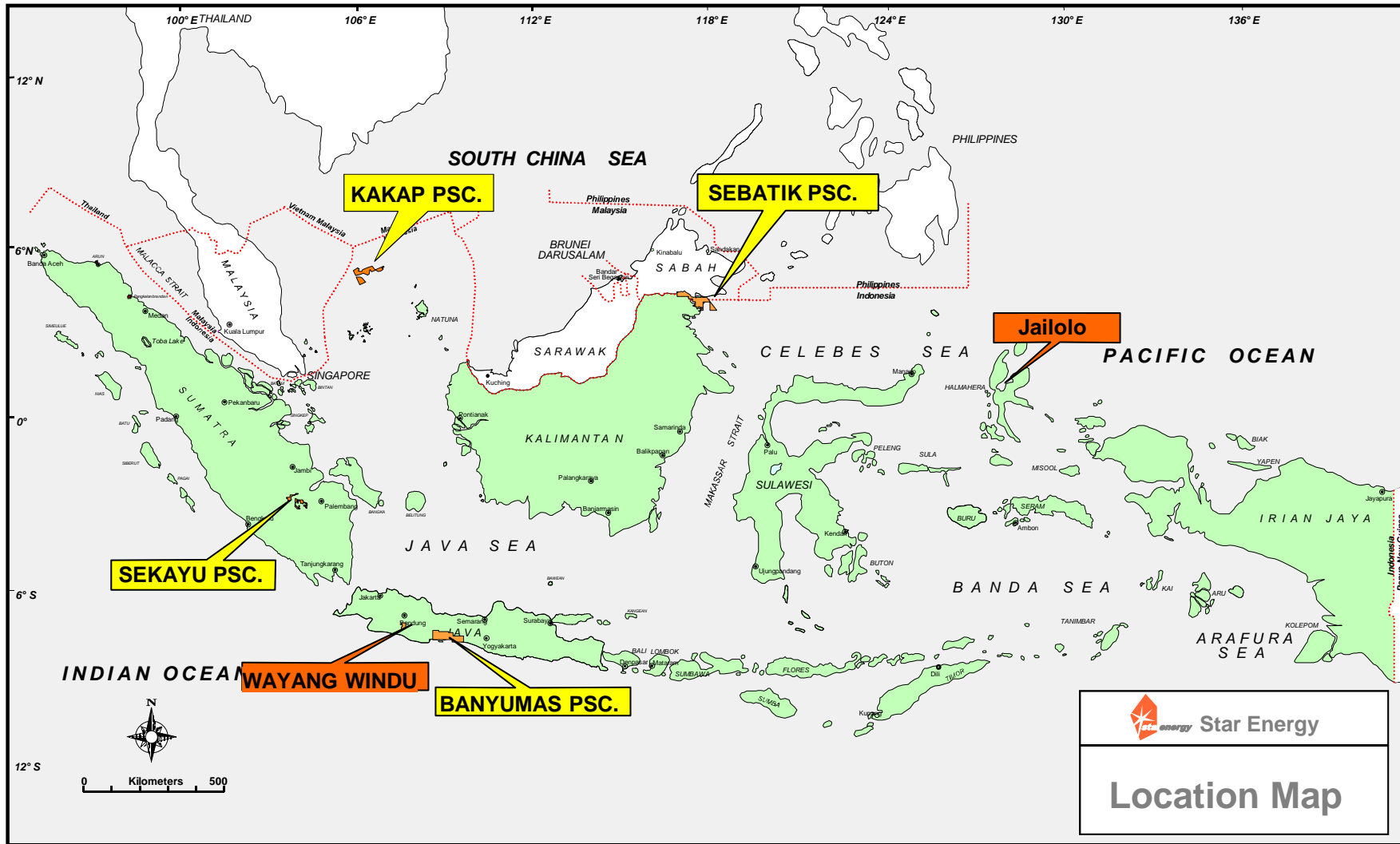
- Wayang Windu
- Jailolo

# Star Energy Group Companies

- *Established in 2003*
- *Committed to developing Oil & Gas and Geothermal Energy in Indonesia*
- *Majority run by Indonesian management and professional staff*
- *Good international reputation and networking*
- *Striving to be the Partner of Choice who is committed to build and sustain good and mutually beneficial relations with the central government, local government, the surrounding community and other stakeholders*



# Areas of Operations



Location Map

# Geothermal Development in Indonesia

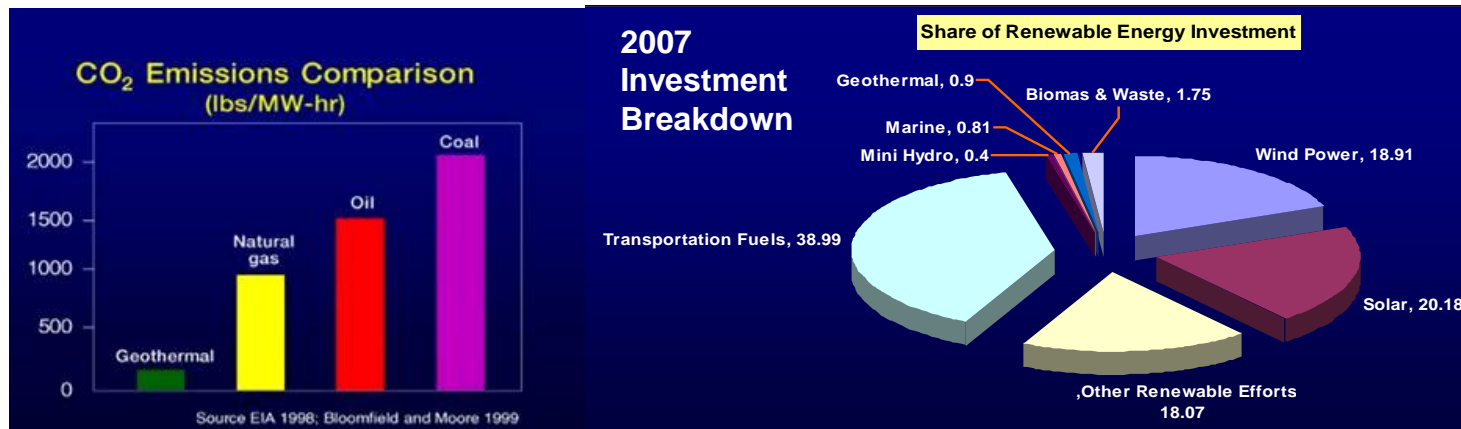
**Indonesia holds 40% of the world's geothermal potential, yet only 1,189 MWe, or 4% of Indonesia's potential, has been developed into commercial operating power plants**



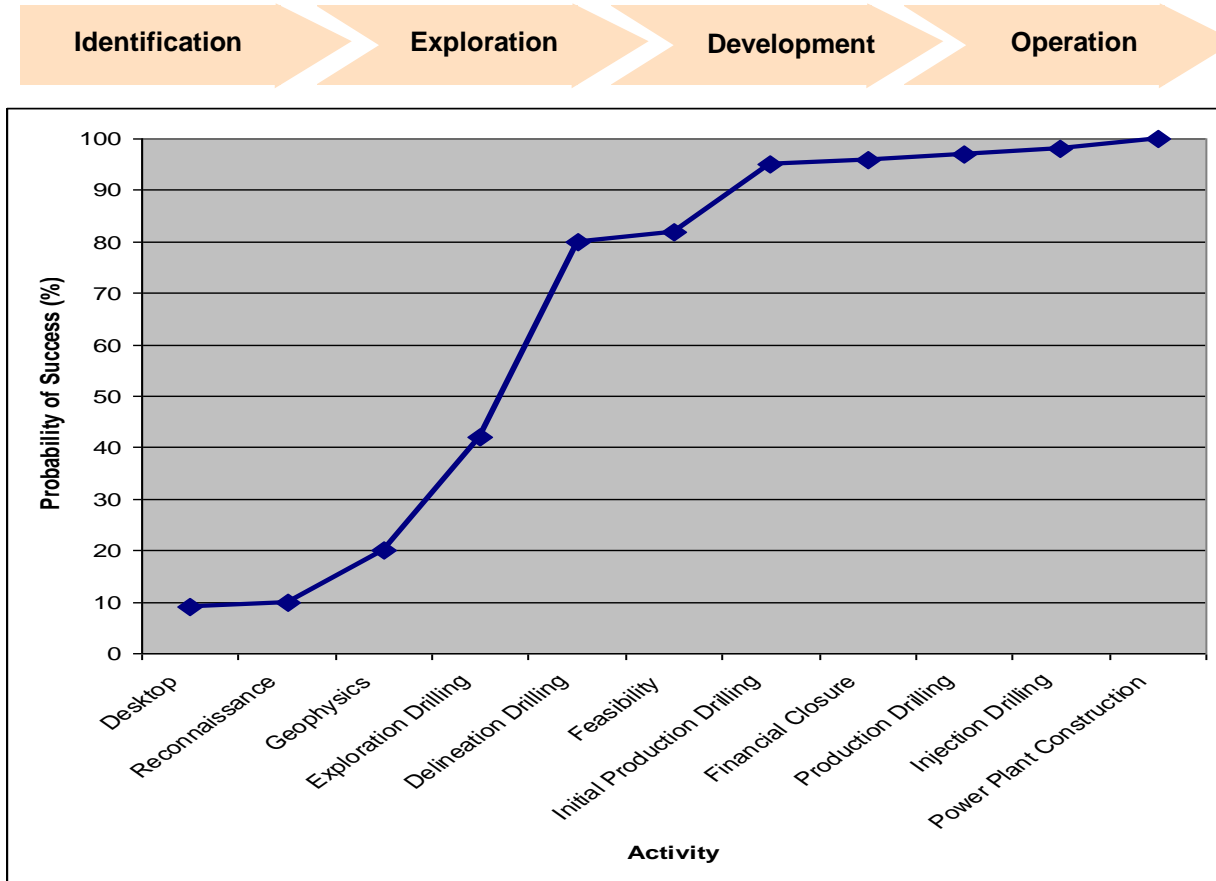
# Some Characteristics of Geothermal Energy

Attractions
Low Carbon
Renewable
Free, subject to extraction costs
Not seasonal, hence ideal base load
Simple and high reliability plant
Not treated as a commodity therefore long term stable price.

Difficulties
Remote locations
Not fully scalable for major power systems
High up-front capital cost makes financing difficult
Relatively high risk in terms of resource certainty
Often located in/near conservation areas, hence not always able to be developed.

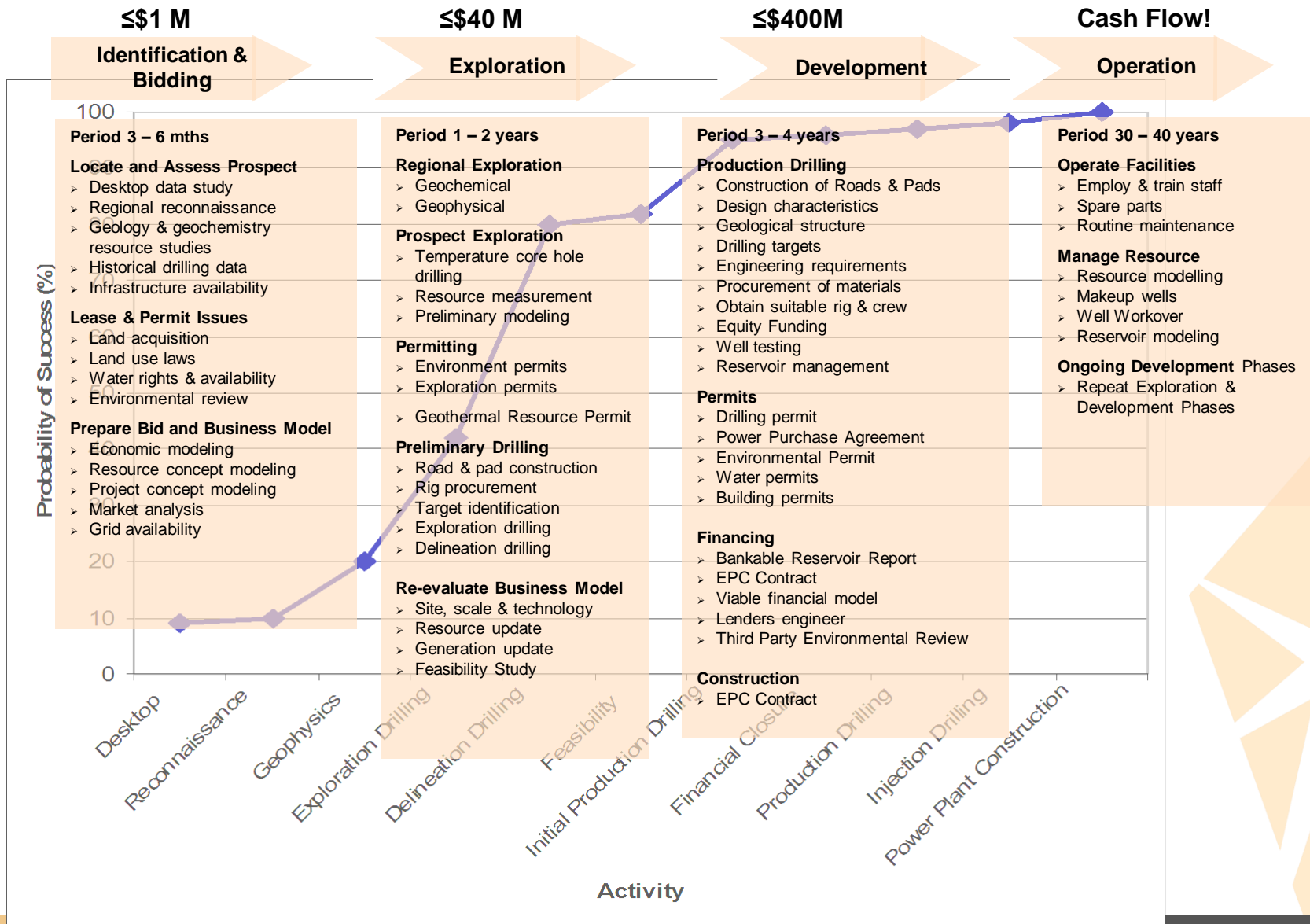


# Risk Profile During Development



This graph shows the major risks faced by investors before traditional debt finance can “kick-in” – probably not until the project is >90% certain, and developer needs to fund substantial equity for several years before achieving returns

# Mitigating Risk – The Phases of a Geothermal Development



# Additional Risks

- Indonesian sovereign risk
- Single buyer risk
- Contract risks at all stages of the development cycle
- Risk of delay (permitting and approvals)



# Funding Alternatives

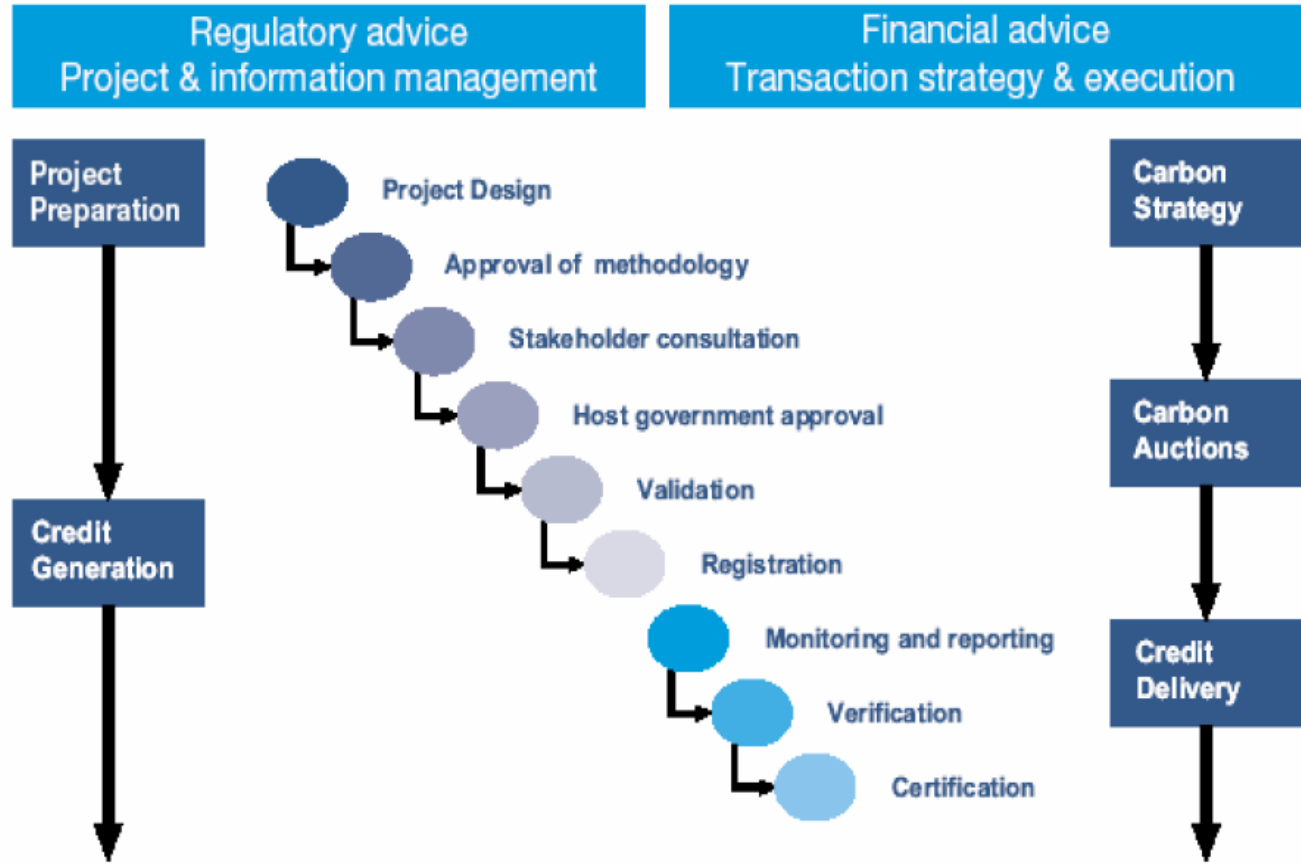
- ✓ The early phases of geothermal development are risk prone, hence there are severe difficulties in raising finance – bankers hate risk!
- ✓ Grant funding can be available for early phase activities (ex: grant for Jailolo Feasibility Study Project from USTDA)
- ✓ Tied finance (export credit, Investment loans etc)
- ✓ Non-recourse development debt funding – more likely to be limited-recourse
- ✓ Public Debt market – bond issues (a recent Star Energy success)
- ✓ Equity Market funding – IPOs, Venture Capital
- ✓ Carbon-offset funding
- ✓ Insurance instruments – new resource insurance policies are expensive and still of limited availability but can help to reduce exposure of developers to resource risk

# Clean Development Mechanism (CDM)

- Mechanism created through Kyoto Protocol – acknowledge emission as a global issue
- Cap and Trade system allowing emission reduction projects in developing countries such as Indonesia to be traded into industrialized countries
- There has been >670 million Certified Emission Reduction (CER) credits issued worldwide until August 2011
- Most of the projects are based in China & India
- All of the installed geothermal power plant in Indonesia in past 5 years have been a CDM project activity



# CDM Process



## Wayang Windu Unit 2 Experience:

- PDD: November 2008
- Stakeholder Consultation: December 2008
- Validation: January 2009 – May 2010
- Registration: May – December 2010

# Wayang Windu Development Phases

- Signed Joint Operation Contract (JOC) with Pertamina and an Energy Sales Contract (ESC) with PLN to develop up to 400 MWe of electricity

- Operational excellence; a record of 98% availability average over 10 years

- Unit 1, 110MWe – commercial operation June 2000

Development started in 1994 during a higher electricity tariff regime, however, development was halted during the Asian financial crisis in 1998. Government of Indonesia insisted on re-negotiation to a lower electricity tariff in 2000.

- Unit 2, 117MWe – commercial operation March 2009

Tariff renegotiation in 2006 (lower than that signed in 1994)

- Unit 3, 127MWe – planned commercial operation 2014

# Wayang Windu CDM Experience

- CDM prior consideration for Wayang Windu Unit 2 development dating back to 2002
- In 2004, the company which holds Wayang Windu contract area is acquired by Star Energy
- Project Design Document (PDD) process and Validation for the CDM registration started in 2008
- December 2010, Unit 2 successfully registered as a CDM project in the UNFCCC



# Wayang Windu CDM Experience

- Estimation of emission reductions is 794,832 tonnes of CO<sub>2</sub>e/annually

- Improvement in IRR Calculation

Project WACC : 18.96%

Project IRR : 17.62%

Project IRR w/ CER : 20.48%



# Issues in the CDM Process

- Time delays & bottleneck in UNFCCC process

Wayang Windu Unit 2 project took 24 months from Stakeholder Consultation to Registration

- Proof of *Additionality* based on investment analysis is crucial to obtain registration

- Uncertainty of process moving forward – market for CERs?

EU ETS Phase III (2013-2020) will not accept credits from CDM project that is not registered by the end of 2012

# Way Forward

- International support is still crucial for renewable energy project development in Indonesia
  
- What will the offset mechanisms post-2012 look like?
  - Extension of the Kyoto Protocol (CDM)
  - Sectoral Crediting
  - Bilateral Offset Mechanism (i.e.: Japan)
  - Nationally Approved Mitigation Action (NAMA)
  
- Developers needs clarity of available schemes
  
- Need international commitment and support in the schemes





Thank You