Geothermal Development Opportunities

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We will not update these forward-looking statements, even though our situation will change in the future.

Outline

- Review of Ormat's worldwide geothermal installed-base
- Development challenges in emerging markets
- Geothermal project development
- Examples co-produced geothermal projects & REG projects.
- Indigenous waste water and waste heat potential in Louisiana
- Summary

Ormat Technologies

- A leader in the Geothermal and Recovered Energy Power Business
  - Pure-Play, Clean Energy Growth Company
  - Owns 505 MW
  - Supplied ~ 1,200 MW of geothermal and REG power plant in 23 countries
  - Ormat makes up ~ 70% of geothermal capacity installed in the U.S. since 2000
- Fully Contracted Generation
  - Base Load
  - Competitive Pricing
  - Visible Cash Flow
- Vertically-Integrated
  - Active in design, engineering, supply, installation, support and operation of renewable and sustainable energy since 1965
  - Technology Leadership

Main Areas of Activities

Reliable Distributed Power

Geothermal Power Plants

Resource Recovery: Biomass

Heat Recovery - Pipelines

Industrial Waste Heat Recovery

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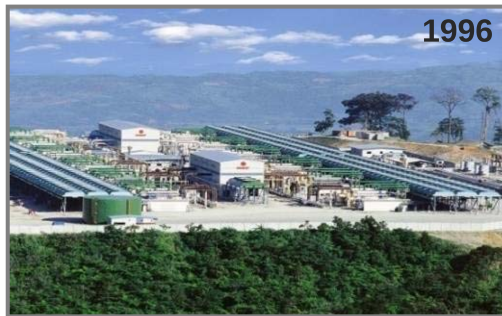
Ormat Geothermal

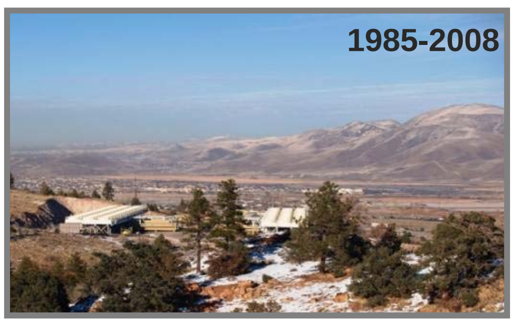
Worldwide Presence

92 MW Heber Binary Geothermal Complex, California

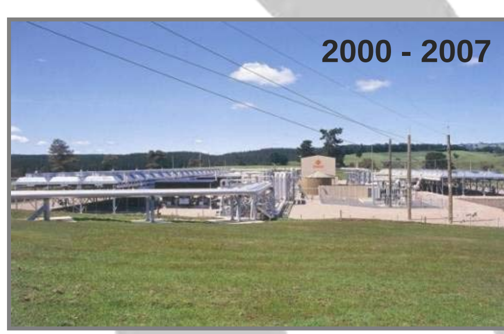


125 MW Upper Mahiao Combined Geothermal Power Plant, Philippines

14 MW Sao Miguel Geothermal Power Plant, Azores Islands



84 MW Steamboat Geothermal Complex, Nevada



120 MW Mokai Combined Cycle Geothermal Complex, New Zealand

20 MW Amatitlan Geothermal Power Plant, Guatemala

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Ormat Recovered Energy

5.5 MW Kerrobert REG Project, Saskatchewan, Canada

5.5 MW Northern Border Pipeline REG Project (OREG1), North Dakota

1.5 MW Heidelberg Cement REG Project, Germany

4.6 MW Neptune REG Project, Louisiana

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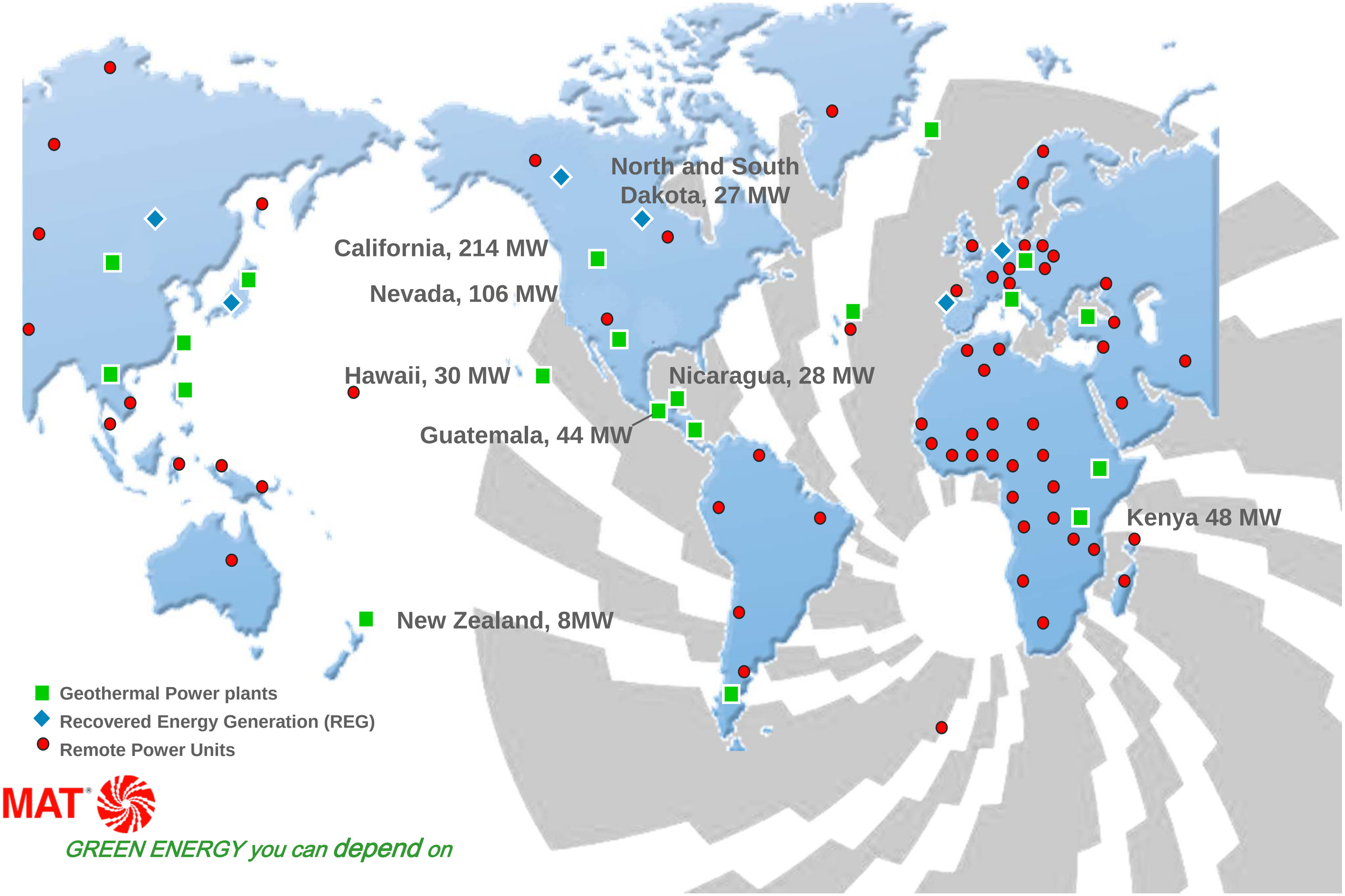
Global Installed-Base



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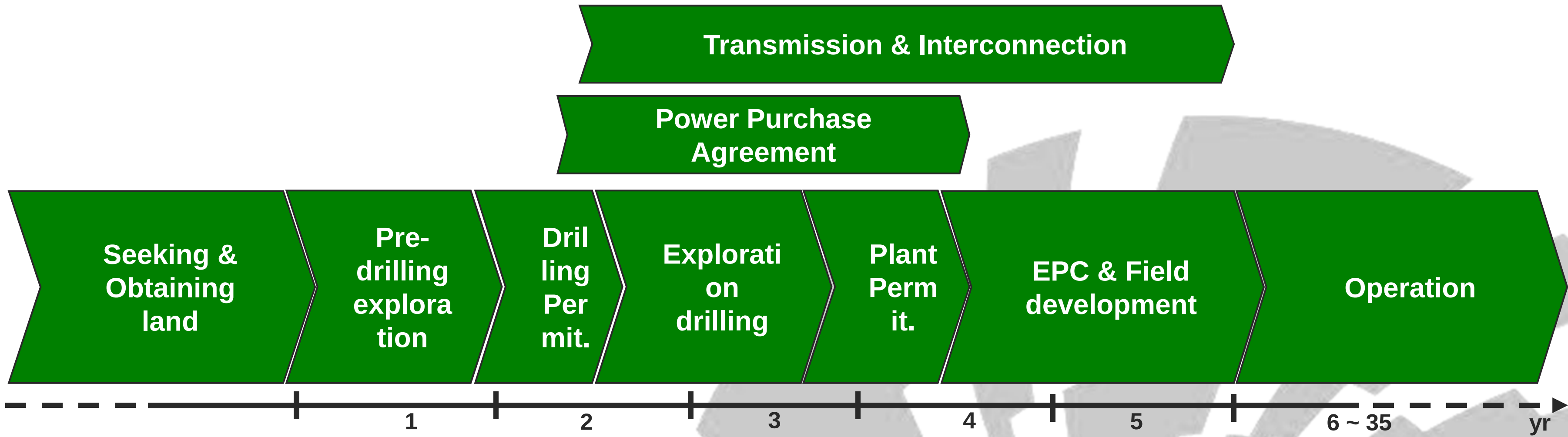
Development Challenges in Emerging Markets

Life is really simple, but we insist on making it complicated"

Confucius

- Financing:
  - Small capacity yet high initial investment costs
  - Life cycle cost of fuel embedded in up-front CAPEX
- Credit risks:
  - Political, resource and off-takers
- Competition with fossil fuels:
  - Fossil fuel subsidies
  - No penalties for GHG emissions
  - Insufficient incentives for renewables
- Monopolistic environment

Typical Project Development Process



"Everything should be made as simple as possible, but not simpler"

A. Einstein

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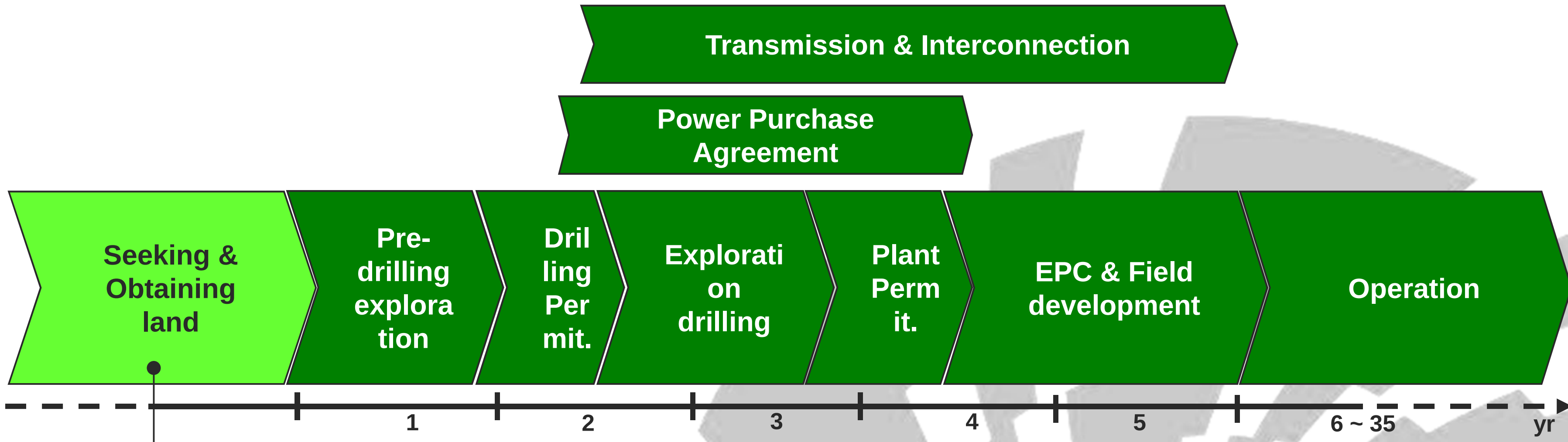
Typical Project Development Process



- Identify lands w/ potentially good geothermal resources
- Lease: federal / state / private / other
- This process can be very slow

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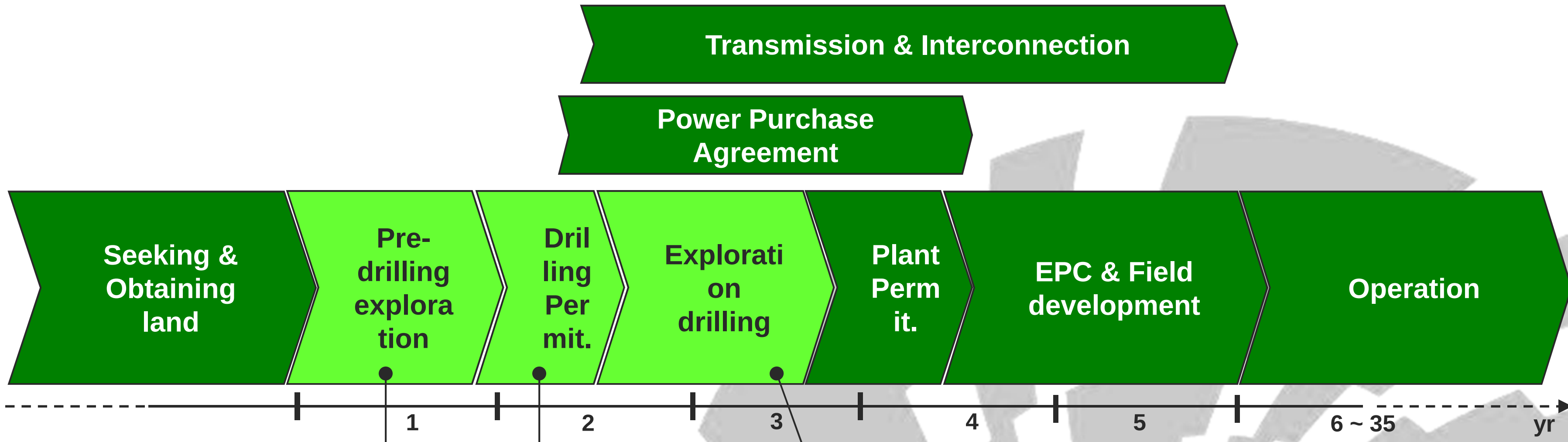
Typical Project Development Process



- Geochemical and geophysical surveys
- Develop geological model
- Specialized technology required in order to optimize the drilling phase

- Covers: air, water, cultural, biological, botanical, other issues
- A discretionary process
- Can be very slow

- Temperature gradient holes
- Slim holes
- Update geological model
- Full-size deep wells
- Resource confirmation
- Capital intensive
- High risk

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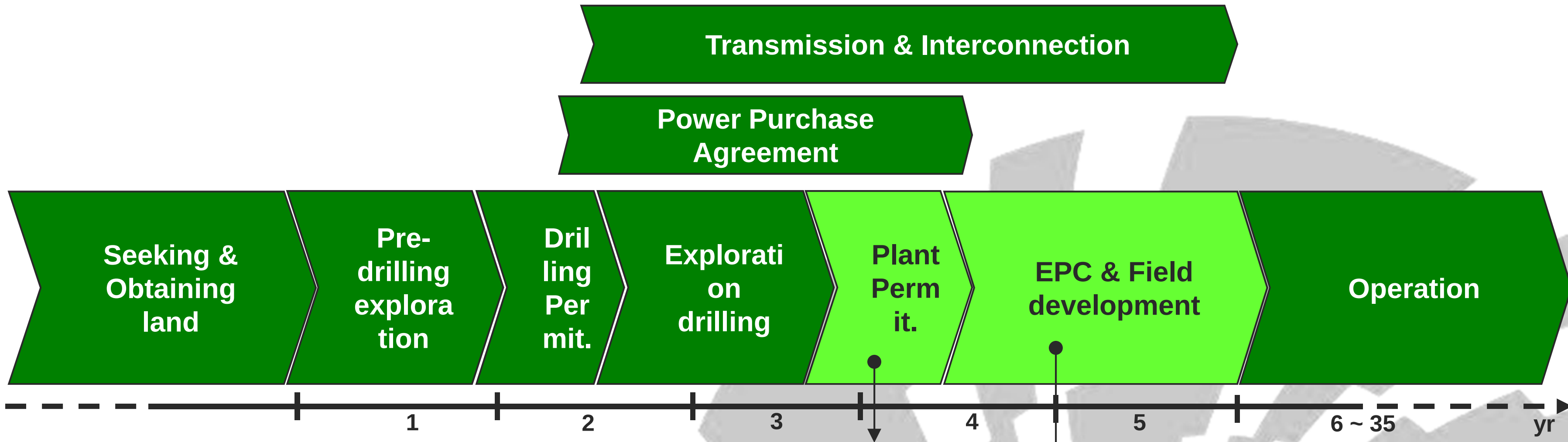
Typical Project Development Process



- Covers: air, water, cultural, biological, botanical, visual, safety, other issues
- A discretionary process with little influence by the developer
- Can be very slow

- Drilling all additional production and reinjection wells
- Conceptual and detailed plant design
- Manufacturing and/or purchasing
- Construction of plant and well-field
- Capital intensive
- Specialized technology required to optimize resource utilization

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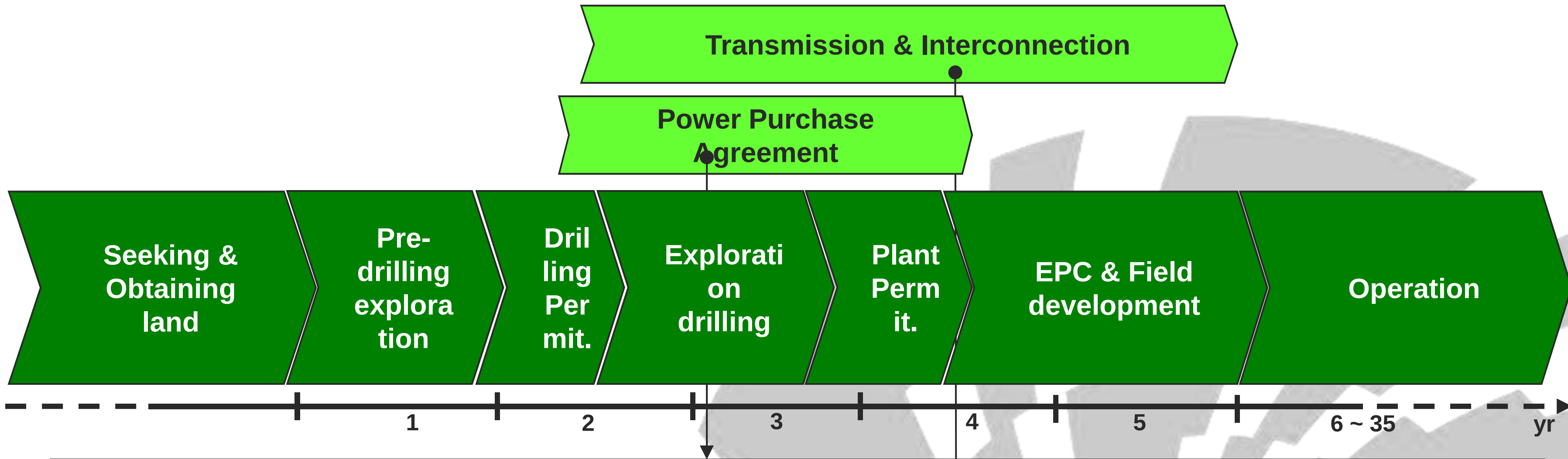
Typical Project Development Process



- Negotiate and sign agreement/s for power and RECs with utilities and/or private users
- Limited willingness by utilities to share the risk of failing to confirm the resource

- Interconnection studies; Interconnection agreement
- Poor matching between grid and many geothermal resources
- Construction of transmission line and substation – usually by the developer

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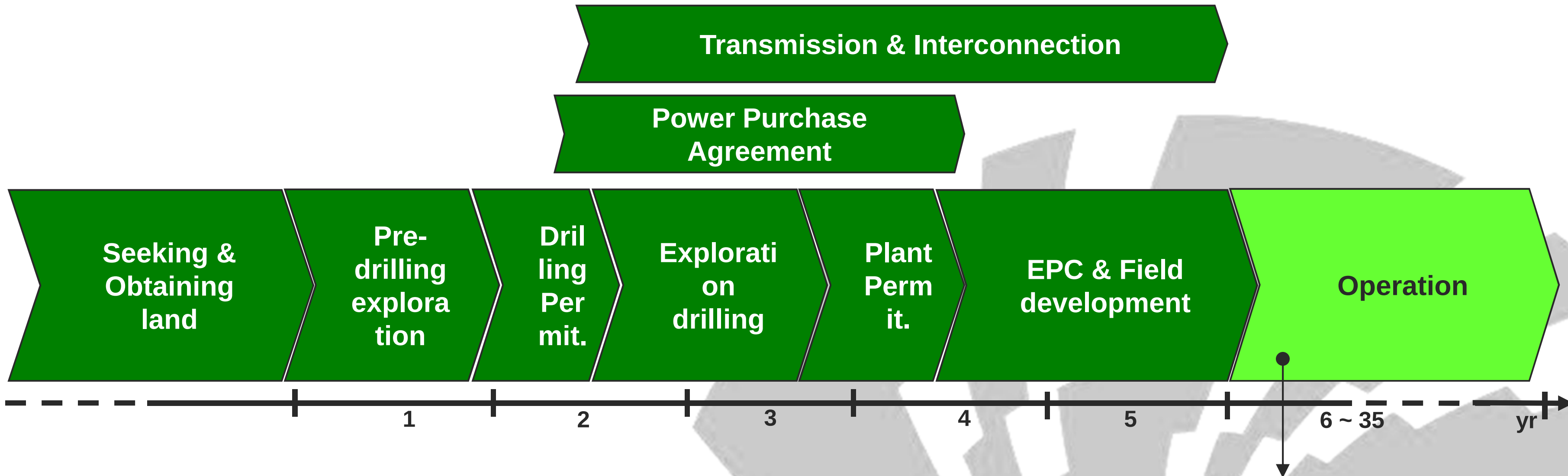
Typical Project Development Process



•Operate the plant

•Maximizing availability and minimizing O&M costs are critical to succeed

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Geothermal from Geo-pressured systems

- Technology Examples

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Geothermal from Geo-pressured systems

- Natural gas production and electricity generation from geo-pressured-geothermal aquifers is an unconventional hydrocarbon source that has long been unproductive due to its marginal economics and lack of technological certainty.

- Today that may be changing
  - Tax incentives
  - Climate Change
  - RPS

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Geothermal from Geo-pressured systems

- Barriers to Geo-pressured geothermal development
- There is little published information concerning temperature gradient, bottom-hole temperature and heat flow in the Gulf Coast, particularly from modern wells. This data could be collected and made available.
- DOE funded flow tests on several wells and they generally were able to sustain sizeable flow rates. Only Pleasant Bayou had a really extended production history. Some questions that weren't answered include whether there is a recharge mechanism (Shook believed that there might be) so that the reservoirs actually might produce significantly more fluid than original production estimates. A properly instrumented flow test might answer this question. The second question is the mechanism of recharge.
- methods of disposing of the spent production fluid. This was a major cost item in the original DOE program since it required a costly fluid disposal well. Without that, economics were much better.

Ormat – 40 years of technical innovation

- However

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Ormat – 40 years of technical innovation

Solar Powered ORC Water Pump – Mali 1966

High Reliability ORC Power Unit for Alyeska P/L 1976

5 MW Solar Pond Collects and Stores Energy - 1982

1 MW ORC Solar Thermal Project –Arizona 2006

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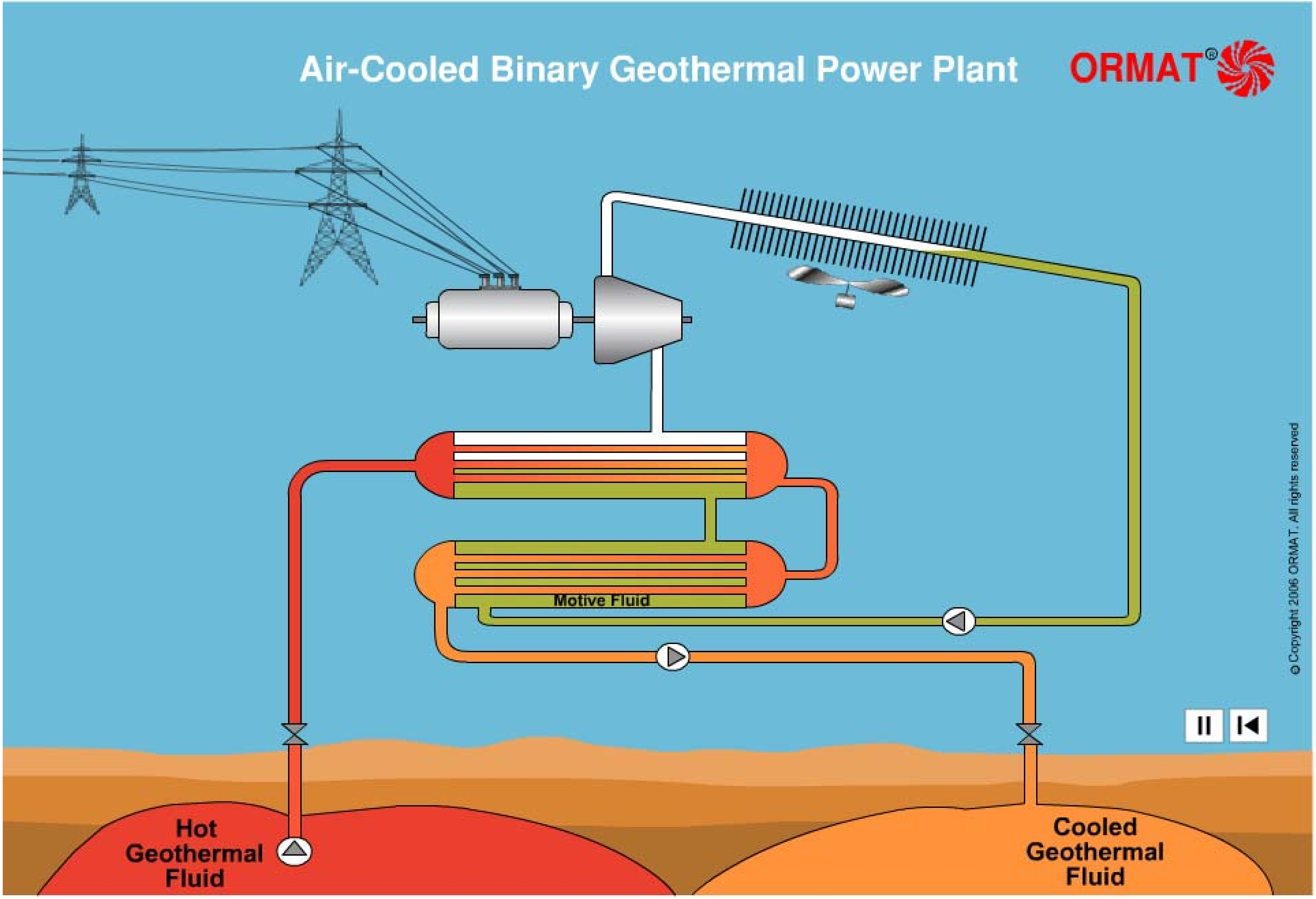
Air-Cooled Binary Geothermal Power Plant
ORMAT®
Motive Fluid
Hot Geothermal Fluid
Cooled Geothermal Fluid
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Case Study - RMOTC

Rocky Mountain Oilfield Testing Center (RMOTC) being used for Ormat demonstration power plant

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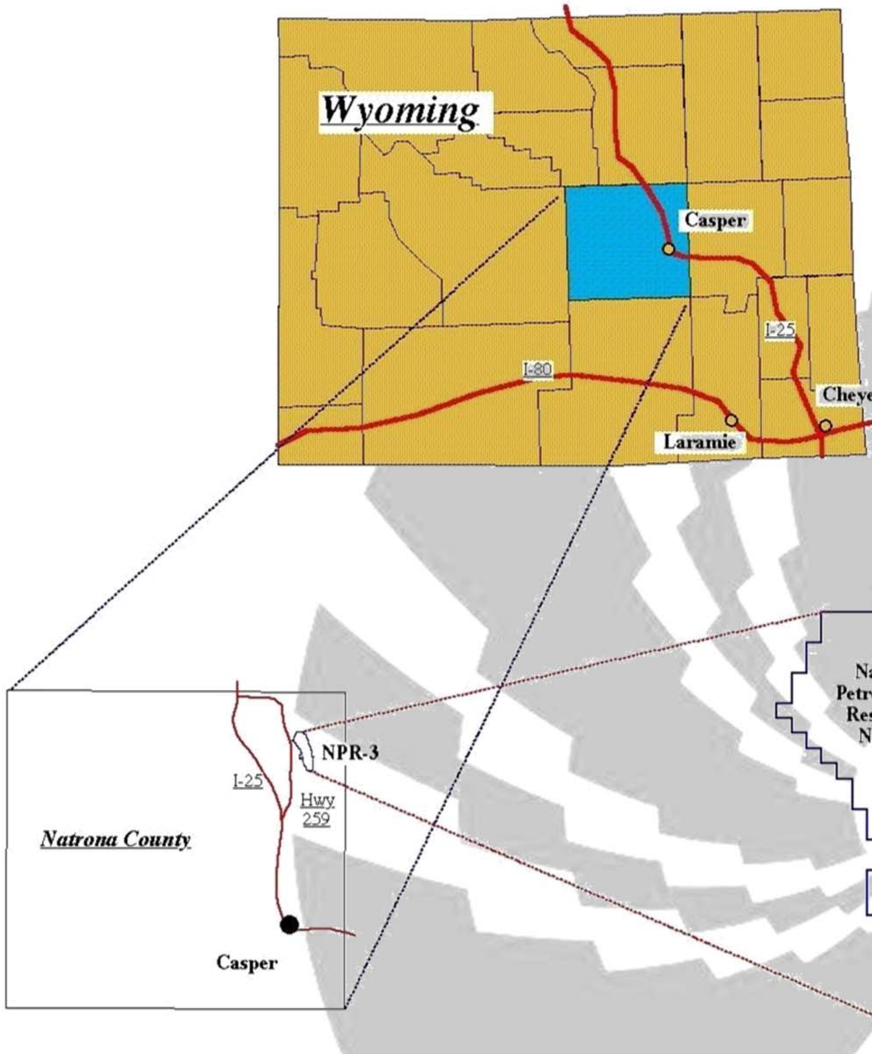
Case Study - RMOTC



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Case Study - RMOTC

Flow Rate:	40,000 BWPD (1167 gpm)
Inlet Temperature:	170°F
Outlet Temperature:	152°F
Ambient Temperature:	50°F
Generator Gross Power:	180 kW
Net Power Output:	132 kW

Case Study - RMOTC

Rocky Mountain Oilfield Testing Center (RMOTC) being used for Ormat demonstration power plant

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Low Temperature Resource

- 1979, Manley Hot Springs, AK
- 120ºF brine inlet temperature, 18 gpm
- 39ºF cooling water inlet, 79 gpm
- 2.0 kW gross output

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Low Temperature Resource

- Collaborative R&D project with the Bureau of Reclamation and UTEP
- 70 kW Solar Pond
- ORC Power Unit at El Paso, Texas
- In operation from 1986 to 2002
- temperatures of 154ºF to 190ºF

Low Temperature Resource

- 250 kW OEC Power Plant Provides Power & Heat from 210ºF Geothermal Fluid

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Co-production, a new challenge

- Generating power from produced water
  - Reduce well field operating costs
  - Eliminate fossil fuel consumption
  - Reduce maintenance costs
- Introduce emission free energy production
- Potential green energy tax incentives

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Co-production, a new challenge

- Resource chemistry, dependability
  - Major factor is heat exchanger lifespan
  - Fouling and corrosion will reduce HEX life
  - Increased O&M costs will reduce economic benefits
  - Every resource is different
- Cooling
  - Water cooling requires cooling tower, constant make-up water, and additional pumps
  - Air cooling (dry cooling) can be utilized anywhere

Recovered Energy Generation (REG)

- The Hidden Green Resource

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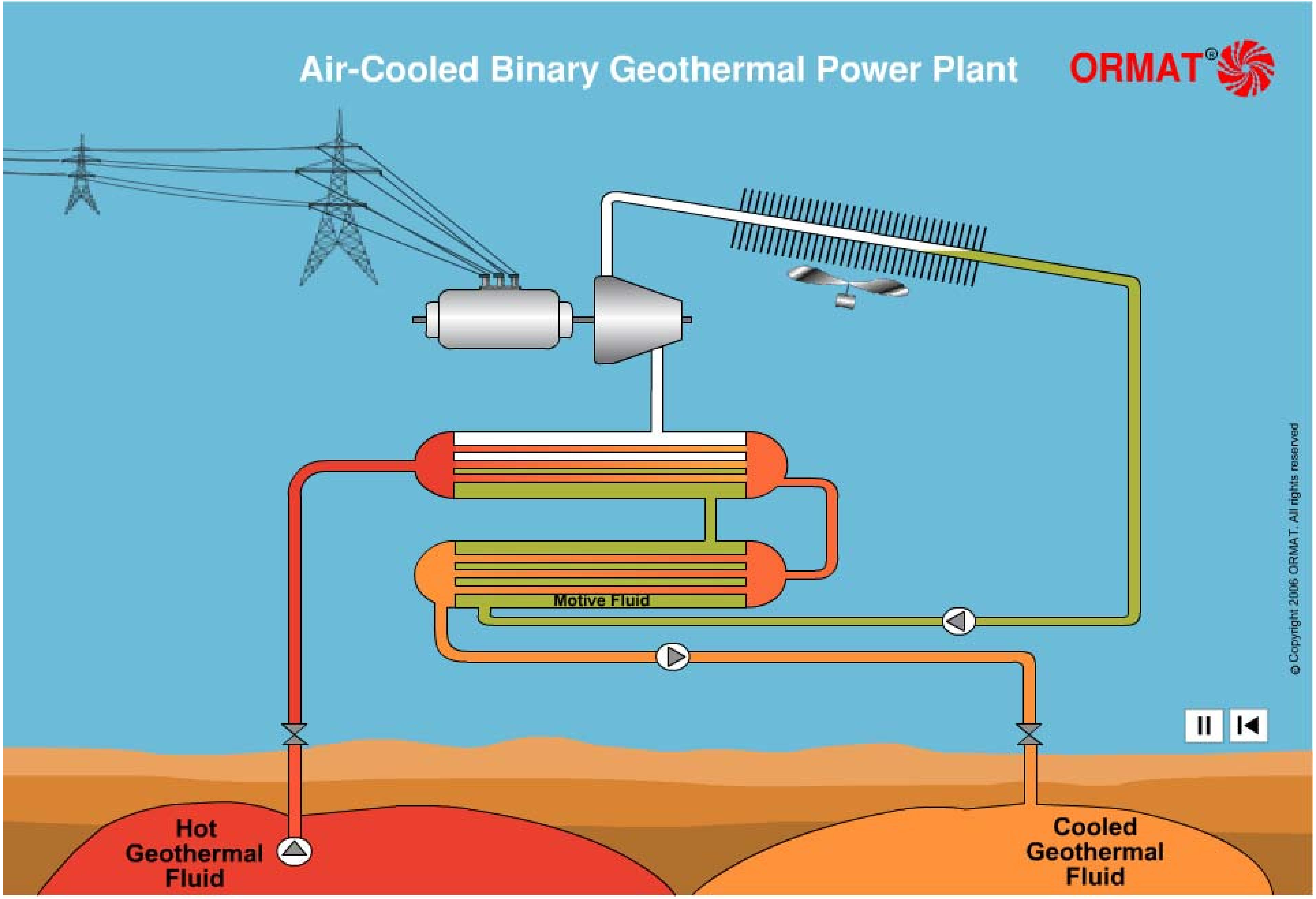
Air-Cooled Binary Geothermal Power Plant
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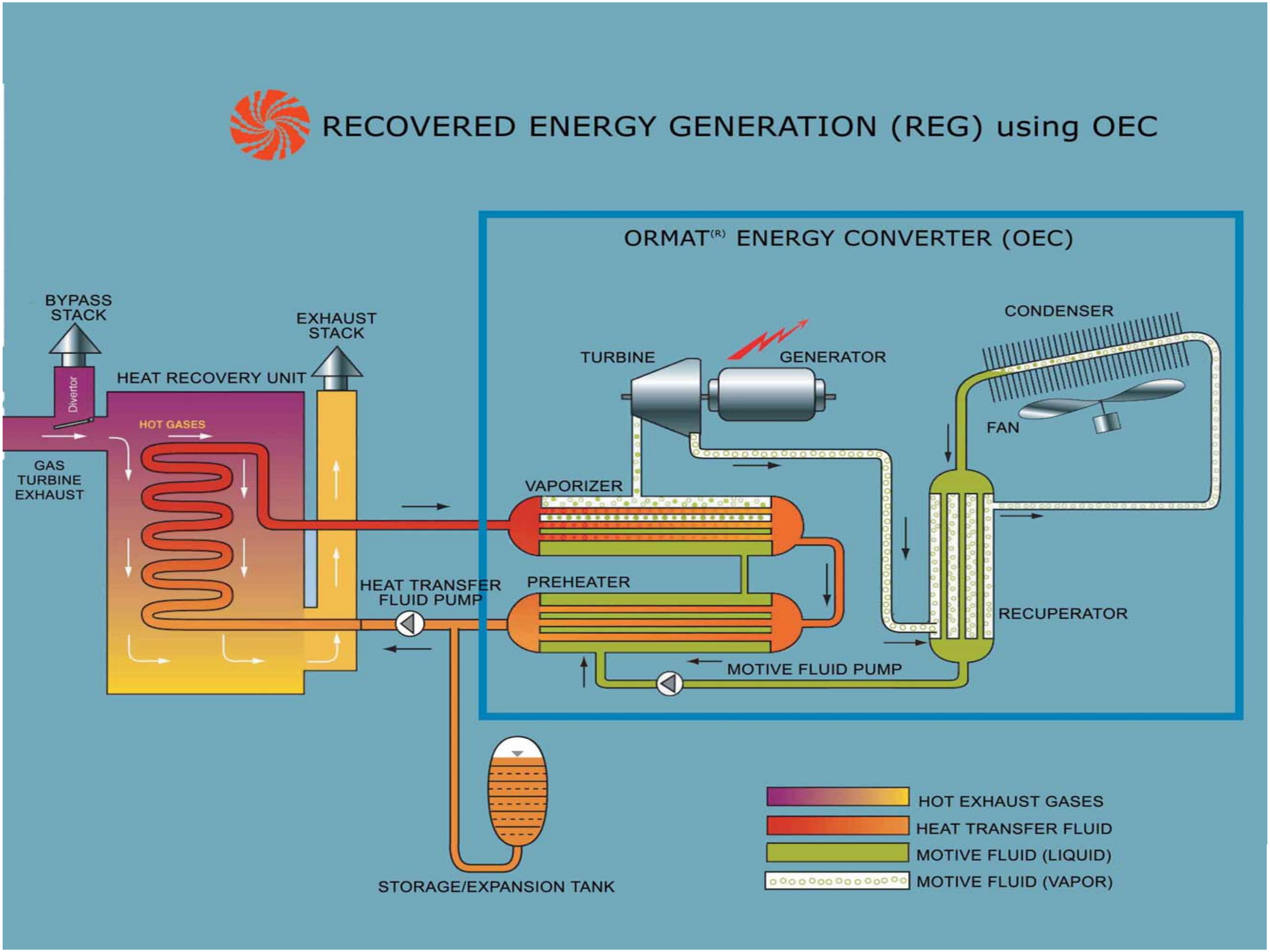
Motive Fluid
Hot Geothermal Fluid
Cooled Geothermal Fluid


RECOVERED ENERGY GENERATION (REG) using OEC
ORMAT(R) ENERGY CONVERTER (OEC)
BYPASS STACK
EXHAUST STACK
HEAT RECOVERY UNIT
Divertor
HOT GASES
GAS TURBINE EXHAUST
TURBINE
GENERATOR
CONDENSER
FAN
VAPORIZER
PREHEATER
HEAT TRANSFER FLUID PUMP
RECUPERATOR
MOTIVE FLUID PUMP
STORAGE/EXPANSION TANK
HOT EXHAUST GASES
HEAT TRANSFER FLUID
MOTIVE FLUID (LIQUID)
MOTIVE FLUID (VAPOR)

One Technology / Different Applications

Turbine – Generator set & Air-cooled Condensers

Heat Exchangers – preheater and vaporizer set

OREG 1 – REG Project at NBPL CS 7

Galena – Geothermal plant

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REG Technology Benefits

- Packaged modular system – fast on-site installation
- High turbine efficiency at low speed
  - 1800 RPM, 60 Hz, Operation
- Reliable unattended operation, no steam operators required
- Low Operation and Maintenance Cost
- Not susceptible to freezing
- Rugged design
  - Outdoor installation typical (even in severe climates)

REG Technology Benefits

- Accommodating to fluctuating loads
- Field proven technology
- Environmentally friendly
  - No fuel consumption
  - Zero emissions
  - No water consumption
  - Qualifies as "Green Power" in many states and environmentally preferred power in some provinces
- Black start and island mode capability
- Insignificant impact on gas turbine compressor operation

REG Technology Benefits

- Nine states -Connecticut, Hawaii, Maine, Nevada, Pennsylvania, Colorado, North and South Dakota, and Washington include waste heat recovery as an eligible renewable resource.

- Because no additional fuel is combusted and Recovered Energy Generation allows for distributed generation (DG), it offers a number of environmental and economic benefits, which include:
  - Reduced emissions of all air pollutants
  - Fewer greenhouse gas emissions, such as carbon dioxide (CO2)
  - Fewer criteria air pollutants, including nitrogen oxides (NOX) and sulfur dioxide (SO2)

- Reduced grid congestion and avoided distribution losses
- Increased reliability and power quality
- Lower operating costs

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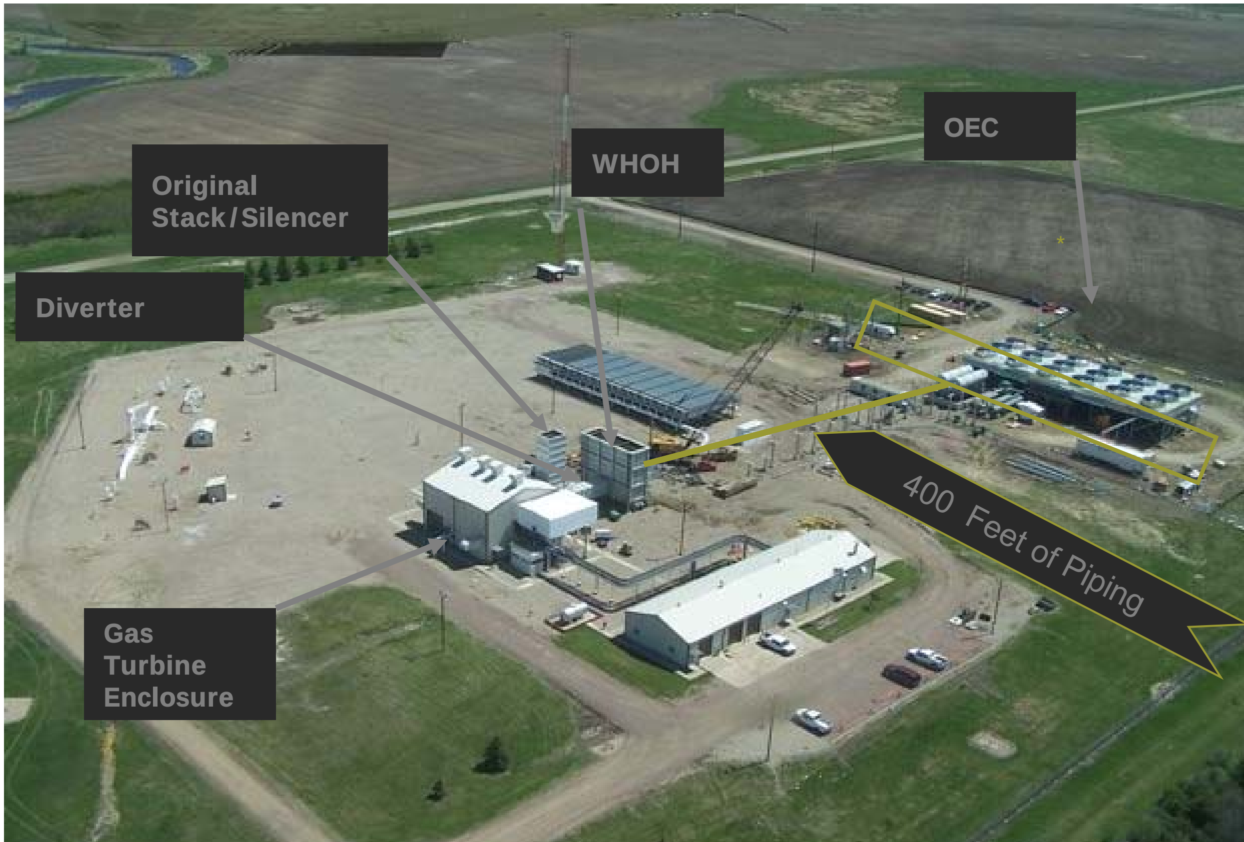
Technology - Flexible installation

- The REG system allows for some large distances between the location of the heat exchanger (Waste Heat Oil Heater) and the OEC.



Technology - Minimum interruption

Process Interruption less than 48 hours (Compressor Station)

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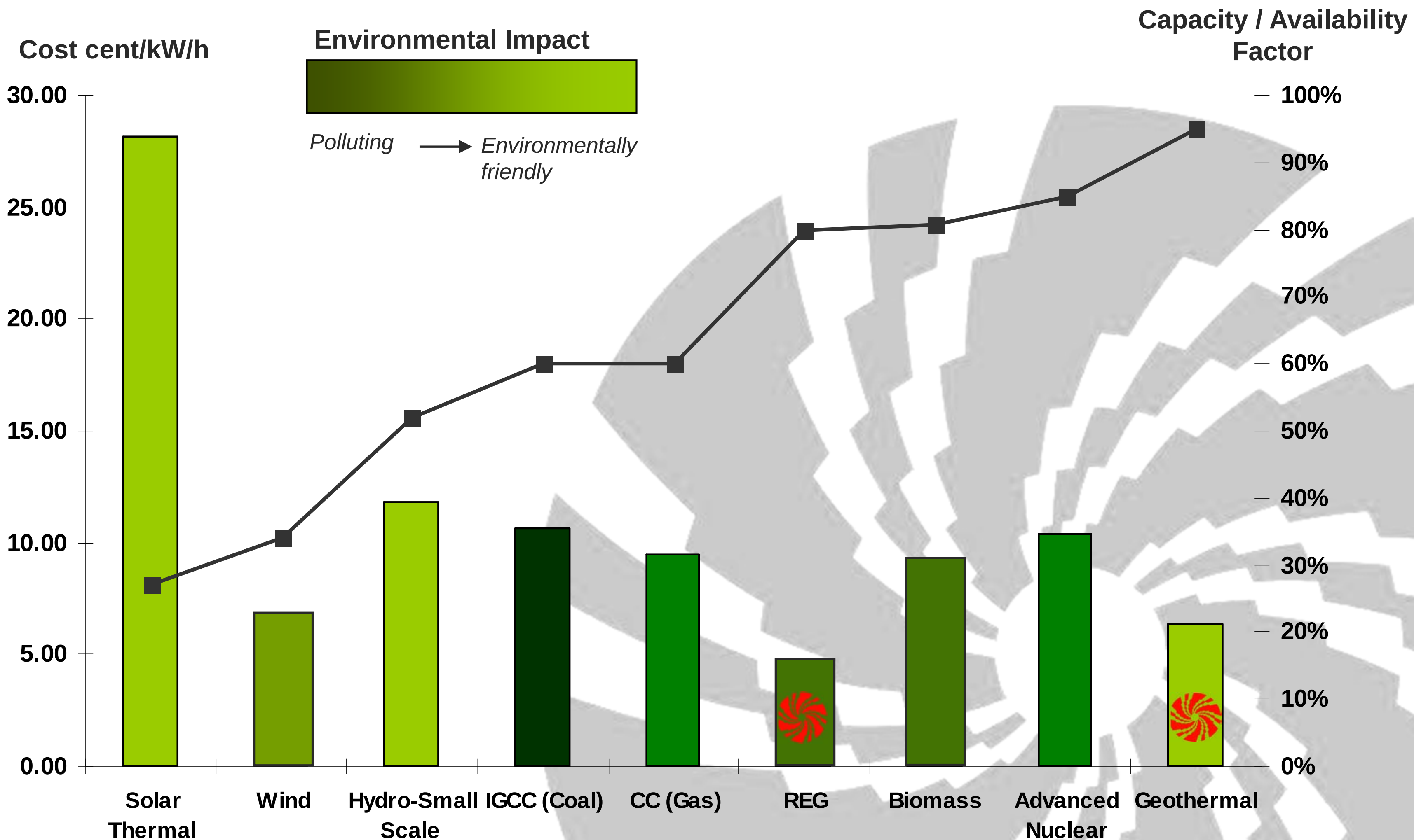
Resource Potential

- Louisiana can and should benefit from waste water and waste heat!
- Geothermal =?
  - Additional feasibility analysis needed
- Recovered Energy Generation = 118.4 MWe
  - Confirmed on existing pipelines and processing plants

Geothermal & Recovered Energy



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Source: Competitive costs of California central station electricity generation technologies, California Energy Commission December 2007, and Ormat.

Summary

- Ormat is developing world class geothermal power plants
- Ormat is committed to successfully implementing innovative technologies
- Geothermal power projects are complicated:
  - Significant risk-capital required for resource development
  - Requires high level of expertise in both development and O&M
- More should be done to incentivize renewables in some emerging markets

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Summary

- Pioneering low temperature geothermal for 30 years
- Co-produced water, a generous resource
  - Challenge: Long-term reliability
- RMOTC OEC Experience gained in oil field production
- Geothermal/REG – Offer domestic baseload renewable solutions to climate change and legislative obligations

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