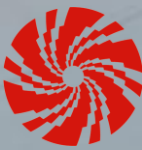


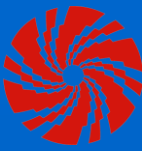
September 25<sup>th</sup>, 2007

**ORMAT**<sup>®</sup>



# Recovered Energy Generation (REG) for the Gas Pipeline Industry

**Presenter: Dan Nadav**



Kerrobert, Saskatchewan, Jan 2007



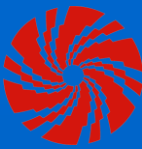


- Recovered Energy Generation using organic Rankine cycle (ORC) technology is capable to capture relative low temperature exhausts in order to generate electricity with no additional emission.
- Given electricity price environment at around 5 cents / kWh, most REG projects are cost effective and economically viable.
- Every MWh generated by a REG unit will help saving carbon-emission equivalent to approximately one ton of CO<sub>2</sub>

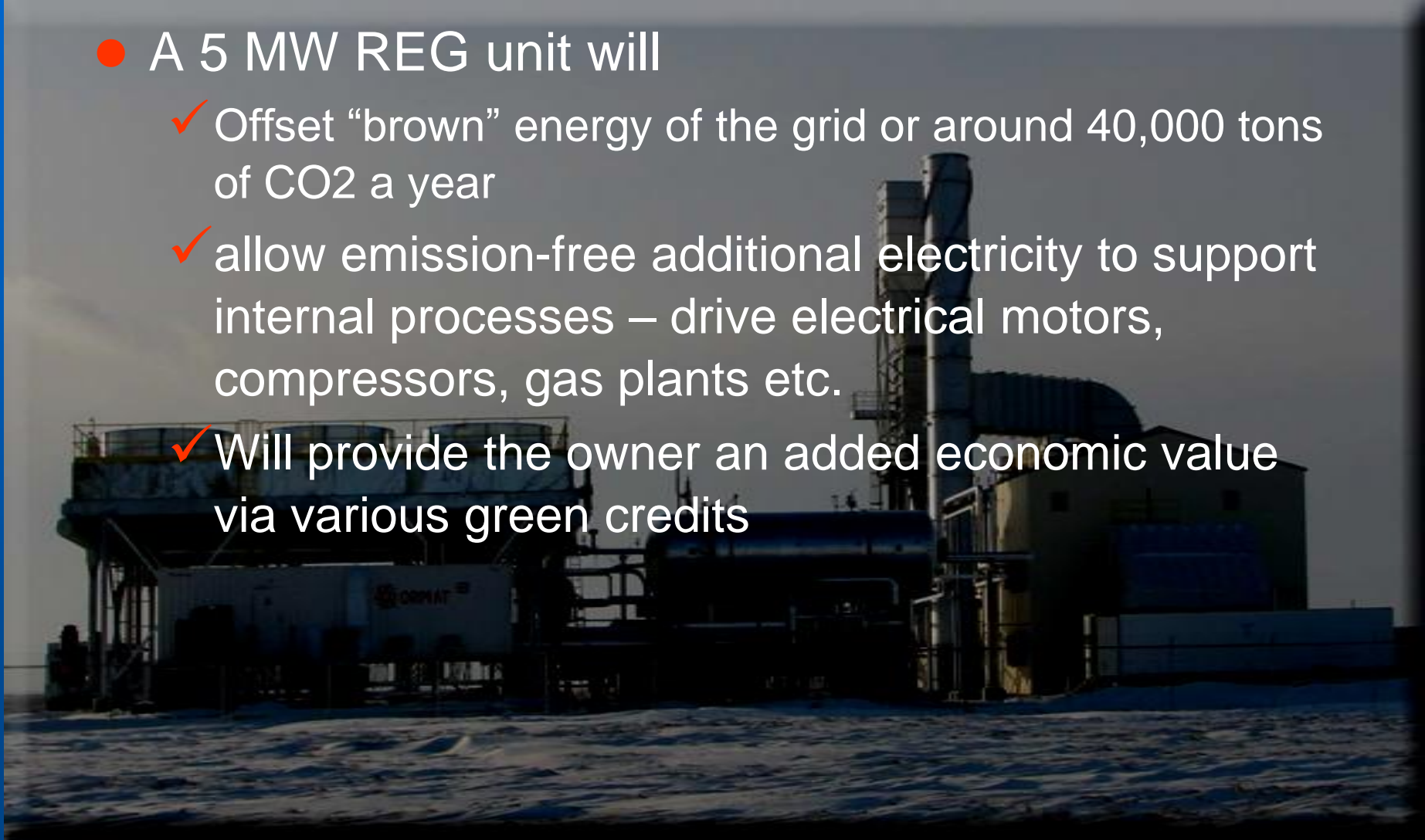


# Executive Summary

ORMAT®



- A 5 MW REG unit will
  - ✓ Offset “brown” energy of the grid or around 40,000 tons of CO2 a year
  - ✓ allow emission-free additional electricity to support internal processes – drive electrical motors, compressors, gas plants etc.
  - ✓ Will provide the owner an added economic value via various green credits



ORMAT®

GREEN ENERGY you can depend on

# Table of Contents

- Company Profile
- The REG Technology
- ORC Benefits
- Ormat's Experience
- Environmental and Other Soft Benefits

# Company Profile

## Main Areas of Activities

Reliable Distributed Power



Geothermal Power Plants



Resource Recovery: Biomass



Heat Recovery - Pipelines



Industrial Waste Heat Recovery

# Company Profile

- Focus on Renewable and Sustainable Energy since 1965
- Listed on the New York Stock Exchange (ORA)
  - ✓ The only pure play geothermal/REG company listed (NYSE)
- Vertically integrated
  - ✓ **Design, Engineering, Manufacturing, Supply, Installation & Operation**
- Flexible Business Model
  - ✓ **Equipment only**
  - ✓ **Turnkey (EPC) power plants supply**
  - ✓ **Electricity sales under PPA**
  - ✓ **Project financing**

# Ormat's Experience

## Neptune Gas Processing Plant

- Heat source - two Solar Mars 100 Gas Turbines
- REG application – 4.6 MW
- Allows island-mode operation
- Historical availability factor near 100%
- O&M performed by the plant operating team
- 24/7 monitoring using Ormat's remote monitoring software package





# Ormat's Experience

## Northern Border Pipeline

- Heat source – 4 RR RB211 Gas Turbines
- Owned and operated by Ormat
- Capacity: 6.5 MW x 4 (locations) = 26 MW (total)
- Technology advances
  - ✓ Automated diverter
  - ✓ Remote operation from main and backup locations
  - ✓ Minimum impact on day to day station operation



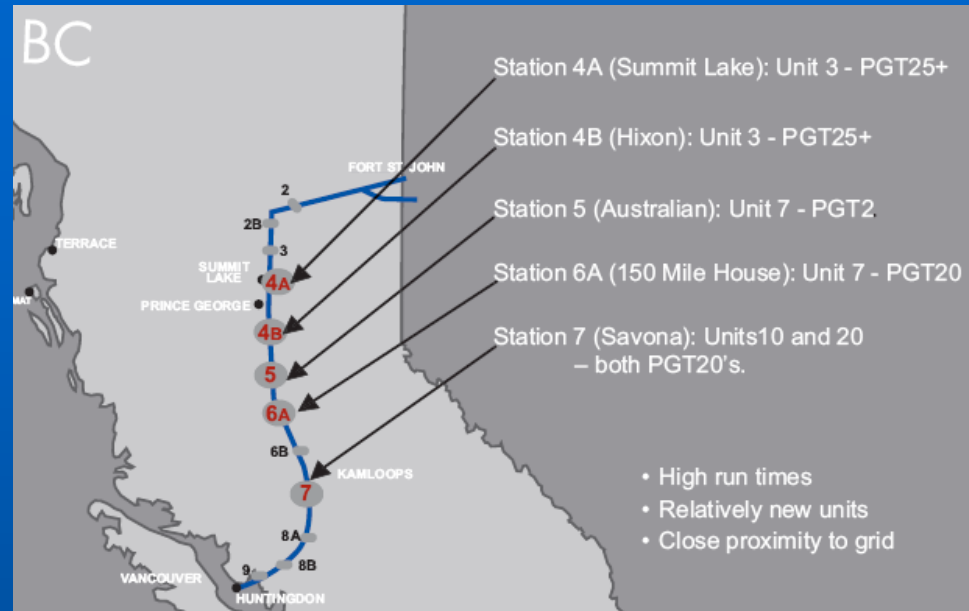
# Ormat's Experience – The Alliance Pipeline

- Heat source – one 33,000 HP General Electric LM2500 Gas Turbine
- The Kerrobert Recovered Energy Generation Power Plant is owned and operated by NRGreen Power Limited Partnership
- Capacity: 6.5 MW
- The electricity generated by the power plant is sold to SaskPower
- Recently NRGreen has signed contracts for three additional REG projects already under construction at its compressor stations in Saskatchewan



# Ormat's Experience – The Duke Energy Pipeline

- Developer: EnPower, an independent power producer (IPP) owned by Pristine Power and Enmax
- An agreement to develop five 5-MW REG projects on five compressor stations at the T-south mainline
- Currently two projects (Station 6A 150 Mile House and Savona) are under construction based on a long term PPA with BC Hydro as part of the utility's "Clean Energy Program"



# Ormat's Experience – Kinder Morgan's Trailblazer Pipeline (the Peetz Compressor Station)

- Heat source – two 12,000 Solar Mars Gas Turbines
- Owned and operated by Ormat
- Capacity: 4 MW
- Generates Green Credits qualified under the Colorado RPS





# Heidelberg Cement in Lengfurt Germany – Project Specifics

- EPC
  - ✓ equipment delivery time – 25 weeks
  - ✓ erection time – 3 weeks
- Power saving
  - ✓ The generated power is equivalent to about 12% of the plant's electricity demand
- System performance
  - ✓ Availability factor – over 98% (average for the first 5 years)
  - ✓ O&M costs - \$6,800/year over the first 5 years of operation (equivalent to less than \$0.001/kWh)
- Recently, Ormat has completed a 5.5 MW REG project with UltraTech, India's largest cement company



# The Environmental Impact

- One Megawatt of REG installed assuming around 95% availability will save:
  - ✓ 8,666 tons of CO<sub>2</sub>
  - ✓ 36.6 tons of SO<sub>2</sub>
  - ✓ 12.5 tons of NO<sub>x</sub>
- Offsetting a coal-fired power plant at 38% efficiency \*

\* Based on the International Energy Agency (IEA)

# the PR impact

- WSJ – Friday September 22
- “More than 30 states.... has already passed laws related to global warming...federal legislation is likely within the next few years ”
- The risk to big emitters of carbon dioxide is that tightening regulations might require to cut back or buy carbon “credits”.

## Use New Tools To Understand Carbon's Cost

**C**OULD GLOBAL WARMING burn your portfolio? As climate change emerges as a hot topic in corporate boardrooms and on the political stage, investors are scrambling to figure out how the reams of newly available data about companies' "carbon footprints" and other environmental risks should influence their investment decisions.

Several tools may help investors sort out the future winners from the losers. On Monday, former President Bill Clinton will release the results of the 2007 Carbon Disclosure Project, a survey requesting data from 2,400 public companies on how they manage climate-change risk.

The report—accompanied by online materials cataloging hundreds of companies' self-reported carbon emissions and energy costs—was conducted for more than 300 institutional investors, including Goldman Sachs Group Inc. and Calpers, the California pension fund.

Advocates for this kind of disclosure argue that climate change is a



### Smoking Out Good Investments

Go to [cdproject.net](http://cdproject.net) for data on hundreds of public firms' carbon emissions and energy costs.

[corporateregister.com](http://corporateregister.com) contains corporate "sustainability reports" discussing environmental and social issues.

Go to [sec.gov](http://sec.gov) for corporate filings, using a company's ticker symbol and keywords like "climate change."

bottom-line risk that investors should factor in. It's "no different from litigation risk or hazardous-waste risks or anything else disclosed in normal financial filings," says Mindy Lubber of Ceres, an organization focused on corporate governance and sustainability.

Climate-change regulations are already affecting business. More than 30 states including California and Illinois have already passed laws related to global warming, and business

leaders and policy makers say additional federal legislation is likely within the next few years.

Sparks, New York/News.com

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# the PR impact

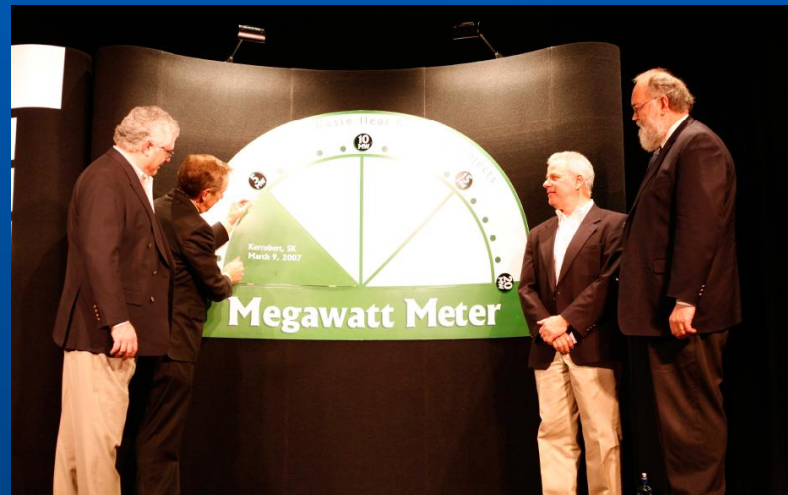
- The current PR landscape provides a perfect opportunity for large emitters and other energy companies to leverage on green energy projects:
  - ✓ Environmentally-conscious public (and investors)
  - ✓ Hungry-for-news Media
  - ✓ Proactive regulators/legislators



# MSNBC – covering the OREG1 (South Dakota) REG plant dedication ceremony



# Alliance – the Kerrobert dedication ceremony with SK premier and minister of energy



**Thank you**

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