Geothermal in Montana

Where Are We Today?

Kathi Montgomery
Geothermal in Montana
Department of Environmental Quality (DEQ)

• State Energy Office
  – Energy Conservation
  – Renewable Energy
Geothermal Resources 2003
Geothermal in Montana

- Historic Development
  - Social
  - Soaking
  - Heat
  - Health
Geothermal in Montana

• Direct Uses
  – Spa and Resort Development
  – Greenhouses
  – Aquaculture
  – District Heating
  – Ground Source Heat Pumps
Geothermal in Montana

- **Electric Generation**
  - **Large Scale**
    - >20 mw
    - Binary technology
  - **Distributed or Self Generation**
    - 250 kw to 3 mw
Generation Schematic

Binary System – 2 Fluids

- Geothermal Reservoir
- Heat Exchanger
- Peaking/Backup Unit
- User Application
- From Production Well
- To Injection Well

- Red: Geothermal Water
- Orange: Working Fluid
Geothermal in Montana

- **Oil and Gas Fields**
  - Co-Produced Fluids
    - Electricity used on-site or PPA
  - Modular Equipment
    - 50 kW – 250 kW
- **ND Project**
  - E of Baker
  - Will Gosnold
Rocky Mountain Oilfield Testing Center

http://www.rmotc.doe.gov/
Green Machine Specs

• 50 kW
  – Min temp 200F
  – Flow rate 250 gpm
  – Condenses 60F
  – Nominal DT 140F
Geothermal in Montana

• EGS
  – Enhanced or Engineered Geothermal Systems
    • Hot Dry Rock
    • Recompleted oil and gas wells, mine shafts
  – Butte Project
    • Leases secured
Geothermal in Montana

• What’s Next?
  – Site Assessments
  – Feasibility Studies
  – Demonstration Sites
  – Assist Developers
  – Constraints
Resources

- www.geothermal.mt.gov
- http://www.mbbmg.mtech.edu/
- http://smu.edu/geothermal/
- http://www1.eere.energy.gov/geothermal/
- http://www.rmotic.doe.gov/