

Geothermal in Montana



Where Are We Today?

Kathi Montgomery

Geothermal in Montana

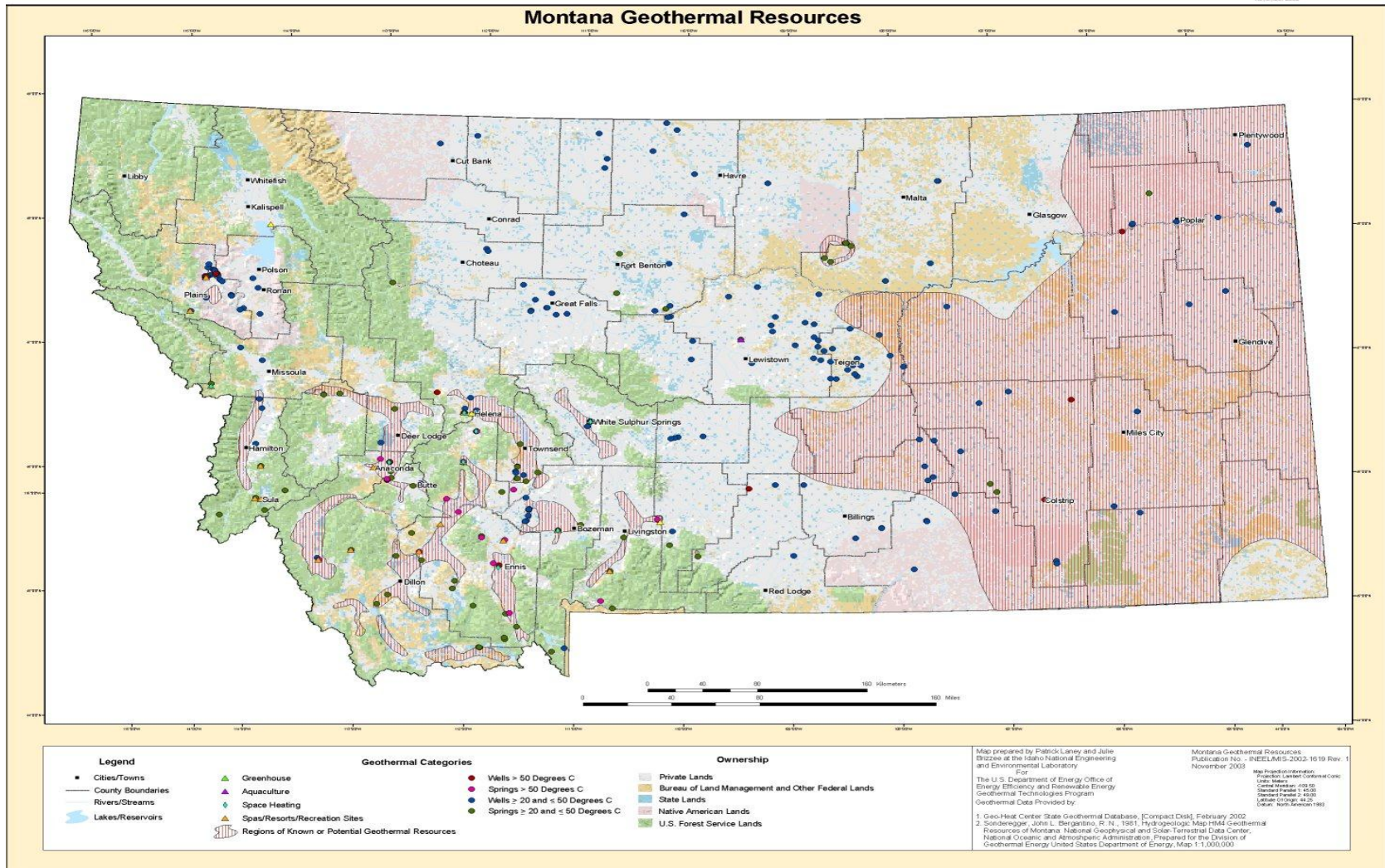
Department of Environmental Quality (DEQ)

- State Energy Office
 - Energy Conservation
 - Renewable Energy



Geothermal Resources 2003

Montana Geothermal Resources
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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

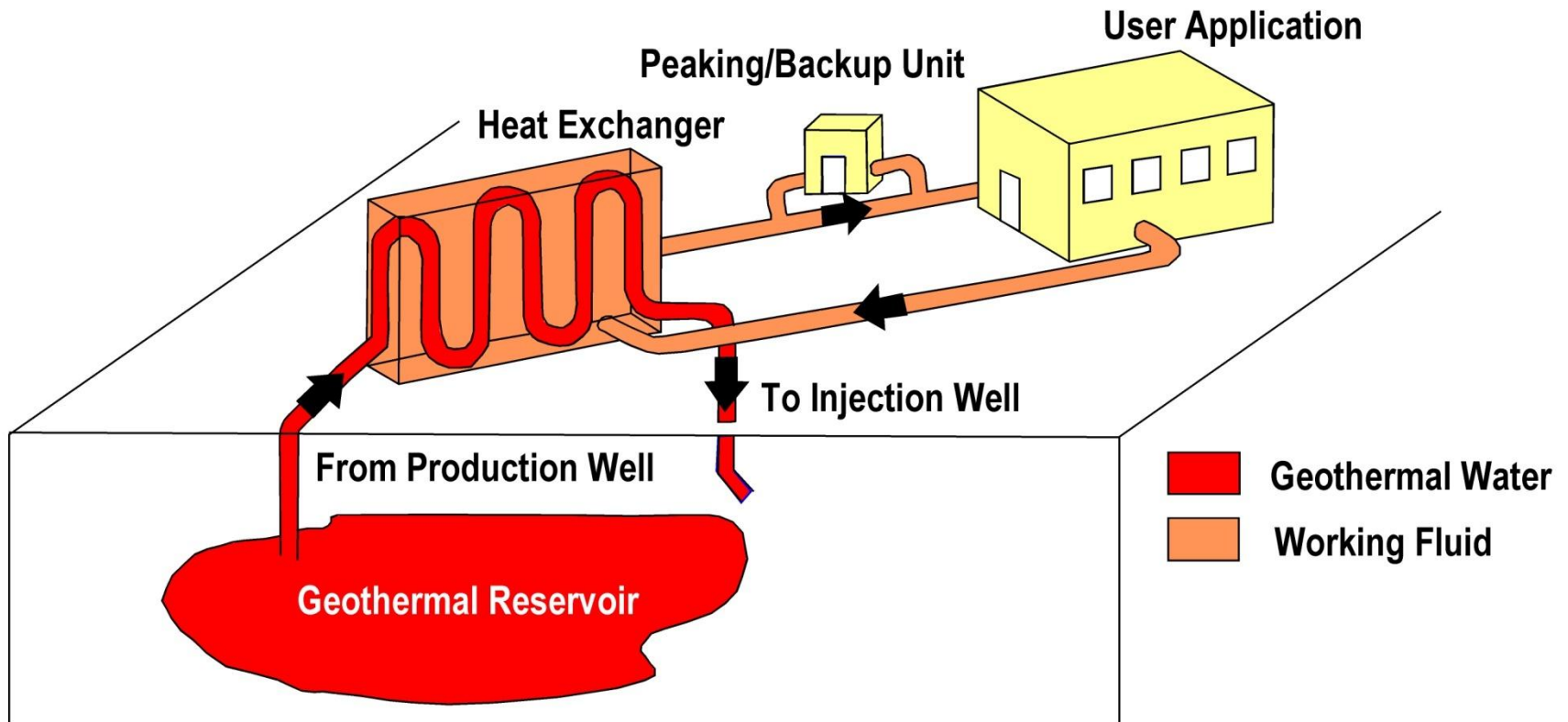


- Distributed or Self Generation

- 250 kw to 3 mw

Generation Schematic

Binary System – 2 Fluids



Geothermal 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.mbmng.mtech.edu/>
- <http://smu.edu/geothermal/>
- <http://www1.eere.energy.gov/geothermal/>
- <http://www.rmotc.doe.gov/>