



# Geothermal Opportunities in Nevada

Sponsored by

Great Basin Center for Geothermal Energy

University of Nevada, Reno

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# Update on Nevada's Geothermal Activity

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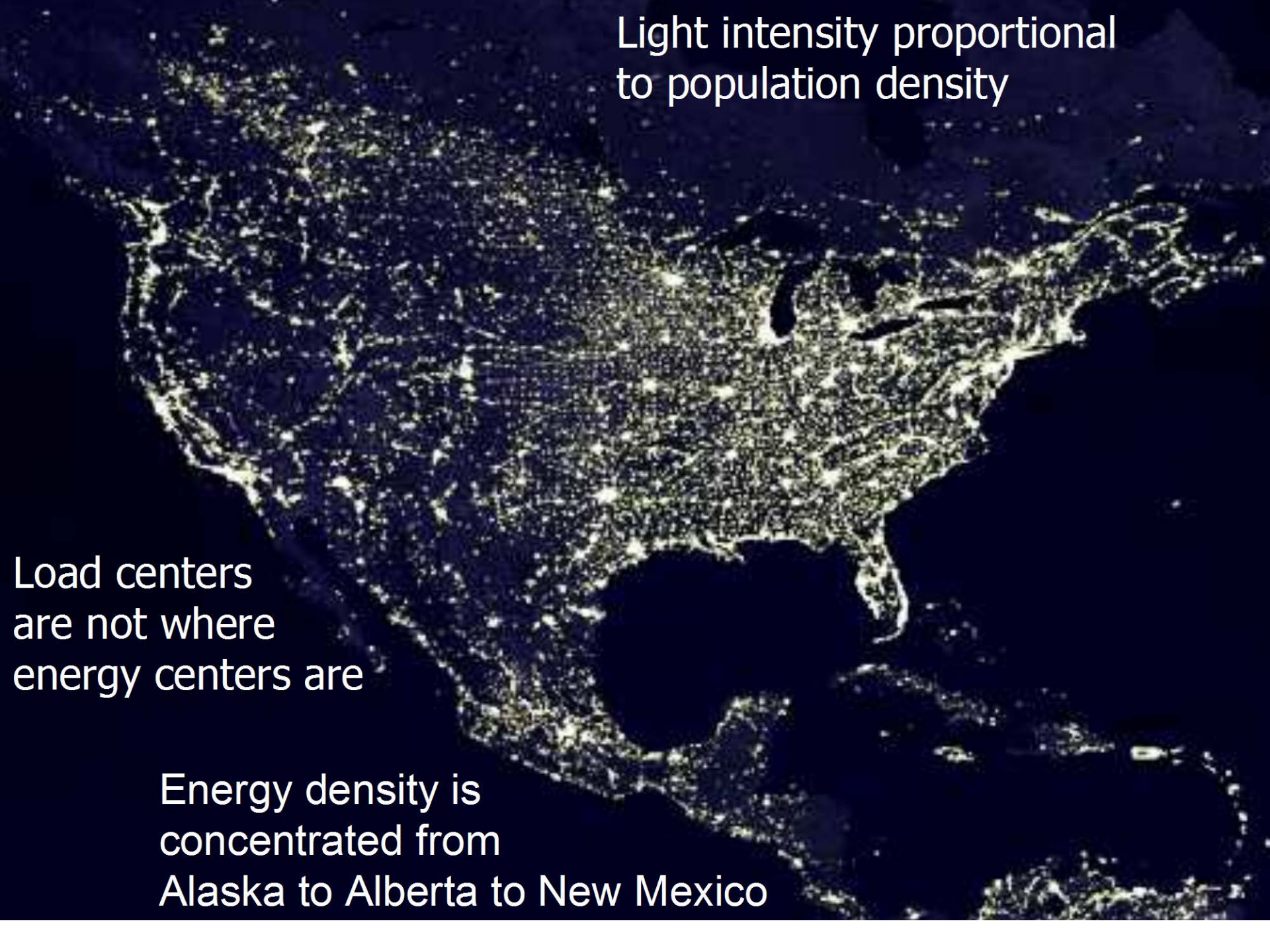
[jsnow@govmail.state.nv.us](mailto:jsnow@govmail.state.nv.us)

[www.minerals.state.nv.us](http://www.minerals.state.nv.us)

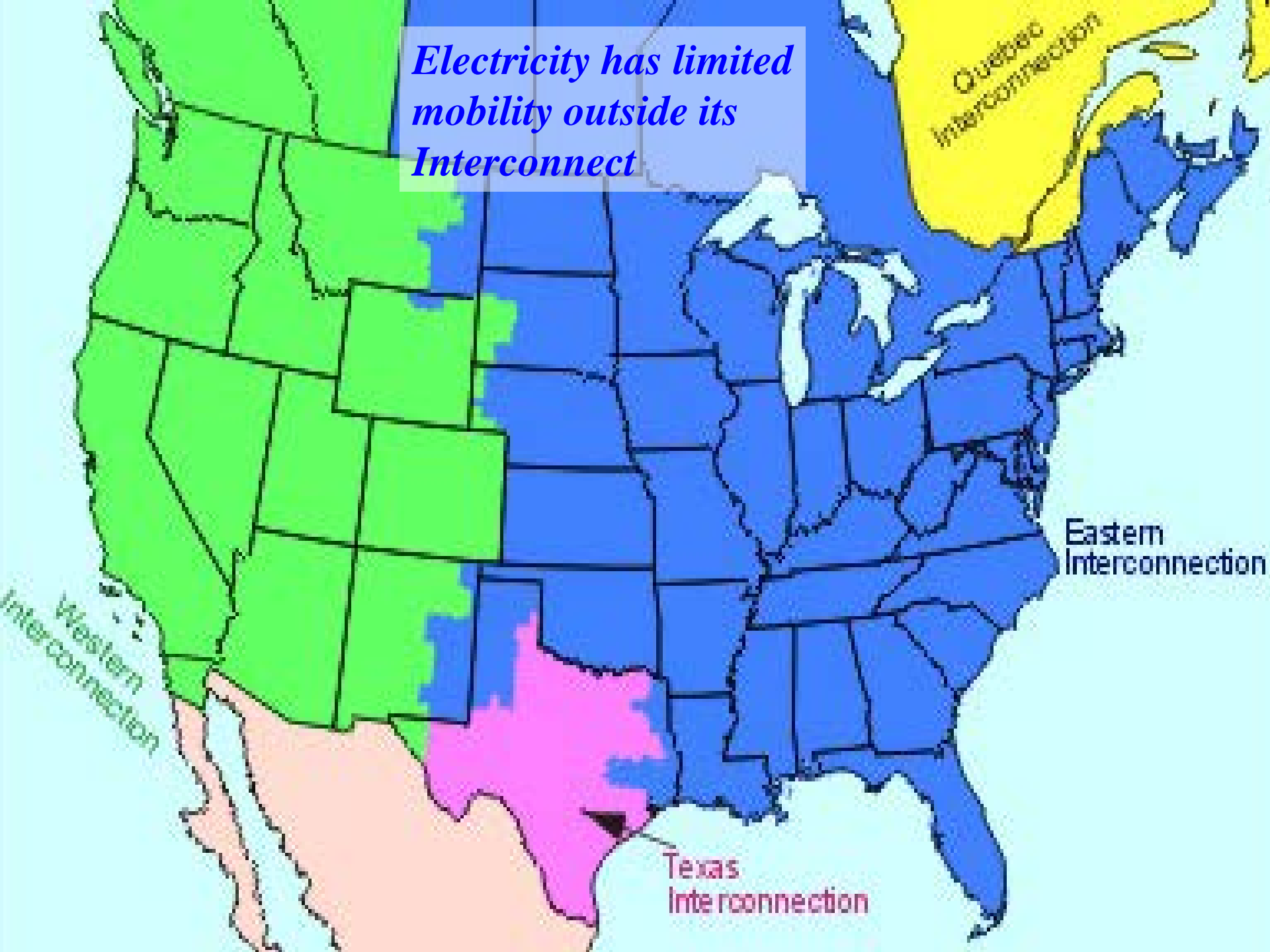
Light intensity proportional  
to population density

Load centers  
are not where  
energy centers are

Energy density is  
concentrated from  
Alaska to Alberta to New Mexico



*Electricity has limited mobility outside its Interconnect*



Quebec Interconnection

Eastern Interconnection

Texas Interconnection

Western Interconnection

# Western Transmission Main Grid System

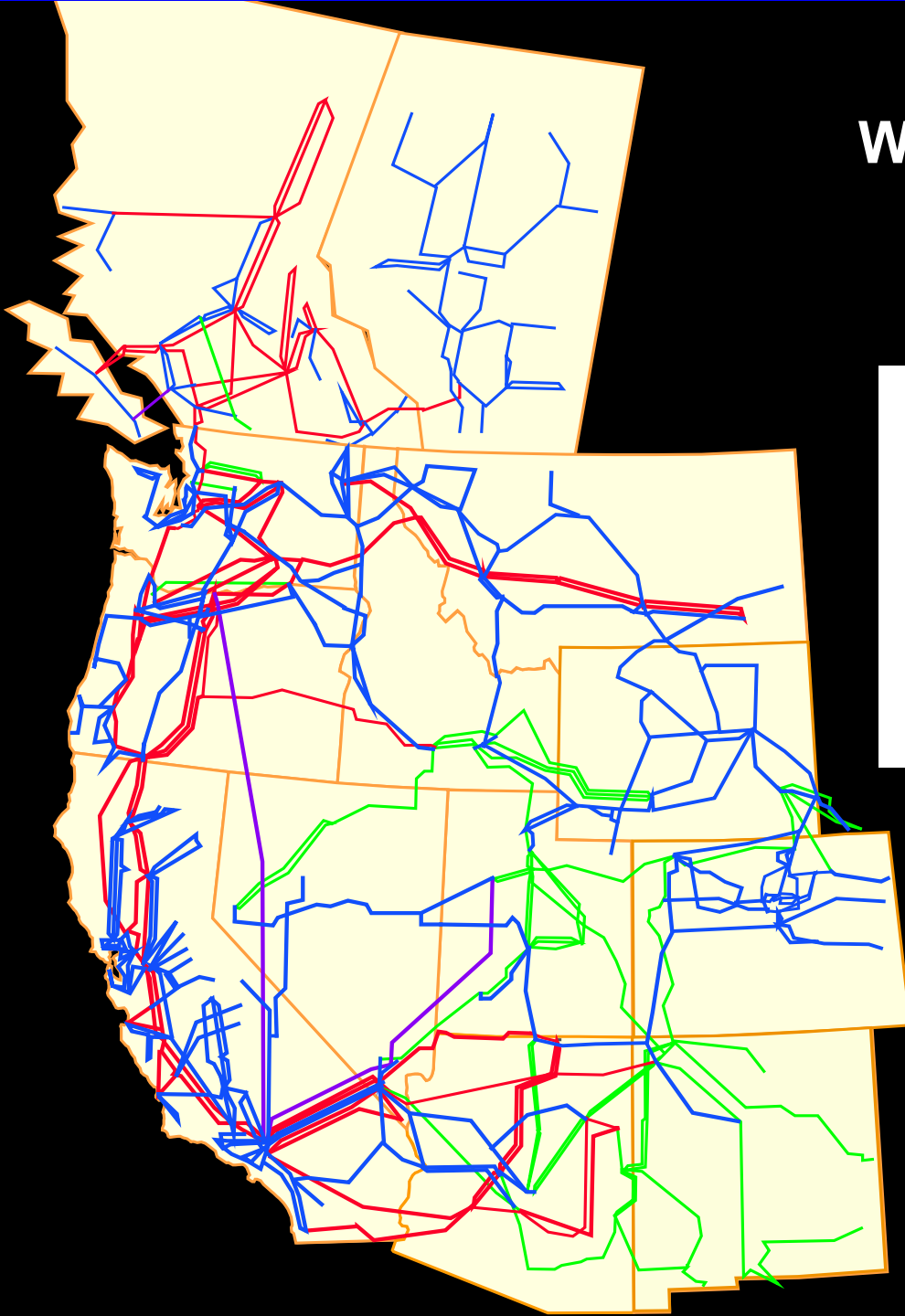
## *Transmission Voltages*

**500 kV - Red**

**345 kV - Green**

**230 kV & below - Blue**

**Energy rich areas in  
the Rocky Mountains  
are not well-connected  
to the coastal demand  
areas and are isolated  
from the rest of America**



# *Nevada Geothermal Power Plants 2001*

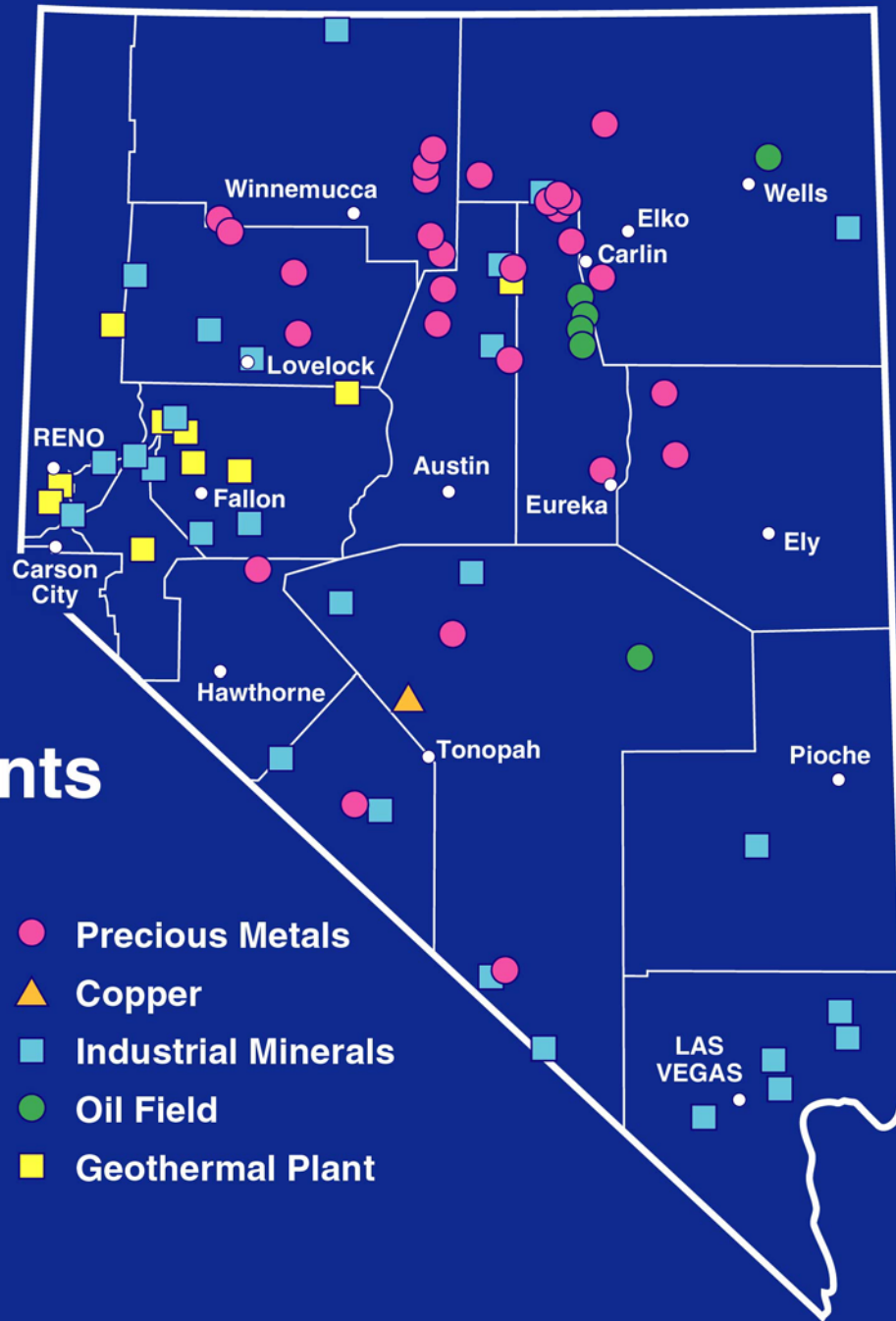
<b>Plant Name (year on-line)</b>	<b>Production Capacity<sup>1</sup> (MW)</b>	<b>Operator</b>
Beowawe (1985)	16.7 (16.6)	Beowawe Power, LLC HC 66, Unit 1, Box 16, Beowawe, NV 89821
Bradys Hot Springs (1992)	21.1 (26.4)	Brady Power Partners P.O. Box 649, Fernley, NV 89408
Desert Peak (1985)	9.9 (11.0)	Western States Geothermal Co. c/o Brady Power Partners P.O. Box 649, Fernley, NV 89408
Dixie Valley <sup>2</sup> (1968)	66.0 (62.0)	Caithness Dixie Valley, LLC 9790 Gateway Dr., Ste. 220, Reno, NV 89511
Empire (1987)	4.6 (4.8)	Empire Energy, LLC P.O. Box 40, Empire, NV 89405
Soda Lake No. 1 (1987) & Soda Lake No. 2 (1991)	16.6 (26.1)	Constellation Operating Services 5500 Soda Lake Rd., Fallon, NV 89406
Steamboat I, I-A (1986) & Steamboat II, III (1992)	53.0 (58.7)	S.B. Geo, Inc. P.O. Box 18199, 1010 Power Plant Dr., Reno, NV 89511
Stillwater (1989)	13.0 (21.0)	Constellation Operating Services 5500 Soda Lake Rd., Fallon, NV 89406
Wabuska (1964)	1.2 (1.45)	Homestretch Geothermal 10 Julian Lane Yerrington, NV 89447
Yankee Caithness (1988)	14.44 (14.44)	Yankee Caithness, J.V.I.P. 9790 Gateway Dr., Ste. 220, Reno, NV 89511
<b>TOTAL</b>	<b>216.5 (242.5)</b>	

1. Production capacity from currently developed geothermal resources (equipment nameplate capacity in parentheses).

Sources: Plant operators, Nevada Division of Minerals, and NBMG files.

2. Gross output of the Dixie Valley plant occasionally exceeds 66 MW.

# Major Mines, Oil Fields, and Geothermal Plants



- Precious Metals
- ▲ Copper
- Industrial Minerals
- Oil Field
- Geothermal Plant

# Beowawe

- Went on line in 1985, 16.7 MW Flash Plant
- 3 prod wells (avg depth 8256', temp 290 F)
- 1 injection wells (avg depth 5927', temp 206 F)
- Wells equipped with fiber optic monitoring



# Brady Hot Springs

- Went on line in 1992, 21.1 MW Dual Flash
- 6 prod wells (avg depth 3057', temp 312 F)
- 8 injection wells (avg depth 622', temp 238 F)
- Intertie Transmission line with Desert Peak
- Shares resource with dehydration plant
- 10 Well Continuous Core Program
- Injection Strategy into Section 25
- Purchased by Ormat in 2001
- Expansion project planned for 2002

# Core From Brady



# Desert Peak

- Went on line in 1985, 9.9 MW Dual Flash
- 2 prod wells (avg depth 3683', temp 312 F)
- 2 injection wells (avg depth 4000', temp 198 F)
- First NV plant to lose SO<sub>4</sub> Contract
- Intertie transmission line with Brady
- Sales point is at Brady Power Plant
- Purchased by Ormat in 2001

# Dixie Valley

- Went on line in 1988, 66.0 MW Dual Flash
- 7 prod wells (avg depth 9261', temp 340 F)
- 10 injection wells (avg depth 7809', temp 230 F)
- Nevada's Largest Geothermal Power Plant
- Power is transmitted to CA via private T-line
- Pressure Augmentation program
- Silica Extraction pilot project
- Multiple collaborative scientific studies
- Purchased by Caithness in 2000

# Empire

- Went on line in 1987, 4.6 MW Binary
- 3 prod wells (avg depth 1770', temp 300 F)
- 4 injection wells (avg depth 668', temp 212 F)
- Shares resource with dehydration plant
- Added cooling tower in 1999
- Pilot tested surface discharge for wetland
- Adding 1MW binary unit via GPTW

# Soda Lake No. 1 and No. 2

- Went on line in 1987 (#1) & 1991 (#2)
- 16.6 MW Binary
- 5 prod wells (avg depth 2608', temp 350 F)
- 5 injection wells (avg depth 4501', temp 200 F)
- Submersible pump with variable drive
- New production well planned for 2002



# Steamboat 1, 1A, 2 & 3

- Went on line 1987 (1, 1A) & 1992 (2, 3)
- 53 MW Binary
- 12 prod wells (avg depth 1085', temp 315 F)
- 5 injection wells (avg depth 1880', temp 190 F)
- Submersible pump technology JV with Centerlift
- Fin Foam clean air-cooling system
- High efficiency turbine generator at 1 & 1A
- 30 MW Expansion Plant 4 planned



# Steamboat Caithness

- Went on line in 1988, 14.44 MW Dual Flash
- 3 prod wells (avg depth 2588', temp 317 F)
- 1 injection wells (avg depth 3115', temp 273 F)
- WWI surplus turbine generator set
- Coiled tubing units for scale removal
- New Production Well 24-5
- U-Boat 3-D Seismic Project via GPTW

# Stillwater

- Went on line in 1989, 13 MW Binary
- 4 prod wells (avg depth 2981', temp 295 F)
- 3 injection wells (avg depth 3435', temp 192 F)
- Experienced catastrophic well blowout in 1989
- New production well drilled in 2001
- Sale of plant is pending?
- Adjacent to Stillwater Wildlife Refuge

# Wabuska

- Went on line in 1984, 1.2 MW Binary
- 2 prod wells (avg depth 430', temp 220 F)
- Surface discharge to wetland
- Nevada's first geothermal plant
- Underwent working fluid retrofit in 1997
- Purchased in 2000 by Egbert family from the Townsend family

# New Projects

- Rye Patch Project
  - Well testing in progress
  - Plant is already constructed
  - High yielding Poly. Foam used to cure lost circulation via GPTW
- Fish Lake Valley Project
  - 3 production wells
  - Sale of project is pending

***Energy:  
A matter of Economy,  
Education and  
National Security***

