



# From Alaska to Florida

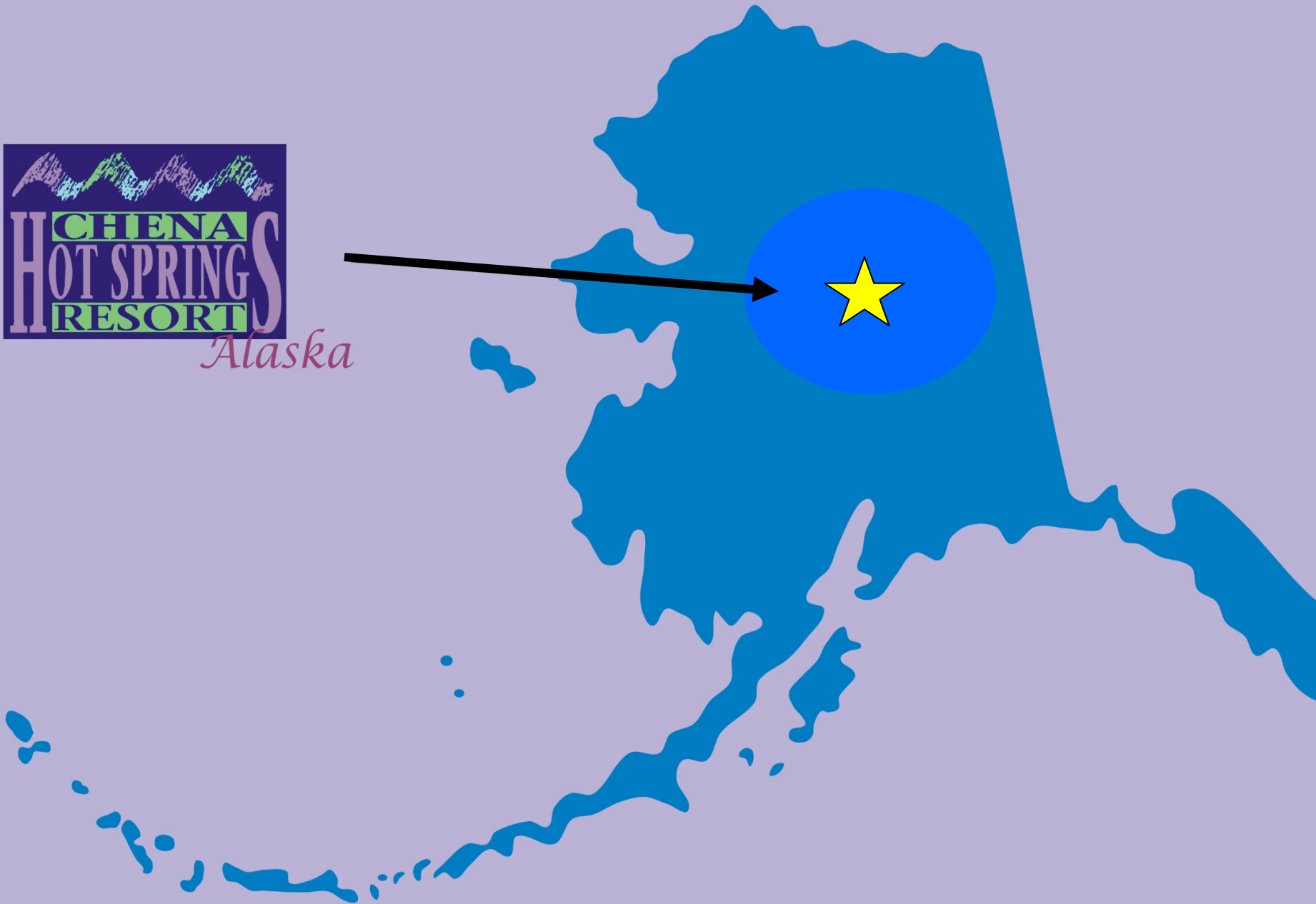
## *Finding the Heat For Community Development*

Presented by: Bernie Karl, Chena Hot Springs Resort





*Alaska*



# Sustainable Living



at Chena Hot Springs Resort

## **VISION:**

***To become a self-sustaining community in terms of energy, food, and fuel to the greatest possible extent***

# Chena Hot Springs



- **Semi remote site**
- **Electric Power 30¢/kWhr**
- **Load 180kW-380kW**

- **Average \$1000/day spent on diesel fuel in 2004**
- **\$550,000 per year in fuel costs at today's price**



# Gardens & Greenhouses











Chena  
**HOT SPRINGS**  
RESORT

*Alaska*

# Renewable Energy



at Chena Hot Springs Resort

# Energy Sources at Chena



## ENERGY NEEDS

- Electricity
- Base Load Heating
- Supplemental Heating
- Water Pumping
- Refrigeration
- Transportation
- Cooking
- Remote Power

## AVAILABLE RESOURCES

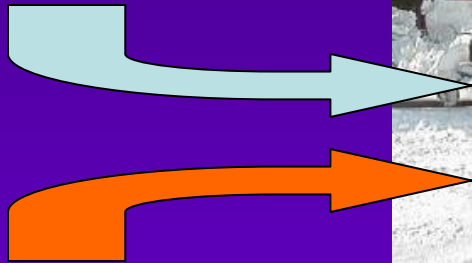
- **Geothermal**
- Hydropower
- Diesel
- Propane
- **Wind & Solar**
- **Biomass**



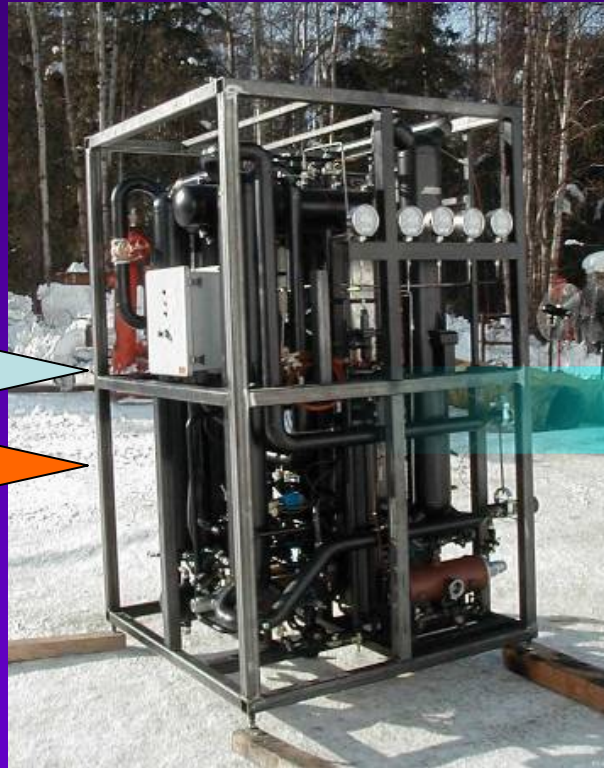
# CHENA HOT SPRINGS ABSORPTION CHILLER



Monument Creek Provides Cooling Water (~40F)



Geothermal Wells Provide Hot Water (~165F)



Approximately 15 tons of Refrigeration Required for Ice Museum (180,000 BTU per hour)



# Aurora Ice Museum



Alaska

# *District Heating*

- First geothermal well drilled in November 1998
- All buildings on property are heated geothermally using ~300gpm of 165°F water
- Estimated yearly savings of \$383,000 in heating fuel costs



***Moose Lodge, 20,000ft<sup>2</sup> heated solely with geothermal district heating system***

# Chena Power Plant



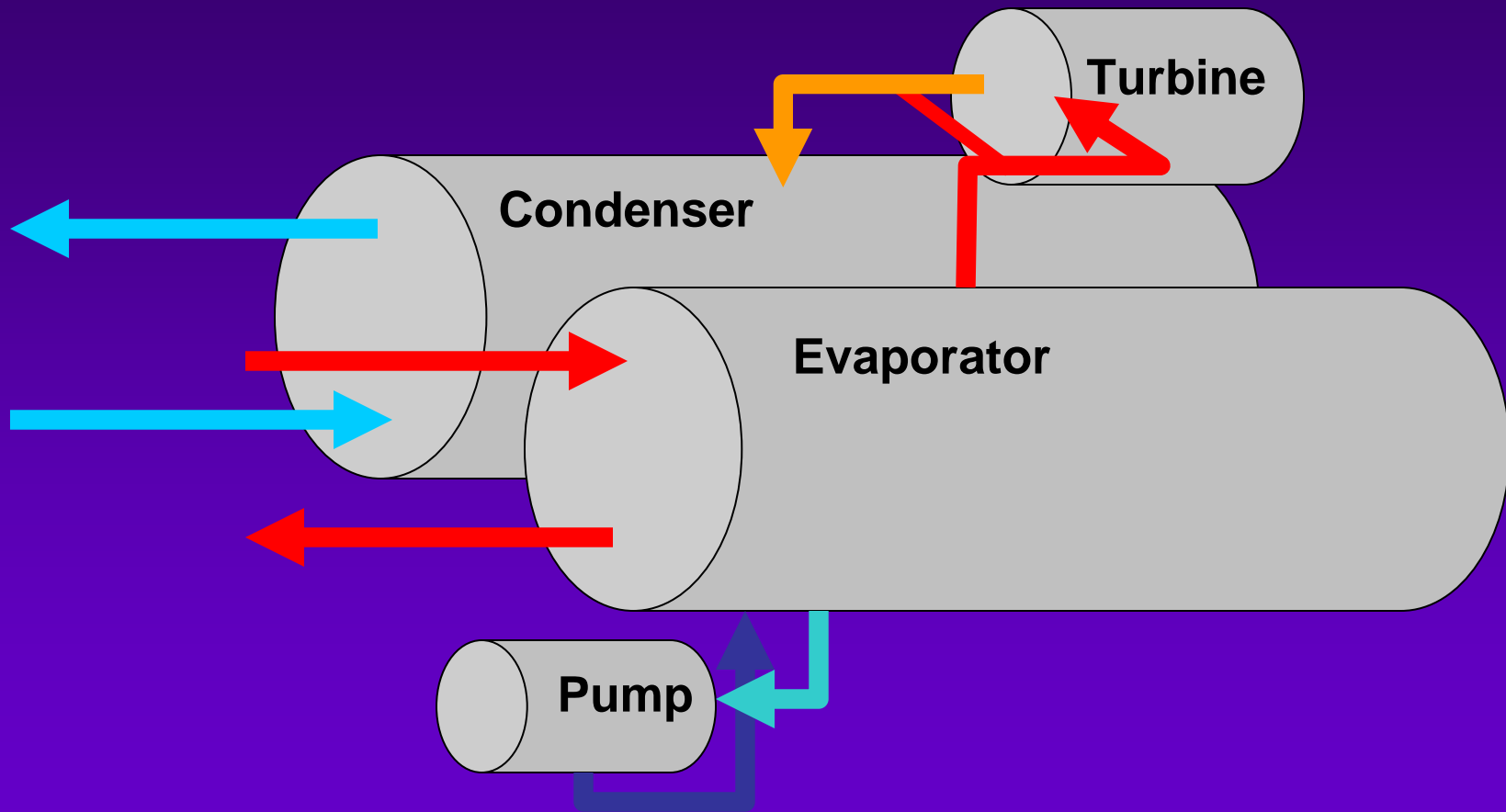
# *Chena Power Plant*



- **400 kW net; installed in 2006**
- **Uses 900 gpm of 160°F water**
- **Air and water cooled**
- **Reduced local cost of power from 30¢ to 5¢**
- **Total project cost \$2 million**
- **Projected savings \$500,000 in 2009**
- **Simple Payback 4 years**
- **Provides additional revenue opportunities**



# Chena Power Plant



# *The bottom line*



August 20<sup>th</sup> 2006 – September 23<sup>rd</sup> 2009

Hours of Operation Turbines #1 and #2	34,168
Availability	98%
Capacity	Average output 266kW
Gallons Diesel Offset	368,335
\$ Saved	\$808,298.95
Tons CO <sub>2</sub> Avoided	~ 3712

# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



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# Mobile Geothermal Power Plant



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# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant



Chena Hot Springs,  
Alaska

Reno, Nevada

Jay, Florida

3,062 Miles

4,732 Miles



# Mobile Geothermal Power Plant



# Mobile Geothermal Power Plant

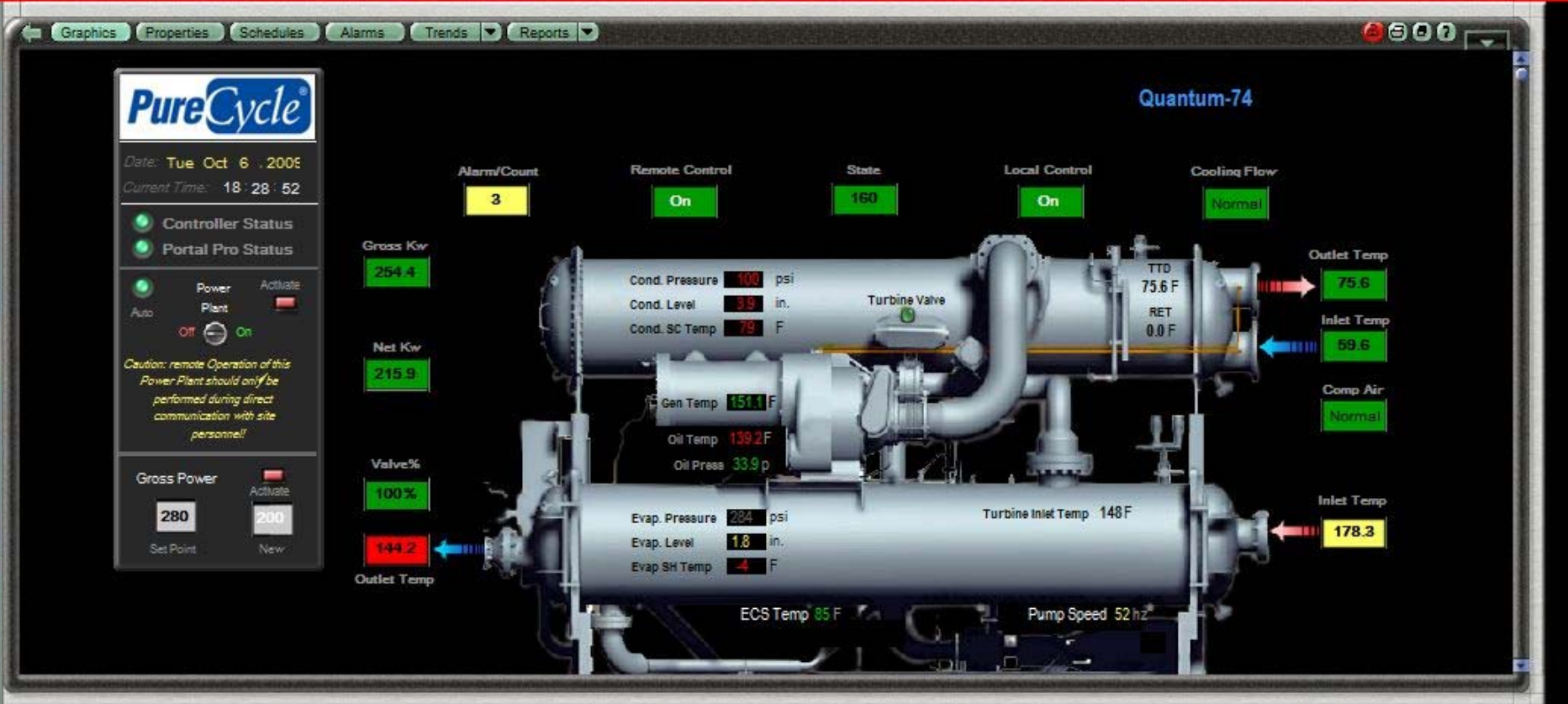




# Mobile Geothermal Power Plant



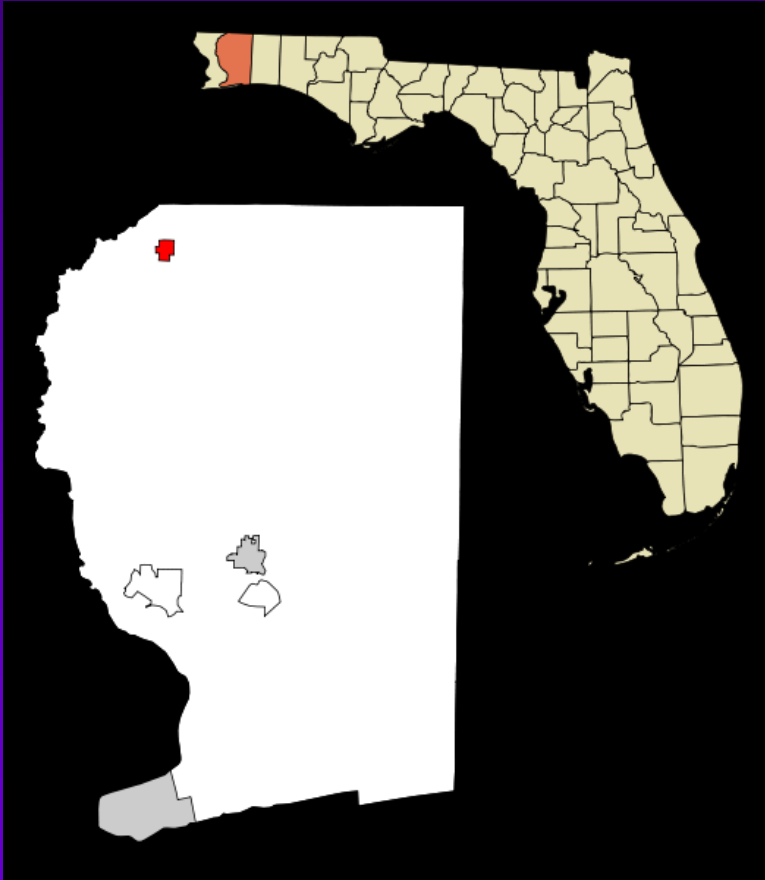
# Mobile Geothermal Power Plant



# Demonstration Site



## Quantum Resources Oil Field- Jay, Florida



- Daily production capacity is 4,500 barrels of crude per day plus 5-7 million cubic feet of natural gas.
- 120,000 barrels per day of approximately 200 °F water is extracted and re-injected into the field.
- Hot water represents ~95% of the fluid stream that returns to the central processing facility. This hot water represents an untapped energy resource.
- The temperature that we will be working with is approximately 185 F.

# *Mobile Geothermal Power Plant*



- Revolutionary Unit
- Operates on waste heat and water from existing oil and gas drill sites
- Assembled right here in Fairbanks
- First unit destined for Jay Florida
- If deployed to all existing fields in Texas alone, would generate 10,000 megawatts of power (about 10 nuclear reactors)

Sustainability: “ Meeting our needs without compromising the ability of future generations to meet their own needs ”

United Nations Commission on  
Environment and Development (UNCED)  
“Our Common Future”, 1987





## **CHENA HOT SPRINGS RESORT**

*[www.chenahotsprings.com](http://www.chenahotsprings.com)*

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**"Sustainable is Attainable"**