

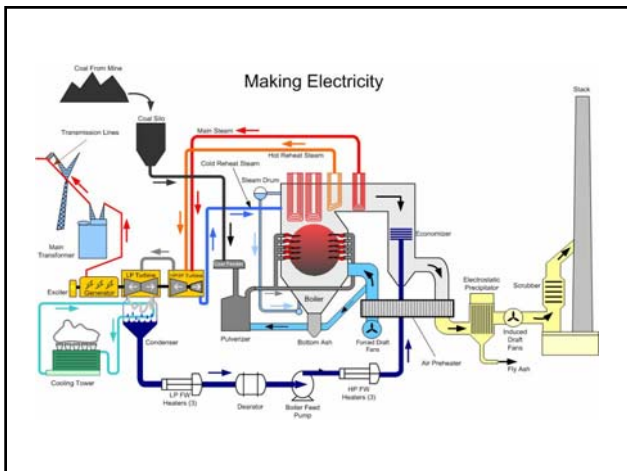
# Energy Conversion Process

Rod Roberts  
Mike Okapal

## Energy Conversion – Coal to Electricity



Jim Bridger Power Plant – Point of Rocks, WY



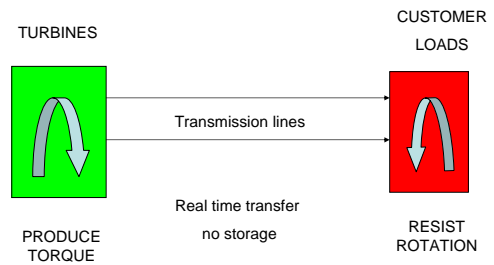
## Systems and Equipment

- Coal Handling / Fuel Preparation
- Boiler
- Combustion Air & Gas
- Pollution Control Equipment
- Feedwater / Steam
- Turbine / Generator
- Condenser
- Cooling Tower

# Power Grids

interconnected power system

## SIMPLIFIED POWER SYSTEM



## PARTS OF THE POWER SYSTEM

- **TURBINES** - Rotational energy (torque) from turbines driven by steam, water, and wind

## Jim Bridger Steam Turbine



## PARTS OF THE POWER SYSTEM

- TURBINES - Rotational energy (torque) from turbines driven by steam, water, and wind
- Transmission system - the connecting shaft

## Transmission lines “the shaft”



## PARTS OF THE POWER SYSTEM

- TURBINES Rotational energy (torque) from turbines driven by steam, water, and wind
- Transmission system provides connection-like a shaft
- **Customer Loads** – the cash register provide resistance to rotation, try to stop rotation

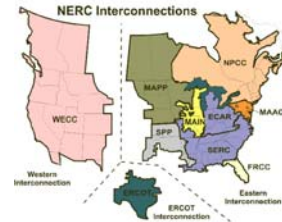
## Customer Loads



## US Power Grid

- Regulated by NERC
- Formed after NY blackout 1968
- World's largest machines
- US split into three systems
  - Eastern 250 million HP
  - Western 150 million HP
  - Texas 30 million HP
  - Each system operated independent

## US Grid



## Western Grid (WECC)

- 1.8 Million Square Miles
- 71 Million people
- 150 million HP
- Technical staff, administrative and coordination duties, in Research Park
- System planning and studies done by individual companies

## Utah and Wyoming Plants

