AES Warrior Run CFB Coal Technology

Governors' Energy Summit
October 23rd 2014

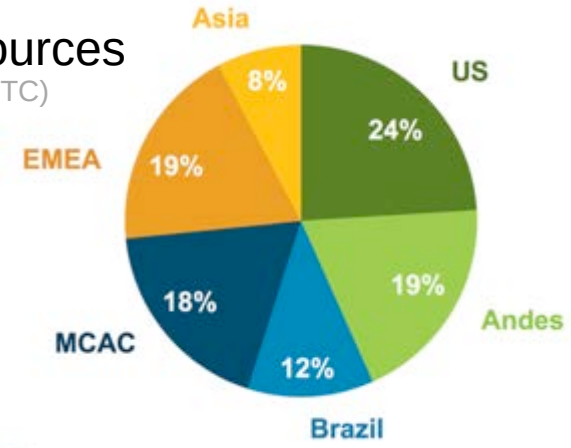
Clean Energy for a Clean Maryland

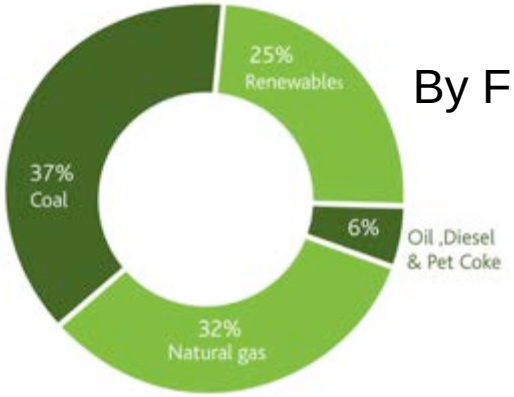
About The AES Corporation

Mission: Improving lives through safe, reliable and sustainable energy solutions.

Diversity Across Markets, Fuels & Technology

Income Sources
(2013 adjusted PTC)





By Fuel Type

Dependable Provider to Utilities and Power Systems

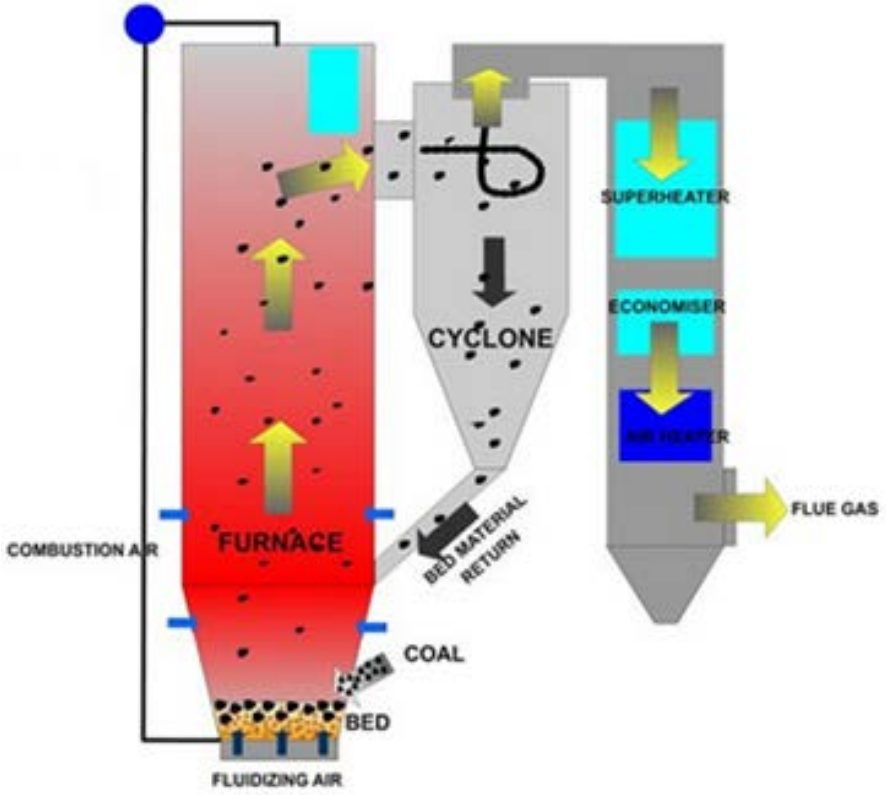
- 21 countries
- 38,000 MW generation
- 9 utility companies
- 11 million customers
- $42 billion assets
- $18 billion revenues
- 25,000 global workforce

About Warrior Run

- Located in Cumberland Maryland
- 180-MW Circulating Fluidized Bed (CFB) combustion technology using MD coal
- Our two products (cogeneration for efficiency)
    - Electricity
    - Beverage Grade Liquid Carbon Dioxide
- Commercial operation commenced in 2000
- 30-year Power Purchase Agreement as a QF Facility under PURPA
- Support AES Values
    - Safety, Integrity, Commitment, Excellence, Fun

About WR…The Technology

- CFB Combustor Technology for efficiency, fuel flexibility, & low emissions
- Pulverized dry limestone for SO2 and Hg control
- CFB and Selective Non-Catalytic Reduction (SNCR) technology for NOx reduction
- Fabric Filter bag house for PM capture
- Co-generation facility with CO2 capture
- Ash beneficial re-use through Mine reclamation



CFB Technology in Today's Regulatory Challenges

Regulation	*How does WR match-up?*
MATS	Testing for LEE (low emitter EGU)
CCR	Alkaline ash for mine reclamation
CAIR/CSAPR	Low NOx & SO2 emitter
NAAQS	Low NOx & SO2 emitter
Effluent Guidelines	On-site waste water treatment
316b	Cooling Tower (with city water supply)
GHG/Clean Power Plan/RGGI	Efficiency, CO2 capture, RGGI

Integrating with the Local Economy

- Maryland mined local coal
- Truck Delivery
- Ability to combust various types of locally sourced Fuel
- Low Discharge
- Alkaline Ash used as mine reclamation and acid mine run-off correction
- Limestone is locally sourced
- Cooling Water Purchased from Cumberland Utilities

Carbon Capture

CO2 Facility

- Extract ~4% of flue gas
- Amine process to capture the CO2
- CO2 is purified, compressed and liquefied
- 115 tons per day of Beverage Grade Product
- Process requires
  - 5% of our steam production equivalent to ~3.8 MW
  - ~1.3 MW of internal load

Partnering with the Community

Evergreen Heritage Center

- Outdoor Learning & Hands-on Programs for Environmental Education & Conservation
- Joined in building the new Energy Learning Station
- Future plans for the Evergreen Coal Trail
- EHC Combines education of Natural Resource Sustainability by understanding our heritage to prepare for our future

Thank-you