Baytown Cogen
Texas, USA

COGENERATION:
Opportunities in Energy Efficiency

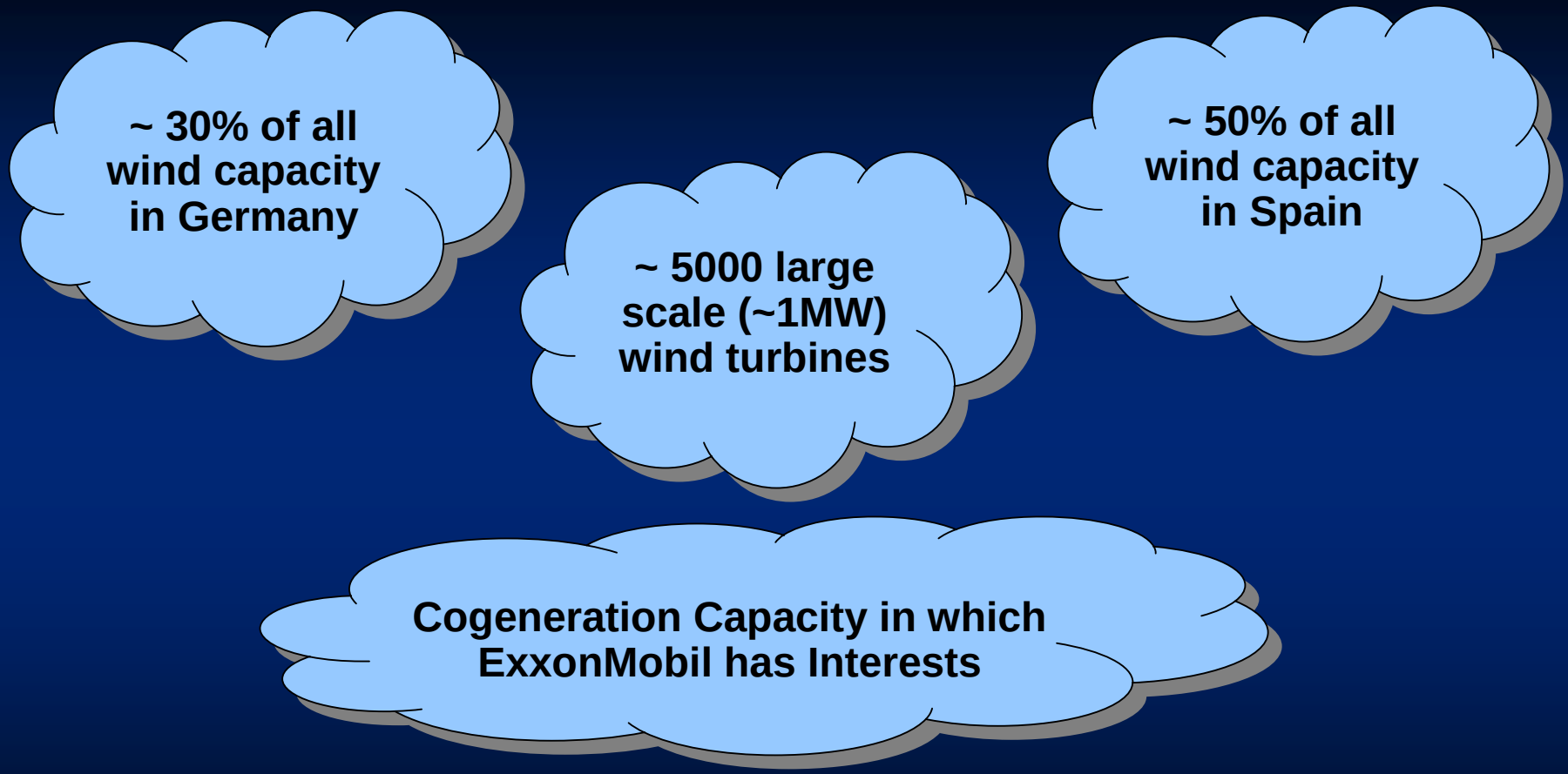
Texas Technology Showcase
6 December 2006

ExxonMobil

Taking on the world's toughest energy challenges.™

Jackson Simonich
Utilities Engineer, Baytown Olefins Plant
ExxonMobil Chemical Company

Opening Remarks



Environmental Performance Equivalents

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Why Cogeneration?

ENERGY EFFICIENT

ECONOMIC

LOWER EMISSIONS

SUPPLY SECURITY

Baytown Train 5
160-MW GE 7FA
Baytown Olefins Plant
Baytown, TX USA

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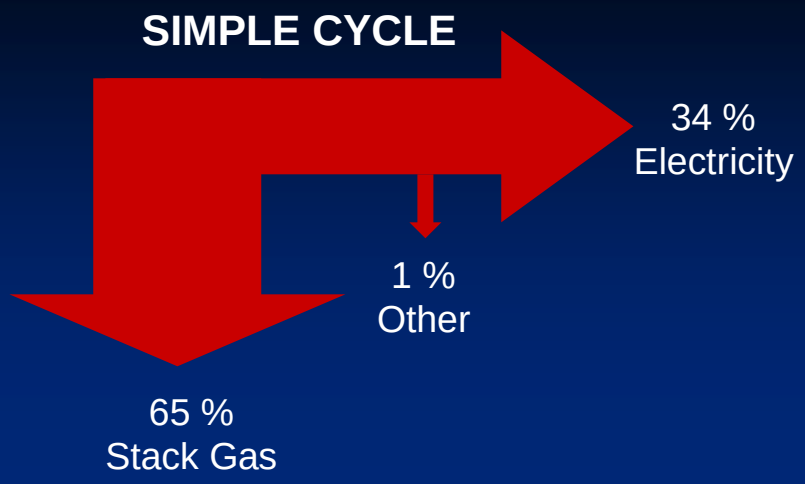
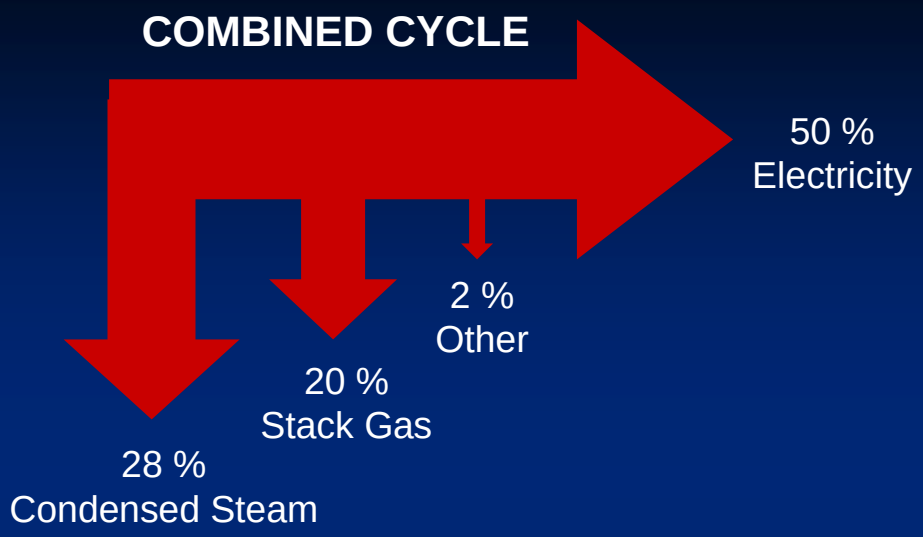
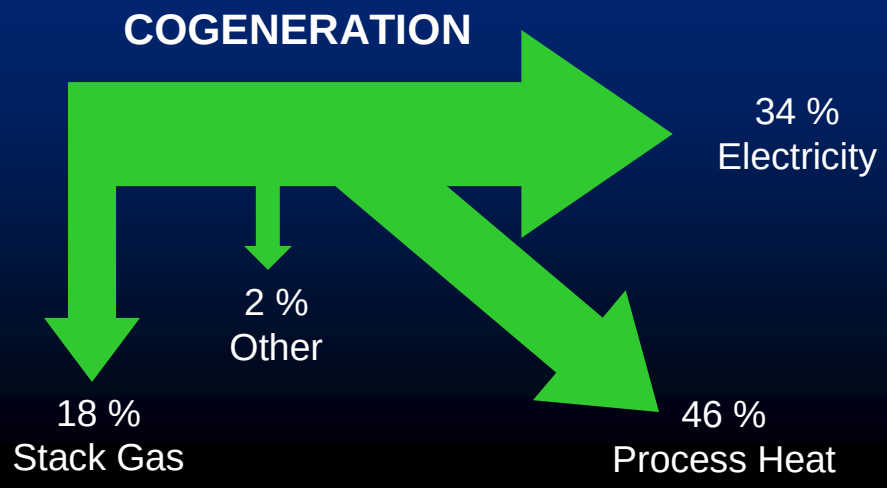
The Business Case for Cogen







- **Cogeneration utilizes useful waste heat that would otherwise escape in stack gases or condensing process**
- **Efficiencies can be twice that of traditional approaches**
- **ExxonMobil global electricity spend is over US$3 G .... So improved efficiency makes a difference !**

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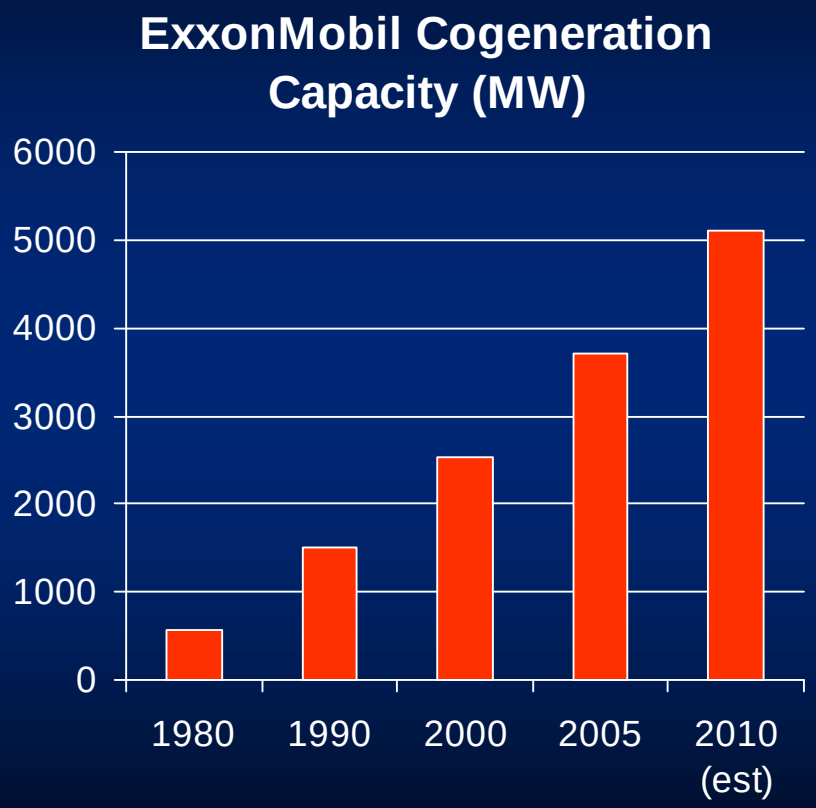
ExxonMobil: A Leader in Cogeneration

- First installation in 1950's
- Over 3,700 MW installed with projects under development all around the world
- CO_2 emissions reduced ~ 9 million metric tones per year
- ExxonMobil self-generates over 50% of its total electricity demand
- Cogeneration provides high overall efficiencies, low costs per MW-hr & low CO_2 emissions. But .....
  - Higher total capital costs
  - Facilities must be base-loaded
  - Back-up power may be required



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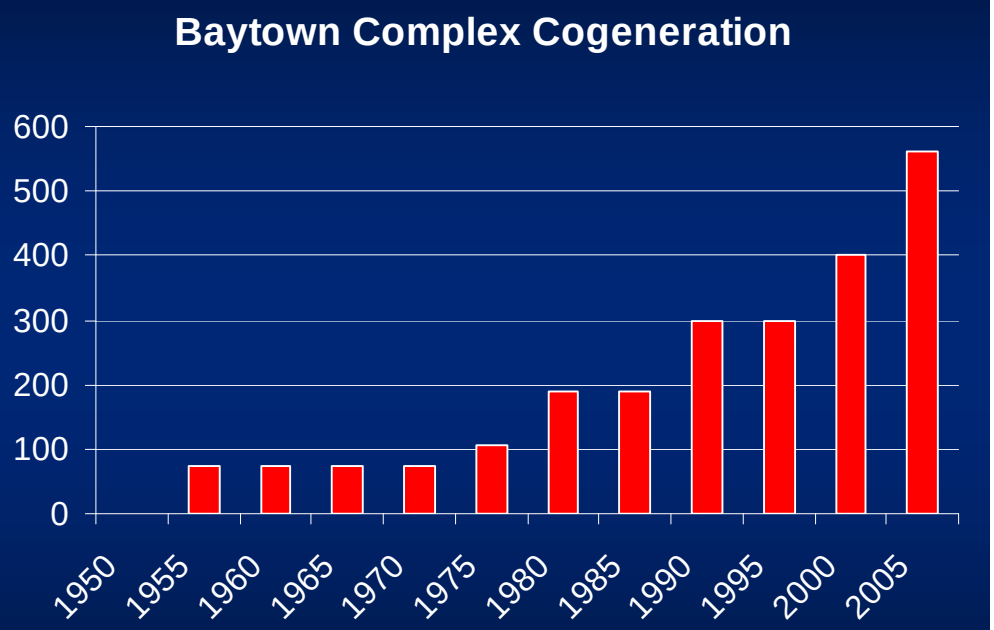
Cogen's Role at Baytown

- ExxonMobil Baytown is the nation's largest refinery and petrochemical complex
  - Utility systems are highly integrated
  - Reliability is paramount – Site requires uninterrupted steam and power generation
- Baytown complex has eleven cogeneration units operating between the refinery and olefins plants
  - Over 550-MW in power and 3450-klb/hr of high pressure, superheated steam
  - Allows the complex to be self-sufficient on power and at times sell excess to grid
- Since 1950 Baytown Complex has matched steam/power demand increases with cogeneration
- Opportunity to improve environmental and efficiency performance



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Case Study: Baytown Train 5

- GE Frame 7FA gas turbine coupled with a heat recovery steam generator
  - 160-MW
  - 560-klb/hr (unfired) 1500-psig superheated steam

- Project Objectives:
  - Increase site efficiency
    - Allowed the Baytown Complex to shutdown three inefficient 1960's vintage steam and electricity generators
    - ~10% improvement in site steam/power heat rate
  - Increase site steam and power reliability
    - Old units prone to trips
  - Reduce environmental emissions
    - 105,400 Ton net reduction in greenhouse gases
    - Significant reduction in NO_x

Equivalent to 30,000 cars

- Best in Class Performance
  - Extremely Reliable -- ZERO unplanned outages/trips during first year of operation
    - GE Fleet World Record
  - Industry Leading Environmental Performance
    - SCR reduces the exhaust emissions to 1.0-ppm NO_x and 1.0-ppm NH_3 slip
  - Received 2006 EPA Energy Star CHP and 2005 American Chemistry Council Energy Efficiency Awards

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Final Remarks

- Cogeneration:
  - Can increase reliability
  - Enhances cost competitiveness
  - Can reduce purchased fuel demands
  - Reduces emissions versus traditional methods of producing electricity and thermal heat / steam separately
- ExxonMobil has a proud history of investing in cogeneration technology .....

... and we continue to look for new opportunities all around the world !

LaBarge AGI Cogen
Wyoming, USA

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Baytown Train 4
100-MW Siemens v84.2
Baytown, TX USA

QUESTIONS ?

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