A Cost Benefit Analysis of Electricity Generation

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Graduate Student Symposium

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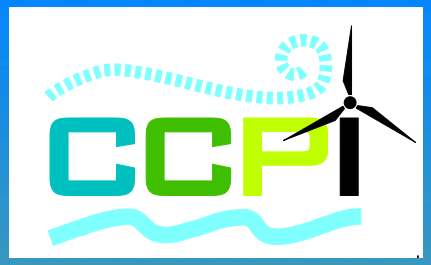
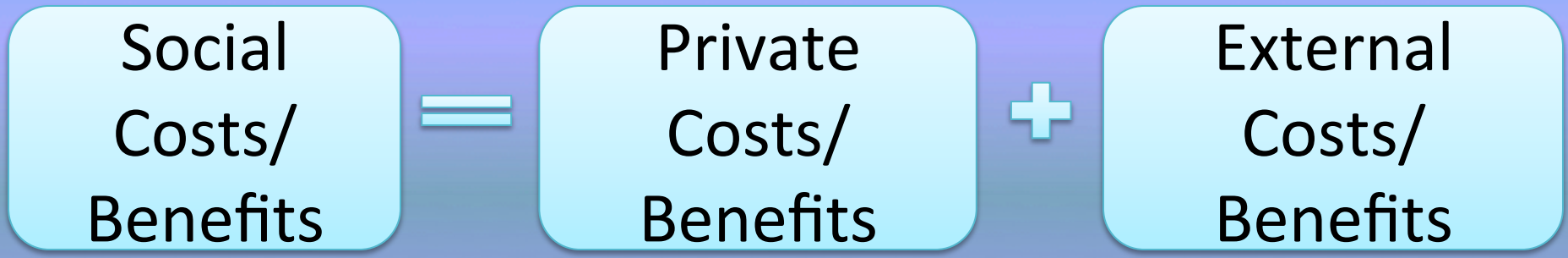
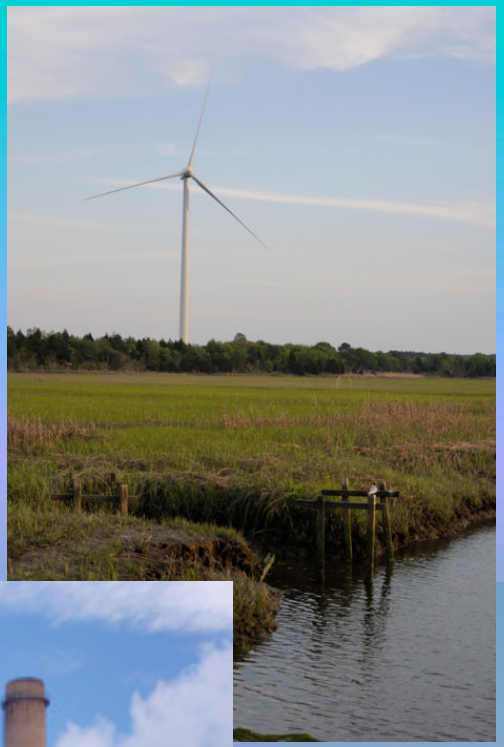


Cost Benefit Analysis



Facilities



College of Earth, Ocean, and Environment, UDel

Edge Moor Natural Gas plant, Calpine

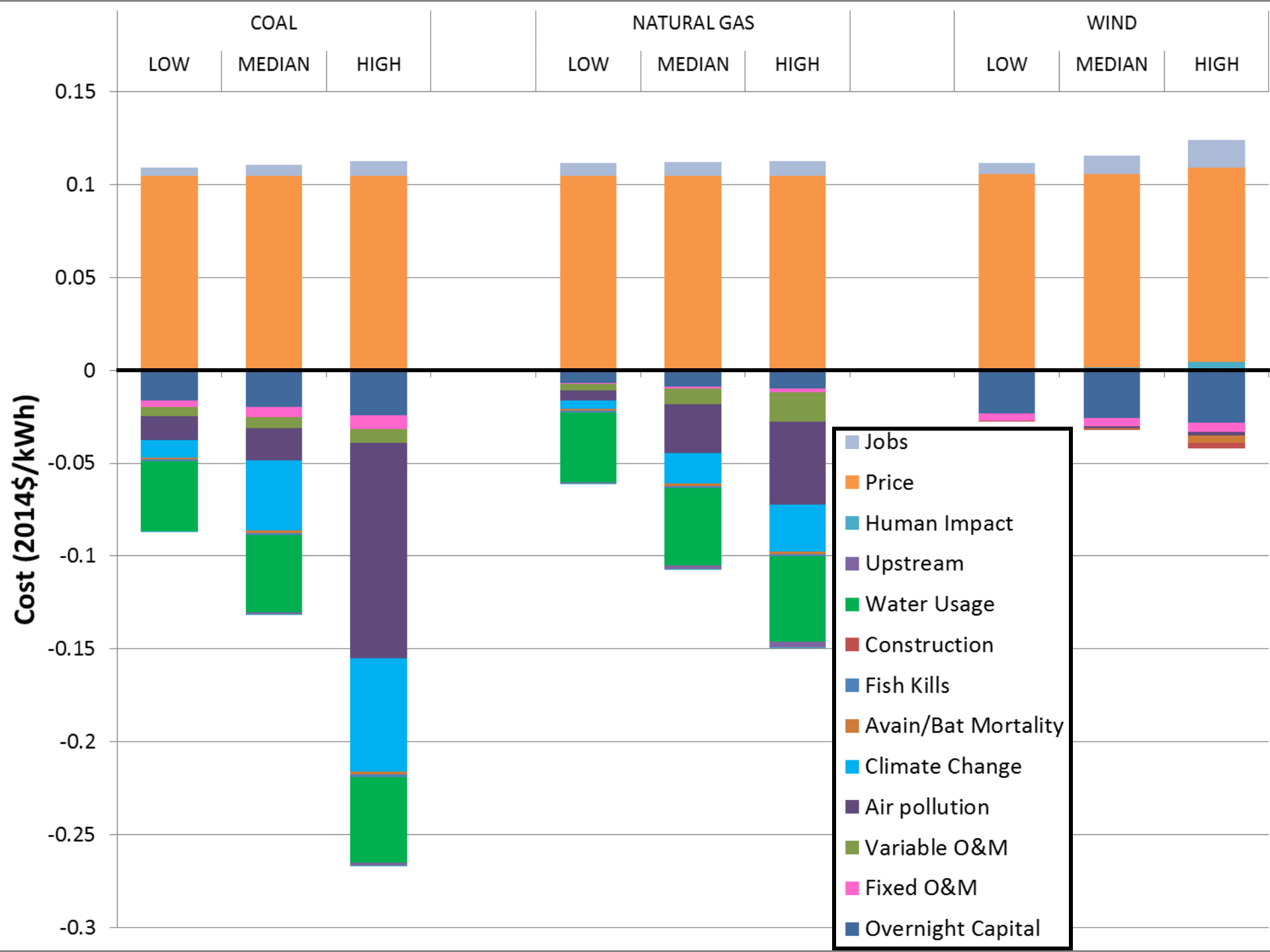
Indian River Power Plant, photo from DNREC

Methodology

- Financial Benefits
  - Electricity
  - Jobs
- Financial Costs
  - Construction
  - Operations and Maintenance (O&M)

Methodology

- Environmental Benefits
- Environmental Costs
  - Air pollution
  - Climate Change
  - Avian/Bat Mortality
  - Fish Kills and Water Use
  - Construction
  - Upstream
- Amenity and Disamenity


COAL
NATURAL GAS
WIND
LOW
MEDIAN
HIGH
LOW
MEDIAN
HIGH
LOW
MEDIAN
HIGH
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
Cost (2014$/kWh)
Jobs
Price
Human Impact
Upstream
Water Usage
Construction
Fish Kills
Avain/Bat Mortality
Climate Change
Air pollution
Variable O&M
Fixed O&M
Overnight Capital

Results

Summation of Costs and Benefits

$2014/kWh	Coal Plant	Natural Gas Plant	Wind Turbine
Low	-0.1187	-0.0098	0.1028
Median	0.0104	0.0235	0.1141
High	0.0501	0.0627	0.1240

Results

Breakeven Price

Required Price of Electricity for Cost=Benefit			
$2014/kWh	Coal Plant	Natural Gas Plant	Wind Turbine
Low	0.2622	0.1420	0.0350
Median	0.1252	0.0995	0.0206
High	0.0788	0.0526	0.0077

Thank You!

Questions?

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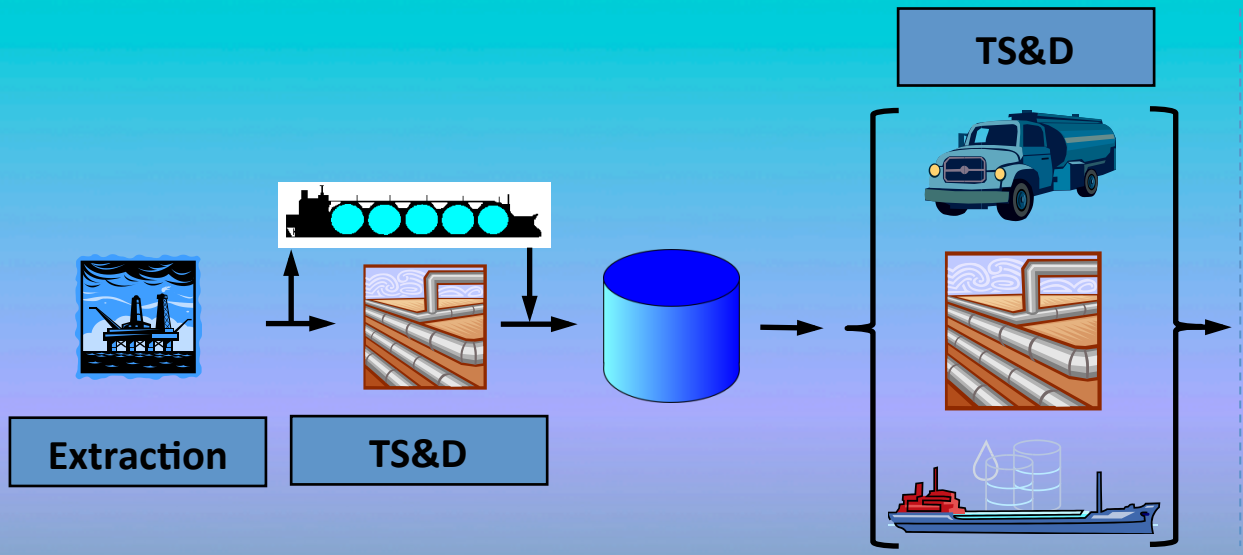
Upstream Stages: Feedstock and Refining

Downstream Stages: Operations



Feedstock-related stages: feedstock recovery, transportation, storage, distribution of feedstock

Fuel-related stages: fuel processing, transportation, storage, distribution of fuel

Upstream

Downstream