Ultra Super Critical technology
Coal Power Generation

GE is dedicated to technologies that are improving economics, are cleaner, more sustainable and respectful of environmental objectives. We are pushing the technology’s limit to improve the efficiency even further. Available today, our double reheat technology and the application of more advanced operating parameters in both single reheat and double reheat configurations delivers further performance gains - bringing plant efficiency close to 50%. 
The Global Energy Mix

In a post ‘COP21’ world, countries are putting more emphasis on attaining the right mix of fuel sources to meet demand and emissions goals, as well as provide energy security. In most countries, a mix that includes renewables, gas and coal power generation will meet the competing objectives for reliable, affordable power.

[Bar chart showing energy mix for Installed Base and Electricity Generated]
Future of coal power generation

Today, 40% of the world’s electricity is produced from coal and we predict that its share will decrease to 30%, over the next decade. 95% of this will come from fast-growing economies in India, China, Asia, the Middle East and Africa. With 2660 GW of installed capacity and nearly 900 billion tons of reserves, coal remains a self-sufficient and affordable means to produce power and provide energy security.
Future of coal power generation

The world population is expected to exceed 10,000,000,000 People by 2050 with most growth occurring in developing countries.

Today, 2 Billion People globally have insufficient or unreliable power to support social and economic development.

Today 40% of the world’s electricity is produced from coal, that will decrease to around 30%.

With 900 Billion tons of reserves, coal remains a vital part of the energy mix.

- Smarter, Cleaner. Steam Power is....
  - TECHNOLOGY ADVANCEMENTS
    - 1.5%age points more efficient than the world record.
    - 3% points lower CO2 emissions
  - DIGITAL CAPABILITIES
    - Up to 1.5%age points more power over the life of the plant
  - ENVIRONMENTAL CONTROLS
    - Able to lower emissions by 70% more than the world’s most stringent standards

180,000 TONS of CO2 saved Per year.

$80,000,000 in additional value to the plant.
GE forecasts that there will be approximately 275GW of new steam power plants over the next 5 years.

These will mostly use ultra-supercritical (USC) technology or even more advanced steam parameters, will produce 25% less CO2 than the average installed plant today and will need to comply with the latest and most stringent emissions regulations that the industry has ever seen.
Technology Advancement

GE’s Steam Power Systems (SPS) has a long heritage of technology leadership and is investing in the highest efficiency steam technology available today.

In 2015, the performance test on the RDK8 plant was conducted and the official result was 47.5% net plant efficiency (NPE). This is a world-leading efficiency for a coal-fired plant.

Since RDK8 was designed, there have been significant technological developments in new materials, combustion systems, turbine technology and air quality control equipment.

These improvements are made possible because of our commitment to investing in world-class engineering and world-class engineers. GE’s SPS makes extensive use of the GE research & development facilities and engineers around the world to ensure that technology leadership is at the core of our product portfolio. Our groups of specialized experts are a diverse, cohesive team of technologists who work every day to create the future together.
Best Advanced Technology
Clean and Competitive Coal Thermal Plants

- Baseline
- 170 bar
- 540°C
- 540°C

- 260 bar
- 565°C
- 585°C

- 260 bar
- 600°C
- 600°C

- 275 bar
- 600°C
- 620°C

- 300 bar
- 600°C
- 620/620°C

- 350 bar
- 700°C
- 720°C

Sub-critical
Supercritical
Ultra-supercritical
Double reheat
700+°C

State of the art
+11.3%
+8.7%
+6.7%
Insignificant CAPEX increase, offset by +7% increase in efficiency & - O&M reduction.

Compliance with most strictest Emissions regulation COP21 standards (<0.75kgCO2/kwh)

Digital solutions maximize lifecycle performance (efficiency +1.5%, Emissions -3%, Reliability +5%)

Flexible & competitive project financing, in line with OECD standards & recommendations.

Best Advanced Technology
Clean and Competitive Coal Thermal Plants


Each technology depends on pressure and temperature for steam

<table>
<thead>
<tr>
<th></th>
<th>Sub-C</th>
<th>SC</th>
<th>USC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Project Cost</td>
<td>97.3%</td>
<td>99.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Net Efficiency (LHV)</td>
<td>93.4%</td>
<td>98.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>CO₂ Emissions Δ tonsCO₂/year</td>
<td>164,972</td>
<td>19,403</td>
<td>0</td>
</tr>
</tbody>
</table>
Clean Coal Power

- SO\textsubscript{x} > 99%
- NO\textsubscript{x} ≥98%
- PM <5mg/Nm\textsuperscript{3}
- CO\textsubscript{2} <0,75g/MWh

NO\textsubscript{x}/SO\textsubscript{x}/PM (mg/Nm\textsuperscript{3} at 6% O\textsubscript{2})

Flue gas cleaning technology

- Ultra Clean Coal power: 100 / 100 / 10
- Clean Coal power: 200 / 200 / 30
- EU guidelines: 500 / 500 / 80

Mercury Control: Mer-Cure\textsuperscript{TM} Filsorption\textsuperscript{TM}

Particulate Control: Fabric Filter, Electrostatic Precipitator

Integrated Systems: NID\textsuperscript{TM}, Spray Dryer Absorber

NO\textsubscript{x}, Control:
- Selective Catalytic Reduction Systems
- Combustion Modification

SO\textsubscript{x}, Control:
- Wet FGD
- Seawater FGD
GE’s Industry Leadership In Steam Power

More than 100 EPC Steam Projects performed by GE in the last decades for more than 75 GW

- 30% of the world’s steam turbine capacity
- 30% of the world’s boilers
- 50% of steam turbines for nuclear power plants

100+ years of expertise put to work for customers every day
Steam Power Systems has accelerated the development of **leading efficiency**, **lower emission** technologies to deliver more value to customers.

**Technology Advancements**
- 1½ % points more efficient & 3% lower emissions compared to today’s best

**PREDIX**
- **Digital Capabilities**
  - Delivers up to 1 ½% more power over the life of a plant

**Environmental Controls**
- Able to lower emissions by 70% more than the world’s most stringent emission standards

**Availability Flexibility Reliability**

**Full EPC Capabilities**

**Financial capabilities**
EPC Power Plant Portfolio Overview

Nuclear Turbine Islands
- PC*: Ultra/Supercritical
  - 200 - 1350 MW
- PC*: Subcritical
  - 50 - 800 MW

Oil/Gas-fired Sub/Supercritical
- 100 - 800 MW

CFB**: Ultra/Supercritical
- 270 - 660 MW

CFB**: Subcritical
- 50 - 400 MW

* PC: Pulverized Coal
** CFB: Circulating Fluidized Bed

Flamanville 3, France
1 x 1013 MW
Operation 2018

Manjung 4, Malaysia
1 x 1013 MW
Operation 2015

Ho Ping, Taiwan
2 x 660 MW
Operation 2001

Shoaiba, Saudi Arabia
14 x 400 MW
Operation 2013

New Product Launched, 2013

Tamuin, Mexico
4 x 130 MW
Operation 2004

TT3 Workshop - P 13
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<table>
<thead>
<tr>
<th>New Region</th>
<th>Operation Date</th>
<th>Plant Name</th>
<th>Country</th>
<th>Steam Cycle</th>
<th>Unit Output [MW]</th>
<th>No. of Units</th>
<th>Plant Output [MW]</th>
<th>Scope of Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIA</td>
<td>2018</td>
<td>Mae Moh 14</td>
<td>Thailand</td>
<td>ultra supercritical</td>
<td>660</td>
<td>1</td>
<td>660</td>
<td>Boiler Island incl. FGD and ESP, Turbine Island,</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2018</td>
<td>Karabiga</td>
<td>Turkey</td>
<td>ultra supercritical</td>
<td>660</td>
<td>2</td>
<td>1320</td>
<td>Integrated Power Package (IPP)</td>
</tr>
<tr>
<td>India</td>
<td>2018</td>
<td>Tanda II</td>
<td>India</td>
<td>supercritical</td>
<td>660</td>
<td>2</td>
<td>1320</td>
<td>Turnkey Turbine Island</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2018/19</td>
<td>Opole 5 &amp; 6</td>
<td>Poland</td>
<td>ultra supercritical</td>
<td>930</td>
<td>2</td>
<td>1860</td>
<td>Boiler Island incl. FGD and ESP, Turbine Island,</td>
</tr>
<tr>
<td>MEA</td>
<td>2017</td>
<td>Yanbu 3</td>
<td>Saudi Arabia</td>
<td>supercritical</td>
<td>620</td>
<td>5</td>
<td>3100</td>
<td>Integrated Power Package (IPP)</td>
</tr>
<tr>
<td>INDIA</td>
<td>2017</td>
<td>Nabinagar</td>
<td>India</td>
<td>supercritical</td>
<td>660</td>
<td>3</td>
<td>1980</td>
<td>Turbine Island</td>
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<td>INDIA</td>
<td>2016</td>
<td>Solapur</td>
<td>India</td>
<td>supercritical</td>
<td>660</td>
<td>2</td>
<td>1320</td>
<td>Turbine Island</td>
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<tr>
<td>ASIA</td>
<td>2017</td>
<td>Tanjung Bin 4</td>
<td>Malaysia</td>
<td>ultra supercritical</td>
<td>1000</td>
<td>1</td>
<td>1000</td>
<td>Turnkey Plant</td>
</tr>
<tr>
<td>ASIA</td>
<td>2015</td>
<td>Manjung 4</td>
<td>Malaysia</td>
<td>ultra supercritical</td>
<td>1000</td>
<td>1</td>
<td>1000</td>
<td>Turnkey Plant</td>
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<tr>
<td>EUROPE</td>
<td>2014</td>
<td>SOŠTANJ</td>
<td>Slovenia</td>
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<td>600</td>
<td>1</td>
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<tr>
<td>MEA</td>
<td>2015</td>
<td>Kusile</td>
<td>South Africa</td>
<td>supercritical</td>
<td>800</td>
<td>6</td>
<td>4800</td>
<td>Turnkey Turbine Island &amp; *ACC</td>
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<tr>
<td>EUROPE</td>
<td>2013</td>
<td>RDK 8 Karlsruhe</td>
<td>Germany</td>
<td>ultra supercritical</td>
<td>912</td>
<td>1</td>
<td>912</td>
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<tr>
<td>MEA</td>
<td>2014</td>
<td>Medupi</td>
<td>South Africa</td>
<td>supercritical</td>
<td>800</td>
<td>6</td>
<td>4800</td>
<td>Turnkey Turbine Island &amp; *ACC</td>
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<tr>
<td>EUROPE</td>
<td>2011</td>
<td>Belchatow</td>
<td>Poland</td>
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<td>858</td>
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<tr>
<td>EUROPE</td>
<td>2012</td>
<td>Neurath (BOA 2)</td>
<td>Germany</td>
<td>ultra supercritical</td>
<td>1100</td>
<td>2</td>
<td>2200</td>
<td>Boiler, Turbines &amp; Architect Engineer</td>
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<tr>
<td>EUROPE</td>
<td>2009</td>
<td>Lagisza</td>
<td>Poland</td>
<td>supercritical</td>
<td>460</td>
<td>1</td>
<td>460</td>
<td>Turnkey Turbine Island</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2008</td>
<td>Patnow</td>
<td>Poland</td>
<td>supercritical</td>
<td>464</td>
<td>1</td>
<td>464</td>
<td>Boiler &amp; Turnkey Turbine Island</td>
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<tr>
<td>EUROPE</td>
<td>2003</td>
<td>Niederaussem K</td>
<td>Germany</td>
<td>supercritical</td>
<td>1 000</td>
<td>1</td>
<td>1000</td>
<td>Boiler + STG island turnkey</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2002</td>
<td>Florina 1 (Meliti Achlada)</td>
<td>Greece</td>
<td>supercritical</td>
<td>330</td>
<td>1</td>
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<td>Turnkey Plant</td>
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<tr>
<td>EUROPE</td>
<td>2002</td>
<td>Niederaussem</td>
<td>Germany</td>
<td>supercritical</td>
<td>1012</td>
<td>1</td>
<td>1012</td>
<td>Boiler &amp; Architect Engineer</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2000</td>
<td>Boxborg Q</td>
<td>Germany</td>
<td>supercritical</td>
<td>900</td>
<td>1</td>
<td>900</td>
<td>Architect Engineer</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2000</td>
<td>Lippendorf R &amp; S</td>
<td>Germany</td>
<td>supercritical</td>
<td>933</td>
<td>2</td>
<td>1 866</td>
<td>Architect Engineer</td>
</tr>
<tr>
<td>EUROPE</td>
<td>2000</td>
<td>Avedore 2</td>
<td>Denmark</td>
<td>supercritical</td>
<td>534</td>
<td>1</td>
<td>534</td>
<td>Turnkey Turbine Island</td>
</tr>
<tr>
<td>EUROPE</td>
<td>1998</td>
<td>Nordjylland</td>
<td>Denmark</td>
<td>supercritical</td>
<td>411</td>
<td>1</td>
<td>411</td>
<td>Turnkey Turbine Island (Double Reheat)</td>
</tr>
<tr>
<td>EUROPE</td>
<td>1997</td>
<td>Skærbæk</td>
<td>Denmark</td>
<td>supercritical</td>
<td>392</td>
<td>1</td>
<td>392</td>
<td>Turnkey Turbine Island (Double Reheat)</td>
</tr>
<tr>
<td>EUROPE</td>
<td>1994</td>
<td>Hemweg 8</td>
<td>Netherlands</td>
<td>supercritical</td>
<td>680</td>
<td>1</td>
<td>680</td>
<td>Turnkey Plant</td>
</tr>
</tbody>
</table>

TT3 Workshop - P 14 GE Proprietary information - For information only Do not disclose without prior authorization
Karlsruhe 8 (RDK8), Germany
Highest efficiency steam plant in world

<table>
<thead>
<tr>
<th>Customer</th>
<th>EnBW Kraftwerk AG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Full Turnkey Power Block</td>
</tr>
<tr>
<td>Product</td>
<td>1 x 912 MW coal-fired USC</td>
</tr>
<tr>
<td>Technology</td>
<td>USC – 292 bar, 603 °C/ 623 °C</td>
</tr>
<tr>
<td>Schedule</td>
<td>Order - 2008 Operation - 2014</td>
</tr>
</tbody>
</table>
| Benefits          | • Net Eff. > 47,6% (>58% with DH), Boiler Eff.: 95%  
                  | • CO₂ < 35% vs installed base  
                  | • CO & NOₓ < 50% authorities |
## Neurath, Germany
### World’s largest USC lignite Power Plant

<table>
<thead>
<tr>
<th><strong>Customer</strong></th>
<th>RWE (Germany)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>Turnkey</td>
</tr>
<tr>
<td><strong>Product</strong></td>
<td>2 x 1100 MW EPC Power Plant</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>USC - 280bar, 600 °C/ 605 °C</td>
</tr>
</tbody>
</table>
| **Schedule** | Order - 2005  
Operation – 2011-12 |
| **Benefits** |  
- Highest reliability of proven technology ( > 96 % annual average )  
- Highest efficiency for lignite fired Power Plant inducing minimum CO2 emission ( about 30 % less than standard ) |
### Šoštanj, Slovenia

**Highest possible efficiency using local fuel, 1st USC plant in Slovenia**

<table>
<thead>
<tr>
<th>Customer</th>
<th>Termolektrarna Šoštanj d.o.o. (TEŠ)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>Power Plant Turnkey</td>
</tr>
<tr>
<td><strong>Product</strong></td>
<td>1 x 600MW lignite USC PC</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>USC – 275 bar, 600°C/610°C</td>
</tr>
<tr>
<td><strong>Schedule</strong></td>
<td>Operation – 2016</td>
</tr>
</tbody>
</table>
| **Benefits**      | • Exceptional net efficiency of 43% using local lignite fuel  
|                   | • Overall reduction in CO2 by 35% and SOx & NOx by ~50% (compared with existing units) |
Belchatow, Poland
Poland’s Largest and most efficient lignite-fired plant

<table>
<thead>
<tr>
<th>Customer</th>
<th>PGE Górnictwo i Energetyka Konwencjonalna S.A. - Oddział Elektrownia Bełchatów</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Power Plant Turnkey</td>
</tr>
<tr>
<td>Product</td>
<td>1 x 858 MW lignite SC Tower</td>
</tr>
<tr>
<td>Technology</td>
<td>SC - 252bar, 550°C/ 580°C</td>
</tr>
<tr>
<td>Schedule</td>
<td>Order - 2005 Operation - 2011</td>
</tr>
<tr>
<td>Benefits</td>
<td>• High efficiency (close to 42%)</td>
</tr>
<tr>
<td></td>
<td>• Low emissions of sulphur dioxide (SOx) and nitrogen oxides (NOx)</td>
</tr>
</tbody>
</table>
Opole 5 & 6, Poland
Poland’s Largest Hard Coal fired Plant

<table>
<thead>
<tr>
<th>Customer</th>
<th>Polska Grupa Energetyczna S.A. (PGE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>• Boiler Island incl. FGD &amp; ESP</td>
</tr>
<tr>
<td></td>
<td>• Turbine island incl. equipment</td>
</tr>
<tr>
<td></td>
<td>• Balance of Plants (BoP)</td>
</tr>
<tr>
<td>Product</td>
<td>2 x 930 MW USC PC – Hard Coal</td>
</tr>
<tr>
<td>Technology</td>
<td>USC 251 Bar 600°C / 610°C</td>
</tr>
<tr>
<td>Schedule</td>
<td>Order - 2014</td>
</tr>
<tr>
<td></td>
<td>Expected Operation – 2019</td>
</tr>
<tr>
<td>Benefits</td>
<td>• Low emissions: SOx, Nox, PM</td>
</tr>
<tr>
<td></td>
<td>• High Efficiency (ca. 45.5 %)</td>
</tr>
</tbody>
</table>
Steam EPC Plant Competitiveness

Demonstrated competitiveness vs. Asian contractor

Project
- Manjung 4, Malaysia

Customer
- Tenaga Nasional Bhd (TNB) Janamanjung Sdn Bhd.

Product
- 1 x 1000 MW coal-fired USC steam plant
- Boilers & steam turbines manufactured in Alstom factories in China

Scope
- Turnkey EPC contract in consortium

Evaluation
- NPV-based on life-cycle costs
- Project won in March 2011 with >3% plant net heat rate advantage vs. competition
**Tanjung Bin 4, Malaysia**

**A major steam power plant project**

<table>
<thead>
<tr>
<th><strong>Customer</strong></th>
<th>Malakoff, Malaysia for TNB, Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>Turnkey EPC with consortium</td>
</tr>
<tr>
<td><strong>Product</strong></td>
<td>1 x 1076 MW gross – 1000MW net supercritical Imported international coal</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>USC – 270 bar, 595 ºC/ 603.5 ºC</td>
</tr>
</tbody>
</table>
| **Schedule** | Order - 2012  
Operation – 22/March/2016 |
| **Benefits** | efficient and cleaner energy to more than 1,400,000 people |
HELE (High Efficiency Low Emission) Global Tendence
HELE technology global tendency & need

China

Japan

EU

Colombia

Escenario 12 del Plan de Expansión de UPME: más proyectos térmicos de carbón de >1GW para 2030

La capacidad instalada actual de Colombia 100% Sub

1.6 GW
USC in Colombia
USC in Colombia for Power Generation

Best Coal available

- Reserves ~17k Mtons
- USC in Colombia for Power Generation
- Need to diversify energy matrix

~90MMTONS Production (90 exports)

Strong economical & social impact

Colombia COP 21 agreements

- Tipo de Meta: Linea Base
- Valor: 20%
- Año: 2030
- Ano base: 2010
- Ton per capita: 4.8
- Participacion en emisiones globales: 0.37%

COP21 standards (<0.75kgCO2/kwh)

Need to diversify energy Matrix

- 70% of current 16 GW capacity is large hydro
- Need to diversify the energy matrix reliable matrix
- Thermal (gas and diesel) mainly act as back up
- Country short on gas, Diesel fuel last resource
- Strong economical & social impact: ~ 17Bt potential coal reserves. First in Latam
- Reliability/ Capacity long term auctions are drivers for new generation projects

OECD Guideline

<table>
<thead>
<tr>
<th>TAMAÑO DE LA UNIDAD DE PLANTA (capacidad instalada bruta)</th>
<th>UNIDAD&gt;500MW</th>
<th>UNIDAD&gt;300 to 500MW</th>
<th>UNIDAD &lt;300MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>USC</td>
<td>12 años¹</td>
<td>12 años¹</td>
<td>12 años¹</td>
</tr>
<tr>
<td>Ultra-supercritico: les decir, con una presión de vapor de &gt;240 bar y &gt;693 °C de temperatura de vapor, O emisiones &lt;750 g CO₂/kWh.</td>
<td>Ineligible</td>
<td>10 años, y solo en países elegibles para la AID¹²³</td>
<td>10 años, y solo en países elegibles para la AID¹²³</td>
</tr>
<tr>
<td>Supercritico: les decir, con una presión de vapor de &gt;221 bar y &gt;550 °C de temperatura de vapor, O emisiones entre 750 y 850 g CO₂/kWh.</td>
<td>Ineligible</td>
<td>Ineligible</td>
<td>12 años¹</td>
</tr>
<tr>
<td>Subcrítico: les decir, con una presión de vapor de &lt;221 bar, O emisiones &gt; 850 g CO₂/kWh.</td>
<td>Ineligible</td>
<td>Ineligible</td>
<td>12 años¹</td>
</tr>
</tbody>
</table>

¹ COP21 standards (<0.75kgCO2/kwh)
In Colombia there are 7 coal projects in an advanced stage of development, equivalent to 2.4 GW. These projects are conceived by investors with traditional technology denominated SUBCRITICAL.

GE conducted a cost-benefit analysis to identify the benefits for the country to promote High-Efficiency and Low-Emission (HELE) technology, denominated ULTRA / SUPER CRITICAL.

The result shows that during the life cycle (25 years) of all projects, HELE technology reduce 58 MM CO2 tones, US $ 690 MM fuel consumption, MM US $ 96 cost of operation and maintenance.

These reductions translates into an important environmental, social and economic impact for the country.

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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SUB</td>
<td>SC</td>
<td>VAR</td>
<td></td>
</tr>
<tr>
<td>Total per year</td>
<td>2,400</td>
<td>4.2</td>
<td>4.3</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Total 10 years (2030 COP 21 Agreement)</td>
<td></td>
<td></td>
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<tr>
<td>Total 25 years (Plants Life cycle)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

* SC Capex estimated : US$1,759/kW installed capacity
** Coal Price estimated: US$45/Ton.
*** O&M estimated:
SC (Super Critical Technology) estimated with 42% efficiency vs. SUB (Sub Critical Technology) estimated with 35% efficiency.
USC advantages in 200 MW units

**Cycle Comparison**

Higher net efficiency that translates into:

- 14% less fuel (and additive) consumption per kWh
- Lower overall emissions
- 120 g less CO₂ emission per kWh

<table>
<thead>
<tr>
<th>Main Steam Pressure*</th>
<th>175 bar</th>
<th>250 bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Steam Temperature*</td>
<td>538°C</td>
<td>600°C</td>
</tr>
<tr>
<td>Hot Reheat Steam Temperature*</td>
<td>538°C</td>
<td>620°C</td>
</tr>
<tr>
<td>Cycle efficiency**</td>
<td>LHV 36,7%</td>
<td>42,8%</td>
</tr>
<tr>
<td></td>
<td>HHV 35,0%</td>
<td>41,3%</td>
</tr>
</tbody>
</table>

Fuel costs: At 50 USD / ton, the fuel saved with the difference in efficiency from 35 % to 41,3 % (HHV) is: 3,3 MUSD / year

NPV on 20 years: 38 MUSD

**Fuel Comparison**

CO₂ emissions comparison:

Between and efficiency of 35 % and 41,3 % (HHV), the CO₂ emission is: 876 g/kWh vs 750 g/kWh

Leading to an annual saving of: 200,000 tons CO₂ / year (representing 1,6 MUSD at 8 USD/ton CO₂
GRACIAS