The Experience of Snamprogetti’s
Four Gasification Projects
for over 3000 MWth

Guido Collodi, Daslav Brkic - Snamprogetti
- ISAB Energy IGCC commercial operation
  - Sarlux IGCC commercial operation
    - ENI Sannazzaro Refinery IGCC
  - CNTIC Nanjing Chemical Ammonia Plant
Snamprogetti IGCC Projects in Italy

The two largest IGCC in the world

**SARLUX (SARAS/ENRON)**
- 551 MWe
- 40000 Nm3/h H2
- VVR(TAR)

**Snamprogetti**
- General Electric

**ISAB Energy (ERG/Mission En.)**
- 512 MWe
- Asphalt from SDA

**Snamprogetti**
- Foster Wheeler Italiana

Gasification Technologies 2003
### IGCC Projects in Italy

#### Main characteristics

<table>
<thead>
<tr>
<th>SARLUX (~550 MWe)</th>
<th>ISAB Energy (~520 MWe)</th>
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</thead>
<tbody>
<tr>
<td>- “Low” pressure (38 barg)</td>
<td>- “High” pressure (67 barg)</td>
</tr>
<tr>
<td>- “Physical” SRU (Selexol-UOP)</td>
<td>- “Hybrid” SRU (MDEA-Dow)</td>
</tr>
<tr>
<td>- Sulphur tail gas recycled</td>
<td>- Sulphur tail gas to incinerat.</td>
</tr>
<tr>
<td>- Hydrogen (Membr.+PSA -UOP)</td>
<td>- Expander</td>
</tr>
<tr>
<td>- 3 x STAG109E (GE/NP)</td>
<td>- 2 x V94.2 (Siemens/Ansaldo)</td>
</tr>
<tr>
<td>- 3 gasif.trains + 2 LTGC etc.</td>
<td>- 2 gasif.+ 1 (part 2) LTGC etc.</td>
</tr>
</tbody>
</table>

**WITHOUT SPARE GASIFIER**

Gasification Technologies 2003
Capacity Factor
Yearly Power Production

% of design

(Pre t.o. 3m.) 1st year comm.op. 2nd year comm.op. 3rd year comm.op.

"SARLUX syngas" "SARLUX total"

"ISAB syngas" "ISAB total"

Gasification Technologies 2003
Sarlux - Operating statistics - Year 2002

(Hours)

- On-stream: 7951 hours
- Product not req'd: 22 hours
- Planned: 646 hours
- Unplanned: 102 hours
- ASU: 141 hours
- CCU + PPU: 39 hours

Gasification Technologies 2003
Snamprogetti IGCC Projects in Italy

ENI R&M (250 Mw)
- **ENI R&M**
- **EniPower**
  - 250 MWe
  - 38000 Nm3/h H2
  - VVR(TAR)
- Snamprogetti/Ansaldo

SARLUX (551 MW)

ISAB Energy (512 MW)

Gasification Technologies 2003
Eni Sannazzaro IGCC
Project description

- Eni Gas & Power
  - Natural gas (12.5 km new pipeline)

- EniRefining & Marketing
  - H2
  - Gasification plant
    - 50 t/h Tar
  - Syngas

- EniPower
  - Ansaldo-Siemens V94-3A.2 (400 MW)
  - Ansaldo-Siemens V94-3A.2 (400 MW)
  - Ansaldo-Siemens V94-2K (250 MW)

Gasification Technologies 2003
SANNAZZARO Gasification Plant
Block Diagram

- SULPHUR RECOVERY
  UNIT
  (EXISTING)

- AIR
- NITROGEN
- OXYGEN
- VISBREAKER TARI
- BP BFW
- SOOT SLURRY

- UNIT 30
  GASIFICATION

- UNIT 30
  SOOT SLURRY PROCESSING
  & FILTRATION

- UNIT 37
  CARBONYL REMOVAL

- UNIT 31
  ACID GAS REMOVAL

- UNIT 31
  HCN/COS HYDROLYSIS

- UNIT 30
  SOUR WATER STRIPPER

- UNIT 30
  SOUR GAS

- FLUSHED GAS

- PROCESS
  CONDENSATE

- FILTER CAKE

- FILTRATE

- UNIT 30
  CARBON DIOXIDE TO REFINERY

- UNIT 37
  HYDROGEN EXTRACTION

- UNIT 33
  HYDROGEN EXTRACTION

- CARBON DIOXIDE TO REFINERY

- SYNGAS
- SPH STEAM

- COMBINED
  CYCLE

- ELECTRIC POWER
- NATURAL GAS
- BFW
- FLUE GAS TO REFINERY
- ASH PRODUCT
- STRIPPED WATER TO WATER TREATMENT

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- SYNGAS
ENI Sannazzaro IGCC
Project status

- July 2003: 1st GT connection to grid
- First half-2004: 2nd & 3rd CCU start-up (NG)
- Second half-2005: Gasification plant start-up
CNTIC Nanjing Chemical Ammonia Plant

Gasification Technologies 2003
CNTIC Nanjing Chemical

- May 2002: 1st gasifier start-up
- May 2002: AGRU & N₂ wash start-up
- June 2002: 2nd gasifier start-up
- June 2002: Ammonia production
Gasification Technologies 2003
Conclusions

• "Smooth" start-ups
• "High" availability

Contractor
Technology
Thank you

Snamprogetti