Presentation on
Soorty Denim SNG(LPG Air Mix) Project
at
WLPG Regional Sub continental Regional Summit at Delhi on 14th Feb 2012
by Owais Mir
CEO
Dynamic Engineering and Automation
Pakistan
www.dea.com.pk
Dynamic Engineering and Automation

- DEA is a professional engineering company, serving downstream energy sector since 2004.

- DEA is proud on successful completion of mega SNG projects in Sohrab, Noshki, KGM (Kot Ghulam Mohammed) with SSGC and other industrial backup projects with well known industries like EMCO Tiles, Sitara Textile, Ittehad chemical, Tetra Pak, Millat Gears, Frontier Ceramics, Century papers and others.

- DEA is a technology partner of Aether Dbs and serving the clients for local installation, sales and O&M services.

- DEA has a strong focus on providing customized backup solutions to the industries and serve the clients with smooth transition and change over technology of fuel i.e SNG with our precise equipments.
Recommending a reliable, permanent and quick Natural Gas Backup Solution

- LPG is a viable fuel and easy to feed stock
- LPG/SNG system acts like a generator for producing natural gas-derived from LPG and the end user doesn't feel any difference
- Due to controlled and precise automation, SNG has the identical woobe index (energy flow) as of natural gas
- No burner changes, no orifice changes and no technical modification is required for feeding SNG
Introduction of Aether Dbs, USA
Our technology partner

Intro:

- Origins in 1898
  - History in Boilers
- Design and Manufacture
  - LPG/SNG equipment
  - SCR Ammonia Injection equipment
  - Process equipment

Certifications:

- ASME U, UM and R Stamps
- UL 508A Electrical Panel Certification
- FM Listed Equipment
- PED and ATEX in progress
Soorty Denim LPG Air Mix project

SNG System (LPG Air Mix)
capacity: 126 mmbtu/h or 3640 cu. meter per hour

Discharge Pressure: 15 Psig

Vaporization Capacity:
WB800V X 2 = 1600 GPH

No. of Venturies: 7
SNG: A mixture of LPG + Air to simulate Natural Gas
1. **Stand Alone Fuel**... to PRECEDE
Natural Gas in a region...

(*STAND ALONE GAS NETWORKS*)

(SNG allows constructing a gas distribution grid and using natural
gas equipment BEFORE natural gas arrives!)

2. **Peak Shave**... to AUGMENT natural gas

(Supplement Natural Gas to help eliminate shortages)

3. **Industrial Backup Fuel**... to SUPPORT
NG during an INTERRUPTION ...

(SNG Backup System – plays the same role as a back up generator for
electricity)
SNG to NG INTERCHANGEABILITY
SNG “acts like” Natural Gas...

Wobbe Index:
a measure of the ENERGY being provided to a combustion process.
Natural Gas

$SG = 0.6$ and the Calorific value $= 935 \text{ BTU/SCF}$

$m = \text{SNG mix consisting of LPG and Air}$

$Wobbe$ Index $= \frac{935}{\sqrt{0.600_0}} = \frac{1421}{\sqrt{1.386_m}}$

$Wobbe = 1207$
If a substitute fuel has a higher SG than the gas it replaces, volumetrically less flows through the piping or orifices with the same pressure drop. To compensate, the replacement fuel has a higher heating value to carry the same original amount of energy to the burner.

**Natural Gas:**
- 935 BTU/SCF
- 0.600 SG
- Wobbe = 1207

**Synthetic Natural Gas:**
- 1421 BTU/SCF
- 1.386 SG
- Wobbe = 1207

- No pressure changes
- No orifice changes
- Seamless fuel swapping
SNG Advantages

- SNG can be the quickest possible energy solution to industries, gas utilities and remote towns
- Adequate supply even in peak periods (Peak Shaving)
- Available during natural gas outages - Back-Up
- Ability to control pressure feed on gas shedding
SNG System Credentials:

- Being used in location planned for future natural gas supply (Bridging application)
- Being used to supplement natural gas when supply is limited (Peak Shaving)
- Being used to replace natural gas in the event of supply disruption (as Back-Up fuel)
- Scalable to meet growing demand
Soorty SNG Application:

- Power Generation Via Gas turbine 5.2Mwatt OEM: Turbo Mach
- Steam Generation plant
- Textile machineries
LPG Transfer Pump to SNG Blending system: Model SB3-10HP OEM: Blackmer, USA
SNG plant after Installation

SNG flame for analysis purpose
LPG Feed Stock tank connected with LPG Transfer pump:
Commissioning and Testing of SNG on 5.2 MW Turbine:

**Results on Natural Gas:**
- Active Power: 4000 Kw
- Gen. Excitation Current: 3.54
- Generator L1-L2 Volts: 6.26Kv
- Phase A Current: 392Amp
- Average Current: 398
- L1 Winding Temp: 71C
- Gen B Temp A: 69C
- Container Temp: 43C
- Comp. in Air Temp. T1: 21.1C

**Results on SNG:**
- Active Power: 4000 Kw
- Gen. Excitation Current: 3.54
- Generator L1-L2 Volts: 6.25Kv
- Phase A Current: 393Amp
- Average Current: 398
- L1 Winding Temp: 71C
- Gen B Temp A: 69C
- Container Temp: 44C
- Comp. in Air Temp. T1: 21.1C
Commissioning and Testing of SNG on 3 5.2 MW Turbine:

**Results on Natural Gas:**
- Turbine B Temp: 83.3°C
- Comp Outlet Air Pressure: 10.36 bar
- Gas Fuel Press: 14.7 Bar
- Main G/V Corrected FB: 56.1%
- Gas Fuel Flow: 120 NM3/hr
- Lube Oil Press: 4.00 Bar
- Turbine Vibration: 1.9 mm/sec
- Gear Box Vibration: 3.5G
- Generator Vibration: 0.4 mm/sec

**Results on SNG:**
- Turbine B Temp: 83.3°C
- Comp Outlet Air Pressure: 10.36 Bar
- Gas Fuel Press: 14.5 Bar
- Main G/V Corrected FB: 56.1%
- Gas Fuel Flow: 120 NM3/hr
- Lube Oil Press: 4.01 Bar
- Turbine Vibration: 1.9 mm/sec
- Gear Box Vibration: 3.6 G
- Generator Vibration: 0.4 mm/sec
# SNG Costing Rs. Per Kw

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Fuel</td>
<td>LPG</td>
</tr>
<tr>
<td>Cost of LPG (kg)</td>
<td>92.4 (Excluding Tax)</td>
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<tr>
<td>Heating Value of SNG (Btu/cft)</td>
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<tr>
<td>Specific Gravity</td>
<td>1.31</td>
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<tr>
<td>LPG/Air Ratio %</td>
<td>40/60</td>
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<tr>
<td>Cost per Kwh(Rs.)</td>
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Country’s first SNG-powered gas turbine introduced

JANUARY 14, 2012
RECORDED REPORT

Dynamic Engineering and Automation have installed country’s first SNG-LPG-air mix system for power generation at Scoby Enterprises in Karachi.

The LPG-fuelled system will operate a 5.2 MW gas turbine thus offsetting the shutdown of natural gas.

“This is a big diversification in terms of SNG applications as a supplement to Natural Gas,” said Owais Mir - CEO of Dynamic Engineering.

With the current gas scenario Dynamic Engineering and Automation is focusing on addressing the vision through strategic approach of SNG which is a blend of LPG - as a base fuel and air, and introduced a permanent solution to cater to the natural gas seasonal shutdowns in industries.

“SNG provides the Natural Gas user with an alternative in the event of a shut down which helps to keep the industries and factories running.

SNG has today become a reality for industries that find themselves disconnected from Natural Gas”, said Owais-PR

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THE NEWS e-PAPER

October 14, 2012

our correspondent

KARACHI: A local engineering firm has installed the country’s first SNG-LPG-Air mix system for power generation, a statement said on Friday. The LPG-fuelled system will operate a 5.2 MW gas turbine, thus offsetting the shutdown of natural gas. It said:

Dynamic Engineering and Automation have installed the system at Scoby Enterprises in Karachi, it said.

“SNG provides the natural gas user with an alternative in the event of a shut down which helps to keep the industries and factories running. The statement said SNG today has become a reality for industries that find themselves disconnected from the natural gas,” said Owais Mir, CEO of Dynamic Engineering

Industries in Pakistan are using this technology without any interruption in their processes. While facing severe energy crisis, the statement said SNG-LPG, by all means is the answer to the current situation of the natural gas as base fuel management in processes and turbine-based captive power industries.
Conclusion:

Soorty Denim SNG project commissioned and started up on 16\textsuperscript{th} Jan 2012 and tested on gas turbine, the power output recorded as 4.5Mw, the SNG compressed upto 12Barg and customer observed seamless transition between NG-SNG, the turbine tested upto 6 hours and all parameters noted same as of NG.
Thank You