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

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Who we are ?

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:126mmbtuh or 3640 cu.meter per hour

Discharge Pressure:15Psig

Vaporization Capacity:

WB800V X 2 = 1600GPH

No. of Venturies: 7

WHAT is SNG?

LPG

AIR

SNG: A mixture of LPG + Air to <u>simulate</u> Natural Gas

WHY use it?

Fuel Interchangeability

Use it WHERE?

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 INTERCHANGEABILTY

SNG "acts like" Natural Gas…

Wobbe Index:

a measure of the ENERGY
being provided to a combustion process.

FUEL INTERCHANGEABILTY
Wobbe Index

Natural Gas

SG = 0.6 and the Calorific value =935 BTU/SCF

$_0$ = original gas

$_m$ = SNG mix consisting of LPG and Air

$$\text{Wobbe Index} = \frac{935}{\sqrt{.600_0}} = \frac{1421}{\sqrt{1.386_m}}$$

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**

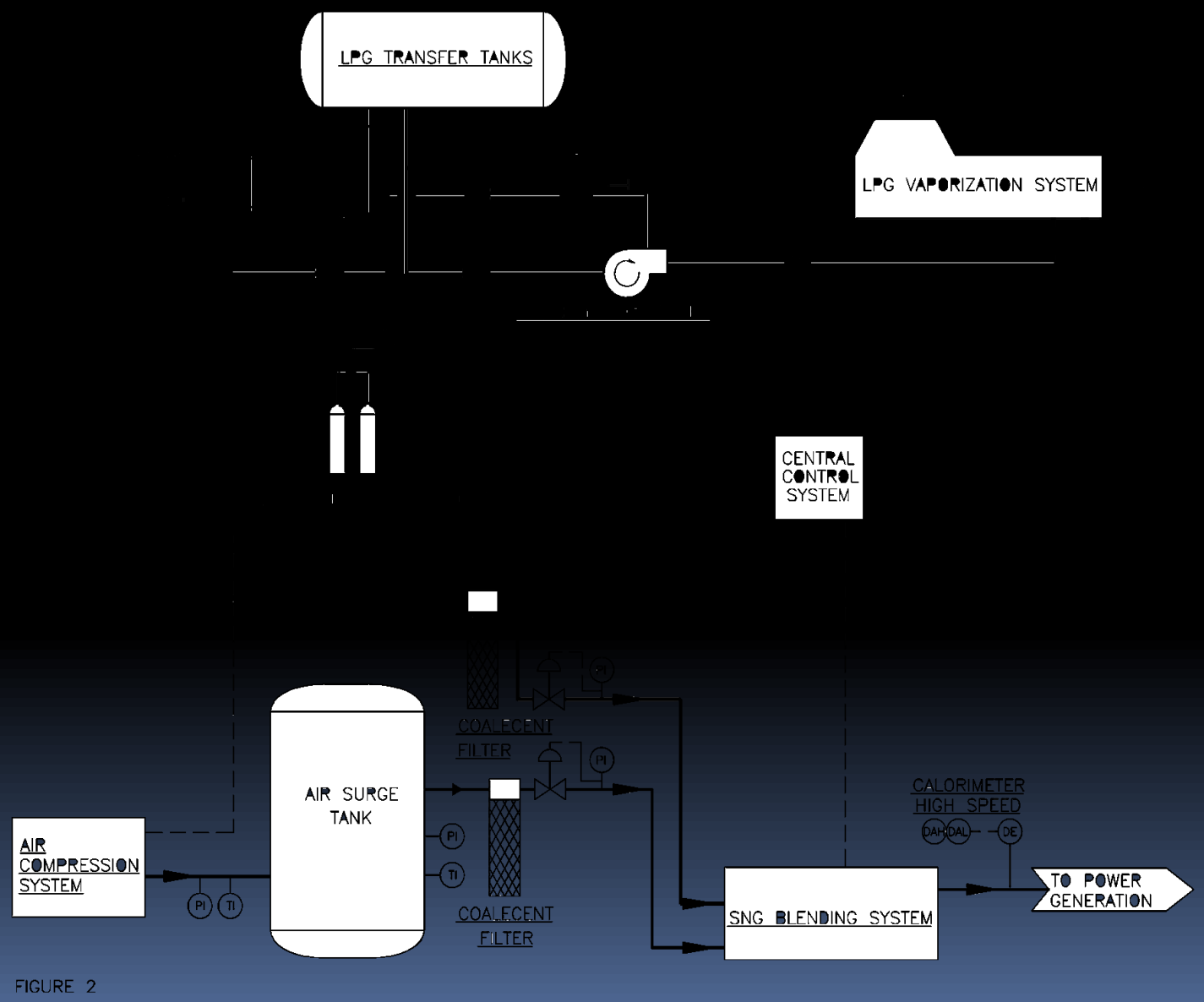
SNG Advantages

- 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

Typical SNG System



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

Fuel	LPG
Cost of LPG (kg)	92.4 (Excluding Tax)
Heating Value of SNG (Btu/cft)	1660
Specific Gravity	1.31
LPG/Air Ratio %	40/60
Cost per Kwh(Rs.)	17

News Clipping:

Country's first SNG-powered gas turbine introduced

JANUARY 14, 2012

RECORDER REPORT

BUSINESS RECORDER

Dynamic Engineering and Automation have installed country's first SNG (LPG-air mix) system for power generation at Soorty 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.

With the current gas scenario Dynamic Engineering & Automation is focusing to address 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.

It 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

INTERNATIONAL THE NEWS e-PAPER

Editor-in-Chief: Mir Shakil-ur-Rahman

SNG installs first gas turbine in Pakistan

JANUARY 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 5.2MW gas turbine, thus, offsetting the shutdown of natural gas, it said.
Dynamic Engineering and Automation have installed the system at Soorty Enterprises in Karachi, it said.
"This is a big diversification in terms of SNG applications as a supplement to the natural gas," said Owais Mir, CEO of Dynamic Engineering.
"With the current gas scenario, Dynamic Engineering and Automation (DEA) 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 shutdown. It helps 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.
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 load management in processes and turbine-based captive power industries.

Conclusion:

Soorty Denim SNG project commissioned and started up on 16th 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