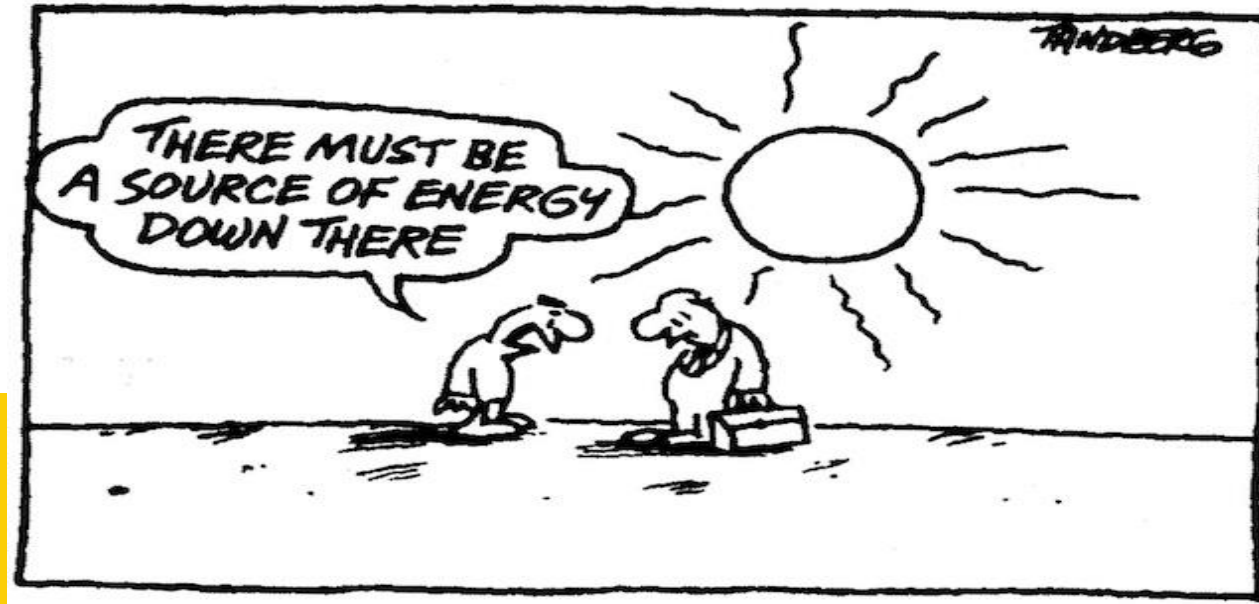




# Energy Efficiency and Renewable Energy for the Oil and Gas industry- EU-GCC Clean Energy Network

Basil Elzein  
November 9<sup>th</sup>, 2016



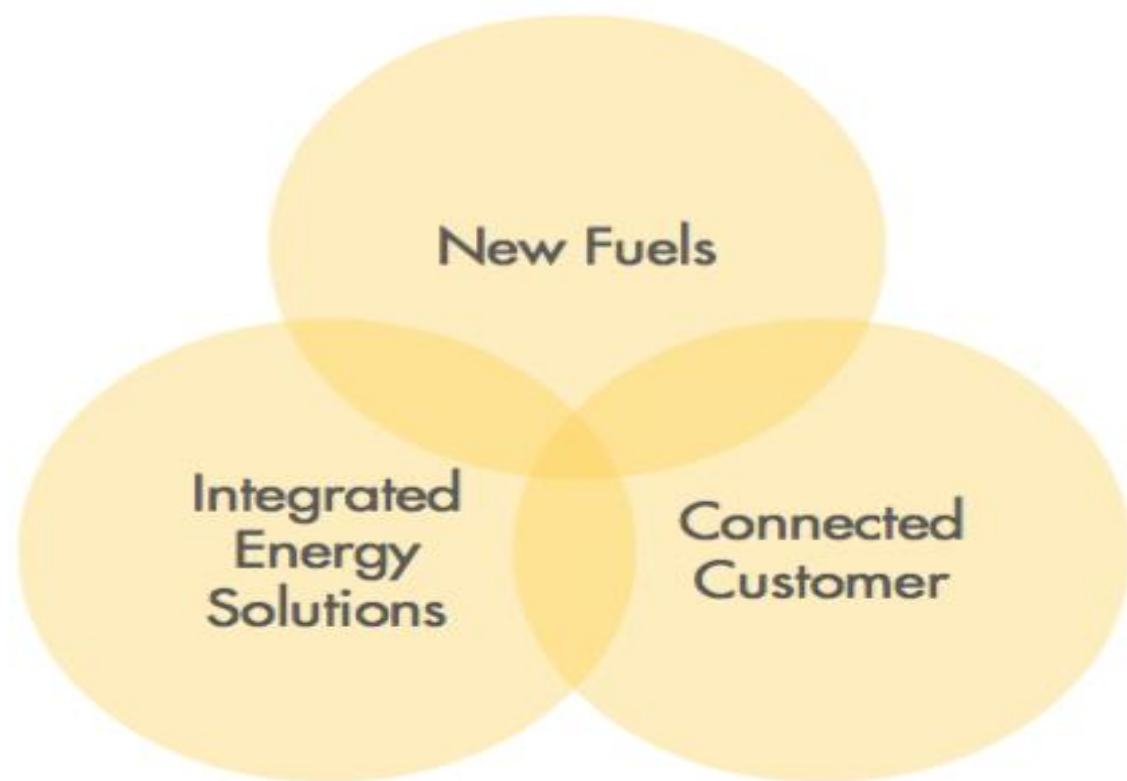
# SHELL: OPPORTUNITIES IN NEW ENERGIES

## FUTURE OPPORTUNITIES



- Material value + upside
- Assessing options + technologies
- Capped exposure

### New Energies



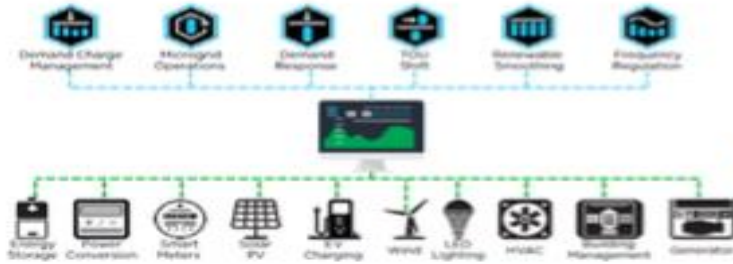
- Capital employed \$1.75 bln : biofuels, wind, solar, hydrogen
- \$200 mln estimated 2016 spend

# NEW ENERGIES R+D INVESTMENTS – OTHER EXAMPLES



## Growing Energy Labs Inc (Geli)

Geli



- Internet of Energy
- Software applications
- Link with energy storage
- Reduce cost and increase reliability of flexible electricity delivery

## Kite Power Solutions



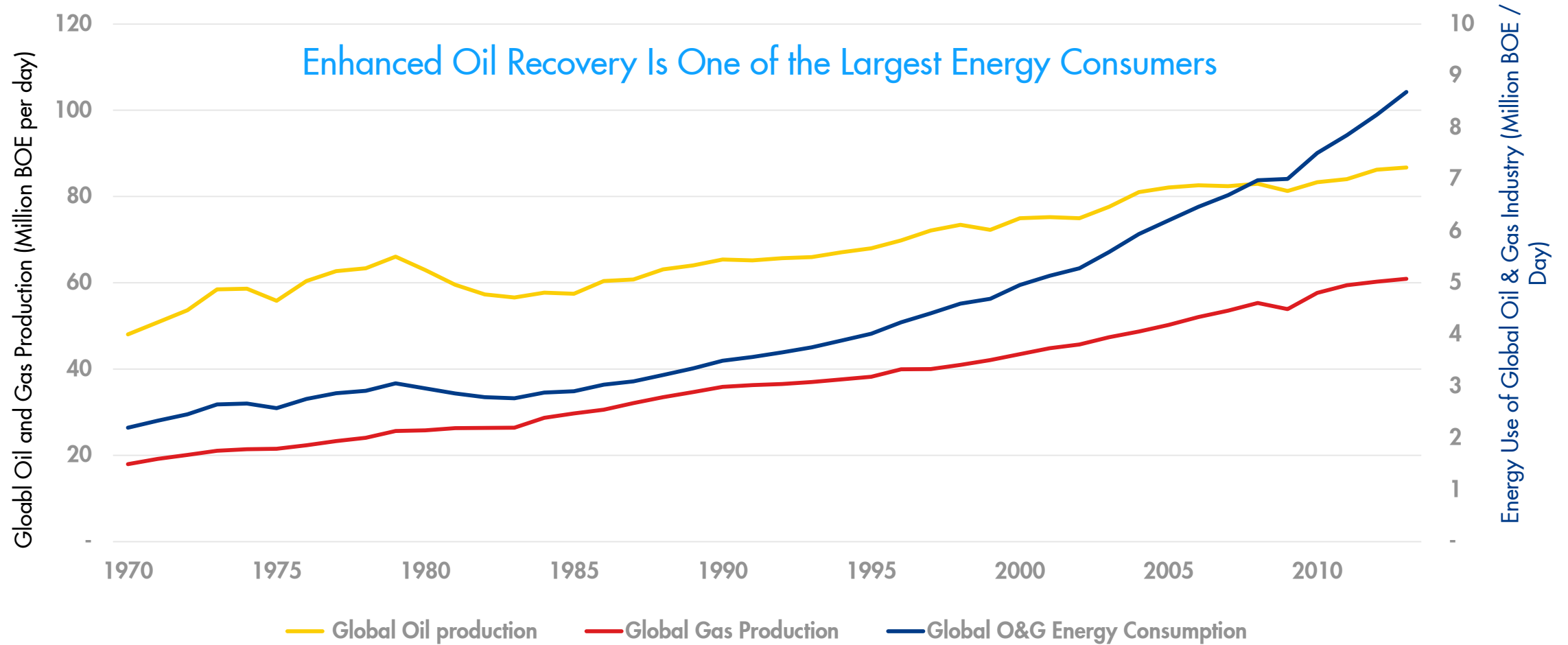
- Accessing high altitude wind which is less intermittent
- Aim to reduce the cost of wind energy

## Aquion Energy



- Develop high-performance batteries
  - non-toxic
  - cost-effective
  - industrial scale
- Balance energy production and demand

# Global Oil & Gas Energy Use ~10% global consumption



# Small scale Integration of Renewables into Oil and Gas operations



# Industrial Scale Integration of Renewables into Oil and Gas operations

Glasspoint - PDO Oman  
(California, Kuwait )



## Solar into Schools

### 3 main project objectives:

- **Contribution to Oman's energy transition**
- **Development of commercially competitive and competent Omani solar SME's**
- **Educational awareness on energy choices**

We are actively partnering and collaborating with a range of regulatory bodies, agencies and key stakeholders to help successfully deliver the Solar into Schools Project and to contribute to Oman's energy transition by helping build a platform for implementation of small-scale solar projects in Oman.

# 22

The number of PV generation systems we aim to install into public schools across all Governorates / regions in Oman, over the next 5 years.

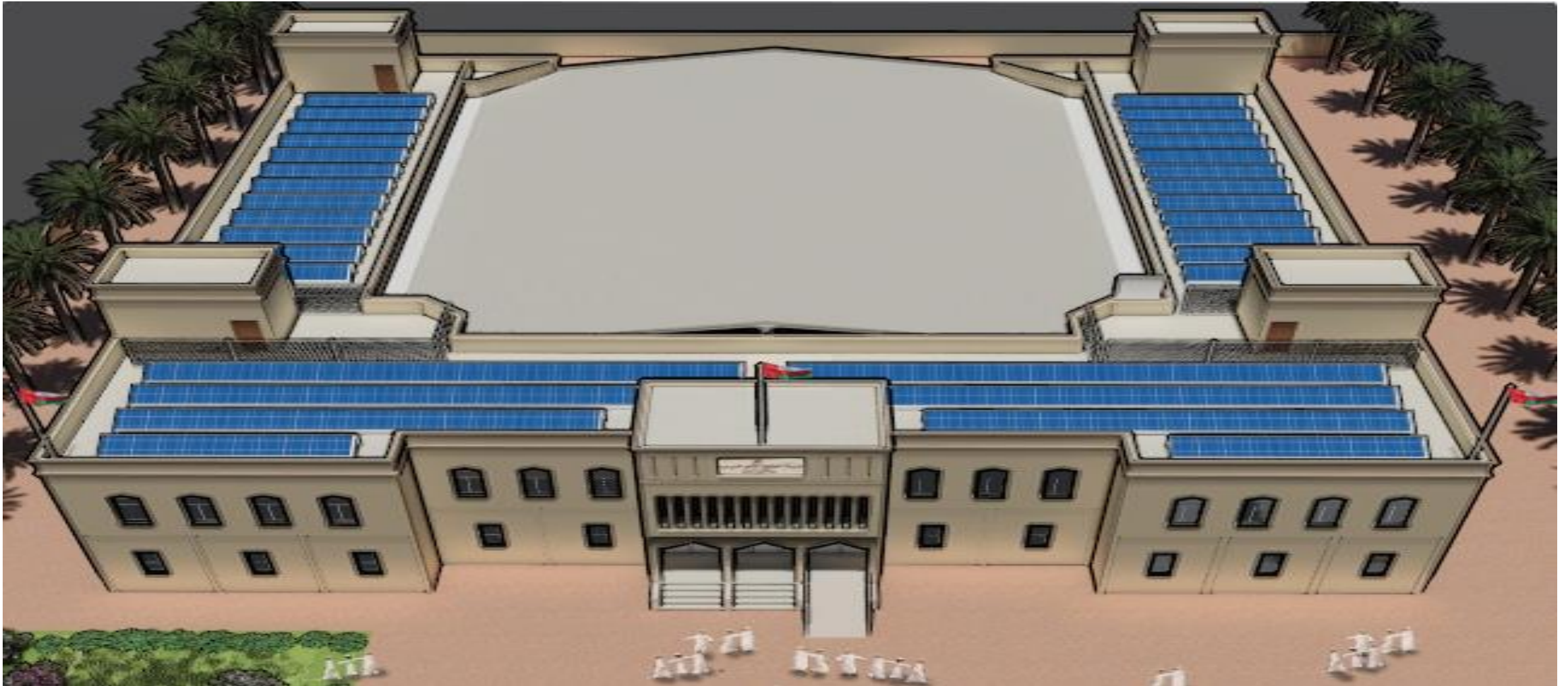
# 4

The number of our first tranche of pilot sites. These sites are located in Muscat, Al-Buraimi, Nizwa and Salalah.

# 100

The approximate size of each school PV generation system (in kW). Surplus electricity will flow back to the public grid.

# Oman's existing architecture lends itself to installation of roof top PV arrays\*



\* Indicative image only. Each site will have a bespoke design to take into account individual site conditions and/or constraints.



# CARBON AND Energy MGT INFORMATION SYSTEM (CEMIS)

## What is it?

- Current practice: Energy / CO<sub>2</sub> costs and performance gaps is largely
- CEMIS is a combination of structured management processes and monitoring and analysis tools, linked to real-time plant data systems
- Based on an established DSM standard

## What can I use it for?

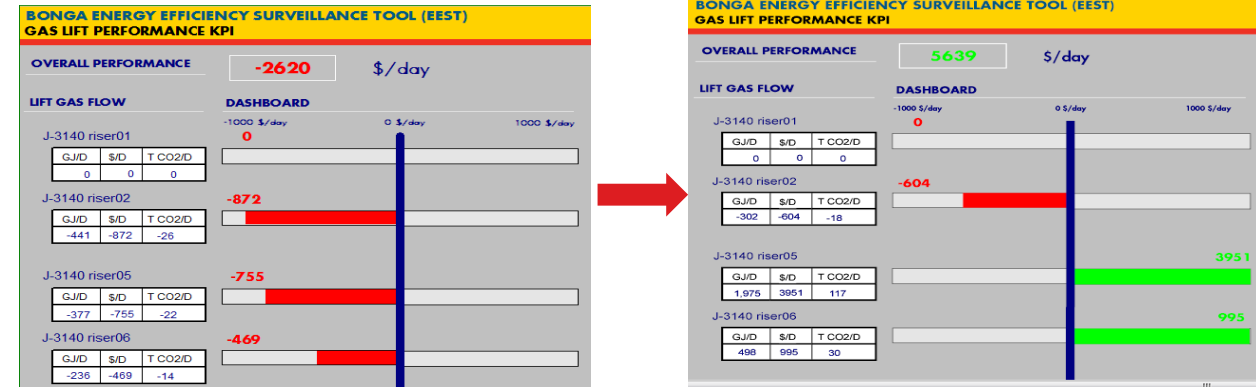
- CEMIS utilises “follow the money approach” by identifying energy drivers and setting targets depending on complexity (efforts from cross discipline work (CEM, Smartconnect, etc.) – hardware not included

## What will it get me?

- Delivers better predictable people behavior
- Reduces CO<sub>2</sub> output, saves energy, and hence Unit Operating Cost goes down and by saving fuels may increase production
- Bring improved availability through a better stable operation
- Benefit at least 5% of energy use savings

## Application Example

- Successful Upstream deployment in asset X
  - Major bad actors discussed in the EEST workshop in December 2013 are addressed, e.g Flaring, Lift gas, water injection, inert gas etc. (\$8m gained; \$6m – flaring & \$2m energy use)
  - Gains from one of the gaps (Lift gas flow), resulted in substantial (oil and gas) production increase (~\$70m)
  - Continuous effort needed for further identified gaps.



Cost to implement	Asset manpower required	Timeline FID to implementation/impact
LNG Plant: ~\$250k Conventional Plant: \$100k	Coordinator: ~40 hrs Engineers: ~40 hrs PI Team: ~50 – 60 hrs	LNG Plant: 6 months Conventional Plant: 3 months

## More Info

Maturity: D4-Su

P&T Focal Point: Oluseyi Adeyemo, GSNL-PTE/EUHT

PRODUCTION OIL	OPEX
PRODUCTION GAS	HSSE

