Introduction

Typical WWTW Layout
Electricity from Waste Water?!?

Separate the issues ....

Electricity comes from what is in the water

Step 1: Remove the solids (sludge)

Step 2: Sludge = food for bacteria
Bacteria treat waste water

Step 3: Excess sludge to gas producing bacteria
Infrastructure Required for CHP installation

Existing Infrastructure

- Anaerobic Digesters
- complete with heating system
- Flare
- Digester Gas Conditioning System
- Gas Engines
- Electrical reticulation
- Control & Instrumentation
- Civil works
Where Does It Fit In??

WWTW incl. CHP Facility
Cleaning Waste Water is Power Intensive: 18-22 kWe/Ml

Anaerobic Digestion reduces the organic load on the WWTW (a must according to municipal sludge guidelines)

Energy Source on Site – Not used currently

Anaerobic bacteria convert carbon rich organics to biogas

Approx. 50% of Capital Spend already done
On Every WWTW In SA ??

Probably not – Size Matters

WWTW of 25Ml/day or bigger

25Ml/day = 250kWe

There are 80 plus WWTW in SA 25Ml/day or greater

Biggest WWTW in SA is 450Ml/day = approx. 4.5MWe can be generated
Combined Heat & Power Plant

Power generation with thermal energy recovery for use in process or industry

100% Input

38% Electrical

50% Thermal

88%

13% Loss
**Digester Gas Conditioning System**

Biogas is a raw fuel

Biogas **must be processed** to ensure long term beneficial low cost use

Every Biogas is different and must be analysed to effectively select appropriate scrubbing technology
Digester Gas Conditioning System...

Conditioning includes:
- Compression
- Moisture reduction
- Cleaning (Removal/Reduction)
  - ✓ Sulphur
  - ✓ Non – Methane Volatile Organics
  - ✓ Siloxanes
    (Increasing annually)

Substantial increase in engine life & reduction in running costs through decrease in servicing frequency
**Gas Engine Generators**

Incl. Heat Recovery

Gensets are base load machines designed to run 24/7

Electrical Efficiency 38% plus
**Electrical, C&I Infrastructure**

The correct integration and mode of operation is critical to the success of a project

- **Plant Operational Mode**
- **Transformers and NER**
- **Earthing & Lightening Protection**
- **Synchronisation & Integration**
- **Monitoring & Control**
Skills Transfer

Private Sector Specialists – Value Add

Knowledge of Gas Quality & Volumes

Sludge Reticulation

Implications for the WWTW

Implications for the CHP
Thank You