Biogas In The Municipal Sector

Biogas to Electricity

On

Waste Water Treatment Works

Presented by:

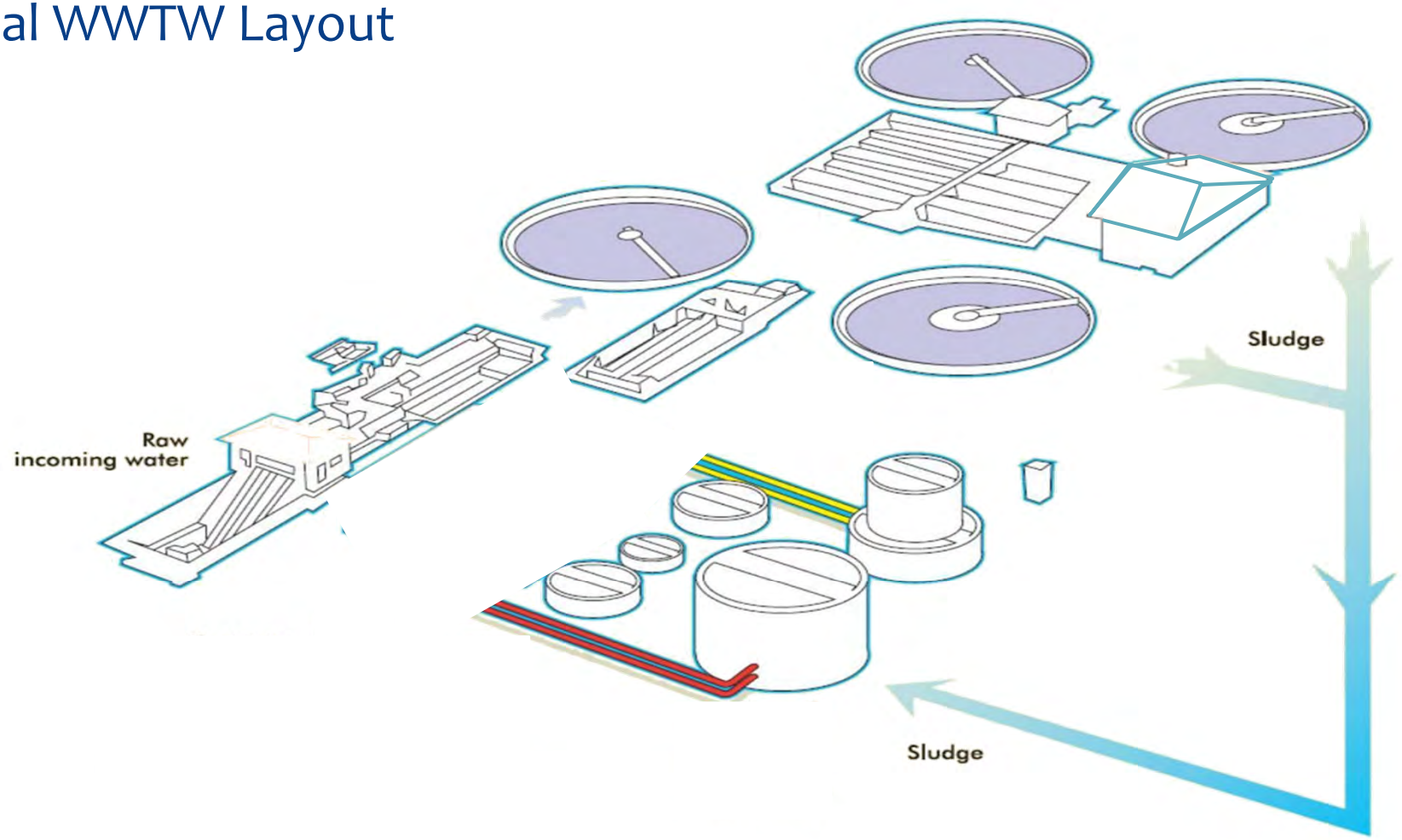
WEC Projects

WEC Projects (Pty) Ltd

- Water
- Sewage
- Biogas to energy
- Operation and maintenance

Introduction

Typical WWTW Layout



Introduction…

Electricity from Waste Water?!?

Separate the issues ….

Electricty comes from what is **in** the water

Step 1:

Remove the solids (sludge)

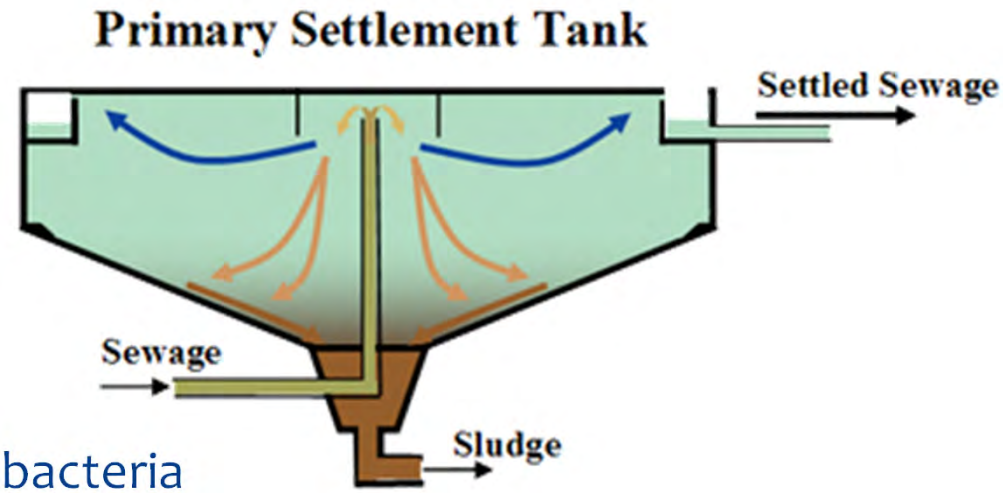
Step 2:

Sludge = food for bacteria

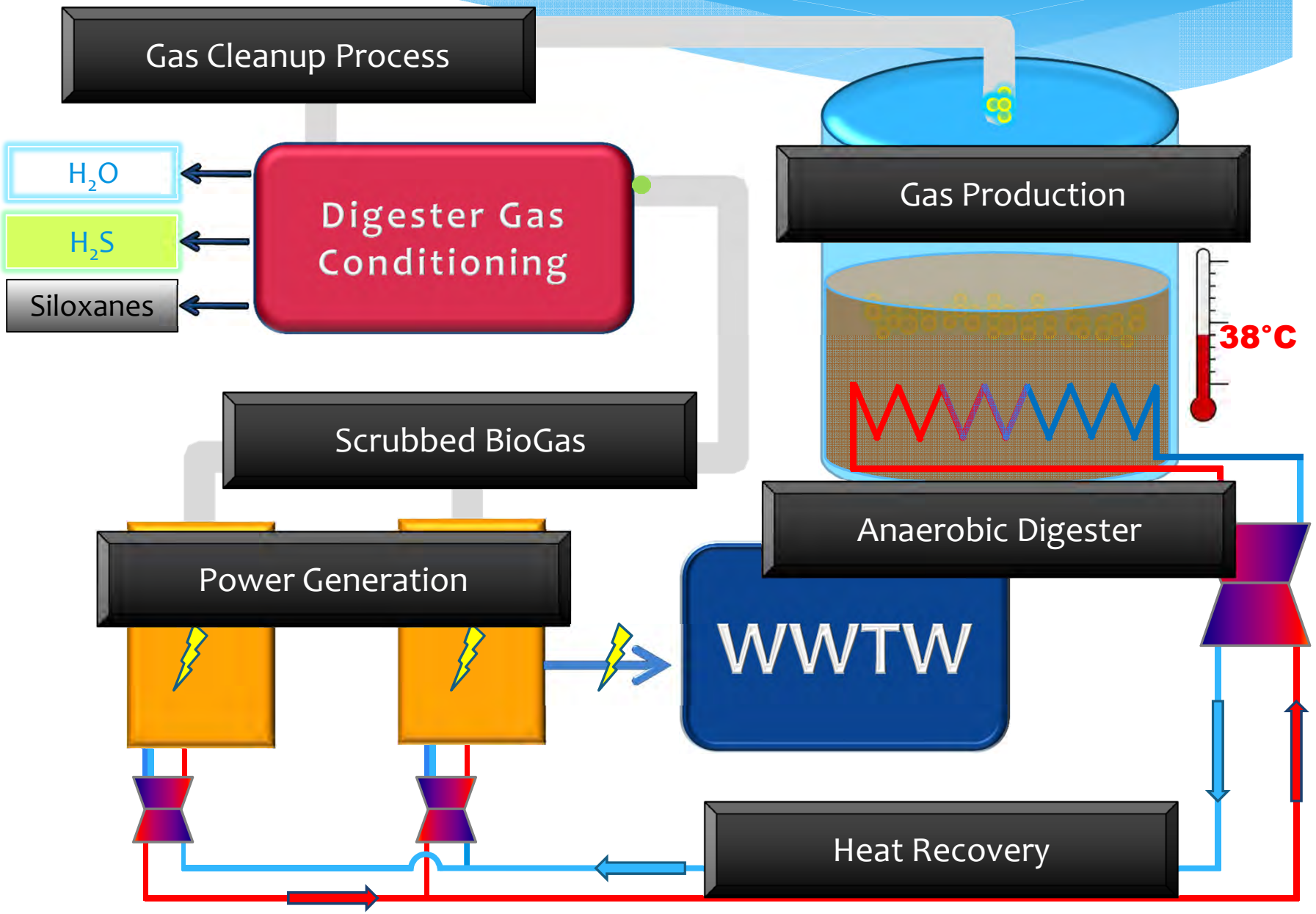
Bacteria treat waste water

Step 3:

Excess sludge to gas producing bacteria



Introduction…



What's Existing ??

Infrastructure Required for CHP installation

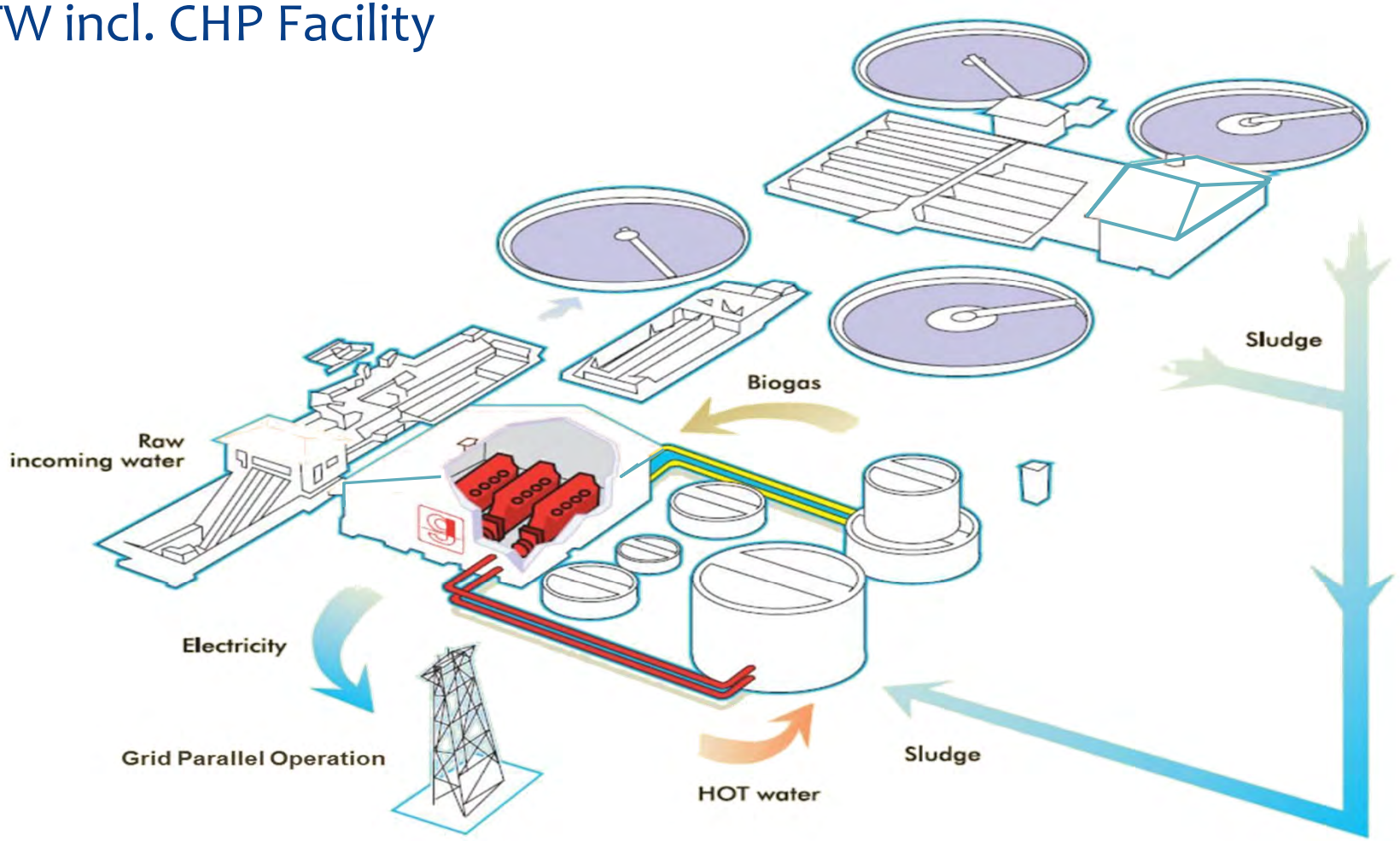
- Anaerobic Digesters
- complete with heating system
- Flare

Existing Infrastructure

- Digester Gas Conditioning System
- Gas Engines
- Electrical reticulation
- Control & Instrumentation
- Civil works

Where Does It Fit In ??

WWTW incl. CHP Facility



Is this a Good Idea ??

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

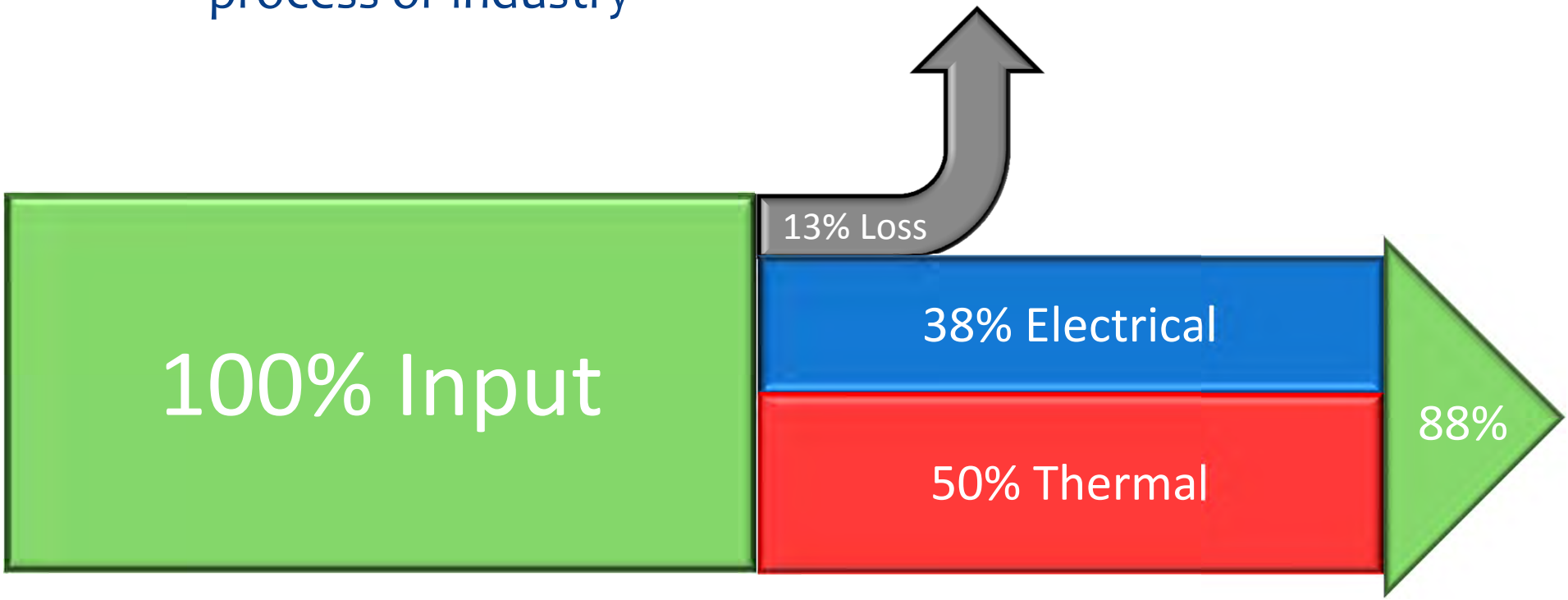
There are 80 plus WWTW in SA 25Ml/day or greater

Biggest WWTW in SA is 450Ml/day = approx. 4.5MWe can be generated

Technology

Combined Heat & Power Plant

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



DGCS…

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 approriate scrubbing technology

DGCS…

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

CHP Plant…

Gas Engine Generators

Incl. Heat Recovery

Gensets are base load machines designed to run 24/7

Electrical Efficiency 38% plus

CHP Plant…

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

Critical for Success

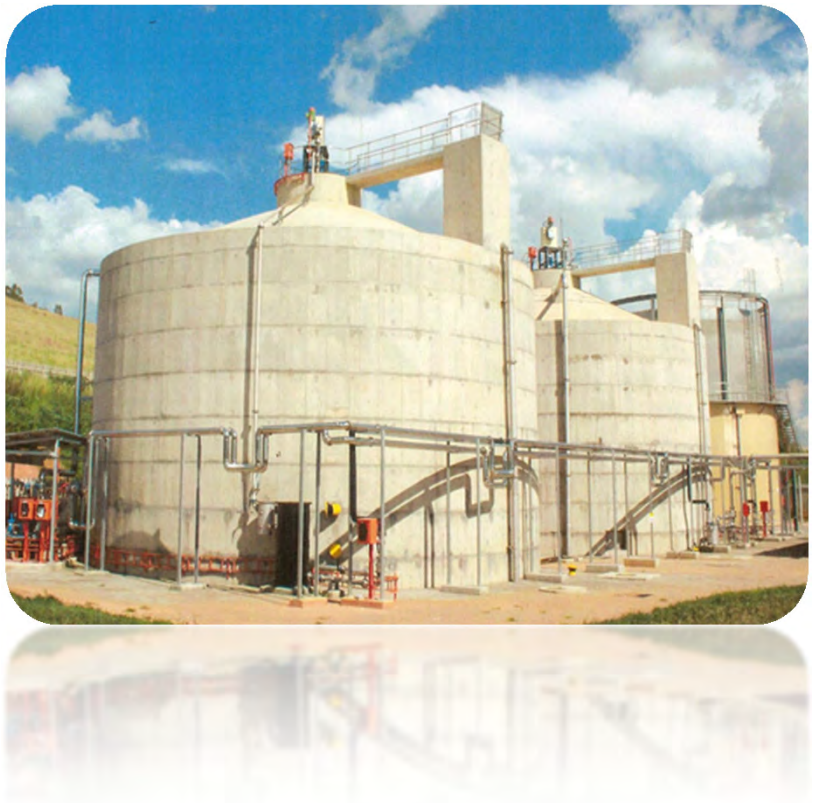
Skills Transfer

Private Sector Specialists – Value Add

Knowledge of Gas Quality & Volumes

Sludge Reticulation

- Implications for the WWTW
- Implications for the CHP



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THANK YOU