


Methane to Markets Partnership Expo 2007

30th Oct - 1st Nov 2007 in Beijing / China

Case studies from operational and planned landfill gas projects in M2M partner countries

GreenGas

G.A.S.
Technology for Green Energy




CDM Projekt Landfill Zámbiza, Quito

Ecuador

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Technology for Green Energy

CDM Landfill Project Zámbiza, Quito (Ecuador)

G.A.S. developed this CDM project in cooperation with its local partner Alquimiatec

- Domestic Landfill in Quito
- Operation: 1979 - 2002
- Municipal operator from 1993
- approx. 5 Mill. t of waste
- approx. 330.000 t per year
- Extension approx. 20 ha
- Depth of waste > 25 m
- No gas collection
- No aftercare

Project Identification

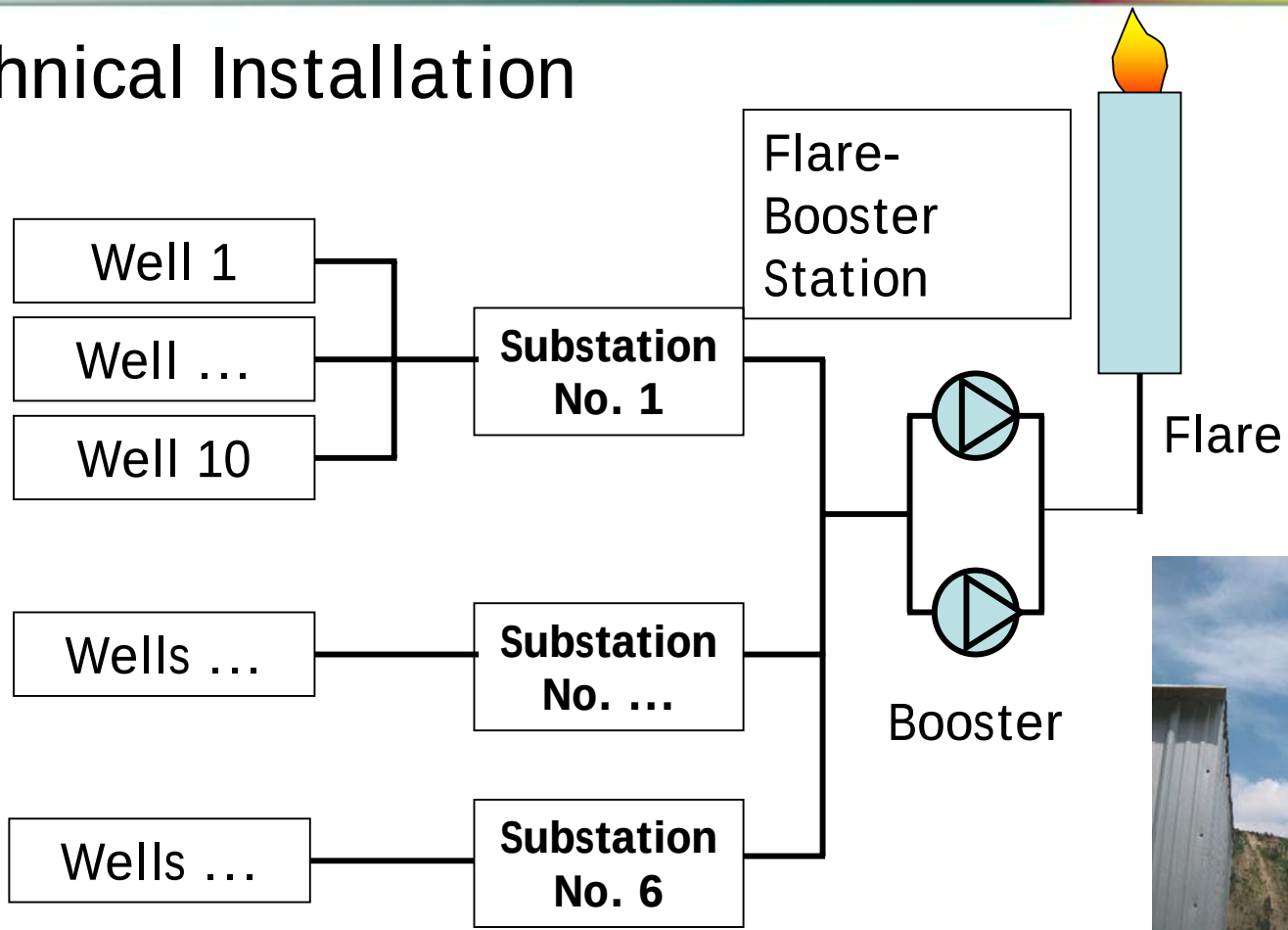
- No gas collection
- No leachate control
- No landfill aftercare

Gas Pumping Trial

Drilling

Pumping Trial / Installation of the gas collection system

Technical Installation



Description of the Project and the Implementation

Place	Quito, Ecuador
Basic Data	• More than 5 mill. t domestic waste • GHG emissions: approx. 13.000 t CH_4/year (corresponding to 273.000 t CO_2e in 2005)
Actual State of Project	• Gas capture and flare • Potential power generation in a second step
Approaches / Data of GHG reduction-potencials	1. CH_4-reduction 860.000 2. Co-generation heat (renewable) 0 3. Co-generation energy (renewable) 35.000 **Total GHG reductions** **895.000 t CO_2e**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CDM Project Landfill in Santiago

Chile

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CDM Landfill Project in Santiago (Chile)

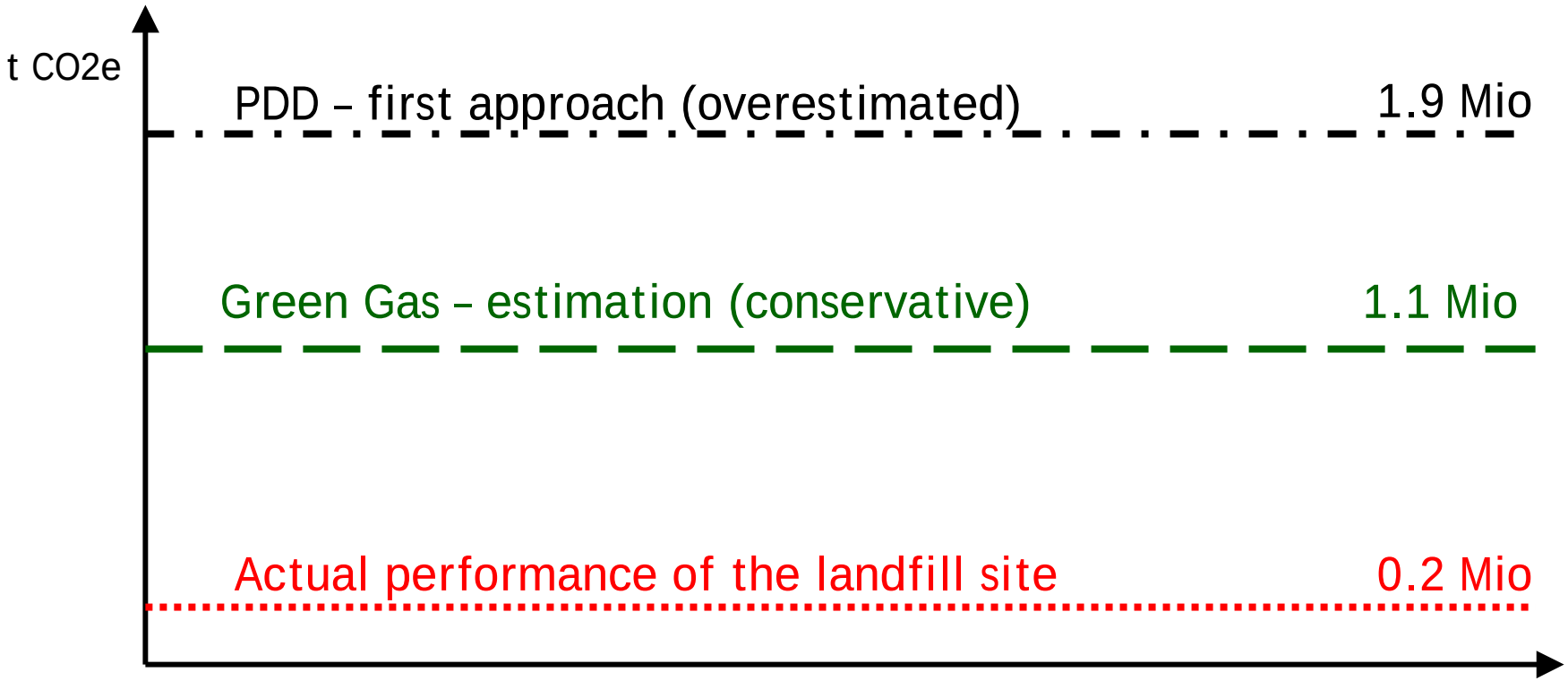
O & M Consultant Agreement between Green Gas and project owner

- Domestic Landfill in Santiago de Chile
- Operation: 1979 - 2002
- Private operator
- approx. 9,8 Mill. t of waste
- approx. 430.000 t per year
- Extension approx. 24 ha
- Depth of waste > 40 m
- Gas collection system and flare system installed in 2006

Description of the Project December 2006

Place	Santiago, Chile
Actual State of Project	• Gas capture and flare • Potential power generation in a second step
Technical Datas	• Gas installation: 74 wells (active) • Volume flow: 2.000 m³/h • Methane concentration: ~35 Vol.% • Operation- hours: 4 h/day
Approaches / Data of GHG reduction-potencials	**Total GHG reductions** **2006 – 2012 - 185.000 t CO_2e**

Objectives – Overview baselines



Objectives

- Transform the landfill site in one of the most modern and rentable landfill sites through:

  - Finding solutions for the mentioned problems
  - Optimizing equipment installed and operation
  - Training staff

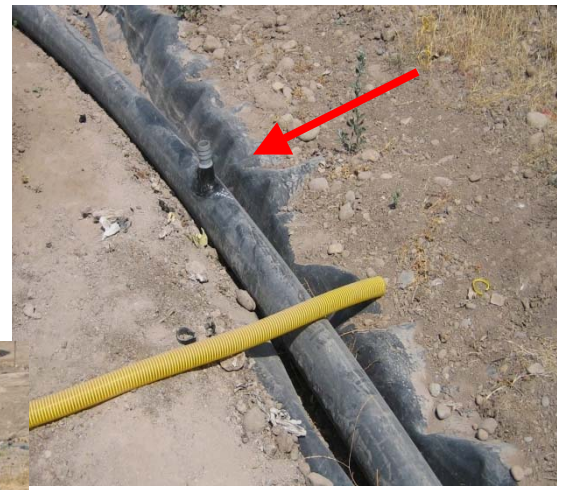
Green Gas Activities as an O & M Consultant

Phase 1: **Analysis of given situation**
(Dec 2006 – May 2007)

Phase 2: **Enhancing the output of the landfill gas utilisation system**
(Jun 2007 – Sep 2008)

Phase 3: **Monitoring services, quality supervising of the workforce on site**

Detected Problems - Design of gas collection system



Detected Problems - Air intake

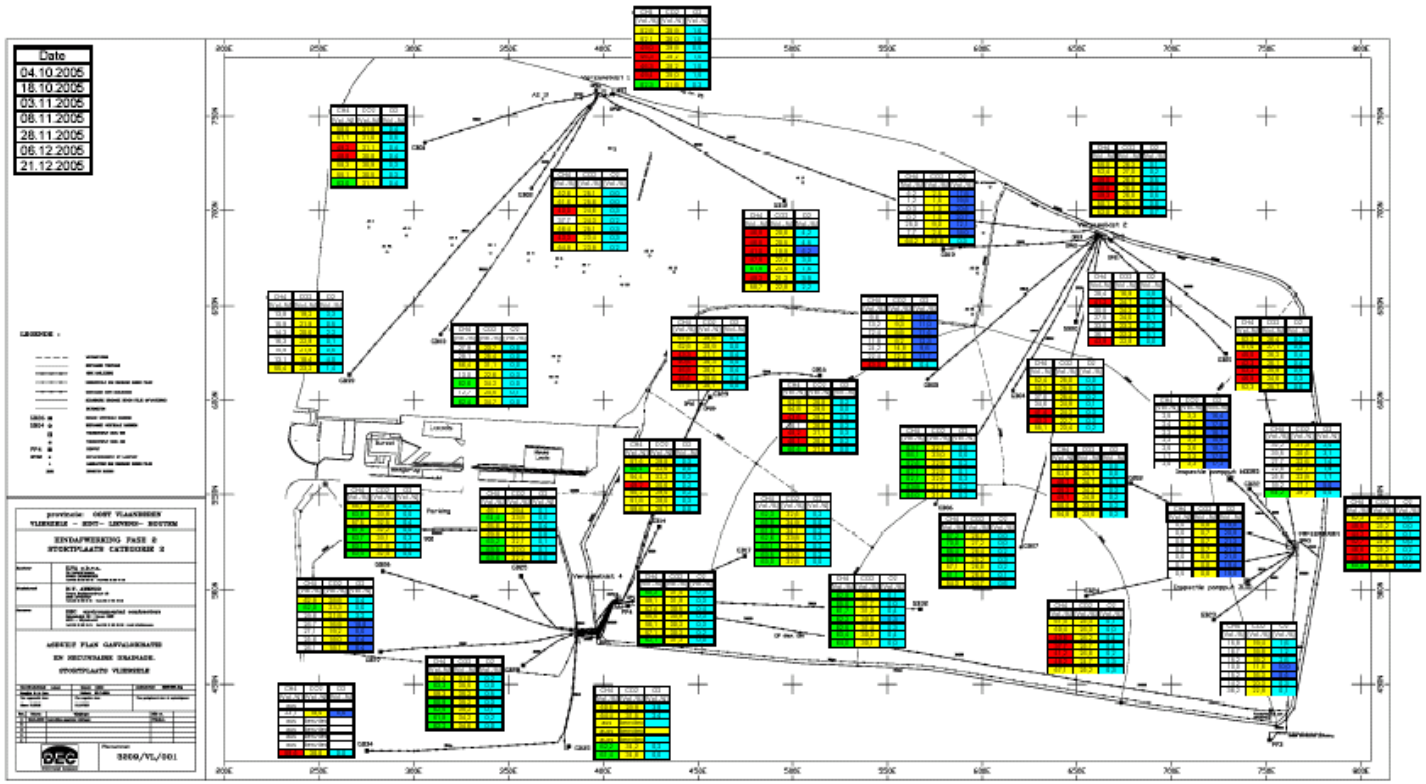
Detected Problems - Dewatering

Detected problems – Flare and booster station

- The minimum flow of the flare too high (appr. 2000 Nm³/h).
- Methane analysing system
- No oxygen analyser
- Flow regulation
- CH4-based suction

Objectives

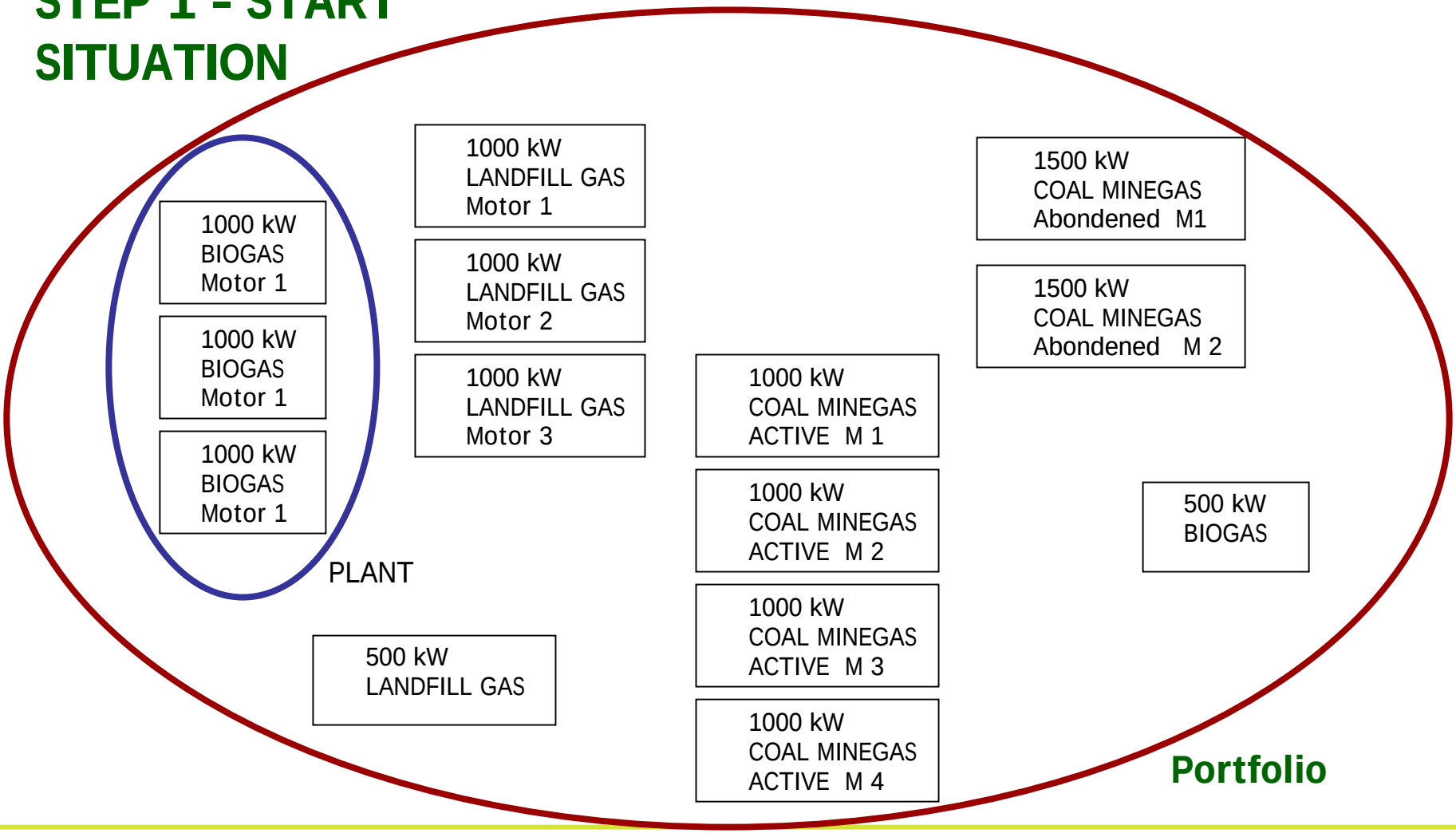
- Top-performing Plant Control (example)



Field results October - December 2005- Overview

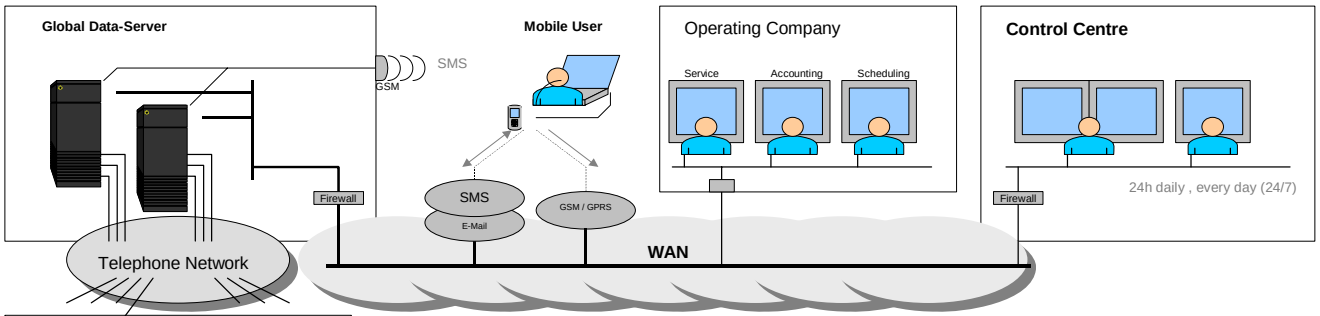
Basic principles of the Portfolio Management

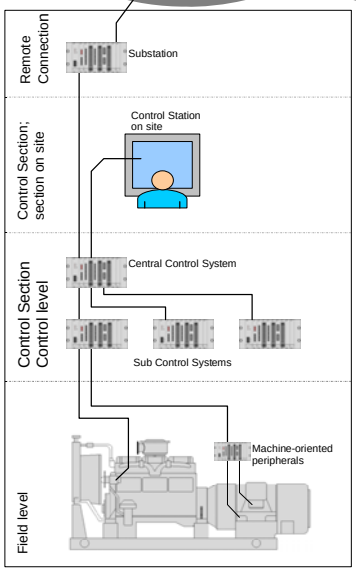
STEP 1 – START SITUATION



STEP 2 – REMOTE CONTROL CENTER

Assembly – Data Publisher





Overview of the essential parts of Kuhse Data Publisher

- DP-Navigator Client-Software
- Master-Server
- TCP/IP protocol for internet connection
- Modem an telephone network
- Telecontrol substations
- system control (switchboard)

STEP 3 – ENERGETICAL DATA COLLECTION

- Gas
  - Volume Flow
  - Methane Value
  - Carbon Dioxide Value
  - Oxygen Value
  - Suction Pressure
  - Gas Temperature
- Operation Hours
- Maintenance Hours
- Electrical Output

STEP 4 - EVALUATION OF THE COLLECTED DATAS

- Comparison between gas engine consumption and recent gas situation

  (volume flow x methane value = available gas performance)

- Operation hours X < 8760 h/a ?

- Average of power generation < installed power capacity

STEP 5 – BALANCE BETWEEN DEMAND / EQUIPMENT

Equipment	Plant	Demand	Recommendation
Gas Consumption in kW		Gas Consumption in kW	
3000	A	5000	ADD Power
5000	B	3000	DROP Power
3000	C	3000	Stay
1000	D	100	Close

5 steps for successful operations

1. Analysing the situation
2. Adopting the current operation to
   - technical needs
   - environmental needs
   - economical needs
3. Training staff on site
4. Ongoing improvement of the operation
5. Experience

Thank you for your attention!

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