Advances toward WTE in Brazil in 2010-2012

WTERT 2012 Bi-Annual Conference at Columbia University

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WASTE – TO- ENERGY IN BRAZIL

LEGAL / POLITICAL ASPECTS AND PUBLIC INFORMATION

NEW BRAZILIAN LAW -2010
+ 1,000,000 WASTE PICKERS
LANDFILL STRONG LOBBY

ECONOMICS
LOW TIPPING FEE
HIGH ENERGY PRICE
HIGH TAXES ON ENERGY

TECHNOLOGY
MB, RDF, MBT
COMB X GASIF
TECH SUPPLIER
HIGHER EFFICIENCY
WITH LOWER COSTS
LEGAL/ POLITICAL ASPECTS AND PUBLIC INFORMATION

BRAZILIAN POLICY ON SOLID WASTE MANAGEMENT (LAW 12305 → PNRS)

TOOK 20 YEARS TO PASS - WRITTEN BY CONGRESSMAN ARNALDO JARDIM

NO FINAL DESTINATION HIERARCHY. LANDFILLS ENVIRONMENTALLY ADEQUATE SOLUTION MAKING NO DISTINCTION BETWEEN BIOWASTE, COMBUSTIBLE WASTE AND INERTS. NO LANDFILL WASTE REDUCTION TARGET

VERY LITTLE LANDFILL REGULATION IN BRAZIL BUT WTE MUST ADOPT EUROPEAN DIRECTIVE ON WI 2000/76/EC WHICH IS CORRECT

ORGANIZED A TWO HOUR MEETING WITH REP. JARDIM TO EXPLAIN EUROPEAN SOLID WASTE AND LANDFILL DIRECTIVES 2008/98/EC AND 1999/31/EC

REP. JARDIM WAS IMPRESSED AND ASKED FOR WTER-T-BRASIL COOPERATION TO IMPROVE THE LAW
After the event WTERT-Brasil will offer one day course on waste-to-energy fundamentals.

This is a São Paulo Communist Party Rep. proposing a law to ban WTE in the state.
Curso - Recuperação Energética do Lixo

14h00 – 20h00 – Curso - Recuperação Energética do Lixo – Uma abordagem científica

Instrutor: Professor Sergio Guerreiro

WTERT – Waste to Energy Council Brasil

Parte 01 – 14h00 – 17h00

1. Introdução
2. Caracterização do lixo como combustível
3. Poder calorífico superior (PCS) e inferior (PCI)
4. Combustão – Tratamento dos gases
5. Queima Direta (“Mass Burning”) x CDR (combustível derivado de resíduos)
6. Comparação entre Combustão, Gaseificação e Digestão Anaeróbia na geração de energia
7. Aspectos legais – Normas Européias x Normas Brasileiras (PNRS)

Parte 02 – 17h00 – 20h00

8. Usinas Lixo-Energia (WTE) com Queima Direta com grelha móvel
8.1 – Noções básicas de termodinâmica
8.2 – Eficiência das usinas - Corrosão
8.3 - Usinas Convencionais (40 bar / 400oC)
8.4 – Usinas Avançadas de alta eficiência
8.4.1 – Amsterdam
8.4.2 – Rudersdorf
8.4.3 – Heringen
8.4.4 – Arhus
8.4.5 – Bilbao (Zabalgarbi)
8.4.6 – Sakai
8.5 – Ciclo Combinado Otimizado (CCO) – Superaquecimento externo
8.5.1 - CCO com Gás natural
8.5.2 – CCO com biogás
8.5.3 – CCO com syngas (gás de síntese)
9. Viabilidade Econômica
9.1 – Metodologia – Financiamento, Tributos, Taxa de Disposição Final, Venda da Energia
9.2 – Estudo de caso 1 - Usina Convencional
9.3 - Estudo de caso 2 - Usina com CCO

20h00 - Encerramento do curso e entrega de certificados.
ECONOMICS

• TIPPING FEES VARY FROM US$ 20 (RIO DE JANEIRO) TO US$ 40 (SOME CITIES IN SÃO PAULO)

• ELECTRICITY PRICES HIGH DUE TO HEAVY TAXES

• FIRJAN (INDUSTRY FEDERATION OF RIO DE JANEIRO) PREPARED REPORT ABOUT INDUSTRY ELECTRIC ENERGY PRICES FOR DIFFERENT COUNTRIES AND COMPARED WITH BRAZIL BEFORE AND AFTER TAXES
Gráfico 1 – Tarifa industrial de consumo de energia elétrica – estados brasileiros e países selecionados (R$/MWh)  (1 US$ ~ R$ 2)

BRAZIL AVERAGE= US$ 165 / MWh
27 COUNTRIES AVERAGE= US$ 108 / MWh

Gráfico 2 – Custo de GTD do Brasil e tarifas internacionais finais de energia elétrica industrial (R$/MWh)

EE BEFORE TAXES – JUST GENERATION TRANSMITION AND DISTRIBUTION

BRAZIL = US$ 83 / MWh

NEW RESOLUTION FOR WTE 100% DISCOUNT FOR WIRE USAGE<30 MWe

ECONOMICS

• BRAZILIAN WTE PLANTS SHOULD RELY MORE ON ELECTRICITY SALES THAN TIPPING FEES BECAUSE THE MUNICIPALITIES ARE SUPPORTED BY THE LAW SAYING LANDFILLS ARE ADEQUATE

• WITH LITTLE REGULATION LANDFILLS ARE CHEAPER

• NIMBY WORKS IN FAVOR OF WTE BECAUSE LANDFILL SPACES ARE HARD TO FIND AND MSW TRANSPORT IS EXPENSIVE (RIO’S LANDFILL 80 KM FROM DOWNTOWN)

• HIGH EFFICIENCY MUST BE CONSIDERED BUT EUROPEAN SOLUTIONS ARE VERY EXPENSIVE
• FIRST BRAZILIAN WTE PLANT BEING BUILT IN SÃO PAULO (BARUERI)

NEW WM COMPANY                              EPC                              GRATE TECHNOLOGY
SÃO PAULO                                      EXPERIENCE WITH LOW BTU WASTE

TECHNICAL DATA ➔ 825 TON/D
LHV = 6,700 KJ/Kg (64 MWth)
STEAM 61 bar / 400°C    CONDENSER 0.1 bar
GROSS POWER = 16.5 MWe

IS BUYING (20,000 TPD OF MSW INCLUDING RIO)

WTERT BRASIL IS PARTICIPATING IN DUE DILIGENCE TO CHECK FEASIBILITY. IDEA IS TO BUILD 16 WTE PLANTS AROUND THE COUNTRY
TECHNOLOGY

• **WTERT BRASIL** CANNOT BE LIMITED TO POLITICAL AND ECONOMIC ISSUES

• ENVIRONMENTAL IMPACTS AND TECHNOLOGICAL SOLUTIONS MUST BE CONSIDERED

• BRASKEM, ONE THE BIGGEST PLASTIC RESINS MANUFACTURERS IN THE WORLD, STABLISHED A PARTNERSHIP WITH **WTERT BRASIL** TO STUDY CHEMICAL RECYCLING OF PLASTIC WASTE

• ALSO THE ESPECIAL COMBINED CICLE NG/MSW IS BEING SERIOUSLY CONSIDERED BY FOXX TO IMPROVE FEASIBILITY WHERE TIPPING FEES ARE LOW LIKE RIO DE JANEIRO

• WE HAVE PROPOSED A VERY SIMPLE APPROACH USING A GAS ENGINE INSTEAD OF GAS TURBINE AND SINCE THE NG CONSUMPTION IS VERY LOW IT CAN BE REPLACED BY LANDFILL GAS (IN CASE THE PLANT IS NEAR THE LANDFILL – HAZTEC HAS MANY)

• OR NG CAN BE REPLACED WITH SYNGAS FROM NON RECYCLABLE PLASTICS/BIOMASS GASIFICATION

• THIS IS A GOOD APPROACH TO ATTRACT LANDFILL PEOPLE TO WTE BECAUSE FEASIBILITY OF COMBINED CICLE USING LANDFILL GAS IS VERY HIGH
MSW eff = 31%    NG eff = 51.6%    NG share = 12%
FEASIBILITY (TIP = U$44; U$87/MWhe; 30% EQUITY; INTEREST RATE 8.25%)

IRR X NG (BIOGAS COST)

- ENGINE AND BURNER WITH NG OR LANDFILL GAS 420°C - 440°C
- NG ENGINE - SYNGAS BURNER 420°C
- ORIGINAL CASE

- LF GAS
- GN
- SYNGAS + NG

- OCC1-hp98420lp30420
- OCC2-hp98420lp30420c/syngas
- OCC3-hp98440lp30420
- ORIG-CONFIG ORIGINAL SEM OCC
- U$ 8/MBtu
THANK YOU VERY MUCH

www.wtert.com.br

SERGIO GUERREIRO RIBEIRO