5th CEWEP Congress on Waste-to-Energy 2010

30 June to 2 July, in Antwerp

New WtE projects in Europe and worldwide

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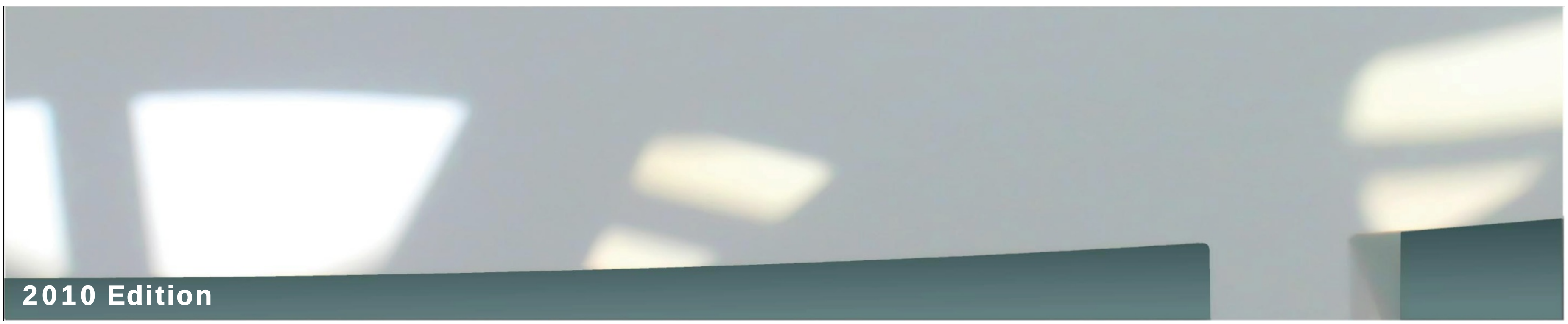
Contents

1. Statistics on WtE - Market in Europe

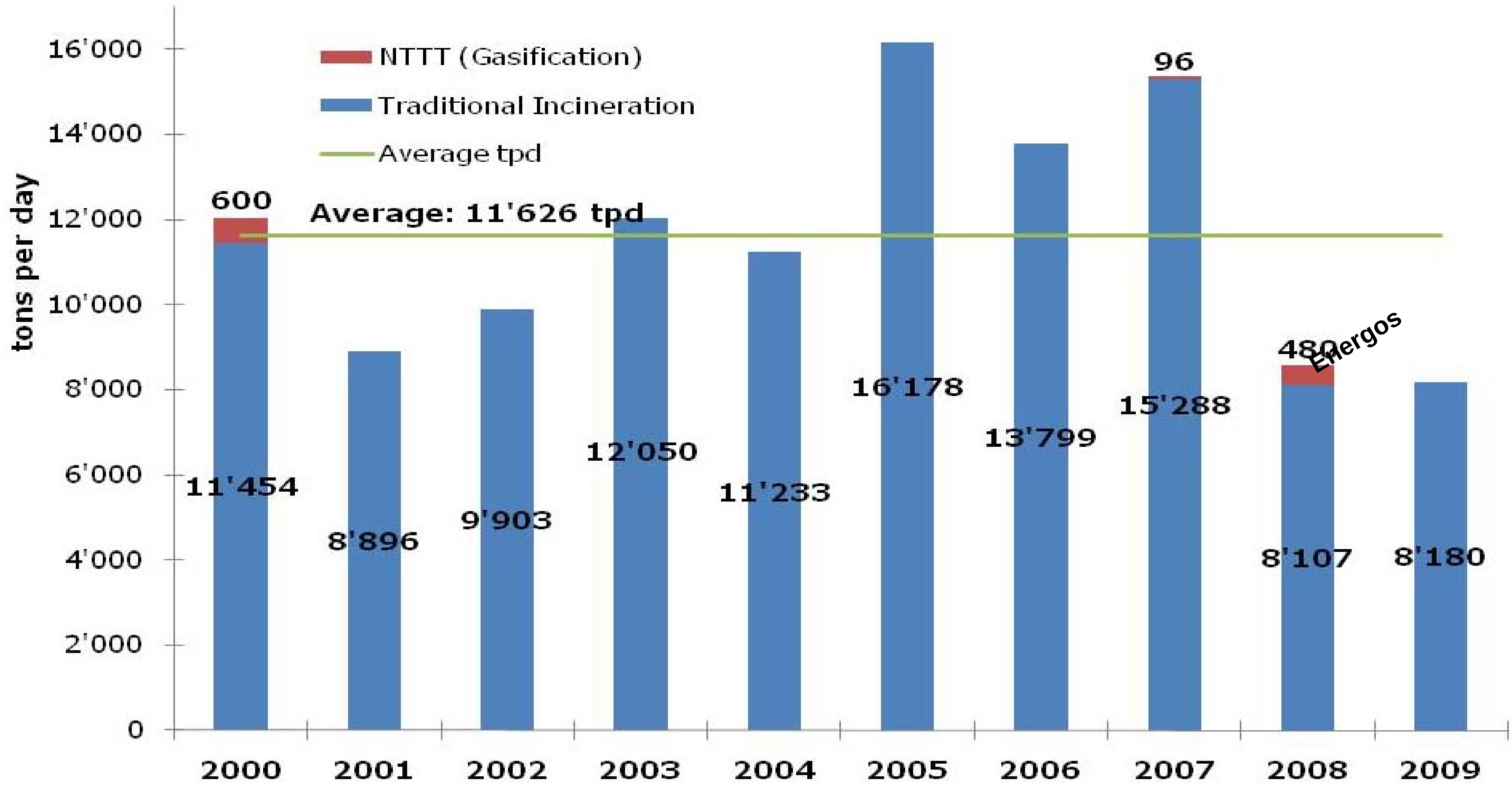
European Market Share Analysis of Thermal Waste Treatment Plants

Martin GmbH

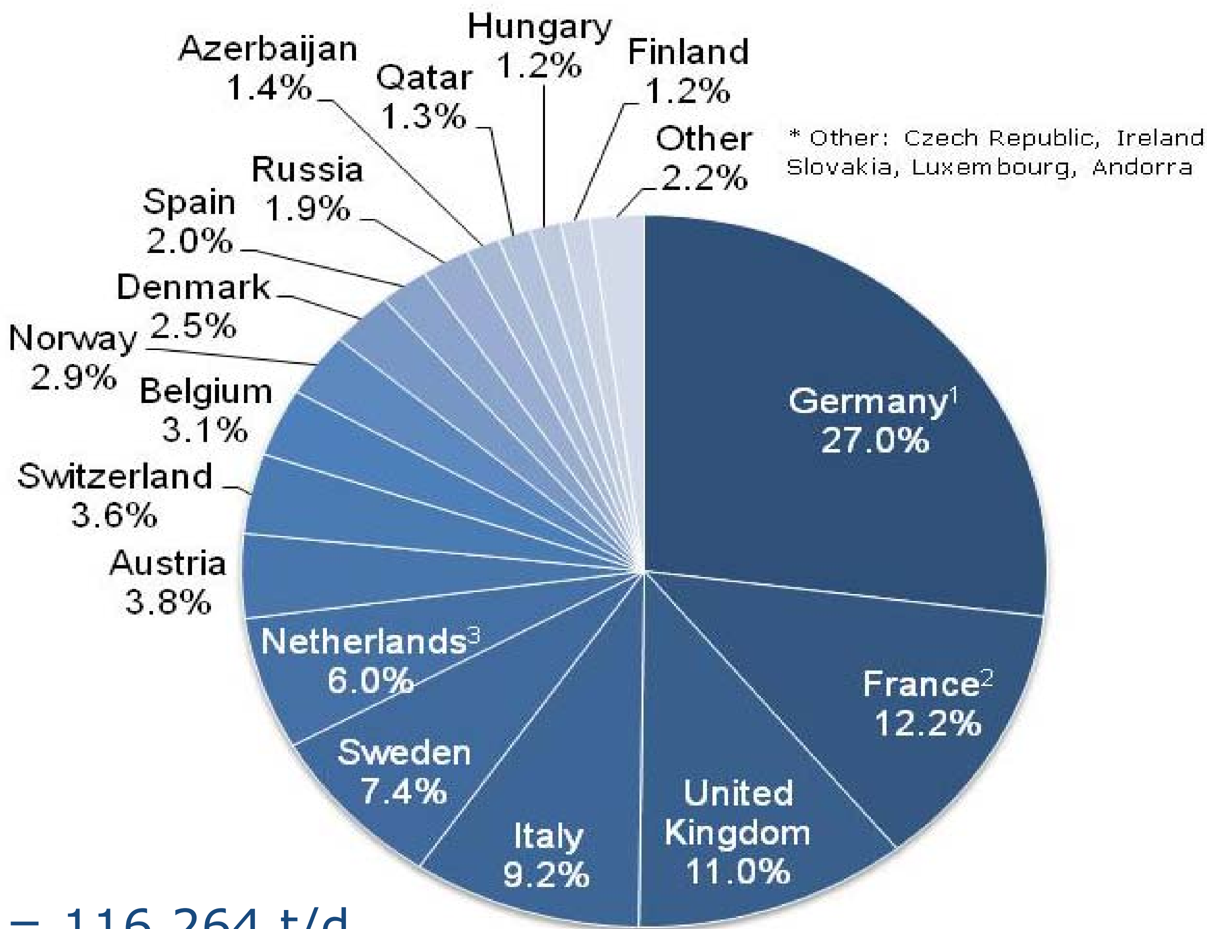


Vaccani, Zweig & Associates

European Plants / Awards 2000 - 2009



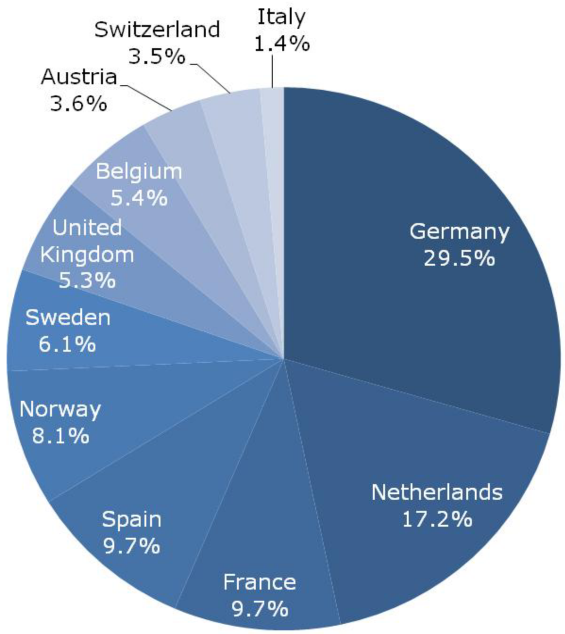
European Plants / Awards 2000 - 2009 (Countries)



total = 116,264 t/d

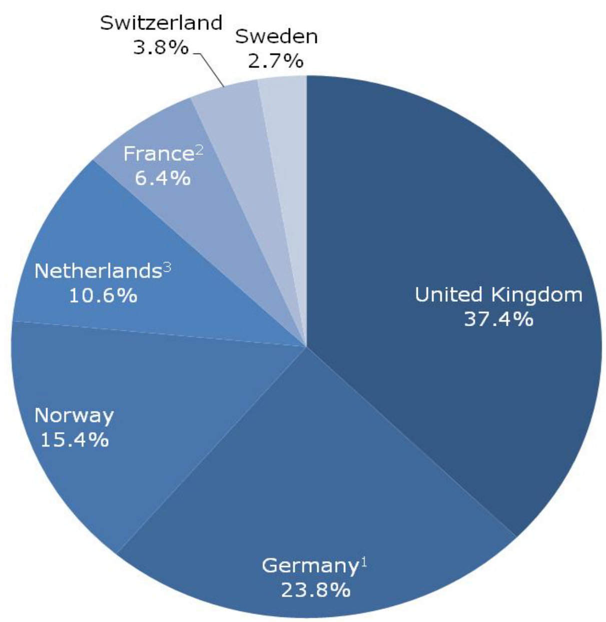
European Plants / Awards 2007/2008/2009 (Countries)

2007



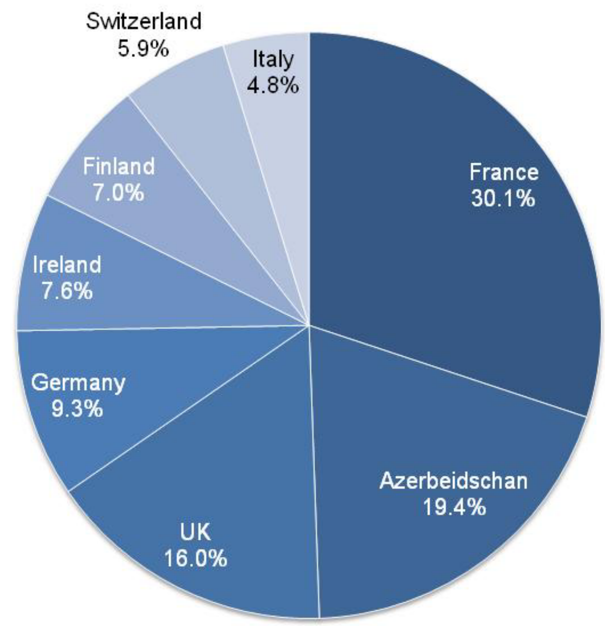
total = 15,288 t/d
number of awards: 29

2008



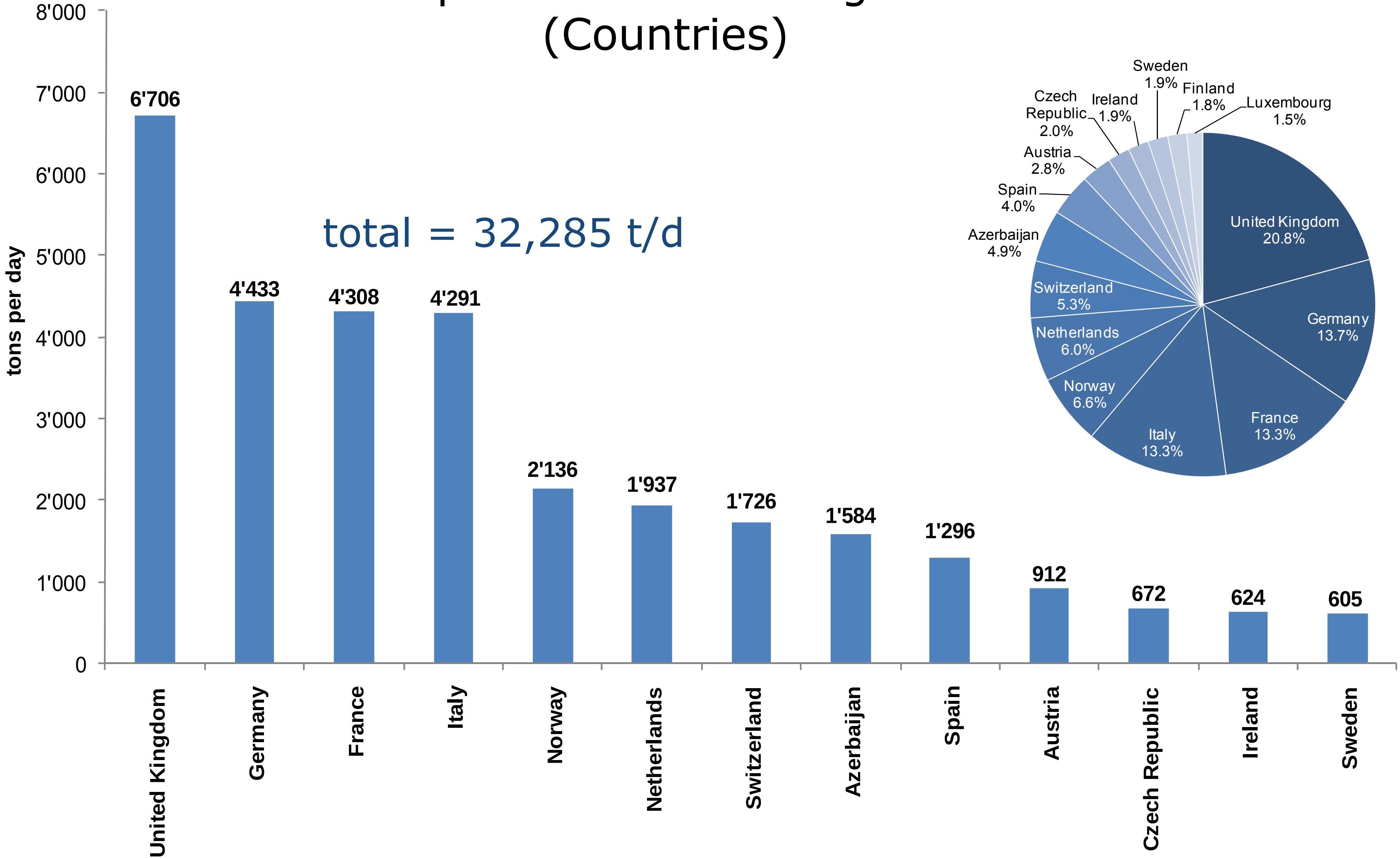
total = 8,107 t/d
number of awards: 14

2009

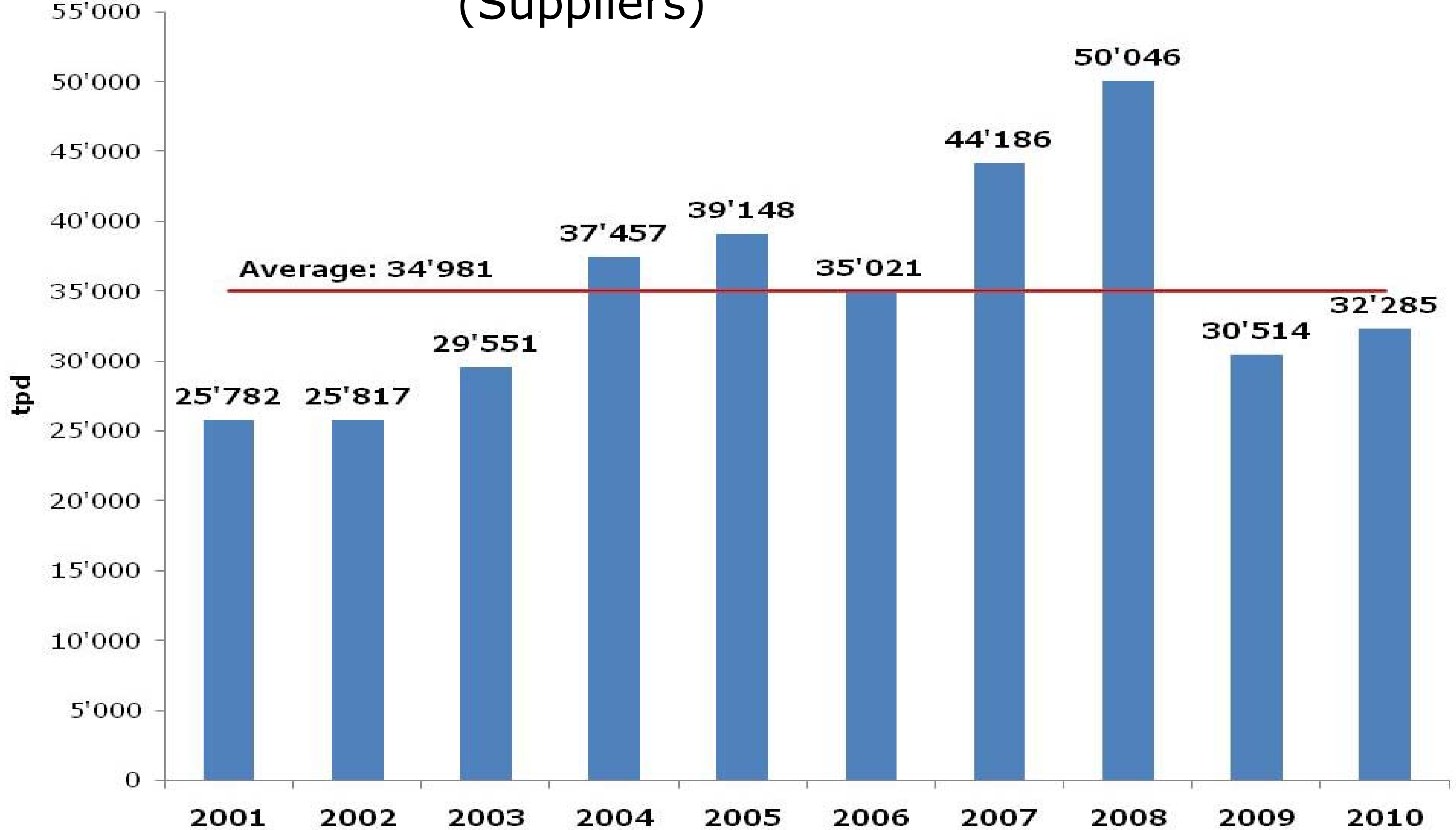


total = 8,180 t/d
number of awards: 9

European Order Backlog 2009 (Countries)



Development of Order Backlog 2001 - 2010 (Suppliers)



2. WTE - Market in Europe / General Statements (1)

- In general, the market dynamics are relatively slow
- The German market had a complete breakdown - only one project has been awarded in 2009 (IGNIS-Spremberg)
- Many new plants have been built in D during the last years, mainly to burn RDF
- New plants in D caused overcapacities with the result of reduced tip fees on the market
- Overcapacities in D might also influence waste flows to and from neighboring countries

2. WtE - Market in Europe / General Statements (2)

- In Netherlands a moratorium has been put in force not to build new WtE plants til 2020
- Norway is saturated
- Sweden is also facing overcapacities (but still some projects for new installations existing)
- Some market volume expected in Finland as well as in Austria and Switzerland
- Denmark shows good prospect for new projects
- East Europe is moving ahead very slowly (mainly Poland)
- Markets with good volumes for the coming years are UK and Italy

2. WtE - Market in Europe / General Statements (3)

- Order backlog in the books of key market players decreasing
- Number of competitors stable
- Price level remains low, mainly in Germany, Italy, Scandinavia and UK
- Future energy and material costs hard to predict
- Sub-suppliers raise price level after a drop in 2009
- Boiler manufacturers suffer from overcapacities and remain aggressive
- Increasing risks / influences by currency exchange rates

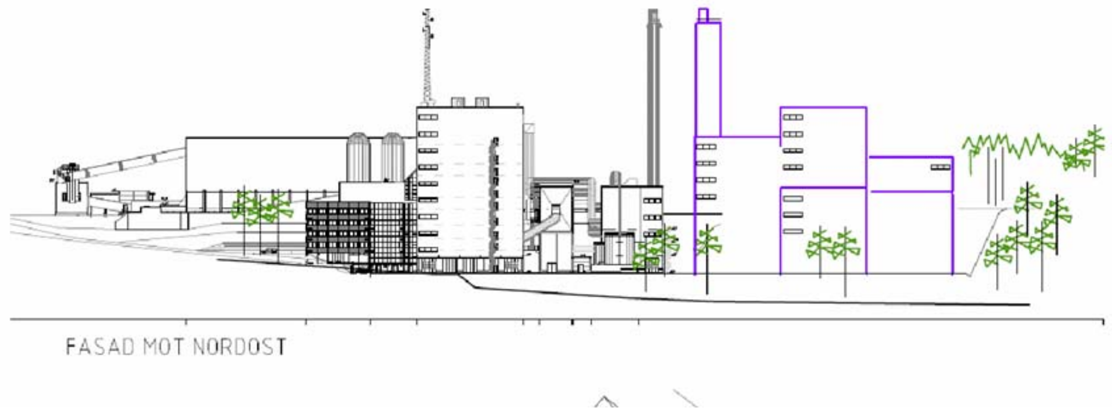
2. WtE - Market in Europe / General Statements (4)

- Grate incineration is - by far - the leading technology for WtE
- Some fluidized bed plants have been installed, but operational experience is not always satisfactory
- Some (but few) gasification activities (mainly UK)
- Funding of gasification/conversion technologies in UK

2. WtE - Market in Europe / General Statements (5)

- Technology-trends:
  - High Efficiency plants =>high energy output
  - Extensive use of Inconel (complete furnace / first pass, superheaters)
  - Shower cleaning
  - Explosive (gas) cleaning
  - Low temperature catalysts
  - High dust / high acid catalysts
  - Dry bottom ash discharge (Switzerland)

3. WtE - Market in Europe / Countries



WTE project Stockholm Brista

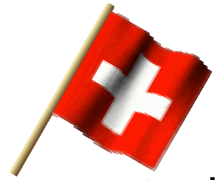
Germany

- Only one project awarded in 2009
- No award expected in 2010
- Maybe replacement in existing plants in future

Austria

- Vienna-Spittelau (retrofit of two existing lines; rfp expected 2010)
- Some projects in early development stage

Switzerland



- Buchs / Aargau (retrofit of existing line; rfp expected 2010)
- Replacement of/in existing plants in development

Netherlands

➢ Moratorium in Dec. 2009 not to build new WtE until 2020

Denmark

➢ Roskilde / KARA and Kjellerup / L90 in bidding procedure)

➢ Vestforbraending (new line; rfp expected 2011)

➢ Projects in earlier stages of development (Amagerforbraending, Arhus, Nordforbraending)

Finland

- Helsinki (400,000 t/y; operator selected; bidding procedure)
- 2 plants recently ordered
- Several other projects under development

Norway

- 2 plants/lines recently ordered
- Other projects under discussion

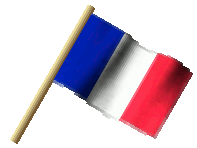
Sweden

- 2 plants recently ordered
- Other projects under development

Italy

- Bolzano, Parma and Torino recently ordered / begun construction
- Milano Sud (2nd plant in Milano; rfp expected in 2011)
- Many projects under discussion
- Delays are ‘normal’
- Cancellation of projects, new rfp is ‘normal’
- Projects in the north more likely to be realized; in the south entirely unpredictable

France



- Market is fairly quiet
- If at all, projects are rather small
- Replacement of Paris-Ivry (rfp in 2011/12?)
- Several projects in early stages of development

Great Britain

- Most active market in Europe
- Many developers (operators) are present
- Procedure for PFI projects is rather complex / long
- Latest DEFRA list for PFI projects contains > 30 projects
- Most projects are BOO
- Several rounds of bidding necessary with substantial cost for developer
- Some merchant plant developments
- Plant construction expected to start 2011/2012

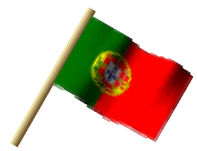
Ireland

- One plant under construction, one under permitting
- Severe resistance from locals and politicians
- Development of more projects difficult/questionable

Greece

- No serious projects at the moment
- Plants needed, but hardly feasible considering the financial situation

Portugal



- Extension of existing plant(s) under discussion
- New projects difficult

Spain

- Have built many Ecoparc’s
- Several new projects / extensions under discussion; time frame for realization unclear

East European Countries (1)

- Bulgaria:
  - Some projects in early stage of development

- Croatia:
  - Some projects in early stage of development

- Hungary:
  - Some projects in early stage of development

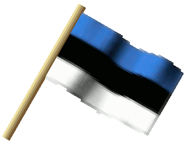
- Romania:
  - Projects in Bucarest and Timişoara in early stages of development

- Slovenia:
  - Some projects in early stage of development

East European Countries (2)

- <u>Czech Republic:</u>
  - ➢ Some projects in early stage of development

- <u>Estonia:</u>
  - ➢ Tallinn awarded



- <u>Lithuania:</u>
  - ➢ Klaipeda awarded
  - ➢ Other projects under discussion

East European Countries (3)

- Poland:

  - Total of 12 projects on so-called 'indicative list'
  - Financed by the EU up to 60%
  - Deadline for financial support is 30.6.2010; will be met by very few (if any)
  - Some other projects also under development
  - First order???

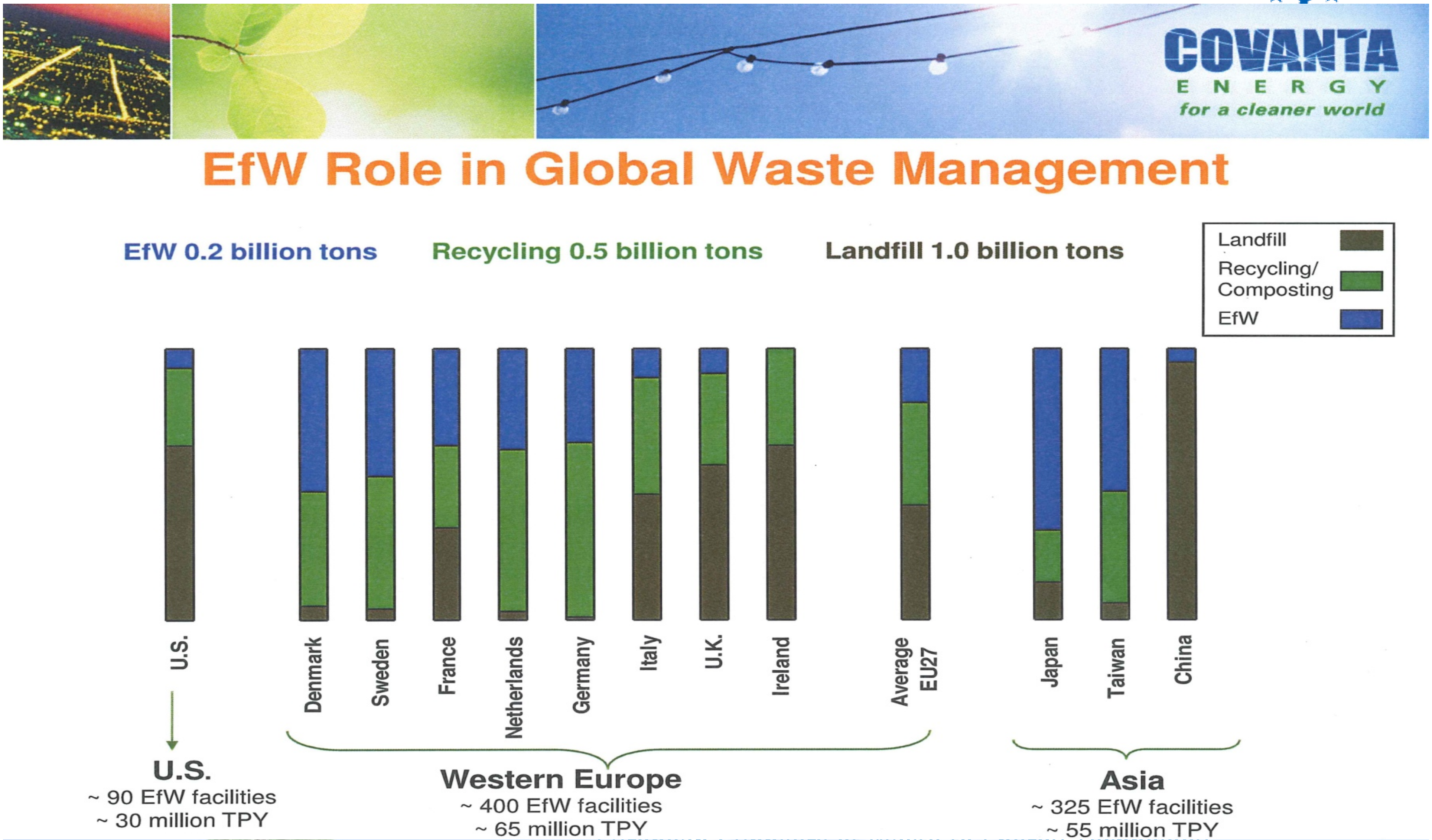
- Slovakia:
  - Some projects in early stage of development

4. WTE - Market in America / General Statements

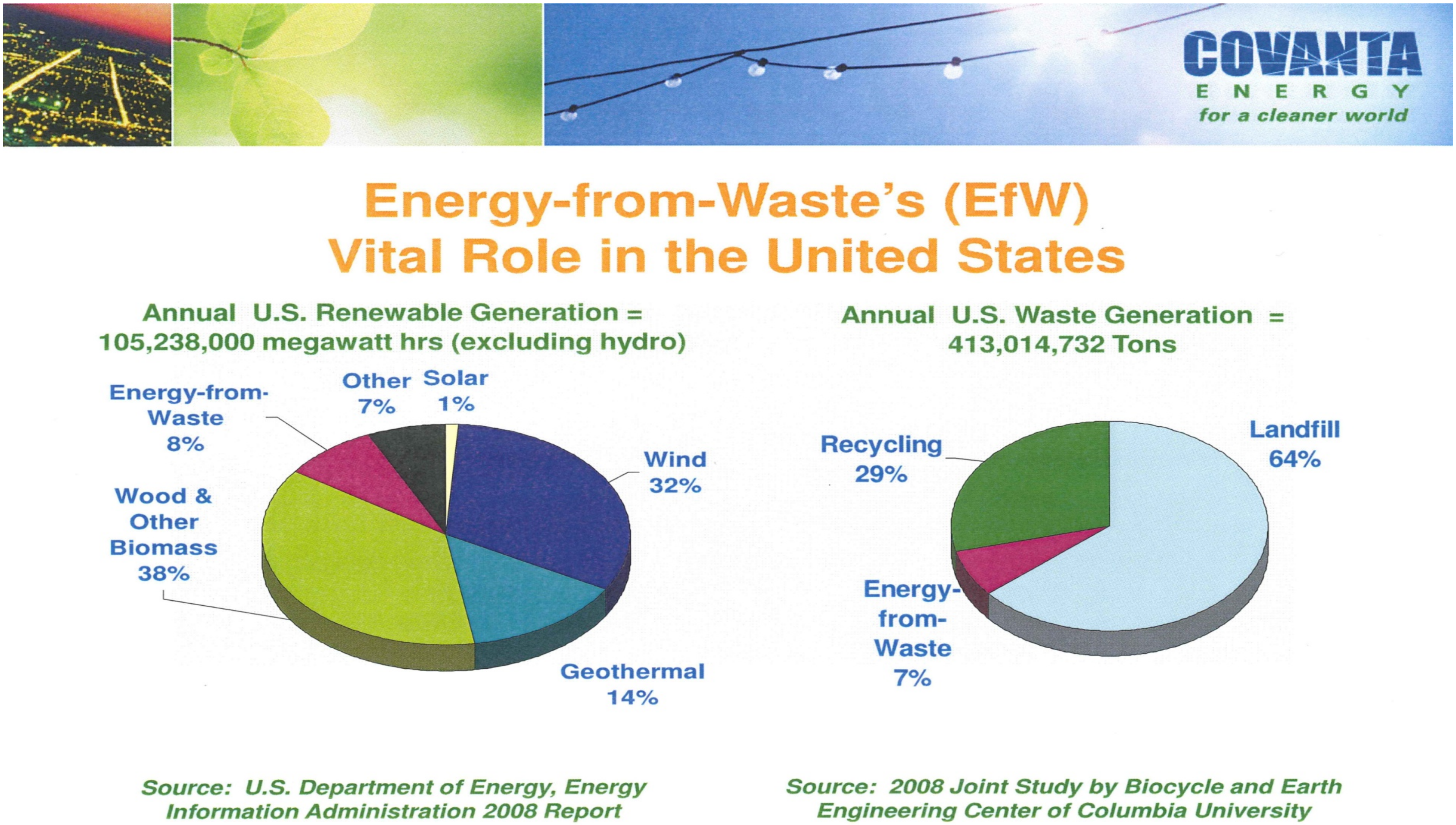
WTE in America

- Market activities (if any) in Canada and USA
- Still low recycling quotes in USA (i.e. ≈ 30 %)
- Market share of WTE in USA ≈ 7 %
- After more than 10 years standstill in USA, some new WTE projects can be expected (mainly expansions of existing facilities, but also some „greenfield-projects“)
- 2 companies dominate the market: Covanta and Wheelabrator (market share > 2/3)
- Some interest in South America, but no serious project development at this point

USA


COVANTA
ENERGY
for a cleaner world
EfW Role in Global Waste Management
EfW 0.2 billion tons
Recycling 0.5 billion tons
Landfill 1.0 billion tons
Landfill
Recycling/ Composting
EfW
U.S.
Denmark
Sweden
France
Netherlands
Germany
Italy
U.K.
Ireland
Average EU27
Japan
Taiwan
China
U.S.
~ 90 EfW facilities
~ 30 million TPY
Western Europe
~ 400 EfW facilities
~ 65 million TPY
Asia
~ 325 EfW facilities
~ 55 million TPY

USA


COVANTA
ENERGY
for a cleaner world
Energy-from-Waste's (EfW)
Vital Role in the United States
Annual U.S. Renewable Generation =
105,238,000 megawatt hrs (excluding hydro)
Energy-from-Waste 8%
Other 7%
Solar 1%
Wind 32%
Wood & Other Biomass 38%
Geothermal 14%
Annual U.S. Waste Generation =
413,014,732 Tons
Recycling 29%
Landfill 64%
Energy-from-Waste 7%
Source: U.S. Department of Energy, Energy Information Administration 2008 Report
Source: 2008 Joint Study by Biocycle and Earth Engineering Center of Columbia University

5. Update on WtE - Projects in America

USA / Canada (Orders / Awards)

- Projects awarded on Hawaii and in Maryland; realisation pending

USA / Canada (Competition / Projects) (1)

- Durham / York Region, Greater Toronto (ON), CDN (2 x 218 t/d; Covanta preferred bidder; county decision in June 2010)
- Gold River, Vancouver Island (BC), CDN (2 x 1,500 t/d; expansion of existing RDF-plant)
- Hempstead (NY), USA (1 x 1,100 t/d; expansion of existing plant)
- West Palm Beach (FL), USA (3,000 t/d plant to complement existing 1,800 t/d plant; bidding procedure)

USA / Canada (Competition / Projects) (2)

- St. Lucie Cty. (FL), USA (3,000 t/d plasma arc gasification plant; proposal of GEOPLASMA LLC to scale back to 200 t/d demonstration plant)
- Tulsa (OK), USA (reactivation of Tulsa # 3 or expansion of existing plant)
- Tynes Bay, Bermuda (1 x 7 t/h, expansion of existing plant; bidding procedure)
- Vancouver Metropolitan / 22 municipalities of the GVRD (BC), CDN (plans for 3 big or 6 small EFW plants under discussion; 400 t/d Plasco-plant considered)

6. WTE - Market and Projects in Asia

- In Asia market activities are limited to China and Japan
- China has become - by far - the largest market for WTE worldwide
- In Hong Kong bidding procedure is expected in early 2011 for a 3,000 t/d plant
- Some, but limited, market volumes in Japan
- Other Asian markets are either saturated (Singapore, Taiwan) or not mature yet (India, Malaysia, Pakistan, Thailand, Vietnam, ….)

Some Facts about China

- Generation of household waste 2009: ≈ 250 Mio. t
- Generation of household waste 2030: ≈ 550 Mio. t (estimate by World Bank)
- Number of WTE plants 2009:
  - in operation: 60-70
  - under construction/in concrete planning stage: 60-70
  - in earlier stages of planning: > 100
- Market price for 500 – 1,000 t/d turnkey plant: 150 - 250 EUR/installed t/y capacity
- Price for a complete plant with 500 t/d capacity ≈ EUR 30 Mio. !! (incl. complete balance of plant, turbine/generator, civil work, …)

WTE plant Tongxing in Chongqing

Tongxing WTE Plant in Chongqing

- Start up: 2005/2006
- Waste throughput: 1,320 t/d
- 2 grate units with semi dry flue gas treatment, 1 turbine
- Total invest: RMB 350 Mio. (≈ EUR 35 Mio.)
- Tipping fee: RMB 60 / t (≈ EUR 6 /t)

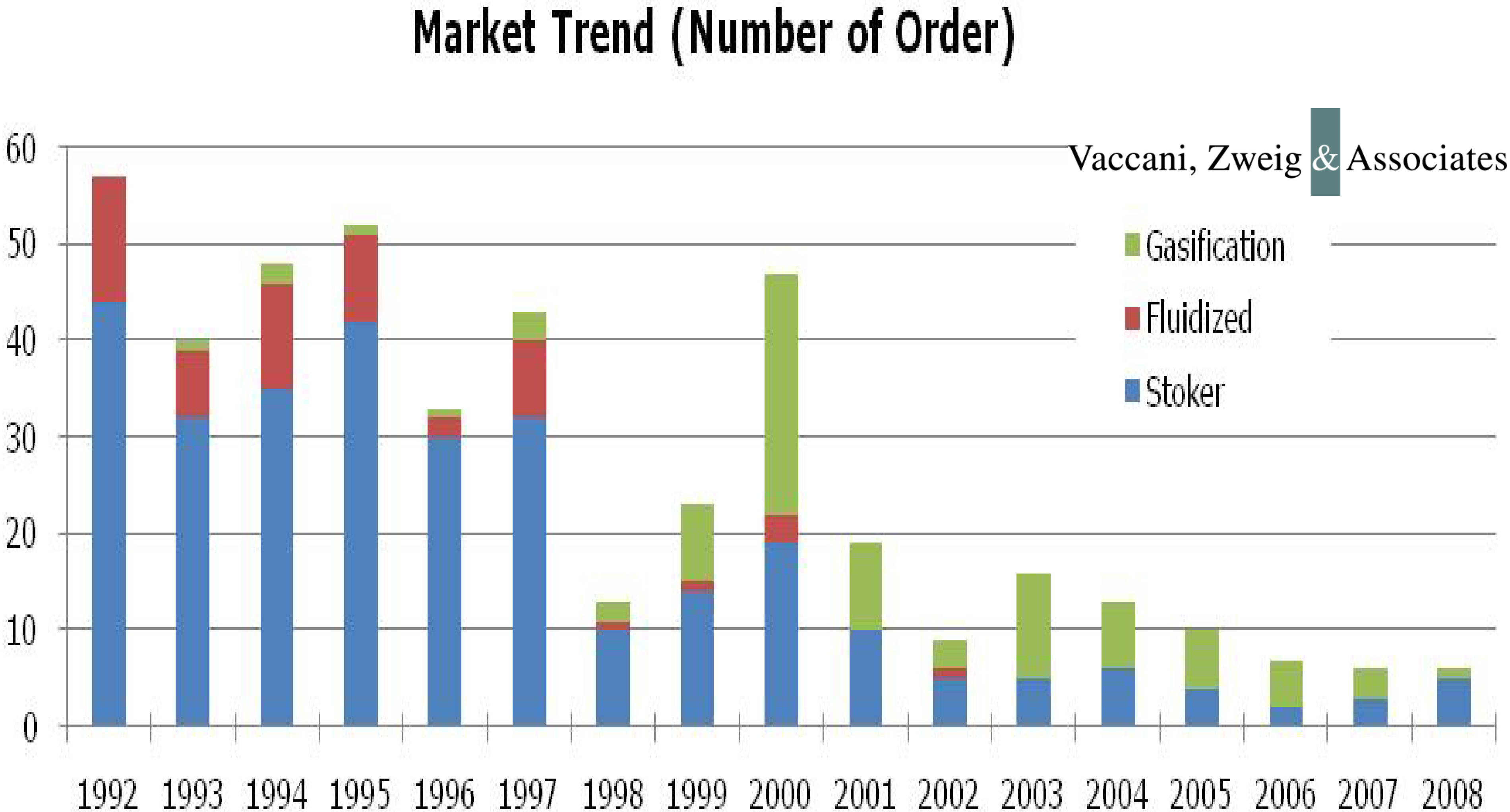
WTE in China

- Projects for new plants with a capacity ≤ 500 t/d are not open for international bidders - only Chinese companies are qualified
- In general, international bidders have severe disadvantages because of their higher cost for any non-chinese deliveries / engineering
- Some „localised" grate systems existing
- Chinese sites are - by far - not in accordance with international standards (safety, site organisation, ….)

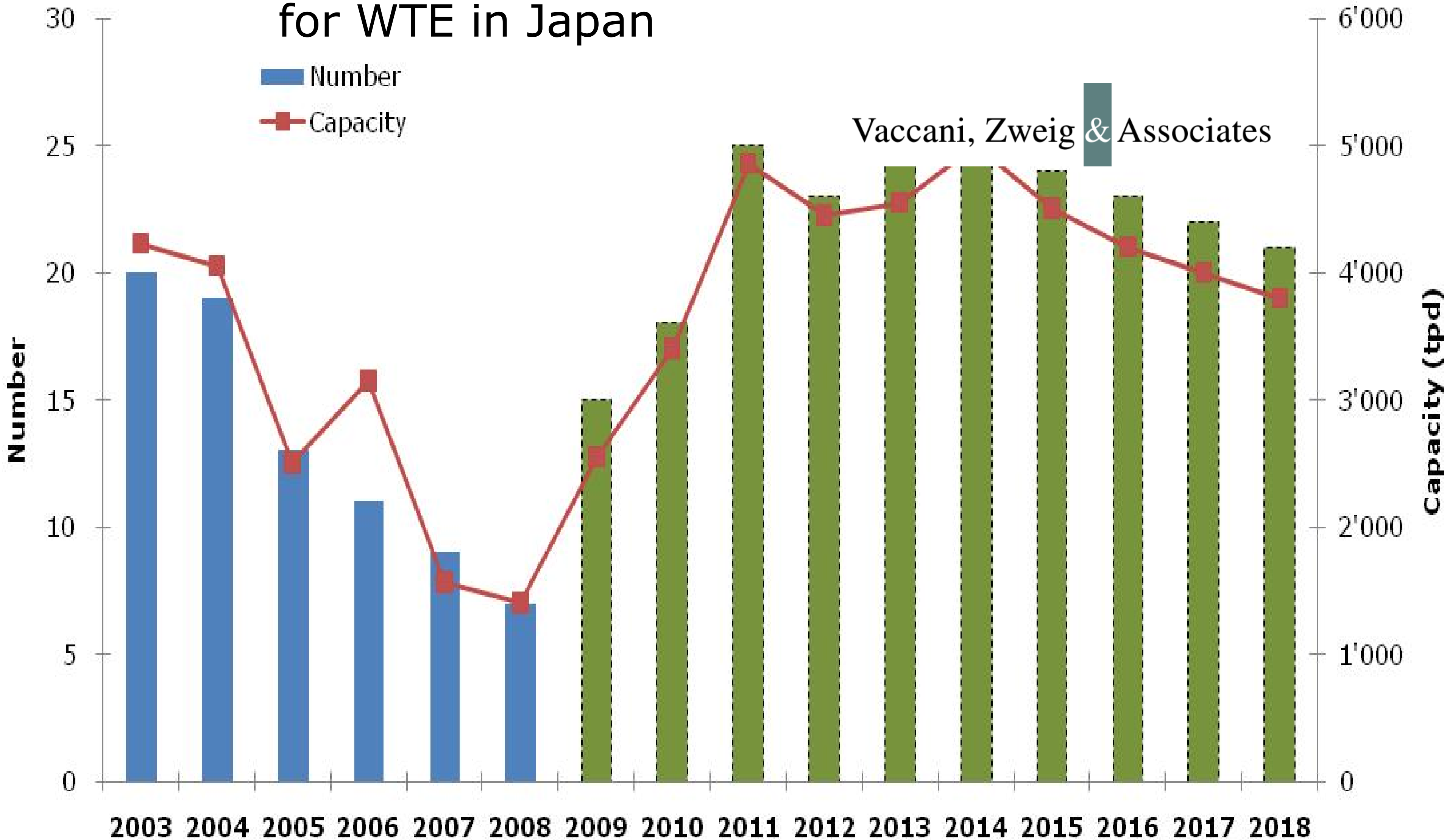
WTE in Japan

- Waste generation relatively stable: 50 - 55 Mio. t/y
- Market volume has shrunk with only few awards
- Discussion about definition of state-of-the-art technology
- Until end of the 90‘s grate incineration (> 2/3) and fluidised bed incineration dominated the market (< 1/3)
- After 2000 gasification systems became more popular until peak market share of 2/3 in 2006, whereas fluidised bed system disappeared completely
- Today grate systems experience a renaissance while gasification is being selected for smaller units only

WTE - Technology Trend in Japan

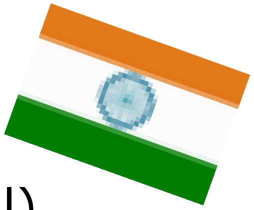


Estimated future Market Volume for WTE in Japan



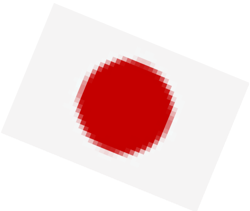
Asia

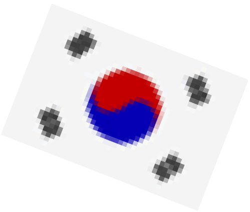
- <u>India:</u>
  - ➢ Bangalore (feasibility study)
  - ➢ Delhi (1 x 700 t/d; feasibility study)
  - ➢ Ghazipur (1 x 400 t/d; budgetary proposal)



- <u>South Korea:</u>

➢ Asan (1 x 220 t/d; order)





7. Summary

- Difficult situation for some European markets due to overcapacities and unpredictable waste flows
- Markets in Europe are changing
- Best market volumes to be expected in UK and Italy
- Poland is about to develop (some) realistic projects
- Financial crisis makes projects unlikely in countries like Greece, Portugal, Spain….
- China, as the largest market worldwide, is not interesting for non-chinese companies due to low market prices and use of ‘local’ technology
- USA is waking up again, but very slowly
- Grate technology is still most widely used technology

Thank you very much for your attention!

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