The Waste-to-Energy Solution

Developing WtE plants in Ireland: Opportunities and Obstacles

Indaver,
leading the field in
sustainable waste management

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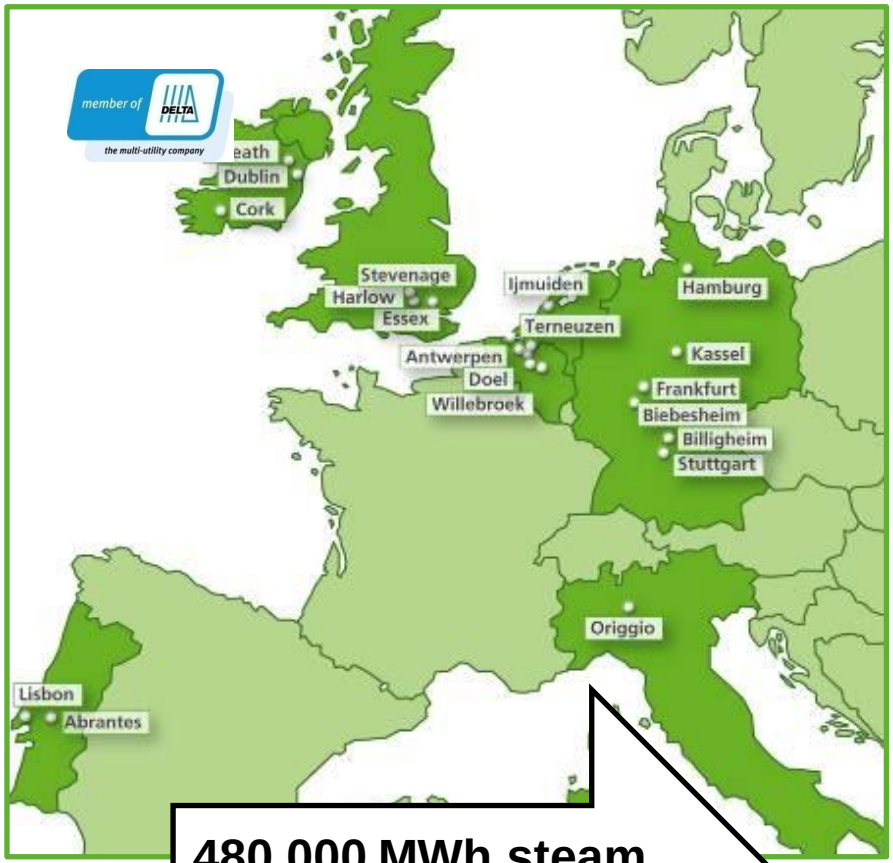
Indaver Group

- Integrated waste management
- Local Government Initiative
  - Now 90% owned
- Member of DELTA
- Turnover €410m
- Over 1,600 employees
- All tiers of hierarchy



4.1 million tonnes handled

(2.1 million tonnes WtE)

INPUTS

480,000 MWh steam

367,000 MWh electricity

RDF, SLF, other biomass

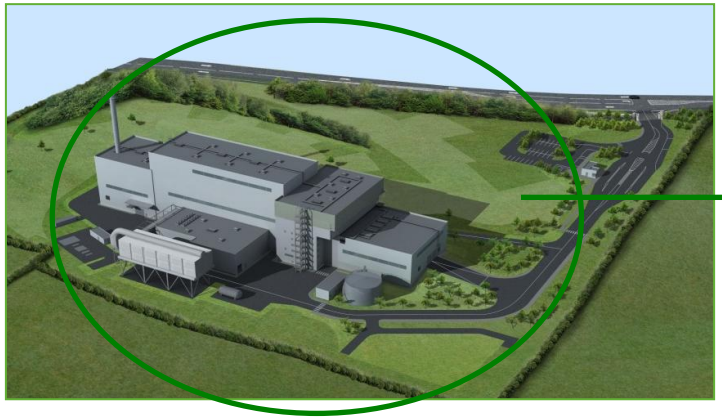
OUTPUTS

Non-Hazardous Waste Facility, Doel

Indaver Ireland

Existing Business

- Operating since 1977
- Site services, TWM, CAS
- Transfer station & Solvent Blending



Meath Project

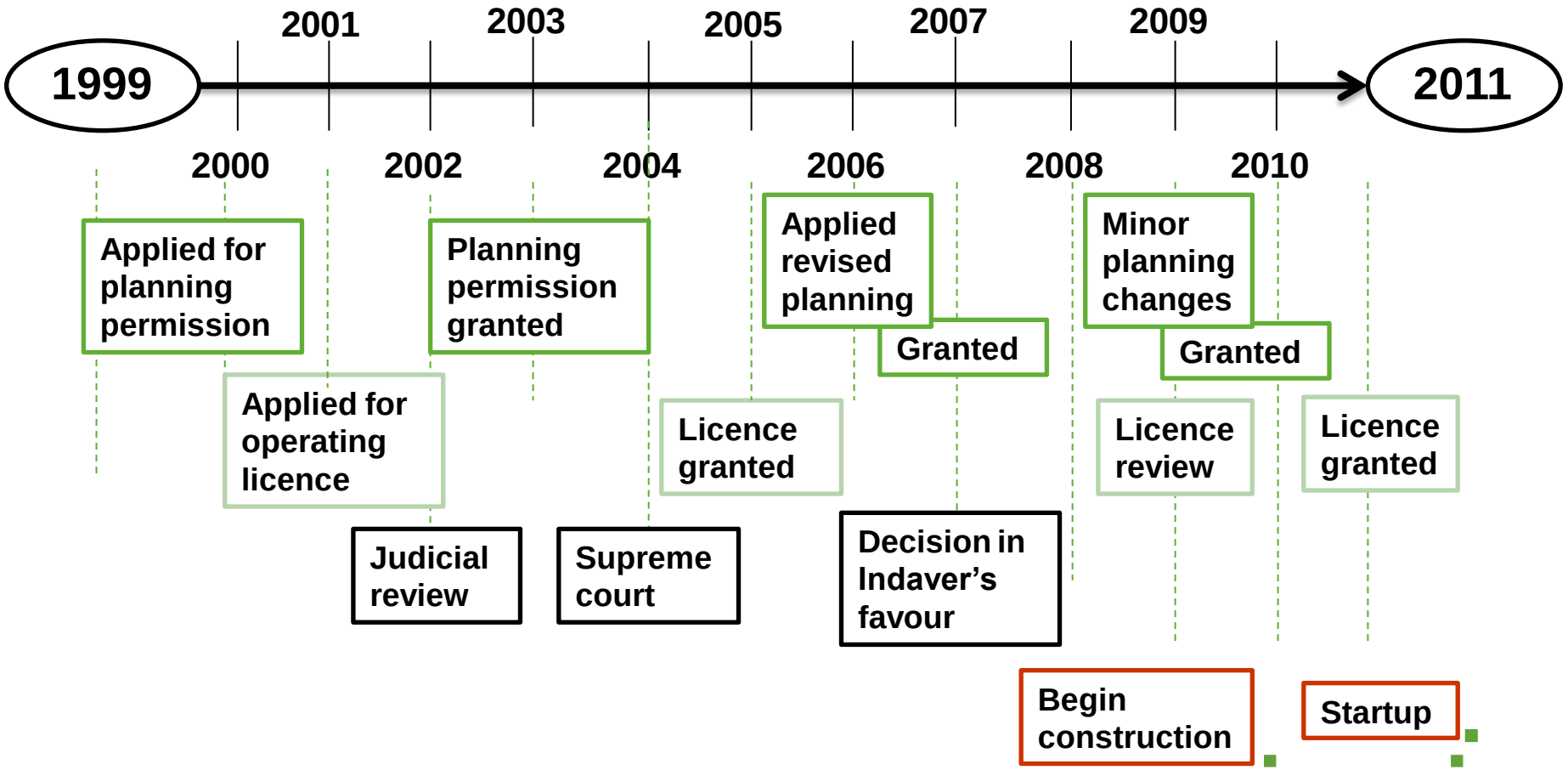
- 200,000 tpa MSW grate furnace
- 15MW electricity export
- Operational September 2011

Cork Project

- 240,000 tpa industrial / MSW
- 22MW electricity or district heating / steam

Pioneers in Ireland

- First commercial waste-to-energy facility



Most scrutinised facility to go through system

But there's more …

- Aviation Authority
- Radiological Protection Institute
- Surface water discharge
- Tree felling
- Fire certificate
- Authorisation to construct generating station
- Generating licence
- Grid Code Compliance cert
- Market Accession (x2)
- TUoS Agreement
- REFIT
- Intermediary registration
- ….
- But not SEVESO!

Driving waste up the hierarchy

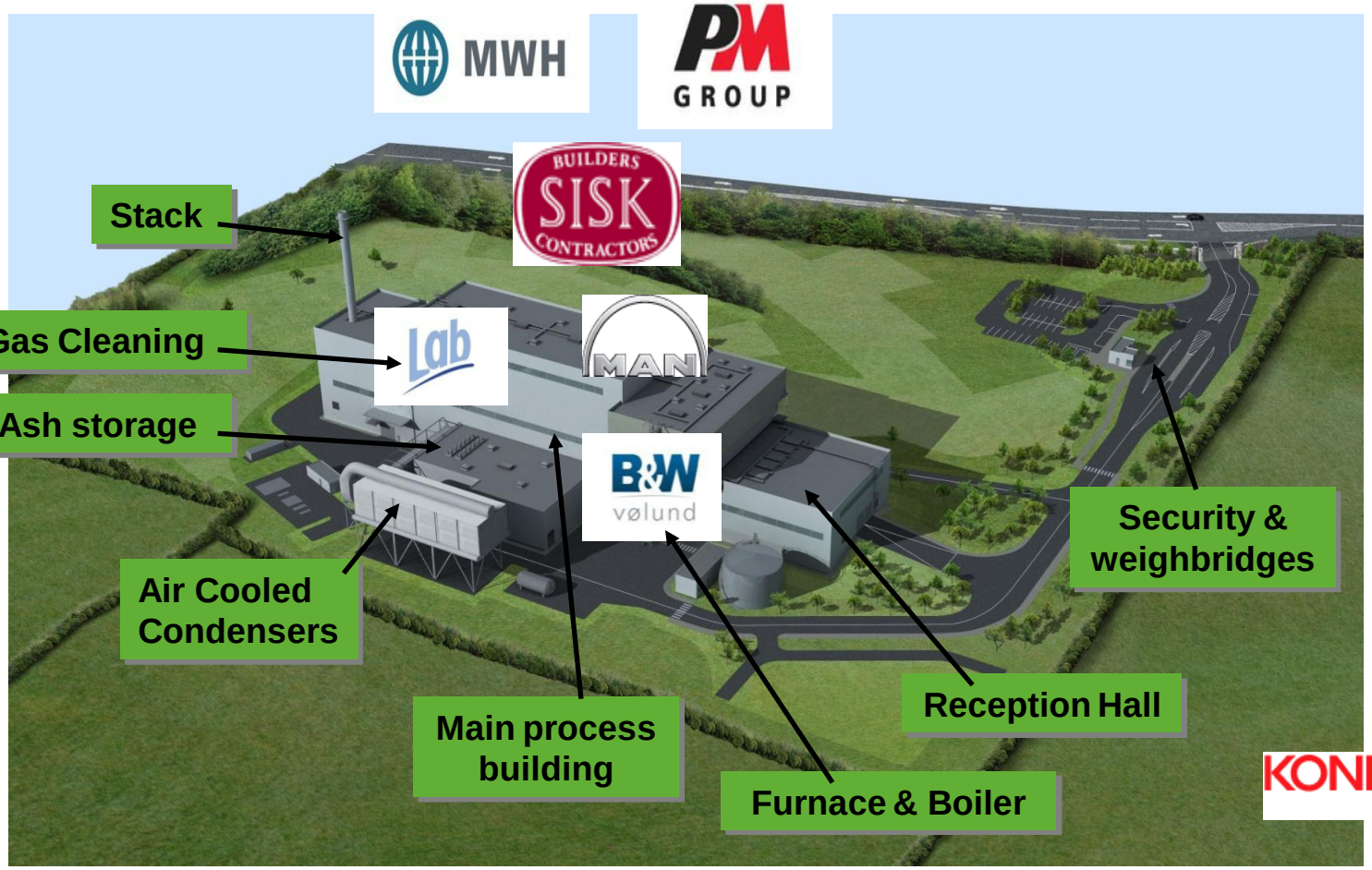
Policy drivers key

- Merchant plant & mainly privatised market
- Landfill levy €50/t (to increase further)
- Enforcement of BMW targets
- Implementation of WFD
- New waste policy pending
- All-island potential:
  - 4 - 5 plants / 1.2Mtpa / 150MW
- Mix of technologies needed

Ireland's First Waste-to-Energy Plant

First Waste Acceptance: 15th August 2011

Meath Project



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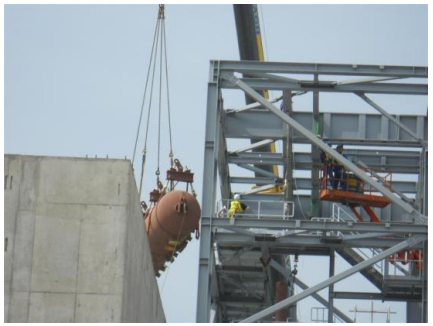
Meath Project Construction to date

Potato field
August 2008

Foundations & Bunker
Sep - Nov 2009



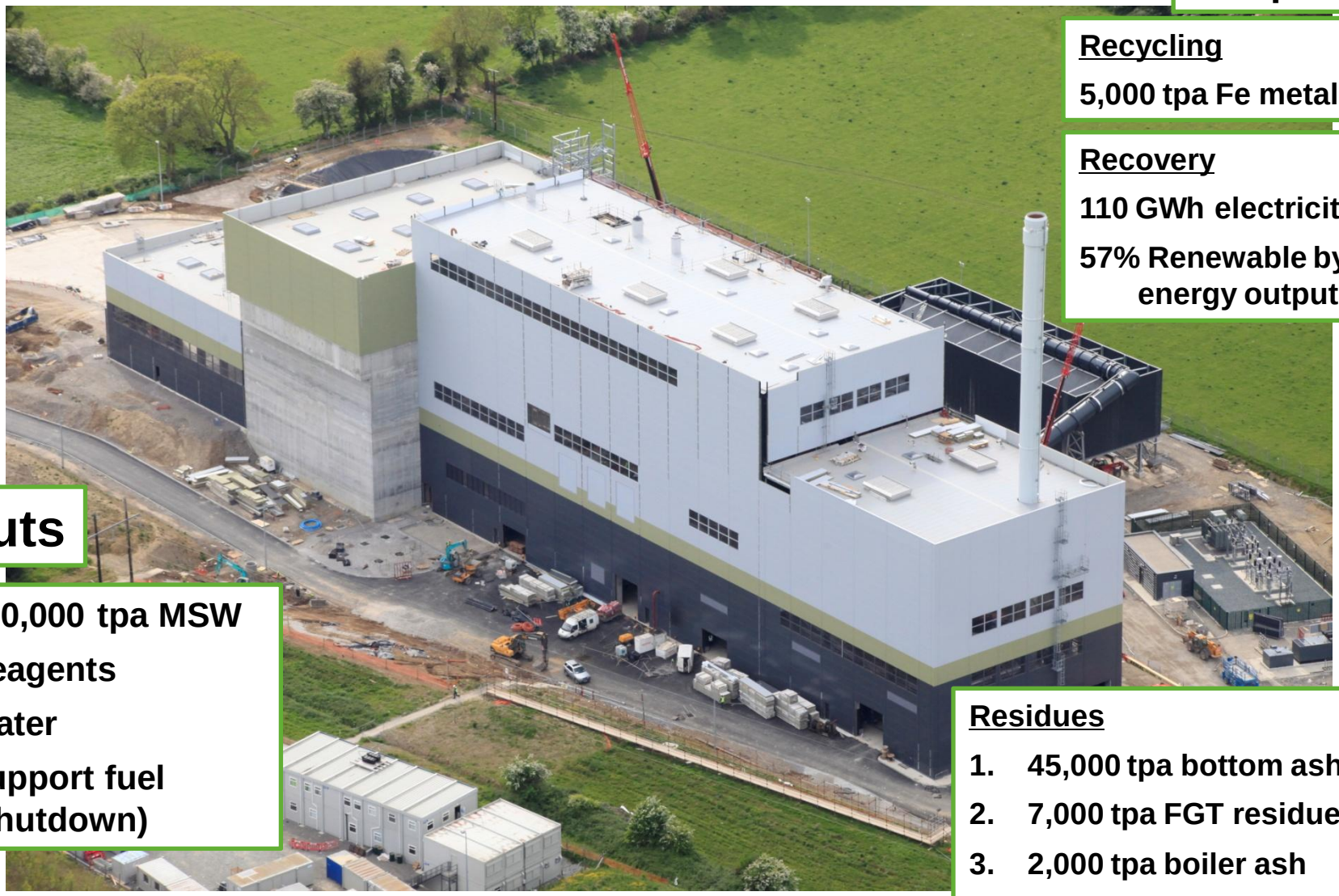
Boiler, Grate, FGT system
May – June 2010

Ancillaries
& pressure test
Sep – Nov 2010

Turbine & air condensers
Dec 2010

Commissioning
Feb – Jun 2011

Meath Project



Outputs

Recycling

5,000 tpa Fe metals

Recovery

110 GWh electricity

57% Renewable by energy output

Inputs

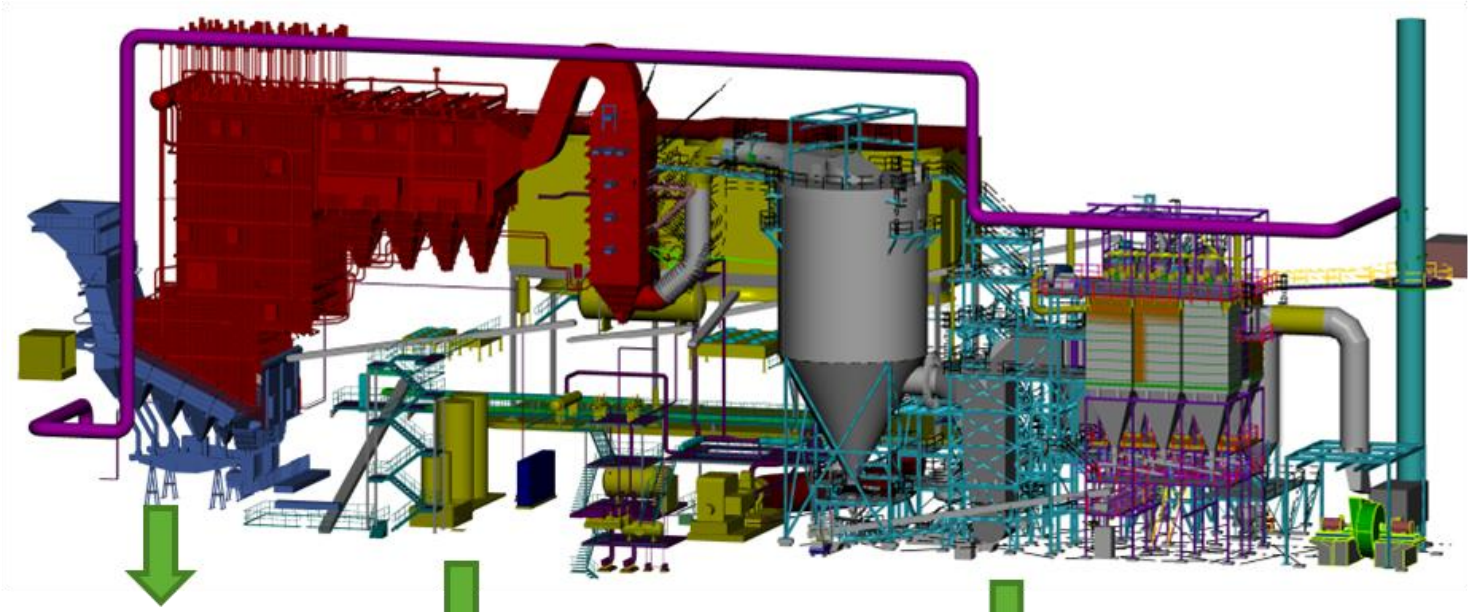
1. 200,000 tpa MSW
2. Reagents
3. Water
4. Support fuel (shutdown)

Residues

1. 45,000 tpa bottom ash
2. 7,000 tpa FGT residue
3. 2,000 tpa boiler ash
4. Clean flue gases

Process Description

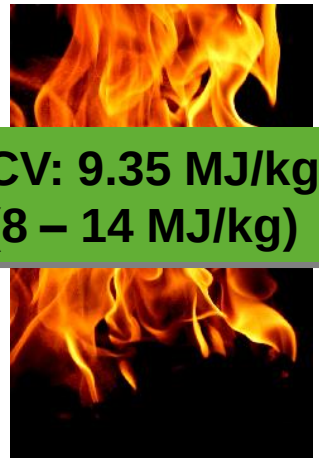
Most stringent air emissions limits of any industry



Design: “Black bin” MSW and similar

Pre-treatment by source separation

Biomass :
➢65% →
(57% RE output)

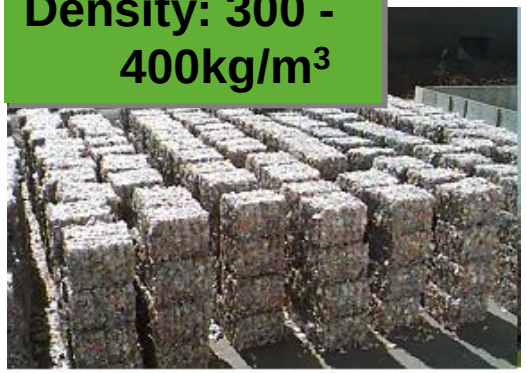


CV: 9.35 MJ/kg (8 – 14 MJ/kg)

Moisture content (total): 40% (10 - 60%)

Ash / inert: 25% input

Density: 300 - 400kg/m^3

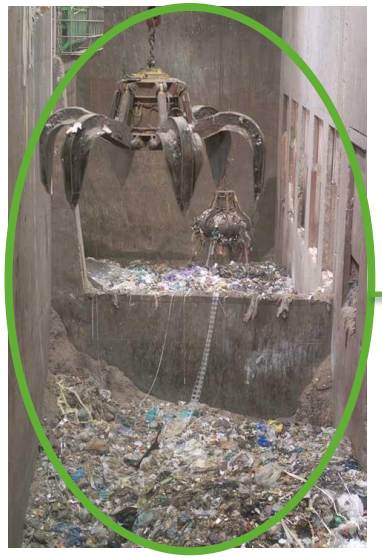


Fuel Input: Flexibility

268 different EWC codes in waste licence…

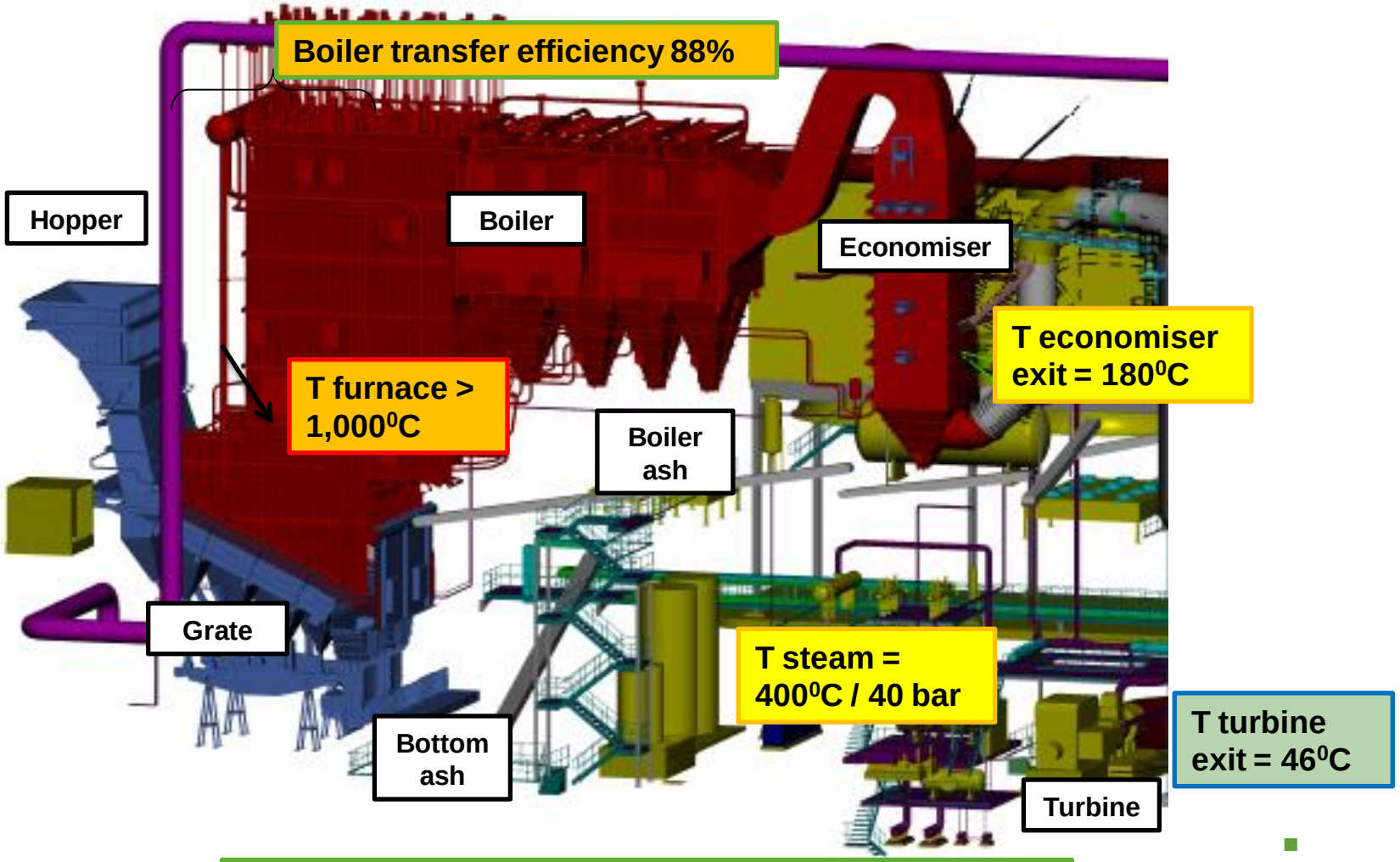
Grate furnace very flexible
- **"difficult" MSW**
- **changes in composition**
- **physical properties**
- **chemical composition**

Can retrofit water cooling



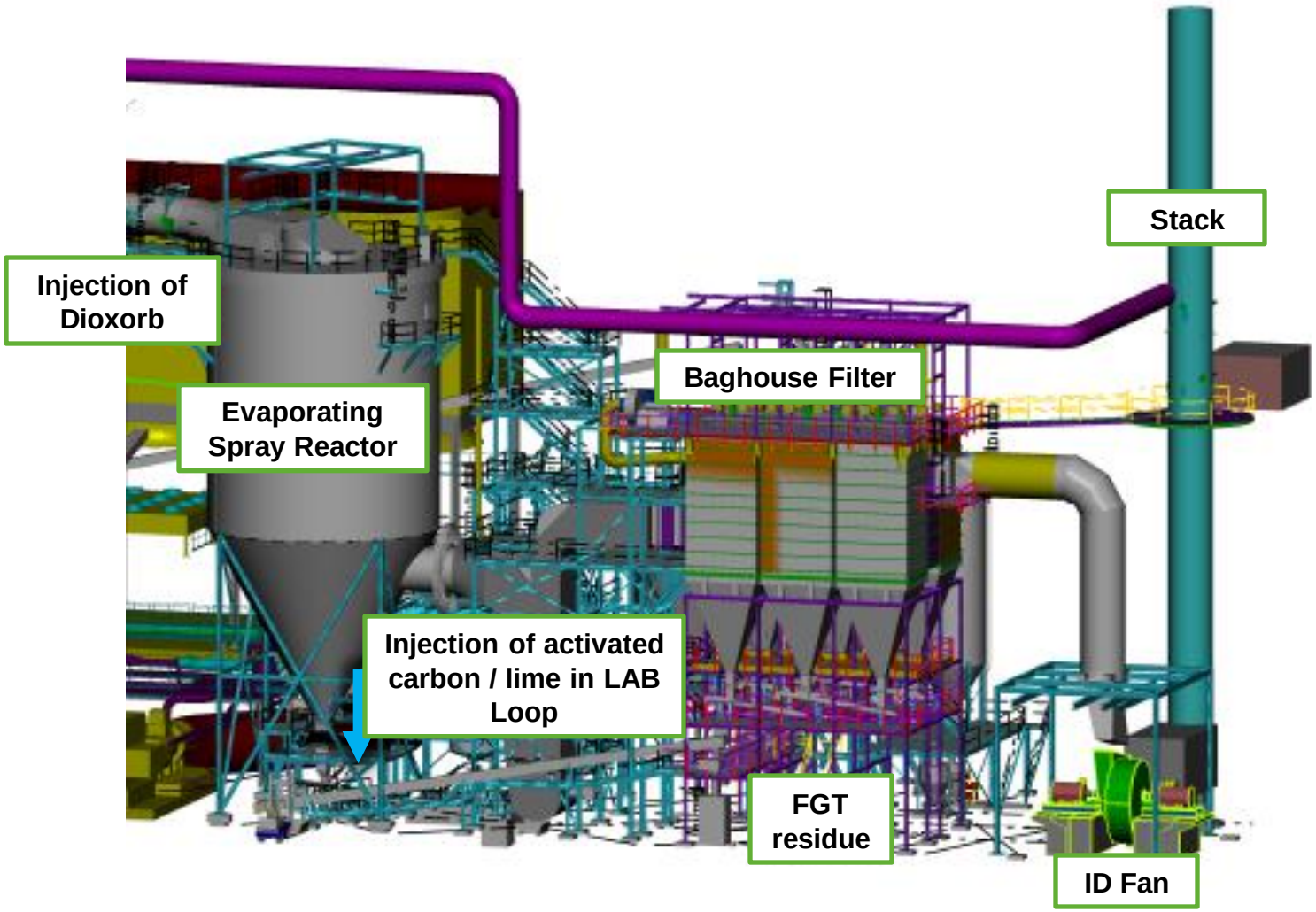
Bunker planning & mixing
- **consistent feedstock**
- **remove non-conformances**
- **achieve optimum CV**

Combustion Process



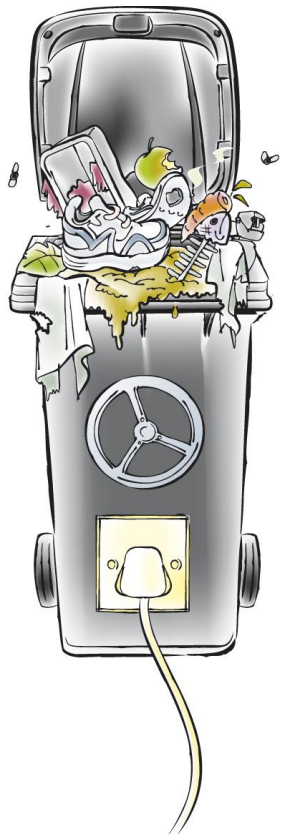
Design for maximum energy recovery
21% Net Efficiency / 15MW export

Flue Gas Treatment System



No process effluent →dry / semi dry system

Outputs



- **Electricity**
  - Electricity only, 15.2MW export
  - 57.1% renewable - qualifies for REFIT
    - Estimate from waste composition
    - Measure from C14 when ready
  - Will meet R1 criteria > 0.65

Bottom Ash

- 50,000 tpa – limited economies of scale
- Remove Fe onsite
- Classification & EPA

Flue Gas Treatment Residue, boiler ash

- 9,000 tpa, export only option
- Build haz landfill in long term

Local Community & Acceptance

- **Funding**
  - Community Fund > €250,000 / year
  - €100,000 / year during construction
  - Additional €20,000 local sponsorship

- **Benefits & Communications**
  - Regular Newsletters
  - 45 jobs
    - 6 from Duleek
    - 65% from NE Region
  - Open days held

What are your views?

Indaver would like to hear of any suggestions or queries you may have about waste-to-energy.

www.indaver.ie / info@indaver.ie

Free Phone 1800 200 646