

R A Z V O J



Waste to Energy



Celje W_tE CHP Plant

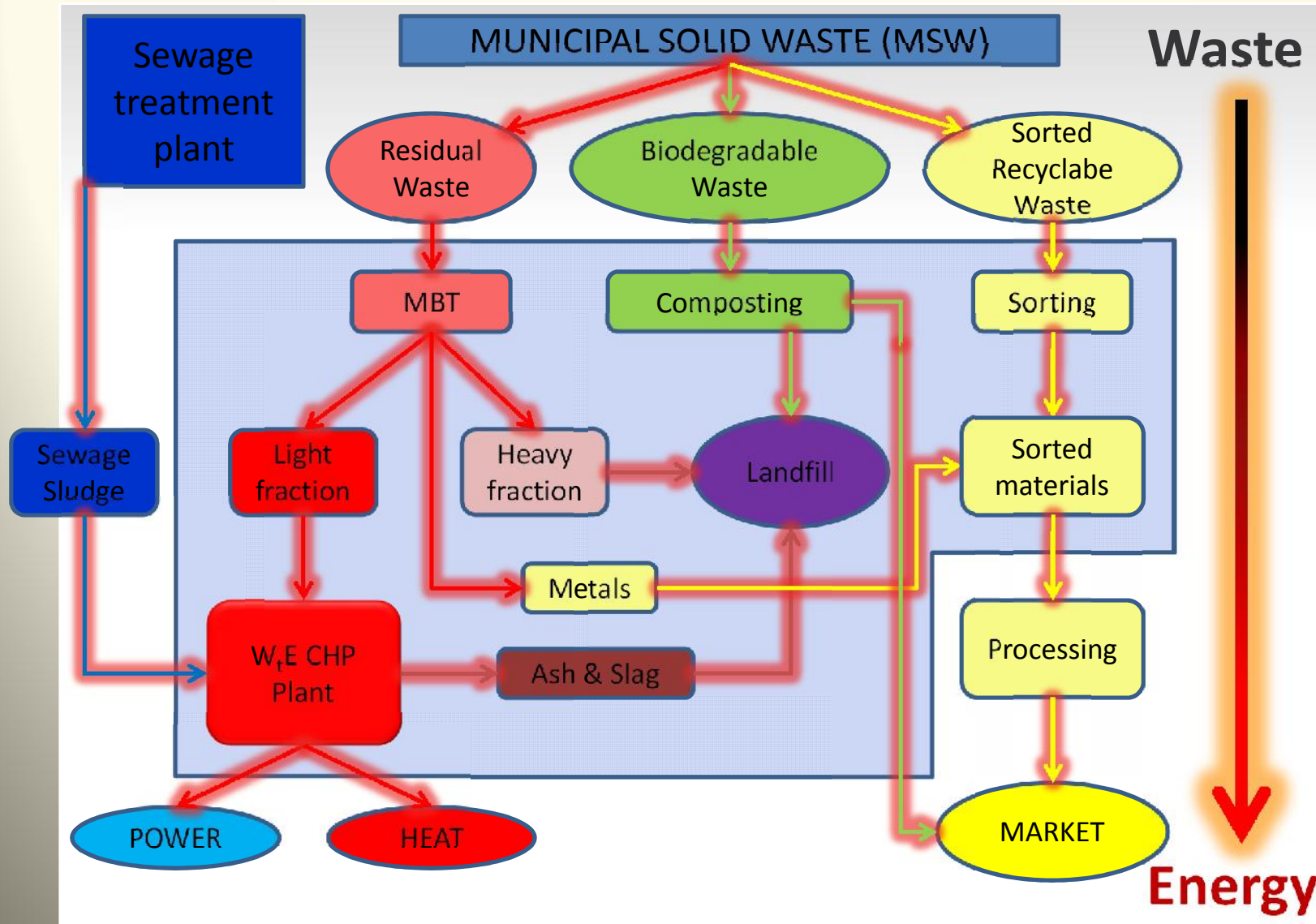
Waste Managment Strategy

Waste management strategy in accordance with European directive **91/156/EEC**:

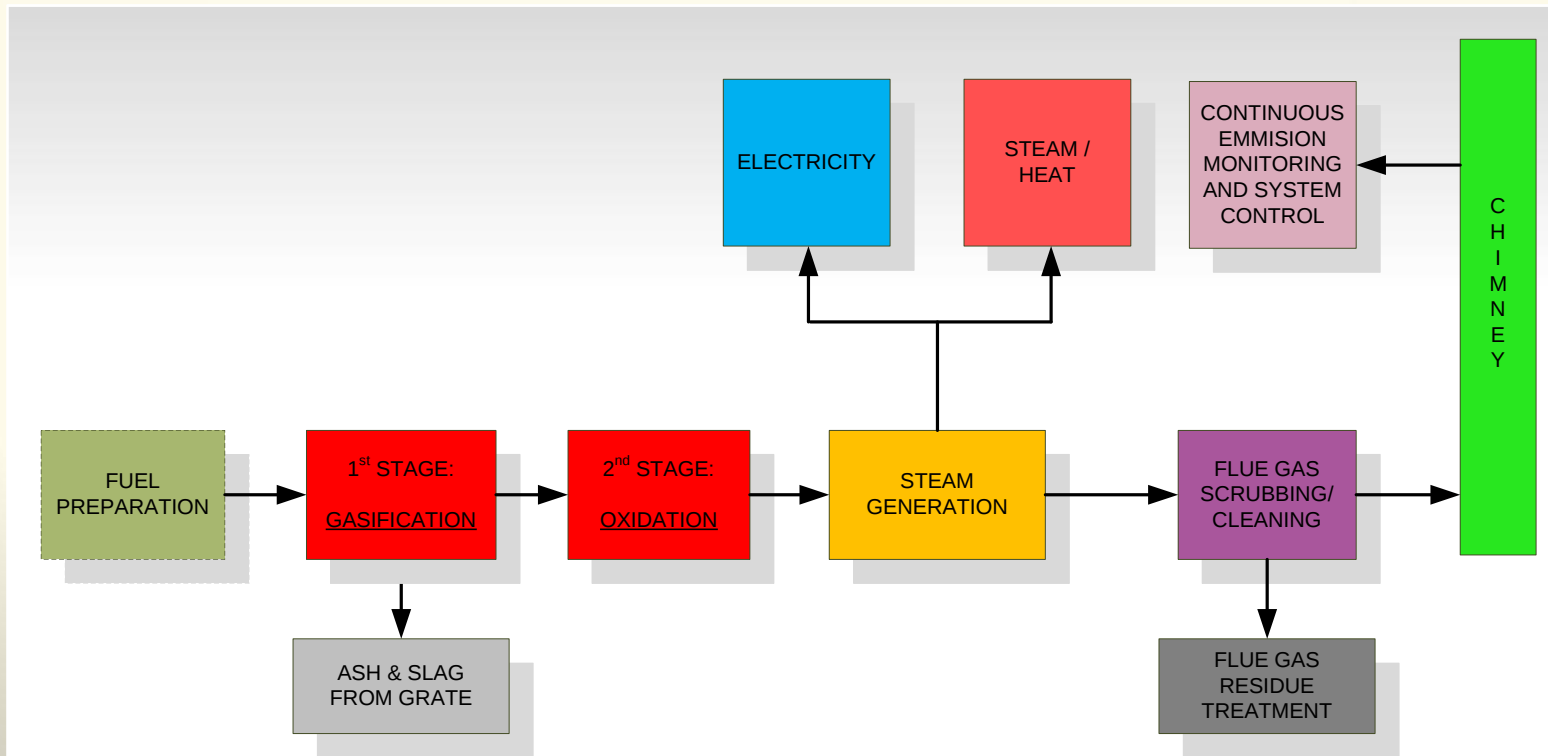
1. Reduction at source
2. Reuse
3. Recycle
4. Energy recovery
5. Disposal



Regional Waste Managment



W_tE Technology



- Weighing, inspection and storage of RDF and SS
- Fuel mixing, transport and dosing into the gasification chamber
- WID-compliant two-stage gasification and thermal treatment process
- Heat recovery / utilization and power/heat production
- Flue gas treatment, emission monitoring and system control

Celje Waste to Energy CHP Plant

Plant priorities:

1. Disposal of waste
2. Heat recovery for district heating
3. Power production



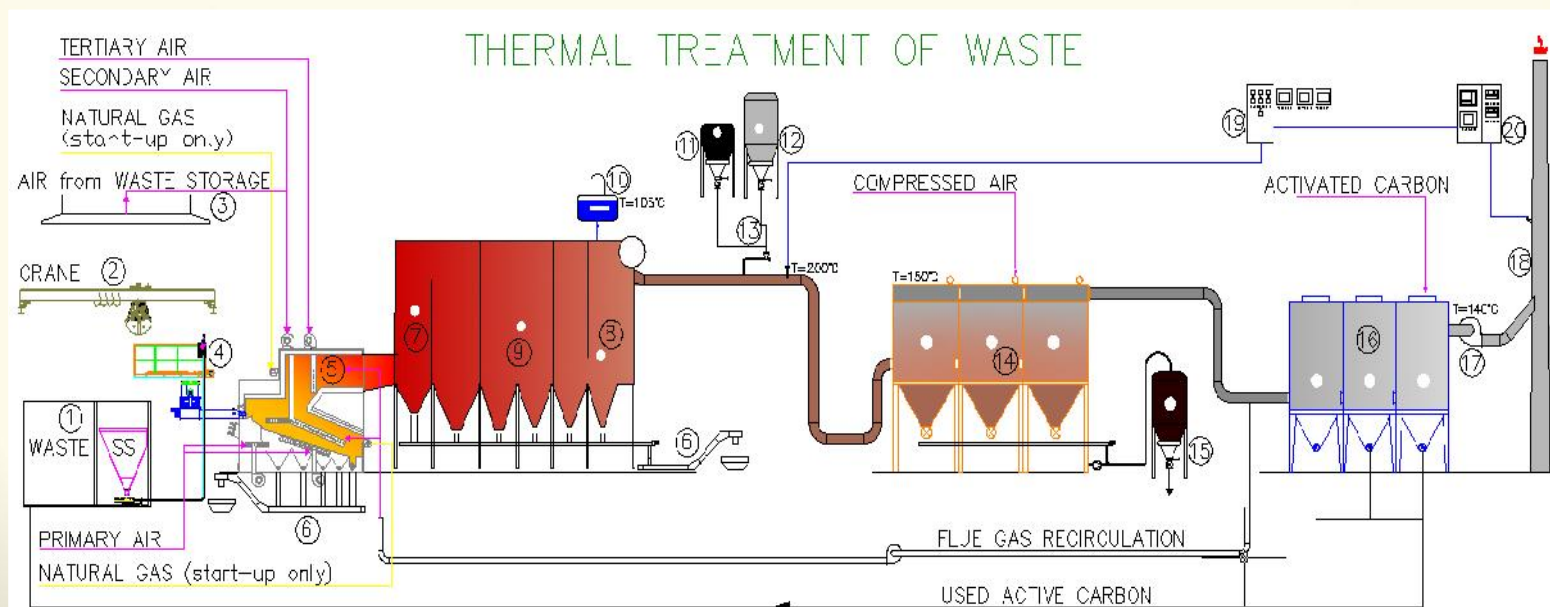
Technical Data

Throughput:	35.000 t/a
Design point fuel CV:	13,6 MJ/kg
Boiler thermal output:	15 MW _{th}
Steam parameters:	20 t/h, 30 bar _a , 360°C
Steam turbine output:	2,1 MW _e
Operation modes:	13 MW _{th} (110°C) + 2 MW _e 15 MW _{th} (130°C) + 0 MWe
Operation:	24 h/day; 8.000 hours/year

Compliant with:

- ❖ EU Directives (WID, IPPC) & Local legislation
- ❖ EU Best Available Techniques Reference (BREF) document
 - ❖ Best Available Technology (BAT)

Process Scheme



- 1 – Fuel storage
- 2 – Crane
- 3 – Air from storage
- 4 – Interm. storage + dosing units
- 5 – Furnace
- 6 – De-ashing system
- 7 – Superheater

- 8 – Economiser
- 9 – Evaporator
- 10 – Supply water
- 11 – Activated carbon
- 12 – Sodium bicarbonate
- 13 – Grinding and mixing unit
- 14 – Ceramic filter

- 15 – Fly ash silo
- 16 – Activated carbon filter
- 17 – Flue gas fan
- 18 – Stack
- 19 – Control system
- 20 – Continuous emission monitoring

Fuel Storage

Fuel delivery:

RDF: 40 times/week

SS: 5 times/week

Fuel storage cap.:

RDF: 1400 m³

SS: 85 m³

Sufficient for 4 days.

Interm. storage:

Volume: 25 m³



Intermediate (mixing) storage

Boiler

Fuel input capacity: 18 MW

Boiler capacity: 15 MW_{th} (water-tube boiler)



Boiler room

Flue gas scrubbing

SNCR

Ammonia solution:
reduction of NO_x

Dry flue gas scrubbing

Sodium bicarb. powder for
reduction of acid gases:
 SO_2 , HCl and HF

Activated carbon powder:
elimination of heavy metals
& dioxins/furans

Filters

Ceramic filter
Activated carbon filter



Activated carbon filter, CEMS and stack

Ceramic filter

Bag filter:

Particle reduction: ~99,9%

Fly ash silo:

Volume: 85 m³

Storage cap. for 5-7 days.



Ceramic filter and fly ash silo

Activated Carbon Filter

Activated carbon filter*:

Reduction of TOC, dioxins, furans and heavy metals including Hg.

No. of pods: 21



* KIV patented technology

Activated carbon filter

CEMS and Stack

Flue Gas Fan:

Volume flow: cca. 33.000 Nm³/h

Continuous Emission Monitoring (CEM):

CO, NO, NO₂, O₂, SO₂, HCl, HF, TOC,
Hg, NH₃, moisture, dust, temperature,
pressure, mass flow

Stack:

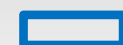
Height: 25m



CEMS and stack

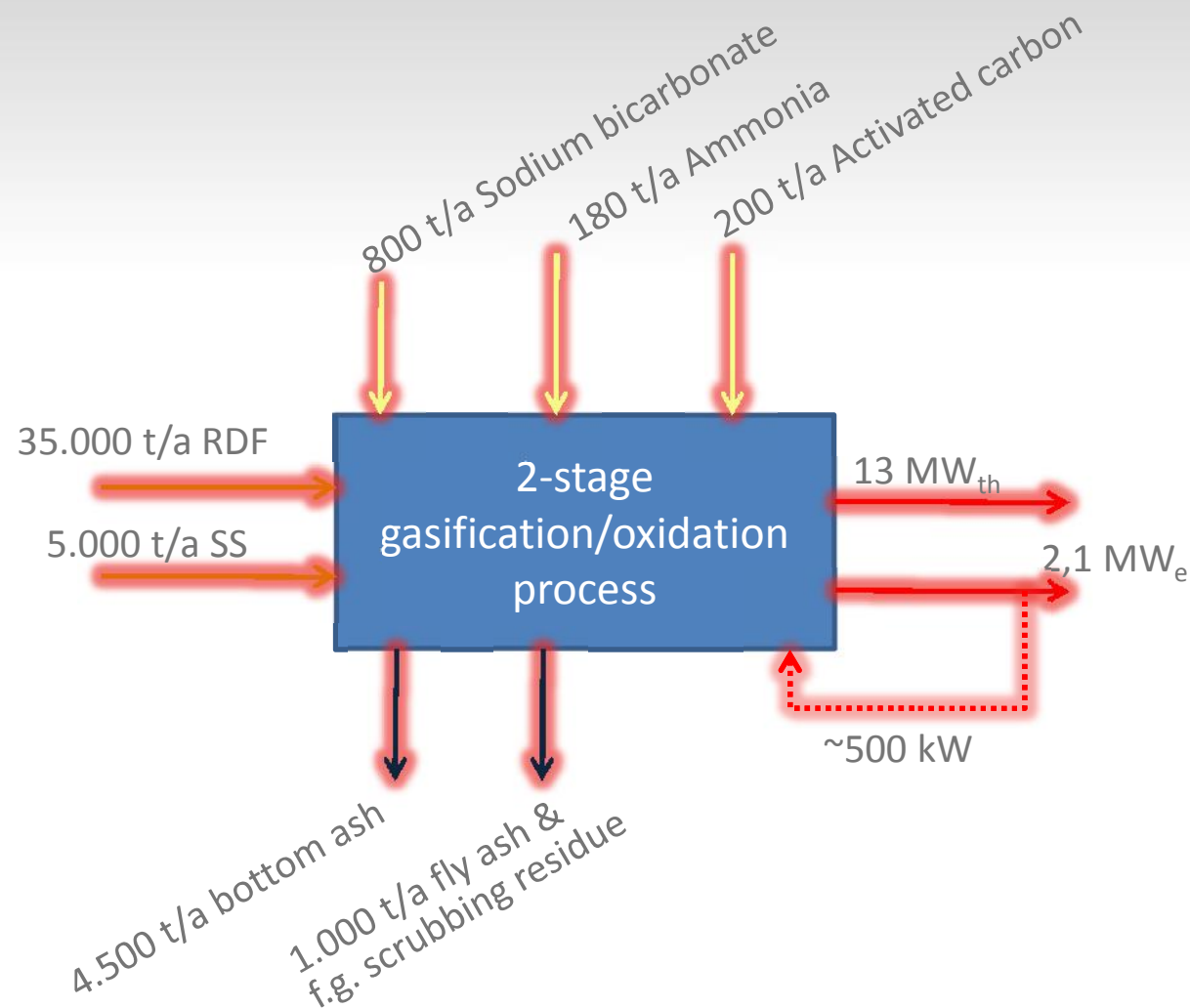
Emission Limits

Lower than WID emission limits!

 WID limits
 Celje limits

Parameter	Half-hour mean values (mg/Nm ³)		Daily mean values (mg/Nm ³)	
	WID limits	Celje limits	WID limits	Celje limits
Dust	30	20	10	5
Total organic carbon (TOC)	20	20	10	10
Hydrochloric acid (HCl)	60	50	10	8
Hydrofluoric acid (HF)	4	2	1	1
Sulphur dioxide (SO2)	200	150	50	40
nitrogen oxides (NO ₂)	400	350	200	180
Carbon monoxide (CO)	100	100	50	30
Heavy metals:				
Hg	0,05		0,05	
Cd and Tl (total)			0,05	
Sb,As,Pb,Cr,Co, Cu,Mn,Ni,V,Sn (total)			0,5	
As, Cd, Co, Cr or As, Cd, Co, Cr (total)			0,05	
Dioxins and furans			0,1 ngTE /Nm ³	

Input / Output



Bird's-eye view

Celje W_tE CHP Plant:

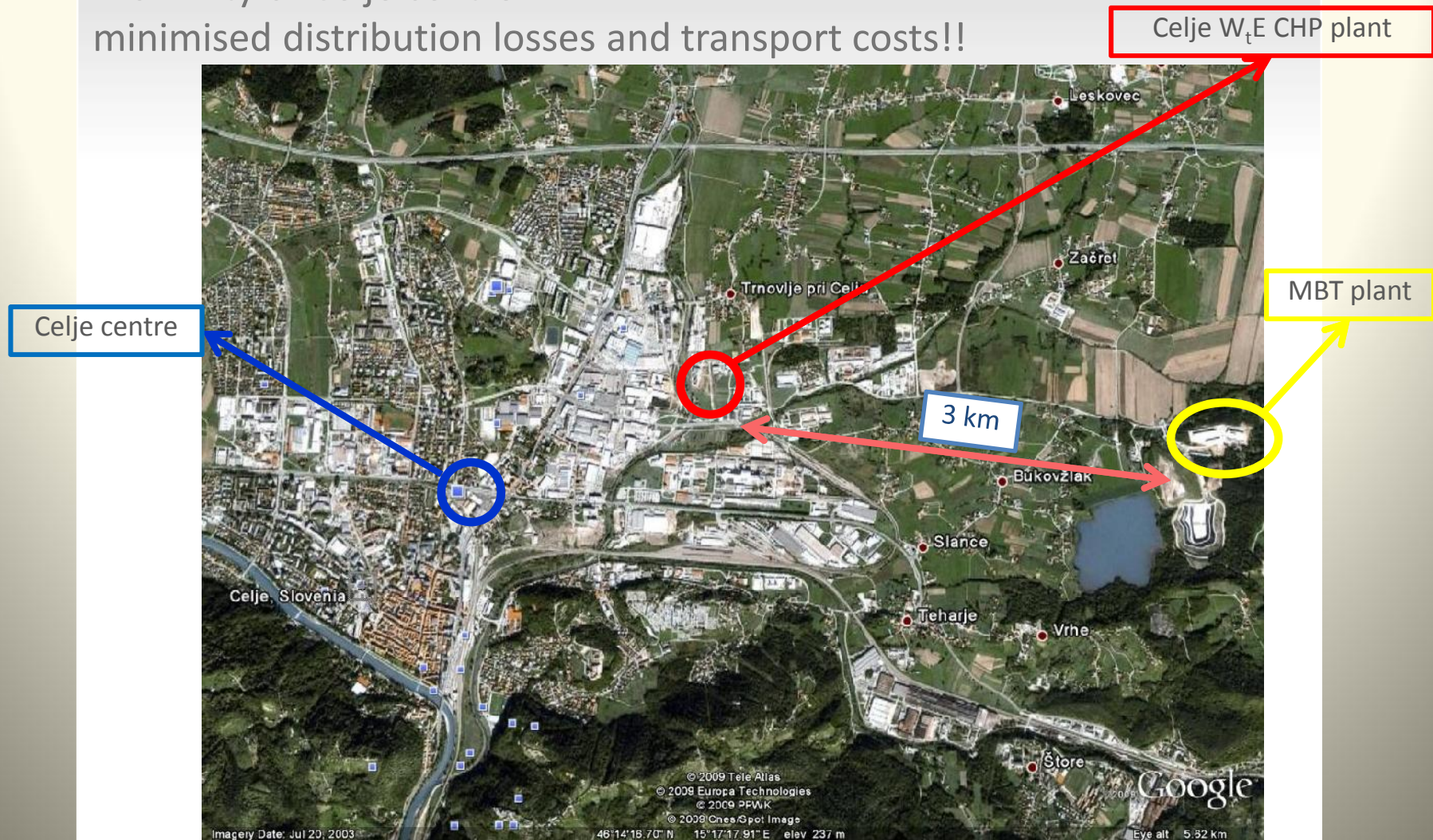
Municipal Solid Waste (MSW) from 220.000 citizens for Combined Heat and Power (CHP) production for the Municipality of Celje.



Location of the plant

Satellite view

Proximity of Celje centre:
minimised distribution losses and transport costs!!



Benefits

Positive environmental and economical benefits:

- Reduction of landfilled waste: ~65%
- 100% disposal of local sewage sludge (40% ash residual)
- Waste from local population given back as electricity/heat
- Minimised waste transport
- Net fossil fuel savings (heating): ~4.000.000 Sm³/year (natural gas)
- Reduction of green house gases
- Optimal utilization of heat and electricity (proximity of Celje)

**A local W_tE CHP solution for
every town / small city.**

RAZVOJ



Contact

RAZVOJ d.o.o. Braslovče
Male Braslovče 13a
SI-3314 Braslovče
SLOVENIA

Tel.: +386 3 7000 380

WWW: www.razvojdoo.si

Email: info@razvojdoo.si

