



International and National Policies and Their Impact on Fuel Quality to W-t-E Plants in Sweden

27 November 2013
8th ISWA Beacon Conference on Waste-to-Energy, Malmö

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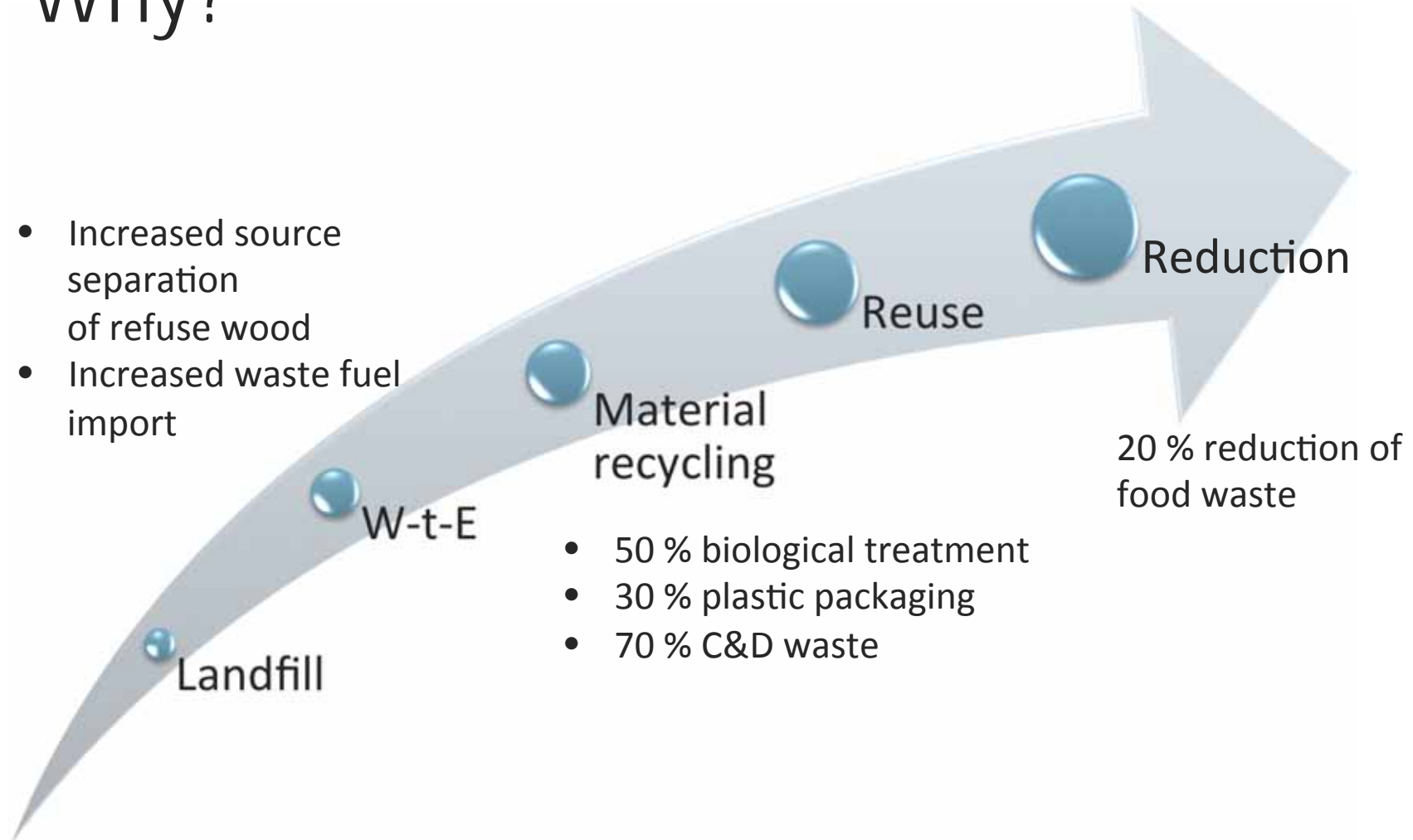




Aim: To assess the composition and characteristics of waste fuels to be energy recovered in Sweden by 2020

Why?

- Increased source separation of refuse wood
- Increased waste fuel import

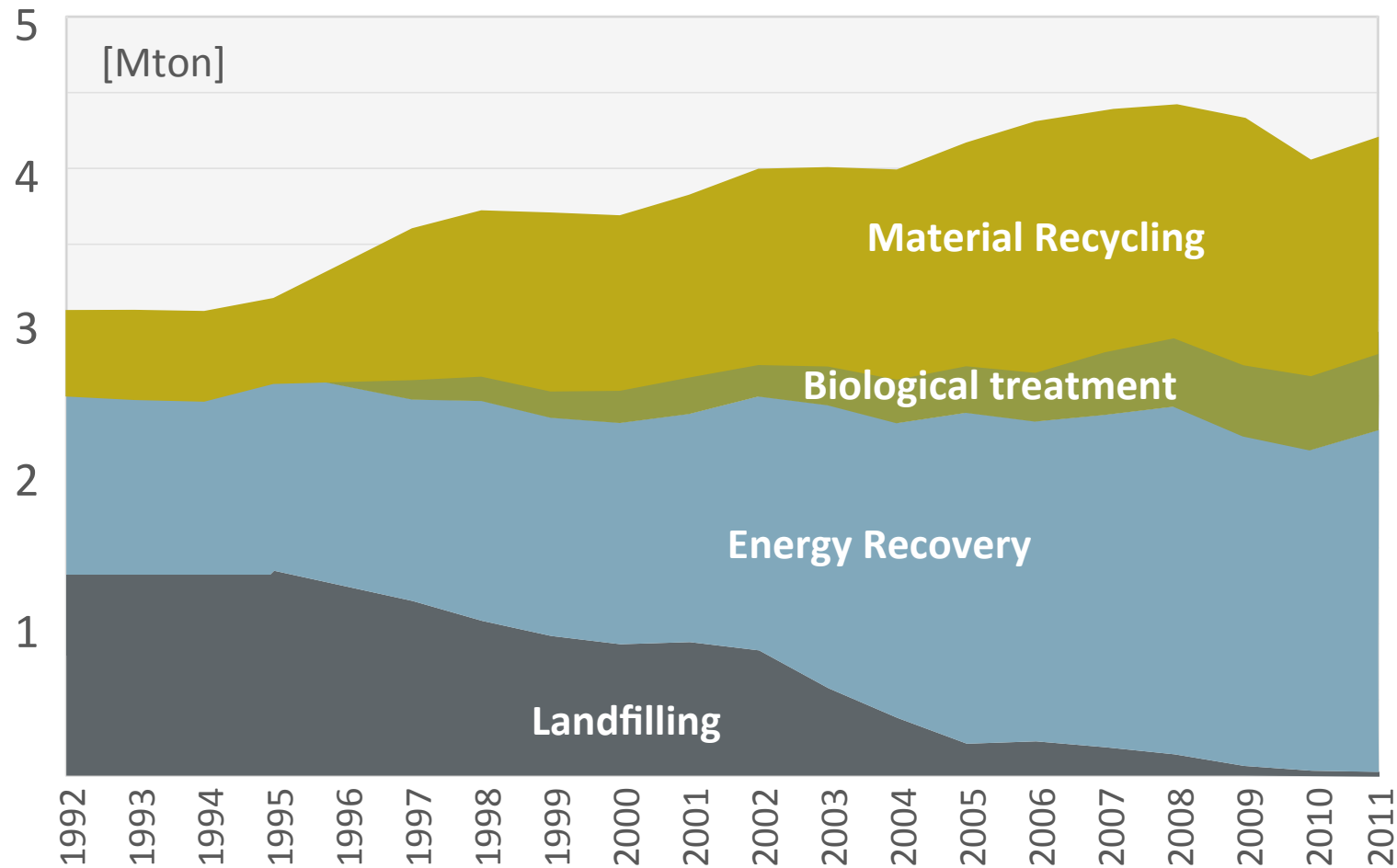




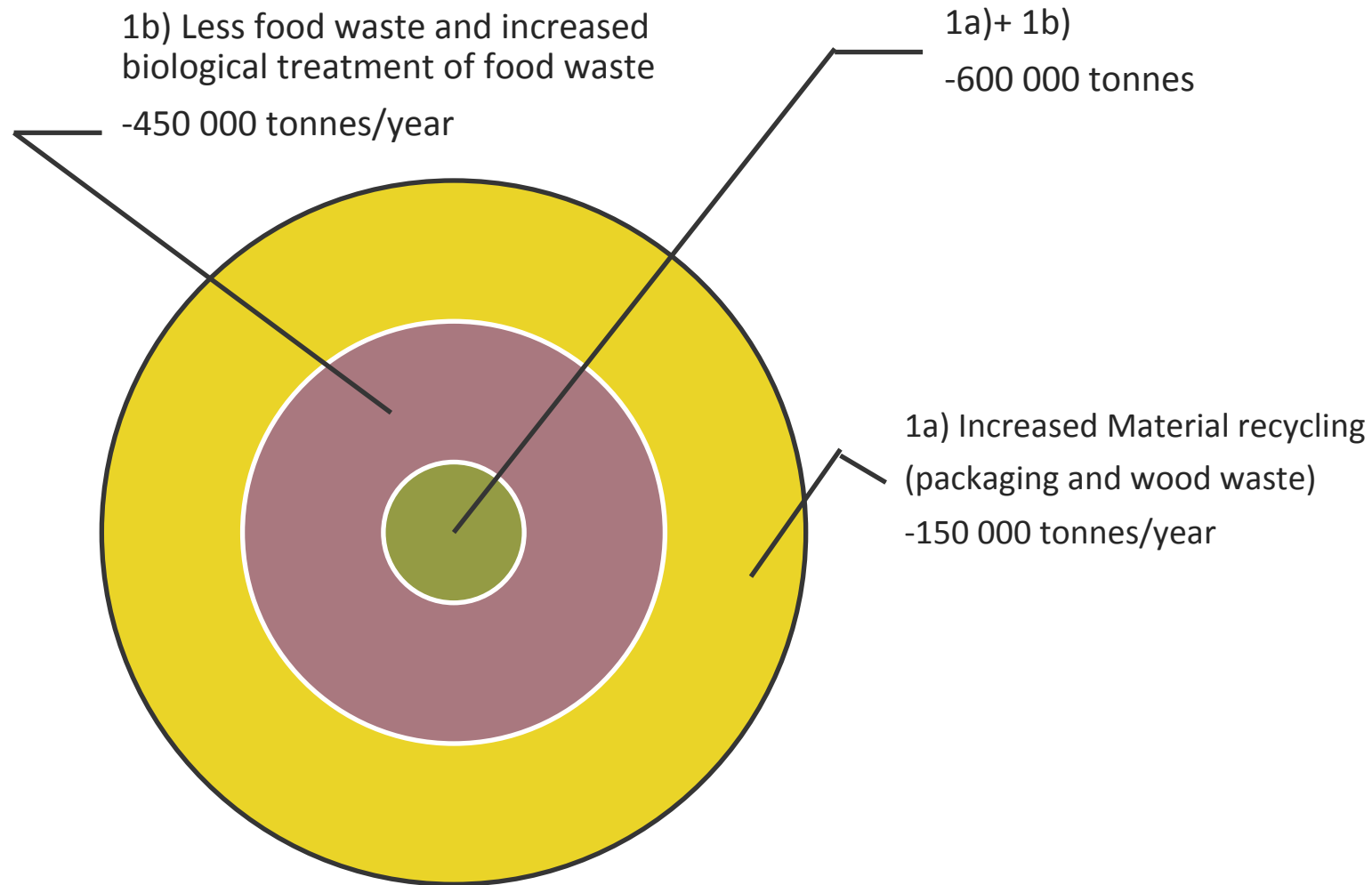
What aspects are included?

- Waste quantities
- Net calorific value
- Content: moisture, fossil material (plastics of fossil origin), chlorine, ash
- Technical aspects of the boiler such as influence on corrosion rates and energy efficiency

Background : Treatment of MSW 1992-2011



The national changes...

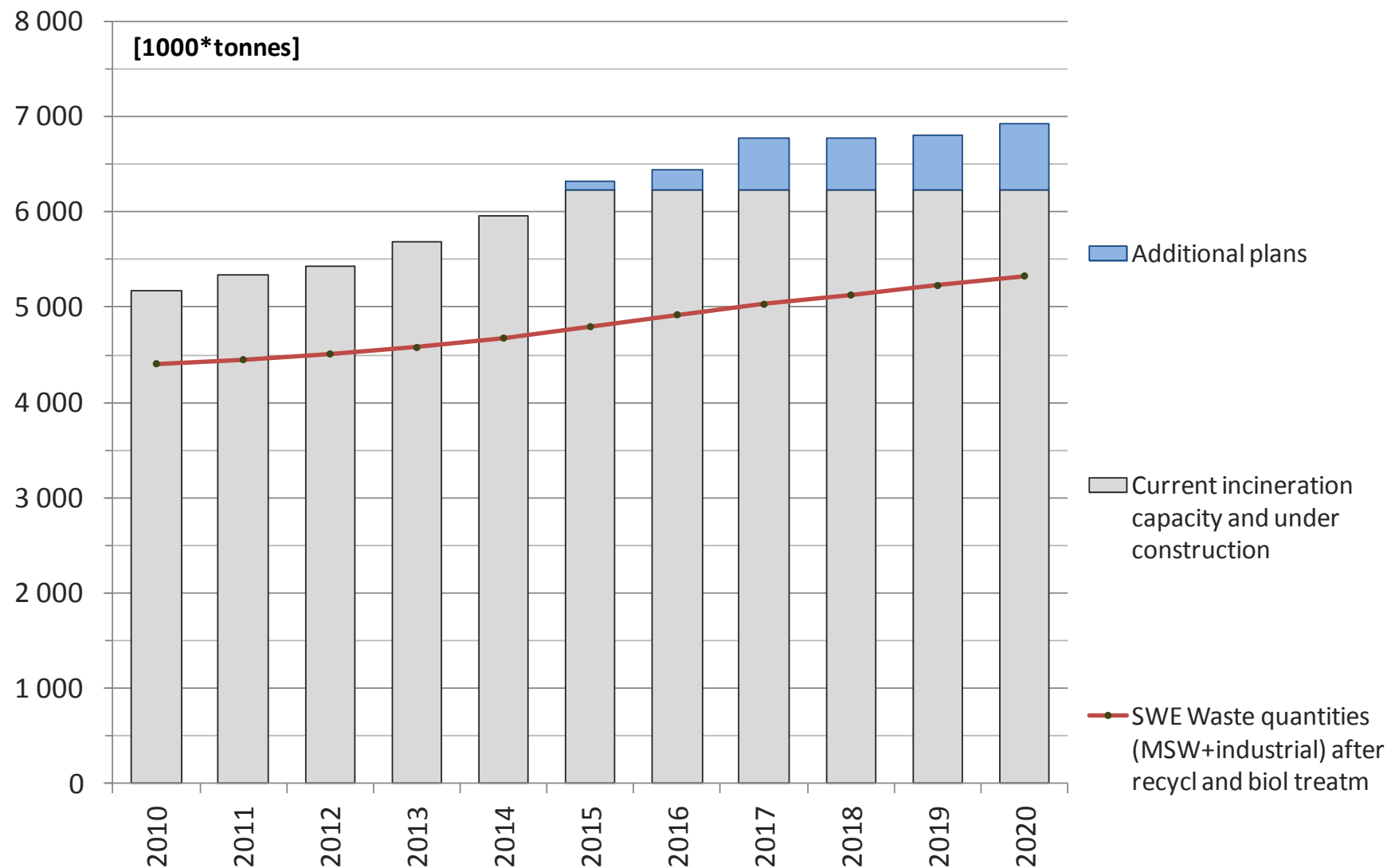


Results: comparison of waste fuels

	Reference 2020	Bulls eye (1a+1b)
Net Calorific value (MJ/kg)	11.3	11.3
Moisture (%)	38	37
Fossil carbon (%)	33	33
Ash (% of DS)	21	22
Chlorine (% of DS)	0.83	0.86
Potassium (% of DS)	0.4	0.29
Zinc (mg/kg DS)	1480	1610

Treatment capacity and waste quantities

March 2013



Results: comparison of imported/ national waste fuels



	Mixed waste (2011)	Imported, RDF (measurement)
Net Calorific value (MJ/ kg)	10.8	13.0
Moisture (%)	38	32
Fossil carbon (%)	32,4	25
Ash (% of dry substance)	20.8	10.1
Chlorine (% of DS)	0.78	0.38
Potassium (% of DS)	0.36	0.25
Zinc (mg/kg DS)	800	98

And the result of the mix is...

Parameter	Reference 2020	Step 2a	Step 2b
Amount (Mton)	5.7	6.4	6.4
Net Calorific Value (MJ/kg)	11.3	11.6	12.7
Moisture (%)	38	36	33
Fossil carbon (%)	33	31	31
Ash (% of DS)	21	20	18
Chlorine (% of DS)	0.83	0.76	0.97
Potassium (% of DS)	0.34	0.28	0.29
Zinc (mg/kg DS)	1 480	1 290	1 330

Future quality: Higher calorific value and lower moisture content

- Less waste might be combusted, with *less income from gate fees*
- Higher combustion temperature
 - Change of the *temperature window for the SNCR*, for NO_x control
 - Increased need of *cooling of the grate*
- Lower moisture content in the flue gas
 - Less load on fans
 - Reduced potential of flue gas condensation



Future quality: Decreased quantities – more mono-fractions and low quality?



- *The mixing of fuel will be even more important*
- The flue gas cleaning system must handle larger variations
- Extra troublesome fuels gives increased risk of corrosion and fouling
- Increased *requirements for process control and on operators responding to changes*

Conclusions

- The *composition change of the Swedish waste fuel is small*
- The average change leads to small effects on boilers and energy efficiency – *however no one will see just the average change*
- Imported waste fuels are so far of *high quality*
- “*Tougher*” fuels are expected:
 - more SLF
 - mono-fractions
 - construction waste
 - sewage sludge
(as long as it is not spread as fertilizer)





Thank you for your attention!

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