2nd INTERNATIONAL CONFERENCE on
Sustainable Solid Waste Management

Processing concept for the production of biomass fuel from mixed municipal solid waste

marss

MATERIAL ADVANCED RECOVERY SUSTAINABLE SYSTEMS

Athen, 13th June 2014

Holger Giani

Background

- **EU Landfill Directive**
  - Landfilling is the worst disposal option for BMW
  - BMW = Biodegradable Municipal Waste
  - Avoidance of BMW from being landfilled by at least 65% (by mass) in comparison to the production of BMW in 1995.
  - Several EU countries don‘t meet requirements yet
  - Different circumstances in EU contries and regions

The MARSS Project

– To provide a technology to **fulfill** the demands from **EU Landfill Directive**

– Developing of a demonstration plant (10 Mg/h dried MMSW)

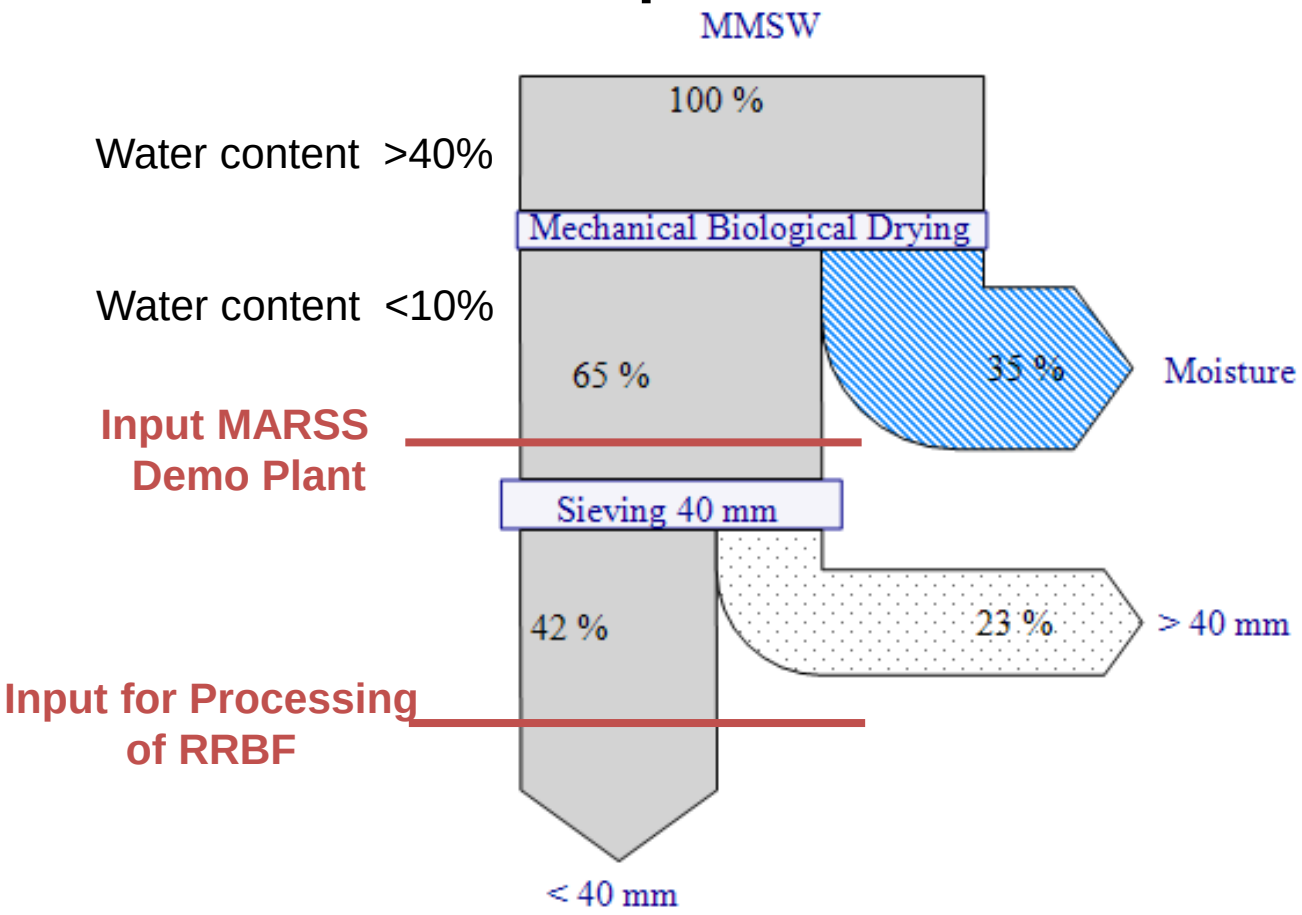
– To produce **RRBF** (Refined Renewable Biomass Fuel) from dried MMSW

- **High heating value** (in range of about 12,000 kJ/kg)
- **High purity** (reducing fossil carbon and inert materials)
- **High mass recovery**

– To **reduce GHG emissions** from MMSW management

TARGETS

Input Material

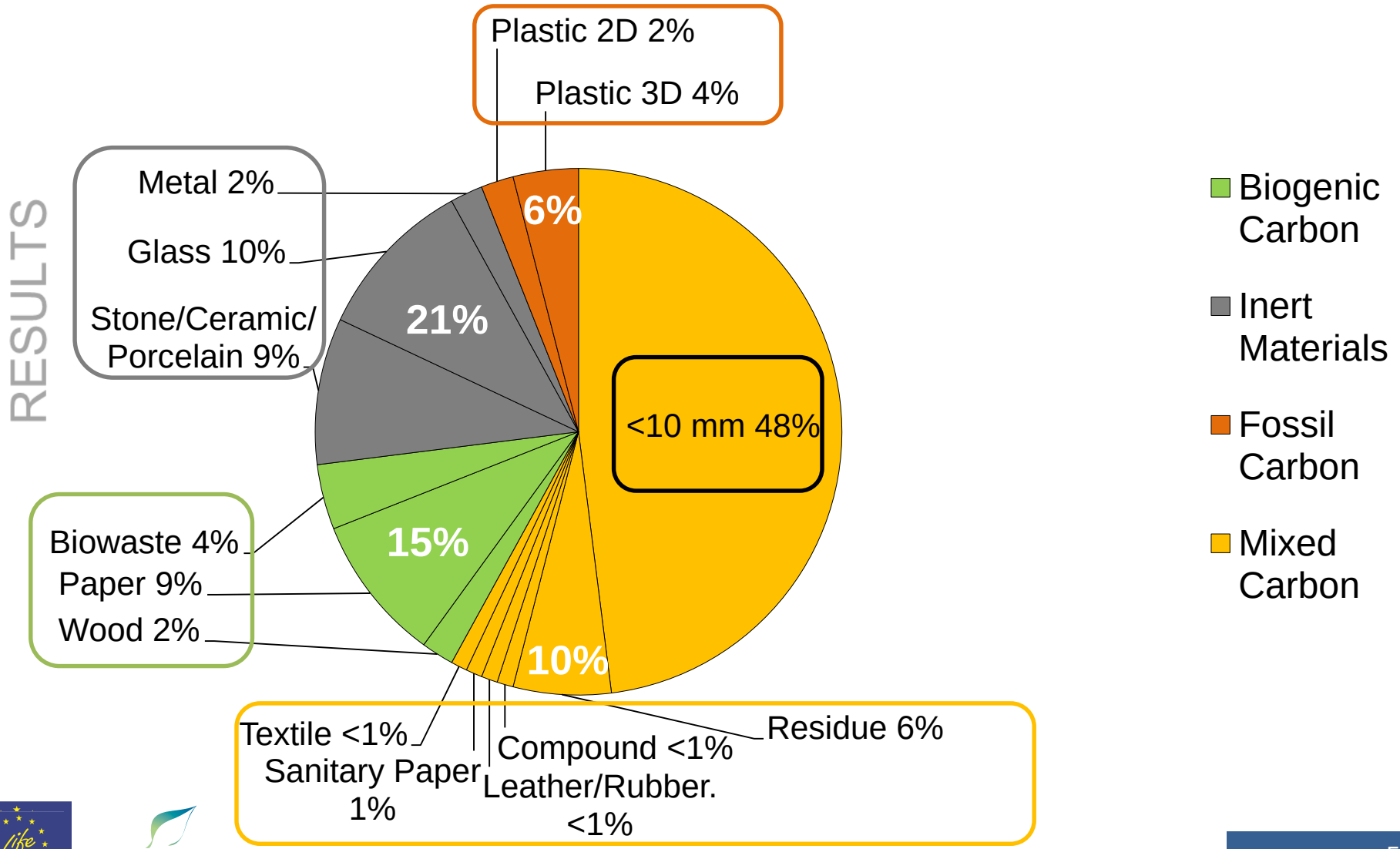


Output MBT Mertesdorf (Dried MMSW) = Input MARSS Demo Plant

MATERIAL

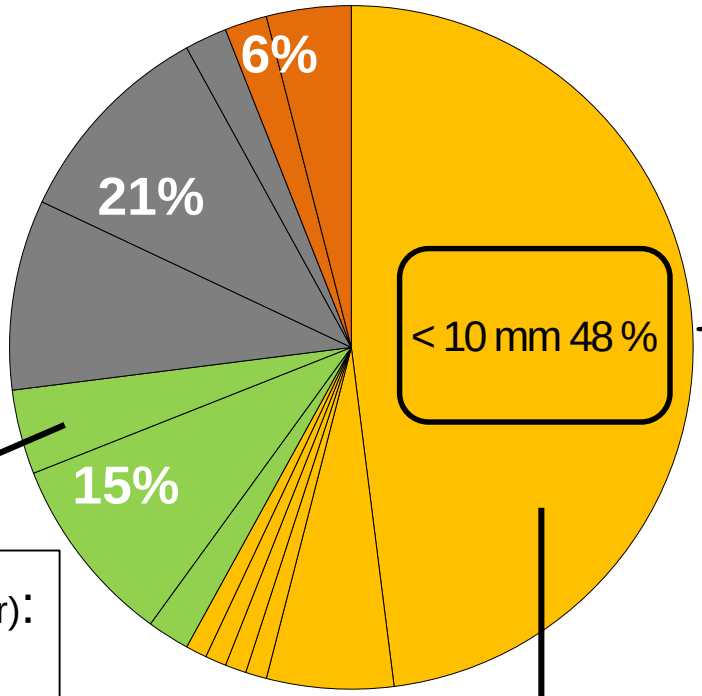
Material Composition (Share of Mass)

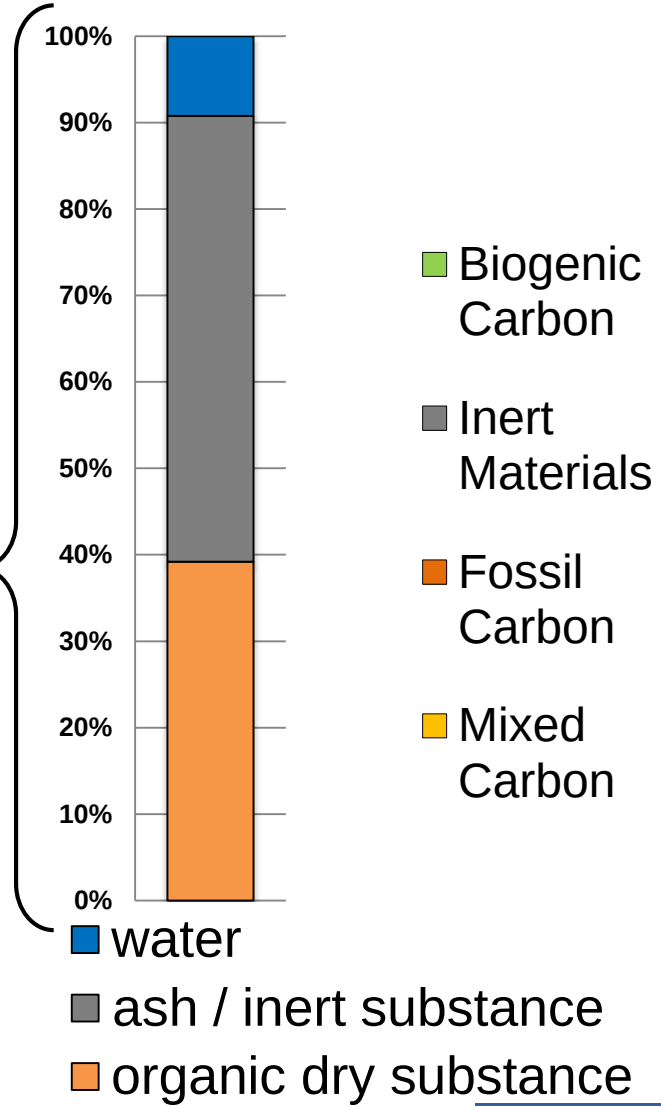
RESULTS



Material Composition (Share of Mass)

RESULTS





calorific value(ar):
12-14 MJ/kg

calorific value(ar):
7-8 MJ/kg

Dry Stabilate

Feeder

Drum Screen

> 40 mm

Not part of Marss RRBF sorting

> 11.5 mm

Not yet determined

Flip-Flow-Screen

0-4 mm

Flip-Flow-Screen

4-11,5 mm

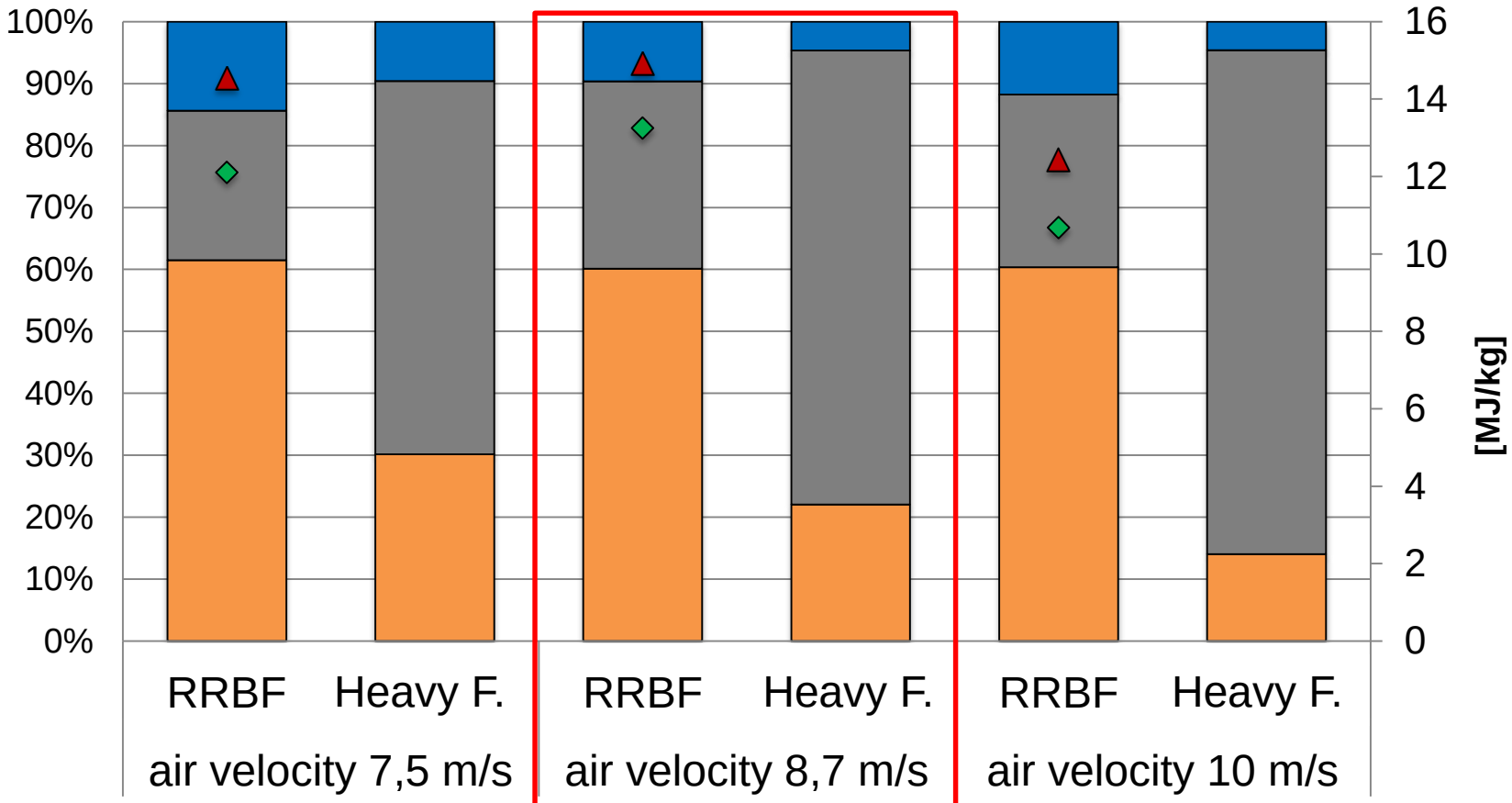
RRBF

LF

Air classifier 3 tests

HF

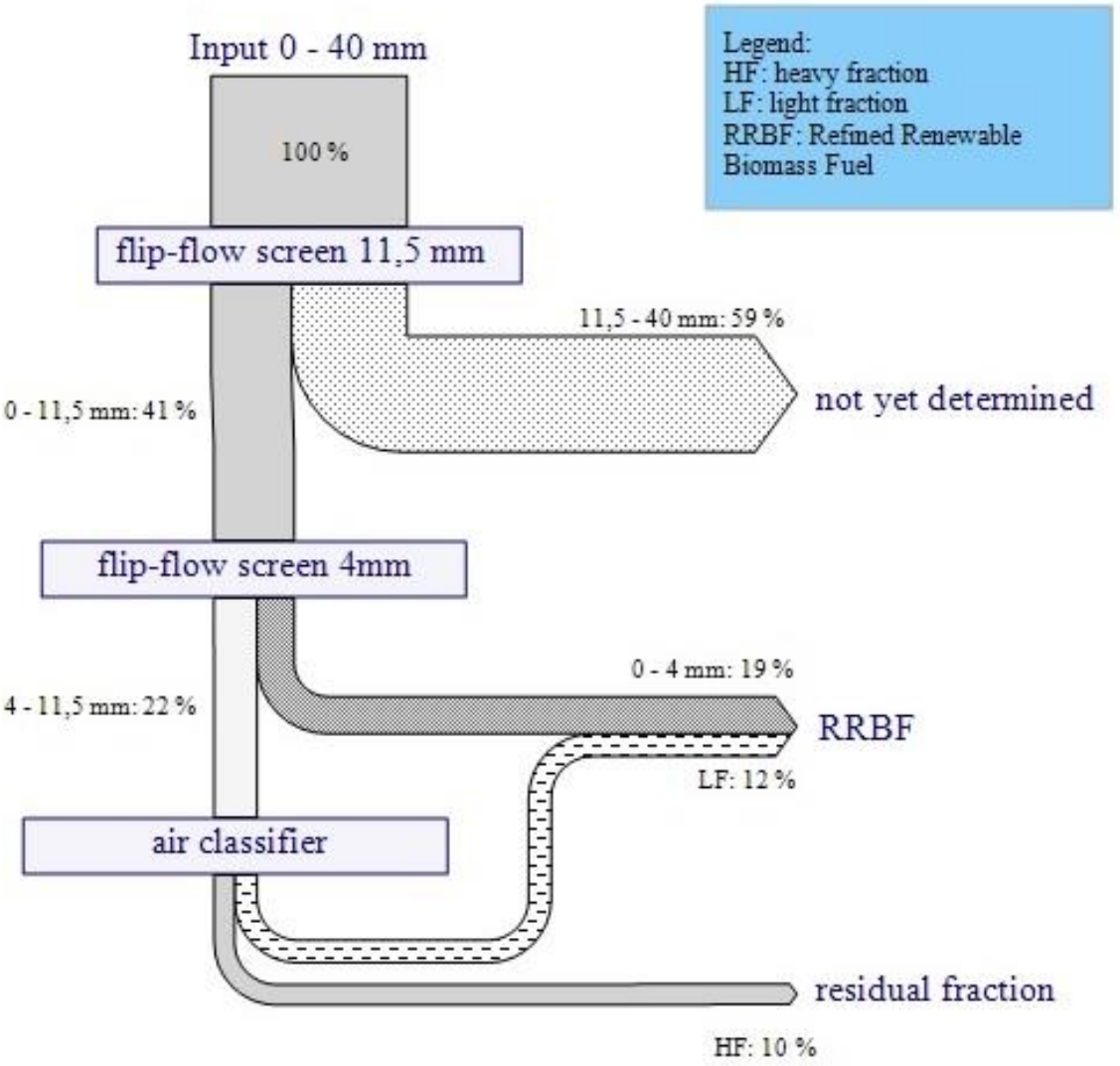
Results of air sifter tests



Mass recovery	37%	63%	52%	48%	64%	36%

organic dry substance
water
net calorific value, dry substance
ash / inert substance
net calorific value incl. water

First tests for plant construction



Conclusion

- Possible to produce RRBF out of MMSW
- Net calorific value for the light fraction > 13,300 kJ/kg
- Purity of RRBF < 11.5 mm most likely > 98 Ma.-%
- Sorting test of fraction > 11.5 mm will on demo plant
- Detailed sieving and separation tests on demo plant

Thank you for your attention!

DISCUSSION

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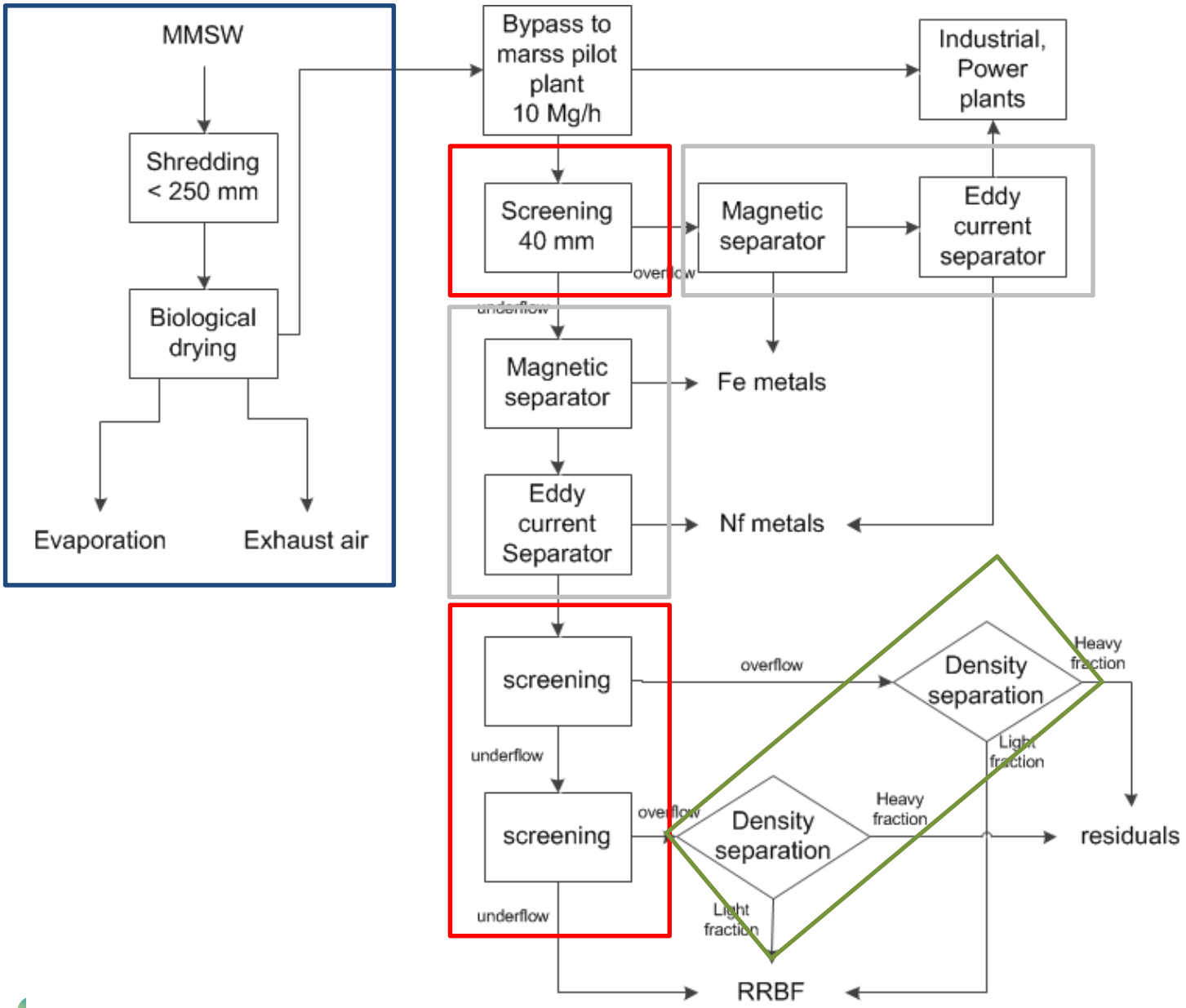
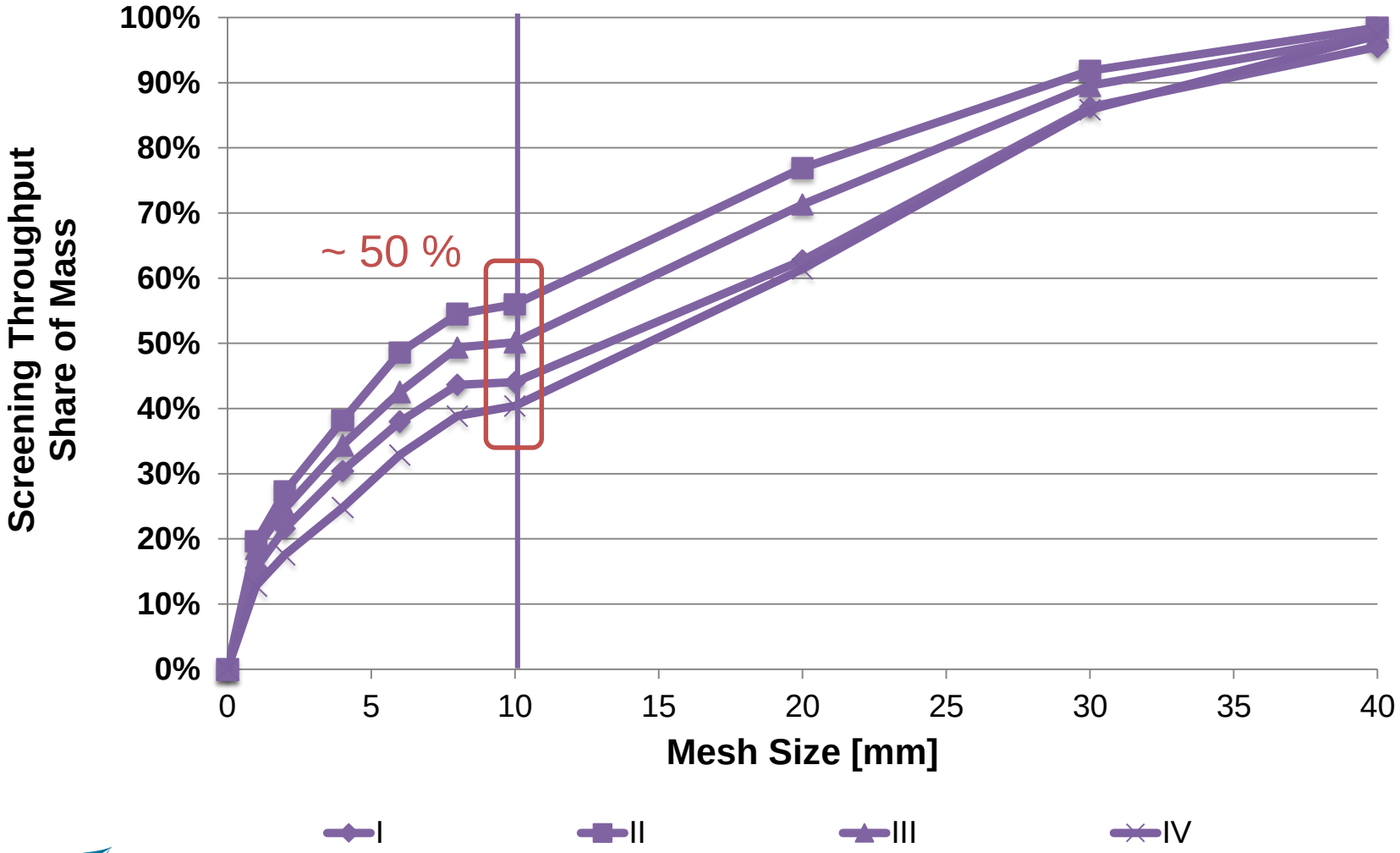
POSSIBLE PROCESS CHAIN



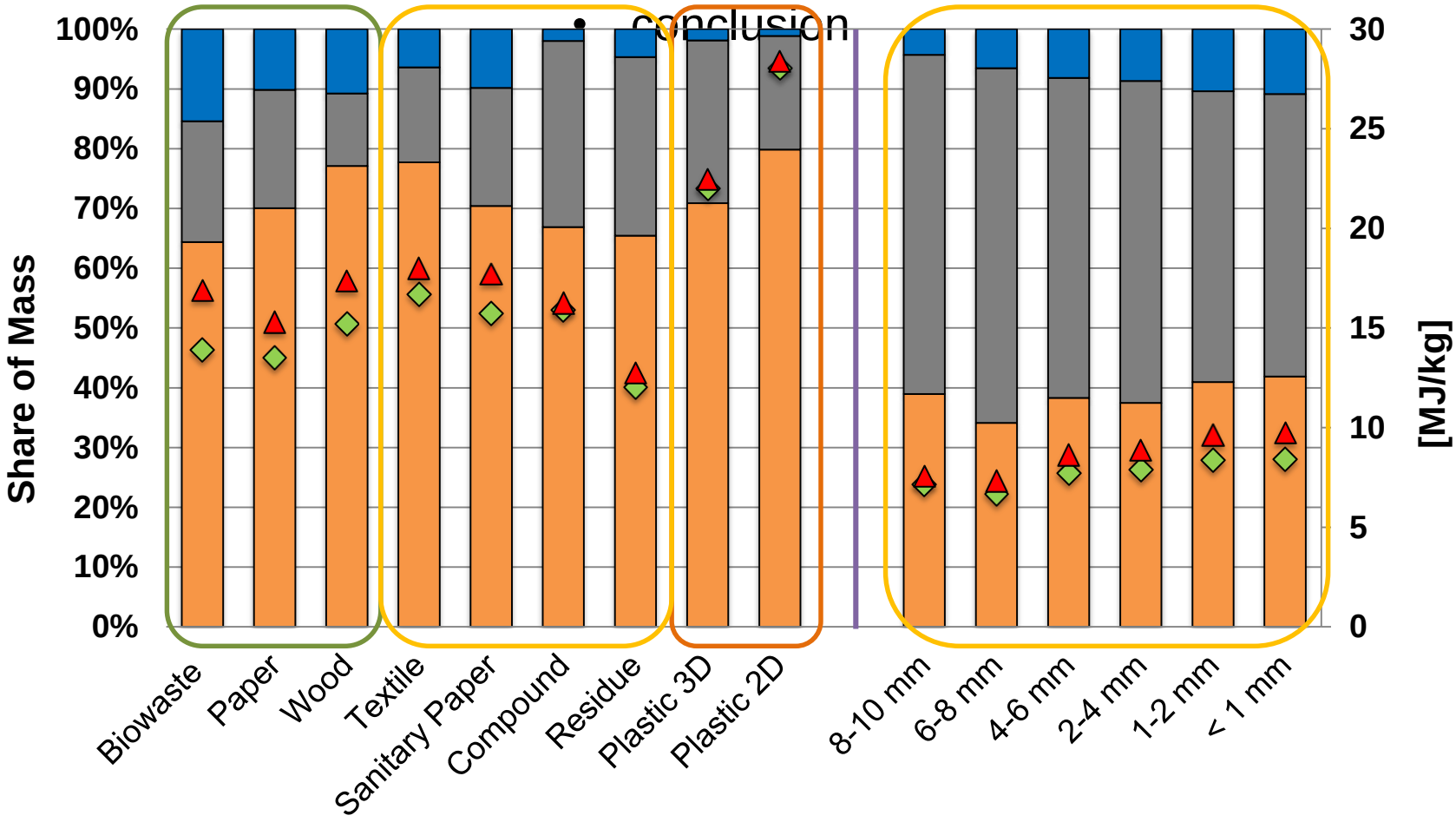
Particle Size Distribution

RESULTS

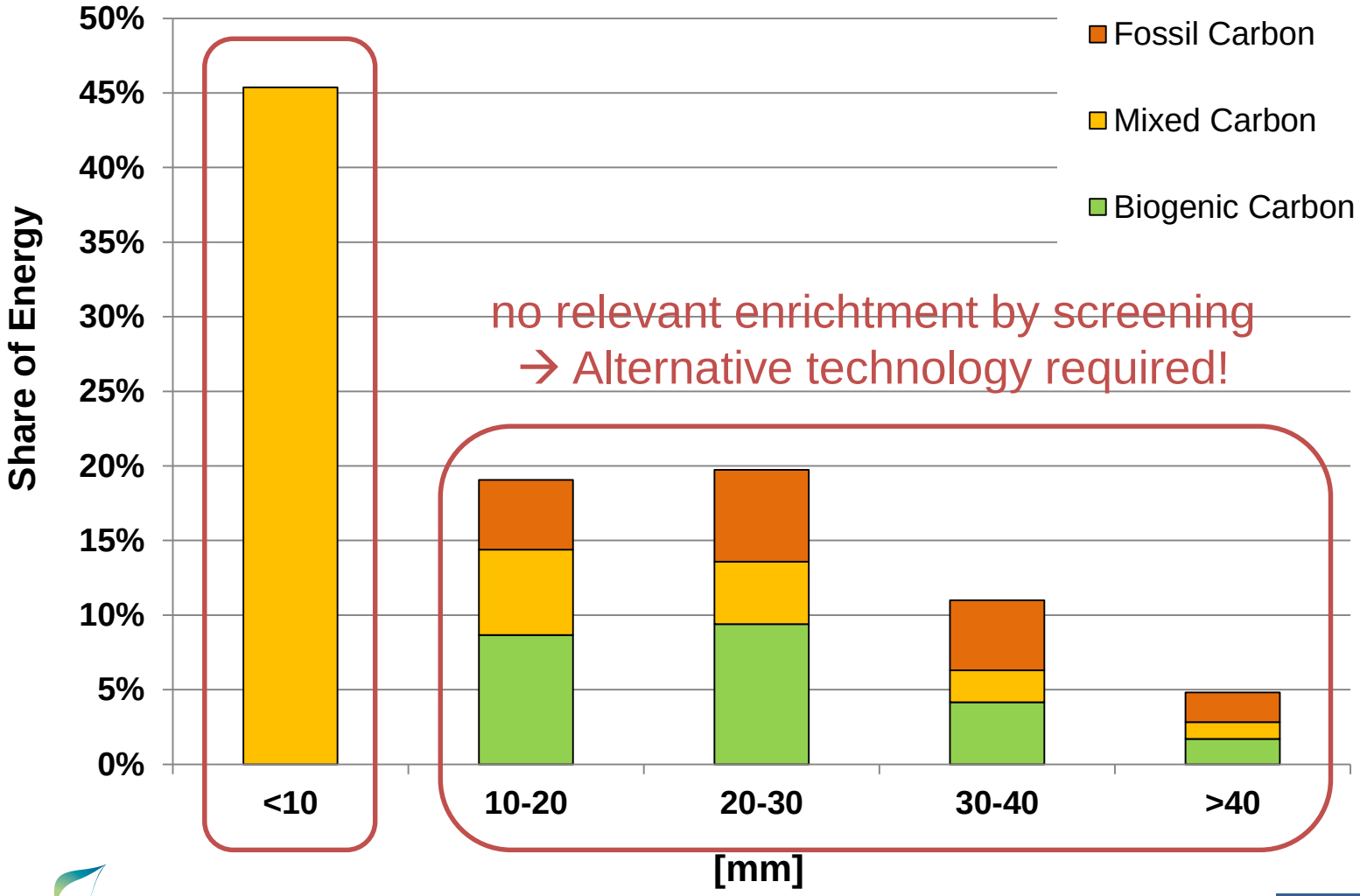


Lab Analyses das selbe für die Produkte!

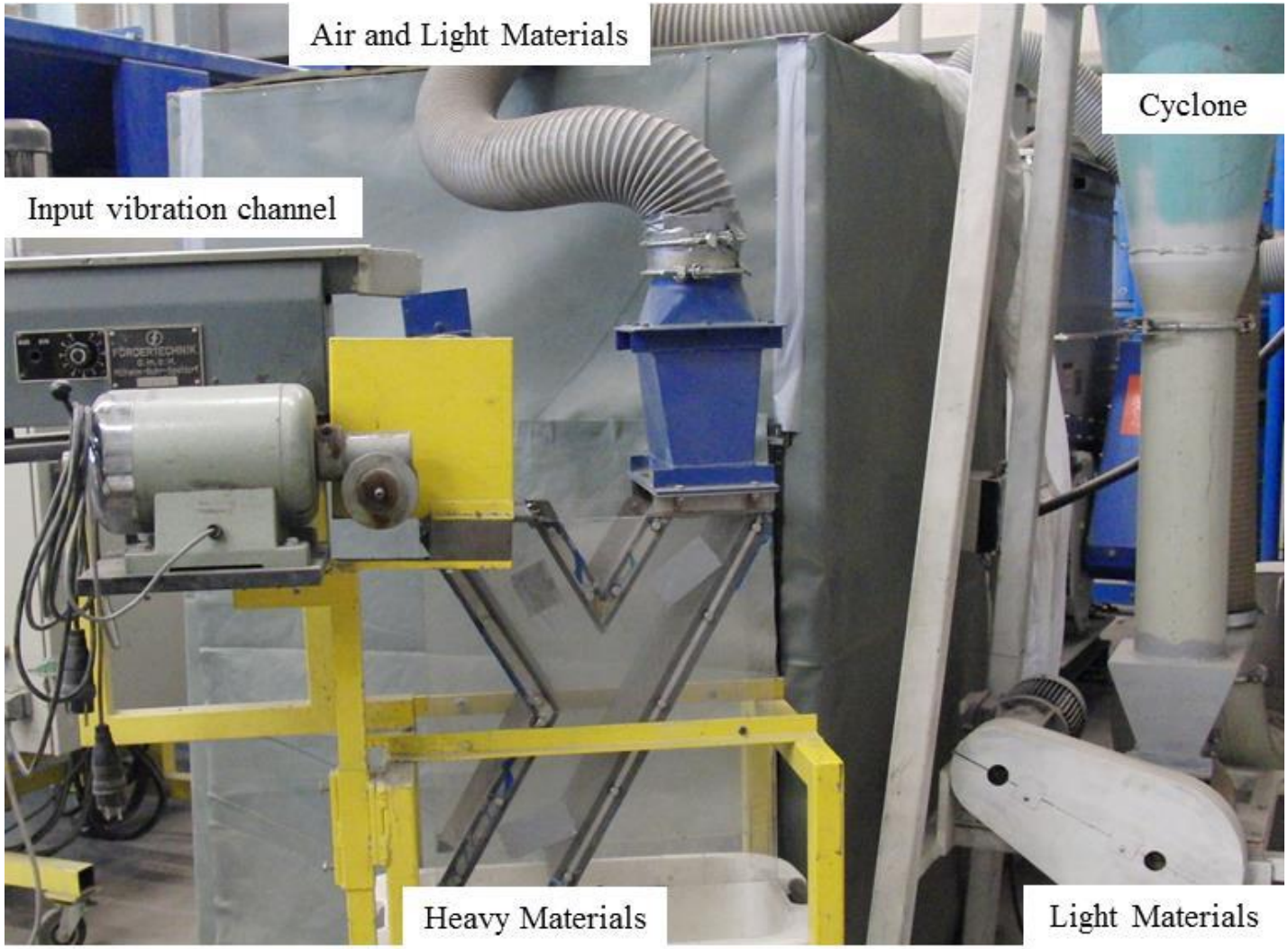
- conclusion



Absolute Net Energy Content (incl. Water)



Air sifter


Air and Light Materials
Cyclone
Input vibration channel
Heavy Materials
Light Materials

Zigzag Classifier

Machine

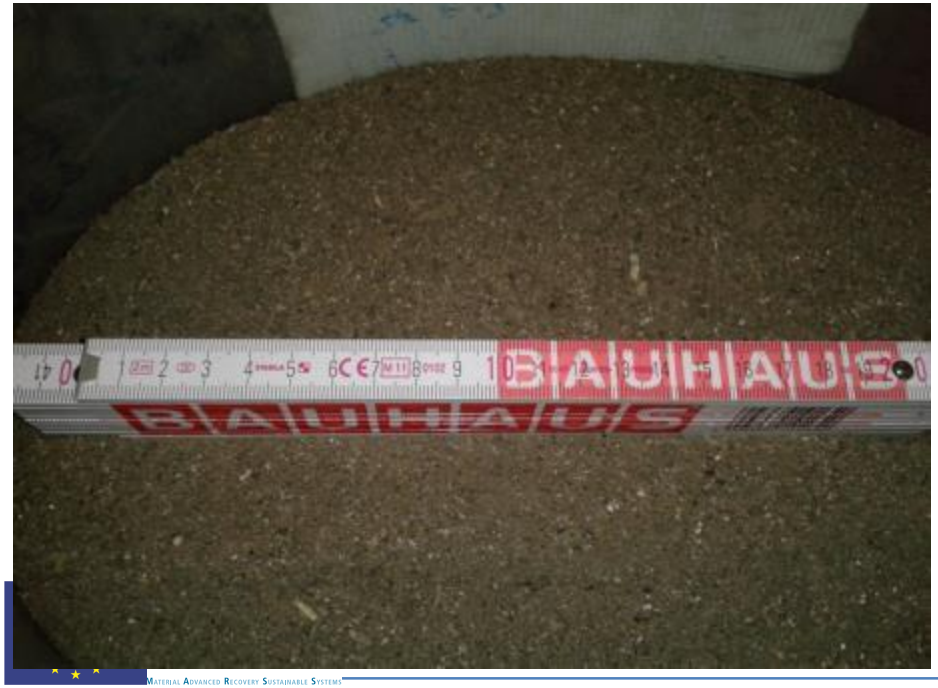
Feeder

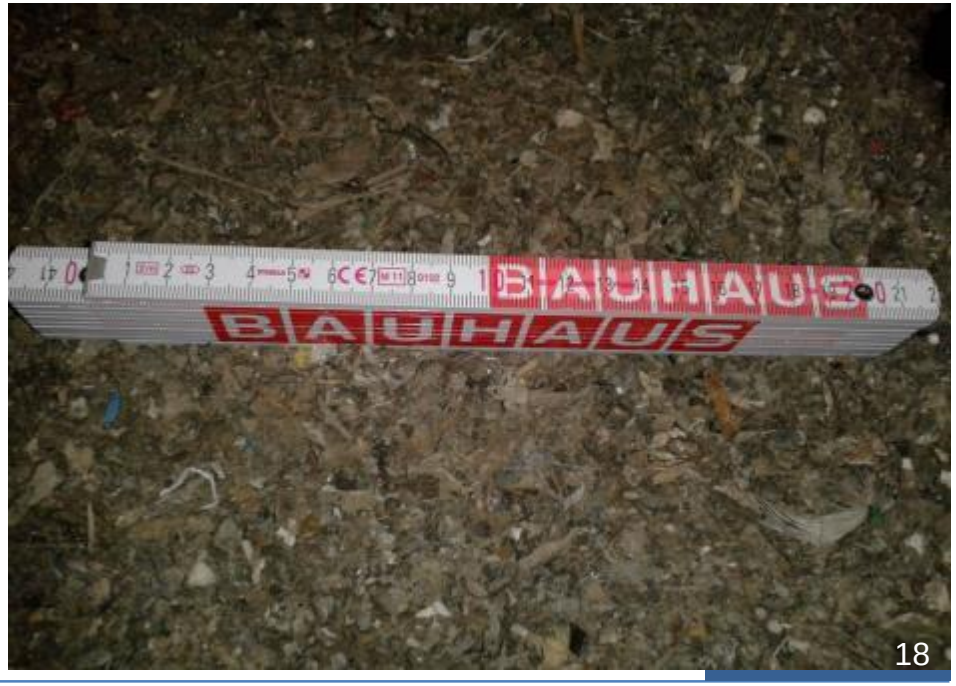
Heavy fraction

Light fraction

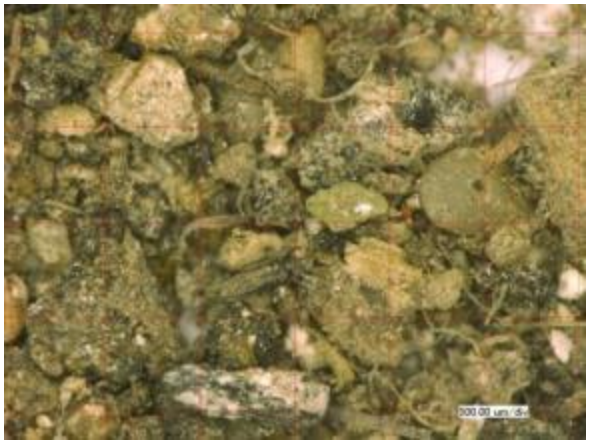
Results classification:

- No clogging
- High screening efficiency





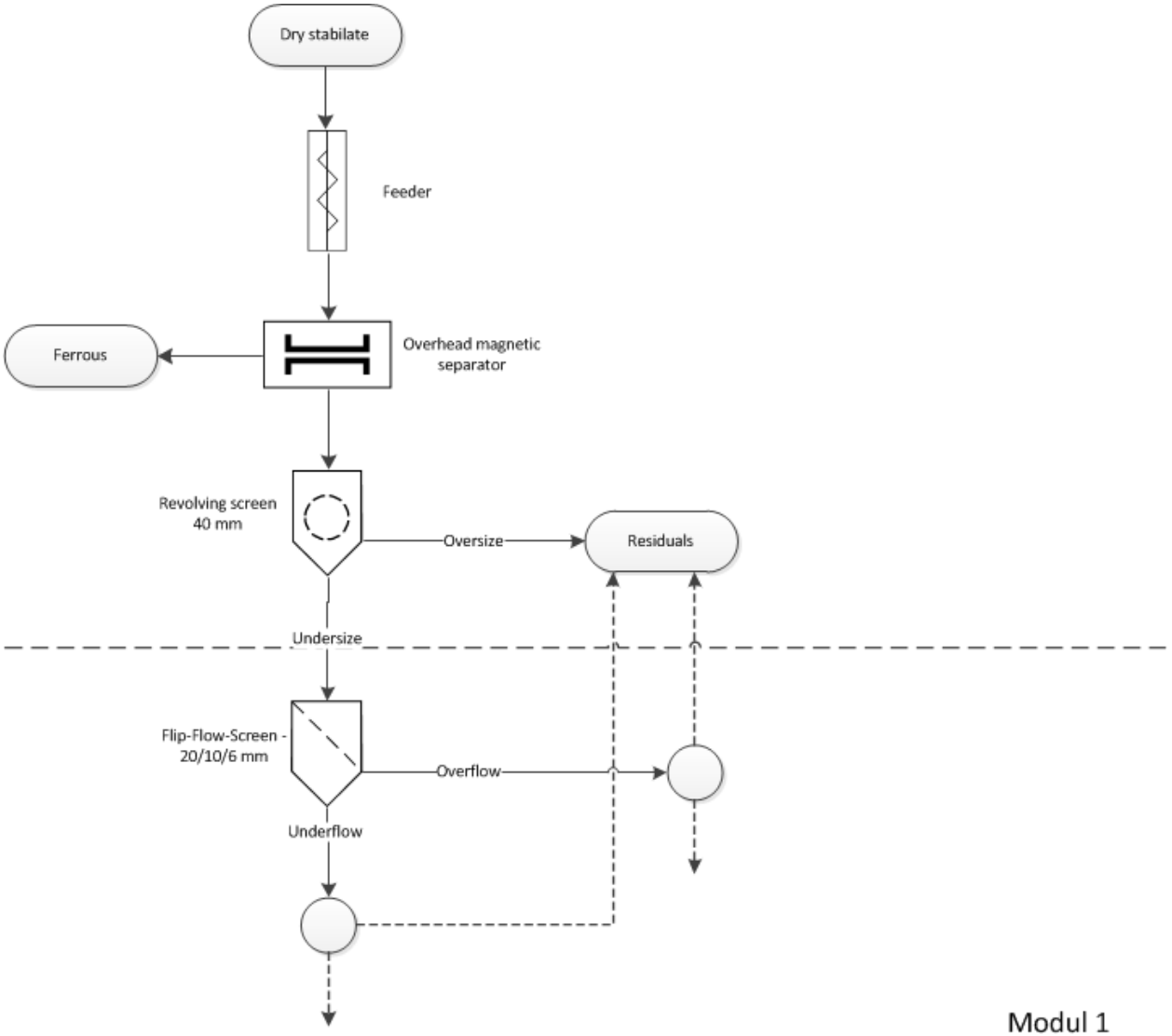
Microscope Pictures



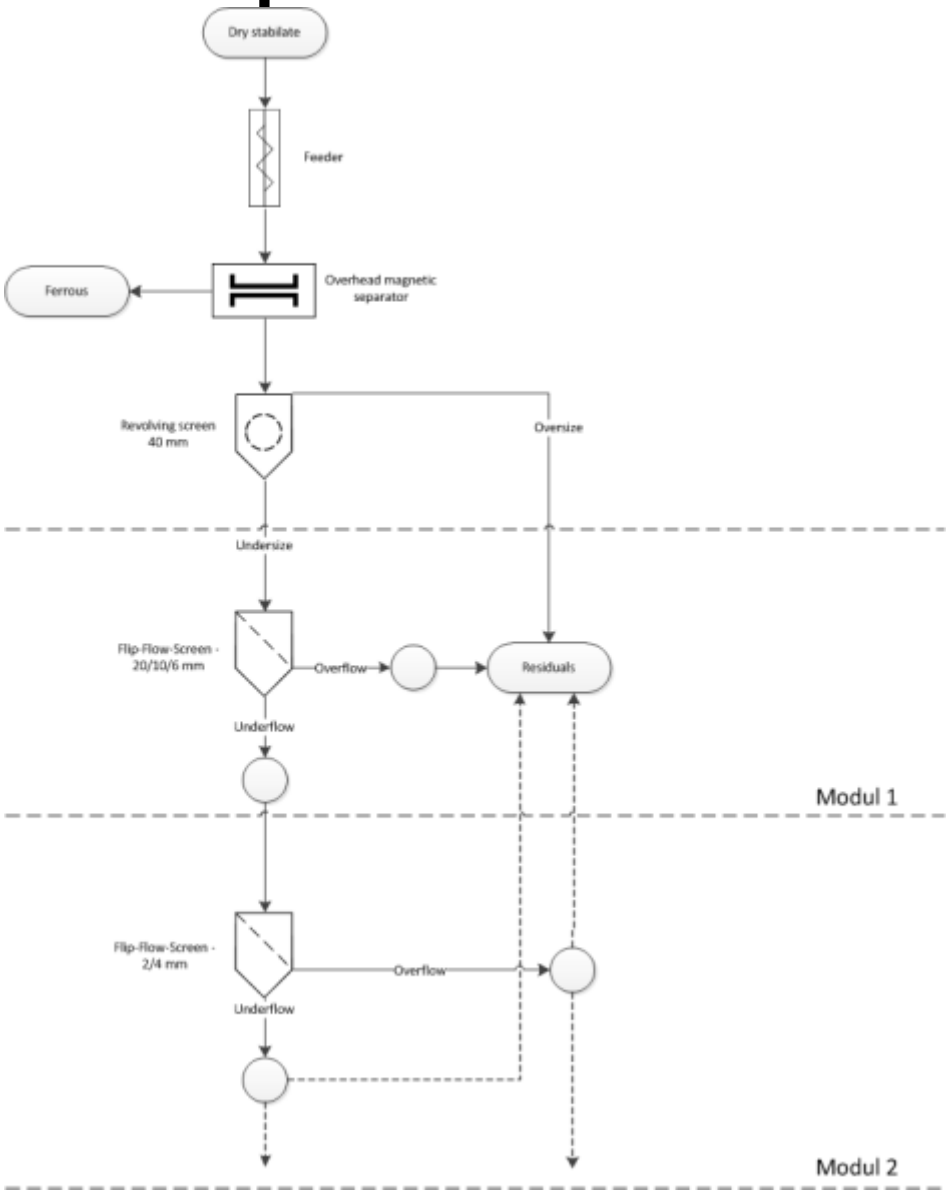
- Fine Fraction < 2 mm

- Fine Fraction 2-4 mm

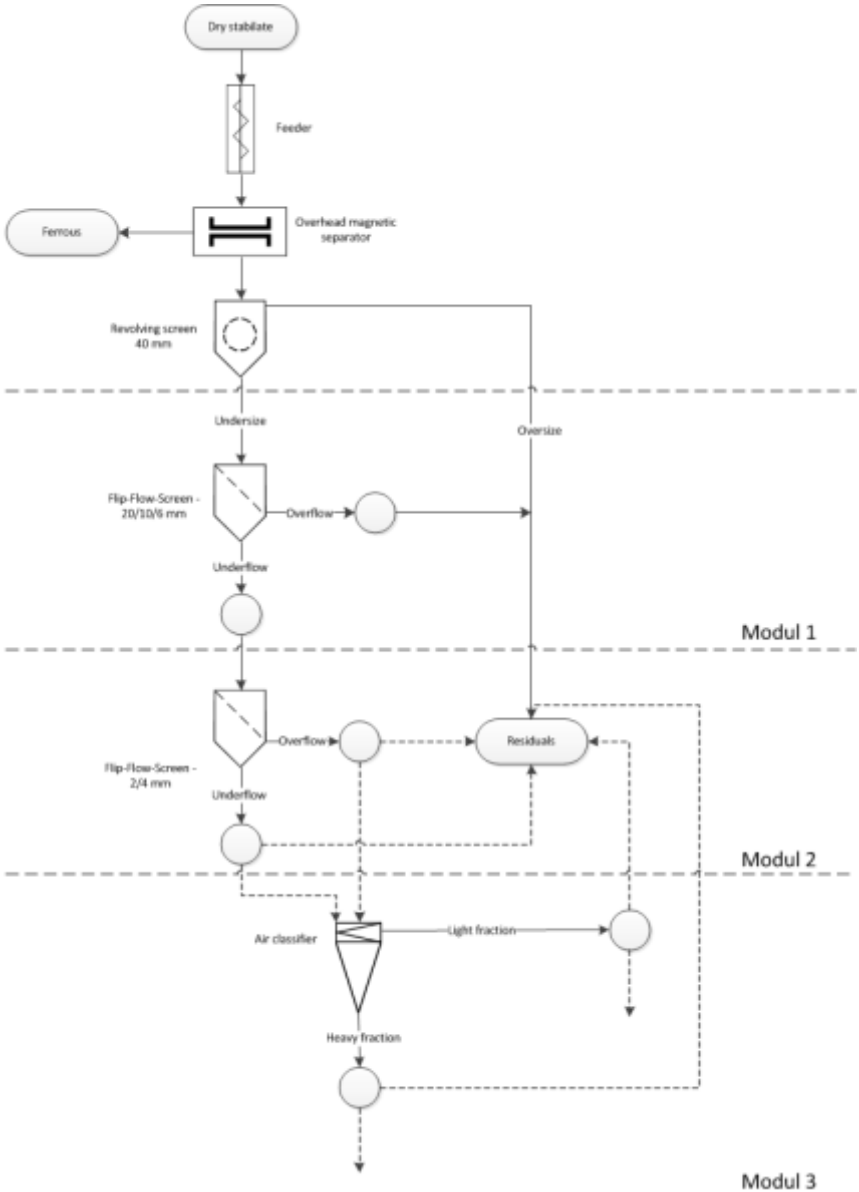
Pilotplant Procedure 1



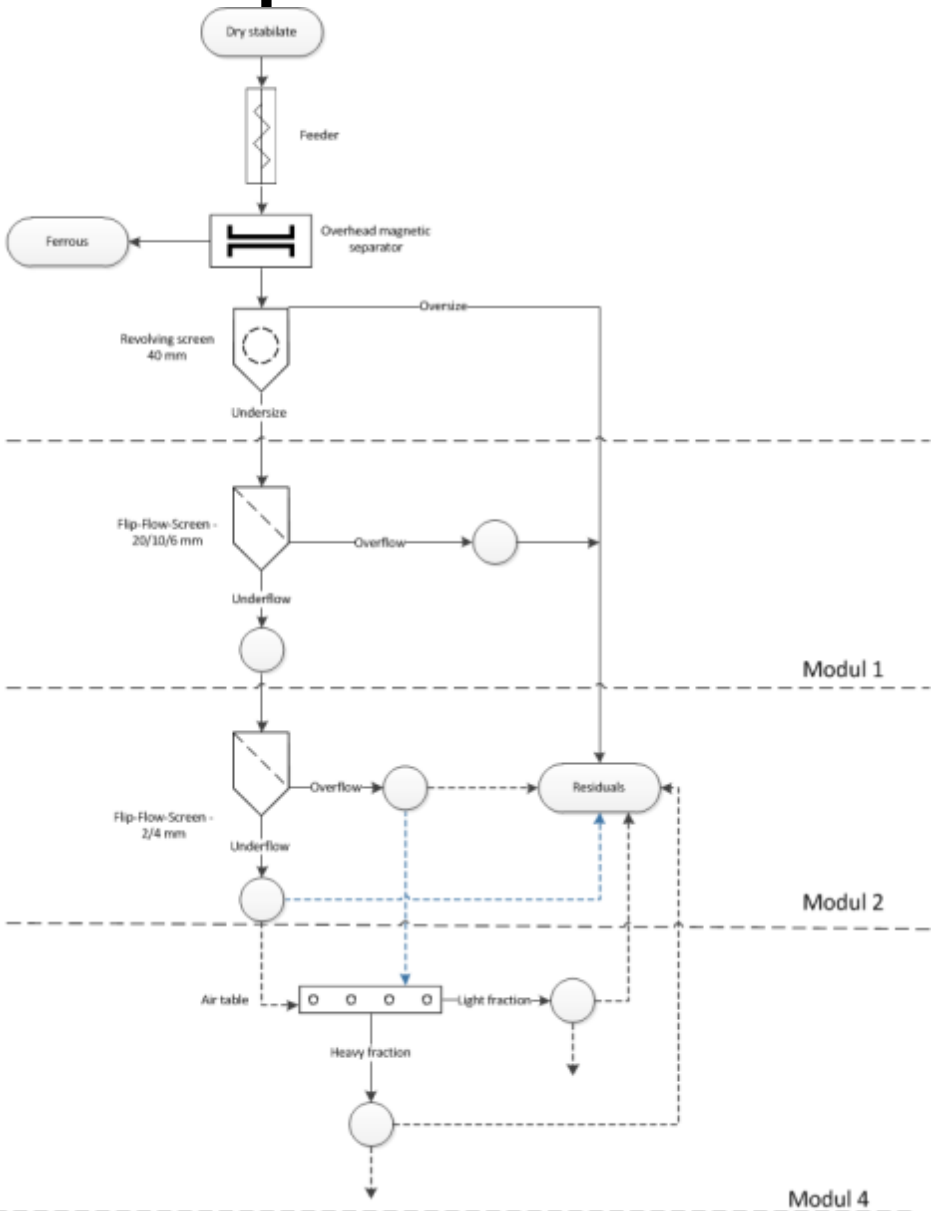
Pilotplant Procedure 2



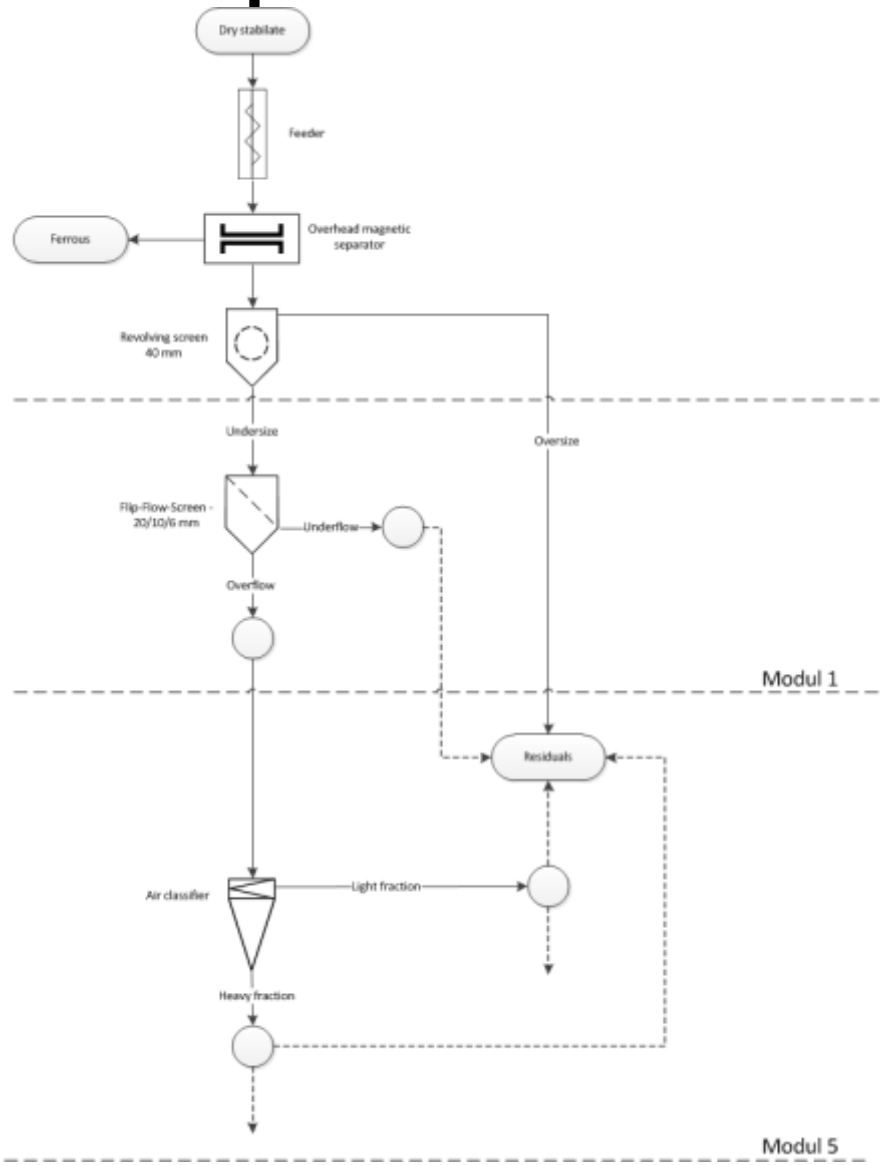
Pilotplant Procedure 3



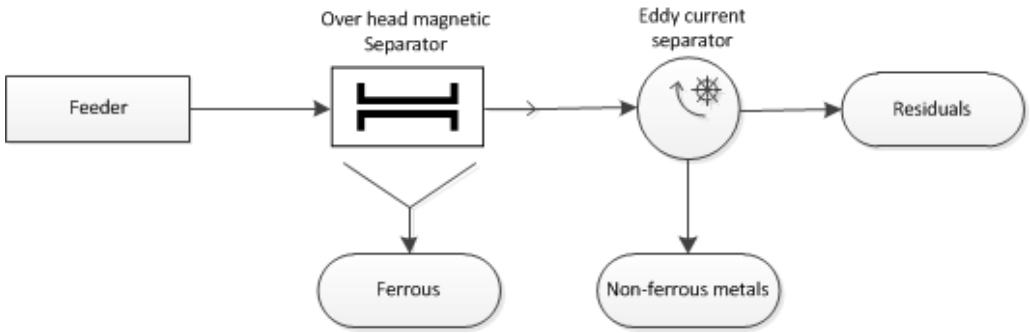
Pilotplant Procedure 4

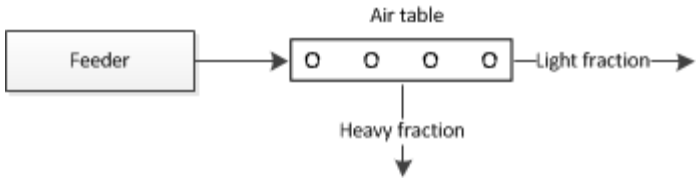


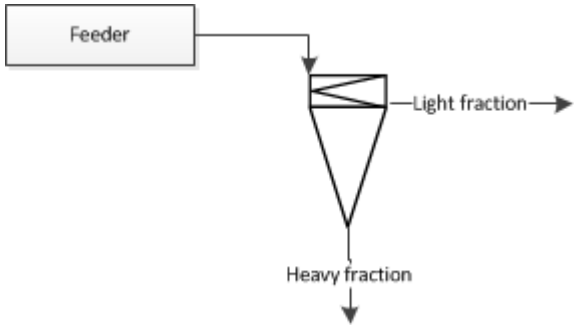
Pilotplant Procedure 5



Pilotplant flexible feeding

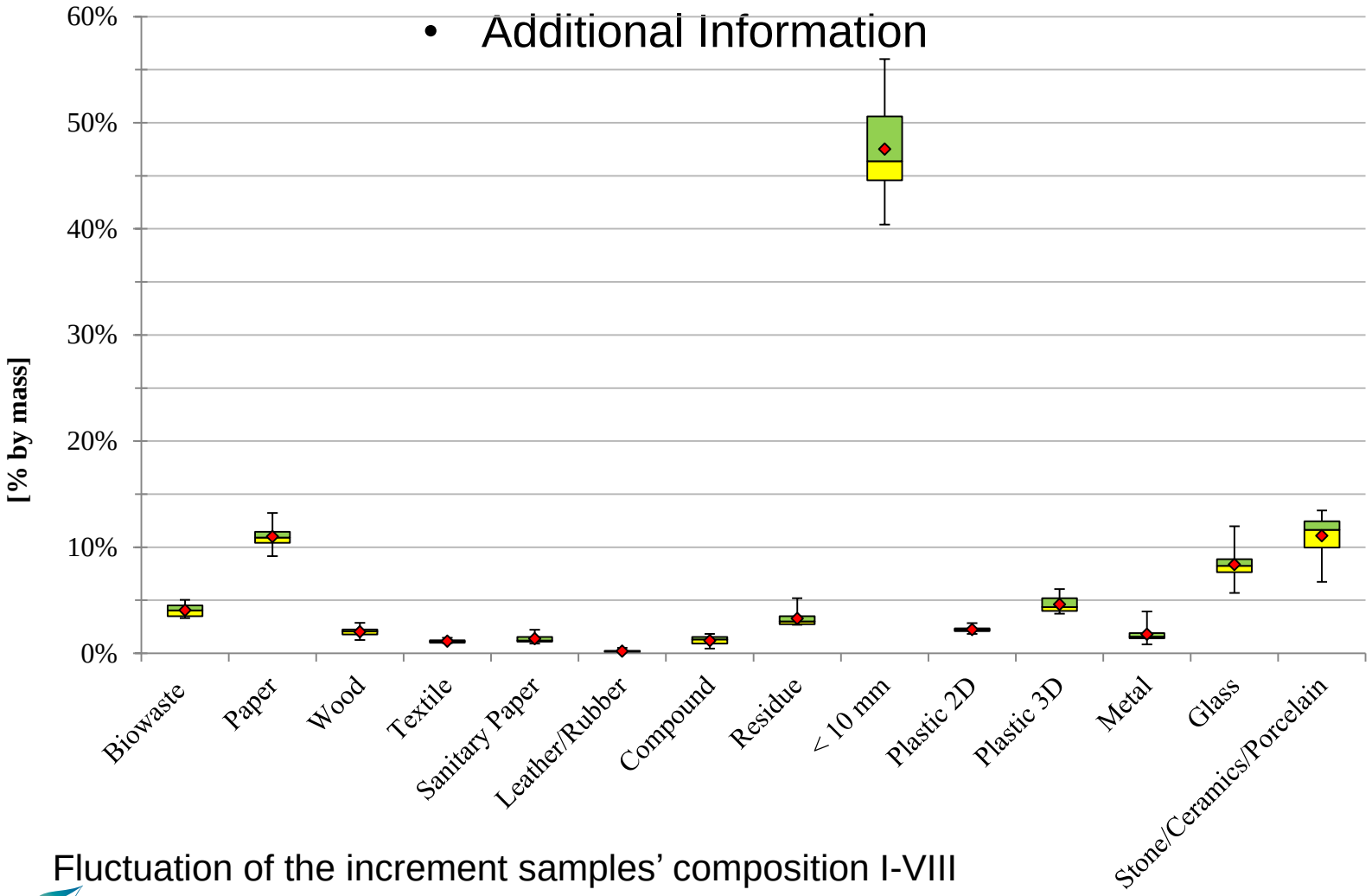






Fluctuation Material Composition

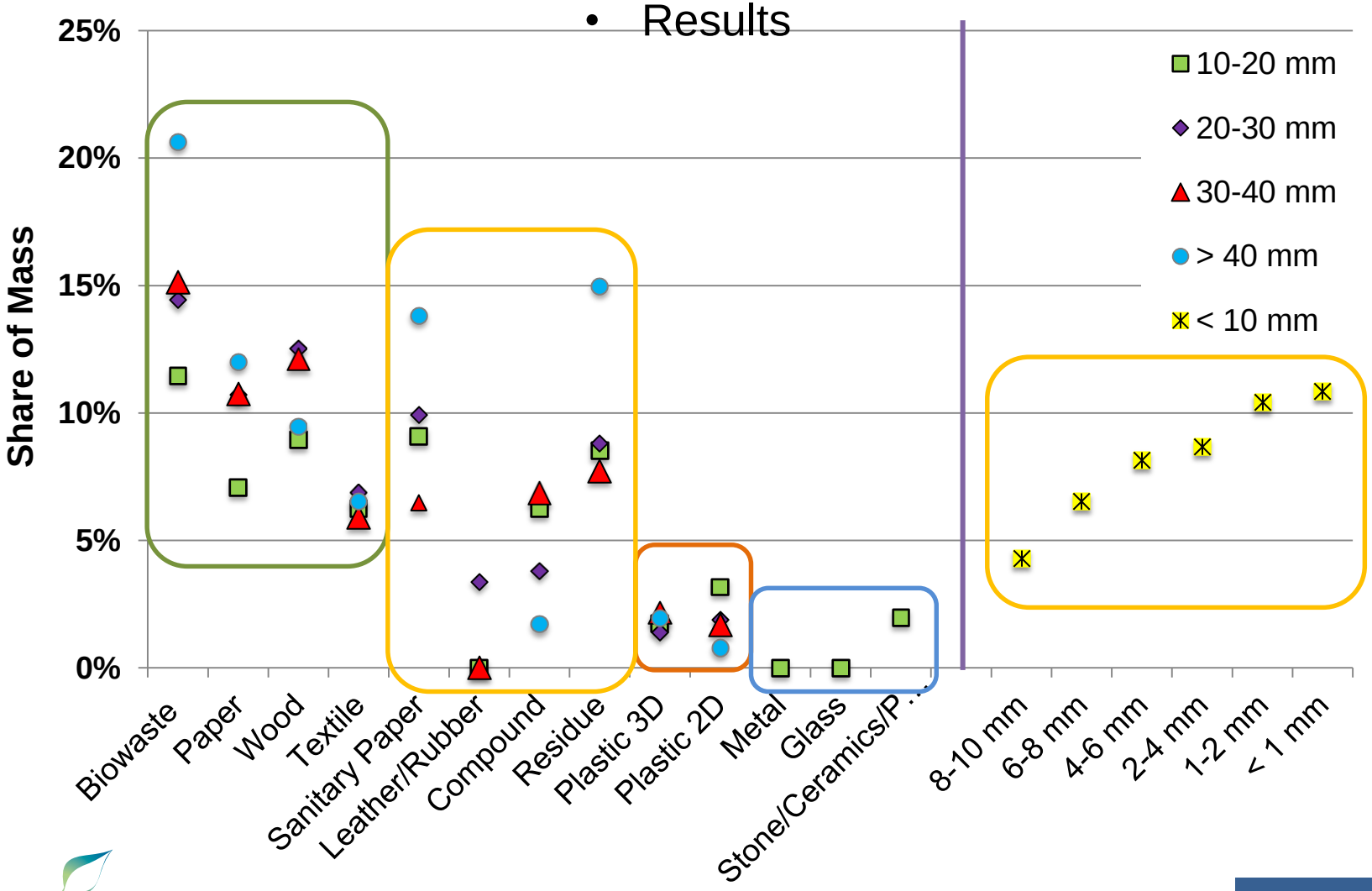
- Additional Information



Fluctuation of the increment samples' composition I-VIII

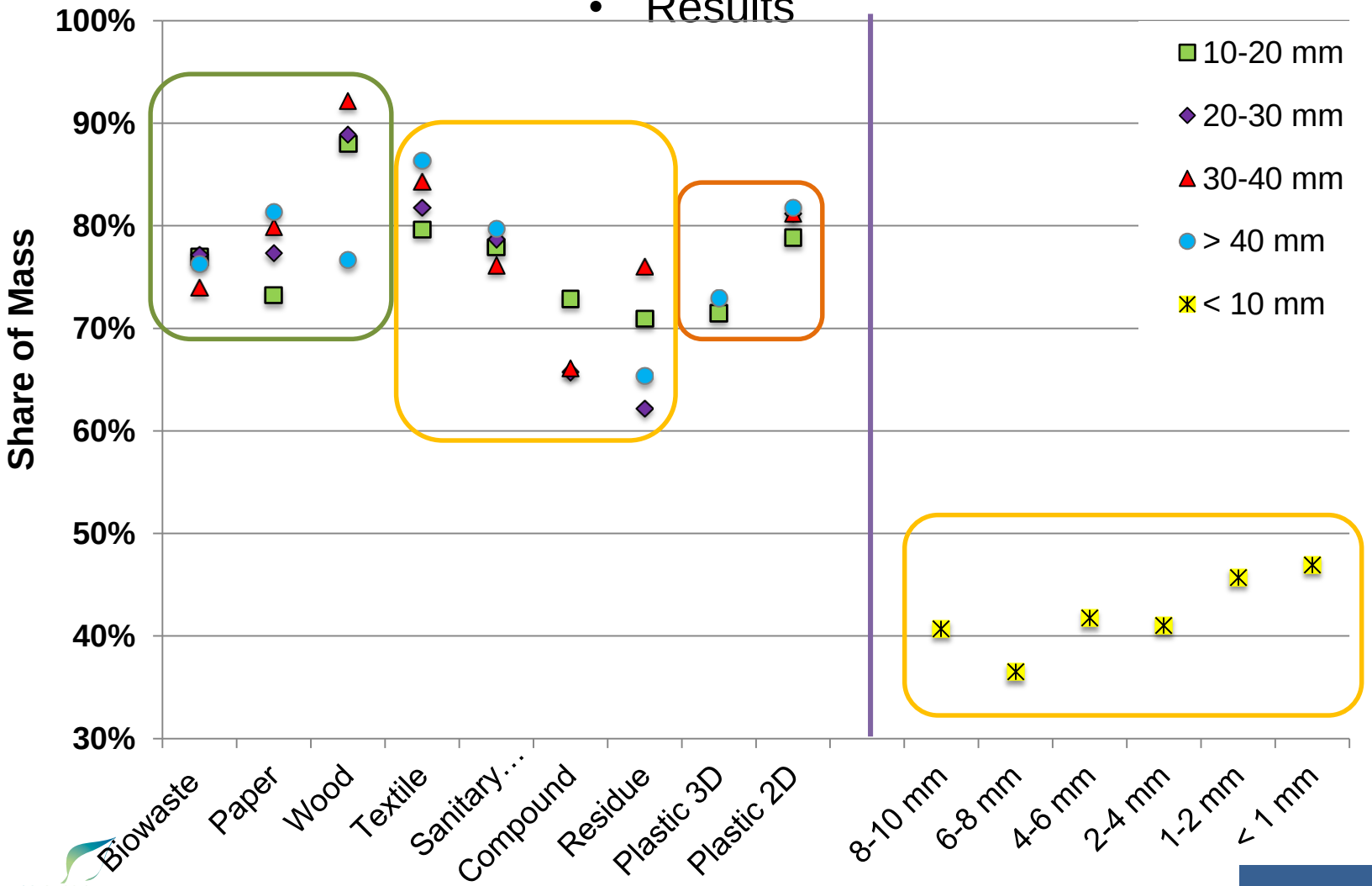
Water Content

- Results



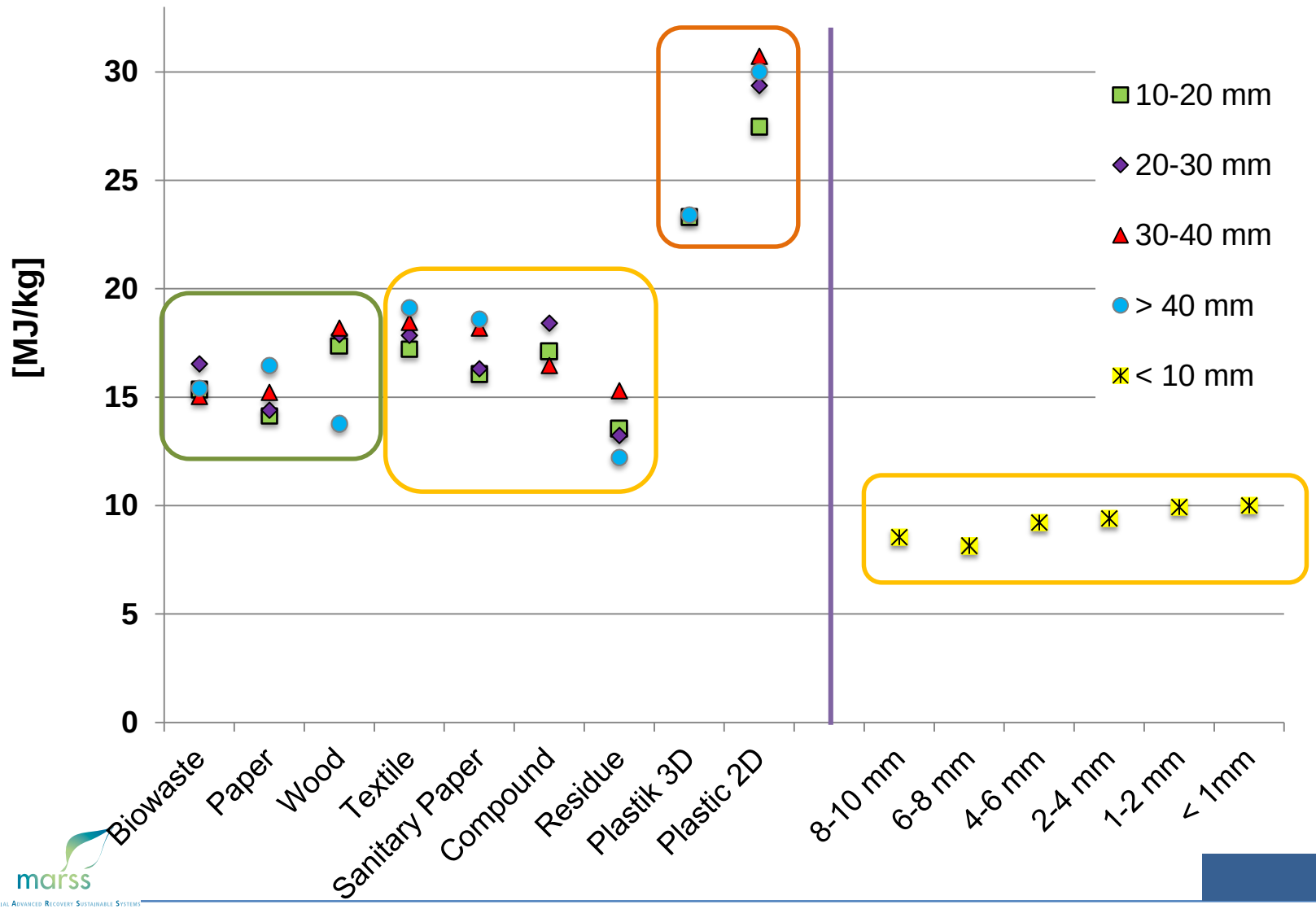
Ignition Loss (dry matter)

- Results



Gross Calorific Value (dry matter)

Results



Composition and Particle Size Fractions

- Conclusion