Integrated sludge dryer and energy production

Dorset te Aalten

22th of June 2012

Jan Grift

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ENERGY DELTA INSTITUTE
ENERGY BUSINESS SCHOOL

Jan Grift:

1979 – 1984	University of Twente, Thermal engineering
1984 – 1990	partner Ingenieursburo IMT BV
1990 – 2000	partner concultancy firm Milieu&Innovatie BV
2000 – 2006	senior consultant Deerns consulting engineers
2006 – heden	senior consultant Energy Matters BV (partner)

Energy supply and energy saving

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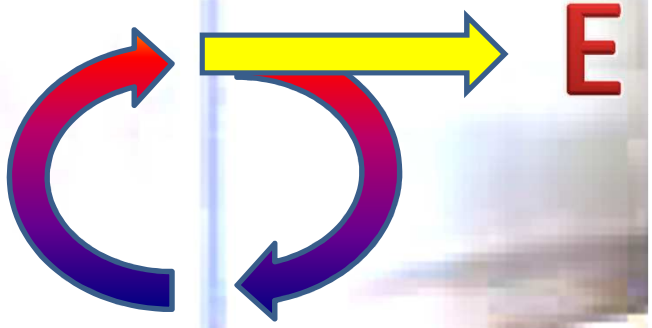
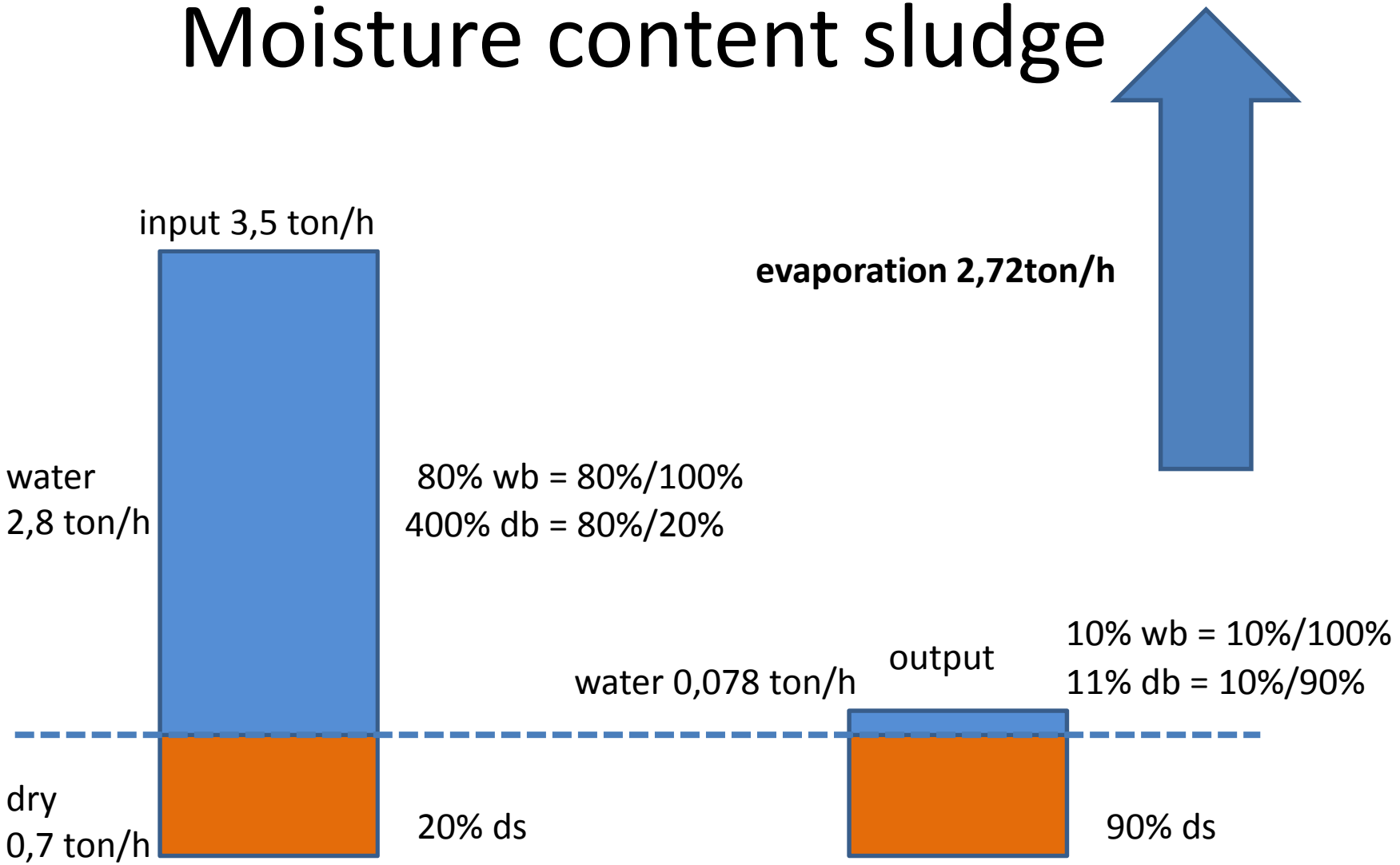
Closed loop beltdryers

- Development by Dorset
- Energy Matters consulting and modelling
- Integrated energy system



Moisture content sludge



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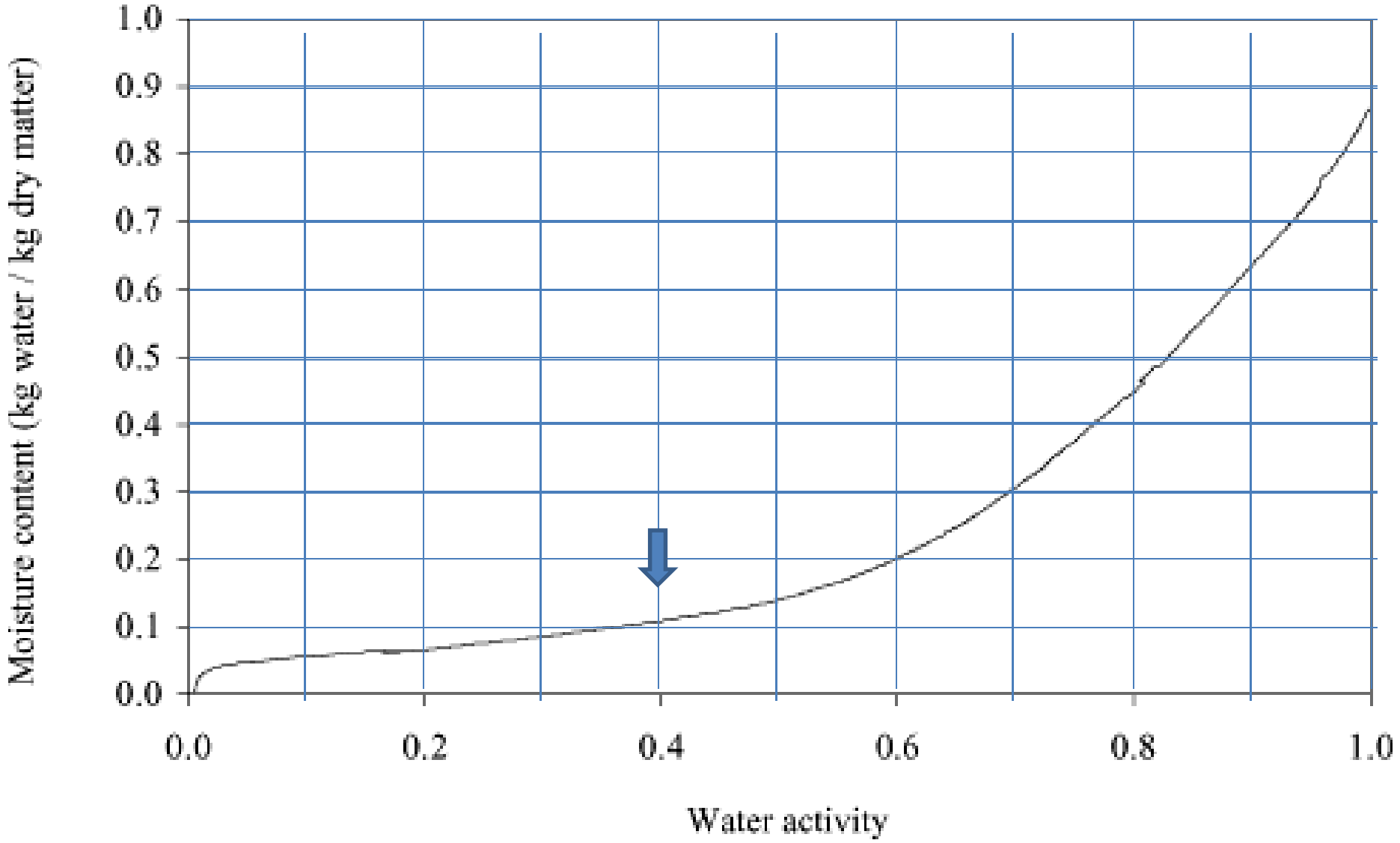
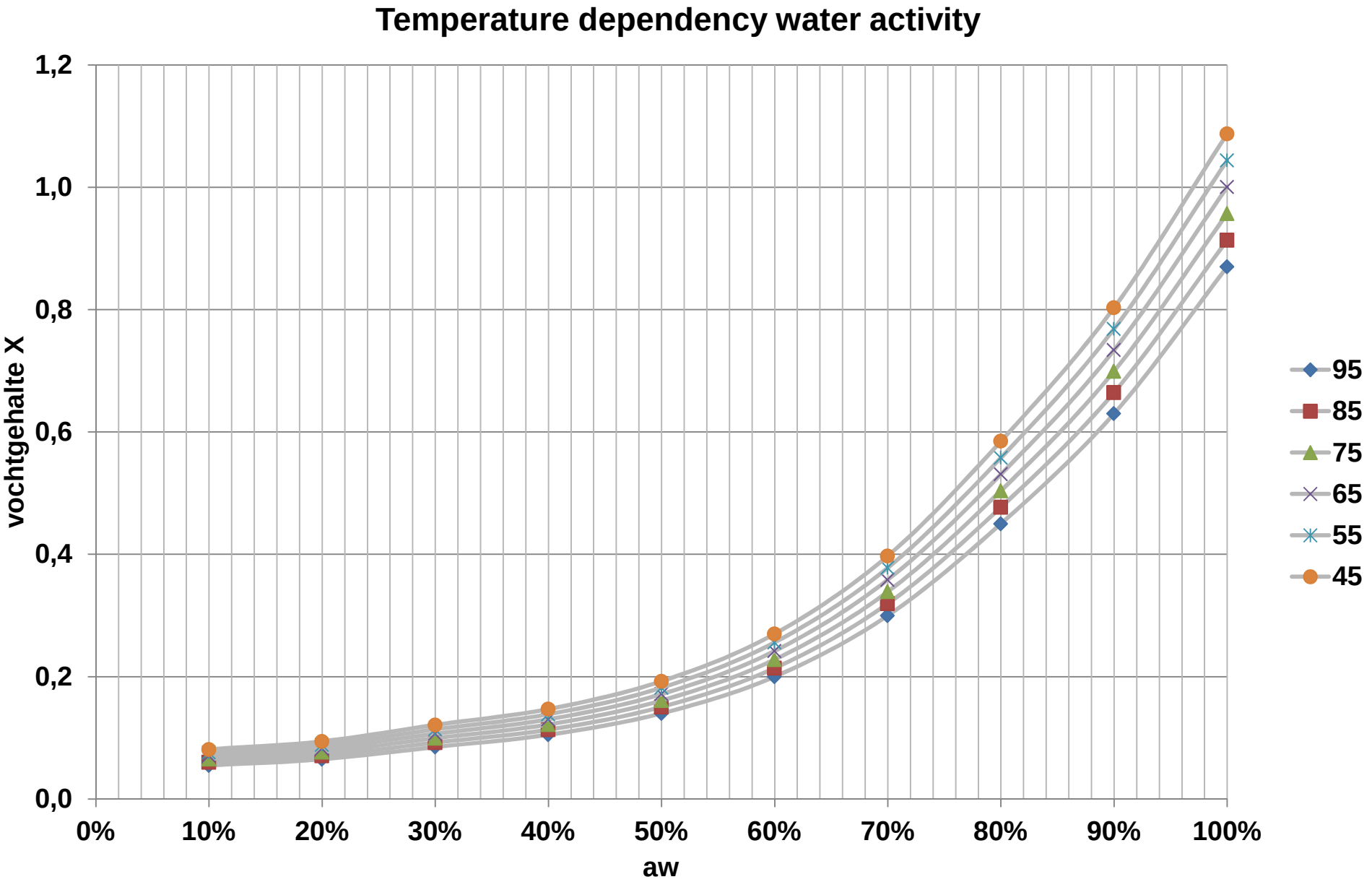


Figure 1: Desorption isotherm of the sludge measured at 95°C



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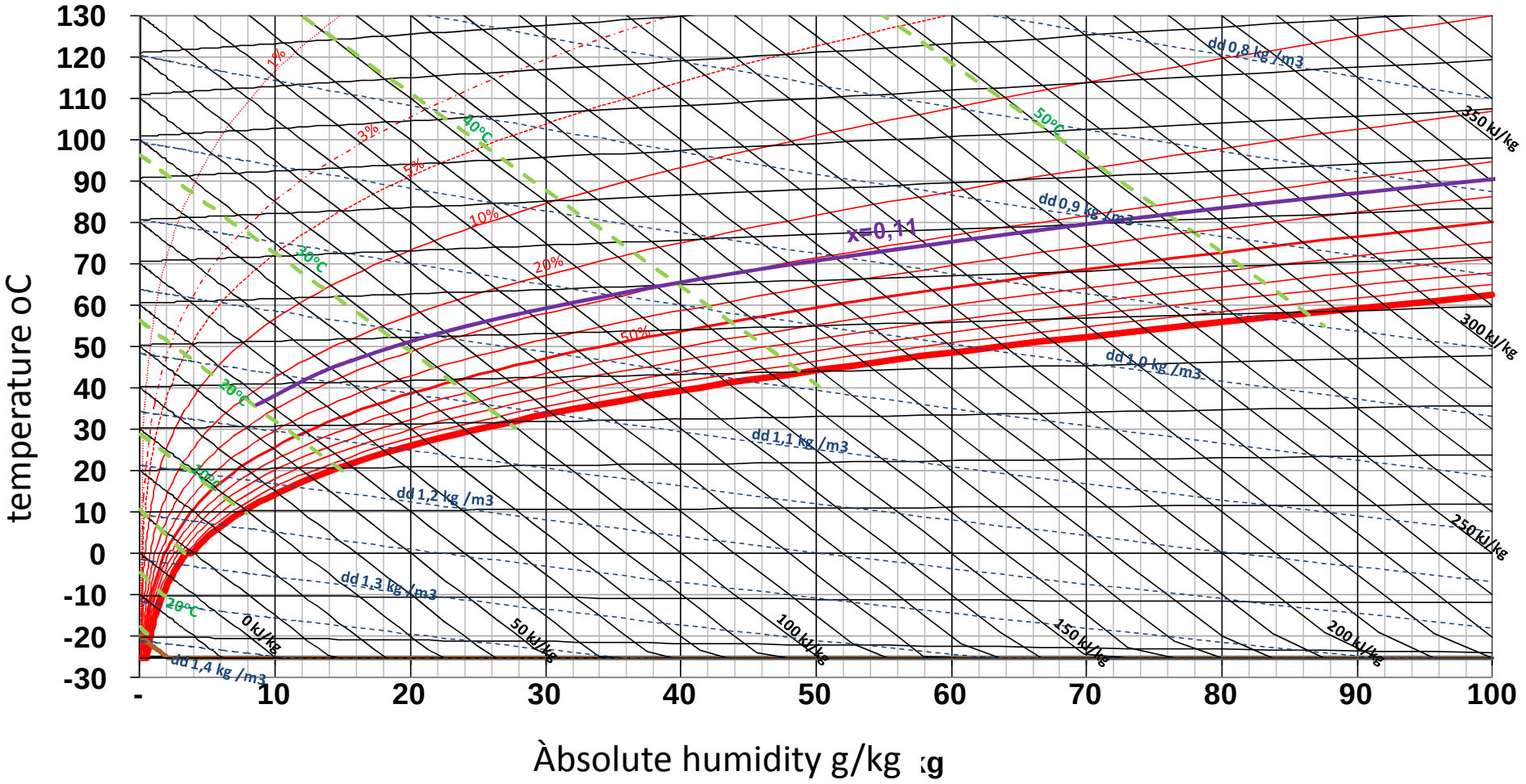
Sorption isotherm

Mollier diagram for humid air



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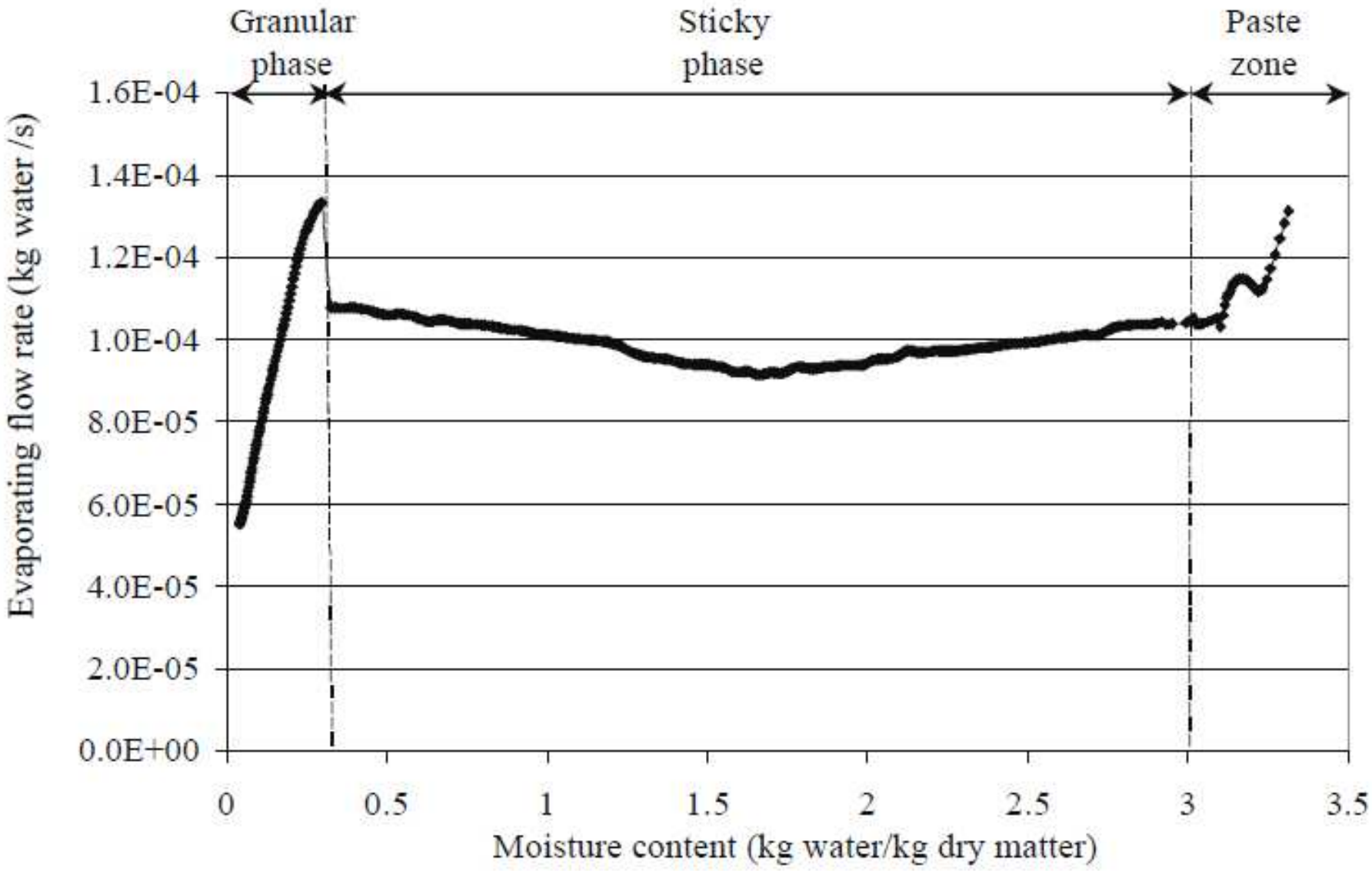


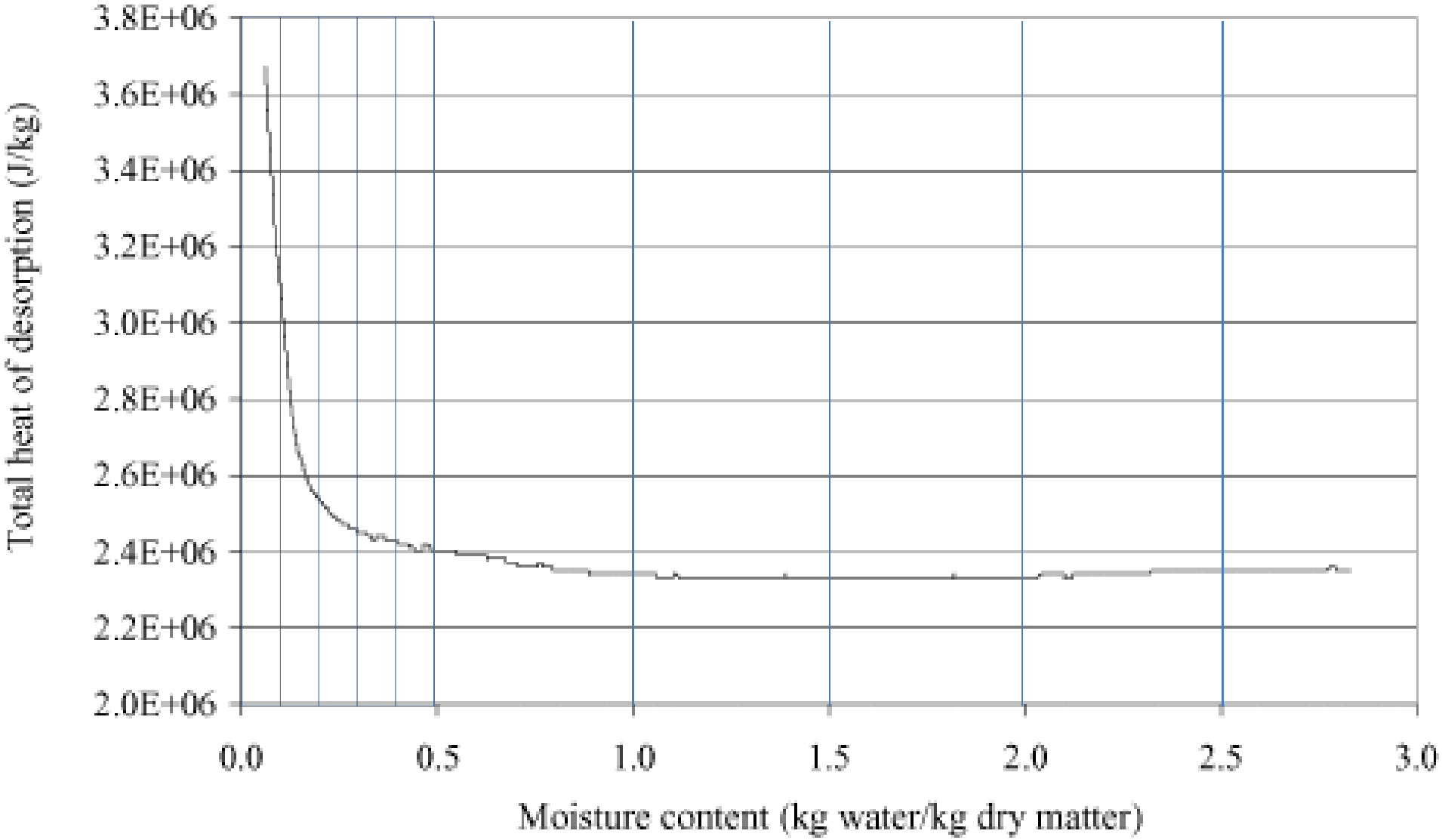
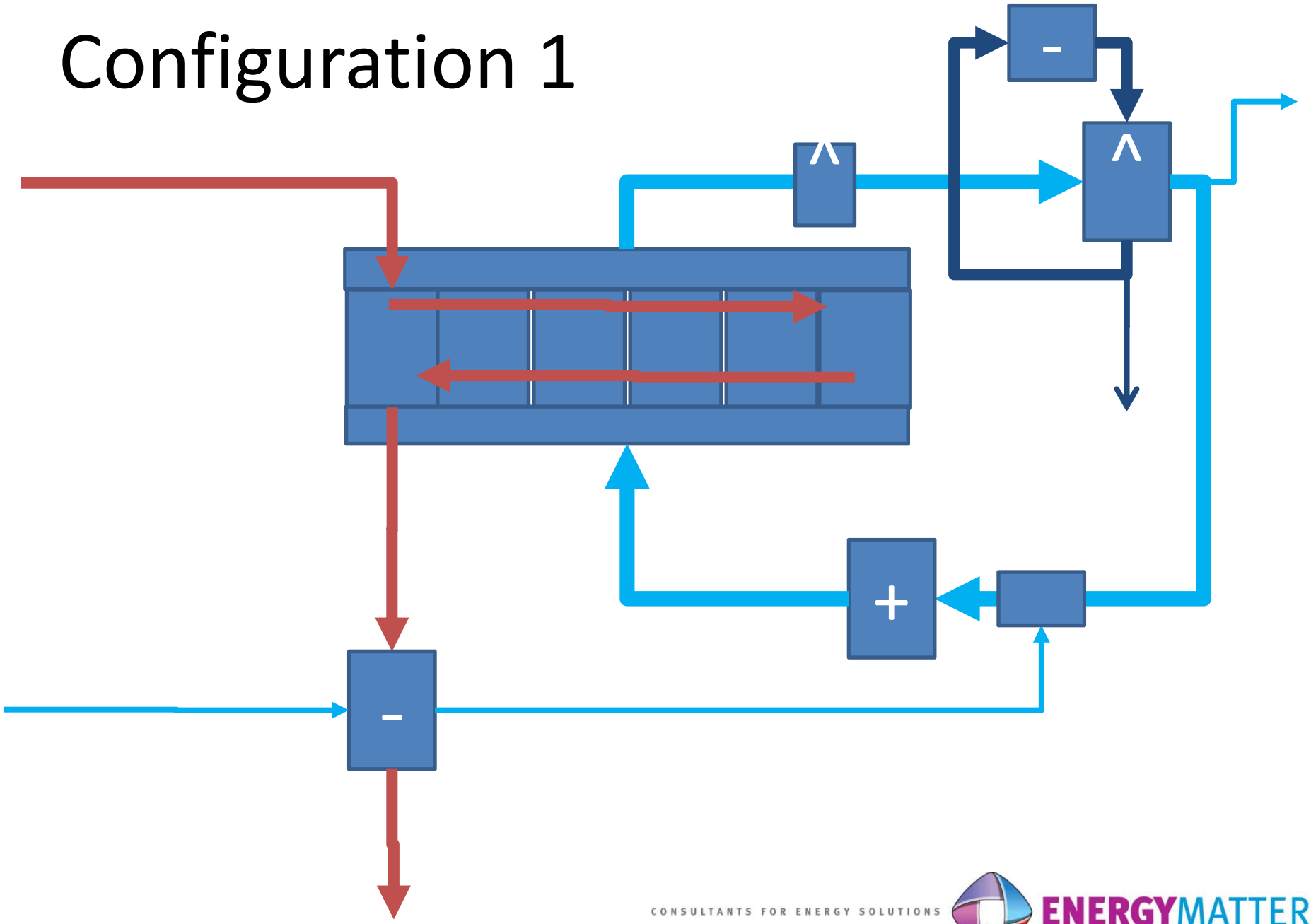


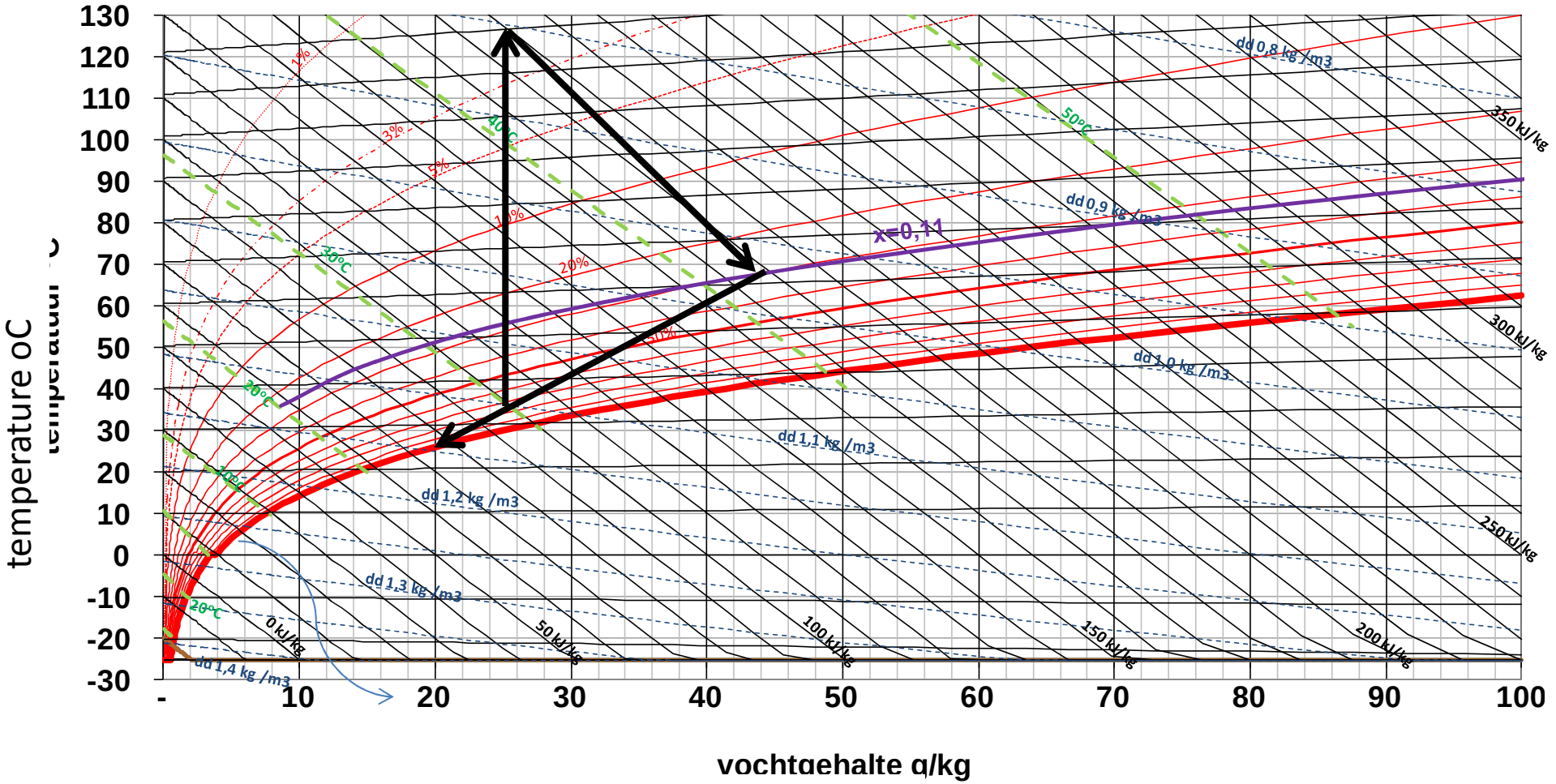
Figure 2: Total heat of sorption measured at 95°C

Configuration 1



Configuration 1

Mollier diagram for humid air



Àbsolute humidity g/kg

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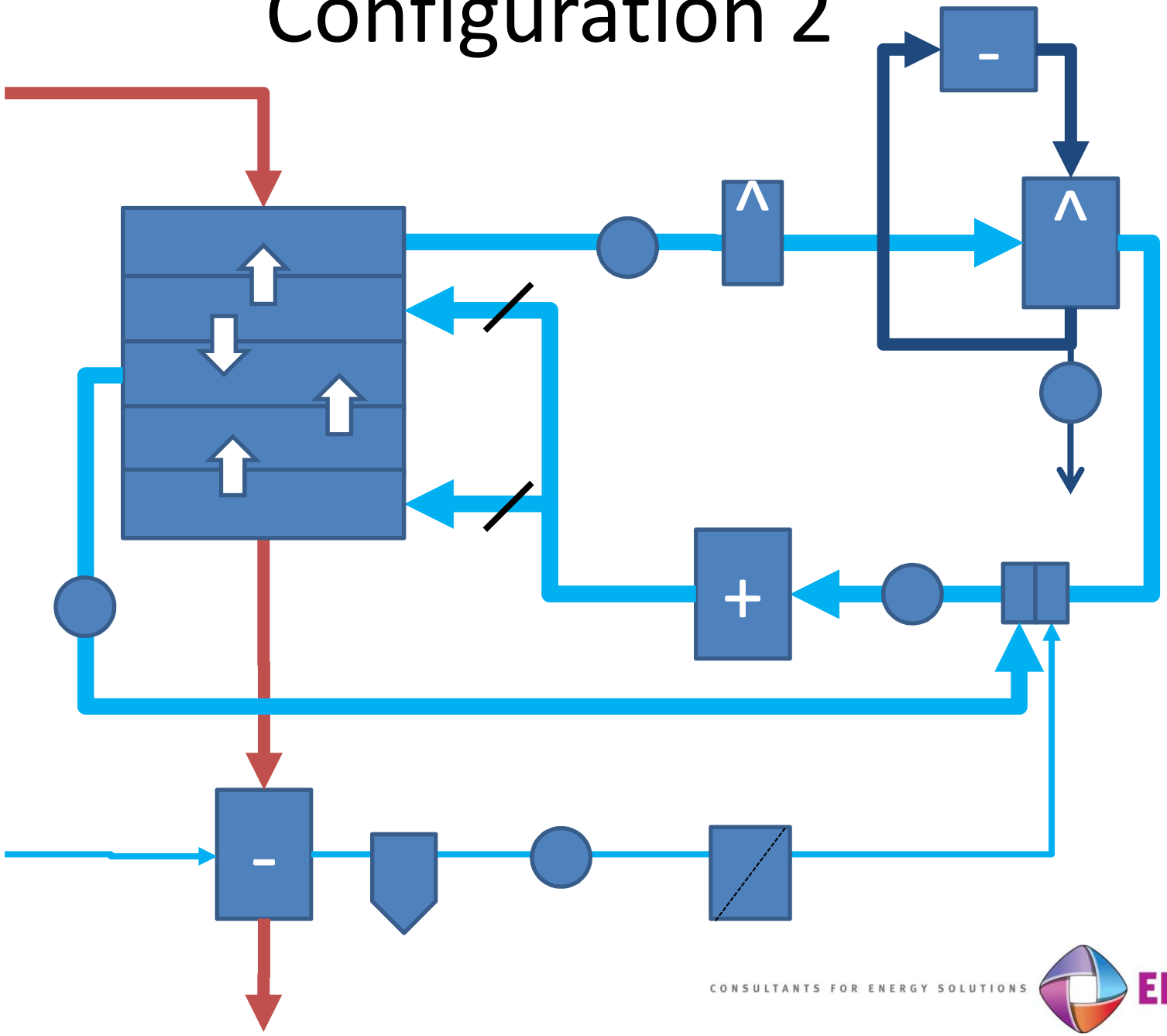
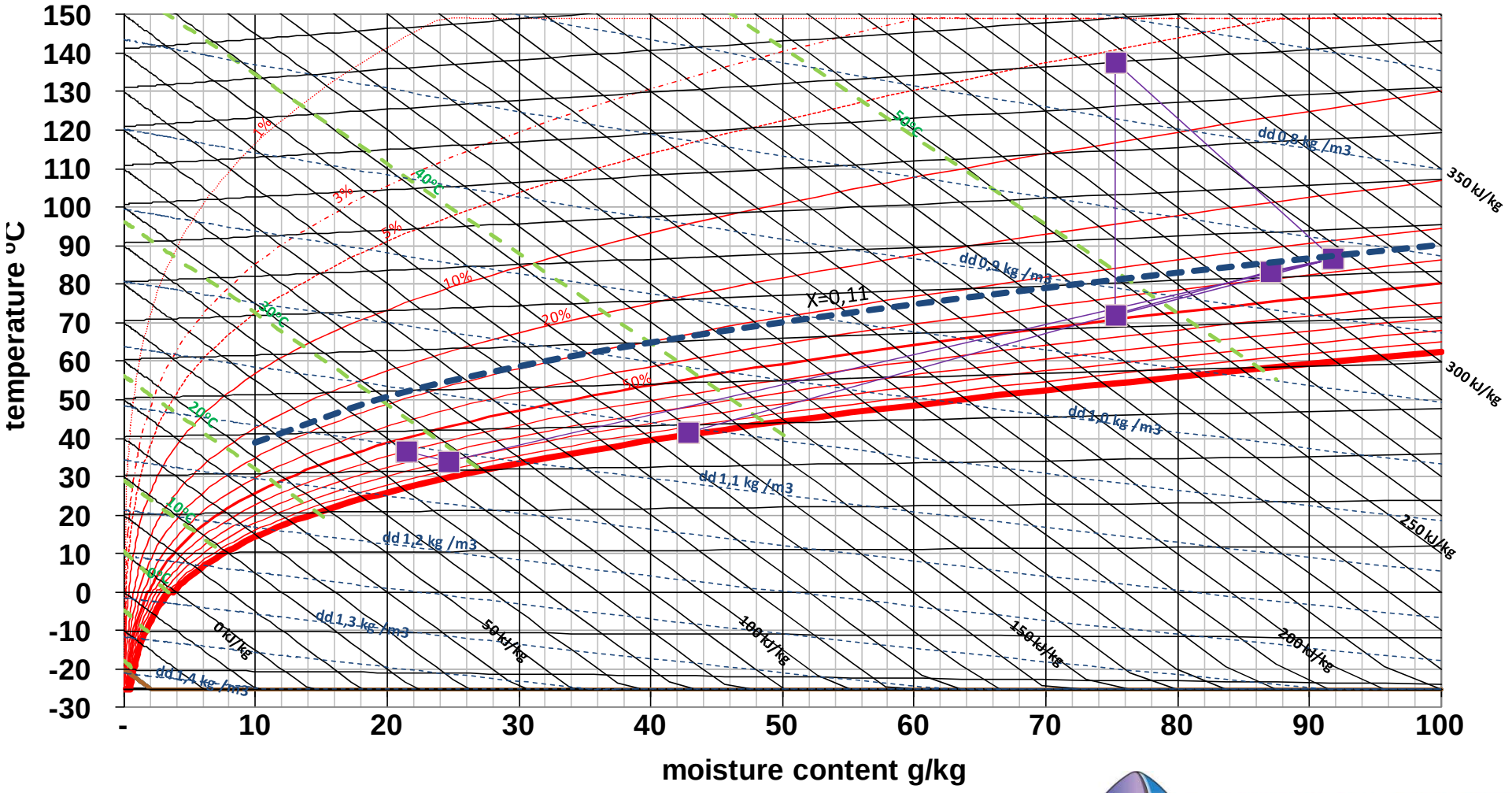
Configuration 2



Configuration 2

Mollierdiagram humid air 101,325 kPa



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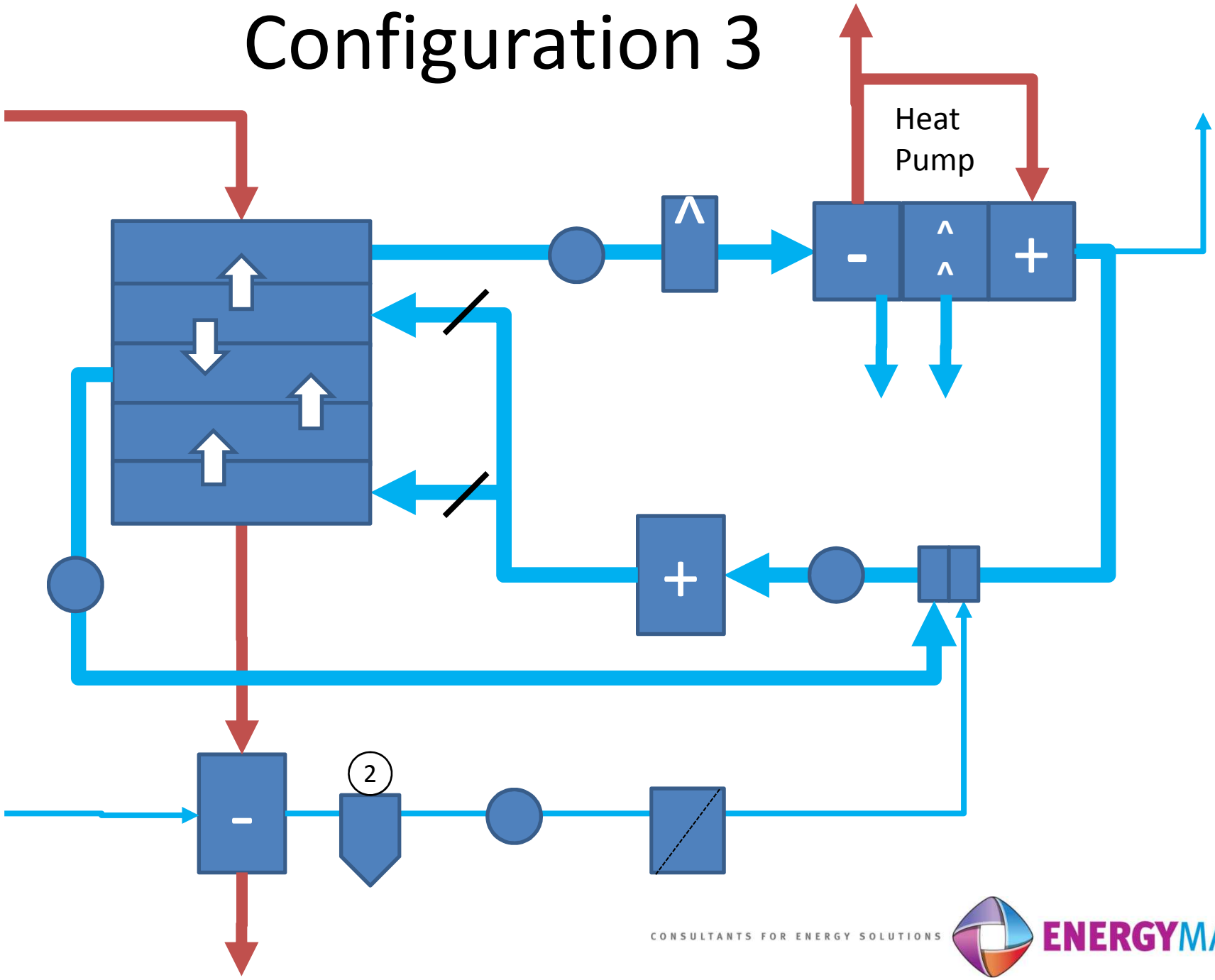
Configuration 3



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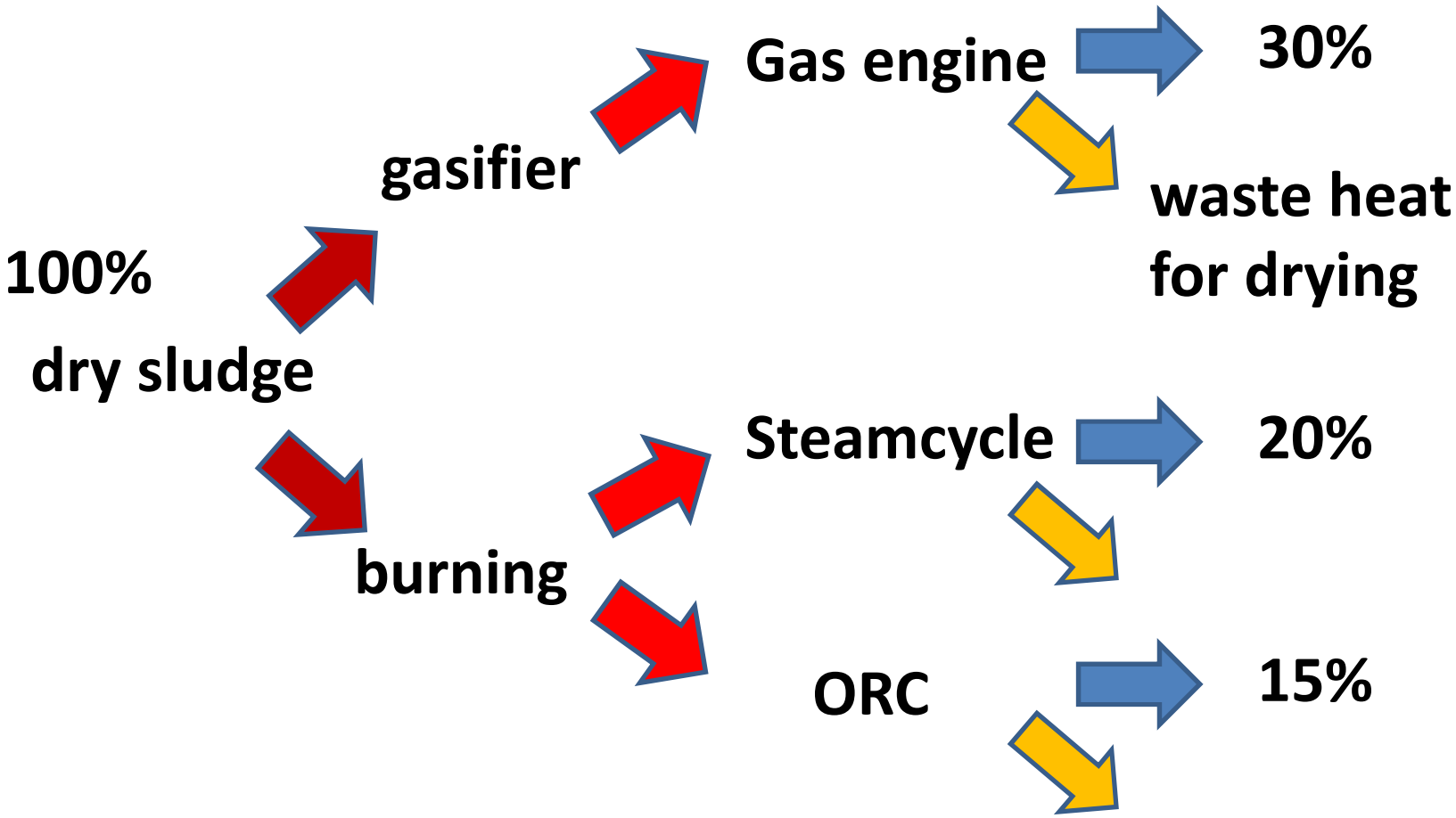
Electricity production



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Conclusions

- Closed belt dryer attractive
  - low electricity demand
  - waste heat (from CHP)
  - low emissions by biological washer
  - small amount of flue gas
- Higher capacity
  - Absorption cooling machine if enough waste heat available
  - cooling water (river, lake) is available
- Gasification / gas engine highest efficiency

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