Twinning Project IL/11
Implementation and Strengthening the Environmental Framework for IPPC, Resource Efficiency and Eco-Management in Israel

Insight on the technologies – Pyrolysis, Gasification and bio-coal used for agriculture waste and sewage sludge treatment

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Workshop on Agriculture Waste Incineration

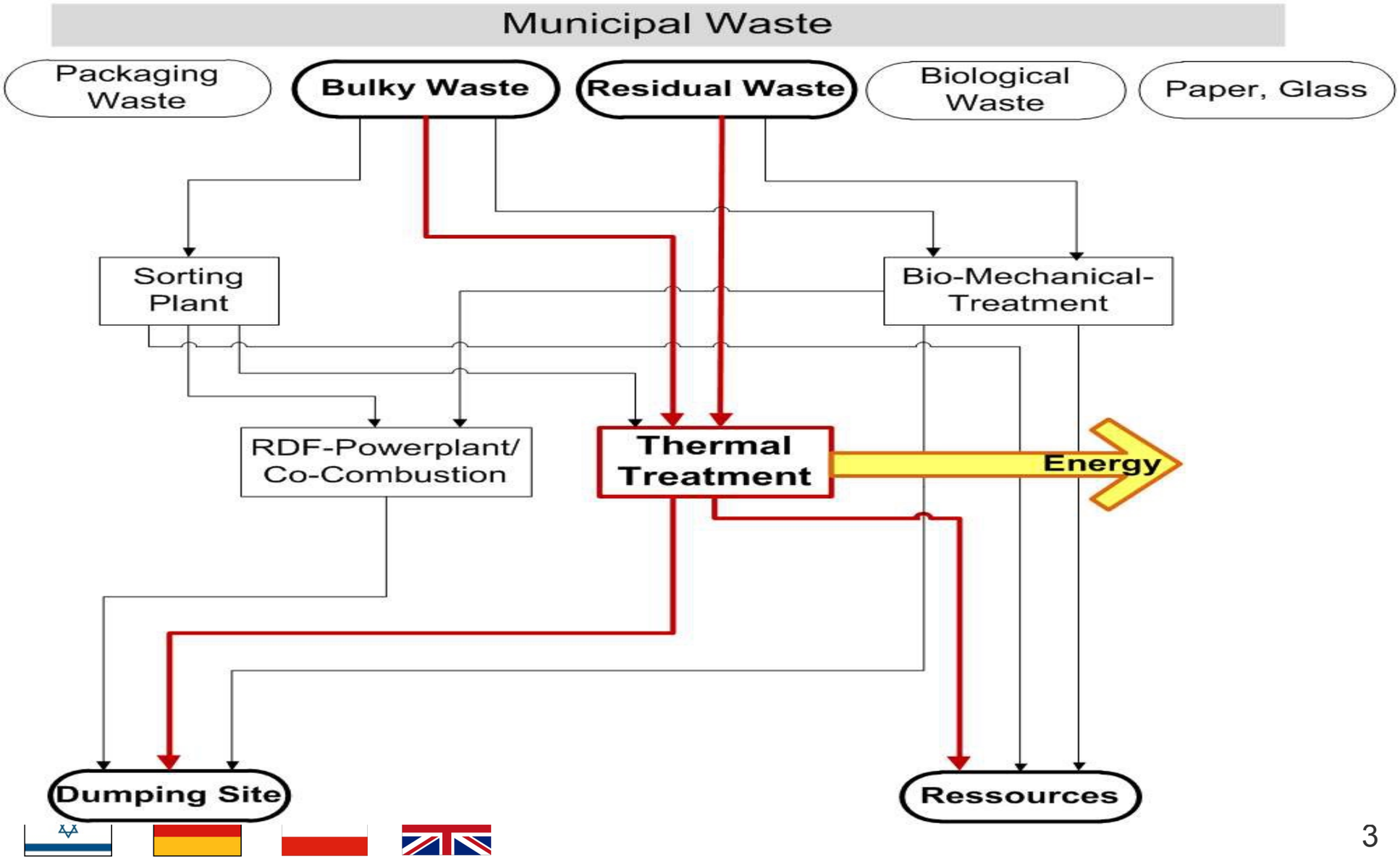
May10th, 2017

Tel Aviv

Technical and Legal Aspects of Thermal Treatment of Waste

I. Introduction
II. Thermochemical Processes
III. Examples for the different process types
IV. An evaluation approach
V. Conclusion

Technical and Legal Aspects of Thermal Treatment of Waste
Thermal Treatment/Incineration of Waste



Technical and Legal Aspects of Thermal Treatment of Waste
Interesting fields for alternative thermal processes

✓ Upstream processes in connection with cements kilns, power plants etc.

✓ Treatment of special fractions, e.g.

- with high pollutant content (e.g. chlorine)

- very low/high heating values

- high ash content

✓ Achievement special features, like vitrified slag

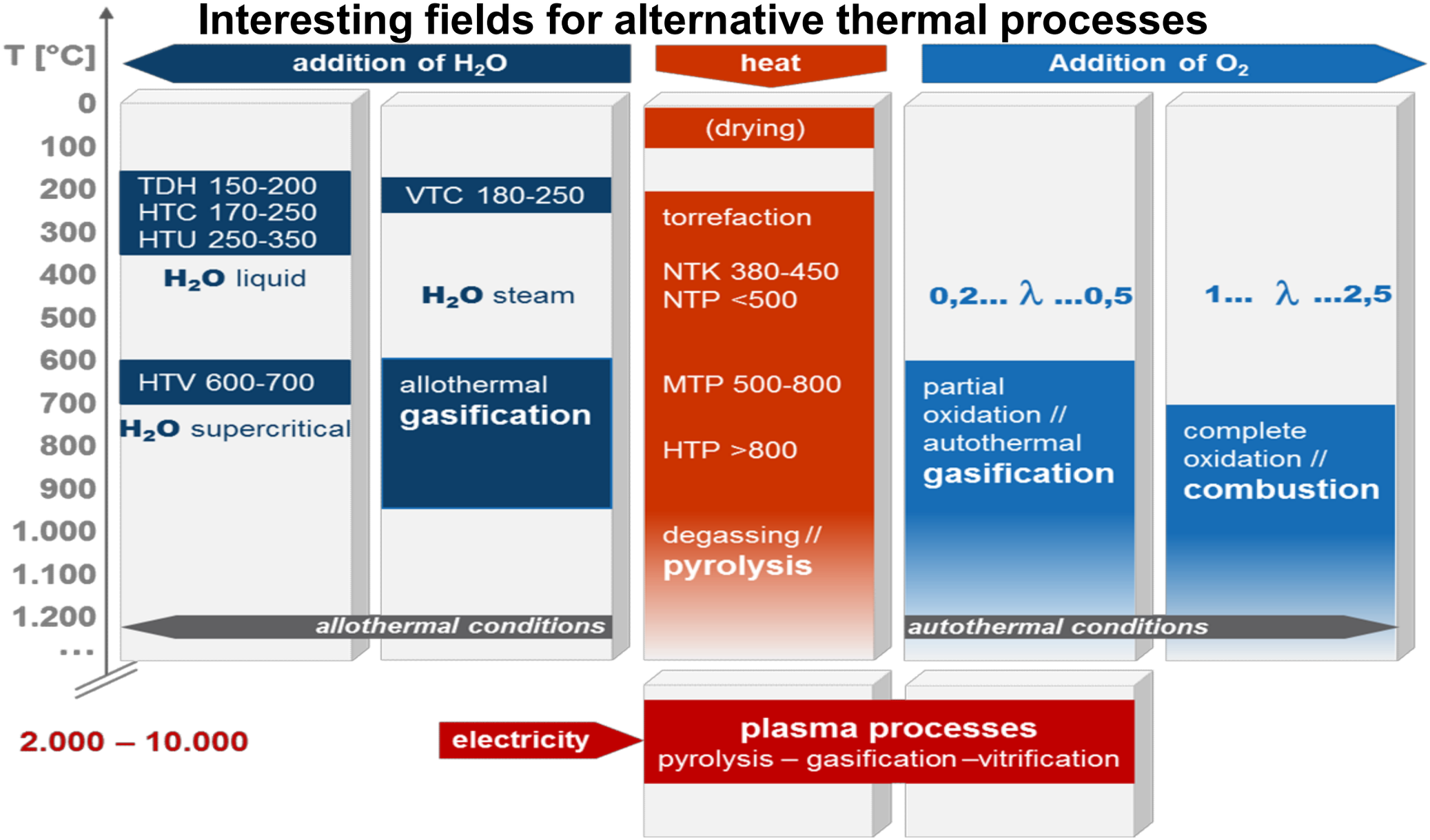
Problematic applications

? Stand alone facilities with no inertization / no product usage

? One-step low temperature processes with high effort for product treatment

Technical and Legal Aspects of Thermal Treatment of Waste

Interesting fields for alternative thermal processes



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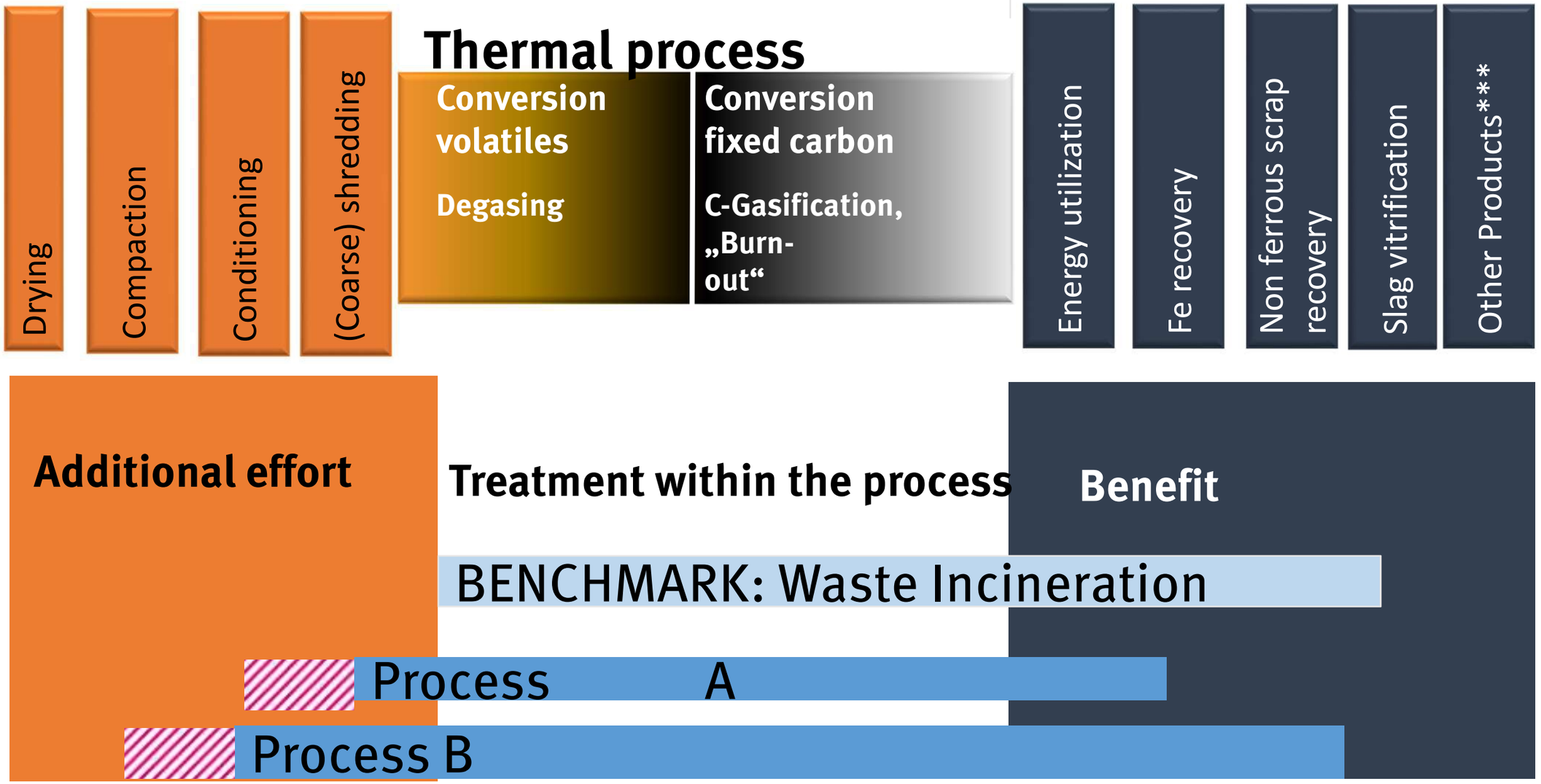

Technical and Legal Aspects of Thermal Treatment of Waste

Evaluation approach

- Determination state of development (operational capability)
  - According to VDI guideline 3460
- Treatment costs (as far as available)
- Characterization and quality of treatment
  - Pretreatment necessary?
  - Degree of inertisation?
  - Recovery of resources?
- Classification of the (pyrolysis & gasification) processes
- Consideration of regional different legal, administrative and economic conditions

Technical and Legal Aspects of Thermal Treatment of Waste
Gasification of Sewage sludge

Gasification of organic materialis the conversion of carbon (C) in combustible gaseous compounds at an oxygen ratio λ > 0

- **Water content in the sludge < 10 % (DS > 90%)**
- **Formation of synthesis gas with the components CO , H2 , CxHy , energy content approx. 1.3 kWh / Nm³**
- **Preparation of synthesis gas for other thermal recovery (cogeneration , gas turbine, boiler, etc.)**

- **References in Germany:**
  Balingen, operating (2,300 tDS/a)
  Mannheim, operating (5,000 tDS/a)
  Koblenz under construction (4,500 tDS/a)

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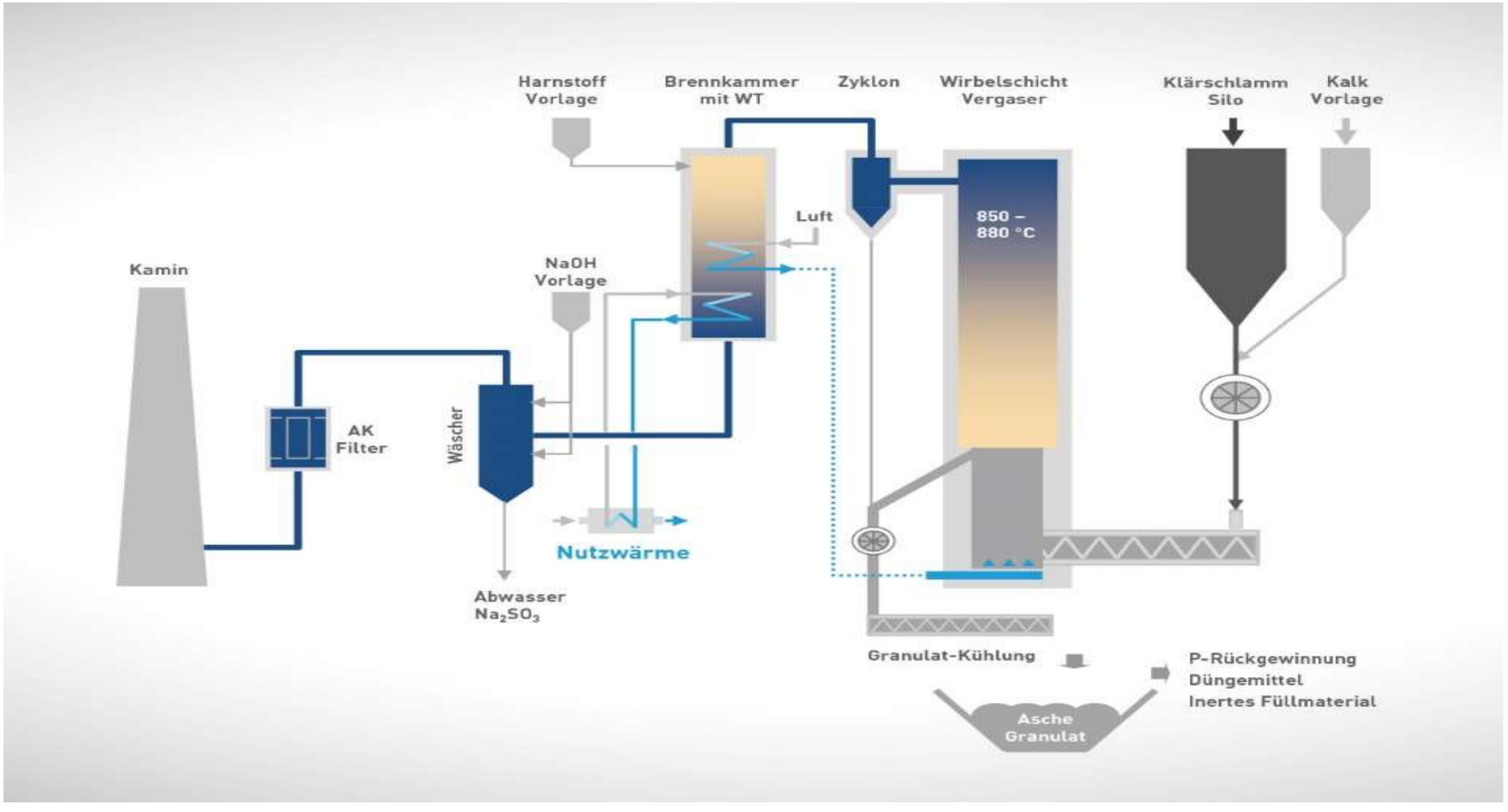
Gasification of Sewage Sludge



Source: KOPF SynGas GmbH & Co. KG