Energy-independent WWPT Weilerbach

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Weilerbach

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Umwelt Bundes Amt Für Mensch und Umwelt
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Structure

- Initial Situation
- Concept
- Design and Construction

WWTP Weilerbach

- Capacity (1990): 16.500 PE
- Aerobic Sludge Stabilisation
- Intermittend Denitrification

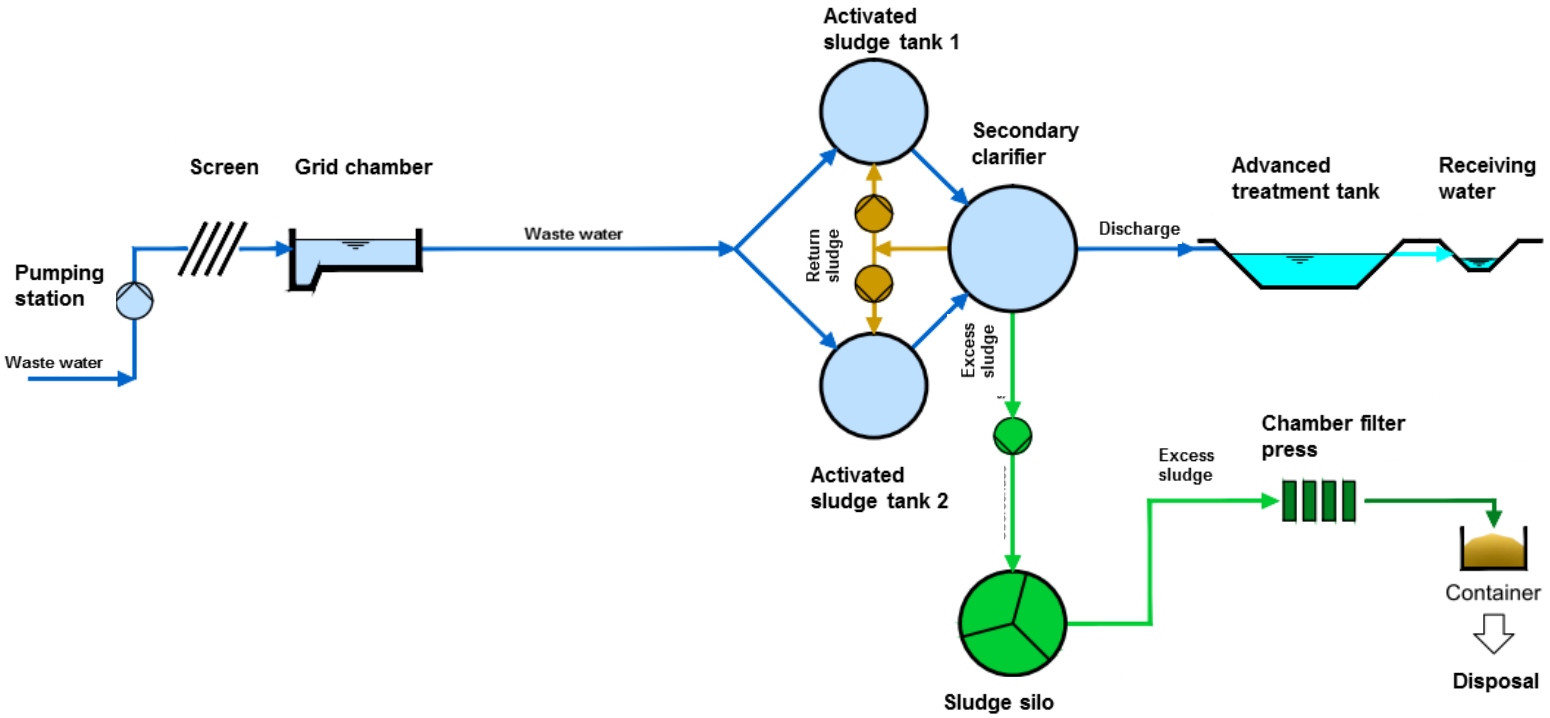
- Actually connected (2013):

  ca. 25.000 PE (COD)

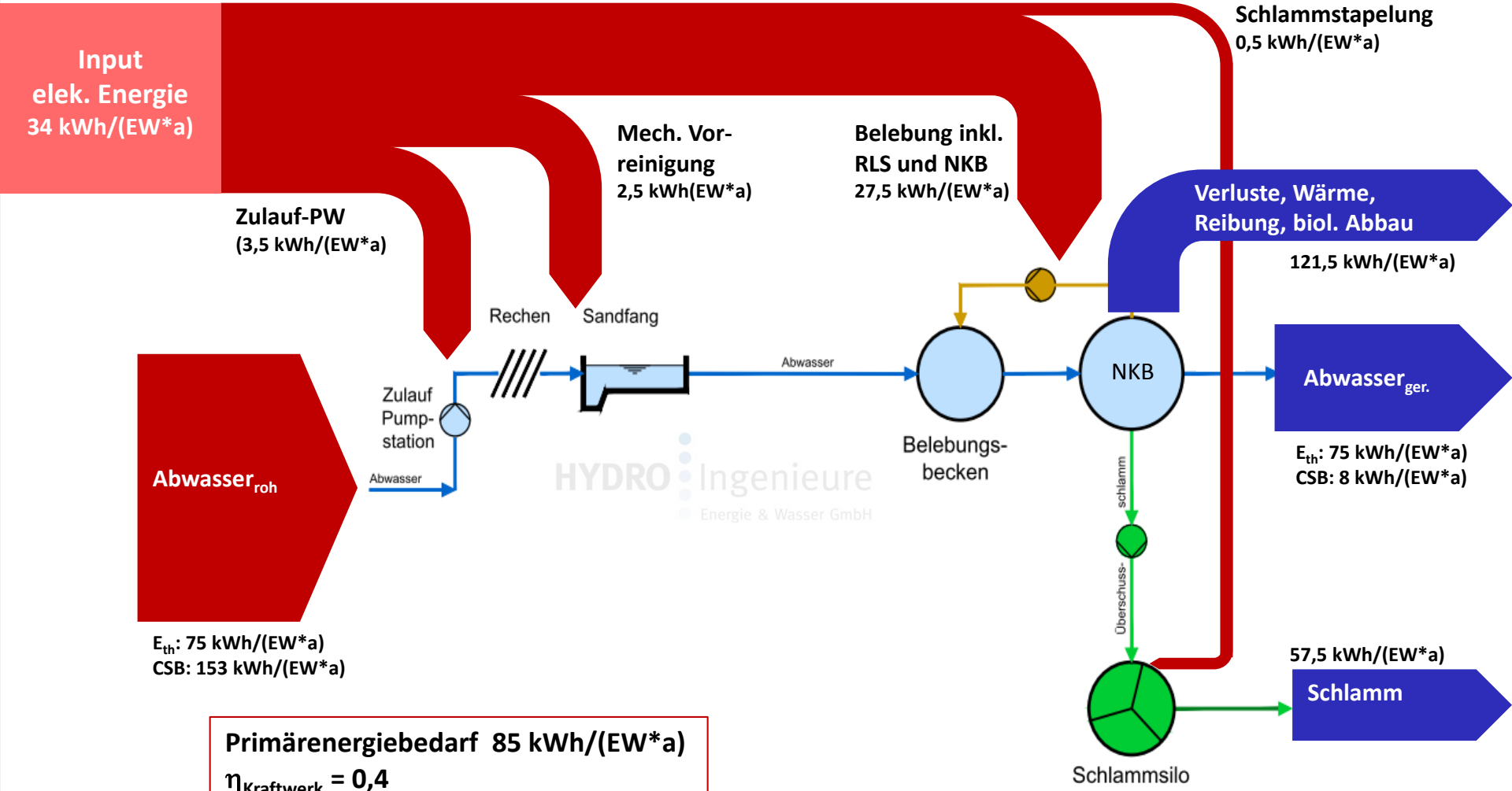
  ca. 29.500 PE (BOD)
- Specific Energy Demand:

  19,2 kWh/(PE*a)

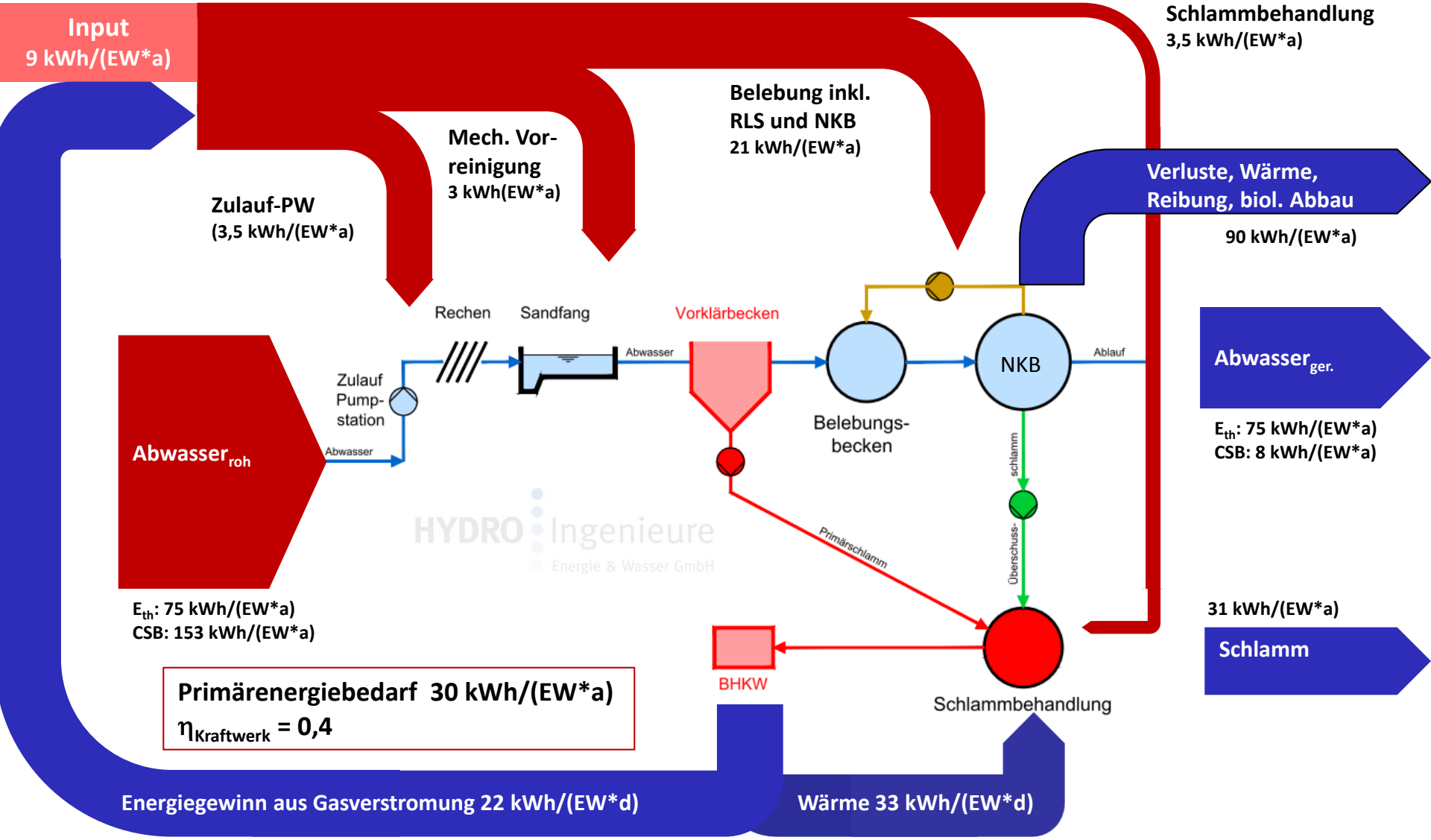
WWTP Weilerbach (actual state)
Aerobic sludge stabilisation



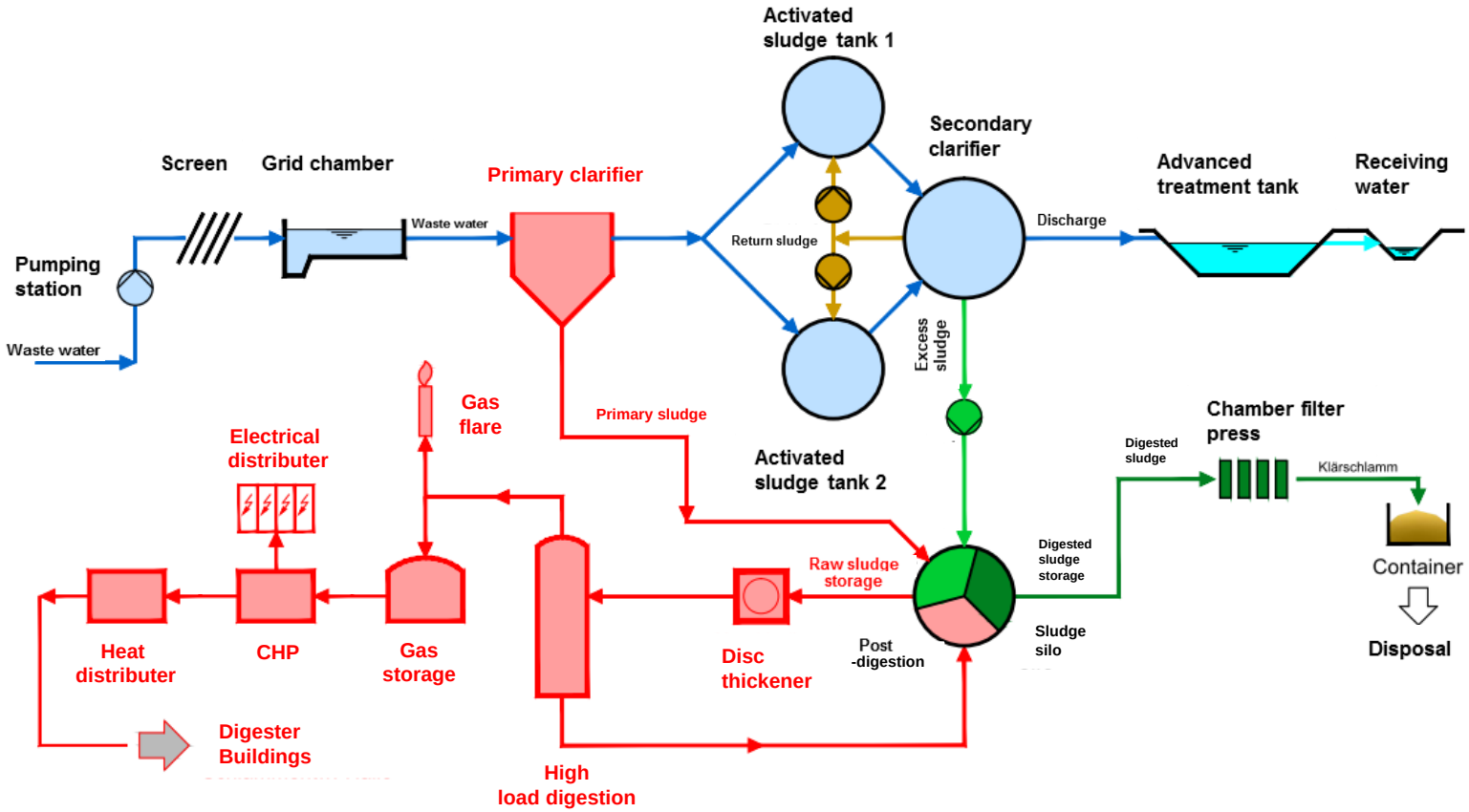
Initial Situation



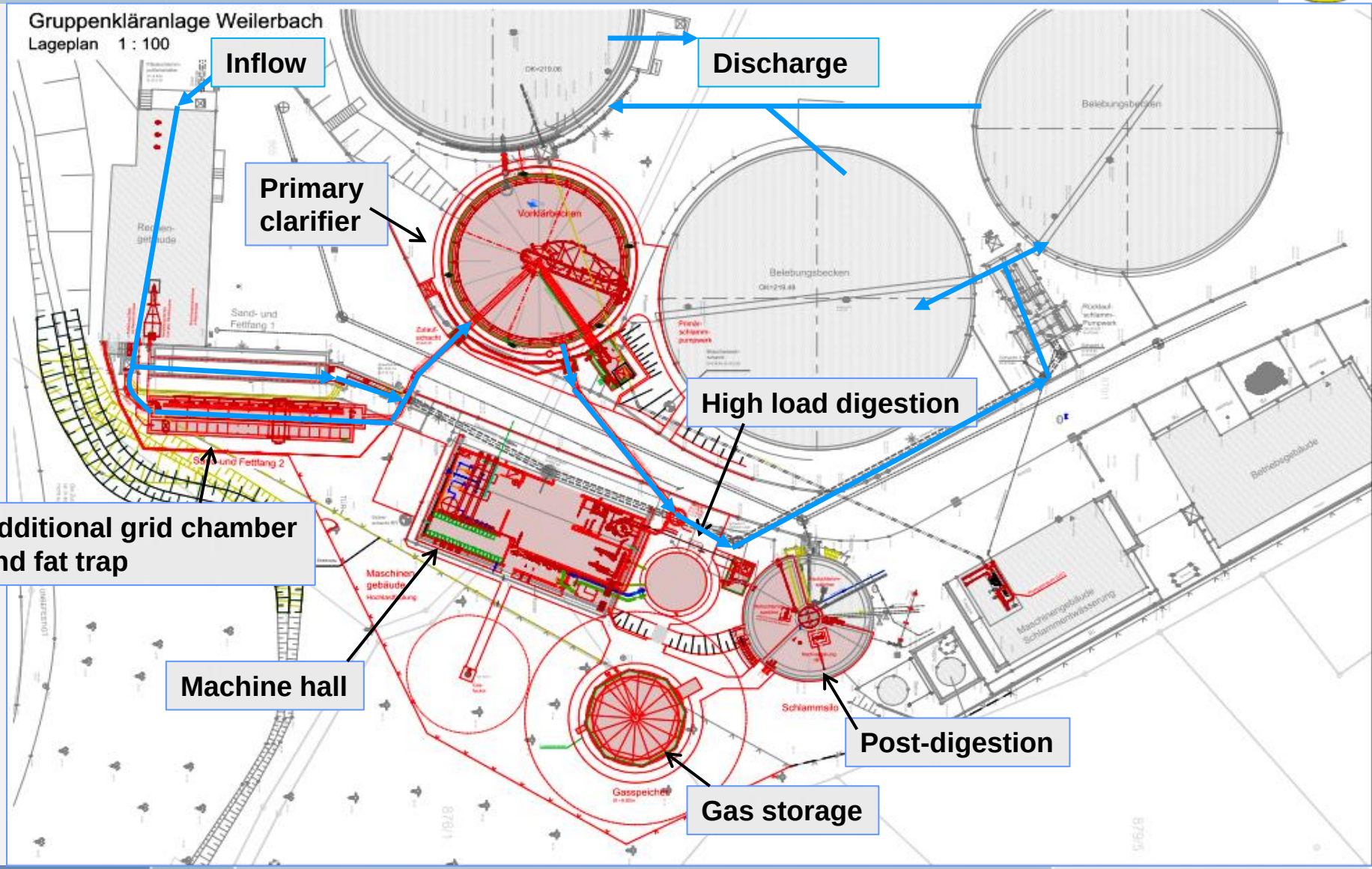
Concept


Input
9 kWh/(EW*a)
Schlammbehandlung
3,5 kWh/(EW*a)
Belebung inkl.
RLS und NKB
21 kWh/(EW*a)
Mech. Vor-
reinigung
3 kWh(EW*a)
Zulauf-PW
(3,5 kWh/(EW*a)
Verluste, Wärme,
Reibung, biol. Abbau
90 kWh/(EW*a)
Rechen
Sandfang
Vorklärbecken
Abwasser
Ablauf
NKB
Zulauf
Pump-
station
Abwasser
Belebungs-
becken
Abwasser roh
Abwasser ger.
Eth: 75 kWh/(EW*a)
CSB: 8 kWh/(EW*a)
Überschuss-schlamm
Primärschlamm
Eth: 75 kWh/(EW*a)
CSB: 153 kWh/(EW*a)
31 kWh/(EW*a)
Schlamm
BHKW
Schlammbehandlung
Primärenergiebedarf 30 kWh/(EW*a)
ηKraftwerk = 0,4
Energiegewinn aus Gasverstromung 22 kWh/(EW*d)
Wärme 33 kWh/(EW*d)

WWTP Weilerbach (after conversion)
Anaerobic sludge stabilisation



Concept


Gruppenkläranlage Weilerbach
Lageplan 1 : 100
Inflow
Discharge
Primary clarifier
High load digestion
Additional grid chamber and fat trap
Machine hall
Post-digestion
Gas storage

Advantages of High Load Digestion

- Reduced Reaktor Volume
- Reduced Energy Demand for Mixing and Heating
- Higher Specific Biogas Yield
- Reduced Excess Sludge Volume due to the enhanced Stabilisation
  (Compared to aerobic Stabilisation approx. 30 % less Sludge)
- Reduced Costs for Dewatering Agents
- Improved Dewatering Characteristics of Sludge
  (Reduces Costs for Transport and Disposal)

Comparision

Parameter	Actual State	After Process Conversion
Total Energy Demand [kWh/a]	480.000	557.000
Electricity Generation [kWh/a]	0	585.000
Liquid Gas Demand [l/a]	3.800	0
Excess Sludge Production [t/a]	1.200	840
Lime (Dewatering) [t/a]	157	105
Ferric Chloride (Dewatering) [t/a]	87	58

Energy self-sufficient waste treatment plant Weilerbach

Innovation award winner in the framework of „Umweltinnovationsprogramm 2011“

Funding priority „Energy efficient waster water treatment plants“

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