

Case Sveberg, Malvik

- Thermal loads are grouped according to the construction plan (2008-2014):
 - Total 530-750 dwellings
 - Four development stages (Stage 1-4)
 - 23 load nodes for each housing sector (B1-B23)
- The thermal loads consist of:
 - Space heating (temperature dependent)
 - Tap water (temperature independent)
- Three main alternatives:
 - Direct electrical heating
 - 4 decentralized heat pumps (HP)
 - 1 centralized biomass boiler



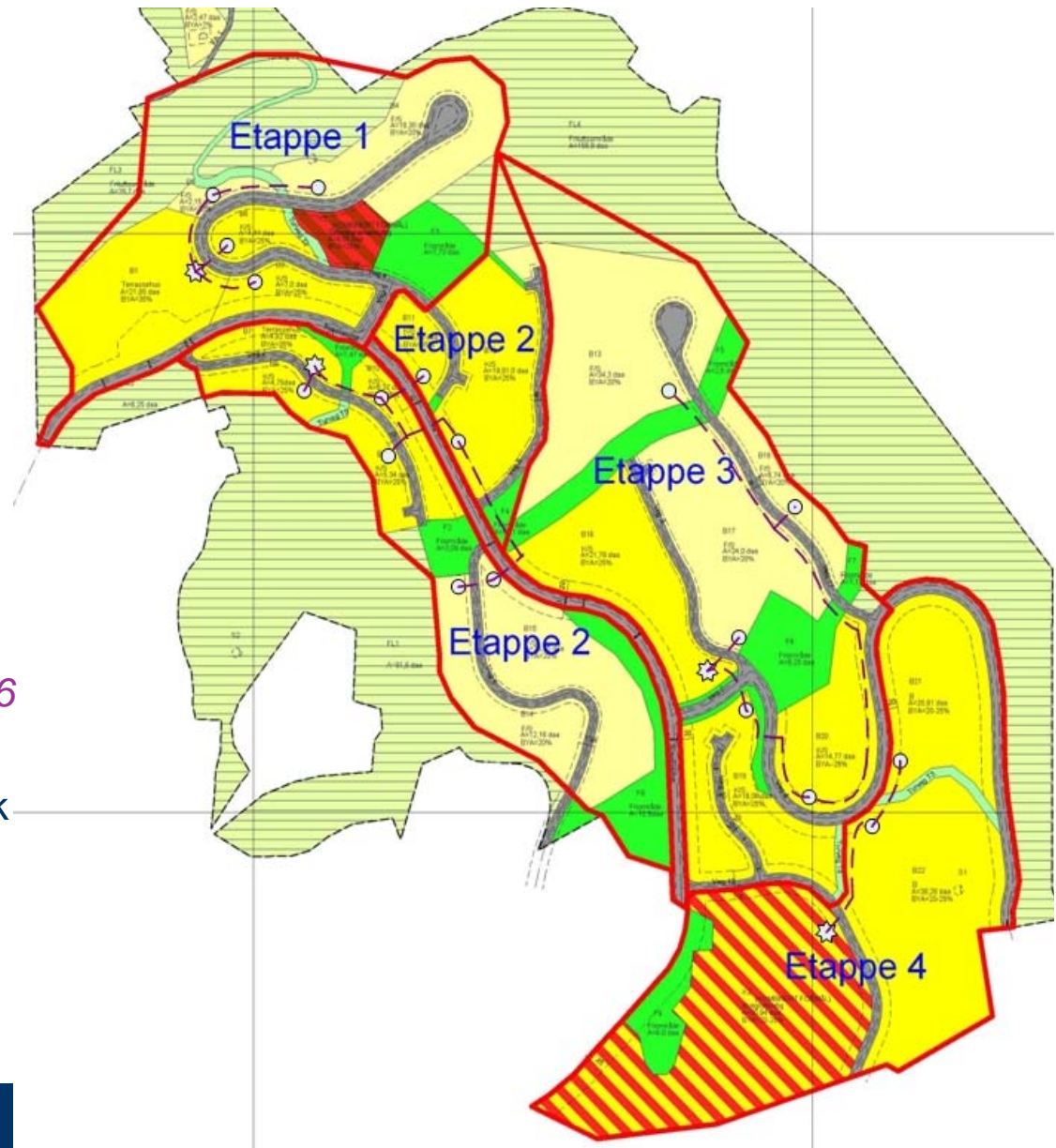
Decentralized heat pumps

■ Pros

- Independent of energy suppliers
- No visual pollution
- Environmentally friendly
- No fuel delivery needed

■ Cons

- Limited capacity in local rock (no water)
- Large investments
- Large number of heat wells
(10-12 kW pr 200m well => 2,6 MW requires 260 wells)
- Backup boiler needed for peak load periods (electricity)



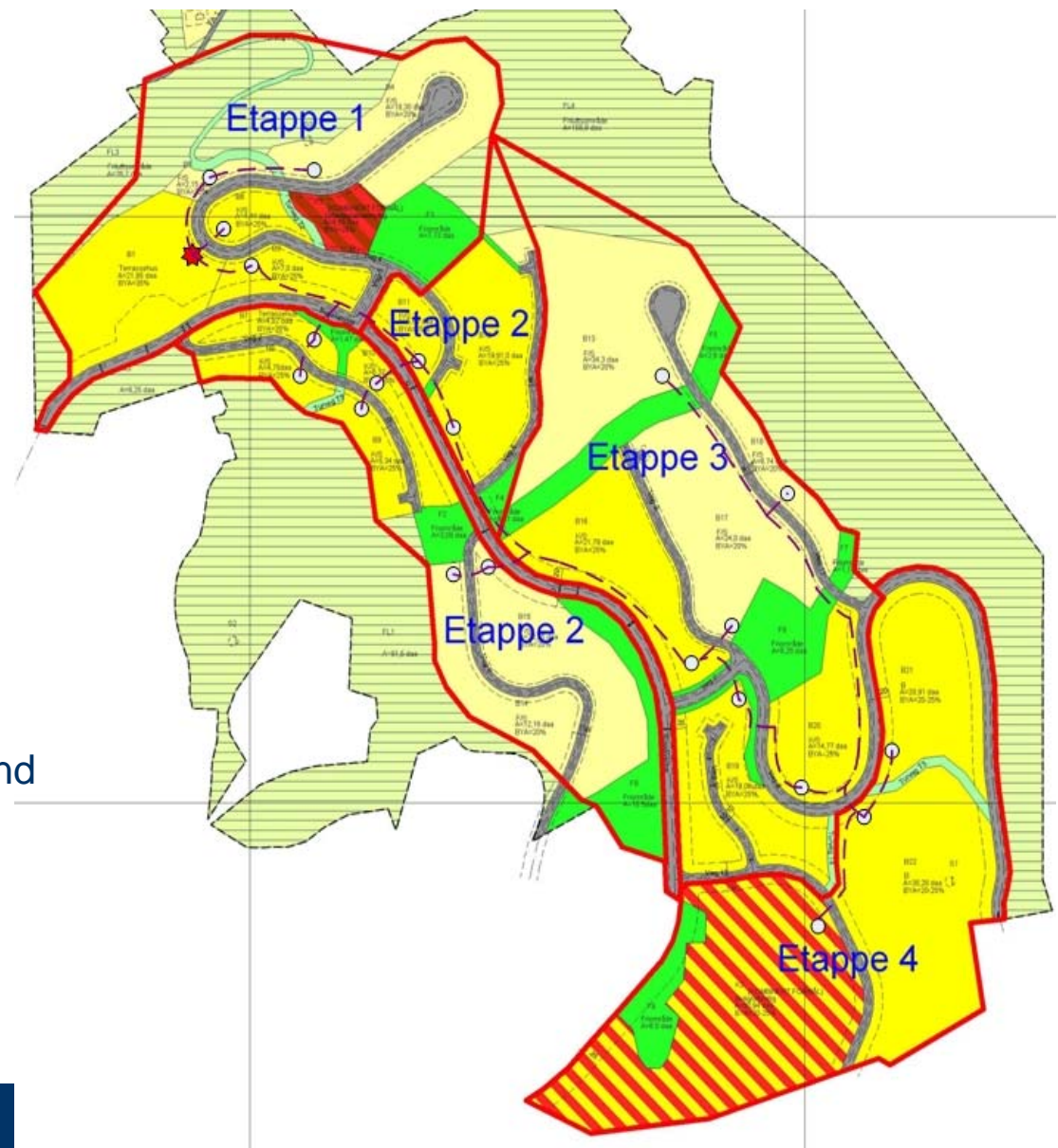
Centralized biomass boiler (gas/chips)

■ Pros

- Flexibility wrt. fuel source
- Careful location will reduce negative effects of fuel delivery and visual pollution
- Moderate investment and operation cost for heat central
- No GHG emissions
- Reduced load in local electricity grid

■ Cons

- Larger investments in heat distribution systems
- Fuel delivery may cause noise and dust problems
 - Chips: Diesel trucks
 - Biogas: Truck or local gasification



Direct electrical heating

■ Pros:

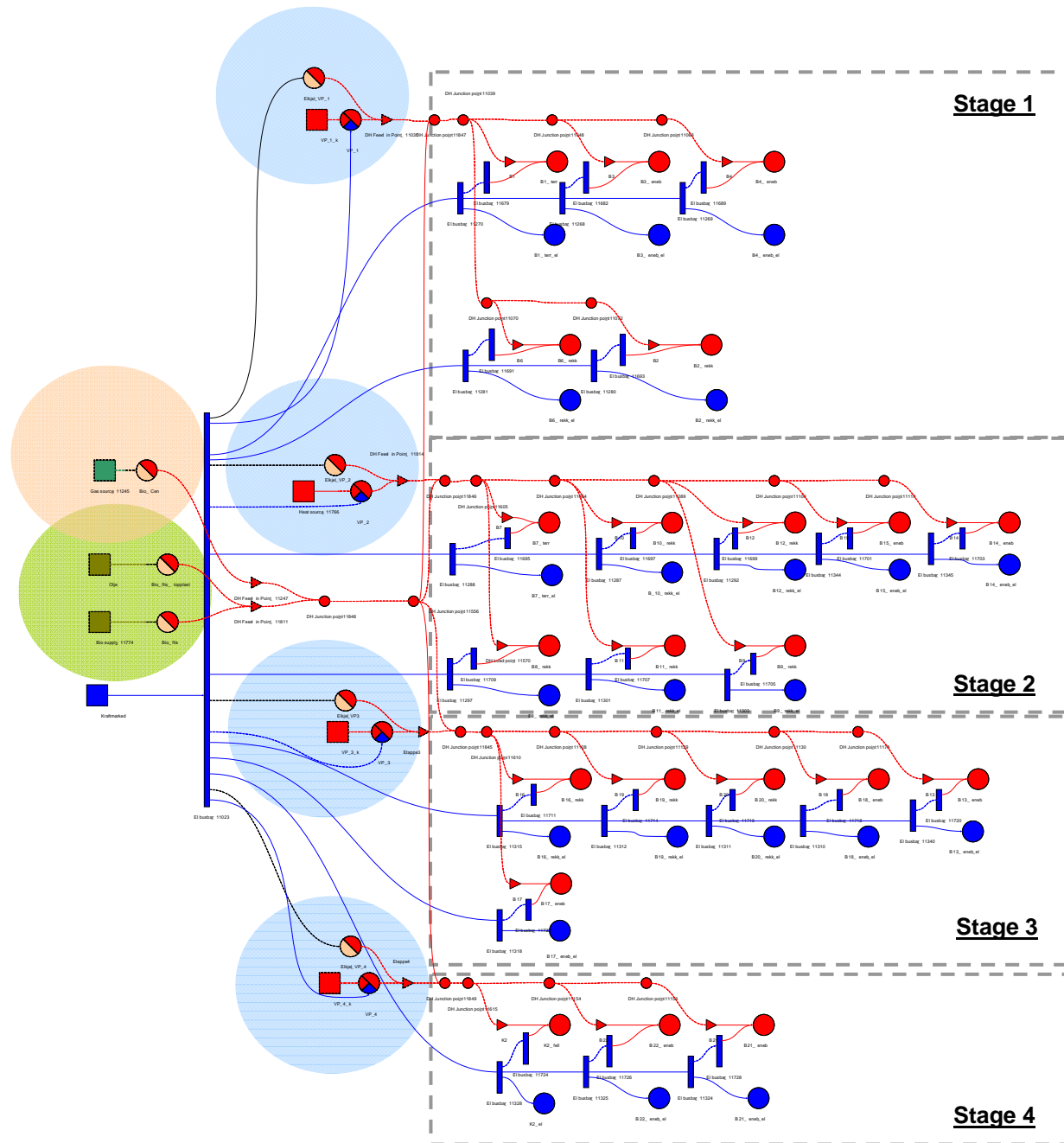
- Independent of energy suppliers
- No fuel delivery needed
- No visual pollution
- Low investments

■ Cons:

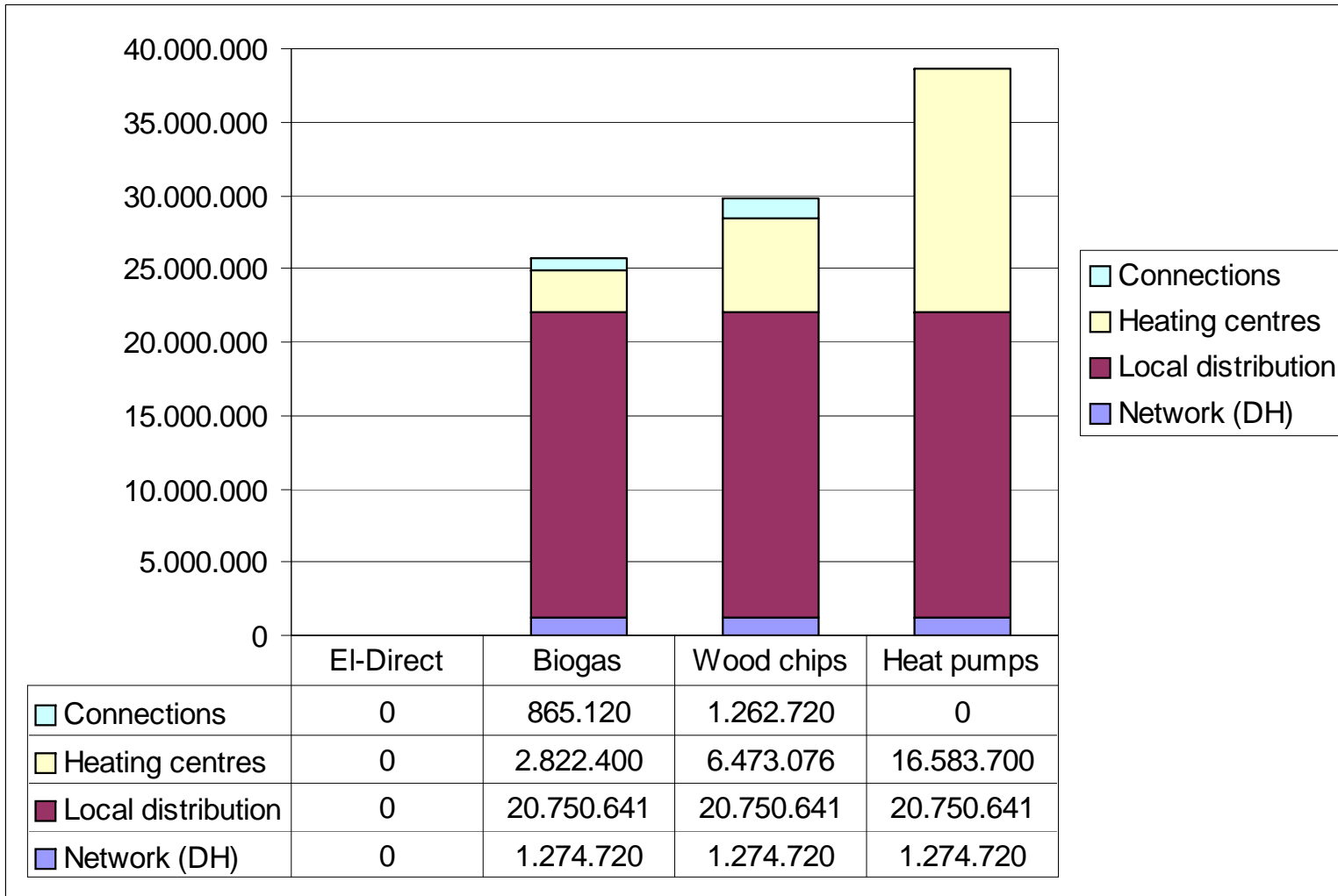
- High energy costs
- No supply / fuel shift flexibility
- Temperature dependent load in distribution grid



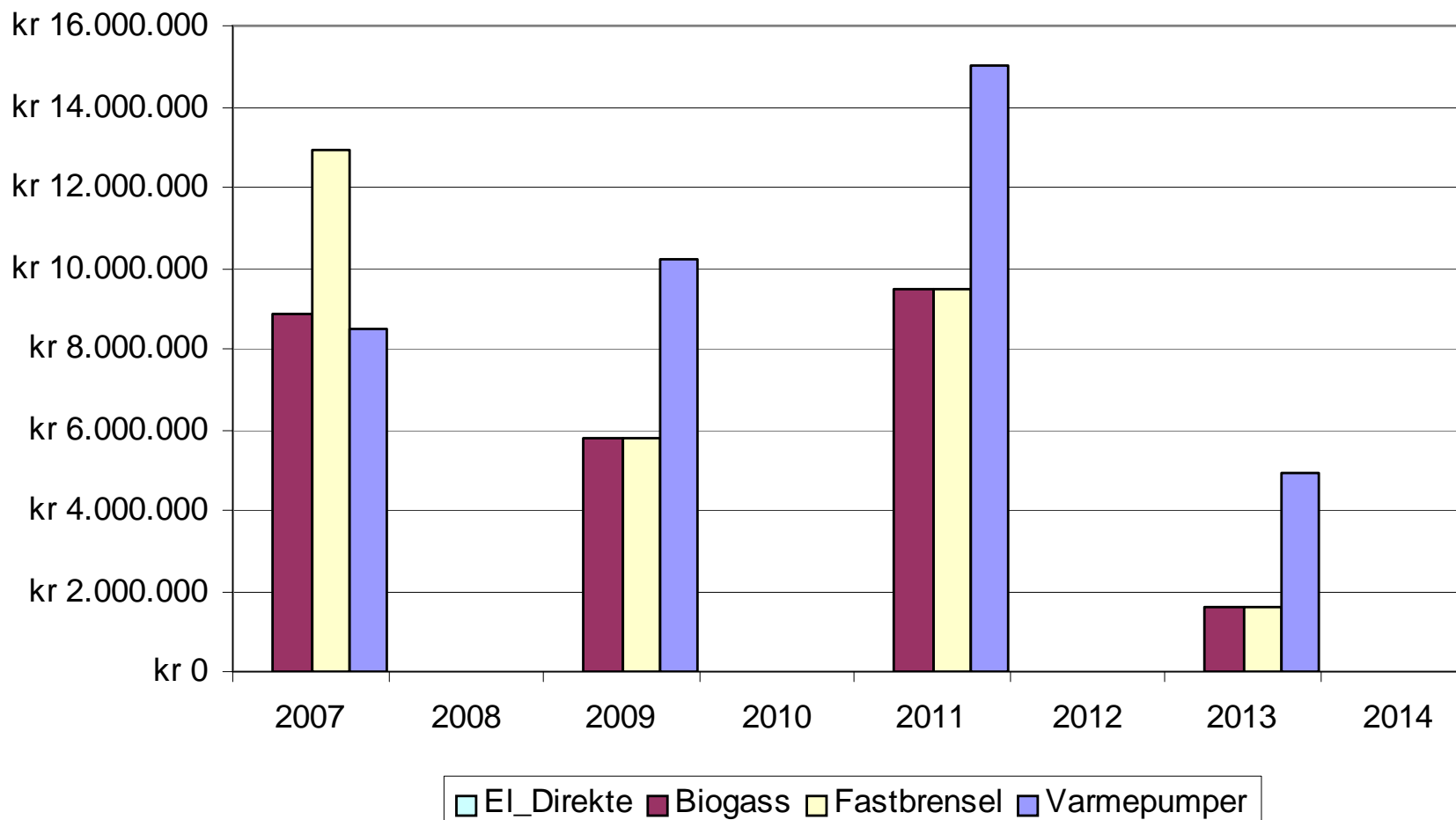
eTransport model



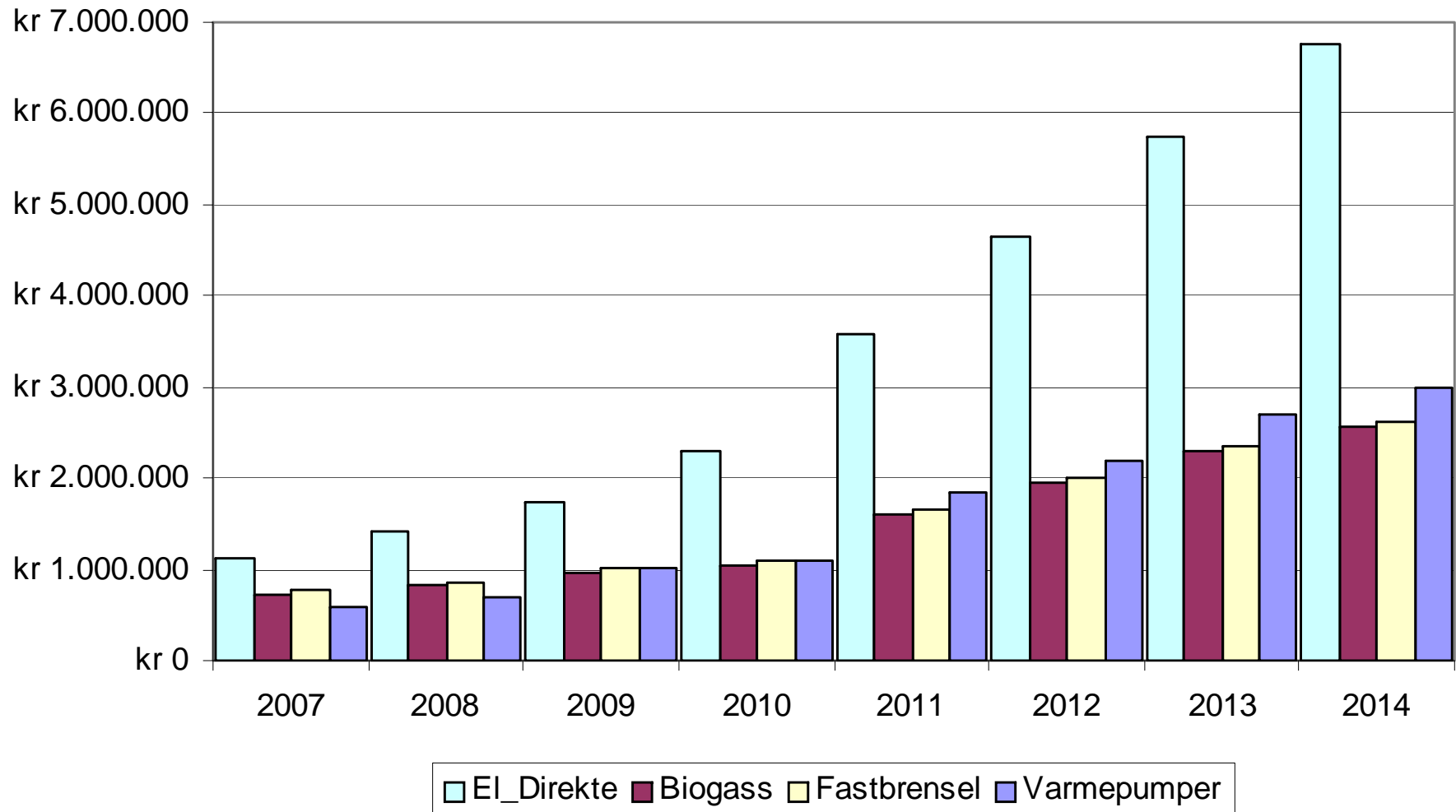
Investments costs



Comparison of Investment costs



Comparison of Operational Costs



Comparison of different alternatives

