Responsible
Renewable
Recyclable
Reliable

EUROPEAN SPALLATION SOURCE

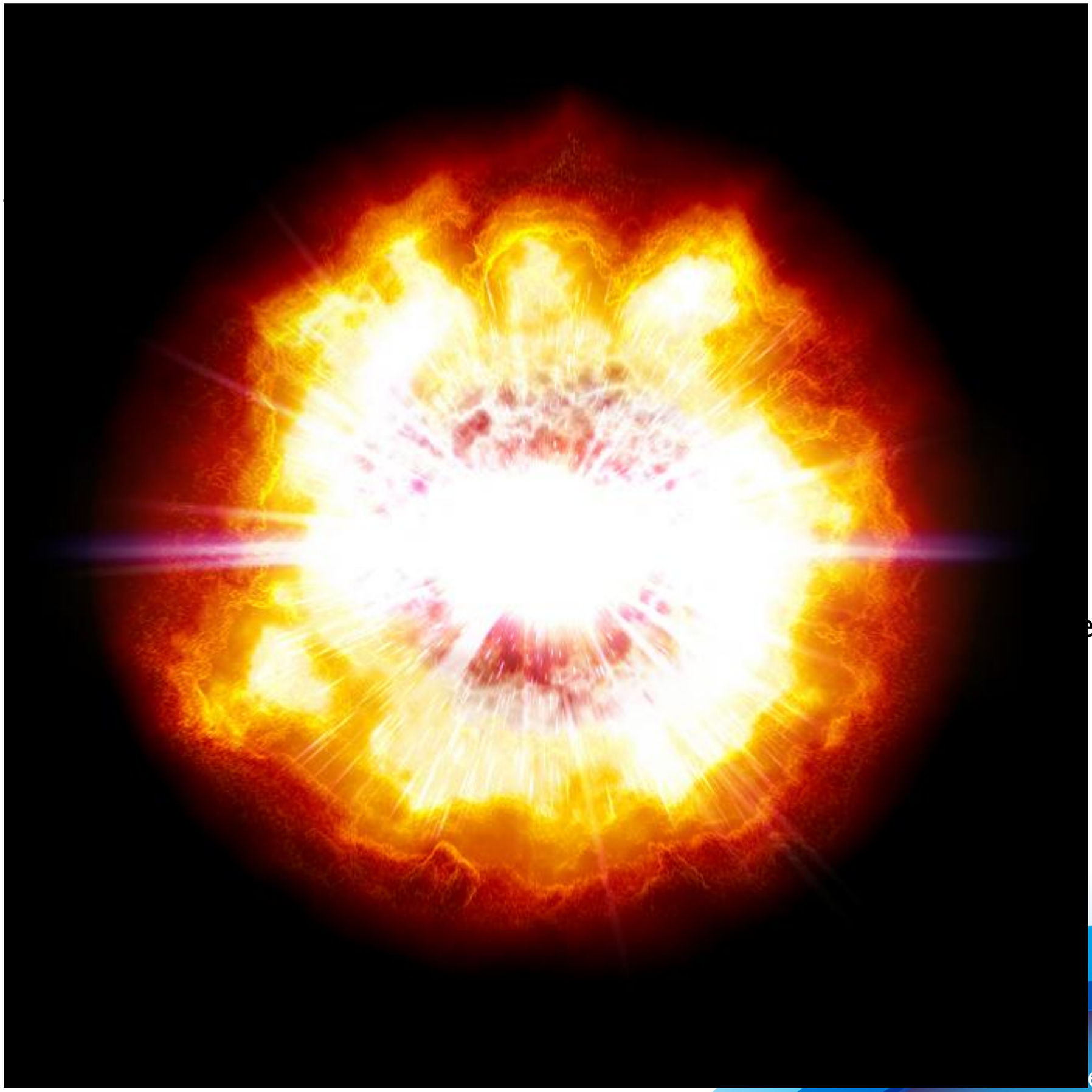
SUSTAINABILITY PARTNERS

e·on

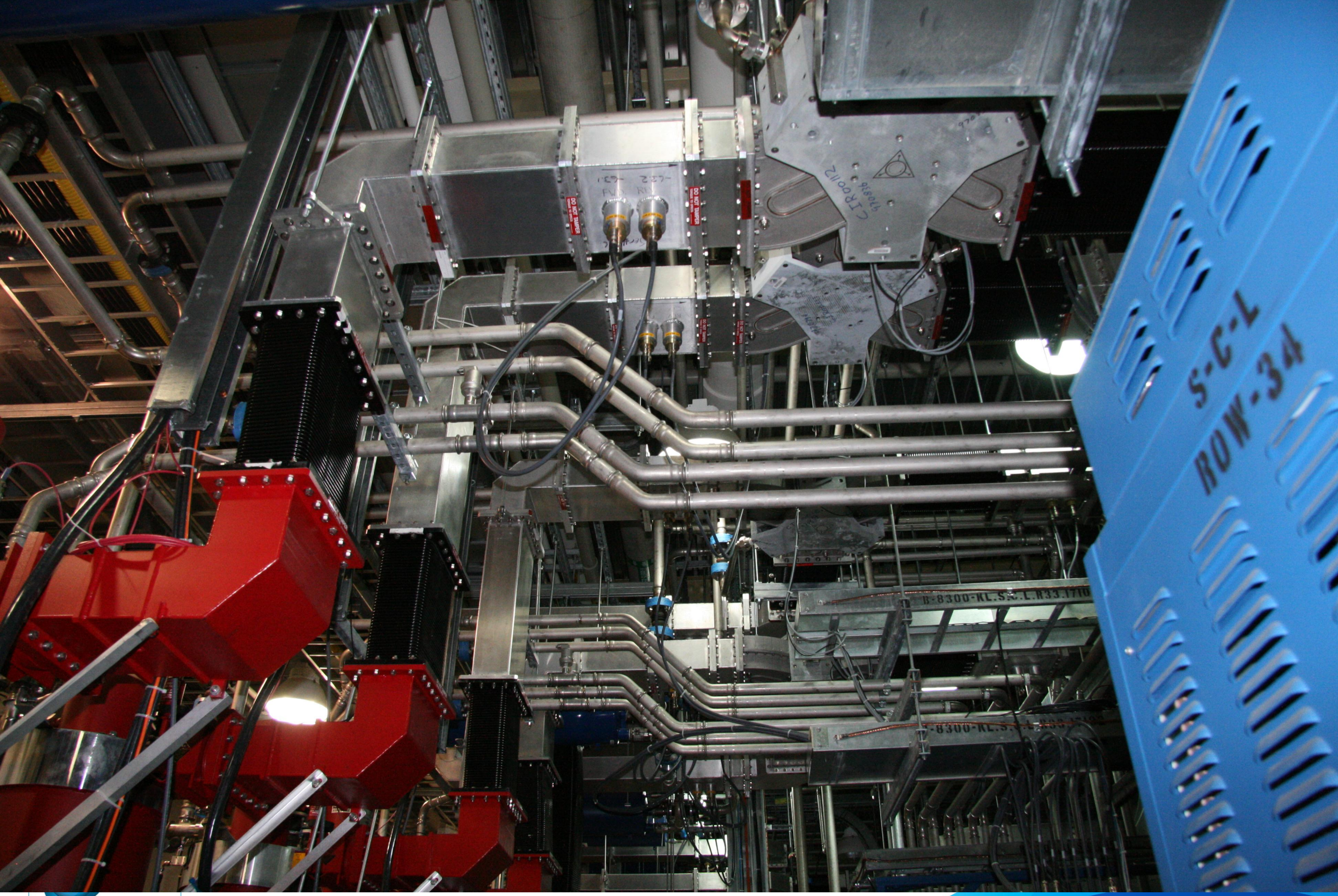
LUNDS ENERGI

Energy Division
Jörgen Persson

Carbone
150 000



e:



SUSTAINABILITY PARTNERS

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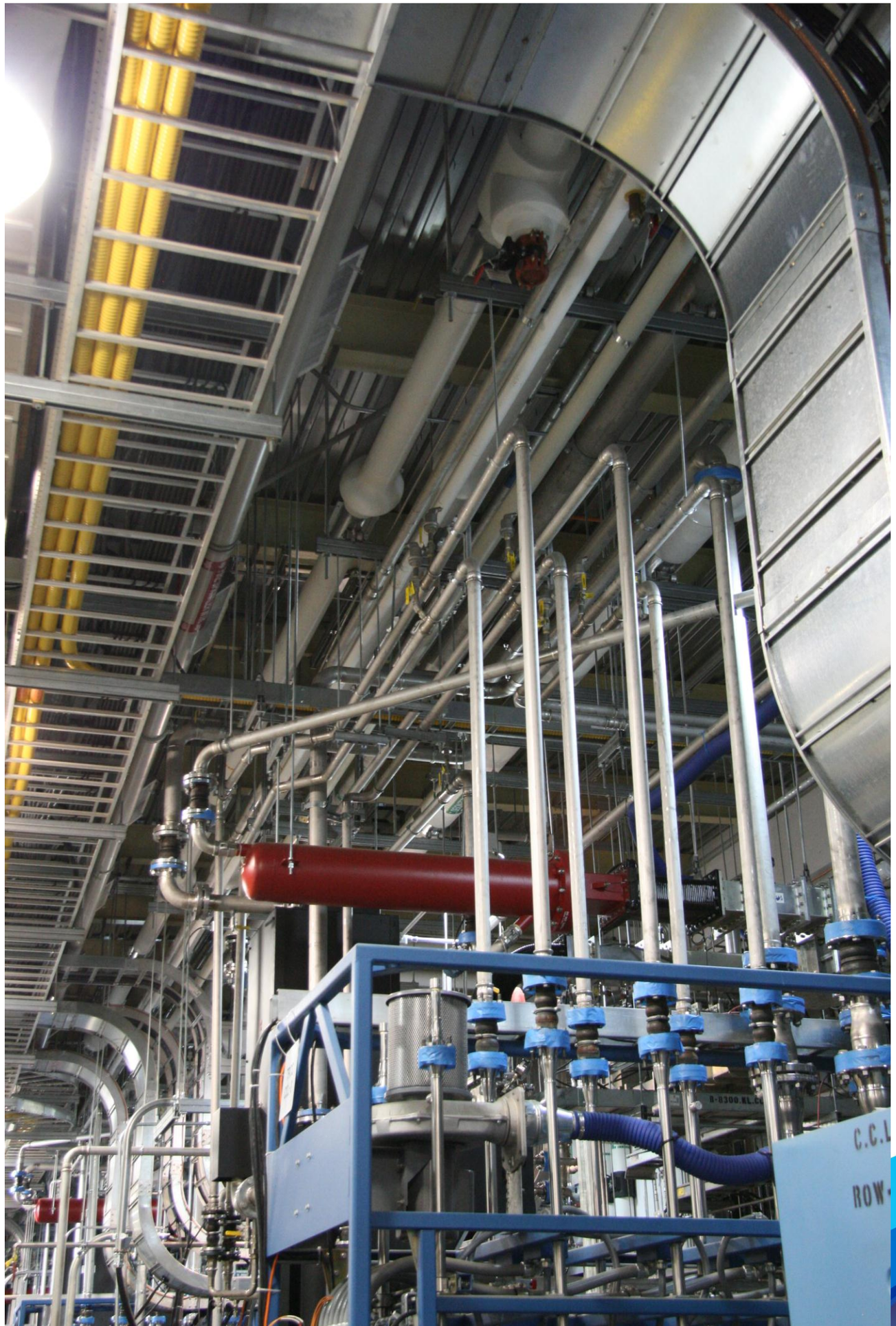

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SUSTAINABILITY PARTNERS

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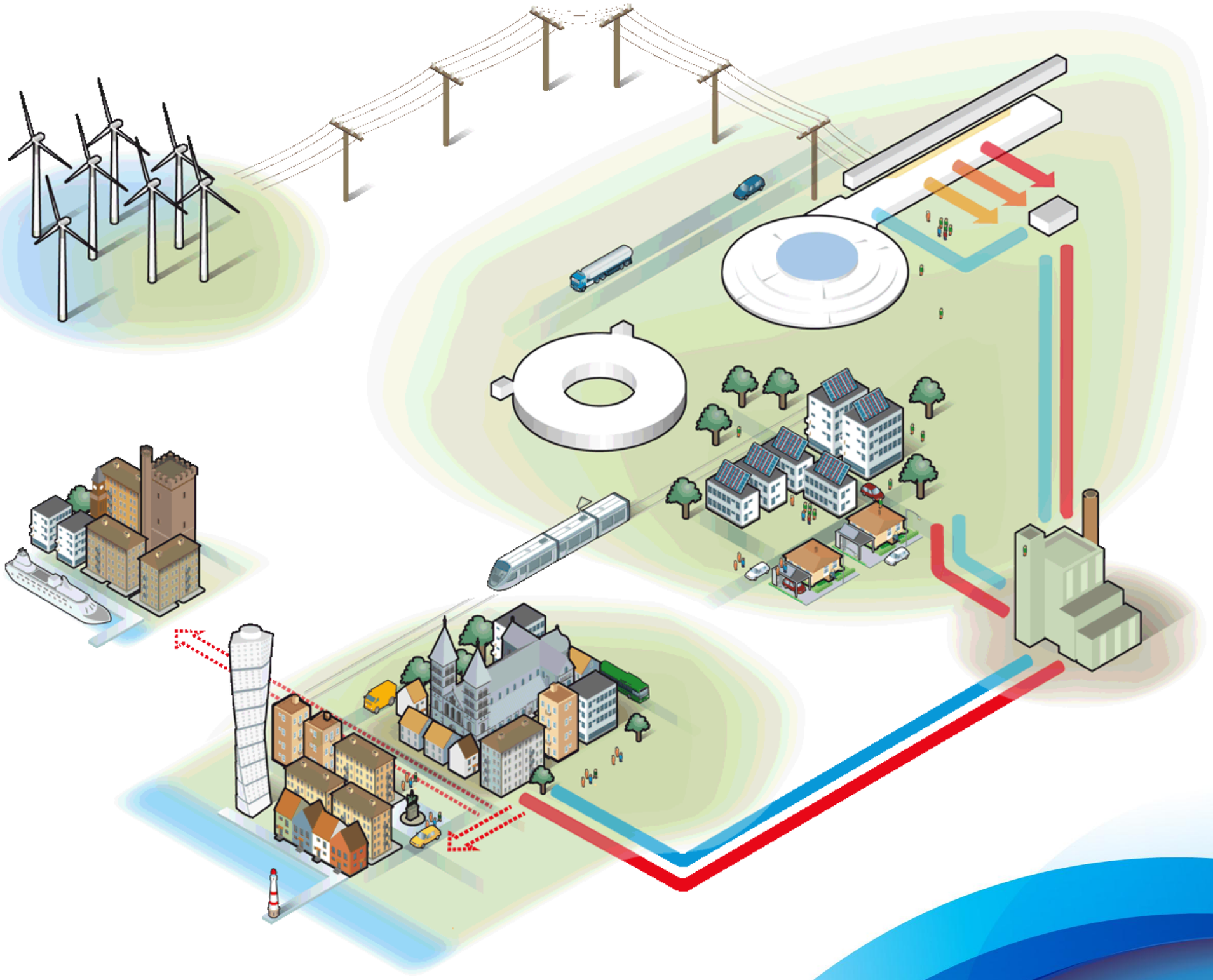
ESS Science for Society

Responsible – Renewable – Recyclable



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SUSTAINABILITY PARTNERS

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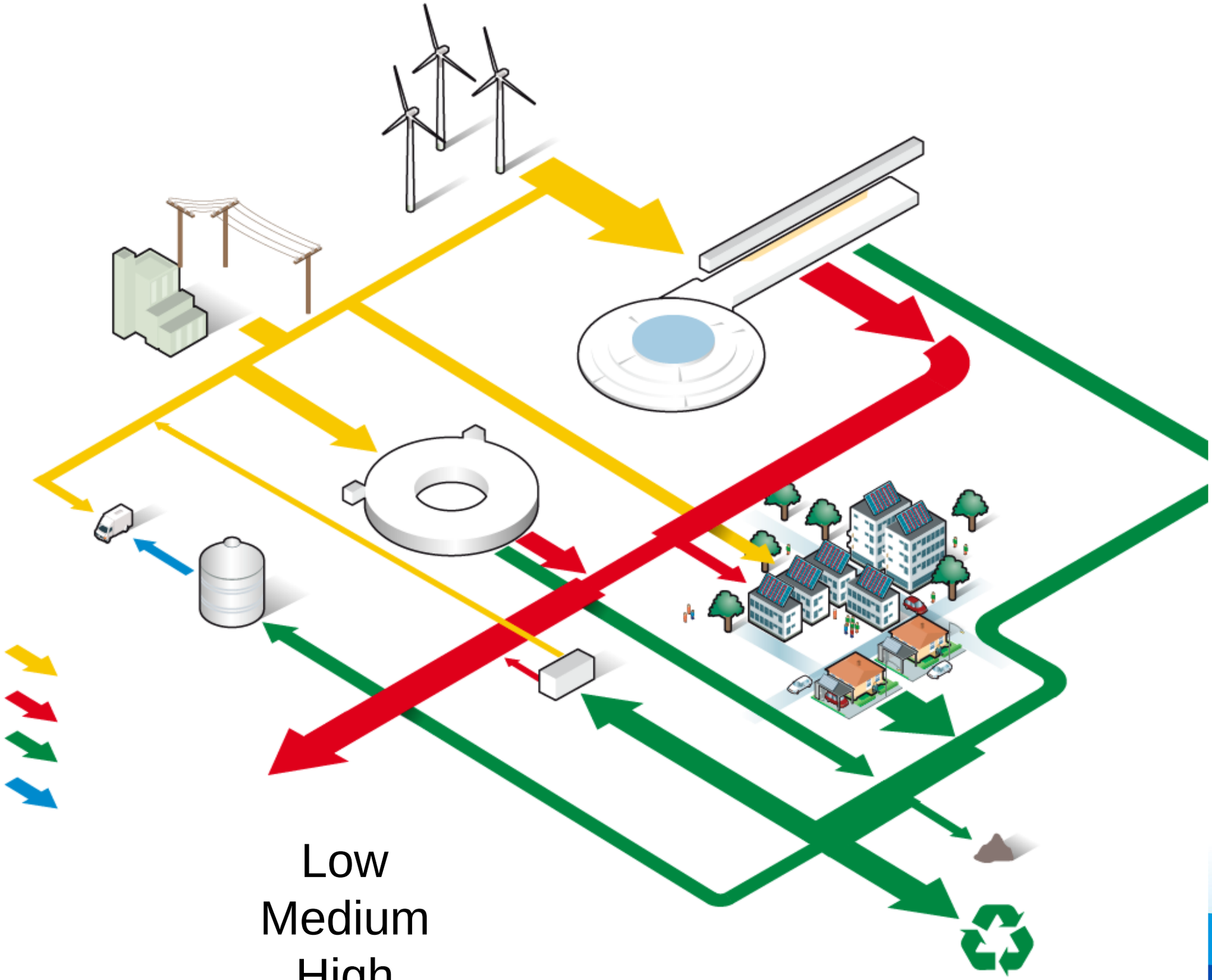
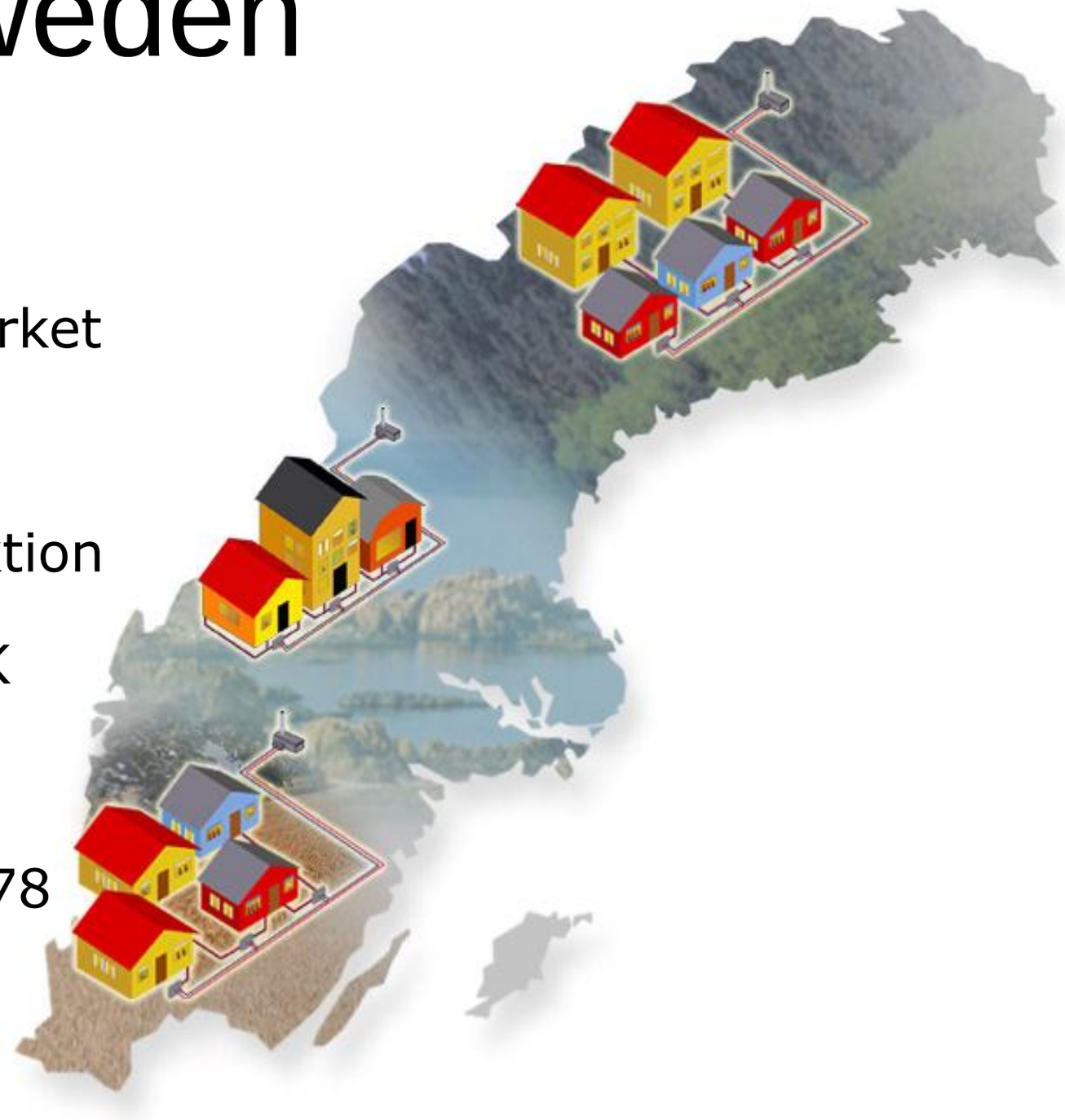


Low
Medium
High

Todays District Heating system in Sweden

- Approx. 50 % of Heating market
  - Located in 570 Cities
- Approx. 50 TWh total produktion
  - Turnover of 23 billion SEK
    - First DH Stockholm

(Sabbatsbergs hospital) in 1878



Heat from accelerator and helium cooling

Heliumsystem

Heat:
69 GWh

Klystroner

Heat:
123 GWh

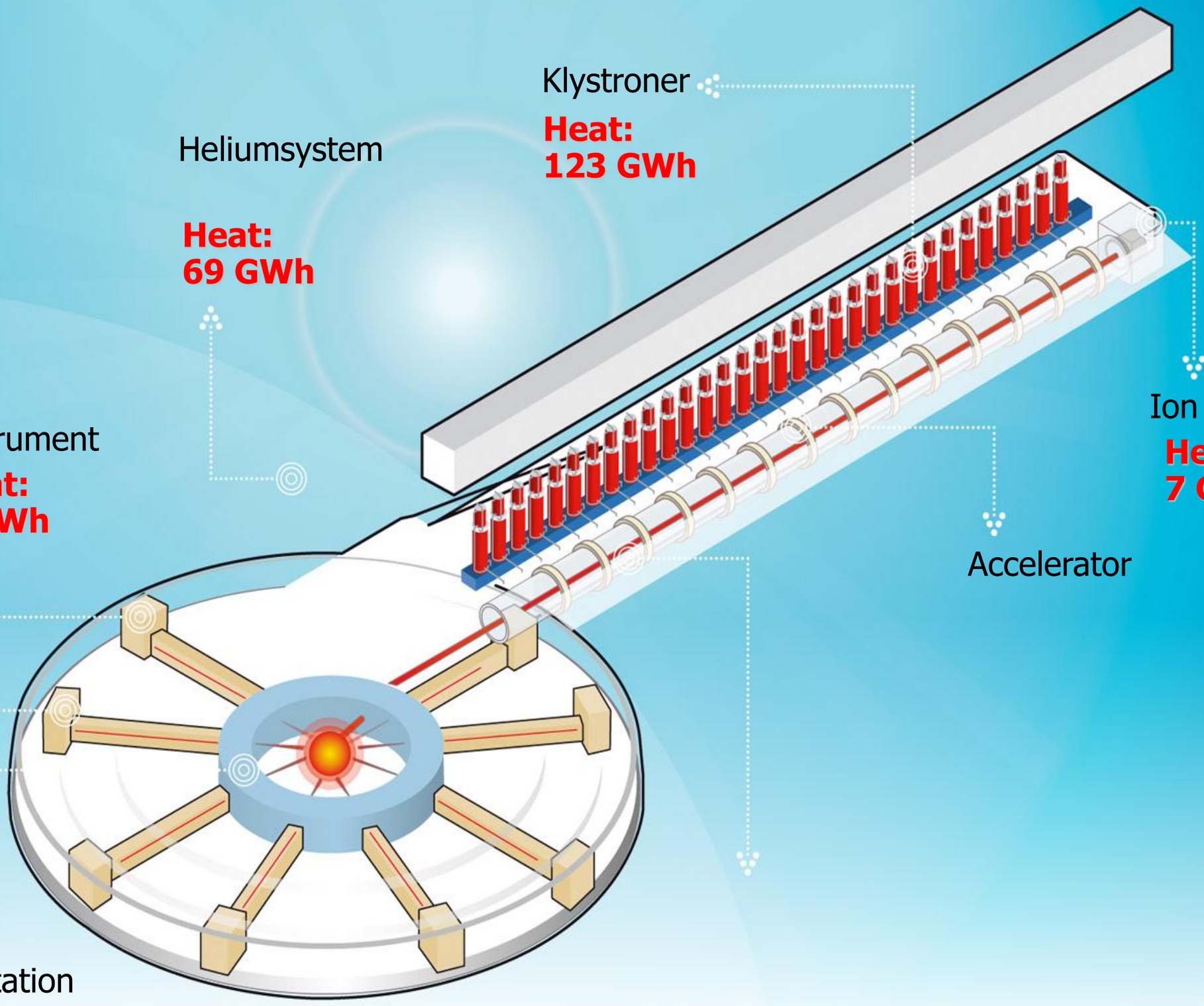
Ion source

Heat:
7 GWh

Accelerator

Instrument

Heat:
5 GWh



Target station

Heat:
11 GWh

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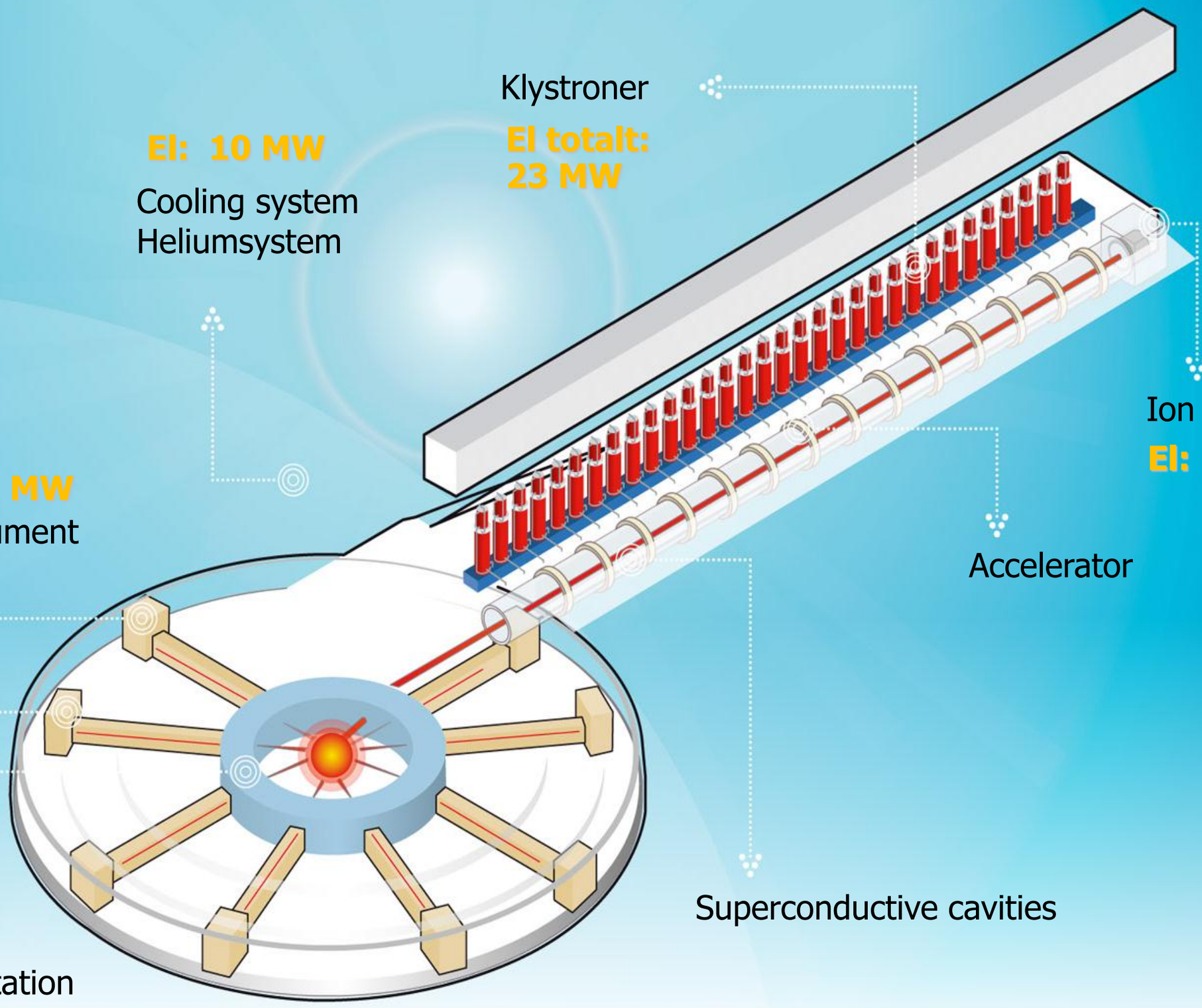
Linac and cooling system are big consumers

Klystroner

El totalt: 23 MW

El: 10 MW

Cooling system
Heliumsystem



Ion source

El: 2 MW

El: 1 MW

Instrument

Accelerator

Superconductive cavities

Target station

El: 2 MW

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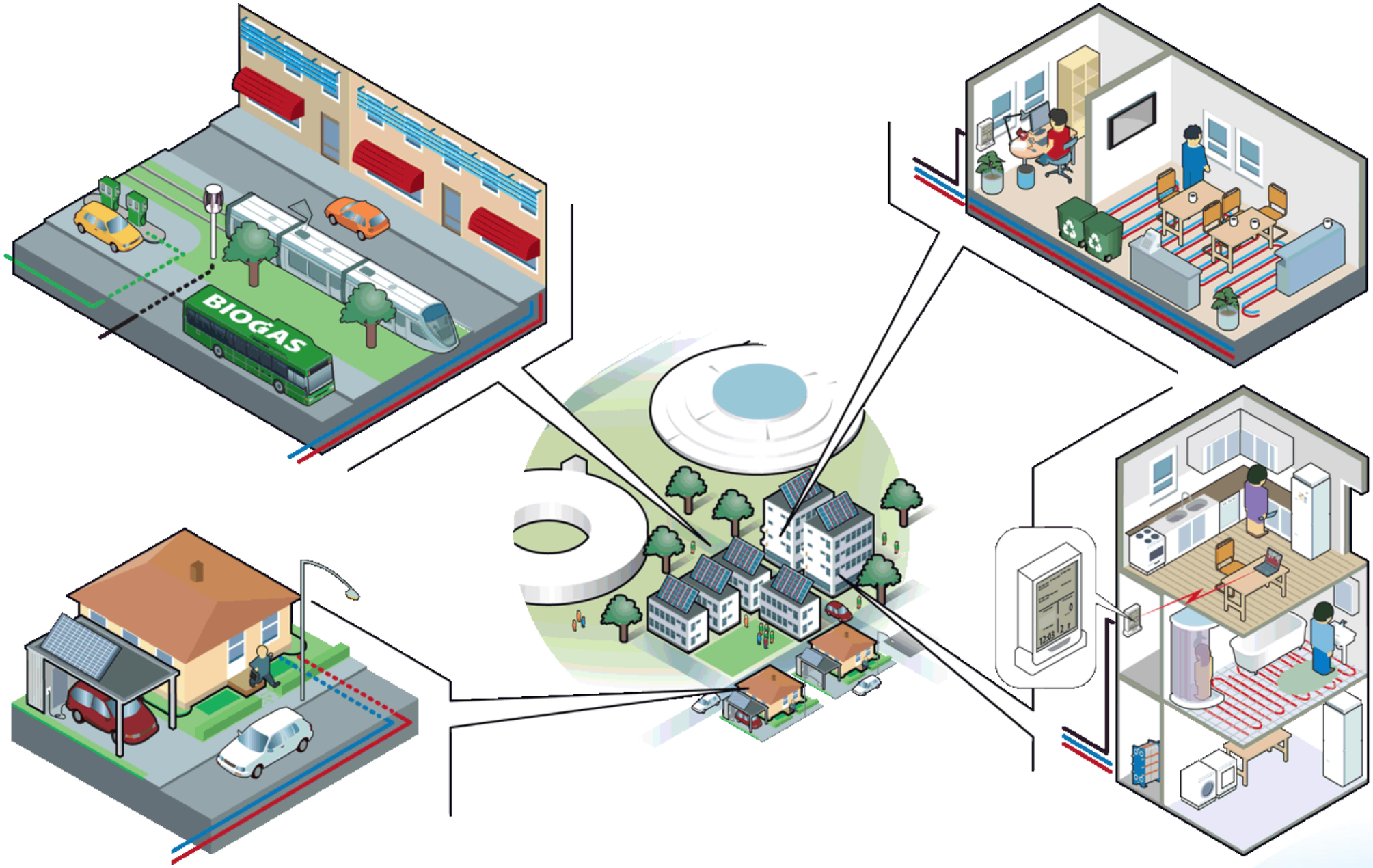
Renewable produktion

- 250 GWh, 130 MW effekt
- Approx. 40-50 Windmills, 2,5 MW
- Investment app 1 600 – 1 900 MSEK
- Green certificate

Sustainable solutions



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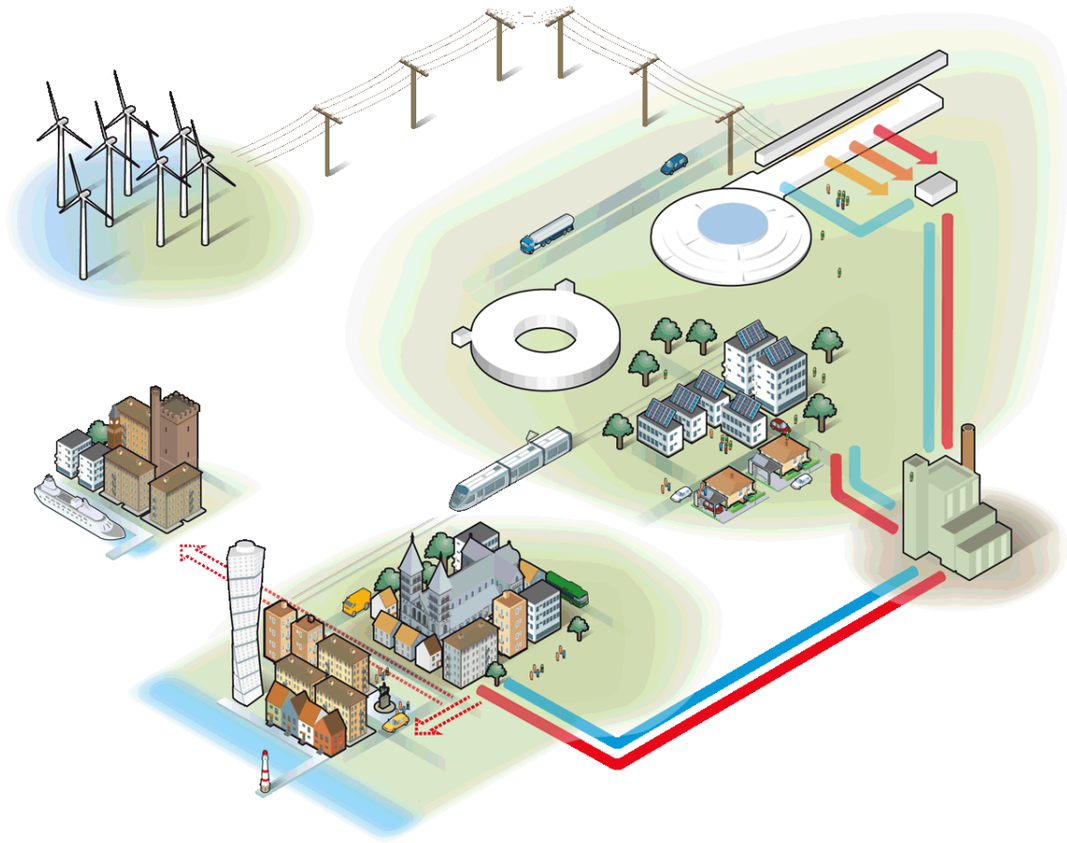
Responsible – Renewable – Recyclable

- Net savings 80 MSEK/y
  (Revenue green certificate, design parameters)
- Surplus heat sale 215 GWh gives app 40 MSEK/y.
- Energy inventory app 60 GWh gives app 30 MSEK.



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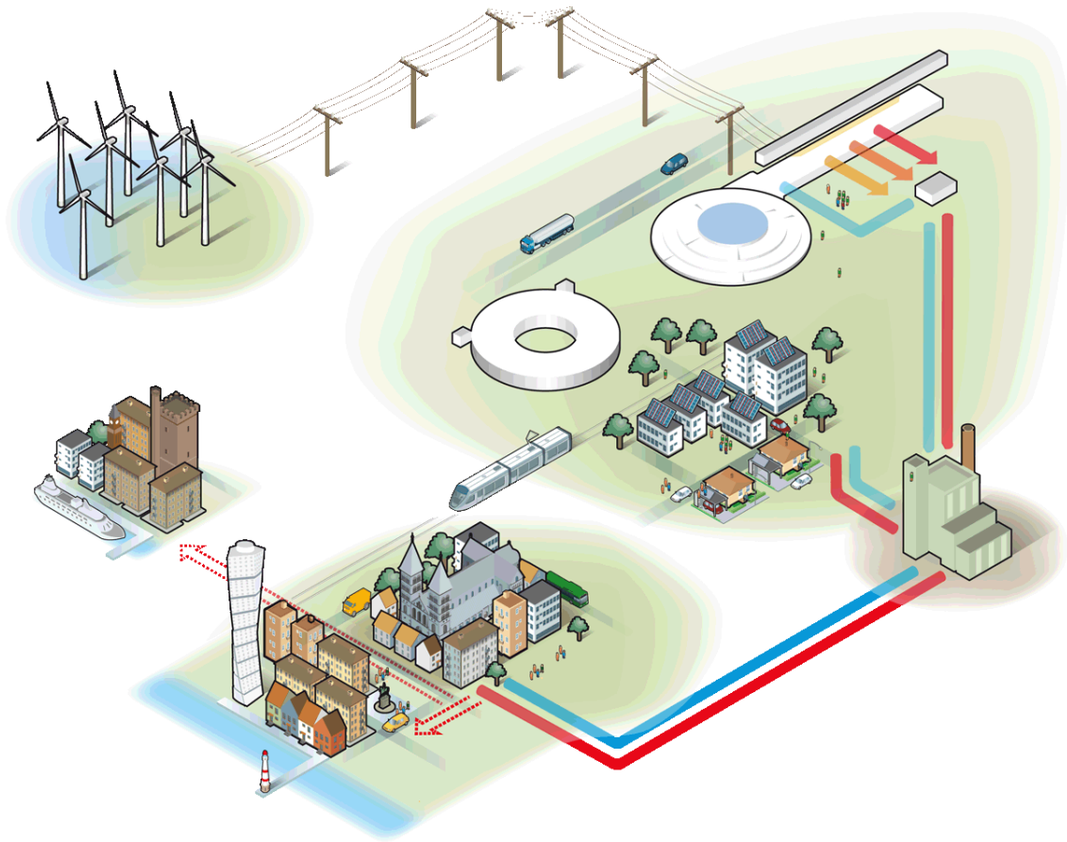
Responsible – Renewable – Recyclable

- Saving 165 000 ton carbon dioxide
- Save 150 MSEK per year for ESS
- International role model



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Simulations

- District Heating system

How do the system cope with the heat load

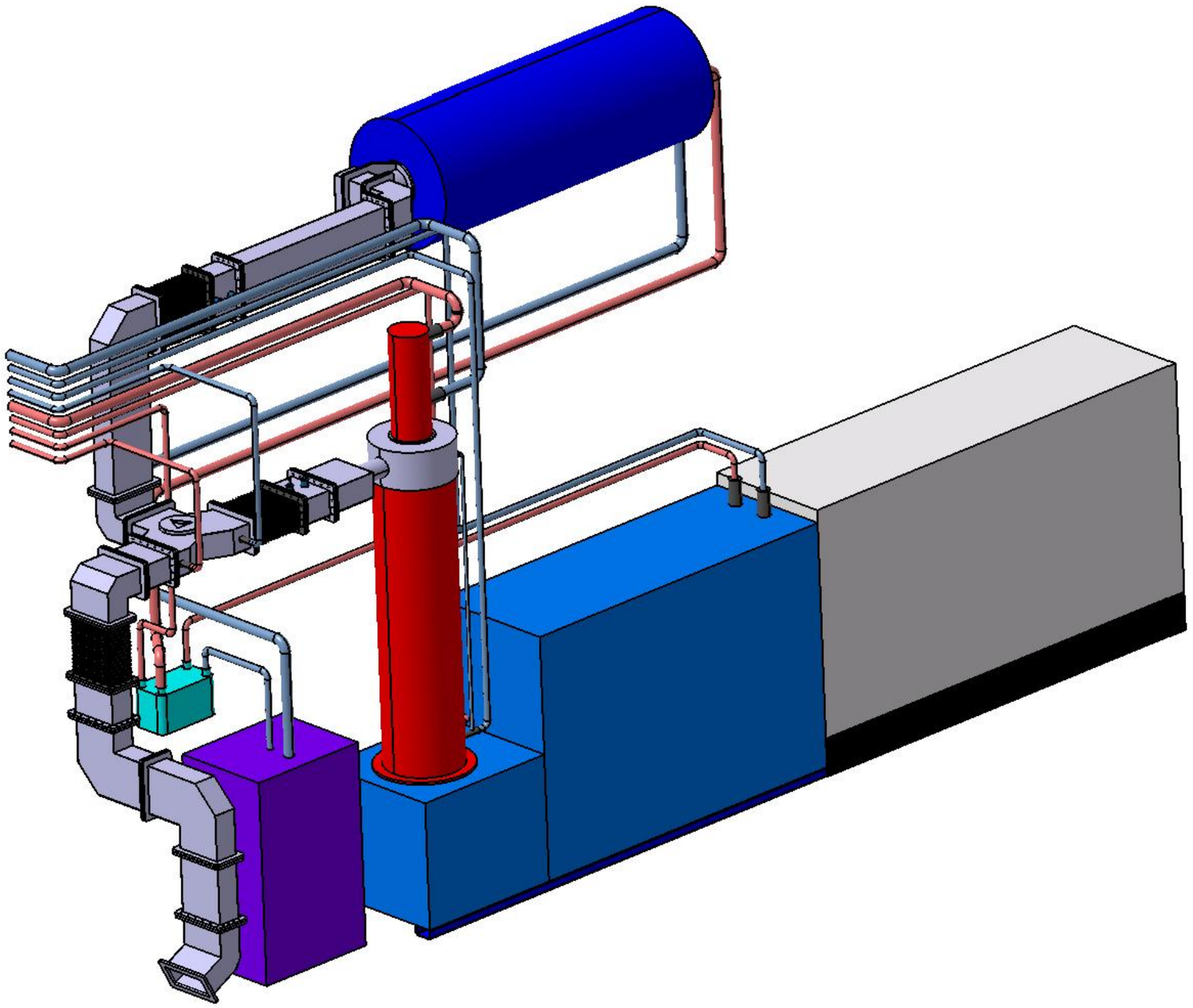
- Klystron Cooling system

Different delta P, delta T, High-pressure system, Low, Medium, High

- Power station with backup systems

UPS, Emergency power, Power quality, Redundancy

- Locate and optimize surplus heat temperatures
- Optimize the pressure drop in klystrons
- Evaluate the dummy load
- Design the systems different parameters



0.0448

ESS Science For Society

145 kV Switchgear

145 kV Transformer ESS
40 MVA
145/23 kV
Yd5

145 kV Transformer ESS
40 MVA
145/23 kV
Yd5

145 kV Transformer ESS
40 MVA
145/23 kV
Yd5

Central Emegeny Electrical Power 7326

22/0,42 kV

? MVA

? MVA

22/0,42 kV

24 kV Switchgear 7325

630 A

630 A

630 A

Station
? A
22/0,42 kV
? kVA
? MVA
Guest Houses 6300

Station
? A
22/0,42 kV
? MVA ? MVA ? MVA
Target Compressor Buldning 3600

Station
? A
22/0,42 kV
? MVA
Utilities:Lightning-HVDC
-Linac -Klystron

Station
? A
22/0,42 kV
? MVA
RF Power Buldning 3500

Station
? A
22/0,42 kV
? kVA
Central Exhaust Stock and Buildning 7360

Station
? A
22/0,42 kV
? MVA ? MVA
Mecland Elec Energineering 7220
Instrument support Facilities 7230

Station
? A
22/0,42 kV
? MVA
RF Test Facility 2700

Station
? A
22/0,42 kV
? MVA
Instrument Laboratory Facility 7235

Station
? A
22/0,42 kV
? MVA
Laboratory and Office Buildning 6100
Fire Brigade 6600
Reception Security 6500

Station
? A
22/0,42 kV
? MVA
LTBT Tunnel 5100
Long Pulse Target Buildning 5300
LTBT Service Buildning 5700

Station
? A
22/0,42 kV
? MVA
Buldning Central Utilities 7200

Station
? A
22/0,42 kV
? MVA
Central He Facility 2600

Station
? A
22/0,42 kV
? kVA
Central Shops
Spare Storage Facilities 7305

Station
? A
22/0,42 kV
? MVA
General Test Area
Magn.valv 7240

Station
? A
22/0,42 kV
? MVA
Waste Management Facilities 7300

Klystron Hall 2300

Station
? A
22/0,42 kV
? MVA
Utilities:Lightning-HVDC
-Front End
-Linac
-Klystron

Klystron Hall 2300
Station (SCCL gallery, B=0,92)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Hall 2300
Station (SCCL gallery, B=0,92)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Hall 2300
Station (SCCL gallery, B=0,92)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Hall 2300
Station (SCCL gallery, B=0,65)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Hall 2300
Station (SDTL gallery)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Hall 2300
Station (SDTL gallery)
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

Klystron Front End 2120-2130
Station
? A
RF Supply For Klystrons
22/0,42 kV
? kVA

DRAFT ESS

Electricity distribution medium switchgear

2011-08-23

STORLEK | FAVNR | RITNINGSNR | REV

SKALA 1:1 | BLAD 1 AV 1

4 3 2 1

B A

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Thanks

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