DEVELOPMENT SCENARIOS OF ESTONIAN DISTRICT HEATING REGIONS

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MOTIVATION FOR RESEARCH

- Estonian energy policy
- Obligatory DH regions
- DH in Estonia 65%

Consumer informing is important

Promoting mobile APP for DH in Estonia

1. Current DH
2. Individual heating
3. Future DH

Planning:
* consumption
* transition
* production
CHARACTERISTICS OF DH REGIONS

- 145 regions have been analysed
- from 0.25GWh to 1 585 GWh
- medium sales 225 GWh
- price ~53 €/MWh
CHANGES

- New consumers
- Energy efficiency increase
  - Network renovation/replacement
  - Temperature lowering
  - Production efficiency increase
  - Energy mix

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5th International Conference on Smart Energy Systems
Consumption will be decreased by 30% in 2030 (Estonian Energy development plan)
- renovation of existing building
- new building are nearly zero energy

Heat production in Tallinn district heating region: forecasts and reality

- Decrease of consumption will not be so fast
- Buildings with individual heating in DH region will have to connect to DH
- New urban areas
Collected data: yearly relative heat losses, length and average diameter of the networks, the share of pre-insulated pipes, supply and return temperature

Assumptions
- All old pipes will be renovated and replaced by pre-insulated pipes
- Supply and return temperature will be reduced

Heat losses in district heating networks with length <1000m
Heat losses in district heating networks with length 1 000…10 000 m
Heat losses in district heating networks with length >10 000 m
Fuel consumption for heat generation, TJ

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<th>Diesel oil</th>
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<th>Peat</th>
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WHY CANT BE REPLACED

- Peat production - 7 DH regions
- Oil shale power plant - 1 DH region
- Shale oil production plant: waste heat / gas 6 DH regions
- Biogas - 2 DH regions
RESULTS

MWh/MWh fin.consumed

- **a-** current situation
- **b-** consumption decrease
- **c-** consumption and heat losses decrease
- **d-** consumption, heat losses decrease and efficiency increase
- **e-** d + fuel replacement if possible

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SHARE OF CARBON NEUTRAL DISTRICT HEATING REGIONS (145 DHR)

Current situation: 34%

Consumption is reduced: 47%

Consumption and heat losses are reduced: 50%

Consumption and heat losses are reduced, fuel replaced: 72%

11%
CONCLUSION

- Heat consumption reduction in building and network sector can make DH region carbon neutral without changes in heat production

- Wood conversion (boilers and CHP) is still the priority option for sustainable DH in Estonia

- More than 1/3 of district heating regions in Estonia are already decarbonized

- When due to consumption and heat loss reduction, there is still need for low capacity peak boilers it will not be replaced and fossil fuel boilers remain for reserve and peak loads

- Based on collected data (for mobile app) regarding existing situation generalised approach has been developed for calculating parameters, needed for app module
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