

Baltic Energy Technology Scenarios 2018

Growing demand, increasing efficiency, and electrification



Nordic Energy
Research

Methods

Two energy system models,
3 scenarios



3 main scenarios

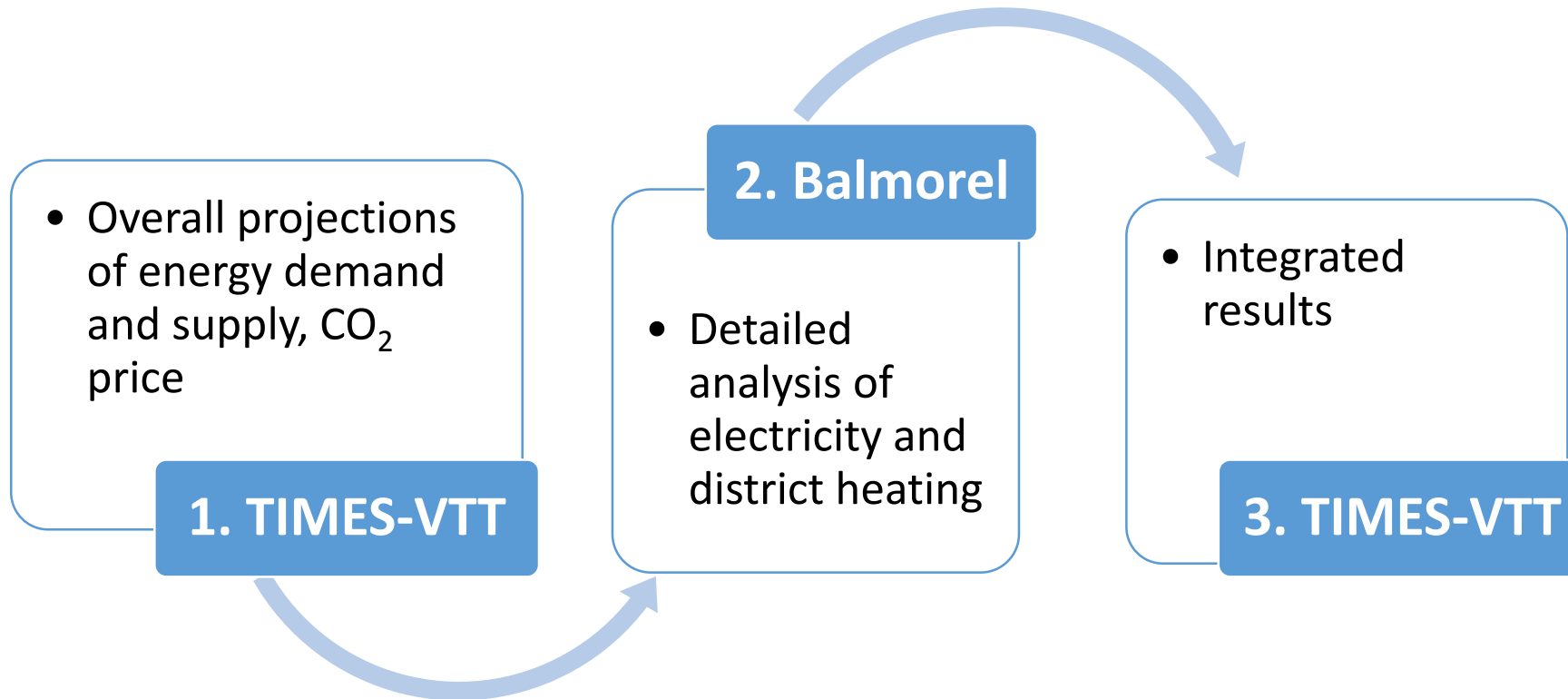
- **4 Degree Scenario (4DS):** Baltic countries achieve 2020 targets, but do not adopt 2030 targets. Other EU proceeds with 2030 targets. Only moderate global ambition after 2030.
- **Baltic Policies (BPO):** As 4DS, but Baltic countries comply with proposed 2030 effort sharing and renewable energy targets.
- **2 Degree Scenario (2DS):** Models a cost-optimal pathway to achieving the global two degree target. EU -80% GHG by 2050. Baltic countries as a part of EU.



Examples of research questions

4 Degrees (4DS)	<ul style="list-style-type: none">• What are the current trends of Baltic energy system?• How much additional measures Baltic countries need to achieve the 2030 targets?• 4DS is needed also to estimate the costs of additional measures
Baltic Policies (BPO)	<ul style="list-style-type: none">• What are the least-cost options to achieve the 2030 targets in Baltics?• Are domestic resources enough for renewable energy targets?• How much GHG and RE targets improve energy independence and electricity trade balance of the region?
2 Degrees (2DS)	<ul style="list-style-type: none">• Are 2030 targets on 2DS pathway?• Which sectors should lead emissions reductions? How fast?• Do we need technologies (after 2030) that are currently non-commercial?

Modelling



Demand sector perspectives

Main sectors:

transport, buildings, industry



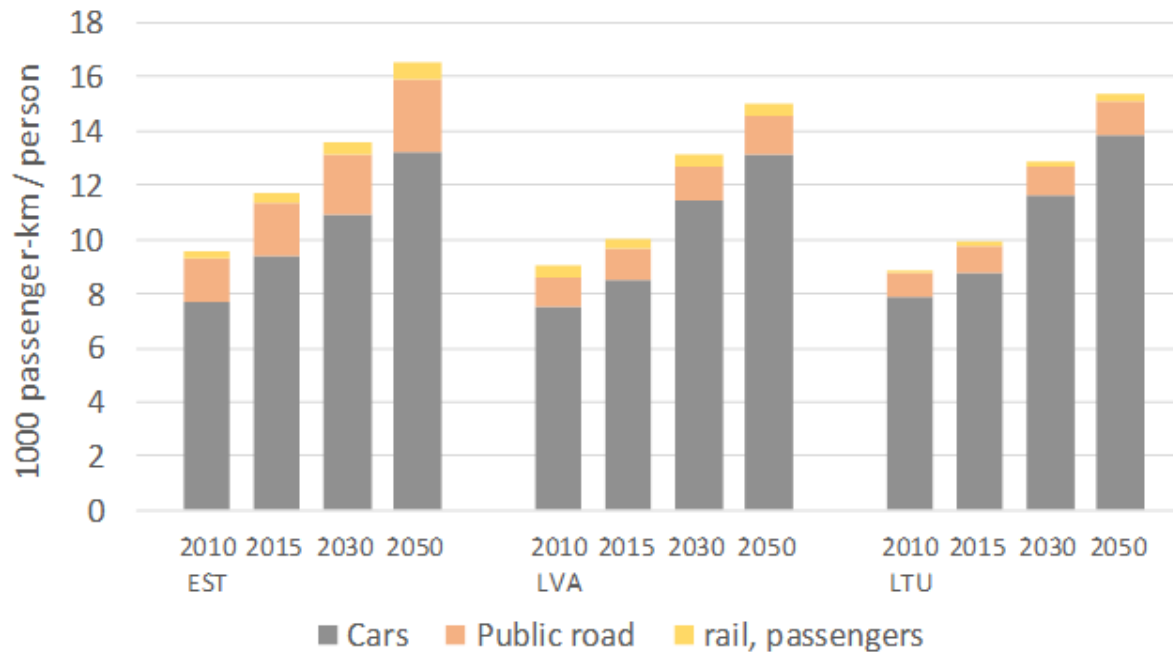
*Key finding from all sectors:
Growing demand, increasing efficiency,
and electrification*



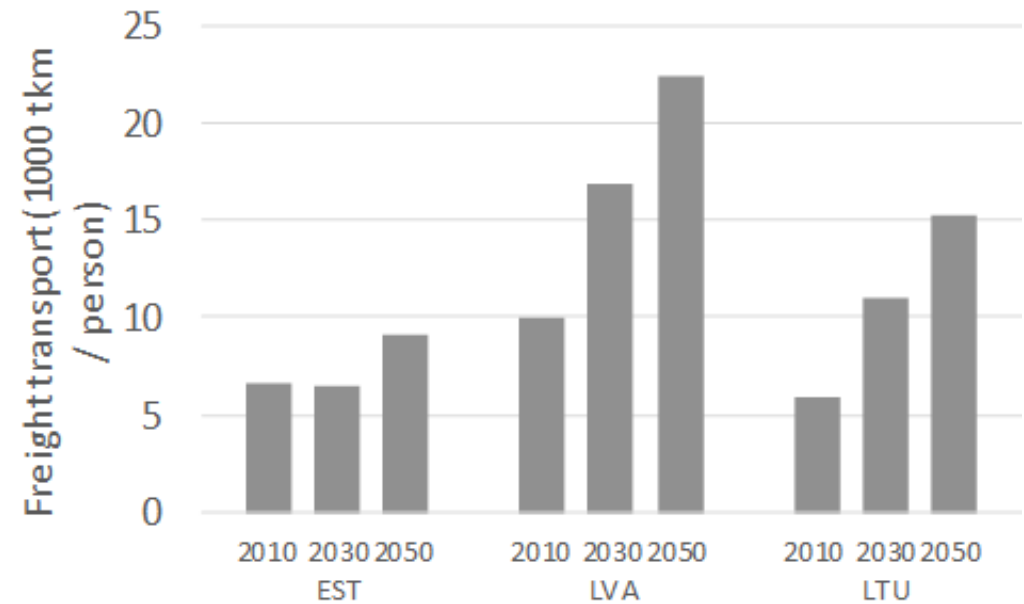
Transport – growing demand

- Transport sector is split to passenger and freight transport

Passenger transport, up to +70%
(EU average +25%)

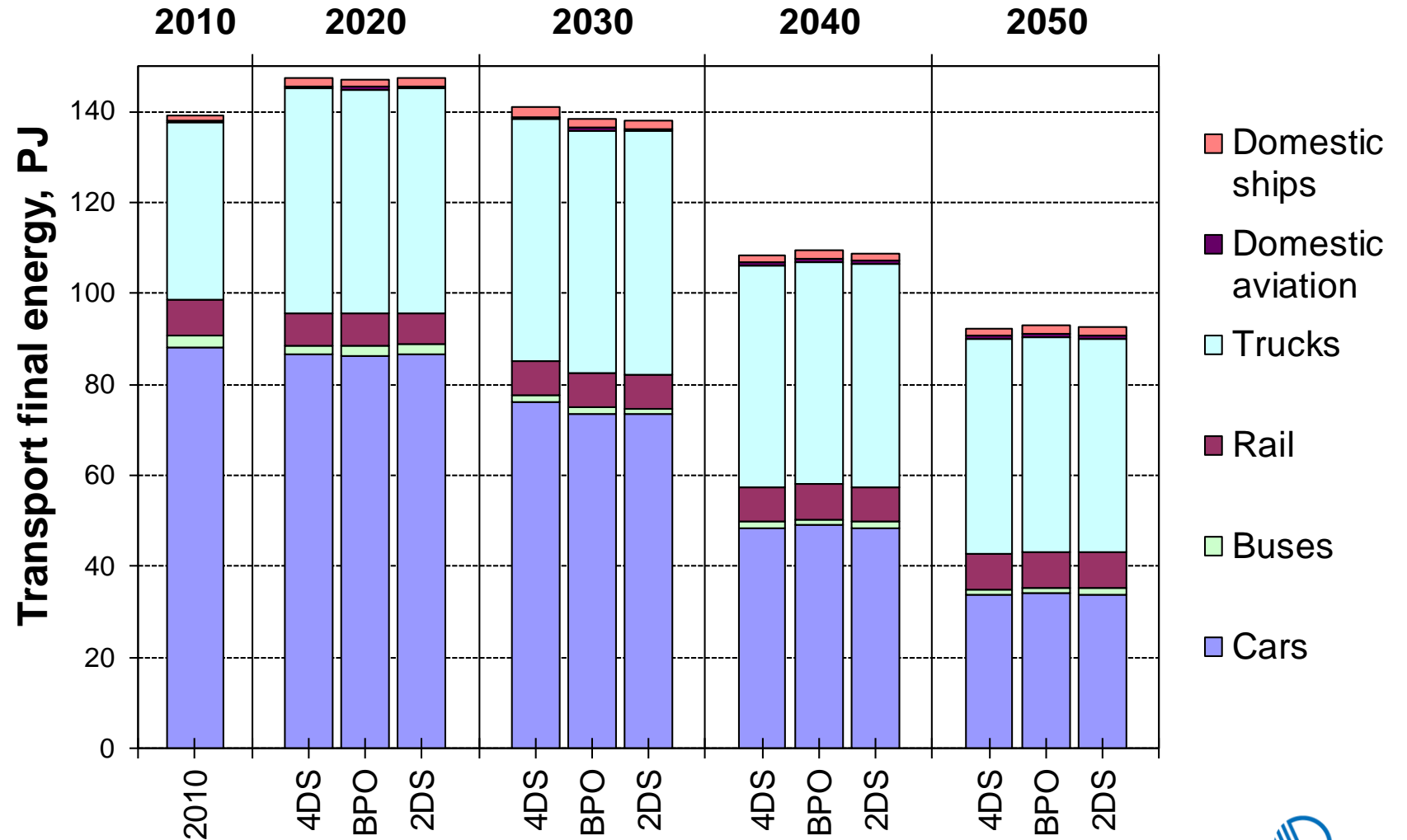


Road freight, from +40% to +150%
(EU average +50%)



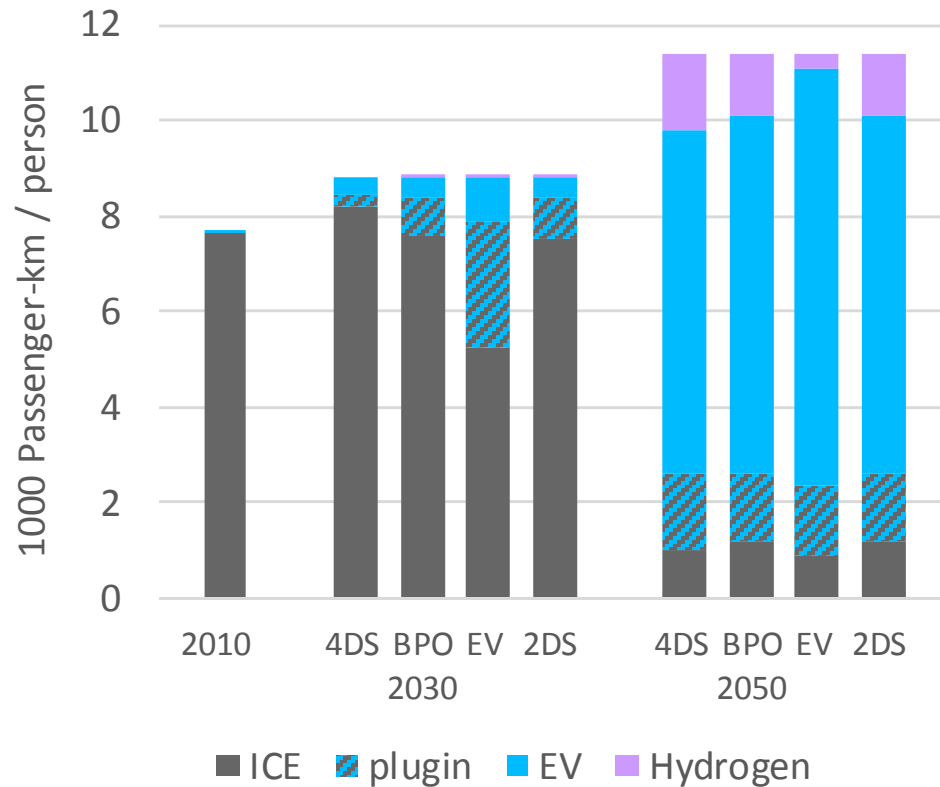
Transport – increasing efficiency

- More existing options to decarbonize passenger cars than heavy trucks.
- Trucks' share of the energy consumption increases despite improved efficiency.

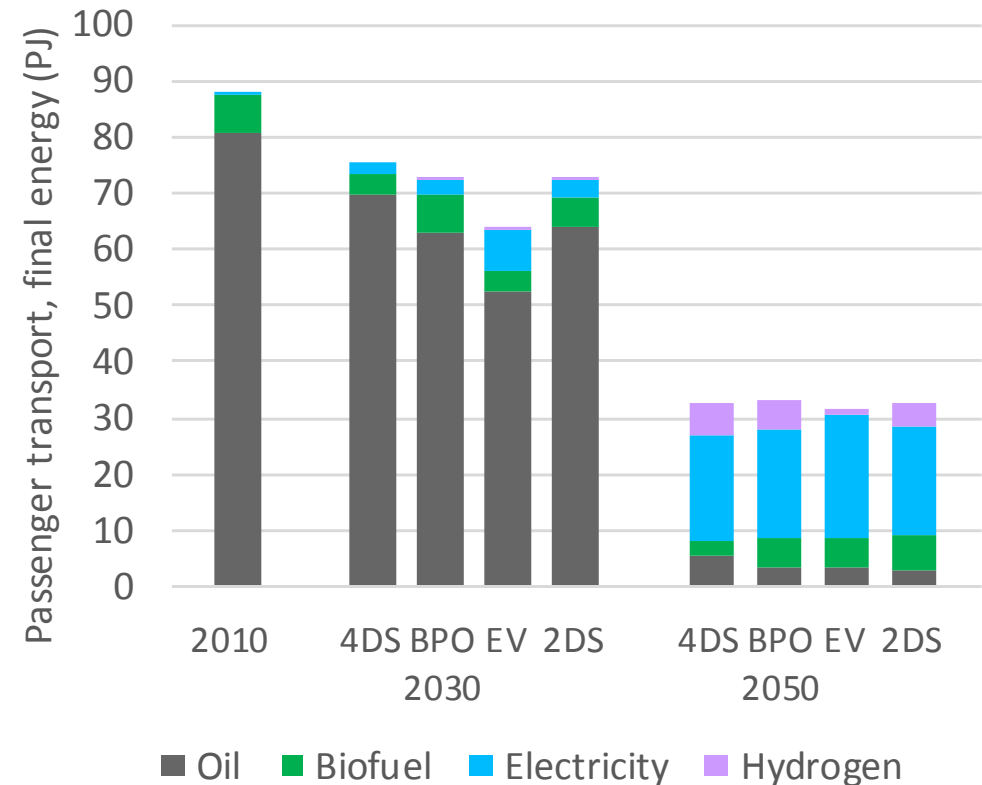


Transport – electrification

Passenger km per person by car type

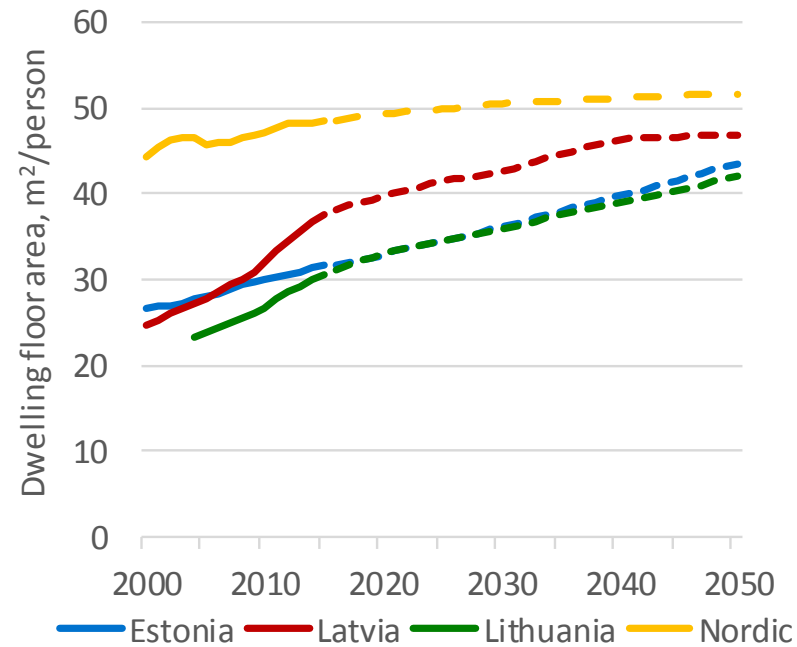


Energy demand by car type



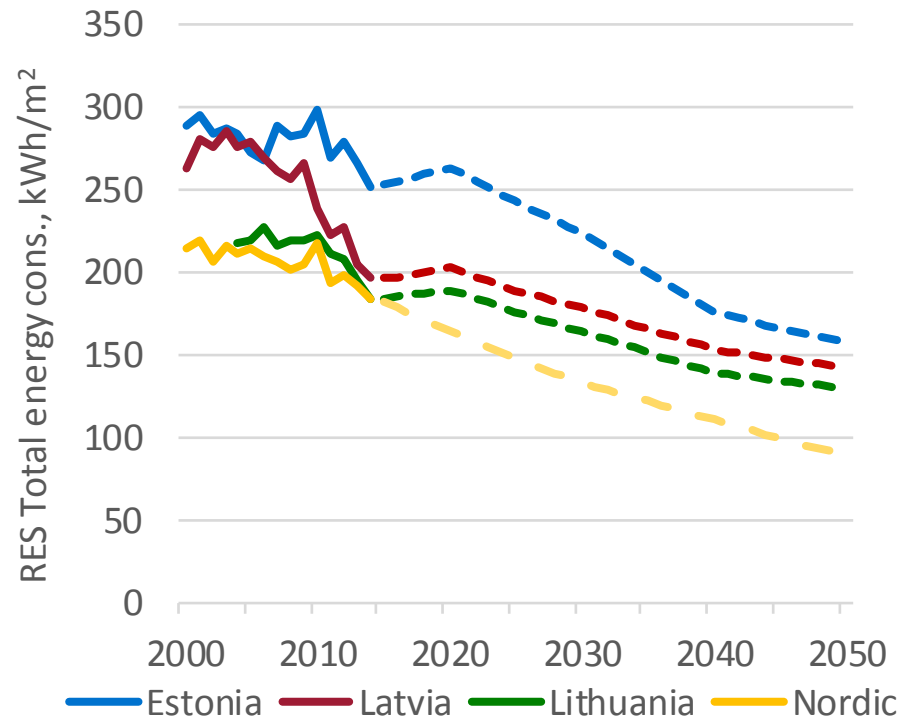
Buildings – growing demand

- Relatively rapid growth in floor area per person
 - A result of slightly increasing total floor area and slightly decreasing population

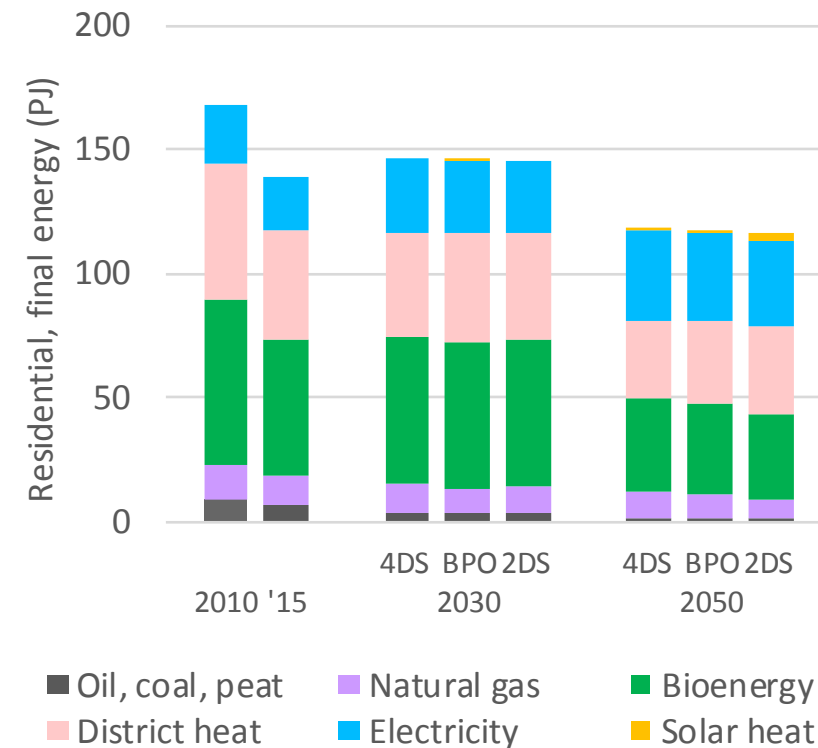


Buildings – increasing efficiency and electrification

Residential buildings' total energy demand per m²

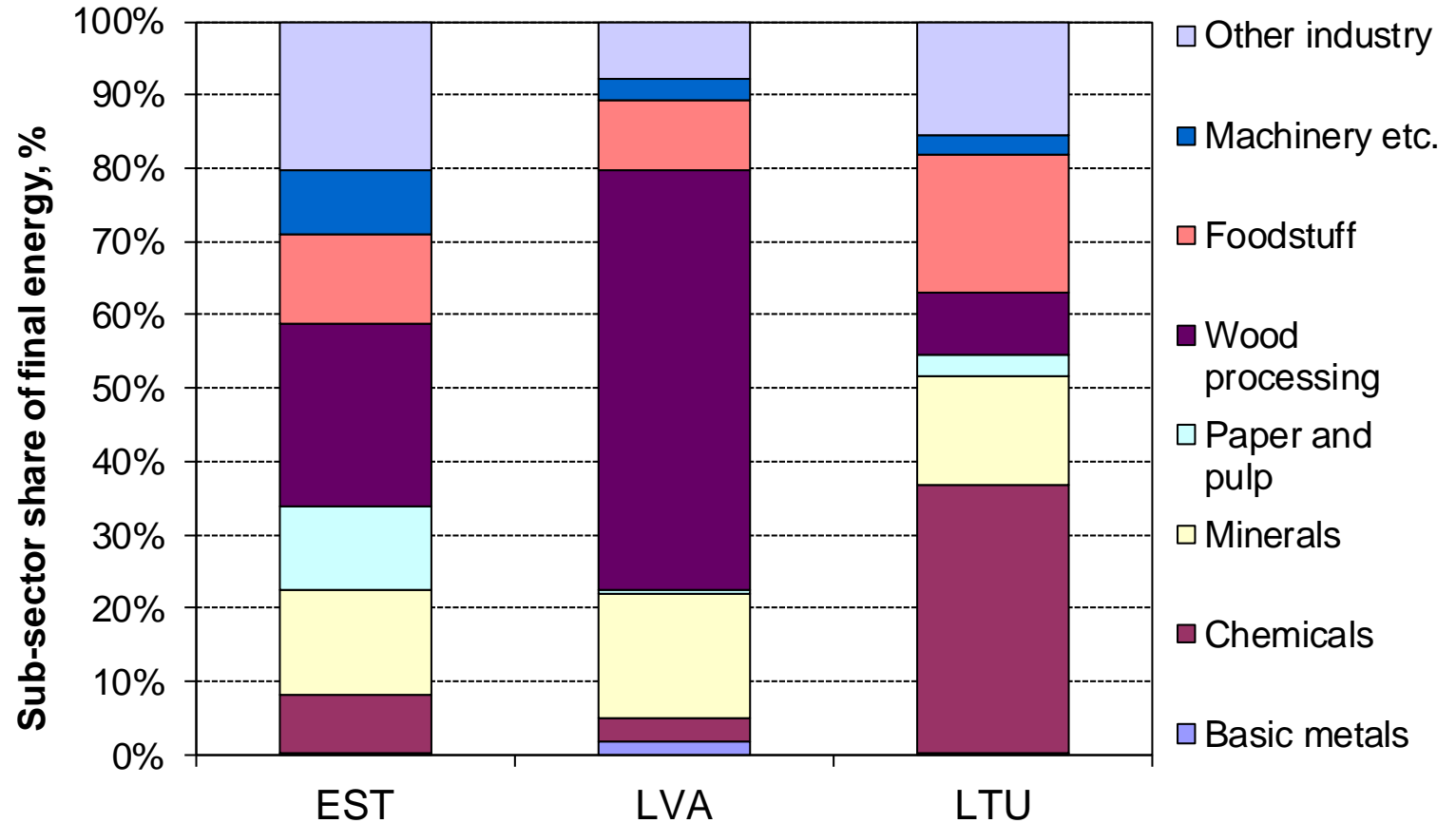


Residential buildings' total energy demand (PJ)



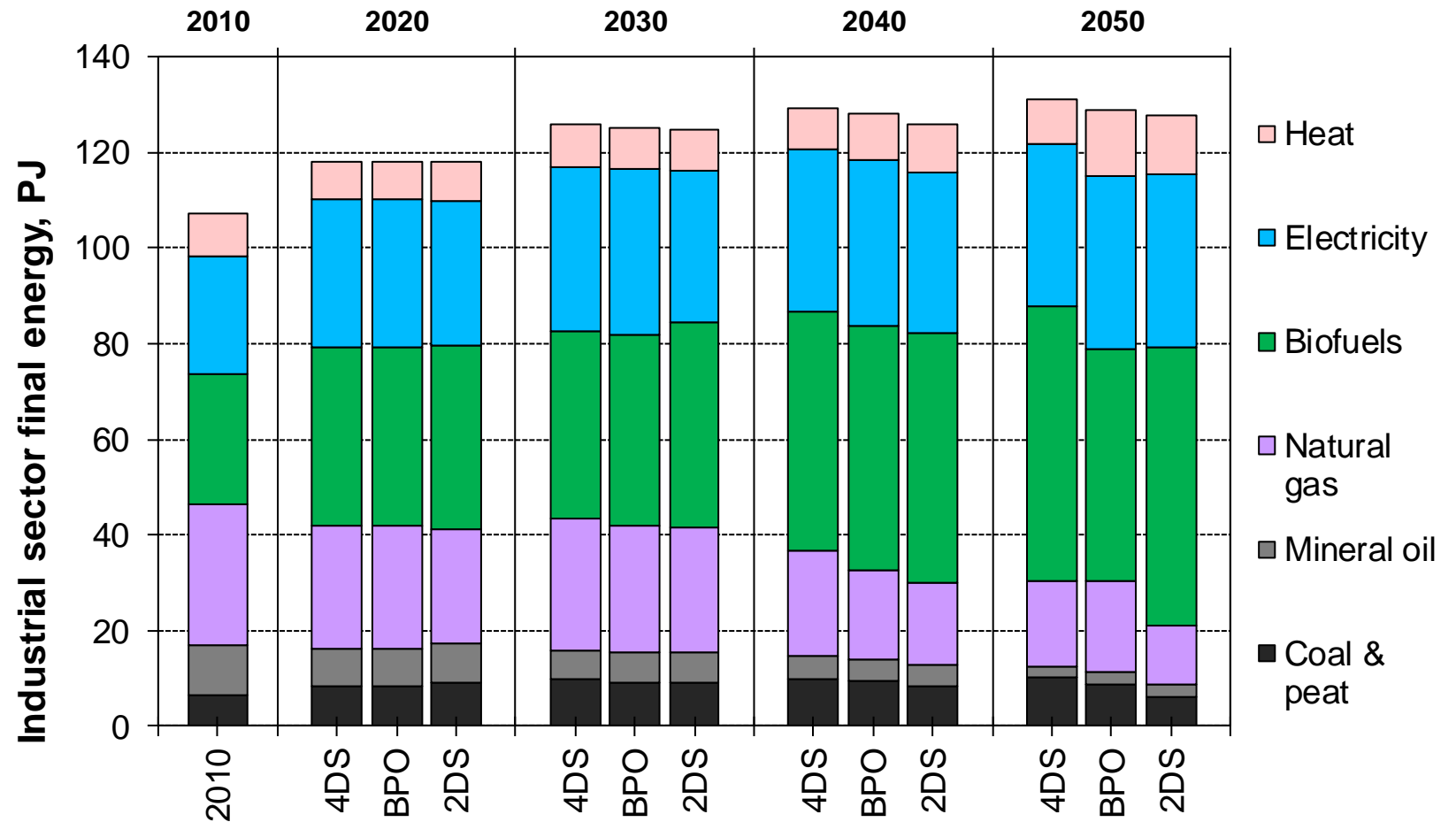
Industry – growing demand

- Industry structure varies among the Baltic countries
- Energy-intensive industries consume 60–80% of the industry's final energy.
- Assumed volume growth from 0% to 55% from 2015 to 2050 depending on industry branch



Industry – increasing efficiency

- Industry energy consumption increases in the scenarios, but less than production
- Larger efficiency gains should be possible, but this likely requires plant specific assessments.



Other sectors

Similar analysis also for

- *agriculture,*
- *waste management,*
- *fuel refining, and*
- *international transport.*



Increasing electricity consumption

- The electricity demand is projected to grow
 - from 10% to 20% between 2015 and 2030
 - from 20% to 40% between 2030 and 2050
 - Depending on country and scenario
- Main reasons: **assumed growth** of transport, building areas, and industry production, and **modelled electrification** especially in transport and heat pumps
- The projected growth is similar to Estonia's national studies, higher than Latvia's, and lower than Lithuania's

