

State of Renewable Heat Production and Consumption in the Danube Region

Regional Centre for Energy Policy
Research

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- The goal of the analysis is to look at the progress towards reaching the 2020 targets of countries in the Danube Region, by comparing their NREAP targets to the actual development realized in the renewable heating and cooling sector.
- The analysis mainly relies on the following data:
 - National Renewable Energy Action Plans of related countries (except for BiH)
 - Eurostat data on renewable heat production and consumption
 - Available progress reports (EU and Energy Community documents)

Task 1: Assessment of RES-H development in the last 10 years

- Tendencies are presented for the period 2004-2014 related to the
 - Supply of renewable heat in DR countries
 - Quantities and shares of different renewable energy sources utilized in DR countries for heat production.
 - Demand for renewable heat in DR countries
 - Main tendencies in renewable heat consumption by different consumer categories.
- Mapping the main differences among DR countries' heat sectors and comparing the main outputs to the EU average.

Task 2. Comparing the actual RES-H development to national targets

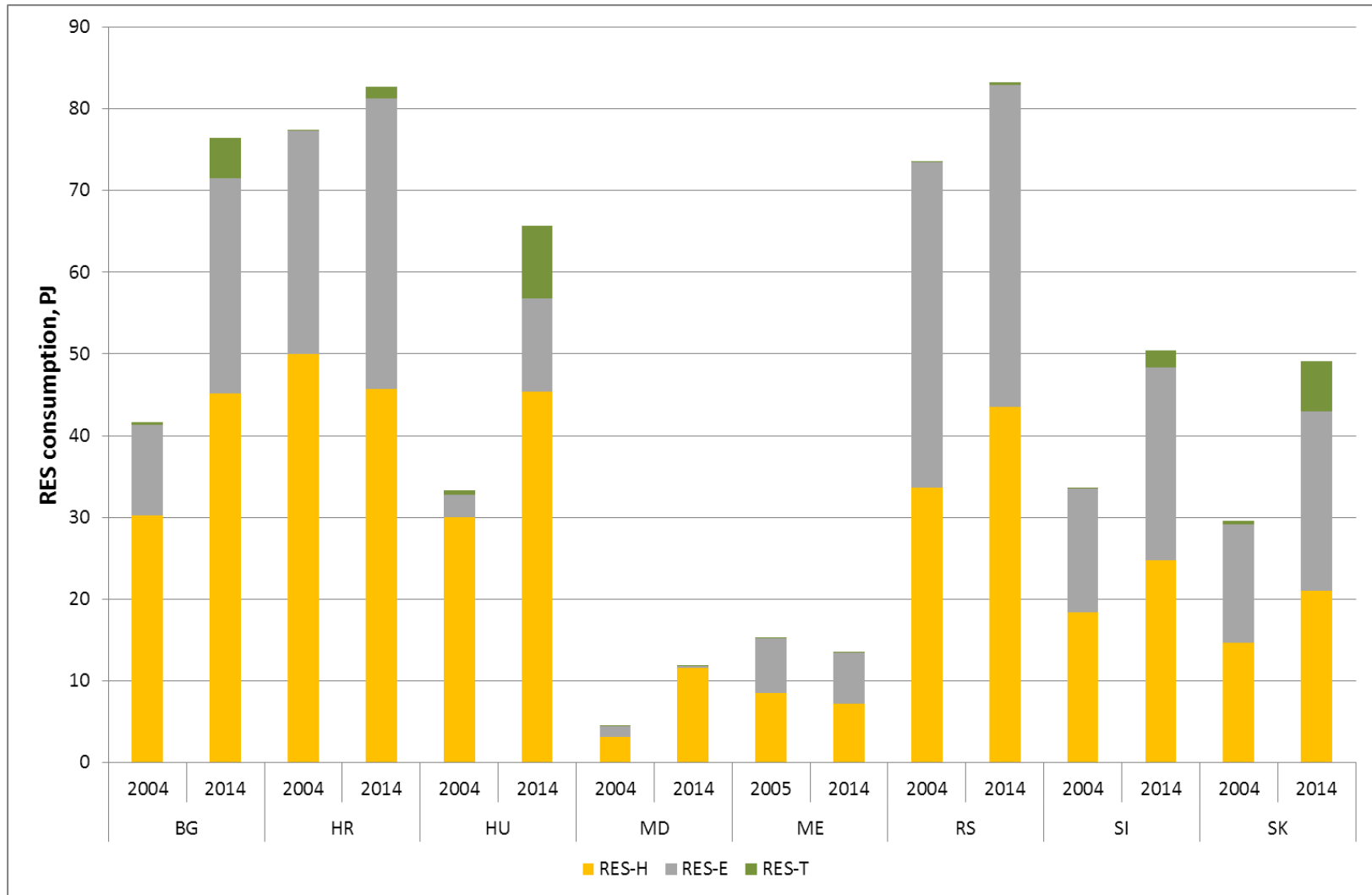
- Indicative RES-H utilization trajectories will be compared to the actual progress in renewable energy deployment of the heating sectors of DR countries, looking at the following:
 - ▶ Share of renewable heat in overall renewable energy utilization targets (RES-E+RES-H+RES-T)
 - ▶ Composition of renewable heat utilization by type of renewable energy sources.
 - ▶ Deviation of 2014 values from targets set in NREAP trajectories.
 - ▶ Comparing actual shares of RES-H in heat consumption to 2020 targets.



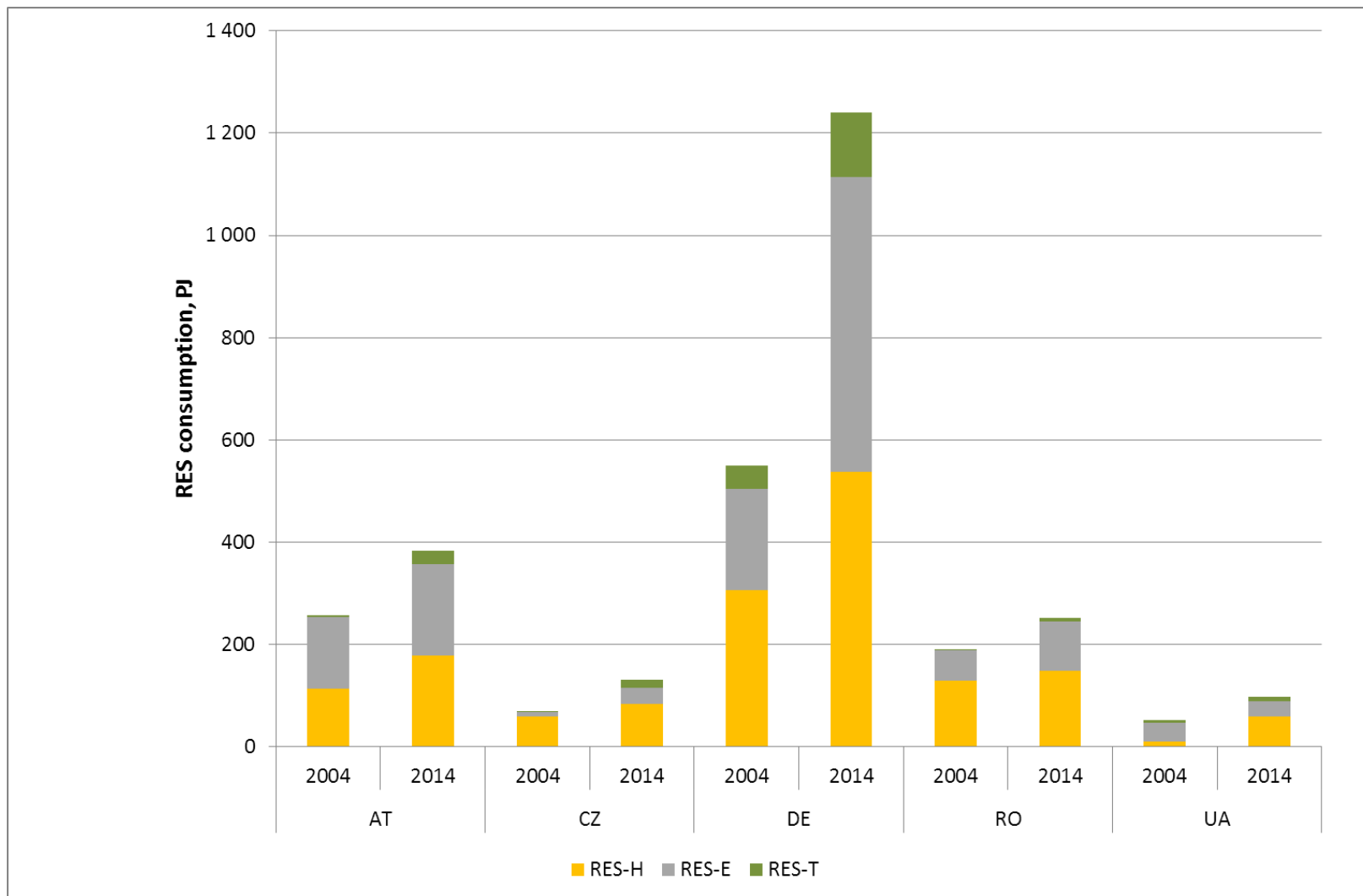
Results - Task I.



RES-H, RES-E and RES-T consumption in 2004 and 2014, PJ



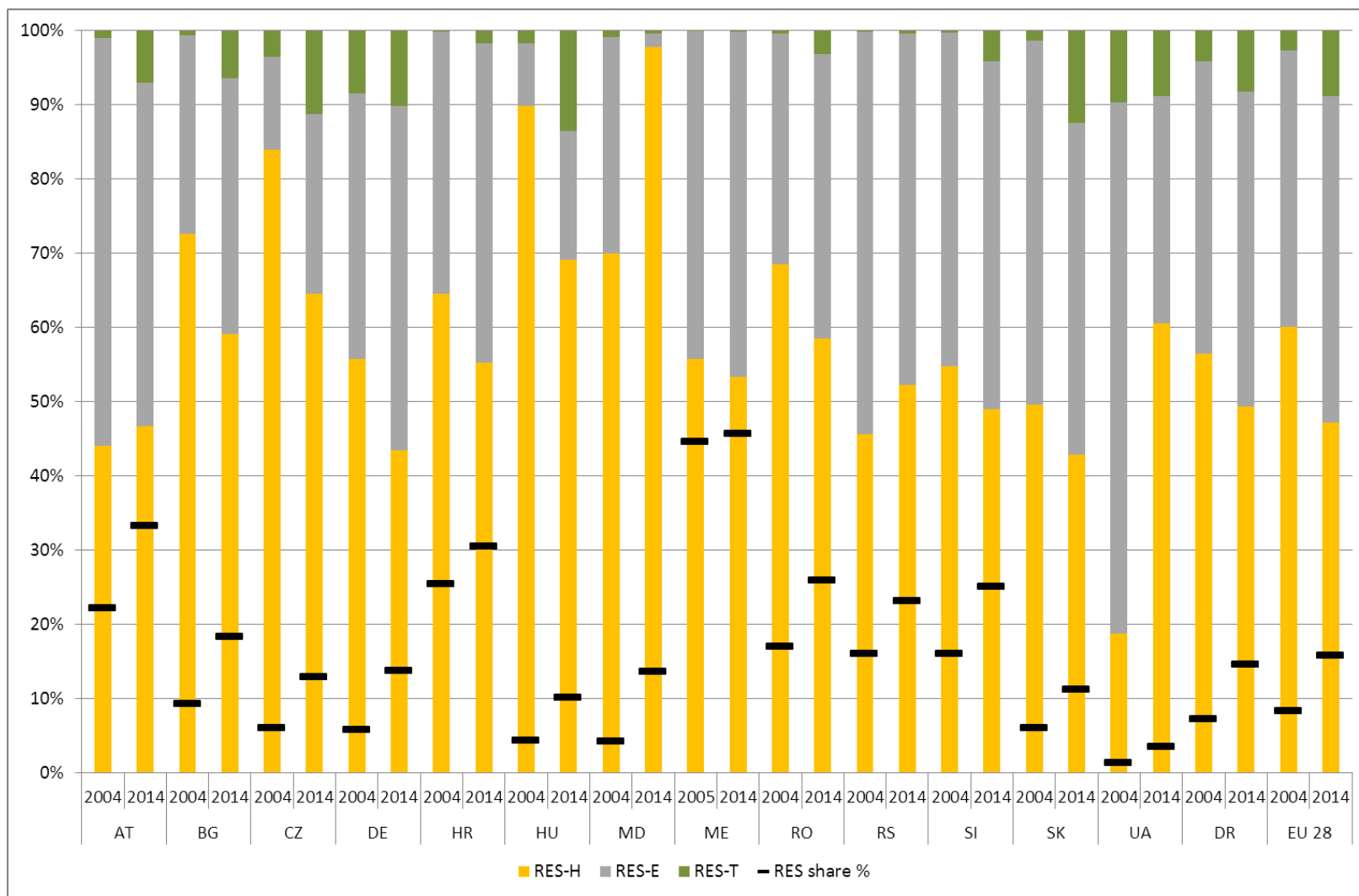
RES-H, RES-E and RES-T consumption in 2004 and 2014, PJ



RES-H, RES-E and RES-T consumption in 2004 and 2014, PJ

- Renewable energy consumption increased in all countries in the period 2004-2014, basically in all renewable energy sectors.
- One exception is Montenegro - data retrieved from Eurostat is not consistent with the data published in their NREAP, probably due to differently classifying biomass-based household heating.
- Renewable heat consumption contributed to the increase of RES use to a large extent, the only country where RES-H utilization decreased is HR (and ME).

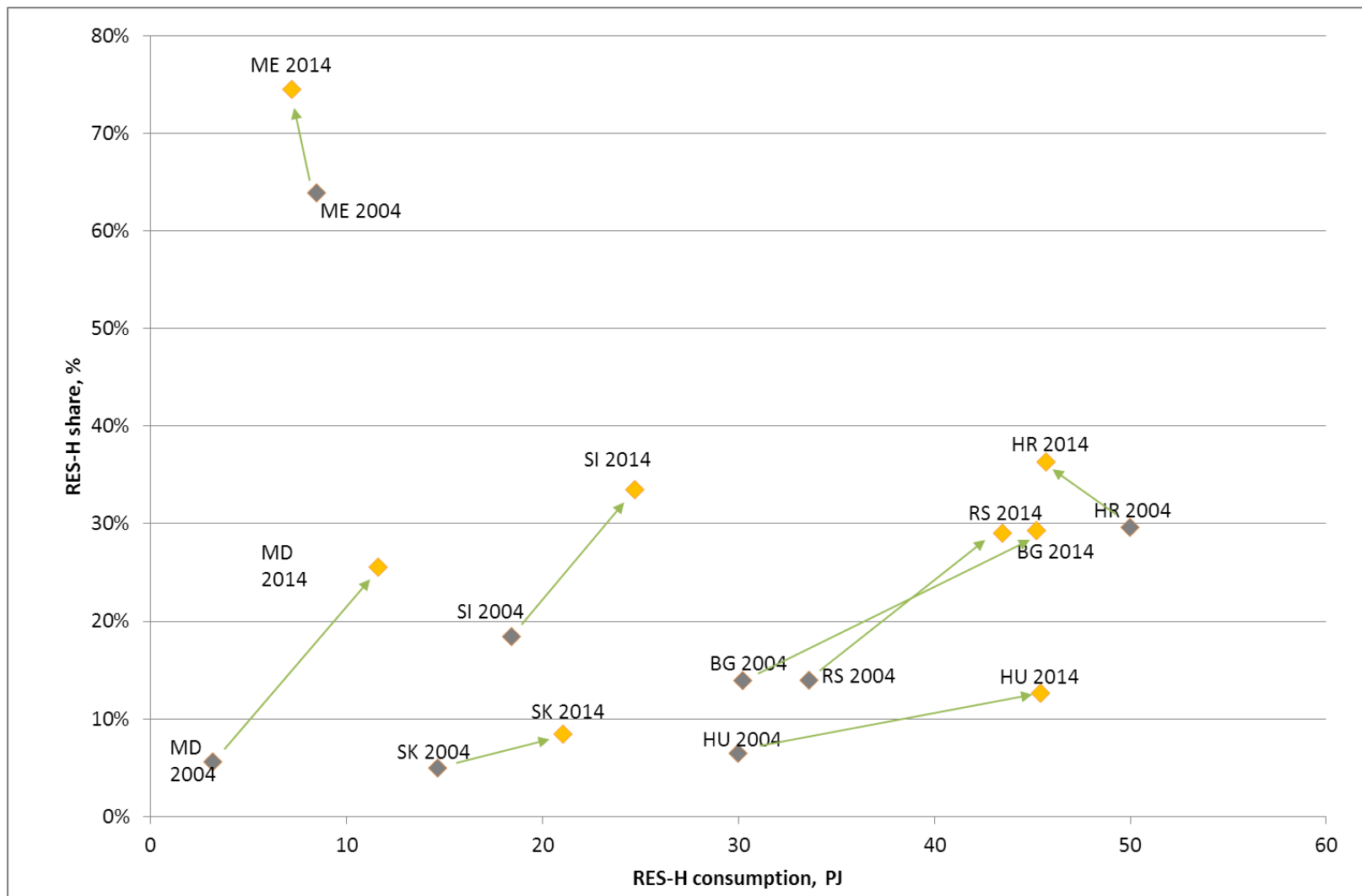
Contribution of RES-H, RES-E and RES-T to total RES consumption, and overall RES share, 2004 and 2014



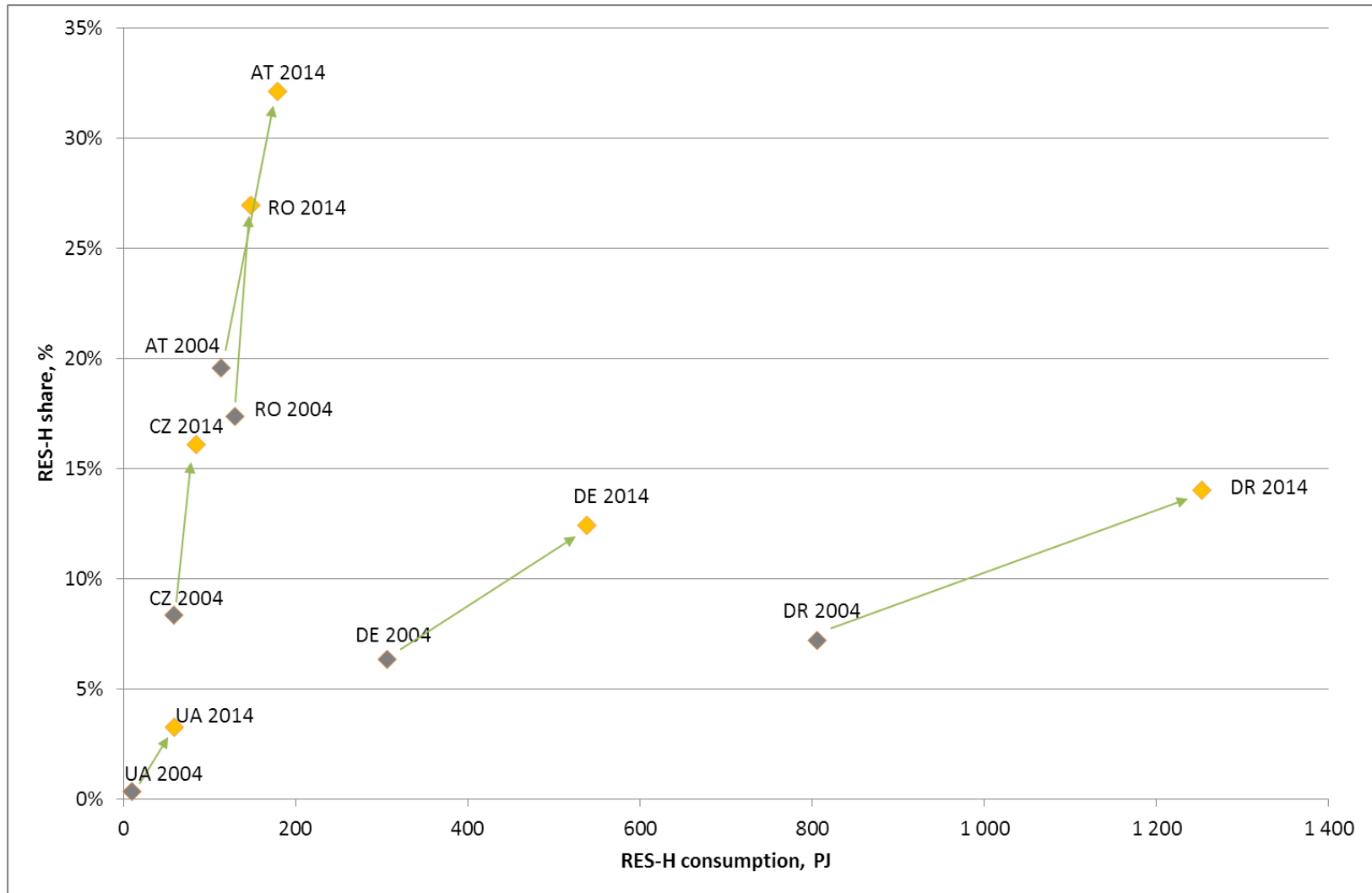
Contribution of RES-H, RES-E and RES-T to total RES consumption, and overall RES share, 2004 and 2014

- Except for AT, DE, SI and SK renewable heat provides the majority of renewable energy in DR countries.
- However, the contribution of RES-H compared to the two other sectors have decreased in almost all countries in the last 10 years, except AT, MD, RS, UA.
- Overall, in the DR countries the share of RES-H decreased, while RES-T and RES-E use expanded, although to a smaller extent than in the countries of the EU28.
- The overall RES share increased in all countries, being the highest for AT and HR (in case of ME data inconsistencies might have led to the high value).

Consumption and share of RES-H, 2004 and 2014



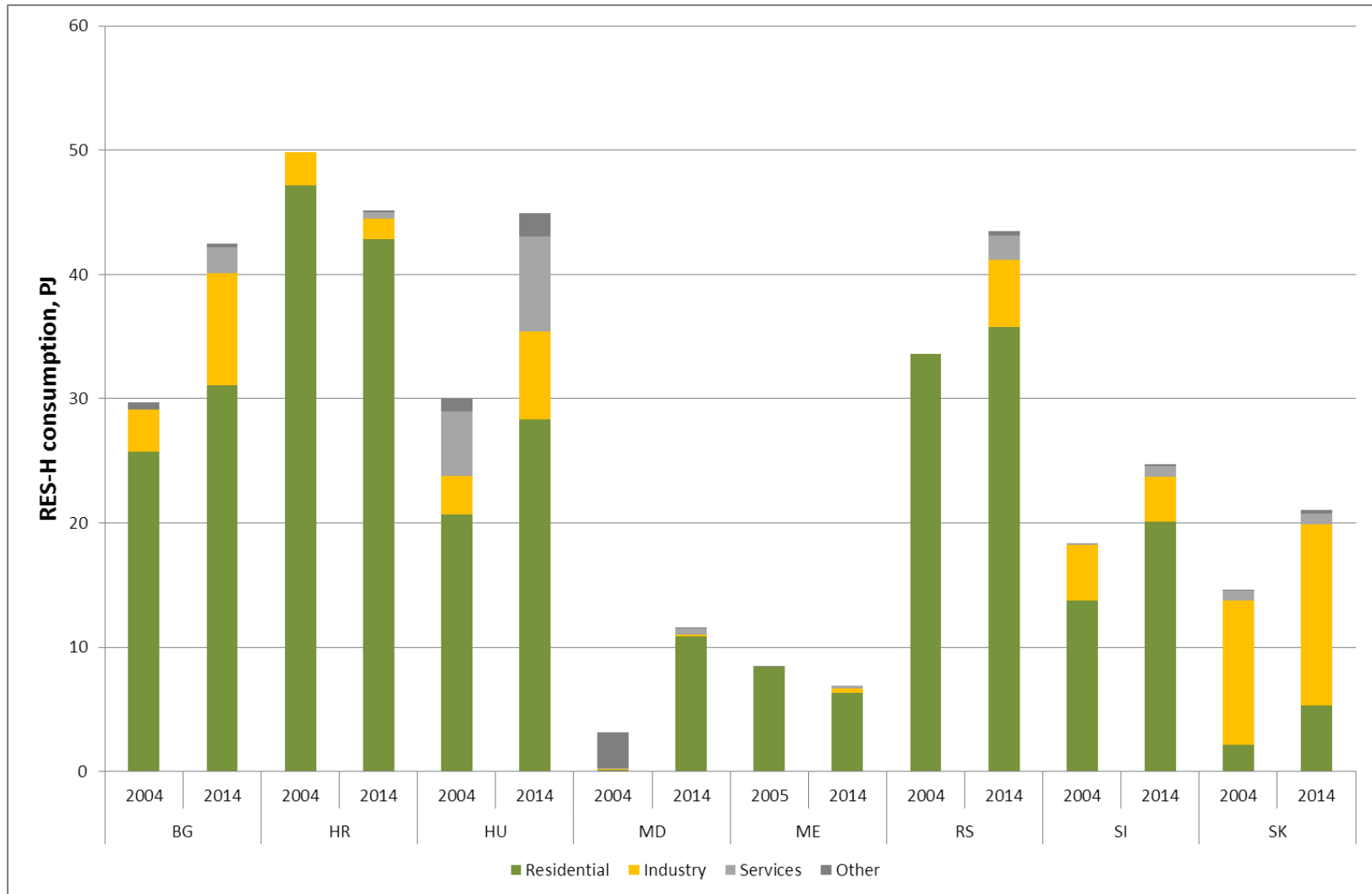
Consumption and share of RES-H, 2004 and 2014



Consumption and share of RES-H in 2004 and 2014

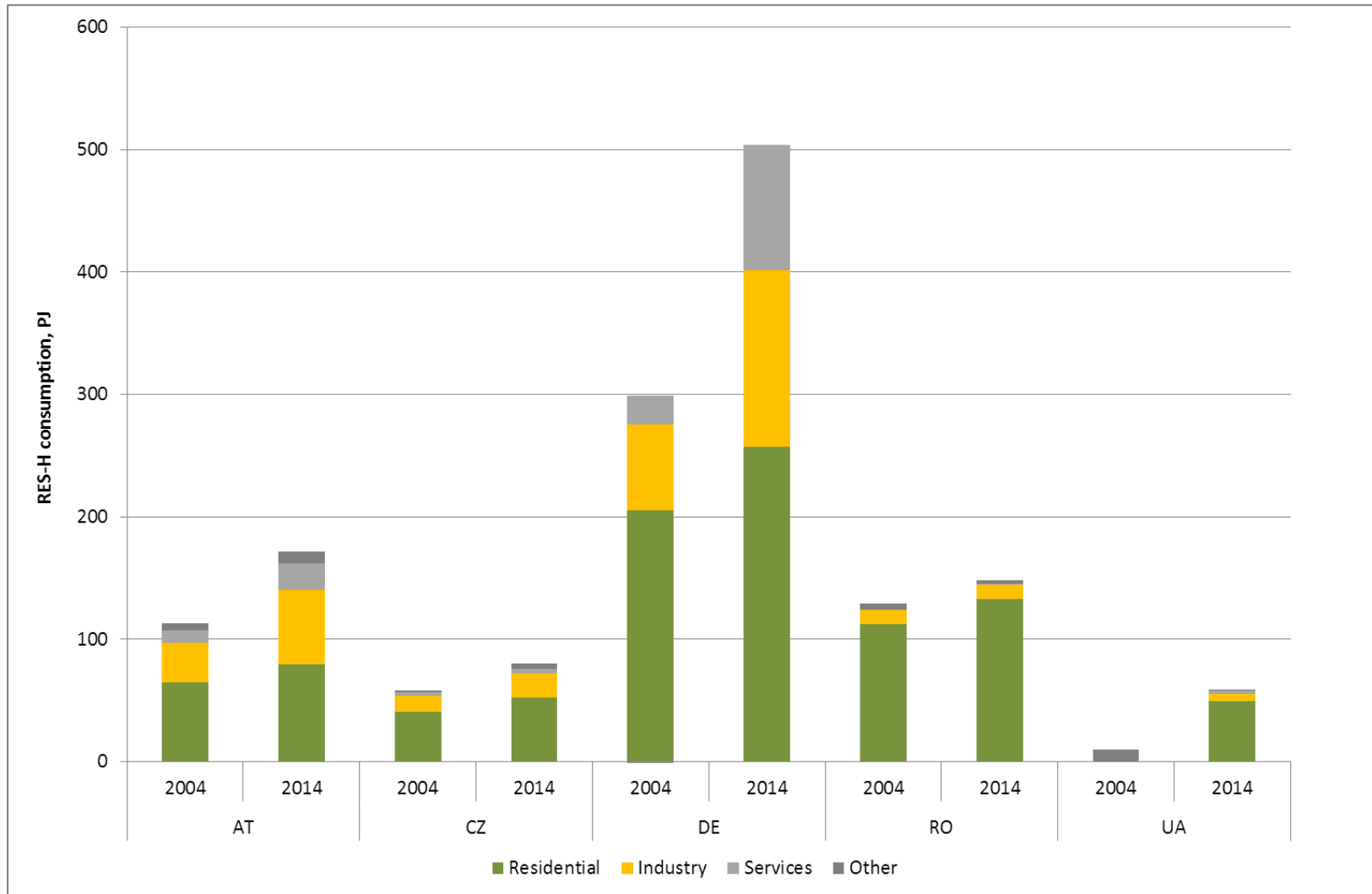
- The share of renewable heat in consumption increased in all DR countries, although in some of them this went together with a drop in consumption (ME, HR).
- The share of renewable heat in overall heat consumption reached 14% in DR countries altogether.
- RES-H utilization expanded by more than 200 PJ in the period 2004-2014 in the DR region.

RES-H consumption by sectors in 2004 and 2014, PJ



Note: Losses and own consumption are excluded. Consumption of renewable DH is estimated based on shares in total DH use.

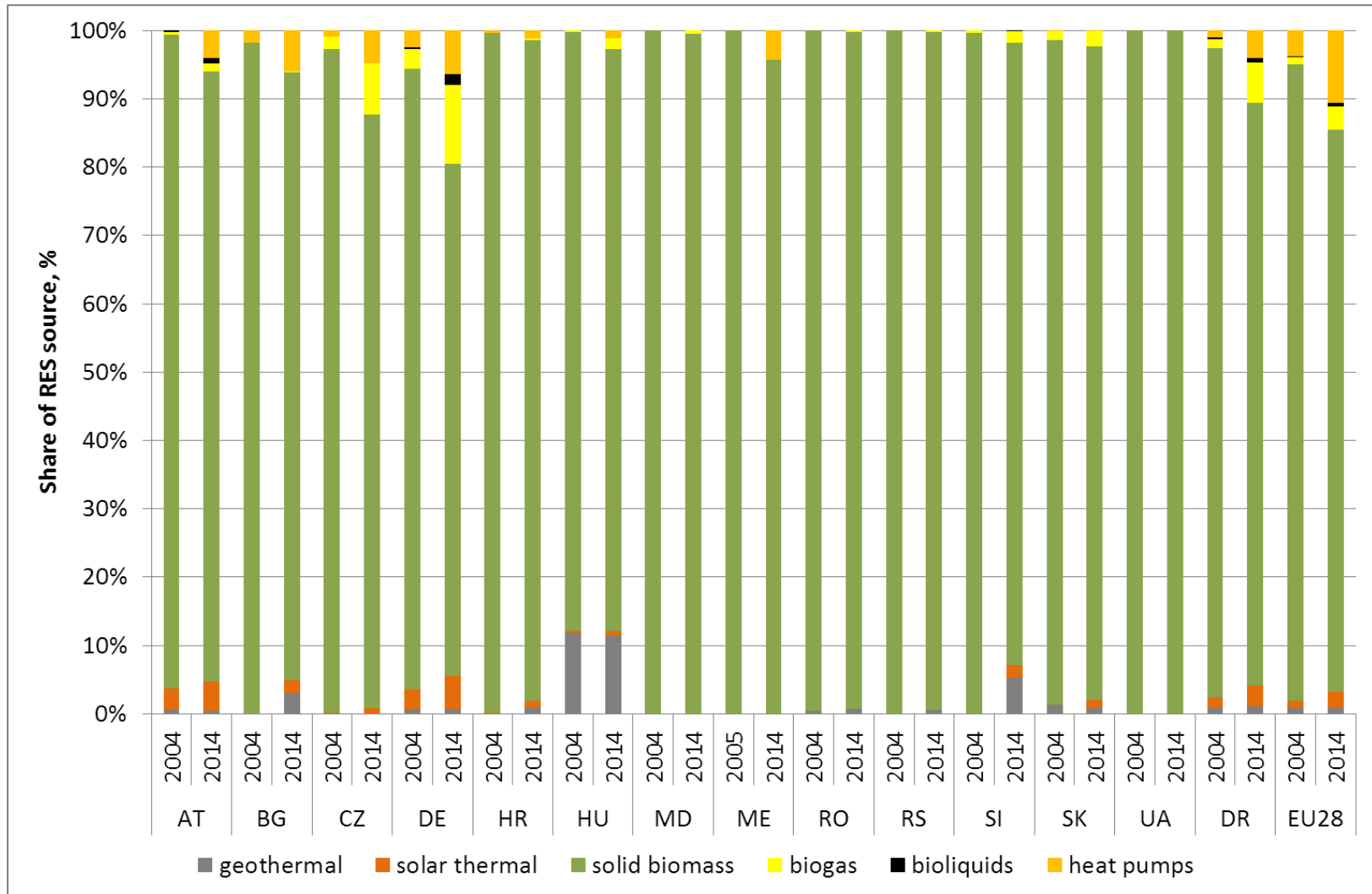
RES-H consumption by sectors in 2004 and 2014, PJ



Note: Losses and low efficiency are excluded. Consumption of renewable DH is estimated based on shares in total DH use.

- The residential sector is the largest consumer of renewable heat in most of the DR countries with growing importance (except in HR and ME).
- Industry plays a major role in Slovakia, while in Austria and Germany services also utilize a growing amount of heat based on renewables.
- The amount demanded by other sectors increased in most countries during the last 10 years.

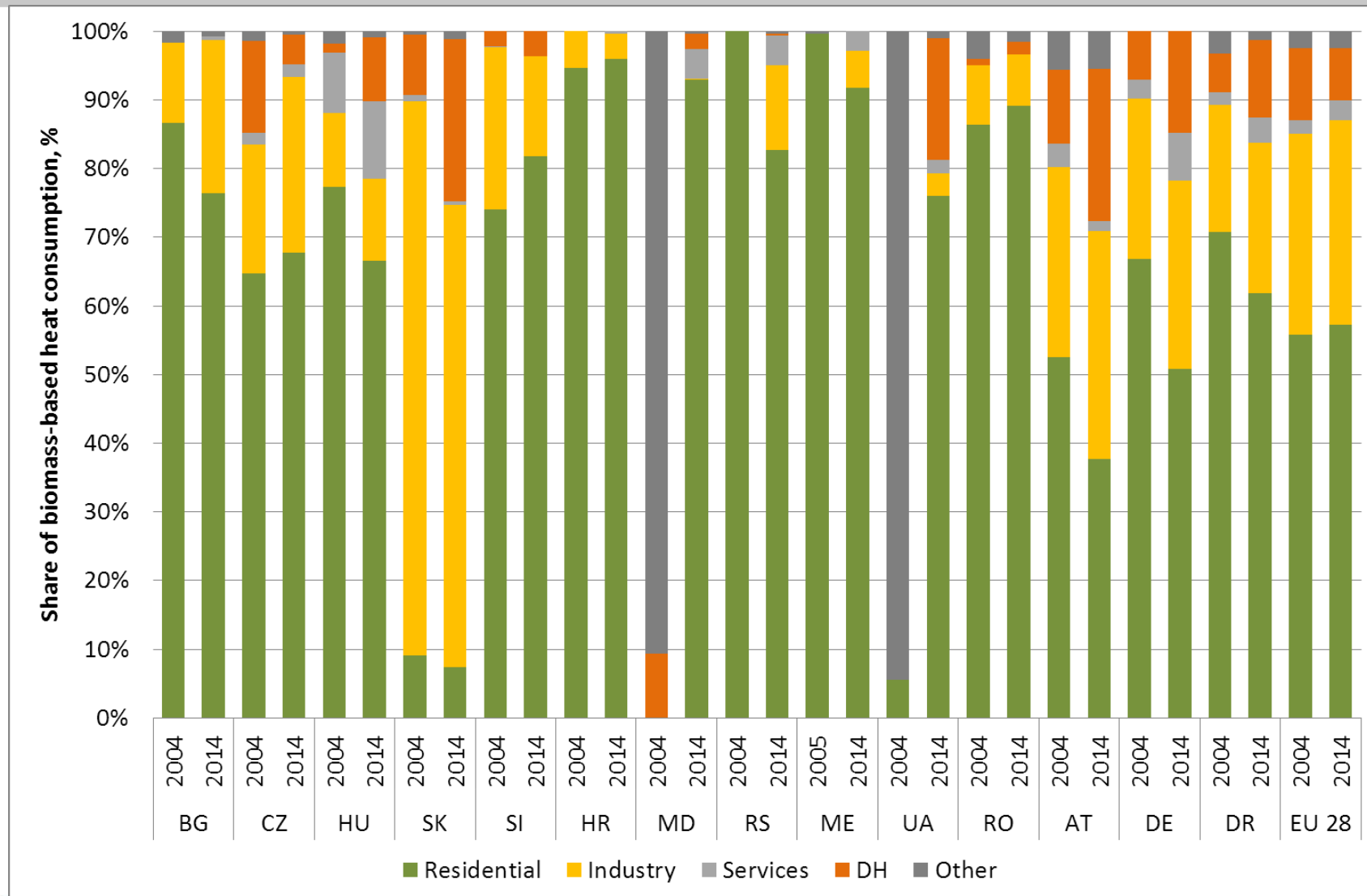
Contribution of renewable energy sources to RES-H consumption, %



Contribution of renewable energy sources to RES-H consumption, %

- Solid biomass is the largest contributor to renewable heat production, its share only declined slightly during the last 10 years.
- Heat-pumps, biogas-based heat and solar thermal heat play some role in AT, CZ and DE.
- Geothermal heat has more than 10% contribution in Hungary.
- Overall, DR countries rely more on biomass in producing heat than countries of the EU (85% versus 83%), while the consumed biomass-heat amount increased by 38% in the DR region compared to 16% in EU28 during 2004-2014.

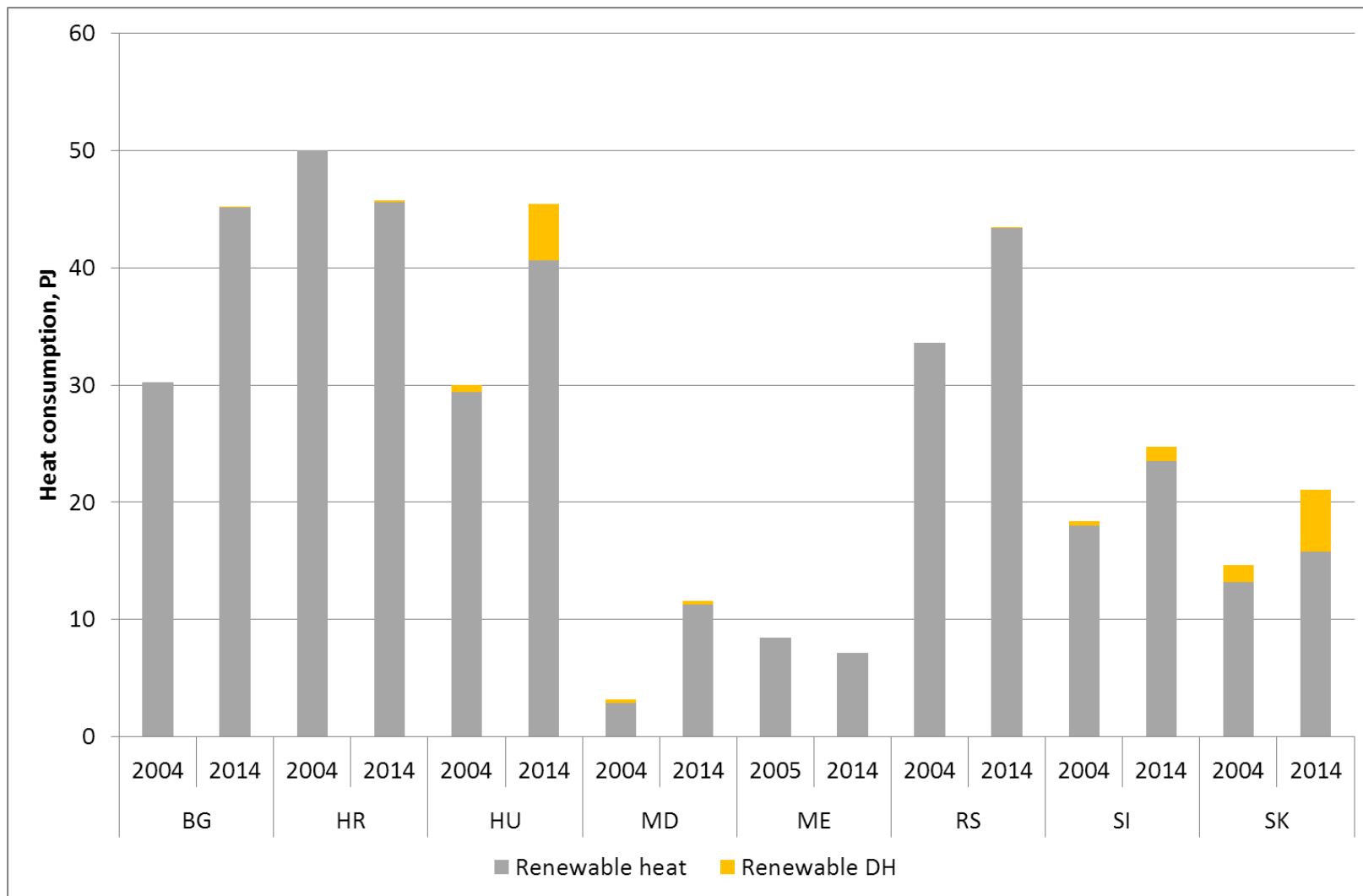
Biomass-based heat consumption by sectors, %, 2004 and 2014



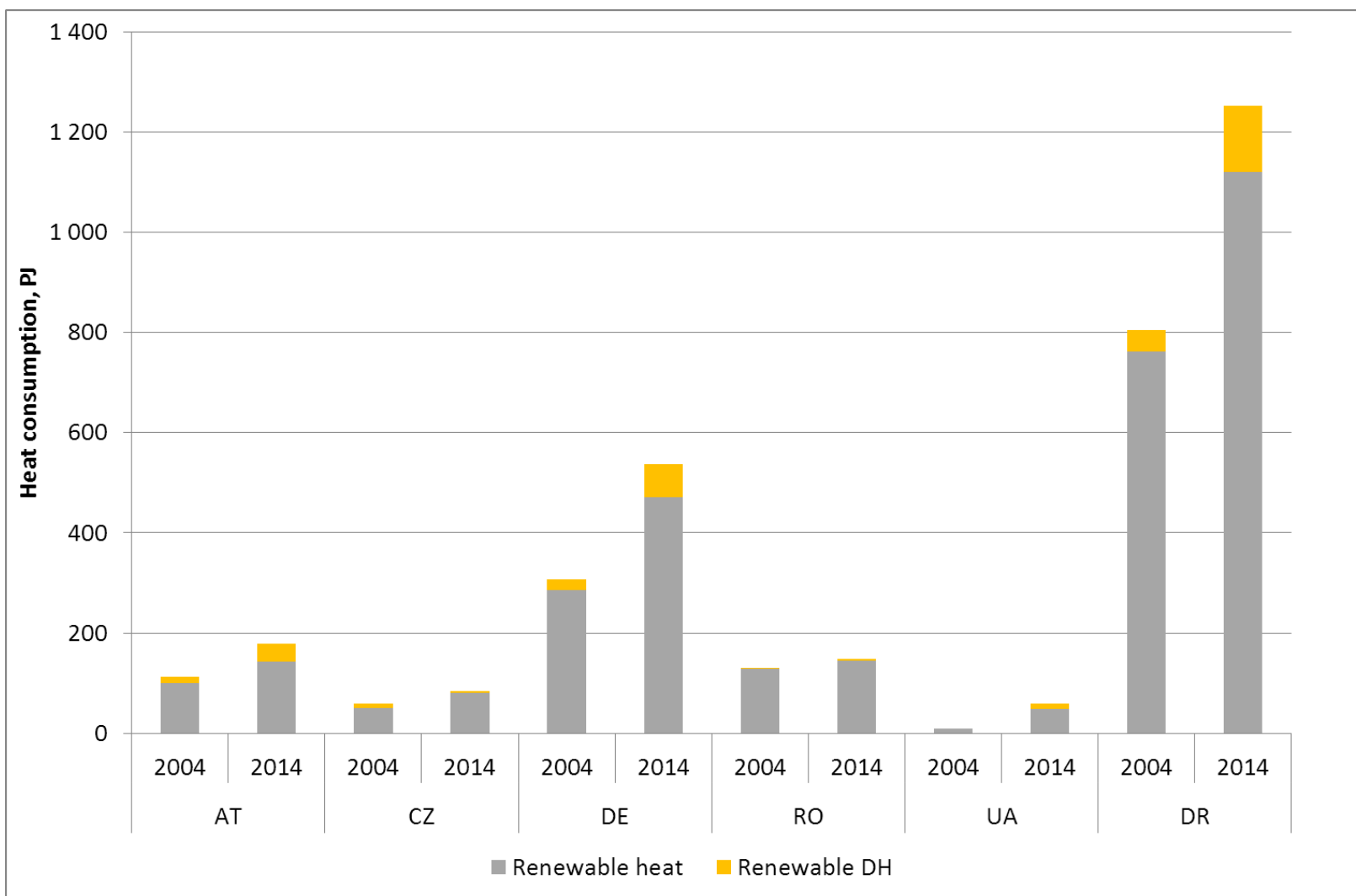
Biomass-based heat consumption by sectors

- When looking specifically at the biomass-based heat consumption, a similar pattern to overall consumption can be observed.
- Most of the heat from biomass is utilized by households except for SK, AT and DE.
- Biomass is used for providing district heat in a growing amount in AT and DE and SK, while in CZ its importance in DH supply decreased.
- The large share of ,other' sectors in year 2004 for MD and UA is probably due to lack of properly classified data provided for Eurostat.
- Although the importance of household consumption decreased in the DR region as opposed to EU28, its share was still above 60% in 2014.

Role of district heating (DH) in renewable heat consumption, 2004 and 2014, PJ

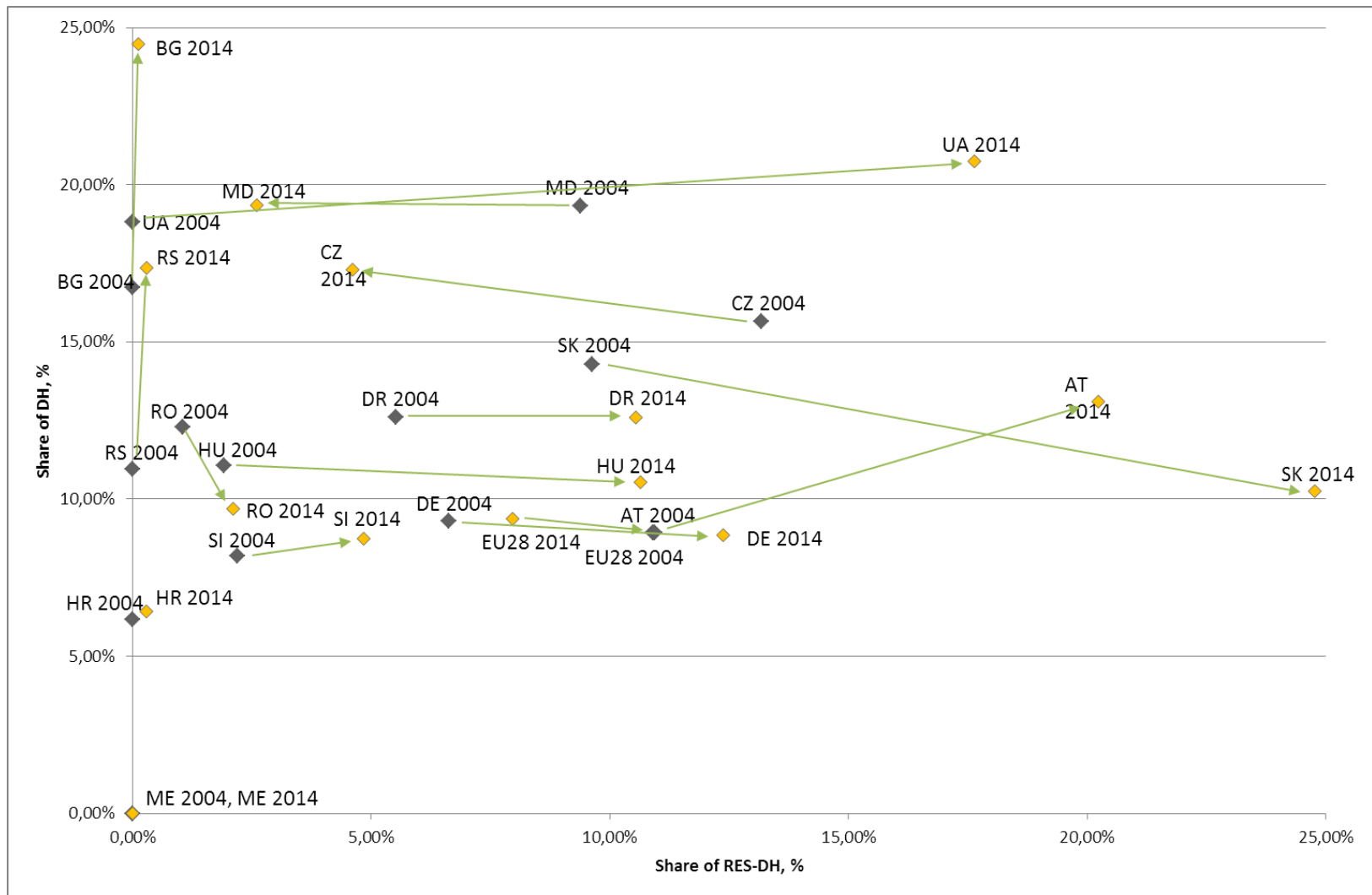


Role of district heating (DH) in renewable heat consumption, 2004 and 2014, PJ



- Renewable energy used in district heating increased from 44 to 132 PJ in the DR region in the period 2004-2014.
- The share of renewable DH in all renewable heat supply is quite small, however it increased from 5,5% to 10,5% in the DR region, as opposed to a 3% decrease (from 11 to 8%) in the EU28.
- The increase is attributable mainly to HU, SK, SI, AT and DE.

Role of DH in total and in renewable heat supply, 2004 and 2014, %



Role of DH in total and in renewable heat supply, 2004 and 2014, %

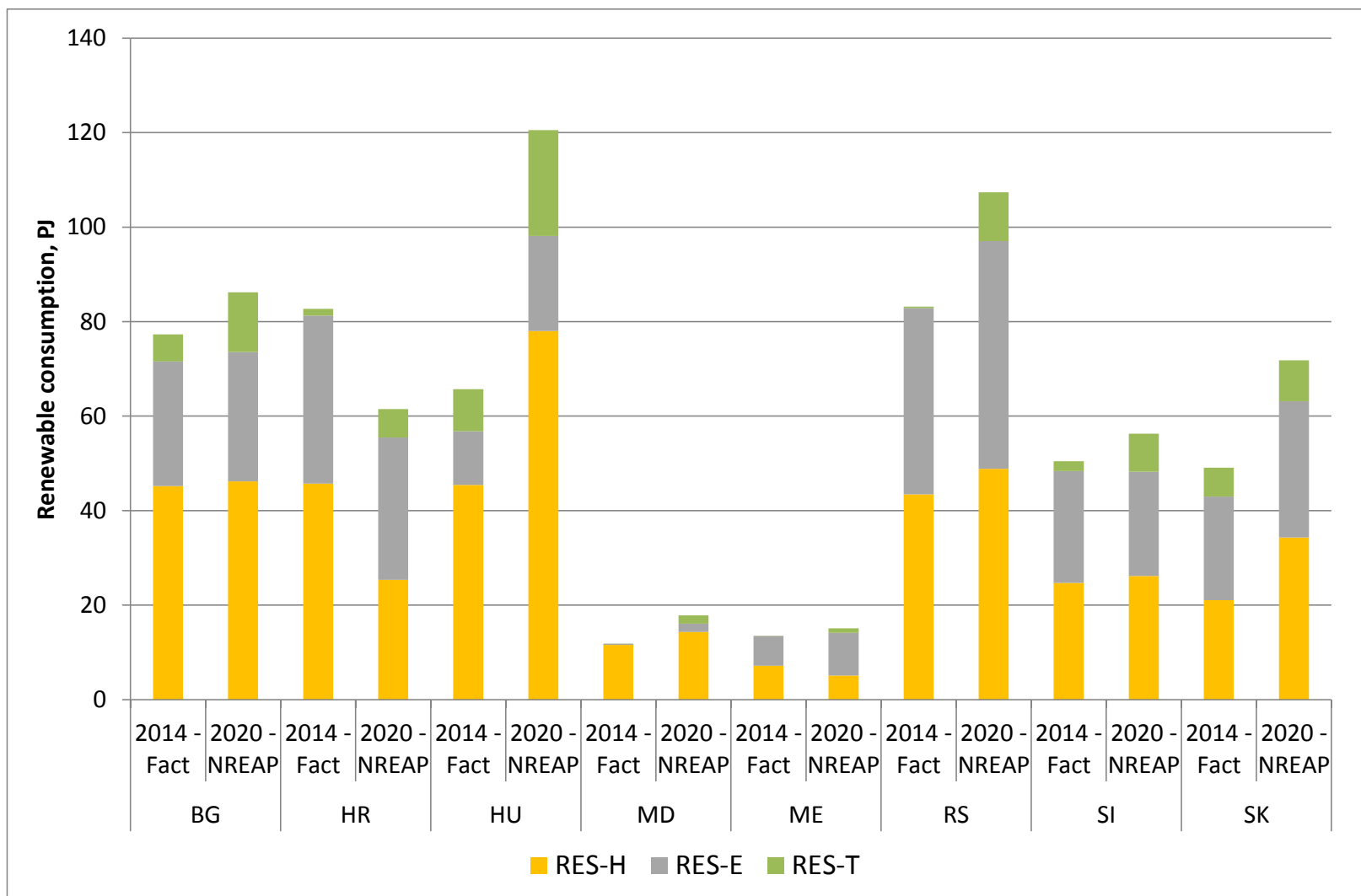
- The share of renewables in DH increased in most DR countries, except in MD and CZ, in spite of the fact that the overall DH share remained approximately the same in the DR region, increasing only in about half of the countries.
- In the EU28 an overall decrease in DH utilization is observable, although increasingly sourced from renewables.
- The importance of renewable DH is rather small in Montenegro (no DH), Serbia, Croatia and Bulgaria, while in Ukraine the share of renewable DH increased from 0 to 18% in the last 10 years.
- Slovakia increased its renewable DH supply by 15% in the last 10 years.



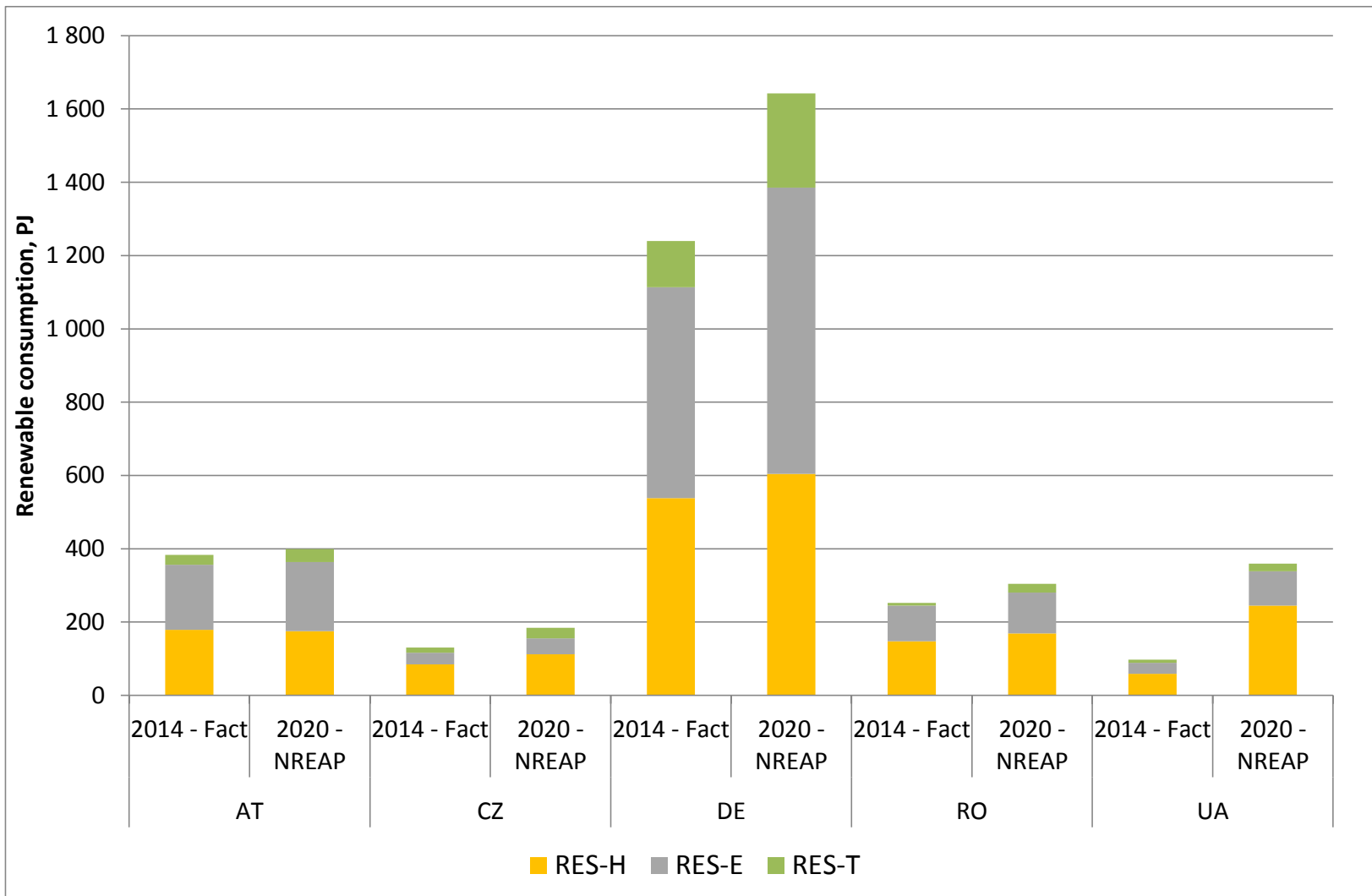
Results - Task II.



RES consumption by sectors, actual versus targets, PJ



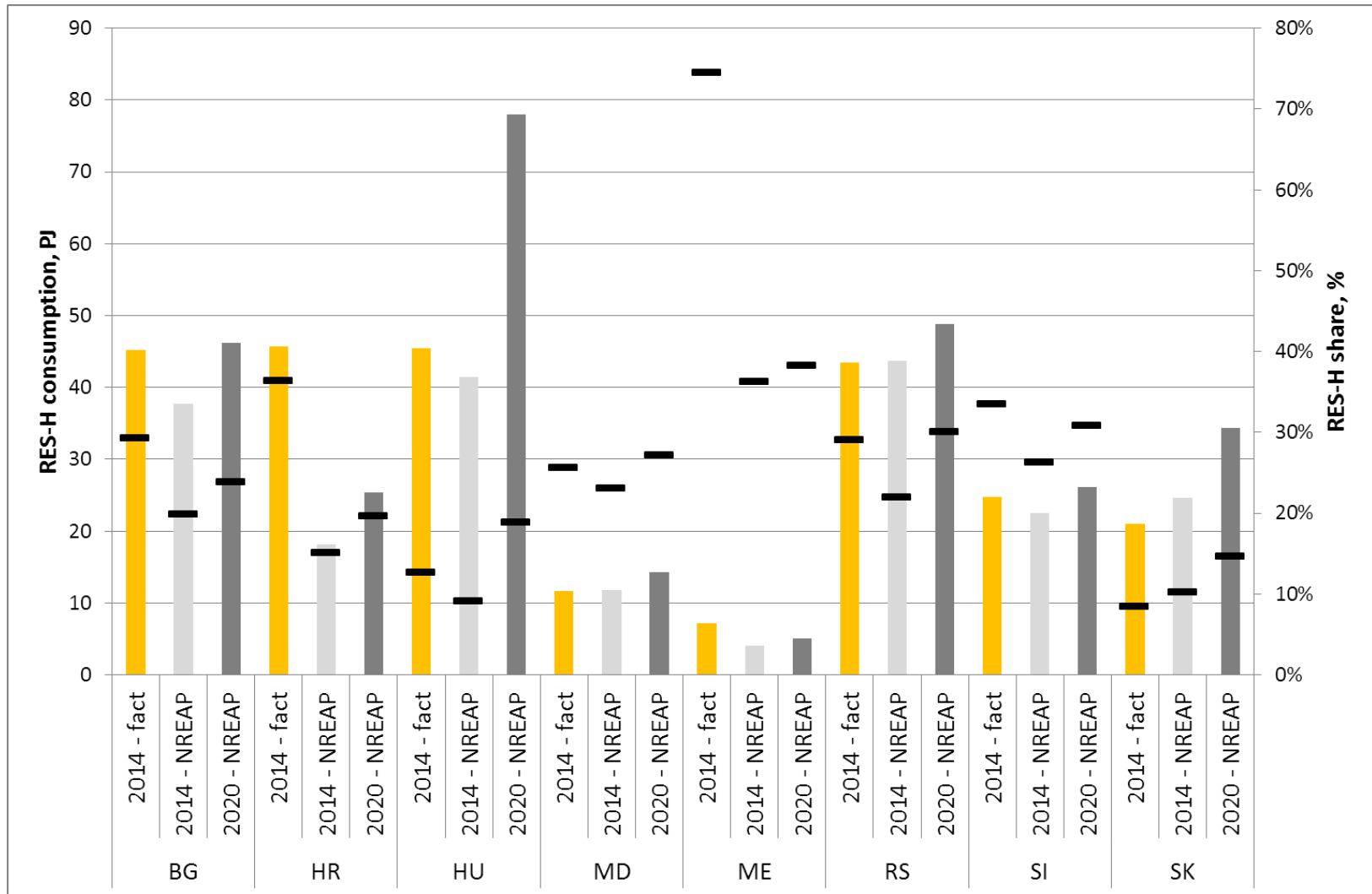
RES consumption by sectors, actual versus targets, PJ



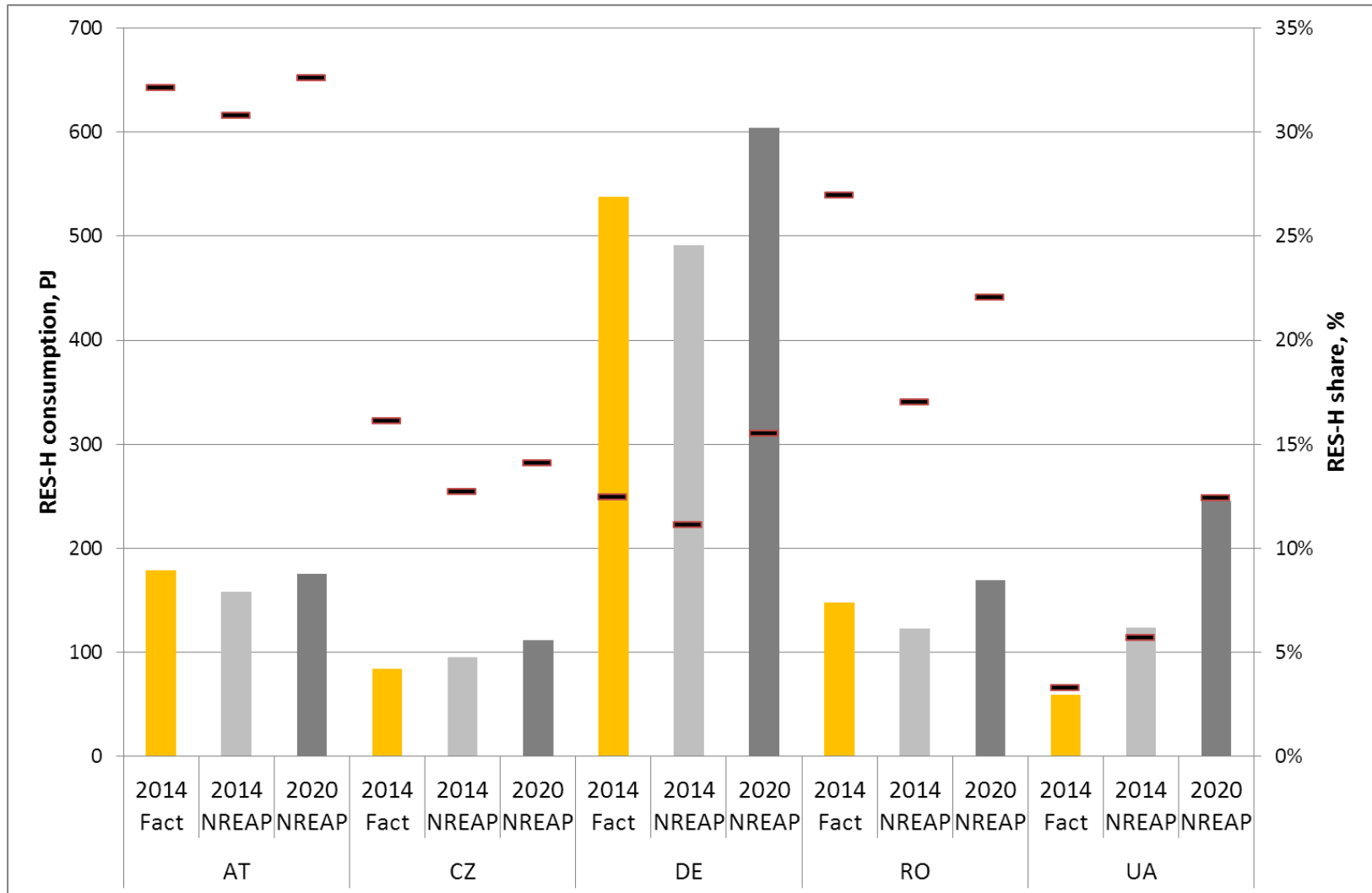
2020 TARGETS IN THE THREE MAIN SECTORS

- Overall RES targets:
 - Only Croatia can meet the 2020 target by 2014
 - In Germany a very sharp increase in RES consumption is needed, both in absolute and relative term.
 - Also in Hungary and Ukraine have to double the present RES consumption.
- RES-H and RES-E give the majority of RES consumption regarding both the present use and the targets.
- RES-H targets:
 - In most countries a moderate RES-H growth is enough to meet the RES-H consumption target, except for Ukraine and Hungary.

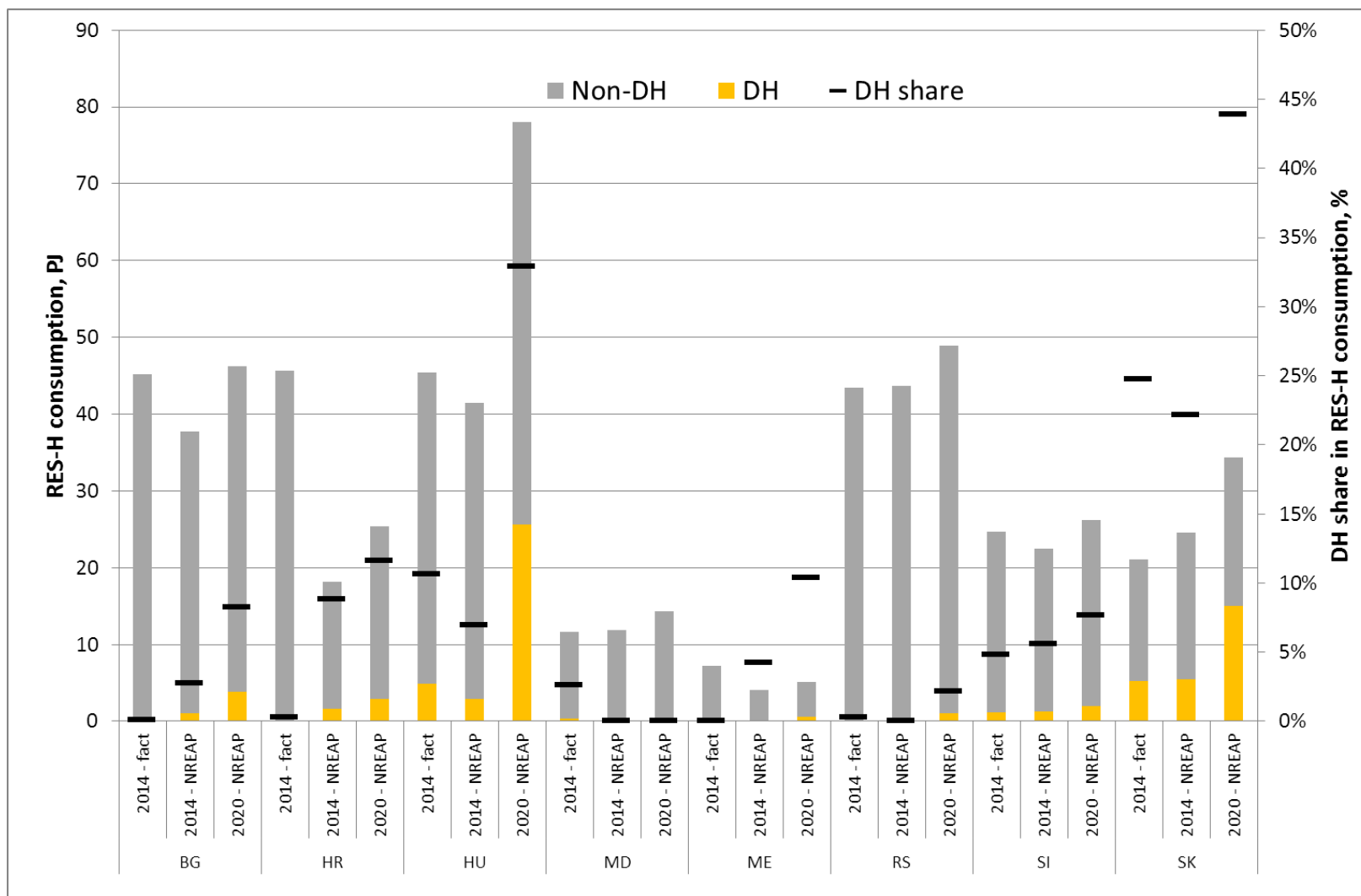
RES-H consumption and share, actual and targeted values, PJ



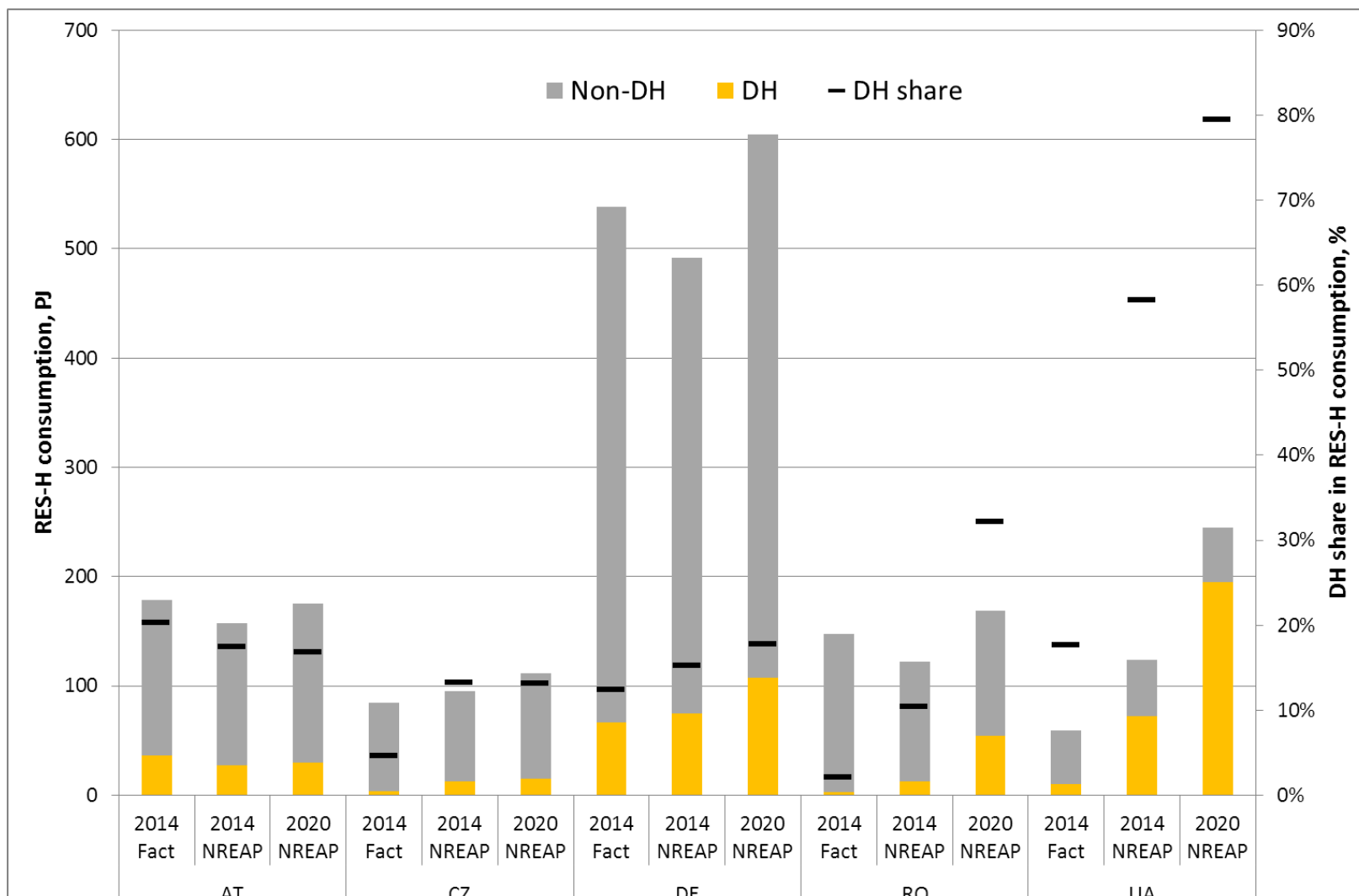
RES-H consumption and share, actual and targeted values, PJ



Renewable DH and other renewable heat consumption, actual and targeted values, PJ

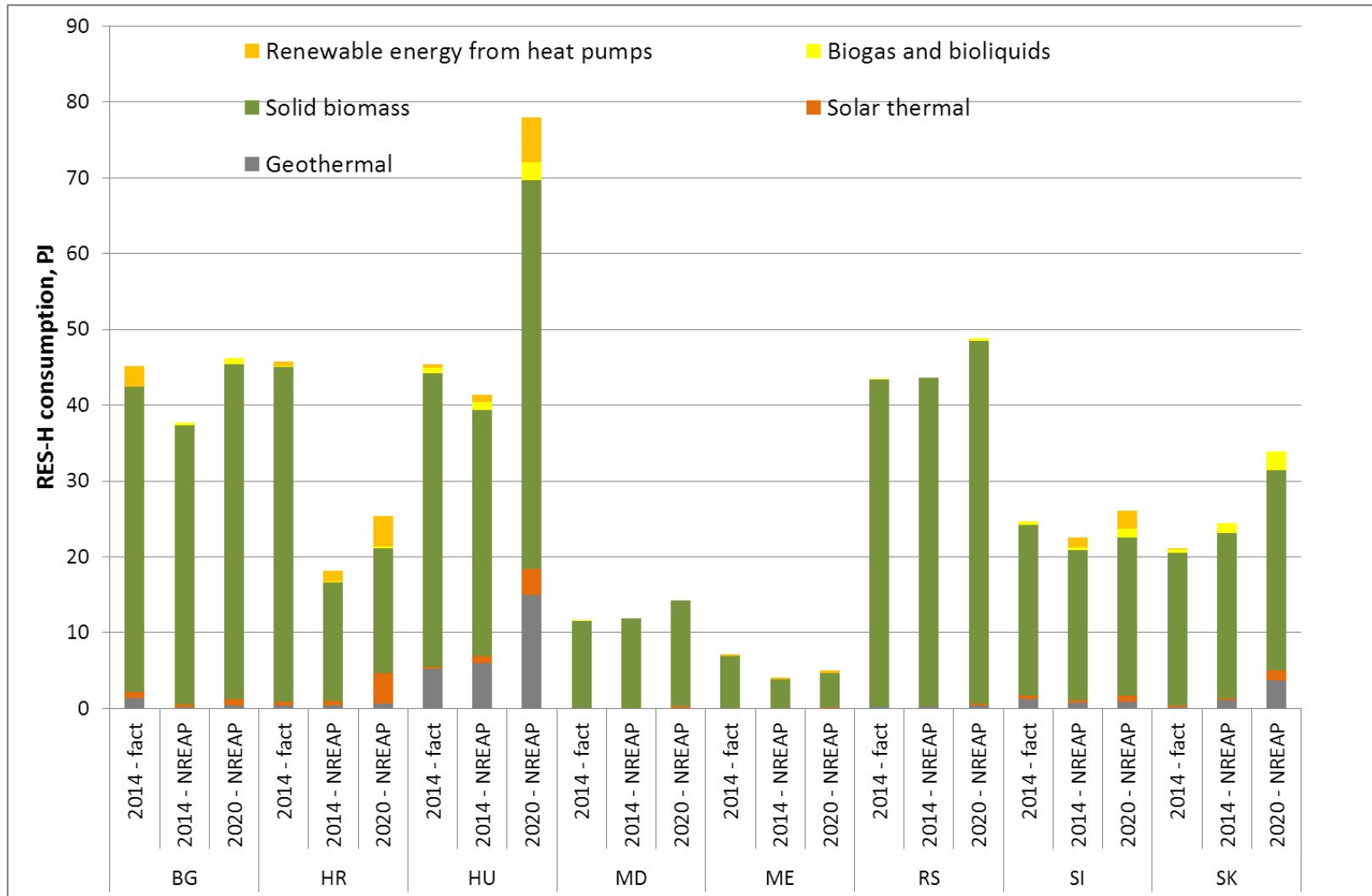


Renewable DH and other renewable heat consumption, actual and targeted values, PJ

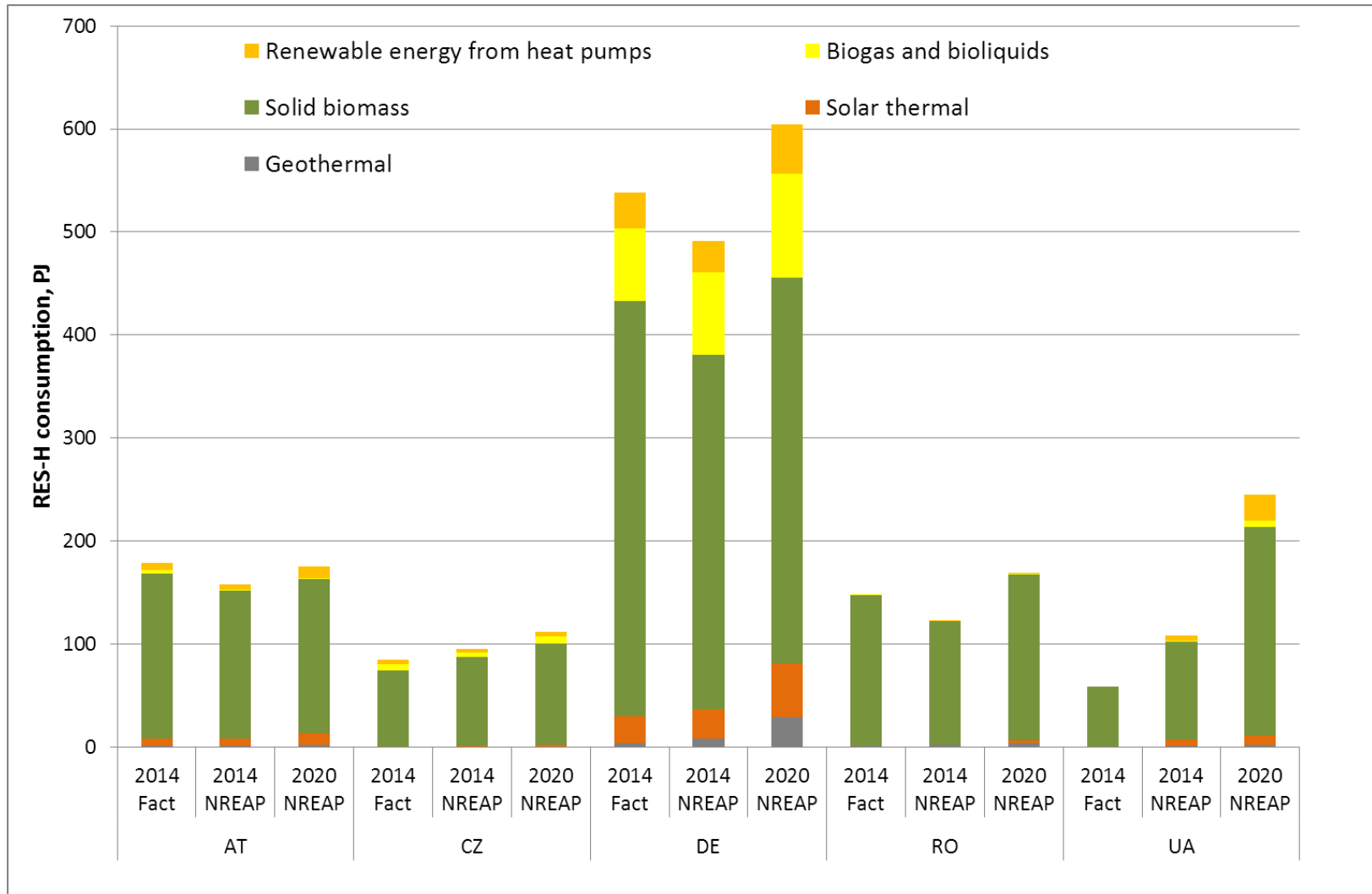


- The majority of the RES-H comes from individual heating modes in 2014
- However, in the NREAPs we see that DH has an important role
- The interim RES-H target for 2014 is 1194 PJ, while the RES-H consumption in 2014 was 1252 PJ (almost 5 % higher than the target)
- However, the 2020 target is 1583 PJ, meaning that a 25 % increase is necessary to meet the 2020 RES-H target in absolute term
- Growing role of RES-DH:
 - ▶ According to the latest data the DH share compared to the total RES-H consumption (11%) is less than the interim target (18%)
 - ▶ As regards the 2020 target, a much higher share, almost 30 % of the total RES-H consumption should come from district heating

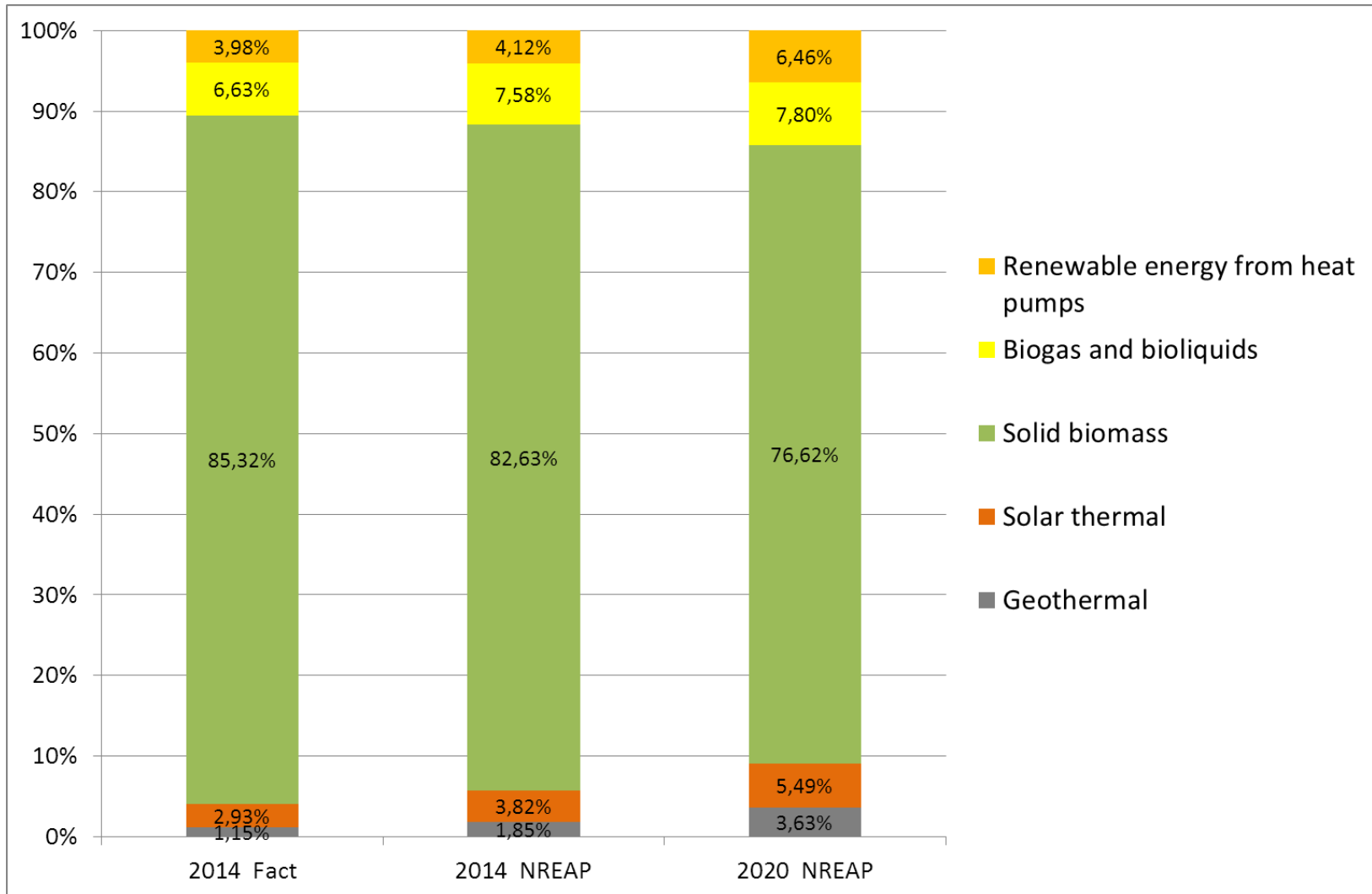
RES-H consumption by renewable source, actual and targeted values, PJ



RES-H consumption by renewable source, actual and targeted values, PJ



RES-H distribution by fuel in DR countries in 2014 (fact) and the targets for 2014 and 2020, %



RES-H distribution by fuel in DR countries

- In 2014 the majority of RES-H consumption was based on solid biomass in DR (85 %).
- The share of biogas and bioliquids is less than 7 %, while the rest was produced by heat pumps (4 %), solar thermal (2.9%) and geothermal (1.1%) installations.
- However, according to the NREAPs, the vision set for 2014 is somewhat less focused on biomass.
- Biomass share was expected to be 82.6 % in 2014, decreasing to 76% by 2020.

- RES-H gives the 66 % of the RES consumption in 2014 in DR countries
- RES-H in DR countries is dominated by biomass as a source, mostly utilized by households.
- According to the NREAPs, RES consumption growth should mainly come from the electricity sector
- NREAPs vision:
 - Higher role of DH
 - Less biomass dominance (but still very significant in 2020 -> 76 %)