Implementation of energy efficiency strategies in EU countries compared to Southeast and East European countries

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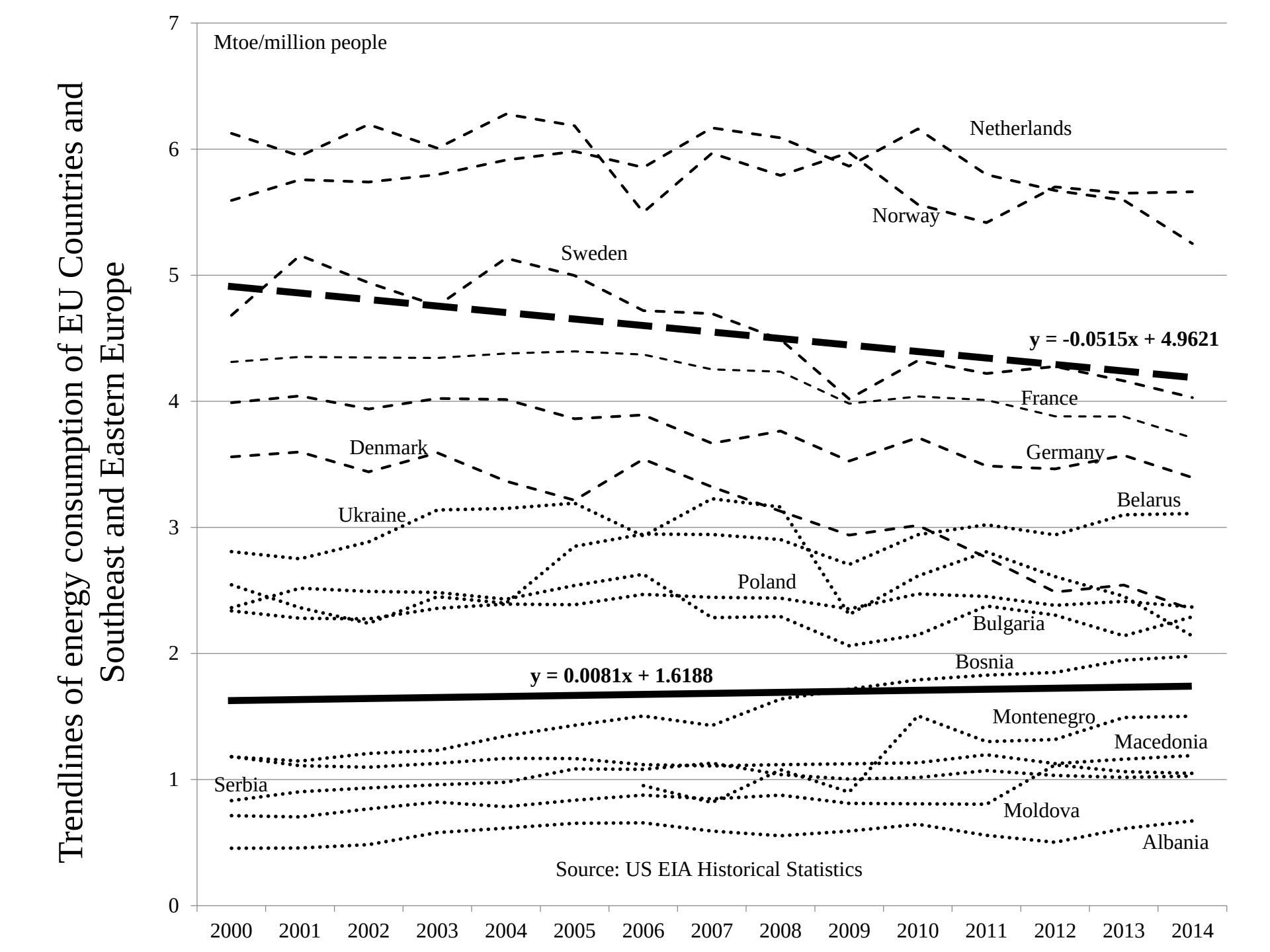

Trendlines of energy consumption of EU Countries and Southeast and Eastern Europe
Mtoe/million people
7
6
5
4
3
2
1
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Netherlands
Norway
Sweden
y = -0.0515x + 4.9621
France
Germany
Denmark
Belarus
Ukraine
Poland
Bulgaria
Bosnia
y = 0.0081x + 1.6188
Montenegro
Macedonia
Serbia
Moldova
Albania
Source: US EIA Historical Statistics

Potential for deep renovation in Serbia

- A deep renovation (DR) reduces energy consumption compared to pre-renovation levels both in the short and the long term, by typically more than 60%
- The Serbian Law on energy efficiency introduced in 2013 defines the energy efficiency obligation schemes. This regulation requires commercial and industrial buildings that consume more than 1,000 toe (equivalent to 41.87 TJ or 11.63 GWh) to introduce an energy management system.
- Municipalities with more than 20,000 inhabitants, central government buildings, public buildings with an area larger than 2,000 m^2 and public buildings that consume more than 1,000 toe are also obliged to undertake the measures required by the Law.

Potential for deep renovation in Serbia

- Serbian Law for planning and construction from 2014, and following regulations also strive to regulate the energy efficiency of the buildings by imposing an obligation of obtaining energy certificates for both newly built and reconstructed buildings.
- When developing the strategy for renovation and defining minimum requirements of the energy performance of the existing buildings, the policymakers should consider the two conclusions that can be drawn from the current literature:
  - regardless of the current renovation that brings energy savings of between 15% and 20%, it is possible to achieve energy savings of up to 80% and this potential should be exploited, and
  - the current rate of renovation is not enough and should be increased to at least 3% to achieve energy targets set for 2050.

Barriers for deep renovation implementation in Serbia

Some of the barriers for DR which were recognized by the implemented EU projects:

- High upfront investment costs;
- Uncertainty about post-renovation energy performance and monetary savings;
- Currently low and overall very fluctuating fuel prices;
- Other priorities of owners and tenants;
- **Property owner group involvement in decision-making process;**
- **Insufficient technical skills of supply-side and insufficient knowledge of owners;**

Barriers for deep renovation implementation in Serbia

Furthermore, in developing countries many more barriers occur:

- Poor energy and legal awareness on the part of owners;
- Public procurement and tendering procedure are primarily pushed towards the lowest price;
- Low purchasing power that points forward:
  - High demand for low-priced and low-quality buildings;
  - Poor quality and low price of design work;
  - A low number, price and quality of energy certificates;
- Unsatisfactory capacity building:
  - Insufficient awareness regarding new requirements, measures, construction products, etc.;
  - Inadequate system for the training and achievement of skills required for green professions;
  - Lack of lifelong learning for selected professions (e.g. designers), etc.

Barriers for deep renovation implementation in Serbia

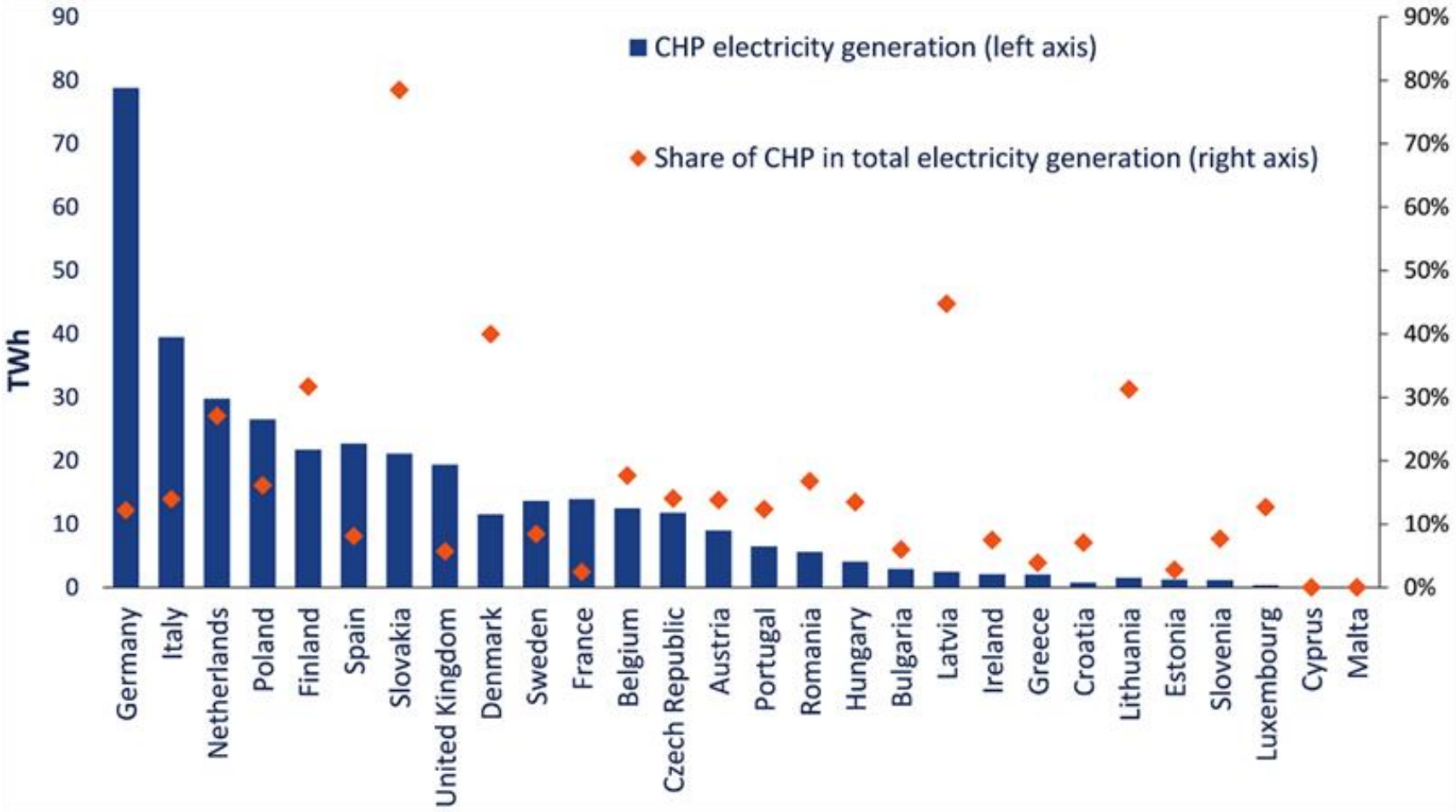
- Lack of motivation for long-term investments
- **Low electricity price**
- **Lack of commitment of politicians** and the avoidance of taking leadership for energy and environmental issues
- All these lead to an **insufficient number of successfully implemented projects** and inadequate education of professionals (designers, engineers, etc) who should be leaders in project implementation.
- **Capacity building is jeopardized**, the motivation for strengthening skills and implementation of new and complex technical solutions is low**.**

Barriers for deep renovation implementation in Serbia

- **Property issues** created in a former period of socialism and ongoing economy transition
  - many illegally built residential buildings, the building is constructed on the entire available area, so it is not possible to make reconstruction because even the smallest changes in building geometry will enter another owner property and
  - bad communication among residents – owners of apartments in multifamily buildings avoid interacting in decision making, joint building maintenance, and all other issues that need residents' agreement.
- Behaviour change concerning the use of district heating

Conclusion

- The significant thermal energy savings can be achieved in educational buildings (on average 68.9% of thermal energy could be saved in primary and secondary schools in the city of Kragujevac) and if the holistic approach of deep renovation is used, the savings could be even higher (with additional electricity savings and RES implementation).
- Policymakers should develop a methodology that would deal with a great number of heterogeneous buildings with various usages. The methodology should try to measure and quantify the joint interactions of building-usage, building physics, building services and the energy management in complex situations in different types of buildings.


CHP electricity generation (left axis)
Share of CHP in total electricity generation (right axis)
TWh
90
80
70
60
50
40
30
20
10
0
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Germany
Italy
Netherlands
Poland
Finland
Spain
Slovakia
United Kingdom
Denmark
Sweden
France
Belgium
Czech Republic
Austria
Portugal
Romania
Hungary
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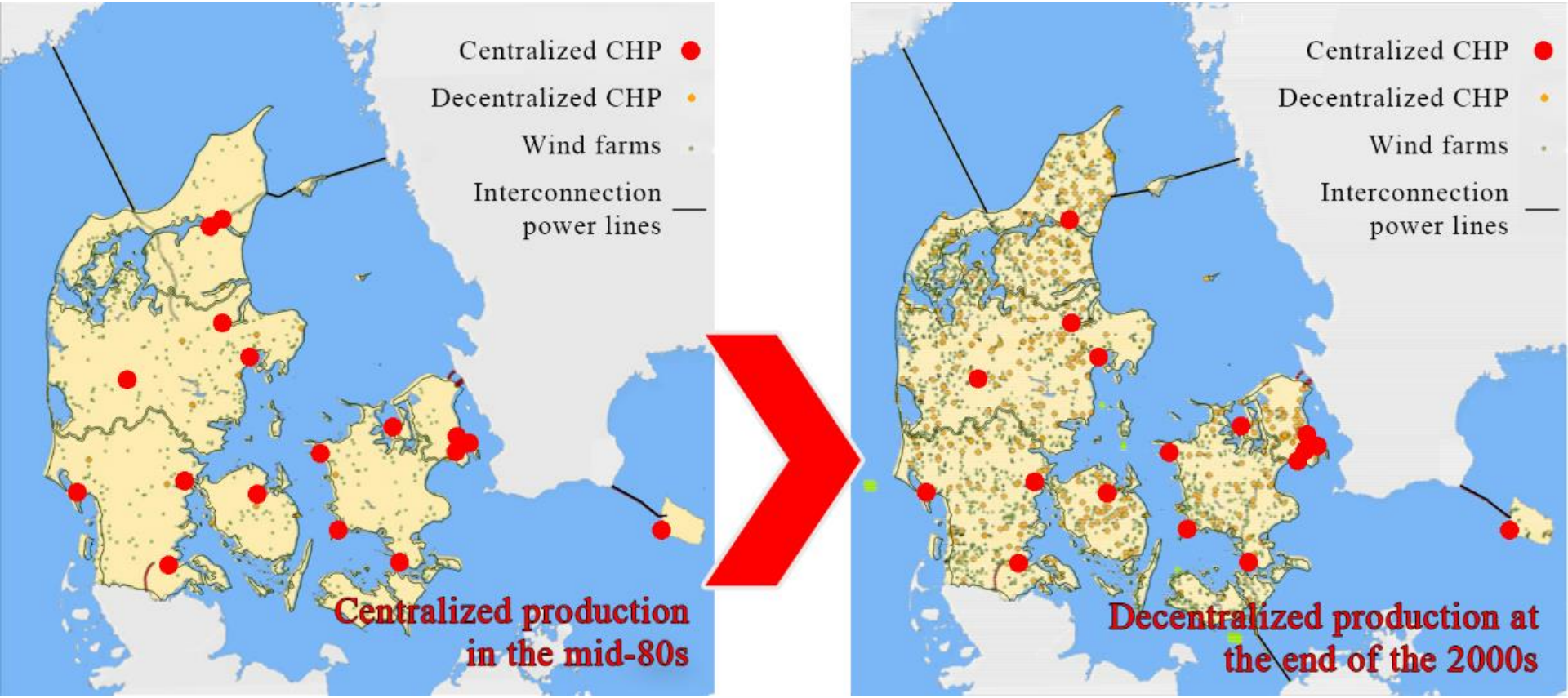
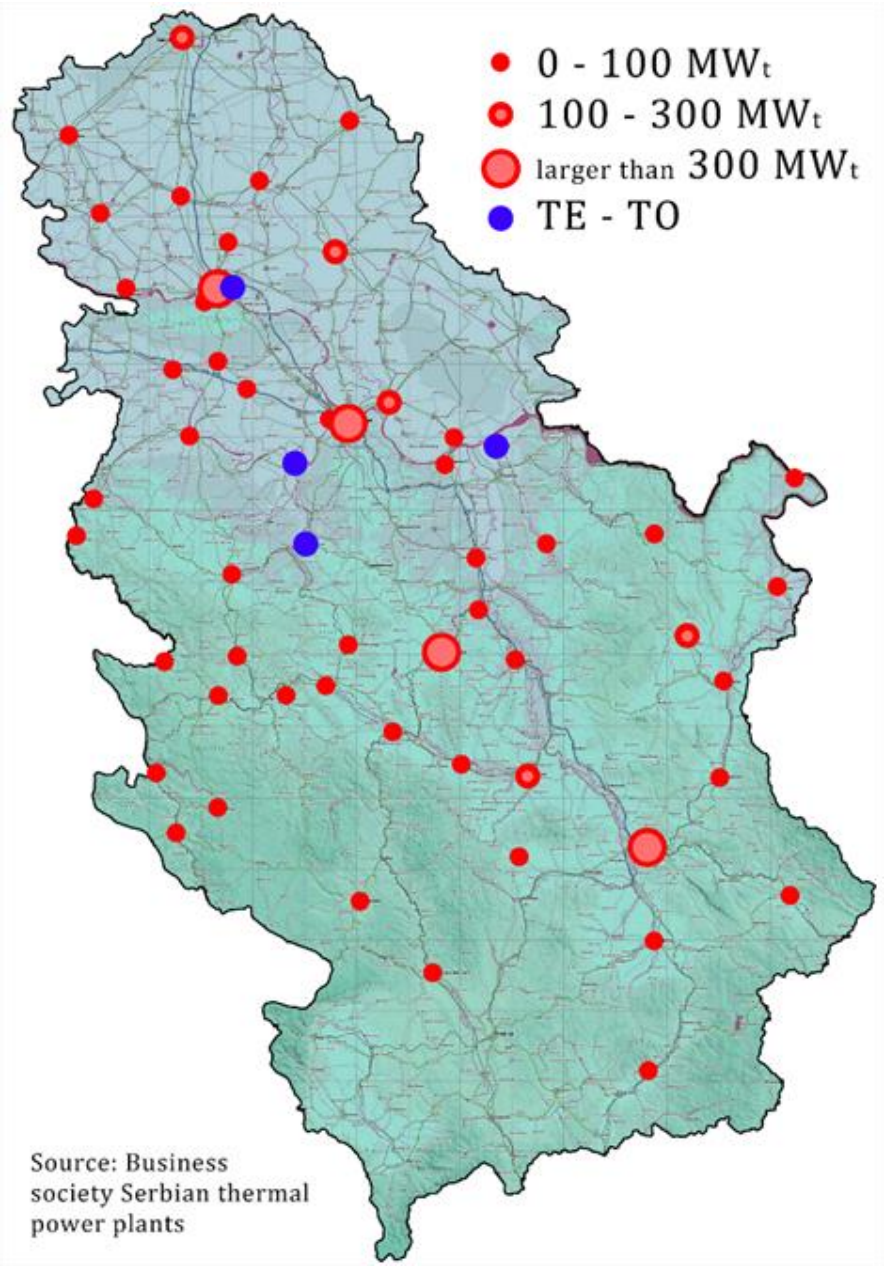
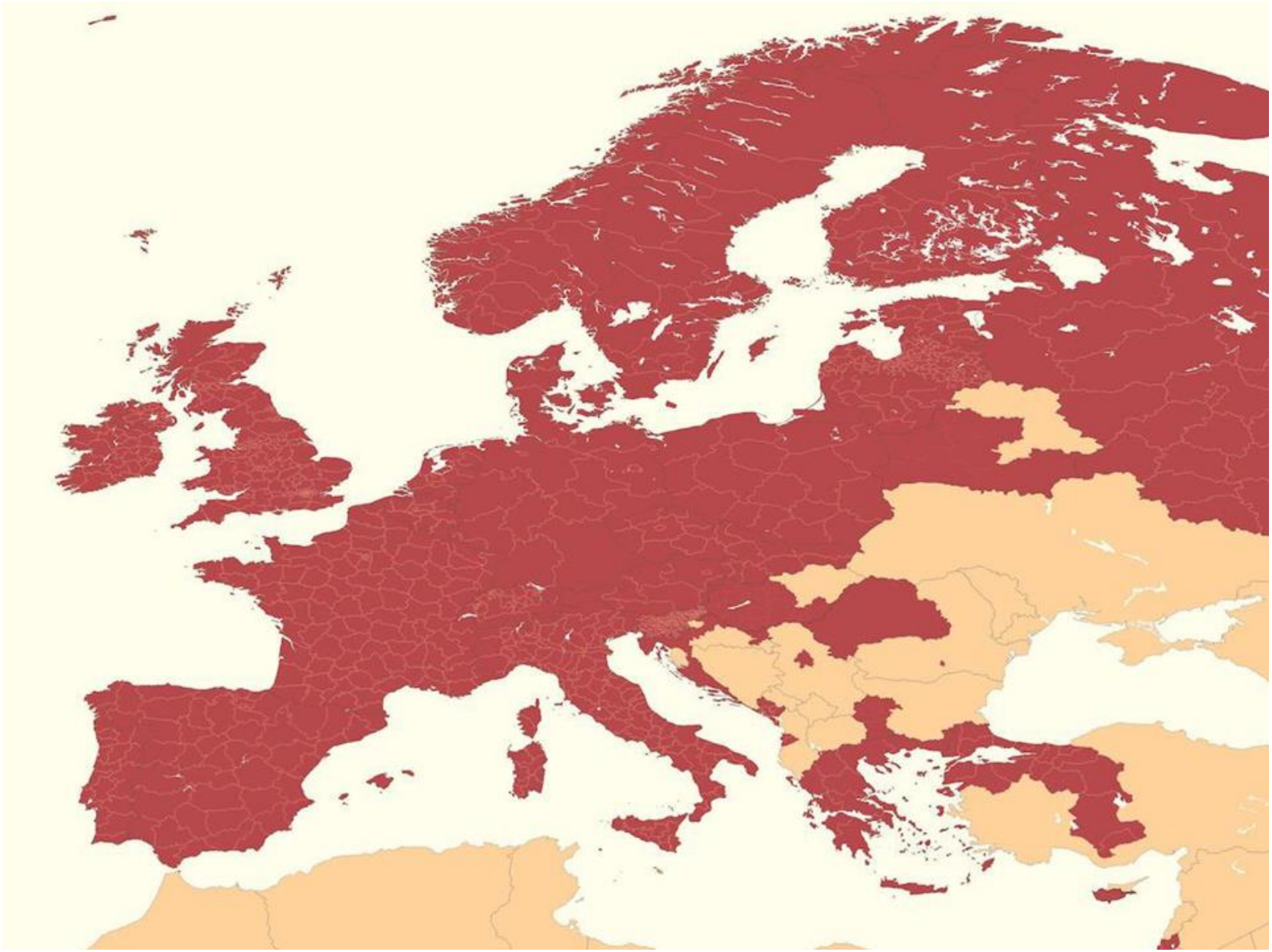
Greece
Croatia
Lithuania
Estonia
Slovenia
Luxembourg
Cyprus
Malta



Energy production in Denmark


0 - 100 MWt
100 - 300 MWt
larger than 300 MWt
TE - TO
Source: Business society Serbian thermal power plants



Regions with Human Development Index over 0.8

Bottom up a.k.a. Public pressure in Germany

- Voluntarily passive house building standard is becoming standard
- Hanover, Heidelberg, and Frankfurt, are already realizing Nearly Zero Energy Buildings on a large scale by adopting the Passive House Standard
- Heidelberg new city district, the Bahnstadt is becoming a model for the implementation of high sustainability standards in urban development
- Dún Laoghaire–Rathdown county in Ireland is proposing passivhouse standard as mandatory

Net zero emissions

- Norway – in law – 2030
- Sweden – in law – 2045
- UK – proposed legislation – 2050
- France – proposed legislation – 2050
- Spain – proposed legislation – 2050
- Finland – in policy document – 2035
- Denmark – in policy document – 2050
- EU – target under discussion – 2050
- Germany – target under discussion – 2050

Source:WorldEconomicForum

Bottom up a.k.a. Public Pressure on Balkans

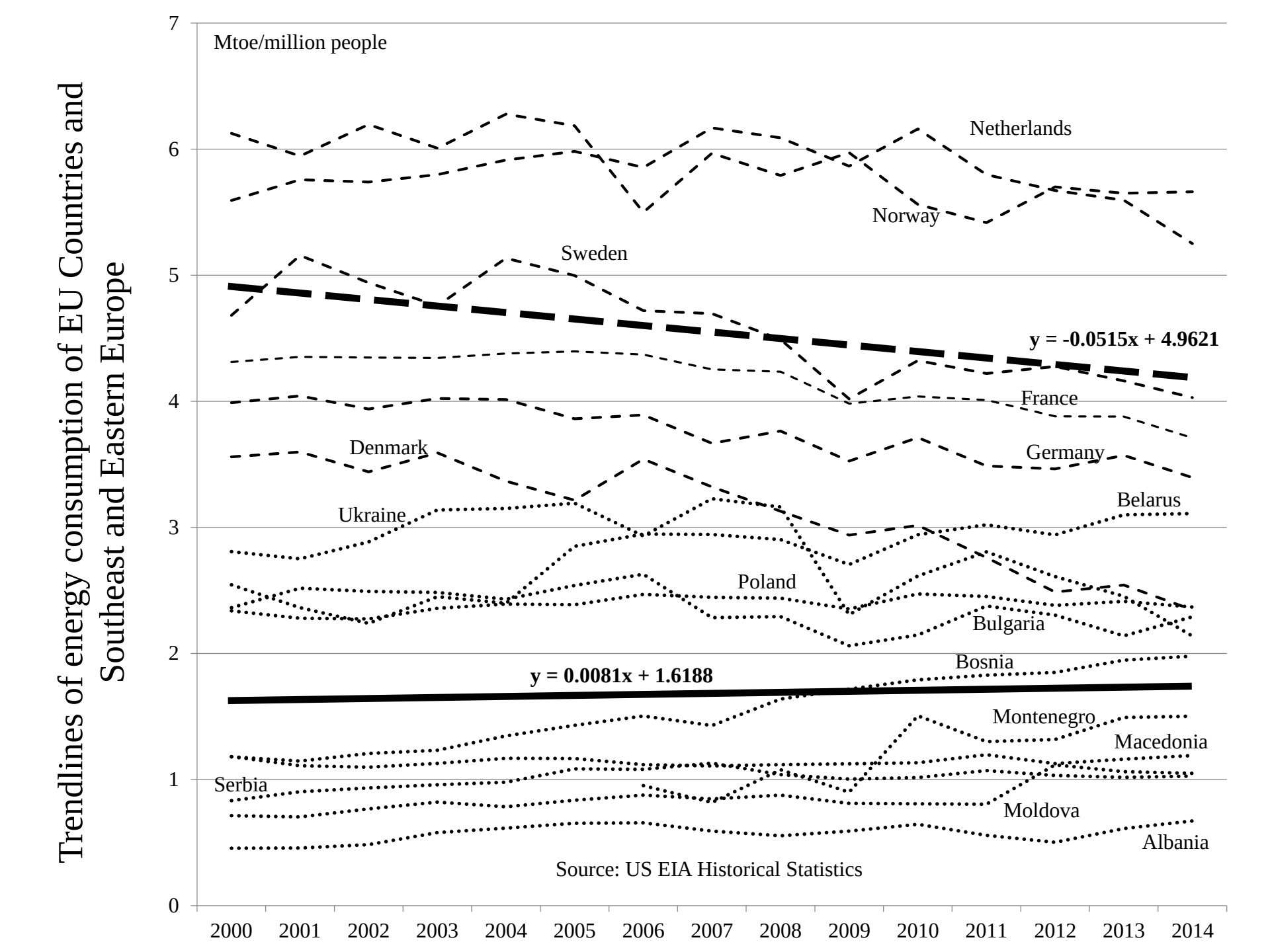
- Small hydro power plants are well known technologies
- Established legal framework suggests adequate exploitation of this resource yet…

Bottom up a.k.a. Public Pressure on Balkans

- But protestors are confronting technology, not lawmakers and law enforcement and…
- No one is proposing alternatives

Energy efficiency goals

- The European Union (EU) aims to achieve an energy efficiency target of 20% energy savings by 2021 and 27% by 2030
- Cities in Serbia are just adopting Energy efficiency programs with very conservative (and easily executable) goals of 1% energy savings per year meaning that:
  - Savings up to 2021 should amount ca. 3%
  - Savings up to 2030 should amount ca. 11%
- Households still can't sell renewables to state owned power grid company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Source: US EIA Historical Statistics

Problem

- Transposition of EU legislation without adequate adjustments
- The way the public perceives itself; mainly as helpless bystander
- Lack of informed and civic-oriented public ready to exert pressure on the legislator

Спасибо за ваше внимание!

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