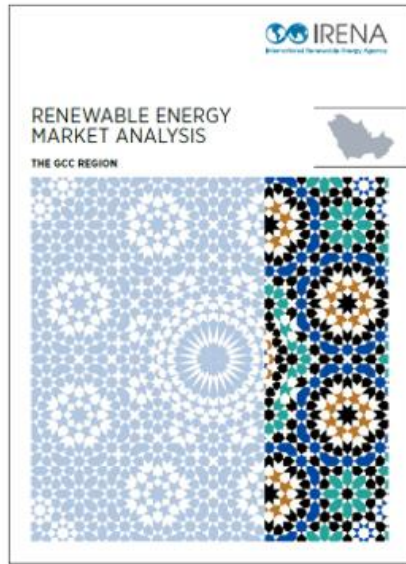


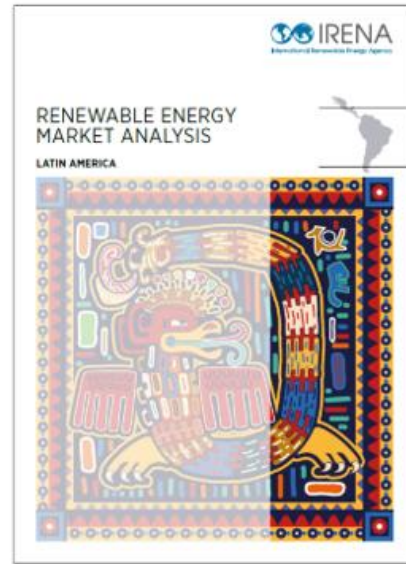
RENEWABLE ENERGY MARKET ANALYSIS: SOUTHEAST EUROPE

Focus on District Energy

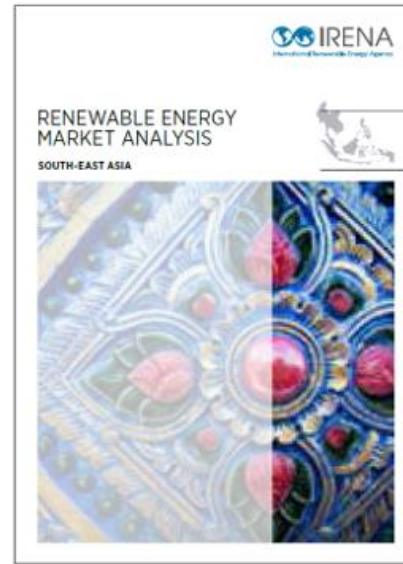
The “Renewable Energy market analysis” series



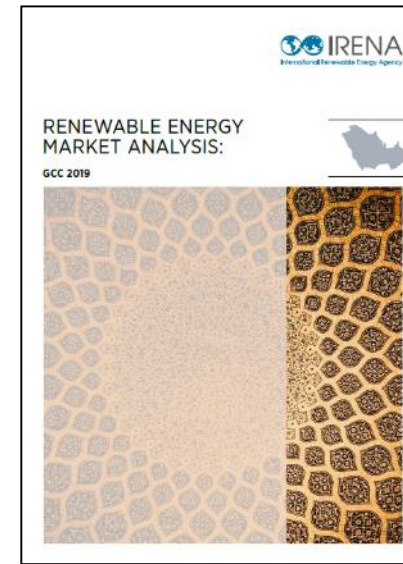
IRENA © 2016



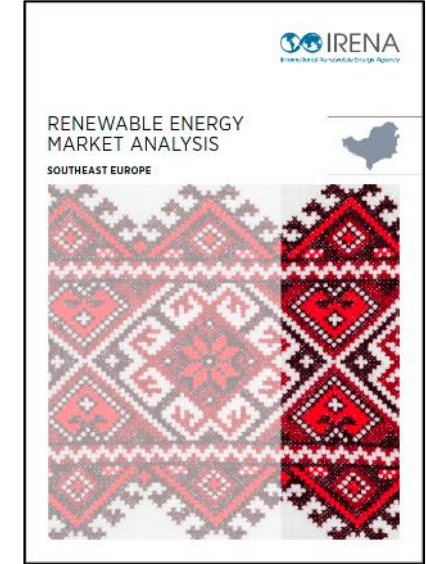
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Energy sector
overview

Renewable
energy landscape

Policy framework

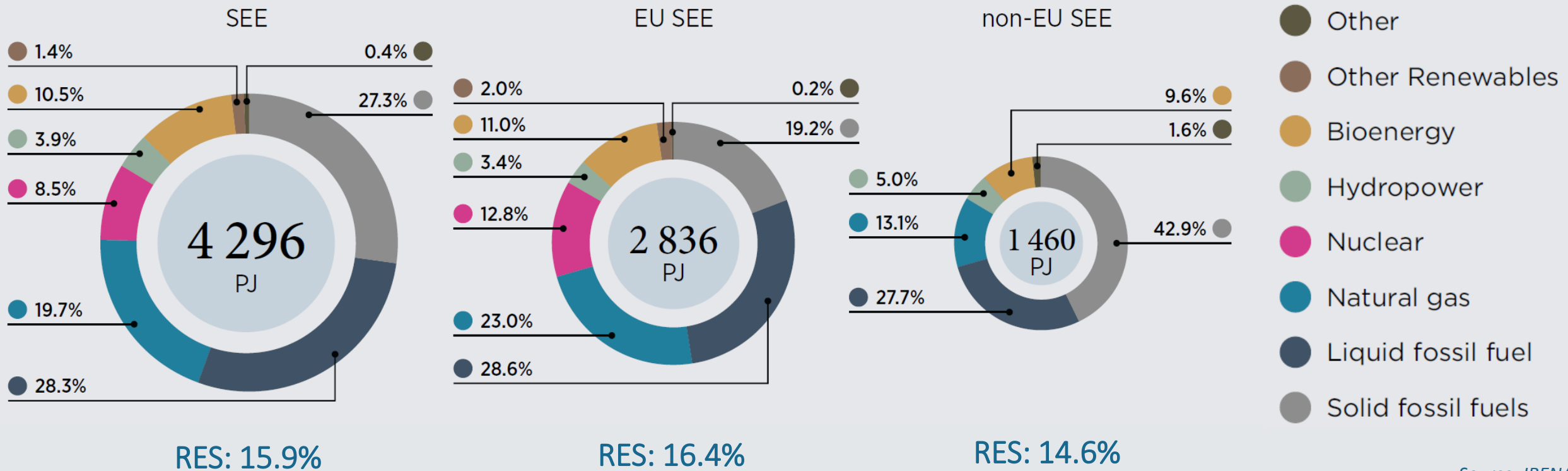
Investment
framework

In-focus
discussion

The way forward

The energy sector reliance on fossil fuels

Total primary energy supply, 2017

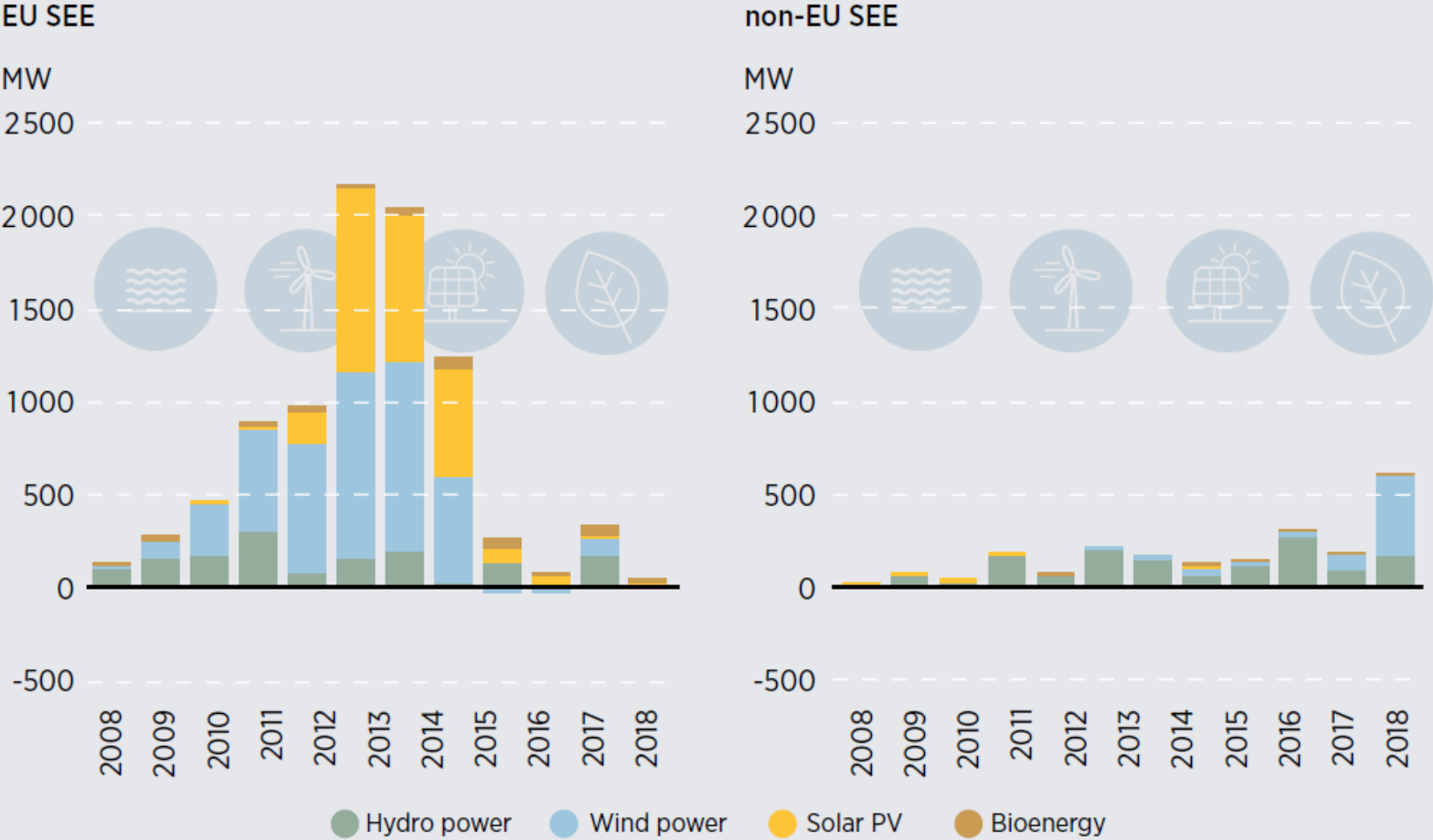


Source: IRENA

This is a pivotal moment for the energy sector in the SEE region

Policies at the center of the energy transition

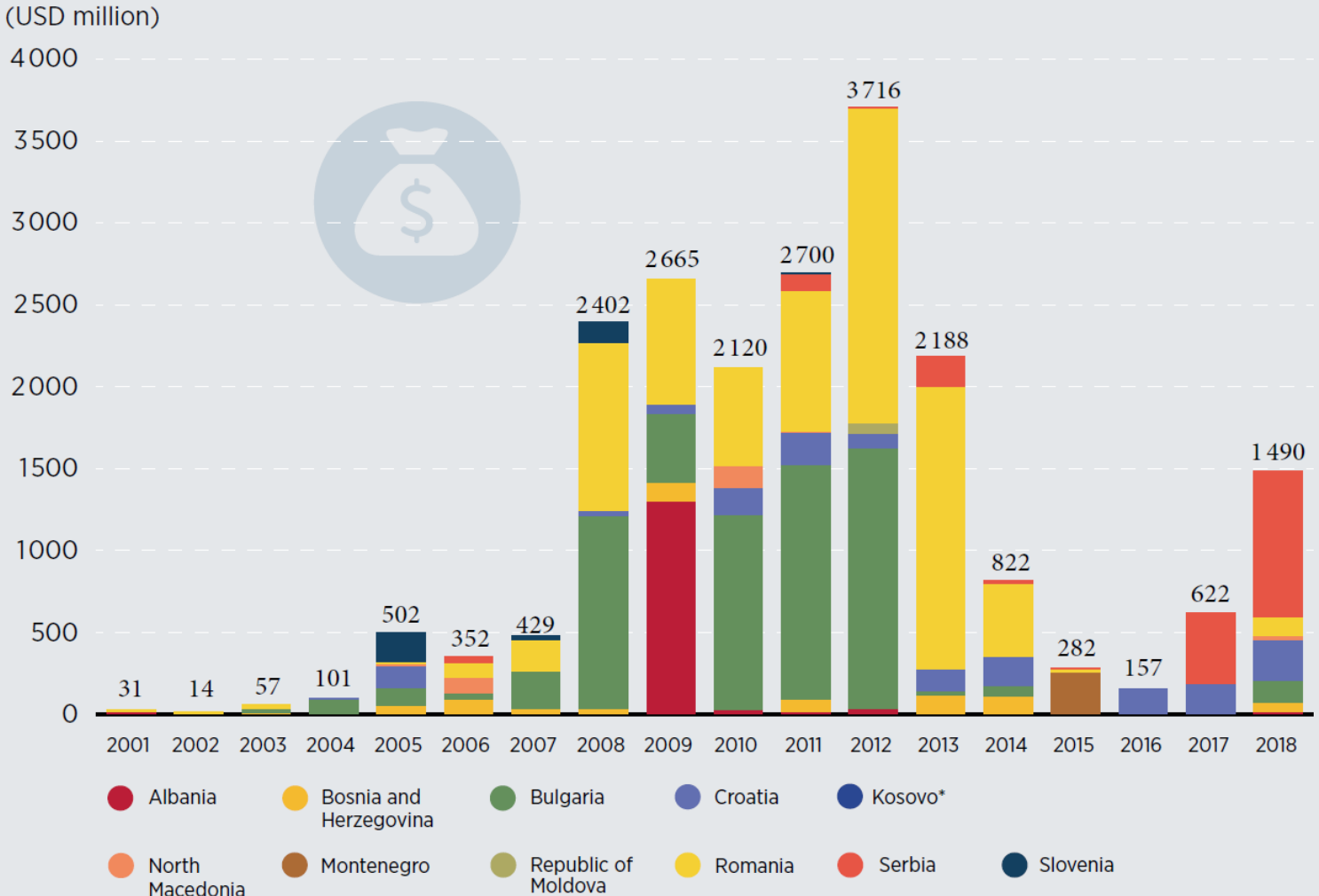
RE capacity additions, SEE, by technology [MW]



Source: IRENA

Policies at the center of the energy transition

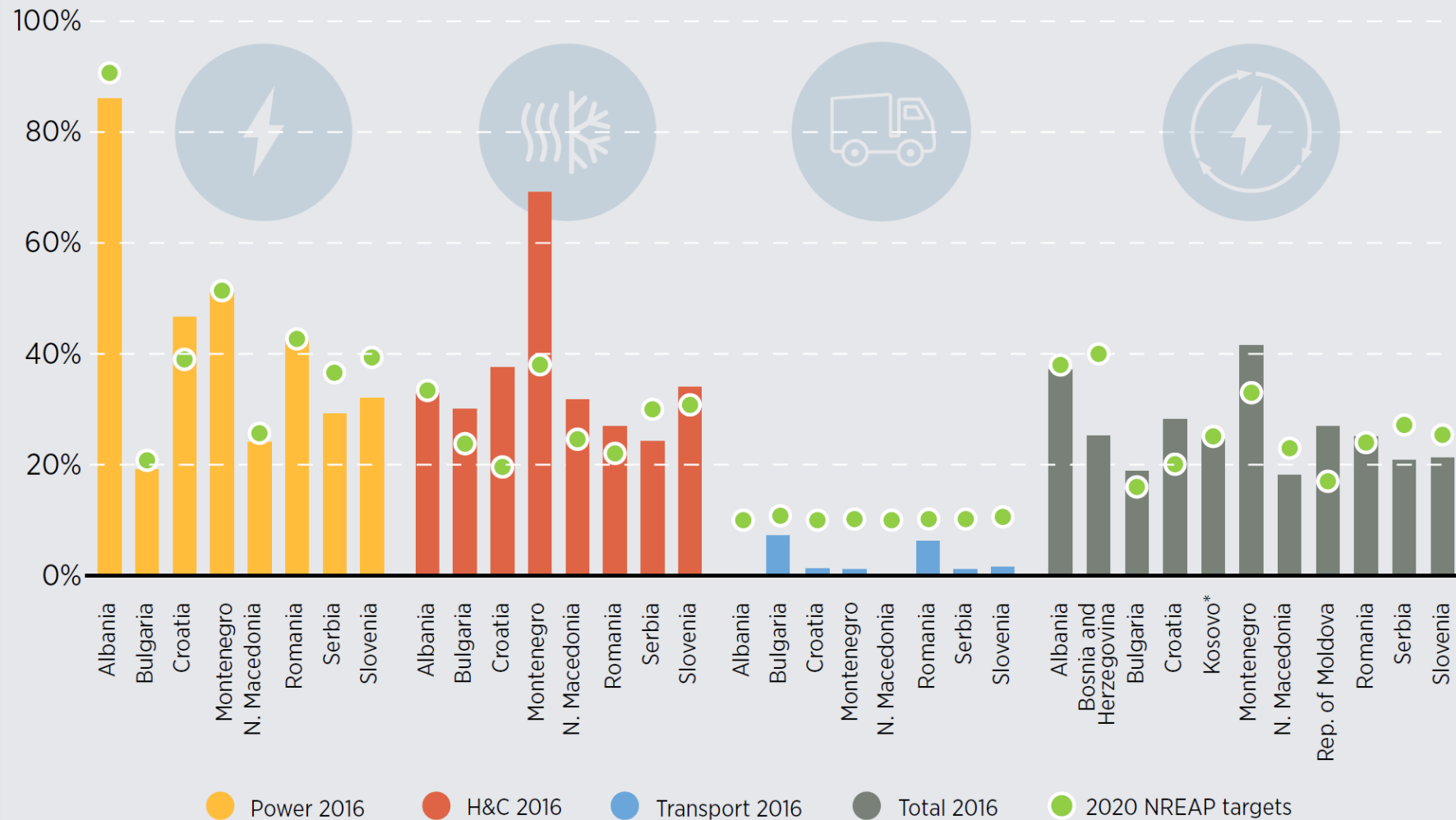
Investment in renewable energy, SEE, by jurisdiction [USD million]



Source: BNEF

Targets and their role

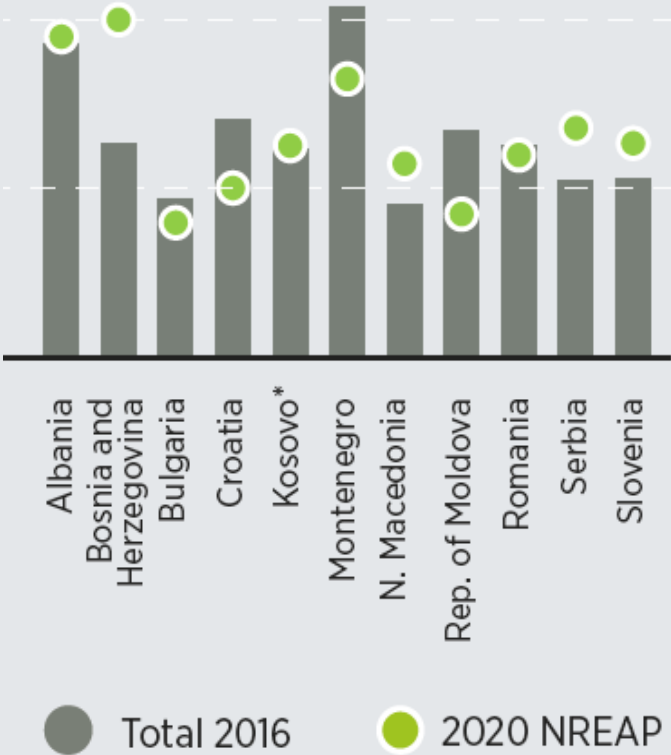
Sectorial comparison between 2020 targets and real 2016 RES shares in TFEC



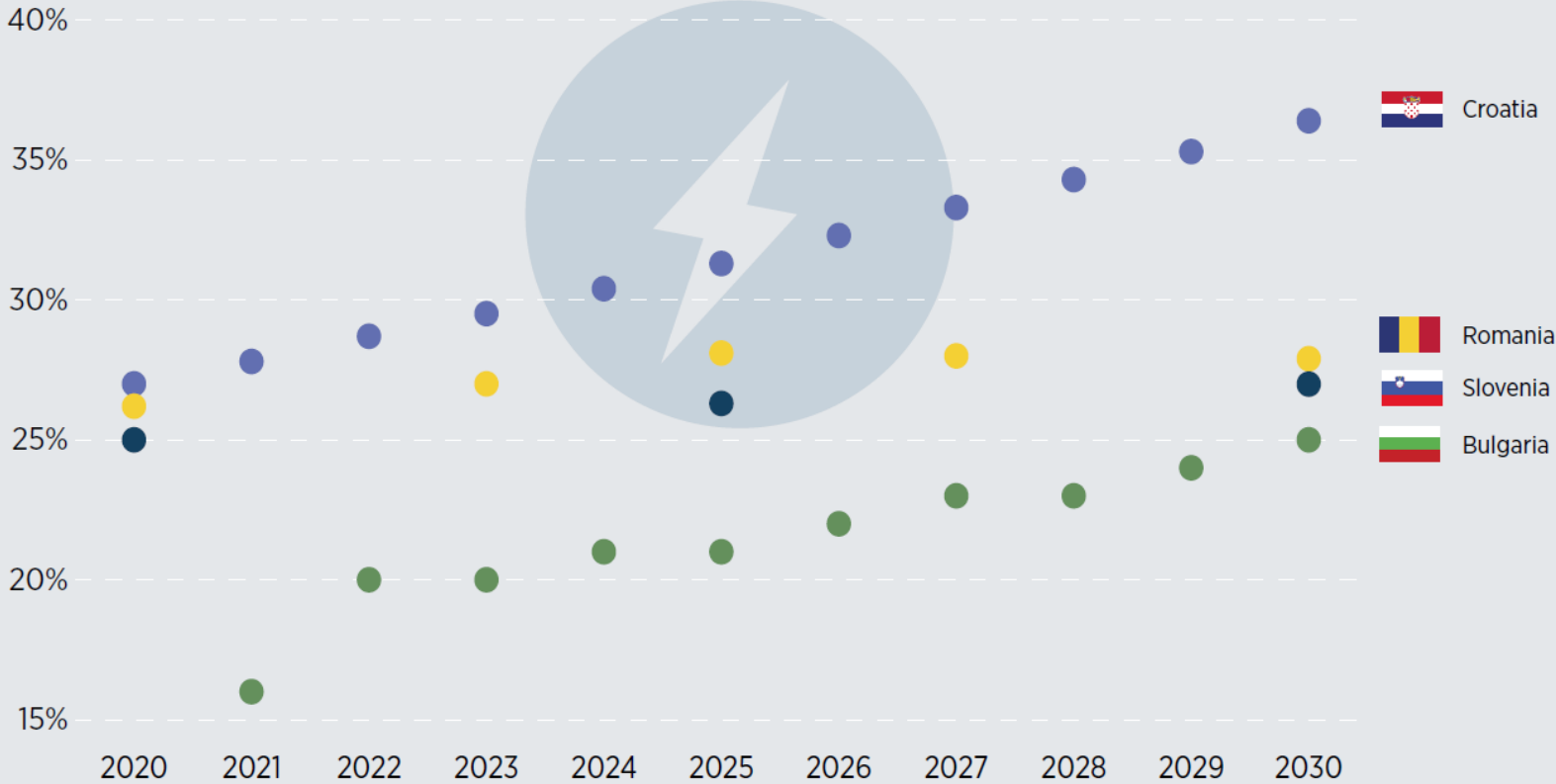
Source: IRENA

New Regulatory framework

2020 targets and real 2016 renewable energy shares

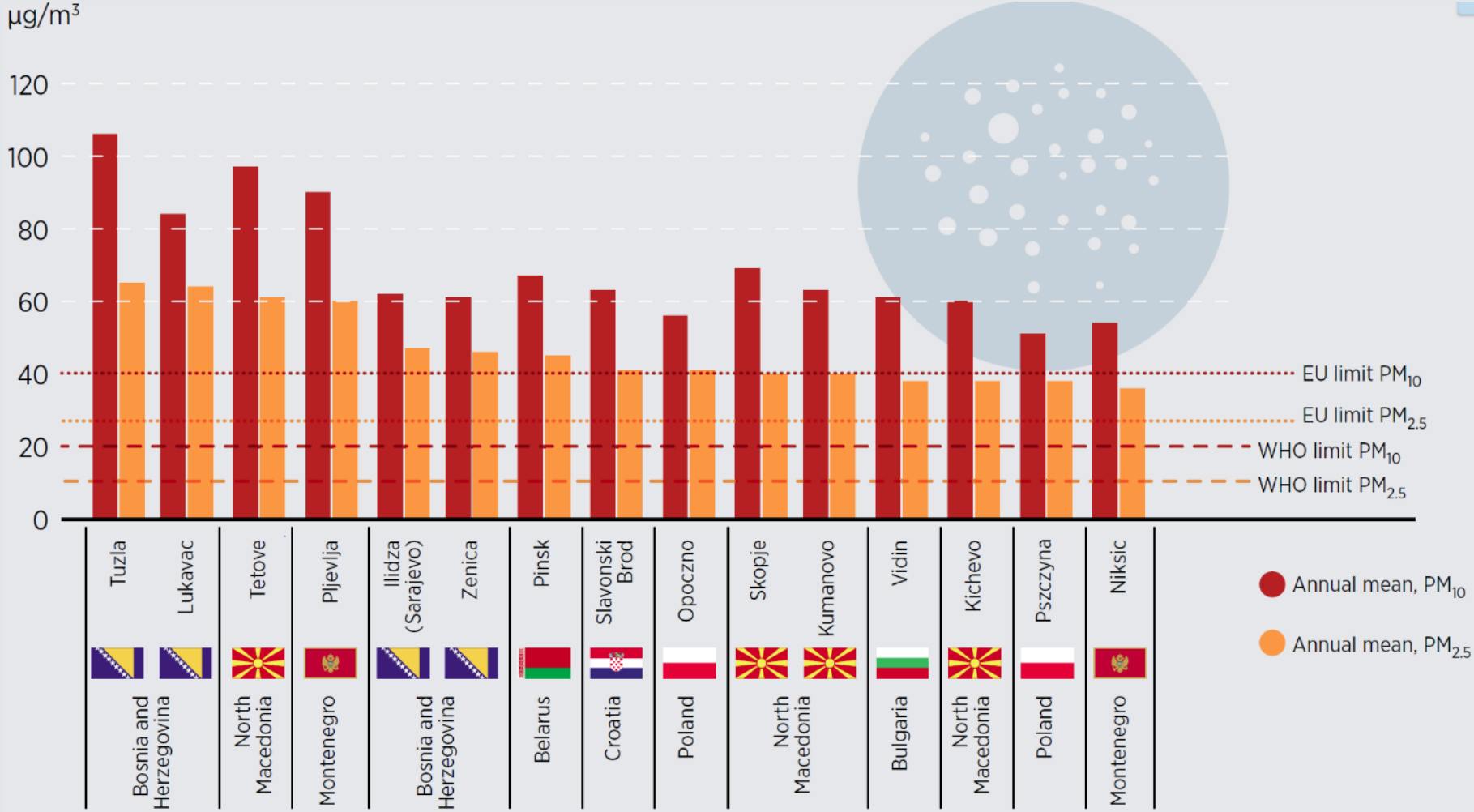


Share of RES in gross final energy consumption, draft NCEP targets



Source: IRENA

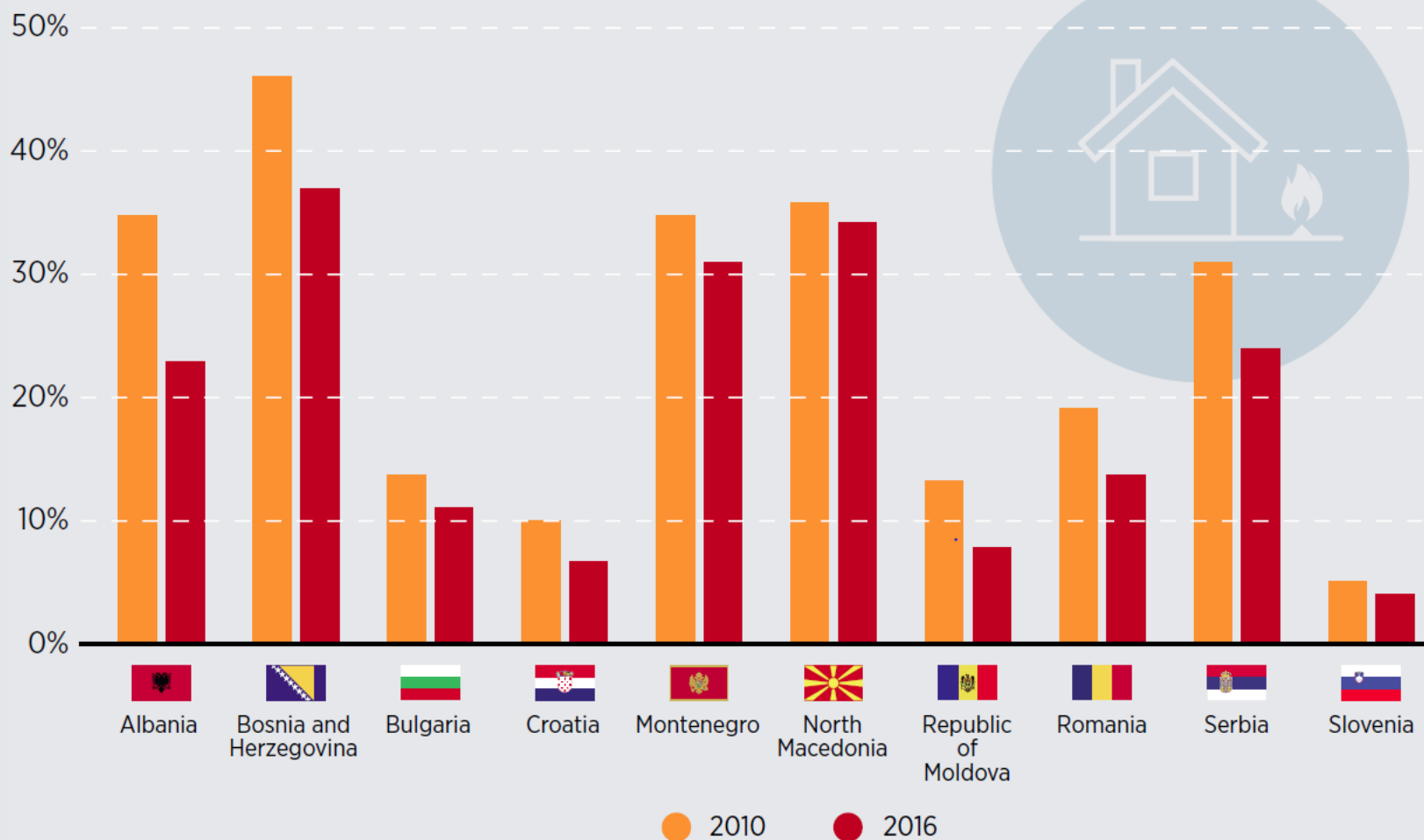
Top 15 cities by level of PM_{2.5} levels, Europe, 2017



Source: IRENA

The role of cooking

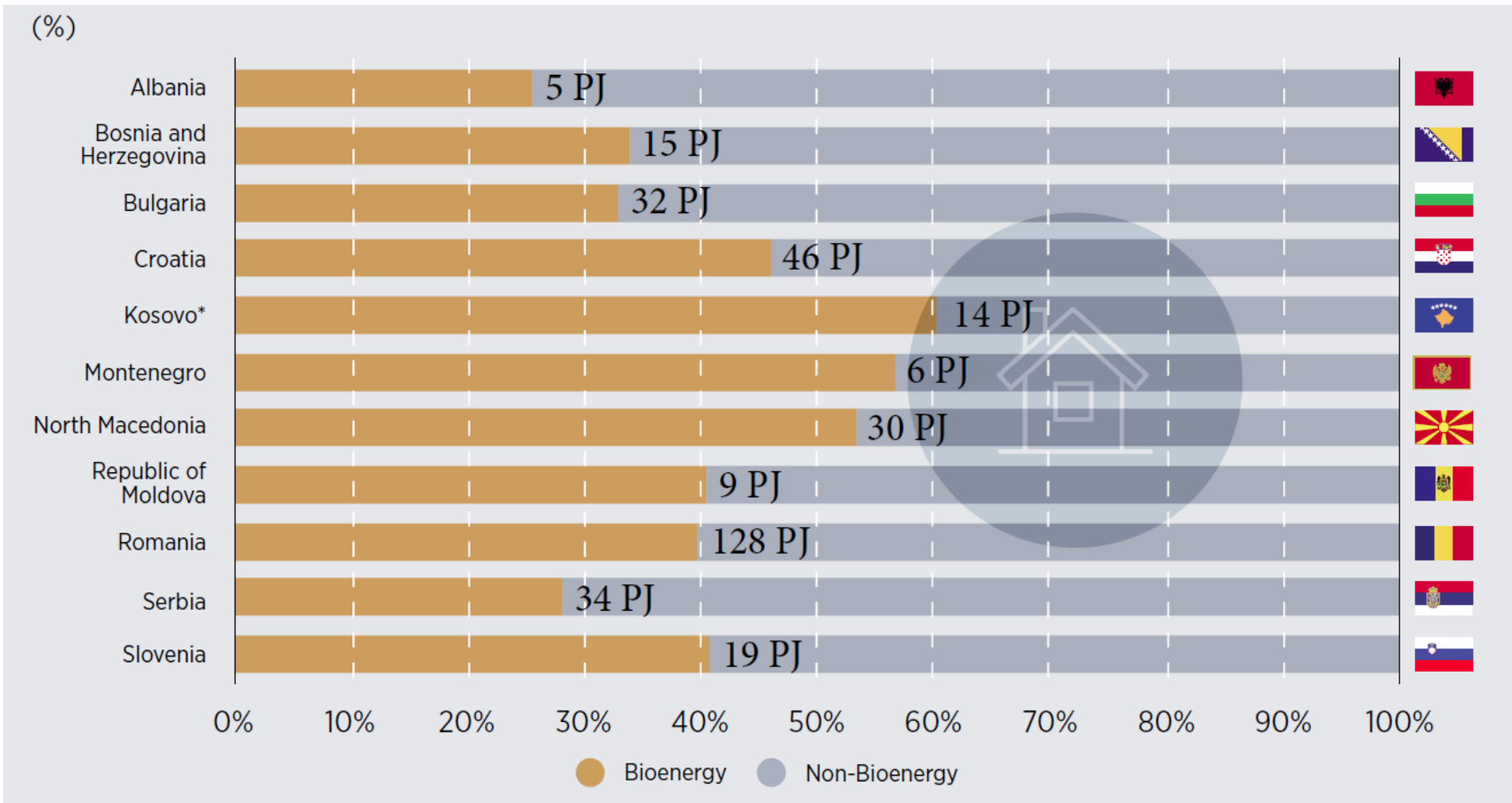
Share of households without access to clean cooking solutions, 2010 and 2016



Source: World Bank

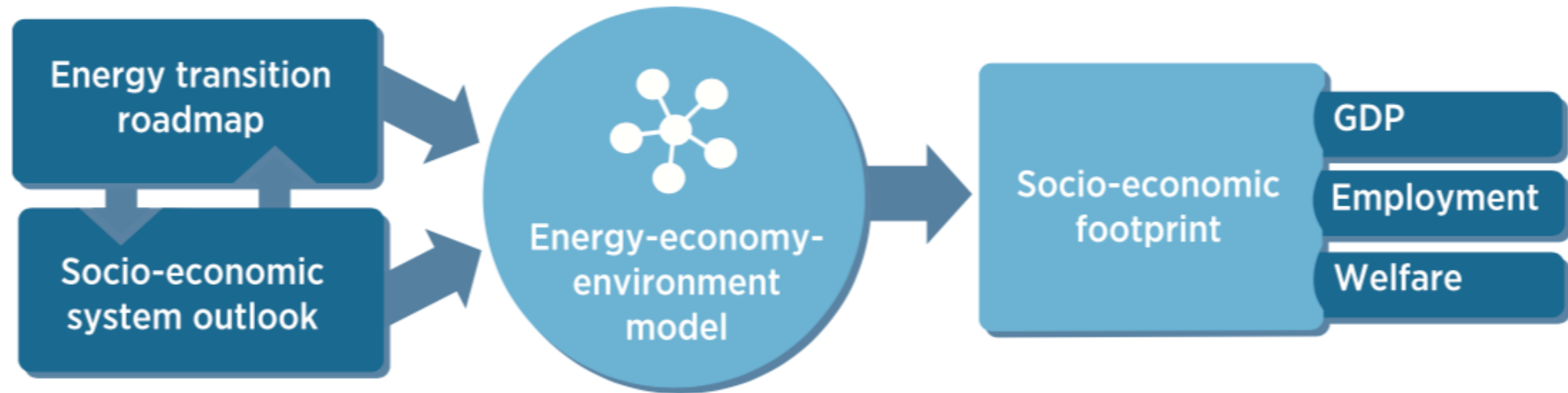
The biomass role in the region: heating households

Contribution of biomass in the residential energy consumption



Source: IRENA

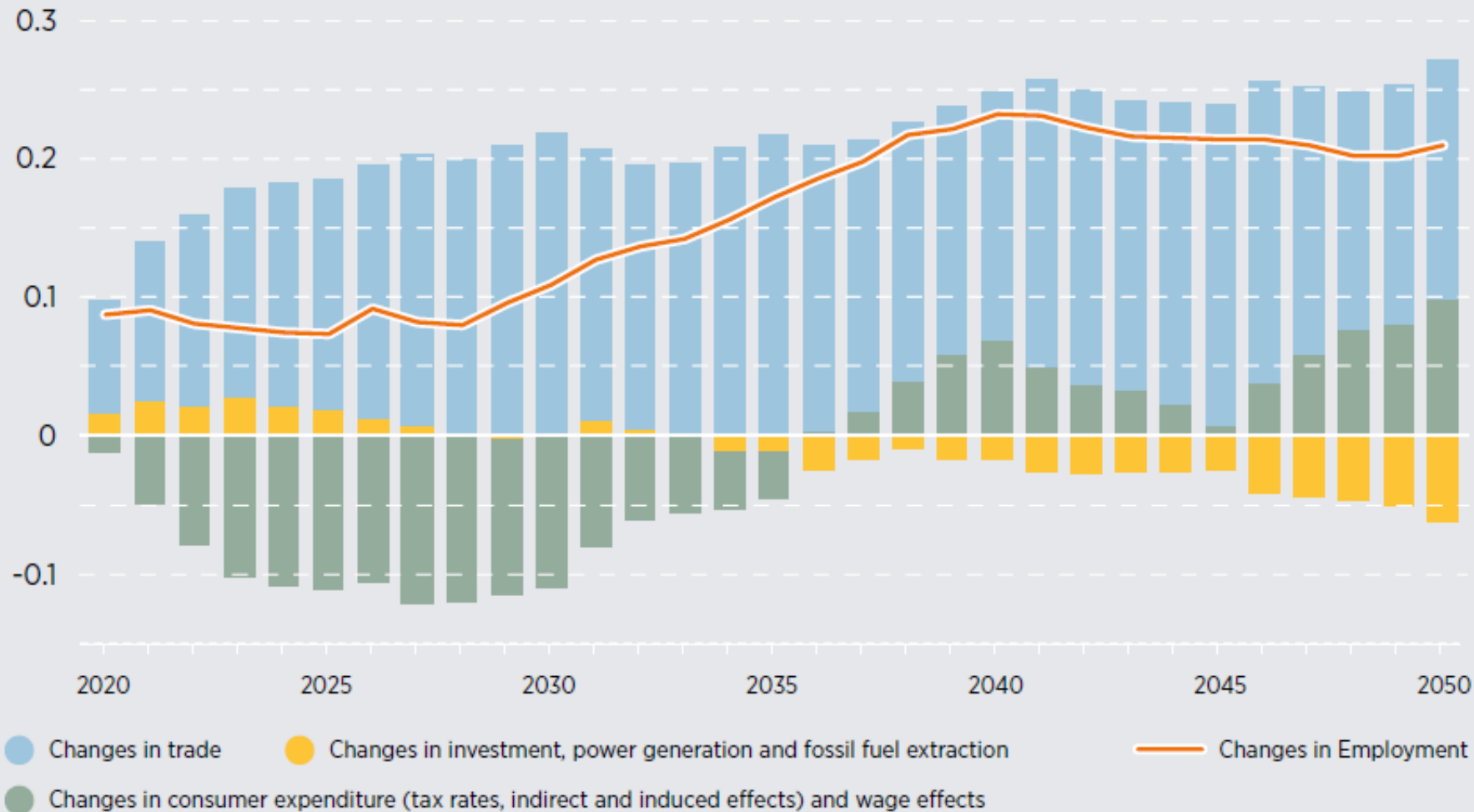
The energy transition and the socio-economic system



A complete transition includes both the energy transition and the socio-economic system transition, and their interlinkages.

Socio-economic impact: employment

Energy transition footprint in terms of employment, SEE, 2020-50 [%]

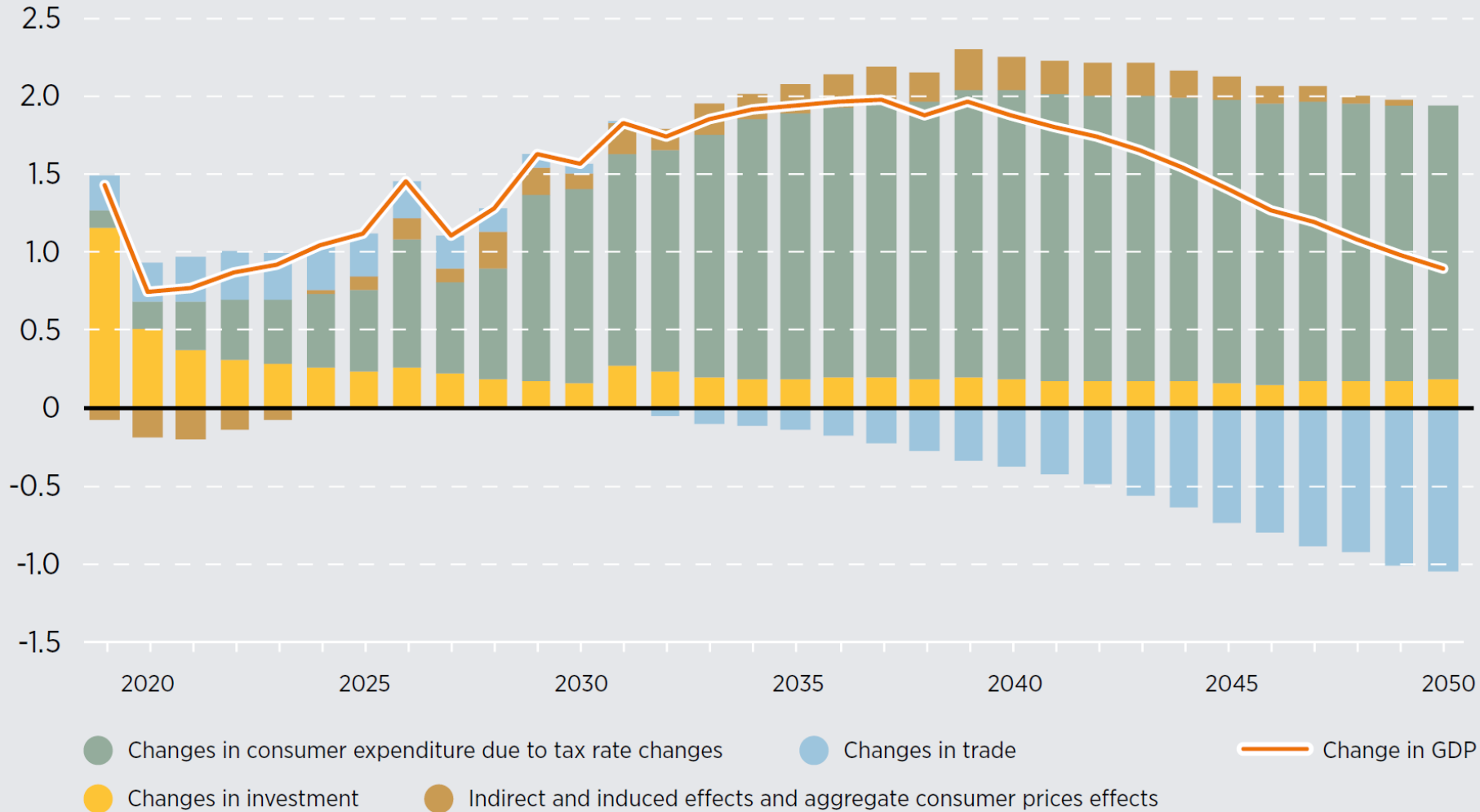


**~ 50 000
additional jobs**

Source: IRENA

Socio-economic impact: GDP

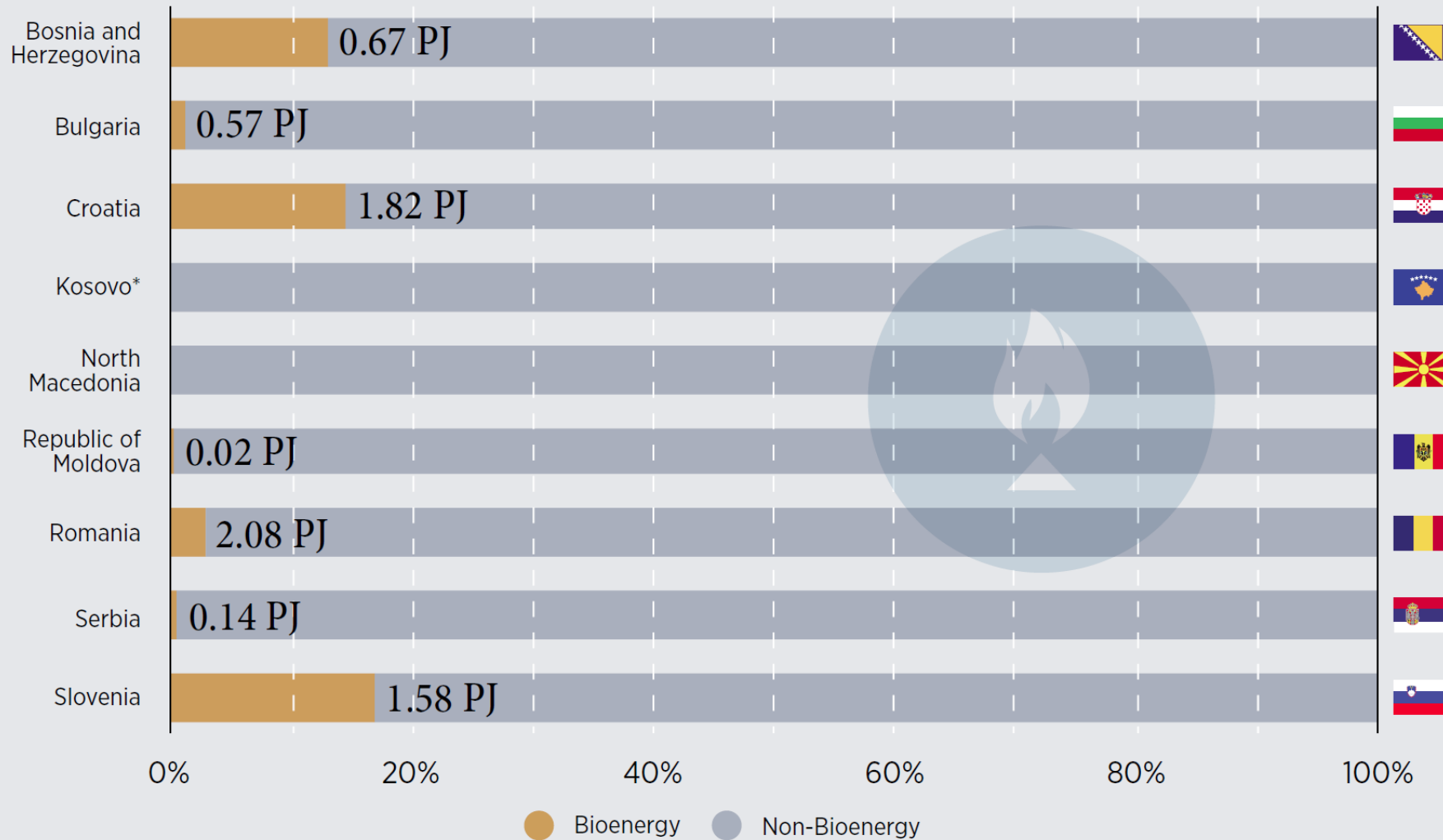
Energy transition footprint in terms of GDP, SEE, 2020-50 [%]



~500 USD bln
Cumulated GDP

The district heating opportunity

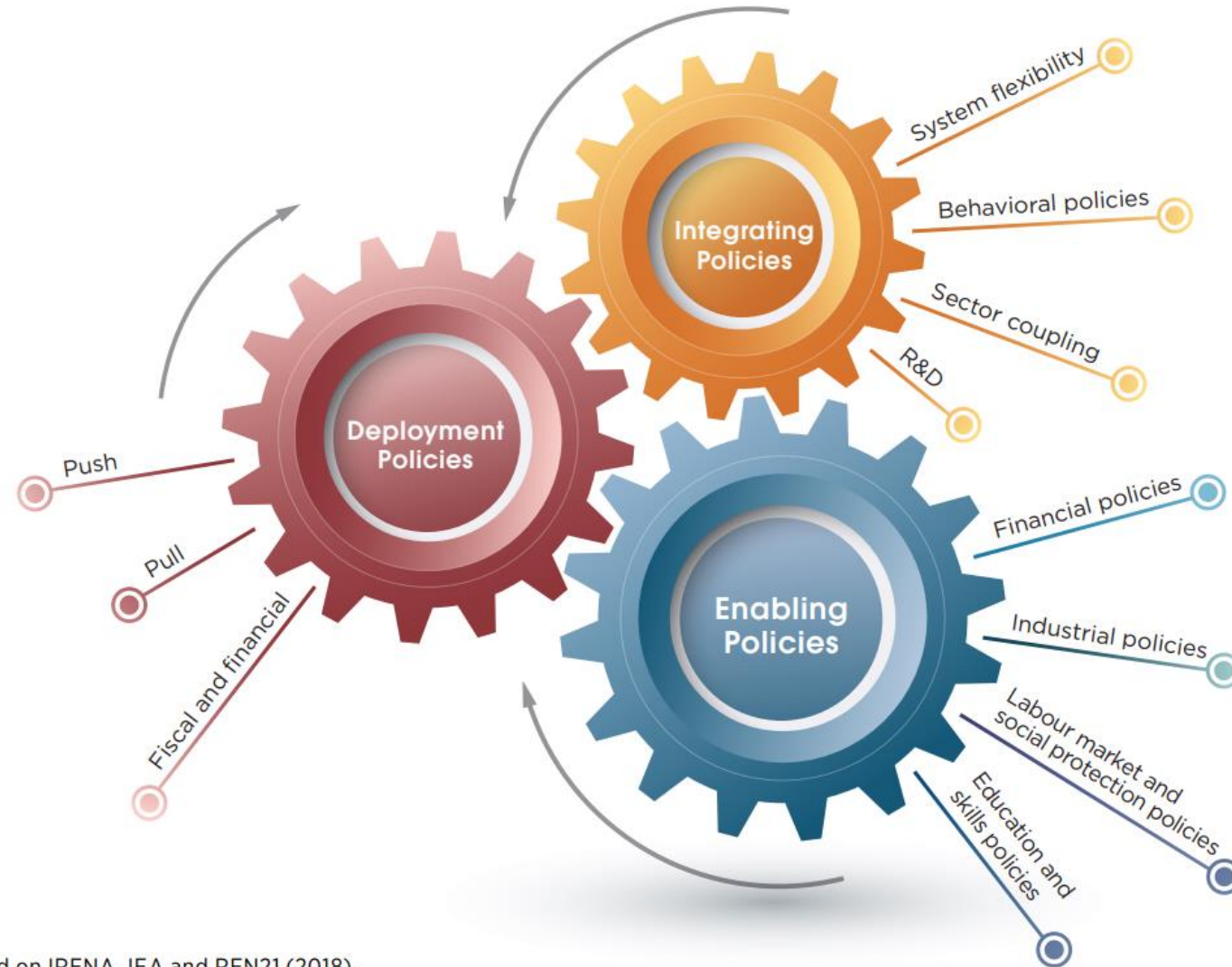
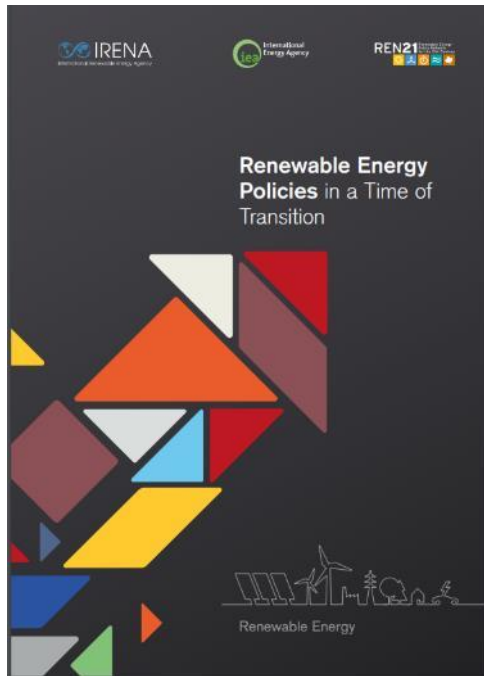
Contribution of bioenergy to district heating, SEE, 2017



Source: IRENA

- **High upfront capital investment requirements**
- **Uncertainty around the use of the network** - *investment returns, "anchor load"*
- **Natural monopoly** - *risk of poor outcomes for consumers, negative consumer perception, reputational damage*
- **Fossil fuel costs do not account for their negative externalities** *artificial uncompetitive playing field for renewable sources.*
- **Technical suitability** - *distribution losses, space requirements, seasonality*

The policies in a time of transition



Based on IRENA, IEA and REN21 (2018).

- **Zoning mandates**
- **Financial incentives**
 - *Subsidies, grants, or tax credits* based on decarbonisation impact;
 - *Debt guarantees* to minimise risk for potential investors;
 - *Concessional finance* from an MDB if unable to secure financing locally

Denmark's Heat Supply Act on District Heating (1979) designates separate urban zones for district heating and natural gas pipes. This not only ensures that economies of scale are achieved, but also prevents inefficient duplication of infrastructure investment. Similarly, **South Korea's** mandate zones serve to minimise both life-cycle costs as well as total energy consumption by eliminating duplicate heat systems.

- **Financing for refurbishment** of existing distribution networks
- **Financing for additional thermal storage**
- **Foster synergies** between renewable DHC and renewable electricity

Germany has made capital investments to refurbish its district heating systems and integrate renewables. It has refurbished its district heating pipes to use hot water instead of steam in multiple cities.

The city of **Munich**, for example, is in the process of converting steam to hot water pipes to drastically increase the share of geothermal in the city's district heating system in order to meet its ambitious goal of 100% renewable district heating by 2040. The project also leveraged synergies with existing infrastructure in that it made use of existing heat distribution pipes, which offset high upfront capital costs and ensured the economic viability of the district heating system.

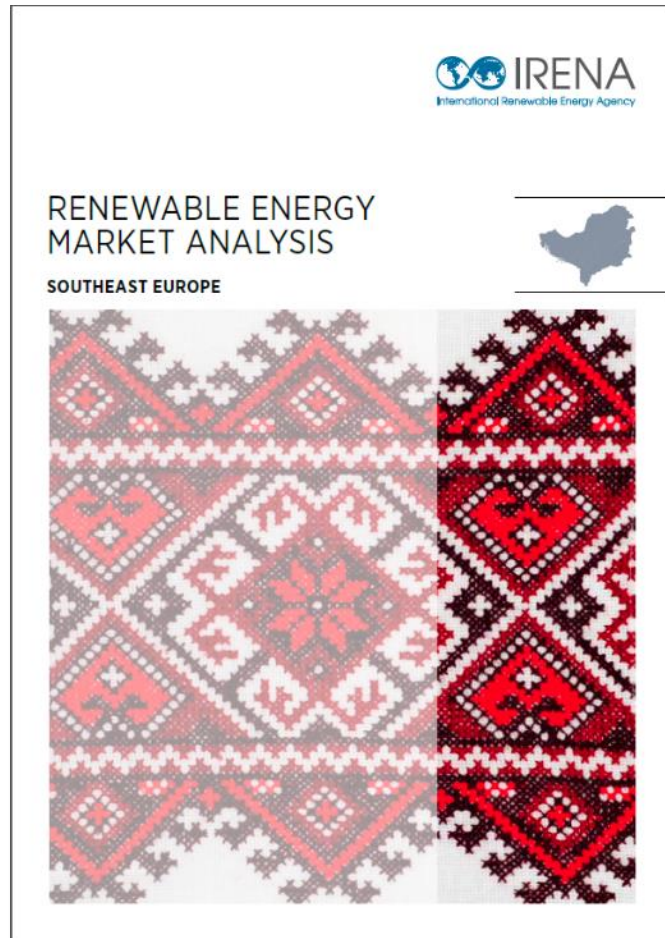
- **Consumer protection policies**
 - policies to regulate the natural monopoly
 - Tariffs on consumption
- **Demonstration projects and R&D initiatives**
- **Carbon pricing**

Sweden's Energy Markets Inspectorate (EMI) and the Swedish Competition Authority supervise the country's district heating market. The EMI ensures that private providers comply with the legislation, which stipulates pricing, customer rights and access to information, and third-party access.

For example, customers have unconditional rights to access information regarding their tariffs and can legally leave the district heating system with no repercussions if their pricing terms change. Providers are also obligated to *negotiate with third parties*, which improves competition and customer outcomes.

In conclusion

	Policy	Barrier tackled	Effectiveness	Feasibility
Direct	Heat mandate zones	Demand 'anchor load' concerns	Has led to economies of scale for DH providers in Demark.	Consumers generally oppose uncompetitive markets
	Financial incentives for infrastructure investment	High upfront capital costs	Must sufficiently offset longer payback and mitigate risk	Depends on fiscal status and budget priorities
Integrating	Investment in improved system technology and flexibility	Technical suitability requirements	Has led to uptake of solar thermal and geothermal DH in Denmark and Germany	Very capital intensive and likely to face budget constraints
Enabling	Monopoly and competition oversight	Natural monopoly	Necessary condition to drive growth	Ubiquity of competition oversight in countries with extensive DHC suggests feasibility
	Demonstration projects	Risk and return uncertainty, demand-side informational		Demonstration projects entail uncertainty by nature
	Carbon pricing/removal of subsidy	Artificial uncompetitive market	Necessary condition to leverage the playing field	Local players may not be able to tackle a national/international issue



<https://www.irena.org/publications/2019/Dec/RE-Market-Analysis-Southeast-Europe>