Renewable Energy Potential and Policies in South East Europe

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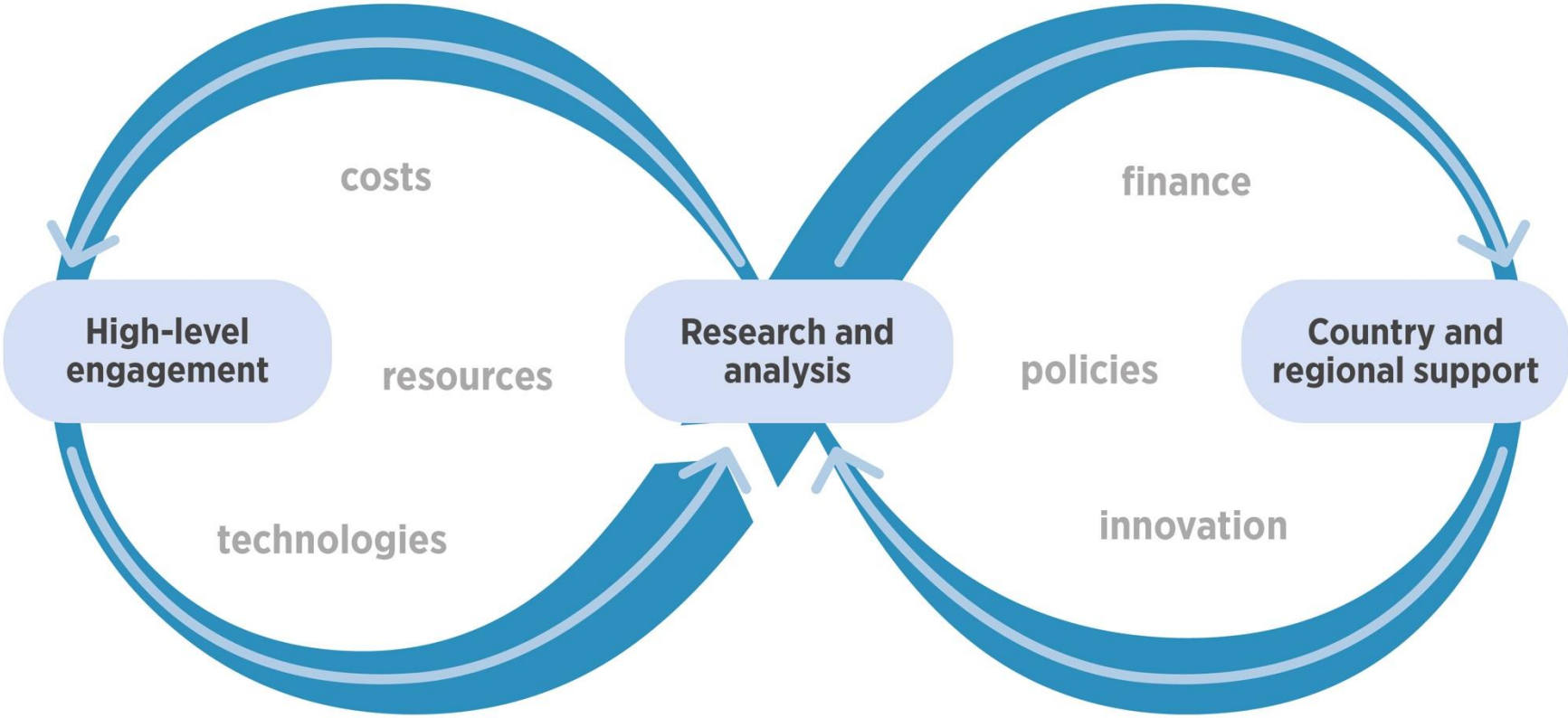
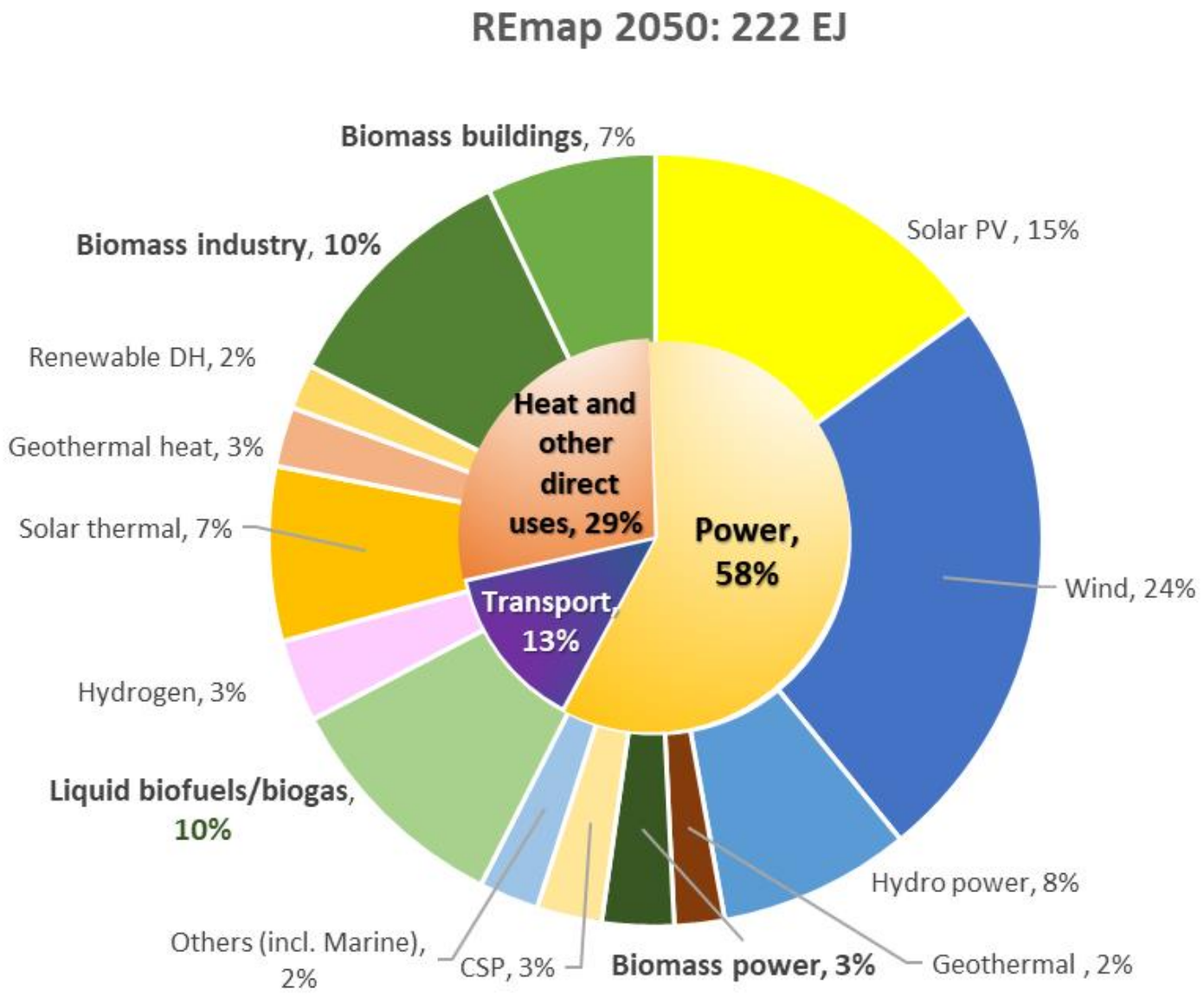
Market Uptake of Renewable Energies for Heating and Cooling
Final Conference of BioVill and CoolHeating Projects
Brussels, 28 November 2018

What IRENA does

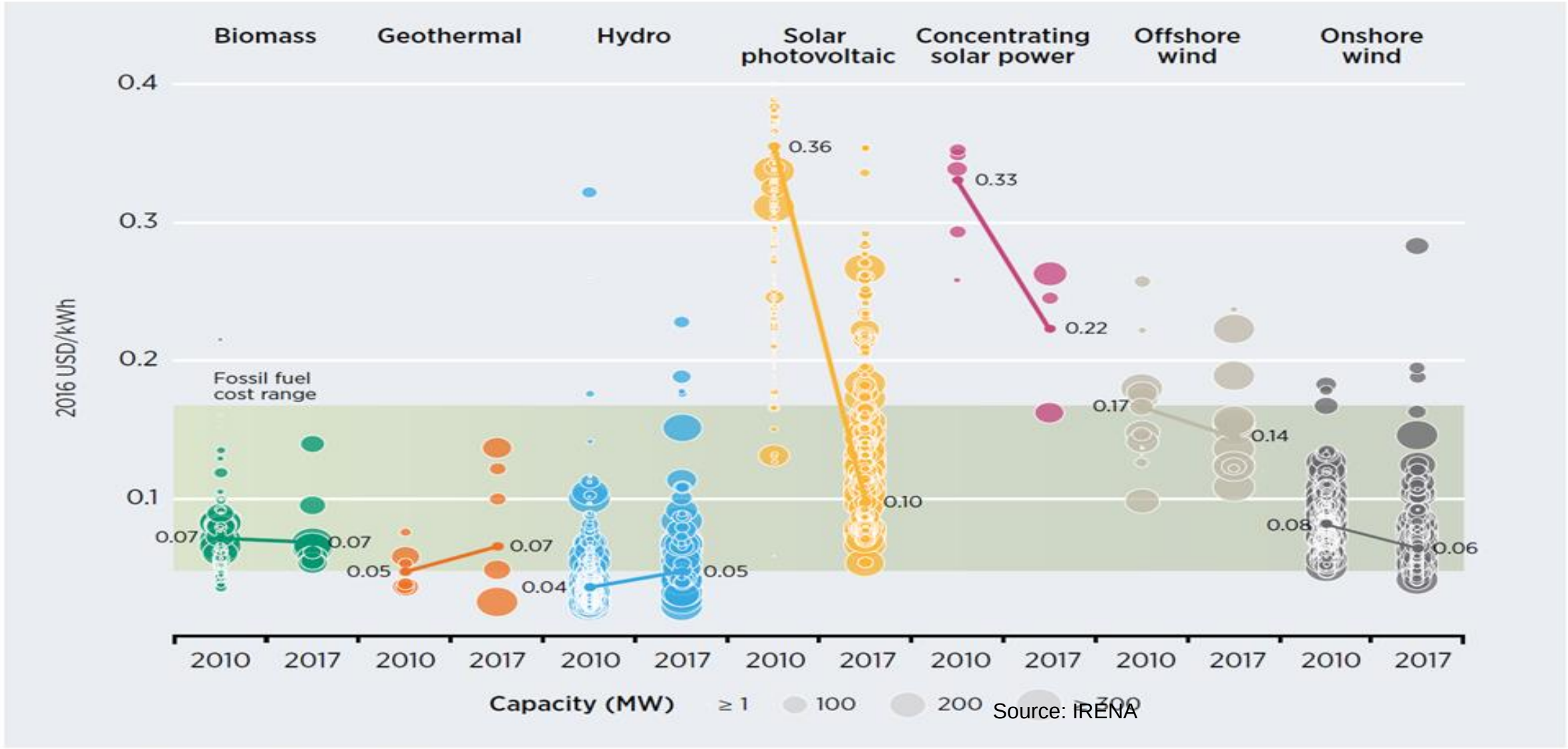


Promote the **widespread adoption and sustainable use** of all forms of **renewable energy** worldwide

Cost-Effective Renewable Energy Potential in 2050



RE costs are falling, boosting cost-effective RE potential



Source: IRENA

Source: IRENA Renewable Cost Database.

Brightening Renewable Energy Prospects for European Union

February 2018

Aim

- Identify options to meet or exceed the proposed 27% renewables target for 2030.
- Assess the aggregated impact of national renewable energy plans.
- Assess the role of renewables in long-term decarbonization.

Insights

- Doubling the RE share is feasible between now and 2030 to a 34% RE share.
- This is cost neutral and creates substantial economic and social benefits.
- RE technology improvements in recent years are the driver for greater potential.
- Accelerating RE deployment key for Europe to be in line with Paris Agreement.

Benefits

- GHG emissions reduced 42% from 1990 in REmap case (vs 31% in reference case)
- Economic savings in REmap case of USD 25 billion/year by 2030 –
- USD 52-133 billion/year counting value of reduced pollution and GHG emissions

Follow-up

- Expansion for all South-East European Energy Community members
- Dialogue and deepening of the analysis for EU members (including Finland)

RE share of EU energy mix could double to 34%, cost effectively, by 2030

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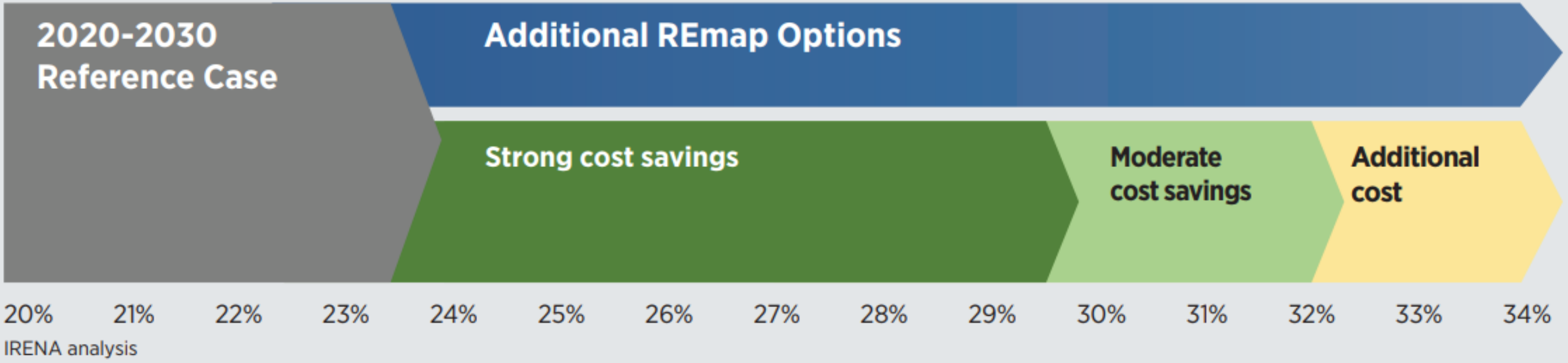


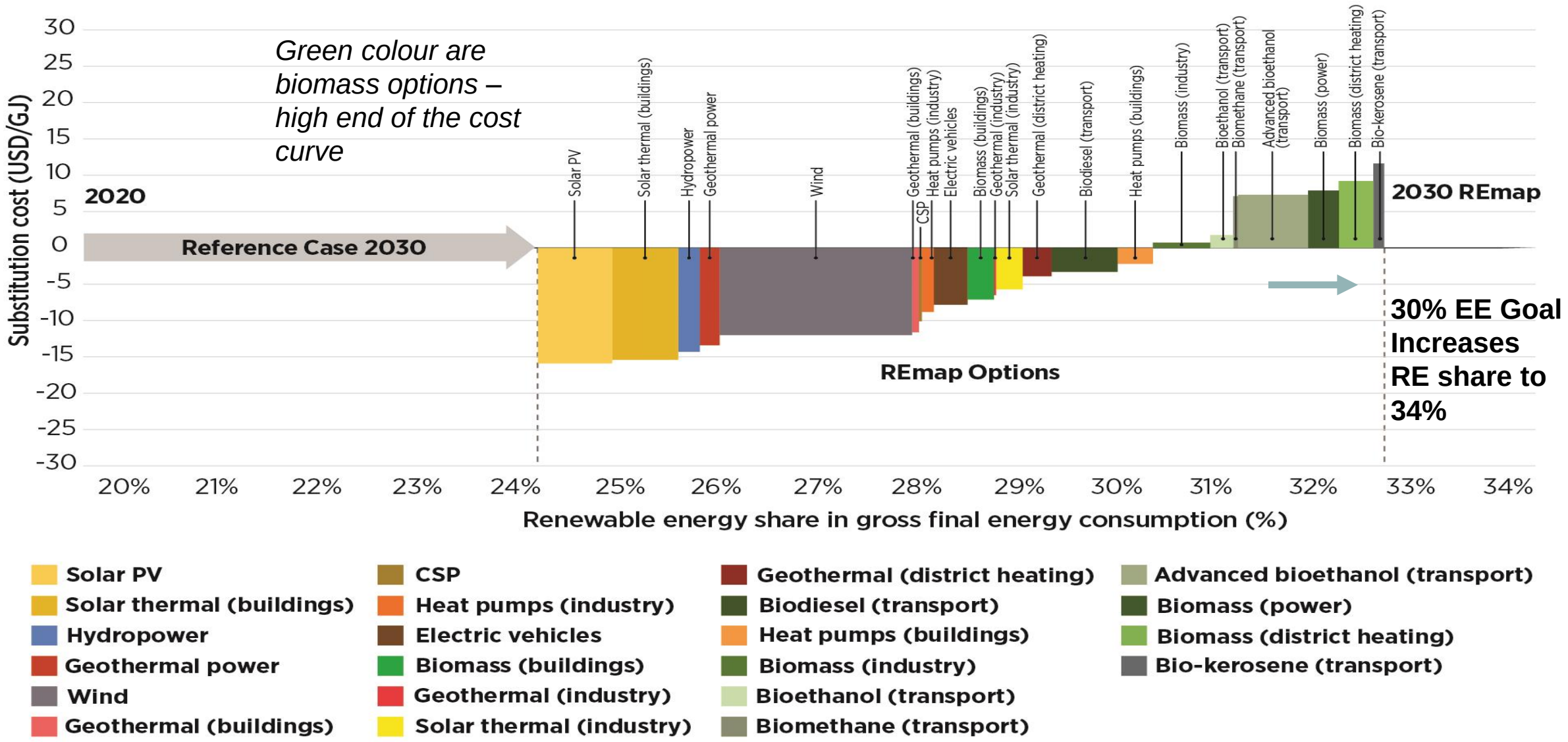
IRENA analysis

Strong cost savings
- Wind power
- Solar power
- Solar thermal in buildings
- Hydro power
- Geothermal power

Moderate cost savings
- Heat pumps
- Electric vehicles
- Biodiesel
- Geothermal district heating
- Solar thermal in industry

Additional cost
- Biomass in industry
- Conventional bioethanol
- Biomass in power and district heat
- Advanced bioethanol
- Biokerosene

Europe: REmap Options in 2030



Note: PV = photovoltaic; CSP = concentrated solar power

Policies to Overcome Barriers to Renewable Energy Investment

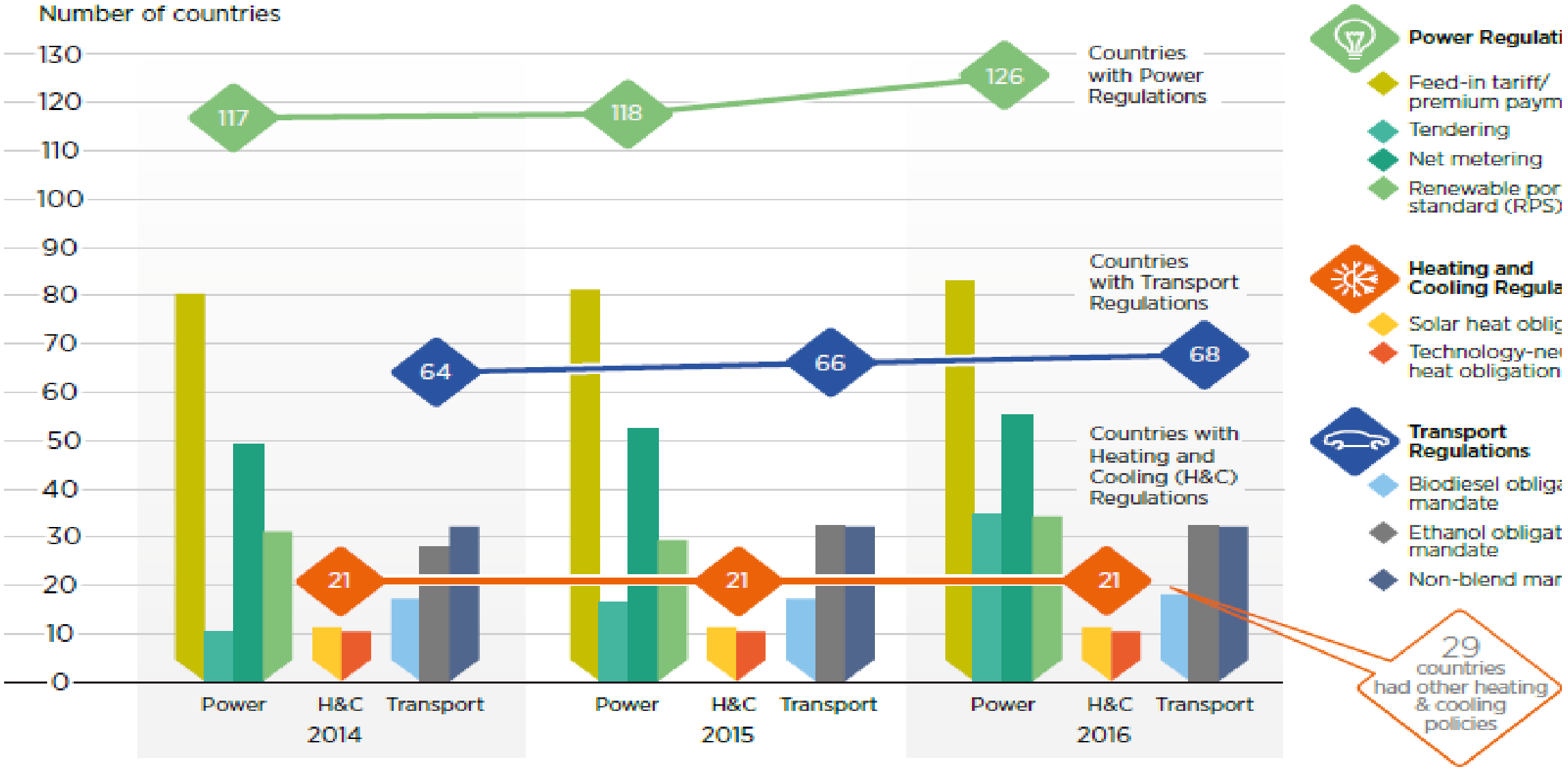
- **Grid integration constraints**
- **Administrative barriers**
- **Market access barriers**
- **Limited access to finance**
- **Design of support schemes**

Potential solutions

Suggested by regional stakeholders

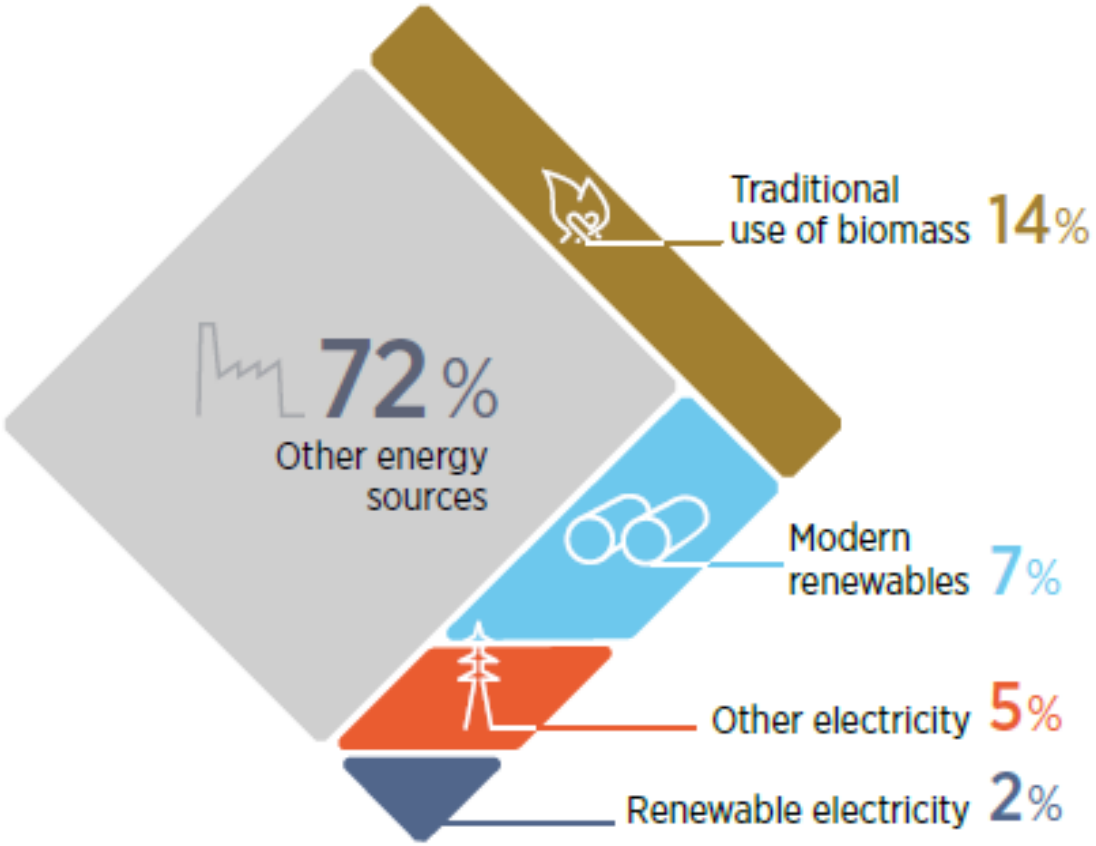
- ✓ Ensure grid access for RE
- ✓ Improve market design to integrate variable renewables
- ✓ Create consistent RE support schemes
- ✓ Streamline regulatory approval for new power plants and transmission lines.
- ✓ Enhance skills and capacities
- ✓ Open markets to IPPs, based on well designed Power Purchase Agreements.
- ✓ REScoops – RE Supply Cooperatives to augment capital available to RE projects

Country RE Regulatory Policies and Measures (2014-16)



Heating Sector: the Cinderella of Renewables Policy

Total global energy consumption for heat in 2015:
More than half of final energy consumption.
But less than a quarter from renewables.



Policy Cluster 1:
District heating

Policy Cluster 2:
Competing with
Natural Gas

Policy Cluster 3:
Industrial heat and hot water

Policy Cluster 4:
Clean cooking

Pockets of Sustainable Bioenergy

- Agriculture
  - Residues associated with growing food production
  - Higher yields on cropland (sustainable intensification)
  - Efficient livestock husbandry, freeing up pasture land
  - Reduced food losses and waste, freeing up farmland
- Forestry
  - Residues (complementary fellings on timberland)
  - Higher yields in planted forests (better management)
  - Afforestation of degraded forest and marginal lands

Bioenergy for Sustainable Development

IRENA – International Renewable Energy Agency
http://www.irena.org/

IEA Bioenergy – International Energy Agency
Technology Collaboration Programme on Bioenergy
http://www.ieabioenergy.com/

FAO – Food and Agriculture Organization of the UN
http://www.fao.org/

Yield Gap: Illustrated by Maize

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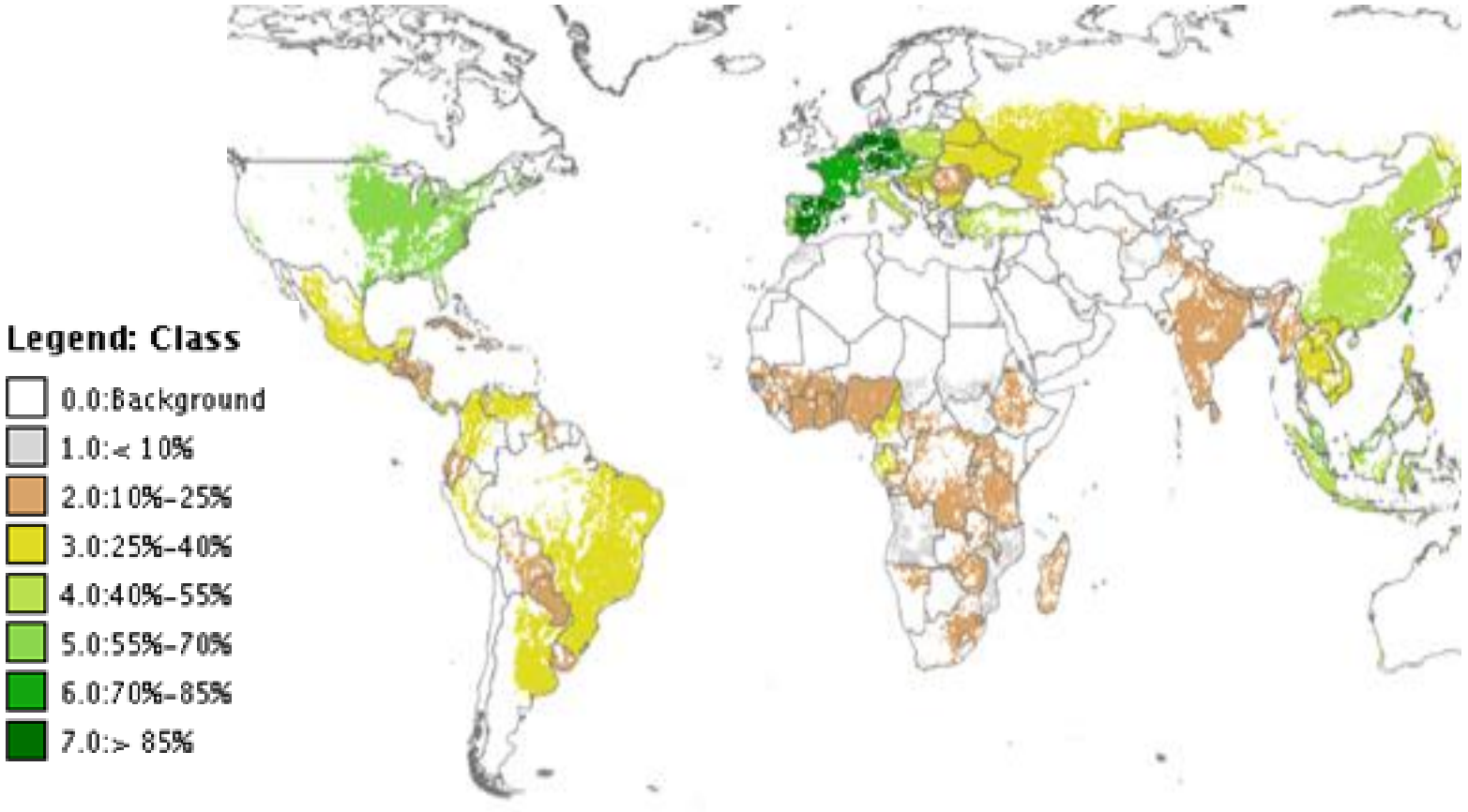
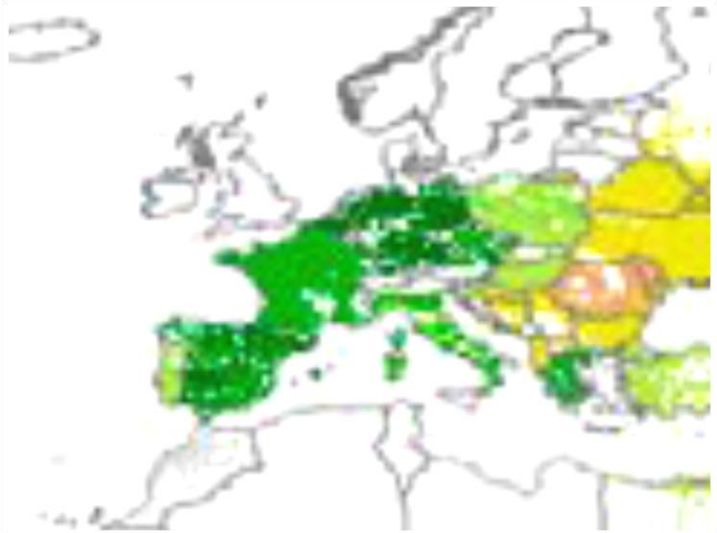
Ratio of Actual to Potential Yield for Maize (Year 2000)



Europe closeup



Source: Global Agro-Ecological Zones

Expansion Measures: Higher Yields

Several measures can help **boost yields** . . . **Agricultural extension services can promote adoption of modern farming techniques** and development of good management practices at a local level, including agroforestry strategies for growing a mix of high-yielding food and fuel crops in different soils and climates. **Secure land tenure can give farmers financial incentives to manage their land for high yields while sustaining soil productivity**.

Restoring Degraded Land

Use of degraded or marginal land is an option for biomass production that **helps restore soil productivity and avoids or mitigates competition for higher quality land. Economic incentives** to promote such land uses should be combined with dissemination of **information on suitable production systems** and experience from previous initiatives, while protecting vulnerable communities.

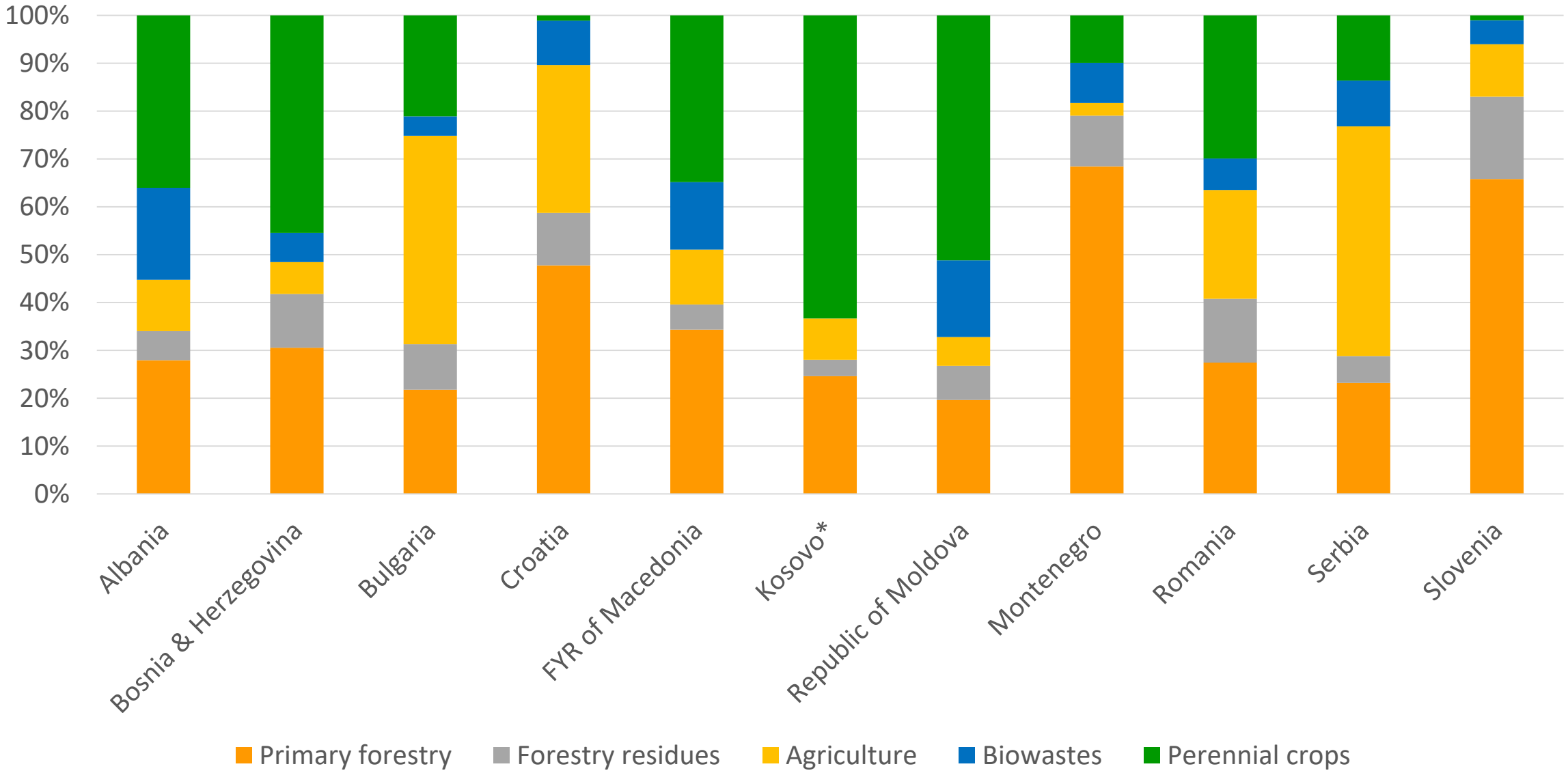
Reduced Food Chain Waste and Losses

Food chain losses could be reduced by promoting good harvesting techniques, investing in storage and refrigeration facilities, developing transportation infrastructure to safely deliver food to markets, **discounting imperfect food items** to encourage their sale, **modifying labels** so food is not discarded prematurely, and **educating consumers** to better match food purchases to their needs.

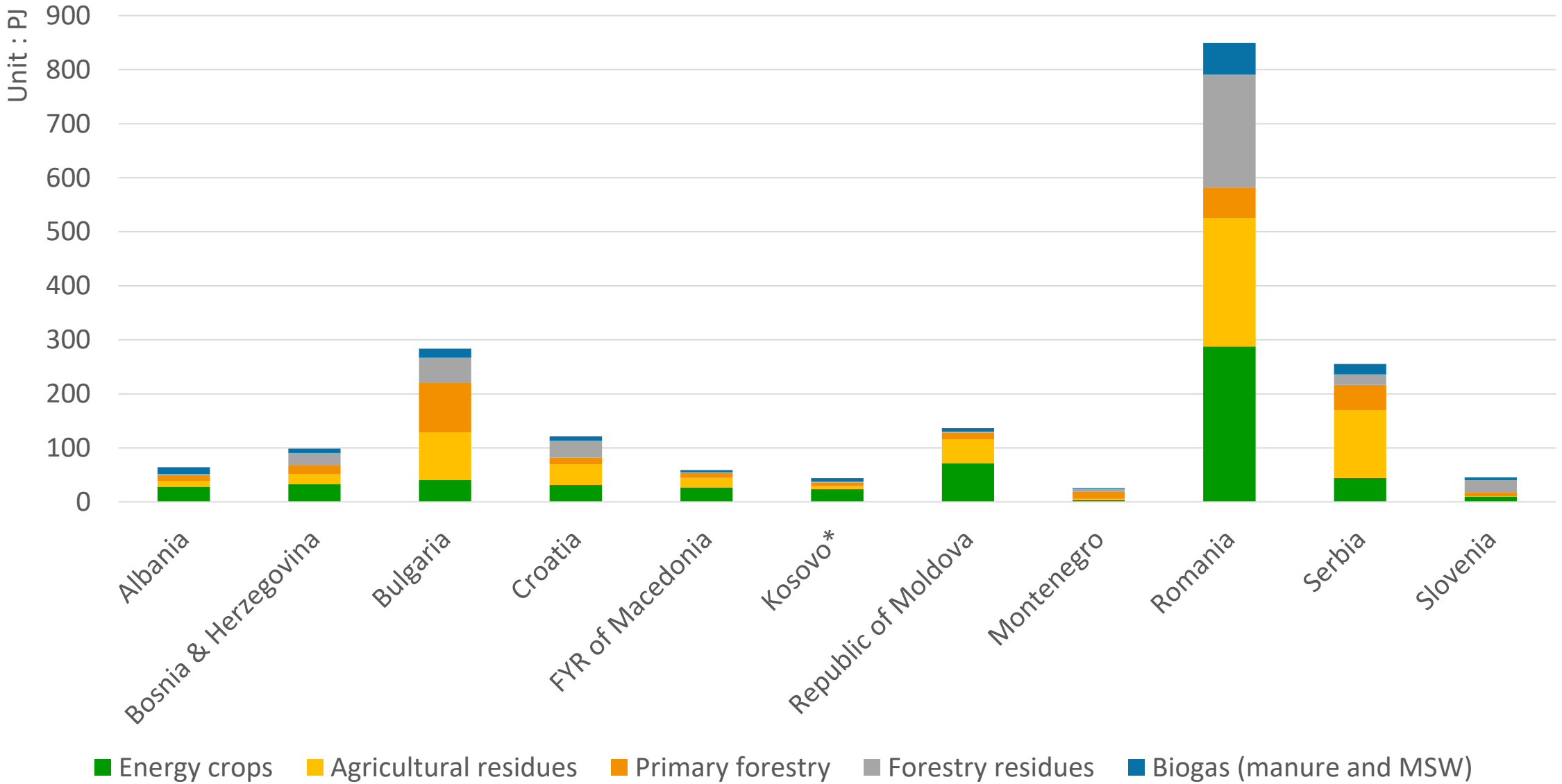
Farm and Forest Residues

Other steps can support **better use of residues and waste from agriculture and forestry value chains**. Examples include incentives for sustainable use of residues, supported by **guidelines to ensure appropriate residue extraction rates** in different conditions. **Soft loans for machinery** can further support the ramping up of bioenergy systems that use residues and waste as feedstock… **Logistical approaches** for cost-effective harvesting and transport of … residues can be disseminated.

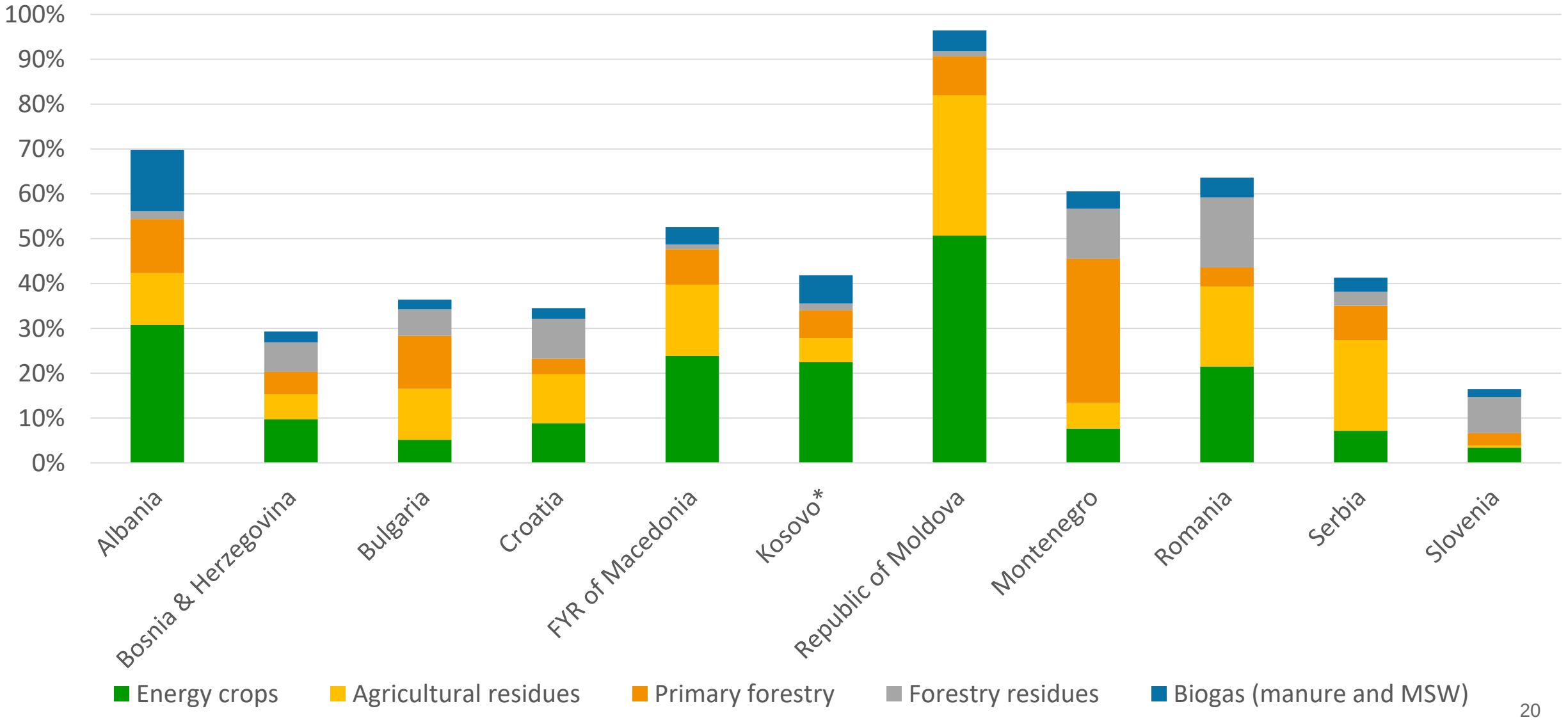
Biomass potential shares per S2Biom assessment for 2020



Pockets of Theoretical Bioenergy Potential in SE Europe



Theoretical Bioenergy Potential vs 2015 TPES in SE Europe



IRENA Project Navigator – Online Platform to Help Developers Form Bankable RE Projects

LEARN

Renewable energy project guidelines with tools & templates

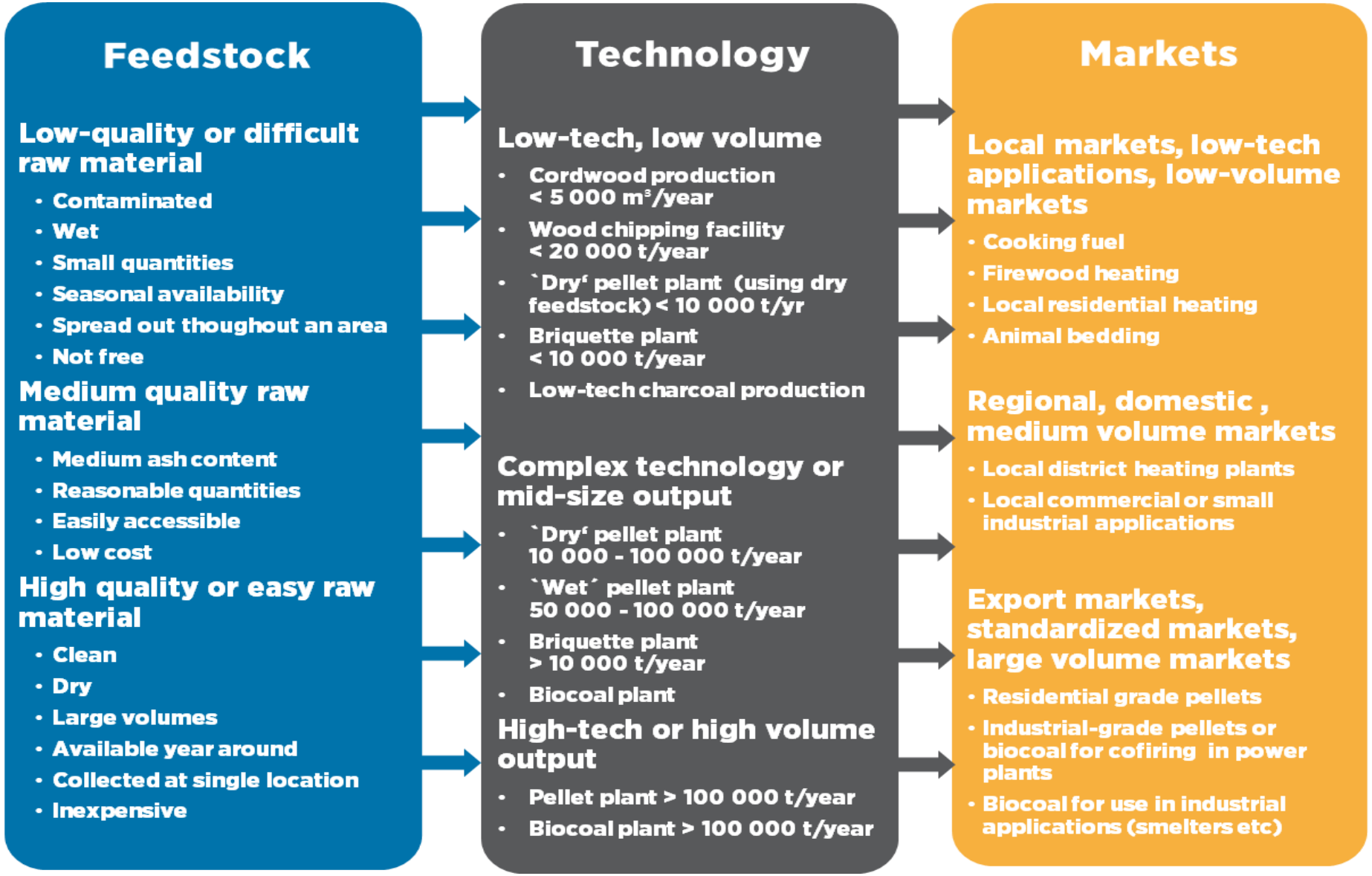
DEVELOP

Interactive online workspace to develop bankable project proposals

FINANCE

Curated search engine of renewable energy financing instruments

Bankability Requirements for Woody Biomass



Early project development phases

Identification | Screening | Assess -ment | Selection | Pre-development | Development | Construction | Operations | Decommissioning

- **Project Identification:** Most bioenergy projects respond to a specific demand or opportunity,
- **Project Screening:** Match a raw material supply to a market and a technology.
- **Project Assessment:** Compare project options, considering feedstock cost and the market price of biofuel to be produced.
- **Project Selection**: Assess the optimum plant size – large enough to obtain scale economies and serve the market, small enough to ensure reliable feedstock supply.

Late project development phases

Identification | Screening | Assessment | Selection | **Pre-develop-ment** | **Develop-ment** | Construction | Operations | Decommissioning

- **Engineering** studies are performed, including the conceptual design of the processing plant. Technology options, constraints and costs are evaluated, technology performance modeled
- **Economics** of feedstock supply and biofuel product sale are formalised by memoranda of understanding (MoUs) which detail terms and conditions for pricing, quality and deliveries.
- Developers must obtain detailed engineering reports and permits, negotiate with investors, turn MoUs into actual contracts, and finalize arrangements for debt and equity financing.
- Navigator covers bankability requirements, contracting approaches, financing alternatives, financial modelling, and project risk mitigation.

Project implementation and operation

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Identification | Screening | Assessment | Selection | Pre-development | Development | **Construc-tion** | **Opera-tions** | **Decommis-sioning**

- **Construction** should be governed by a project **master plan** that results in a **commissioning report** and **acceptance certificates** for key plant components.
- **Operations** phase should be planned to achieve and consistently **maintain projected production levels and product quality**.
- **Feedstock quality, storage and processing** practices should be **closely monitored**.
- **Decommissioning** should consider regulations and stakeholder input, recognising that grid components have different lifetimes.

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