



Danube Bioenergy Nexus

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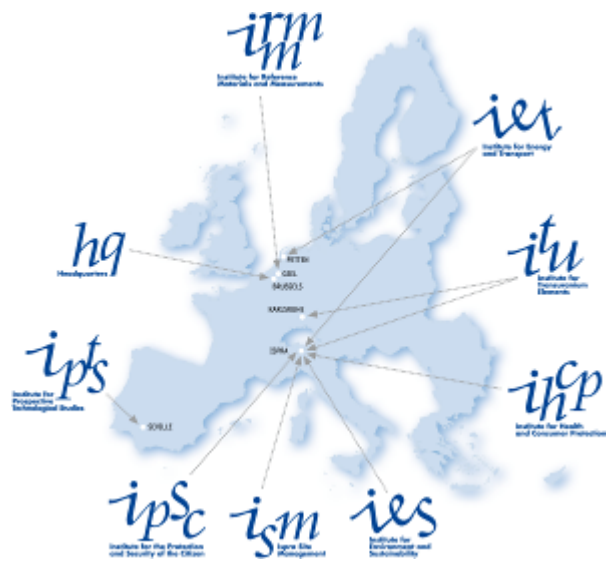
Task Coordination Meeting, Danube-INCO.NET Project
29 April 2014
CEI Headquarters, Trieste, Italy

www.jrc.ec.europa.eu



Serving society
Stimulating innovation
Supporting legislation

Who are we?



JRC: the European Commission's in-house science service

Institute for Energy and Transport 1 of the 7 scientific institutes of the JRC

Our mission: *“provide support to Community policies and technology innovation to ensure sustainable, safe, secure and efficient energy production, distribution and use and to foster sustainable and efficient transport in Europe”*

Main activities:

- Renewable energies
- Sustainable & safe nuclear energy
- Energy techno/economic assessment
- Hydrogen and fuel cells
- Clean fossil fuel
- Energy efficiency
- Security of energy supply
- Sustainable transport

As a Directorate-General of the European Commission, the JRC provides customer driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies.

What do we do? REU scientific strategy

Policy Area:

JRC Response:

Energy Efficiency

EC Energy Efficiency Office
Policies for buildings, products and cities

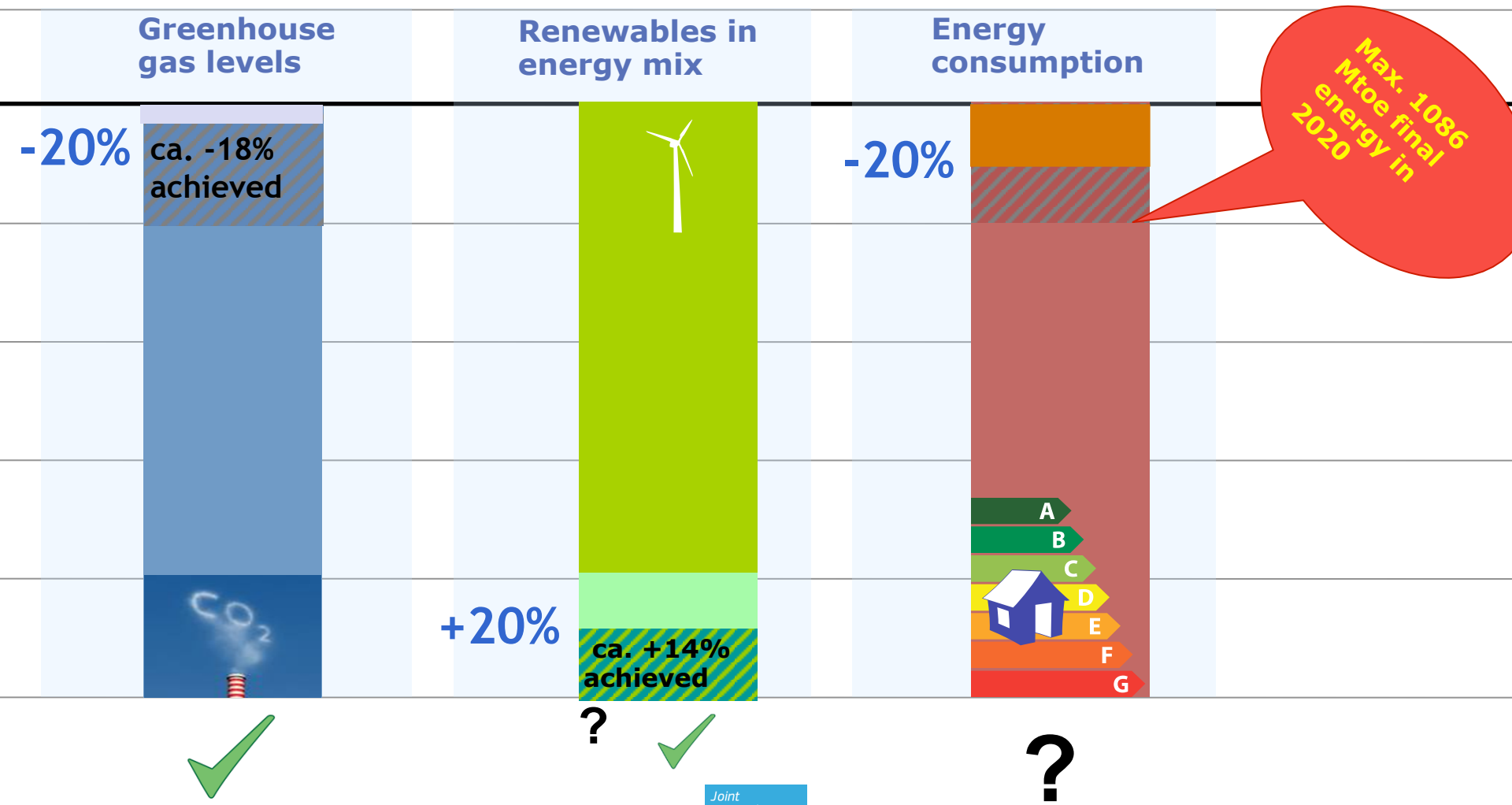
Renewable Energy

Mapping and Monitoring
Resource assessment and Implementation

Standards and Innovation on PV

PV Reference Laboratory
PV Systems evaluation and PV Status

The EU 20-20-20 policy: Where are we today?



Renewable Energy Mapping & Monitoring in Europe and Africa

Activities

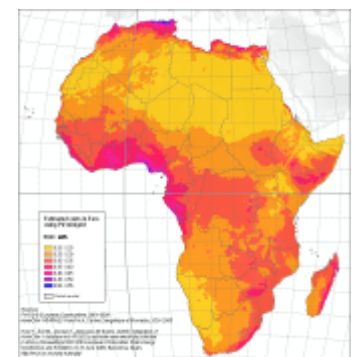
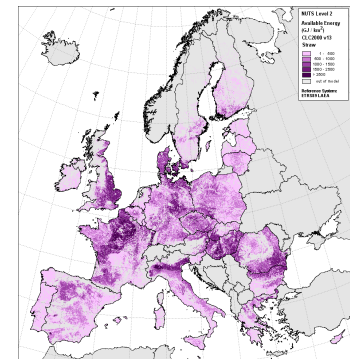
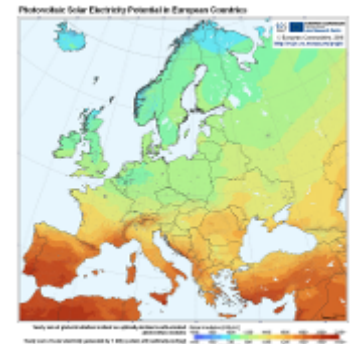
Monitor the implementation of the RES Directive
2009/28/EC

Support Commission evaluation process for Member
State reports

Assess resource use and potential: biomass,
biofuels, solar, wind, geothermal

Technology assessment

Engage in the EU-Africa Energy Partnership



EU Renewable Energy Policy

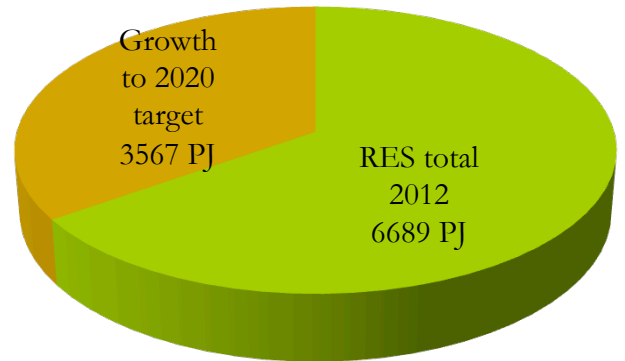
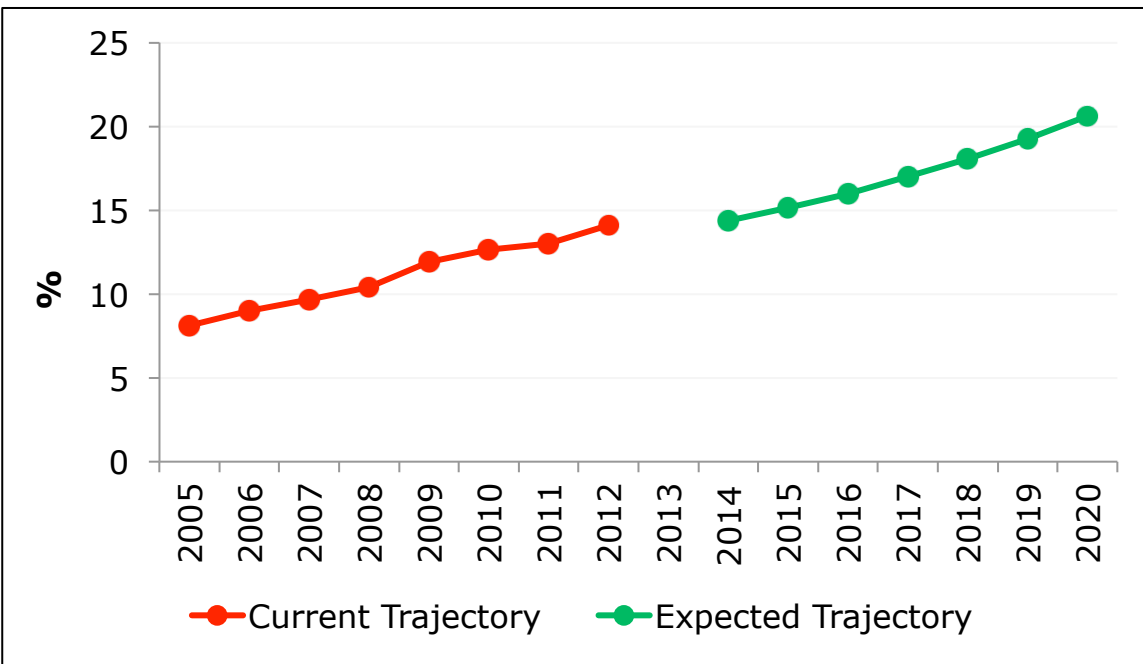
RES Directive 29/2009: Mandatory 2020 target:

20% share of Renewable Energy Sources in Consumption

- Individual mandatory targets for the Member States
- National Renewable Energy Action Plans
- Fixed trajectory,
- bi-annual Progress Reports

RES development

Member State Bi-Annual Progress Reports and National Renewable Energy Actions Plans



Biomass availability

Because Renewable Energies sources are mostly **SPARSE** and/or **IRREGULAR**, a careful potential evaluation should be geographically based.

Statistical databases (regional level)

- agricultural crops: area, yield, production
- forest data: forest area, growing stock, annual increment
- land use

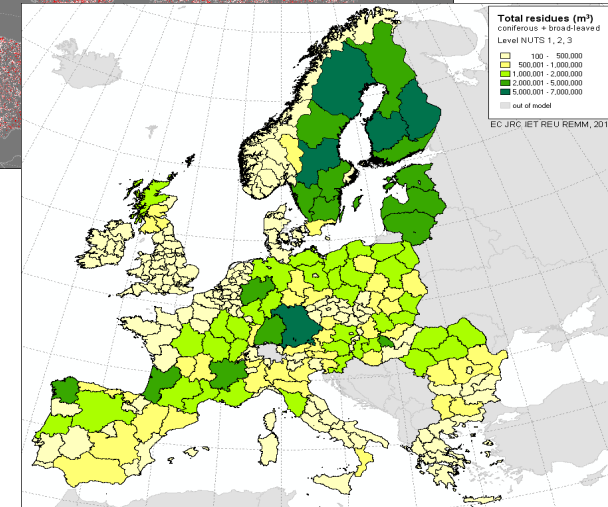
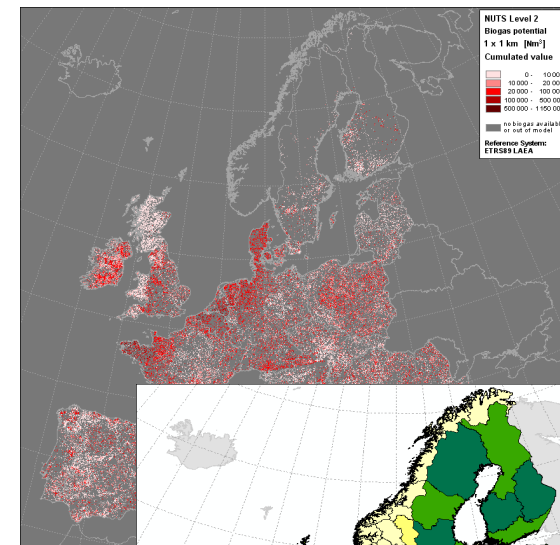
Spatial datasets

- CORINE Land Cover 2000
- forest map
- soil maps
- terrain map
- road map

Geographical Information System (GIS)

JRC maintains spatial data on: Agriculture, Forest, Land Use, Soil, Transport infrastructures.

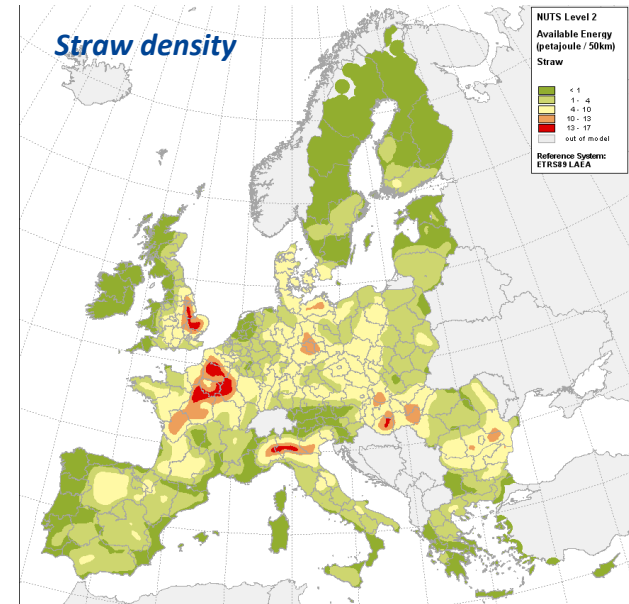
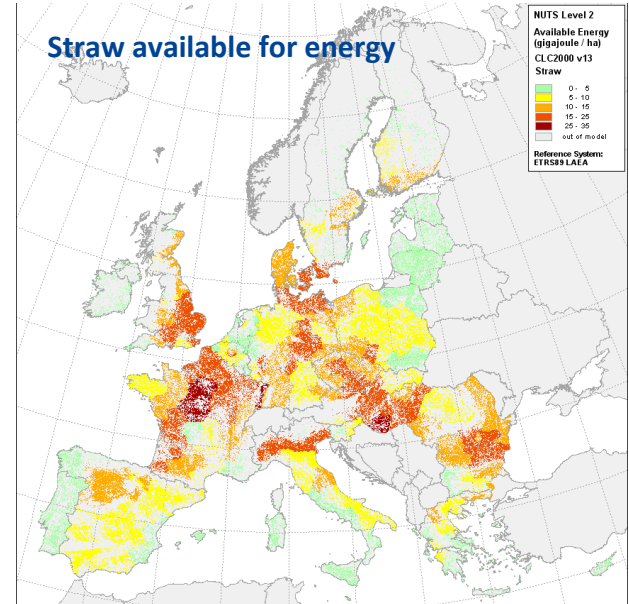
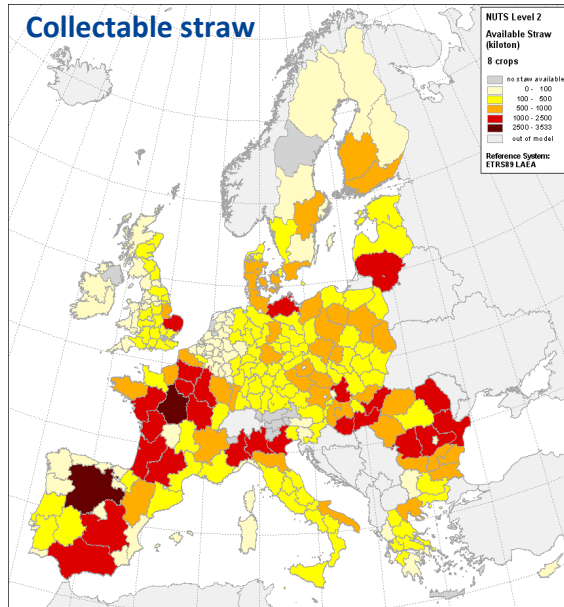
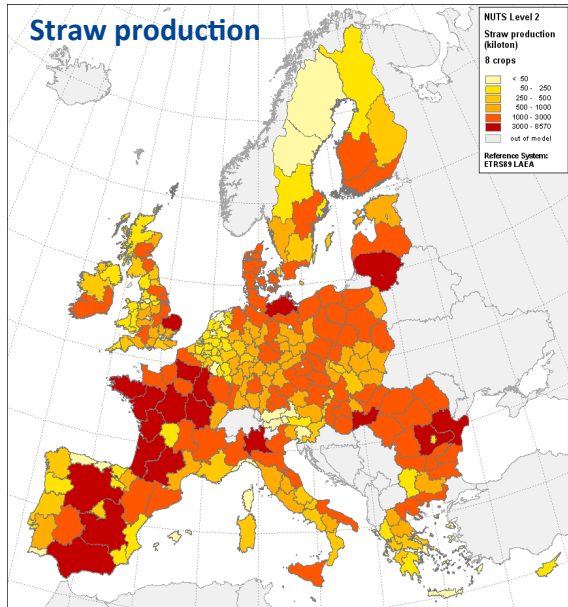
All this data are valuable for an integrated biomass assessment potential covering the whole EU.



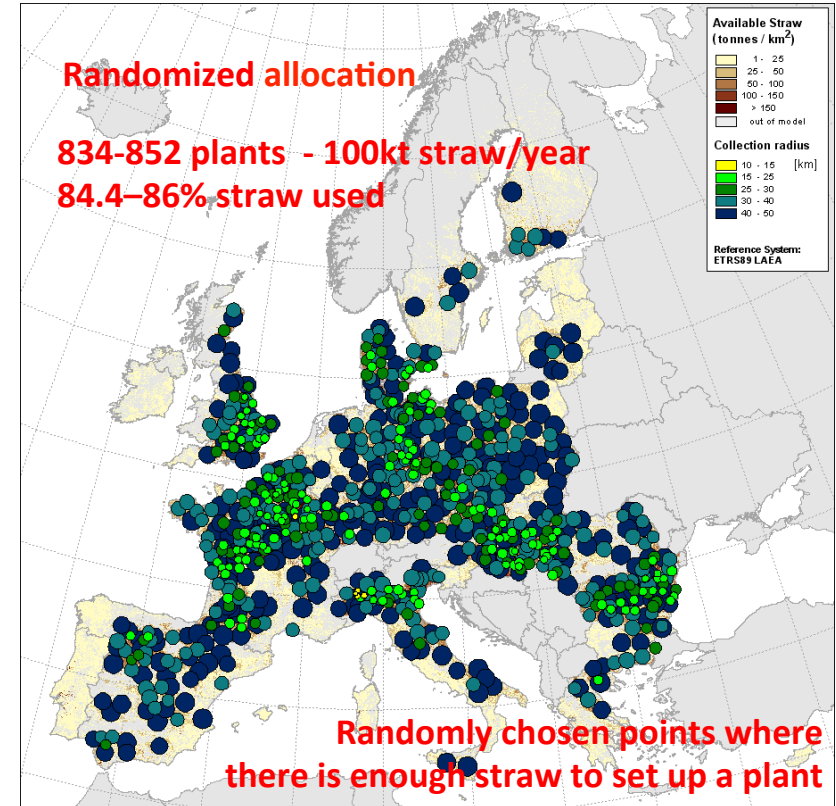
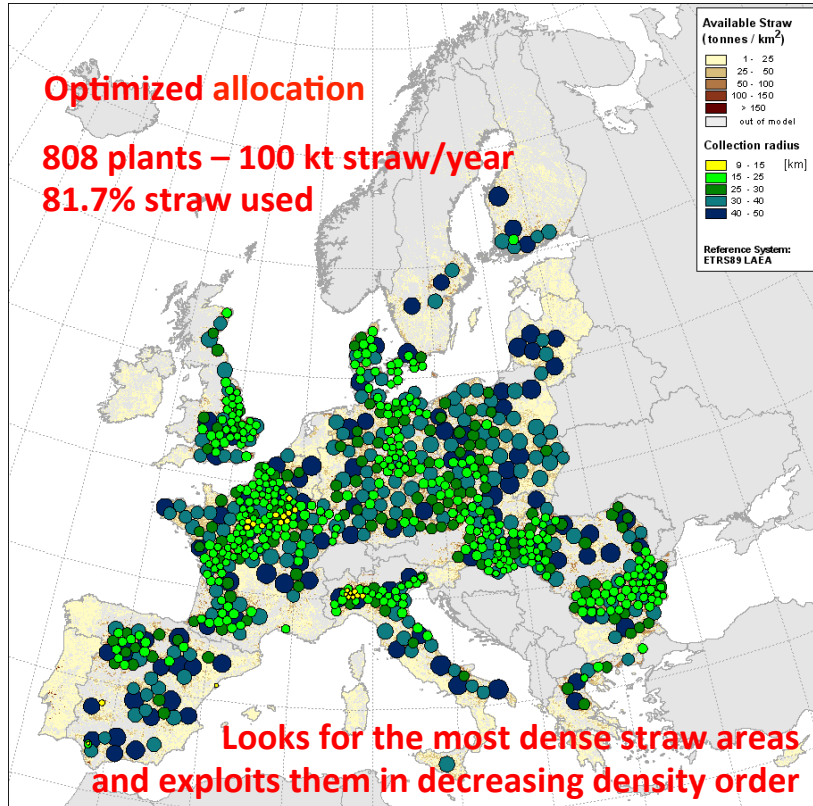


European Commission

GIS-based assessment of EU crop residues



Localization of straw-based power plants



Contents lists available at SciVerse ScienceDirect

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser



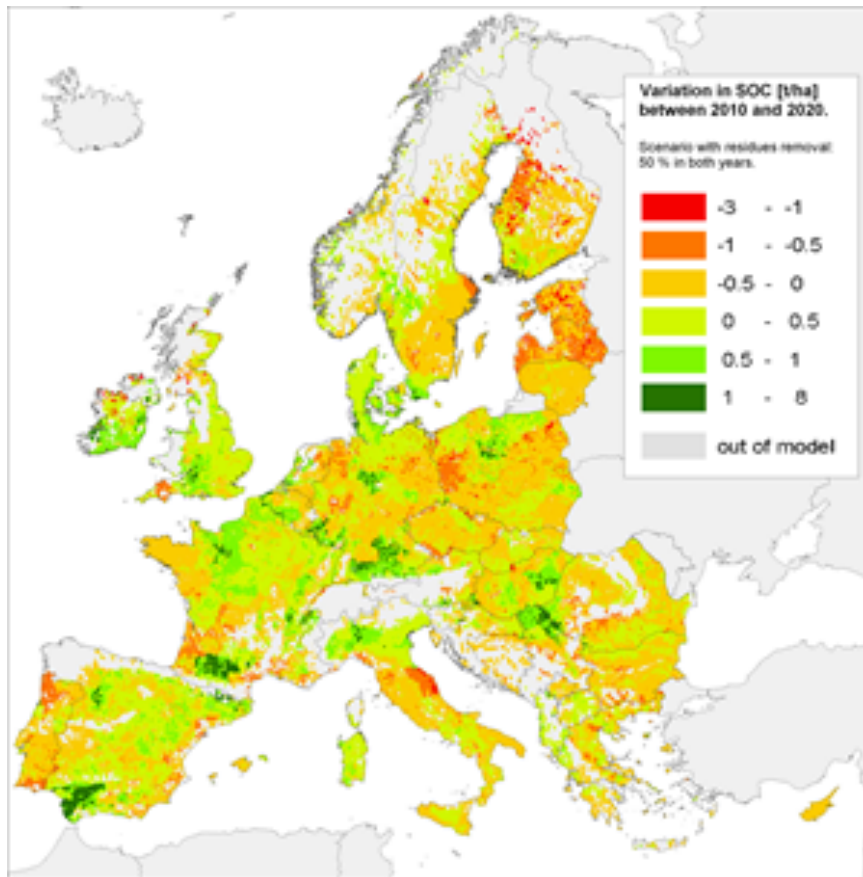
The possible contribution of agricultural crop residues to renewable energy targets in Europe: A spatially explicit study[☆]

F. Monforti*, K. Bódis, N. Scarlat, J.-F. Dallemand

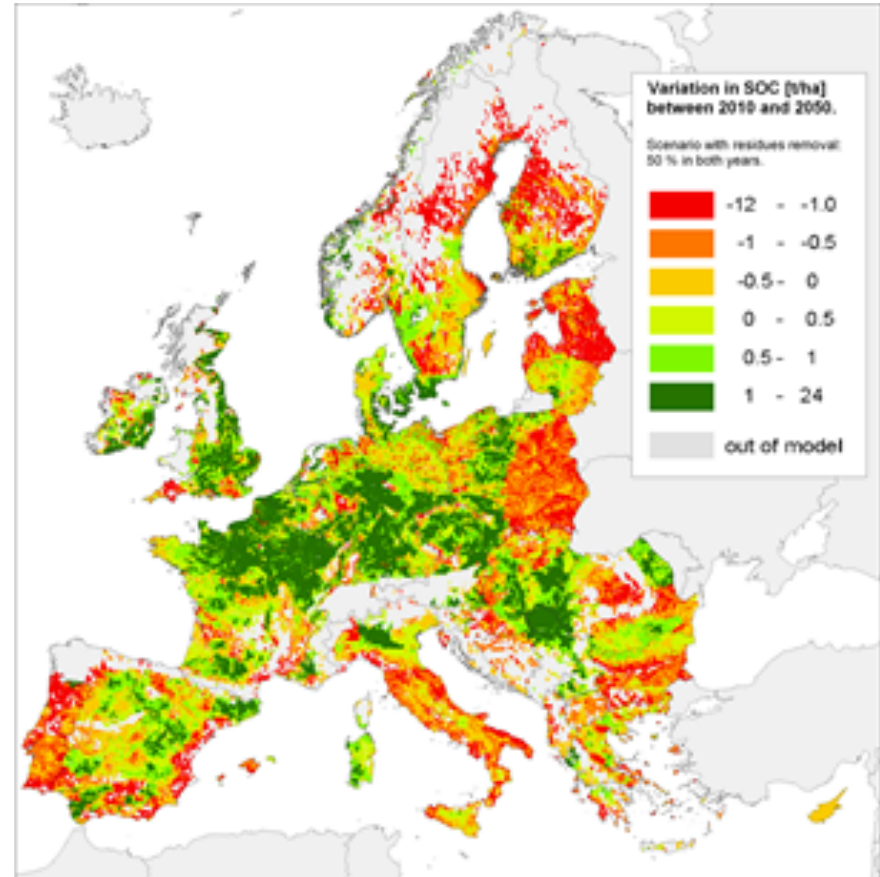
European Commission, JRC, Institute for Energy and Transport, Renewable Energy Unit, Via E. Fermi 2749, TP 450, I-21027 Ispra (VA), Italy

Sustainability of residues collection - soil carbon preservation

Optimal energy use of agricultural crop residues preserving soil organic carbon stocks in Europe (Submitted 2014, Renewable & Sustainable Energy Reviews).



Collection “standard” 2010-2020



Collection “standard” 2010-2050

Land use for bioenergy

- assessment based on the NREAPs projections (E, H&C and biofuels)
- availability of domestic biomass from forestry, agriculture and waste
- additional import of biomass
- availability of 2° generation biofuels and bioliquids
- domestic and imported biofuels and bioliquids

Scenarios

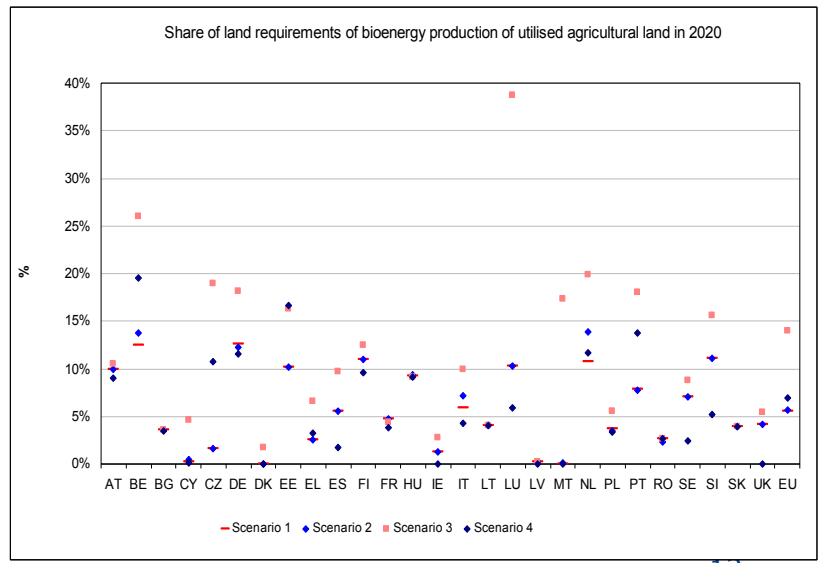
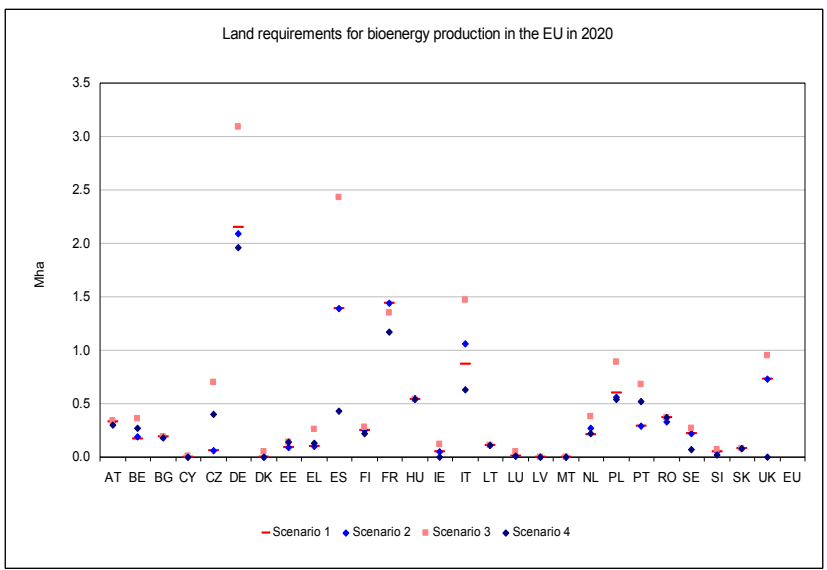
1. NREAPs reference scenario
2. Additional import of biofuels scenario
3. No 2nd generation biofuels scenario



Possible impact of 2020 bioenergy targets on European Union land use. A scenario-based assessment from national renewable energy action plans proposals

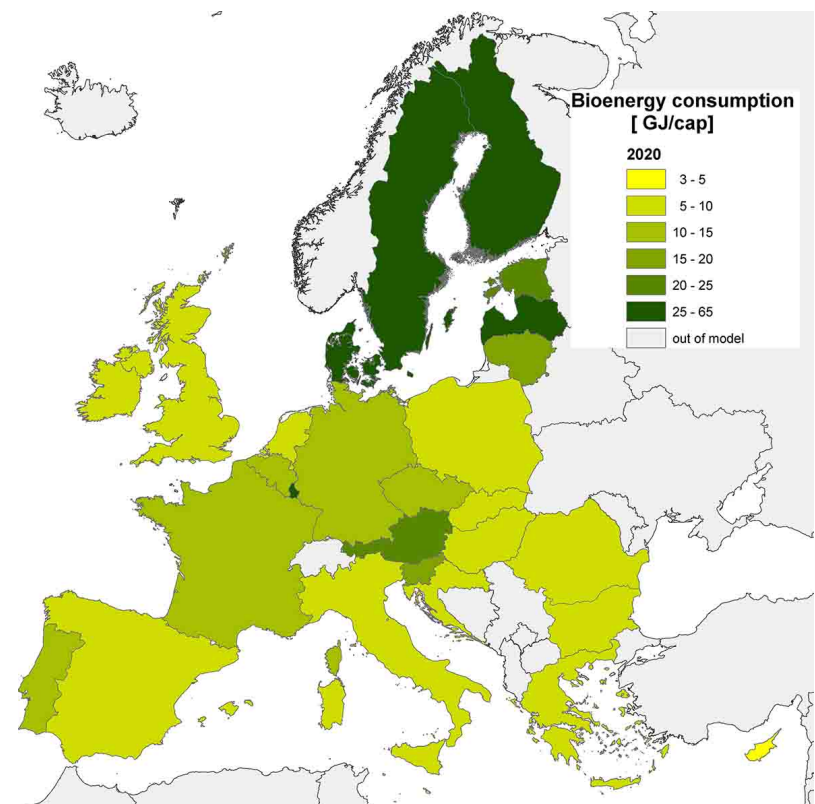
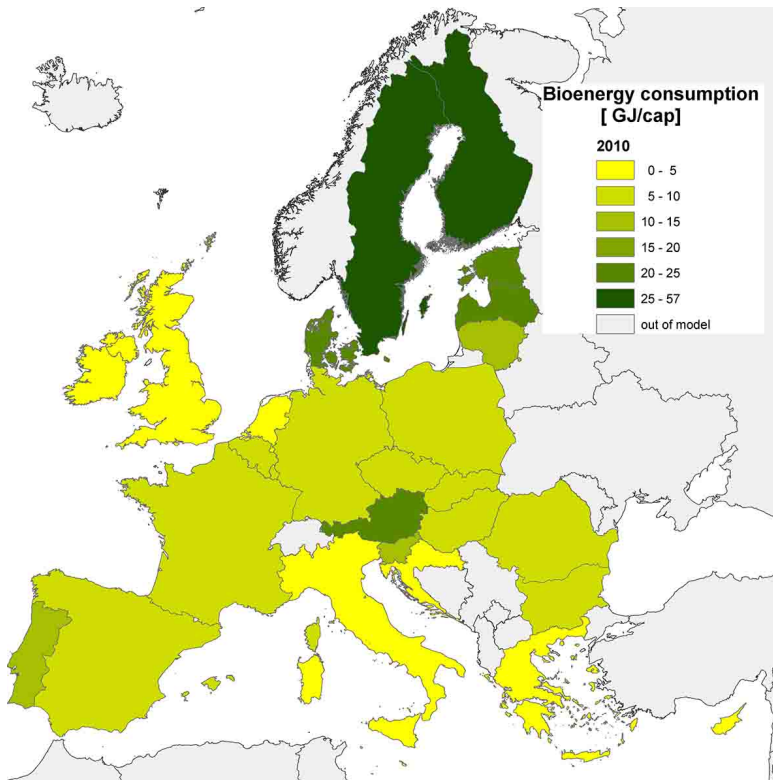
Nicolae Scarlat*, Jean-François Dallemand, Manjola Banja

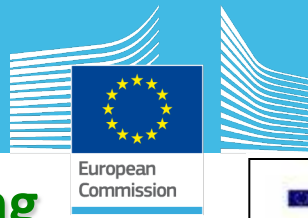
European Commission, Joint Research Centre, Institute for Energy and Transport, Renewable Energy Unit, Via E. Fermi 27-49, I-47030, 20027 Ispra, VA, Italy



Bioenergy in EU 28 (GJ/capita)

Member State Bi-Annual Progress Reports and National Renewable Energy Actions Plans





European Commission

Scientific/Technical Networking

Extending RES sustainability criteria to solid and gaseous biomass, The Hague, Uppsala, Toronto, 2012 - JRC, IEA, INAS, NL Agency

Agro-environmental impact of biofuels and bioenergy (EUROCLIMA), UNICAMP/CTBE Campinas, Brazil, 2011.

Greenhouse gas emissions from biofuels and bioenergy (EUROCLIMA), INTA, Buenos Aires, Argentina, 2011.

The effects of increased demand for biofuel feedstocks on the world agricultural markets and areas, Ispra, 2010.

Review and inter-comparison of modelling land use change effects of bioenergy, OECD/EEA, Paris, 2009.

Direct and indirect impact of biofuel policies on tropical deforestation in Malaysia, MPOC, Kuala Lumpur, Malaysia, 2008.

Sustainable Bioenergy Cropping Systems for the Mediterranean, Madrid 2006 - JRC, EEA, CENER, CIEMAT.

Cereal straw resources for bioenergy in the European Union, 2006, Pamplona, Spain, CENER.

Cereals straw and agricultural residues for bioenergy in New Member States and Candidate Countries, 2007, Novi Sad, Serbia.



Biomass resource assessment for biofuels/bioenergy and competition with other biomass uses, Eberswalde University/EEA, Eberswalde, Germany, 2009.

SRF, SRC and Energy Grass in the European Union: Agro-environmental component, present use and perspectives, 2007, Harpenden -EEA, Rothamsted.

EU Forest-based biomass for energy: cost supply relations and constraints, Metla/EFI, 2007, Joensuu

Danube Bioenergy Nexus Scientific Support to the Danube Strategy Initiative

Priorities

Energy Production

Agriculture Development

Environmental Protection





Danube Bioenergy Nexus

The initiative aims at bringing together experts from the whole area and a specific attention will be paid to associating

- National institutions (including research institutions)
- International partners (including the International Bioenergy Task 43 on Biomass feedstock for energy markets)
- EU Initiatives such as for example the JRC Enlargement/Integration/Neighbourhood Programme or Horizon 2020

Two meetings are currently in preparation

Vienna - June 2014

Kiev - September 2014



European
Commission

Draft programme

**High-level event on the
Scientific Support to the Danube Strategy
24-26 June 2014, Vienna**



**organised in the frame of the
Annual Forum of the EU Strategy for the Danube Region,
26-27 June 2014, Vienna**





Danube Bioenergy Nexus

Aim: address the challenges and opportunities of bioenergy in the Danube Region

Main activities

- Local Bio-Heat
- Agricultural biomass feedstock for biogas
- Statistical assessment of bioenergy status and progress in Danube countries
- Public support schemes and funding mechanisms for bioenergy
- Assessment of agricultural crop residues availability
- Scientific and Technical Networking in the field of bioenergy
- Feasibility study on transport of biomass in Danube River

Bioenergy deployment in Danube Region (in print)

9 EU Member States

AT, BG, HR, CZ, DE, HU, RO, SK and SI

7 non-EU countries

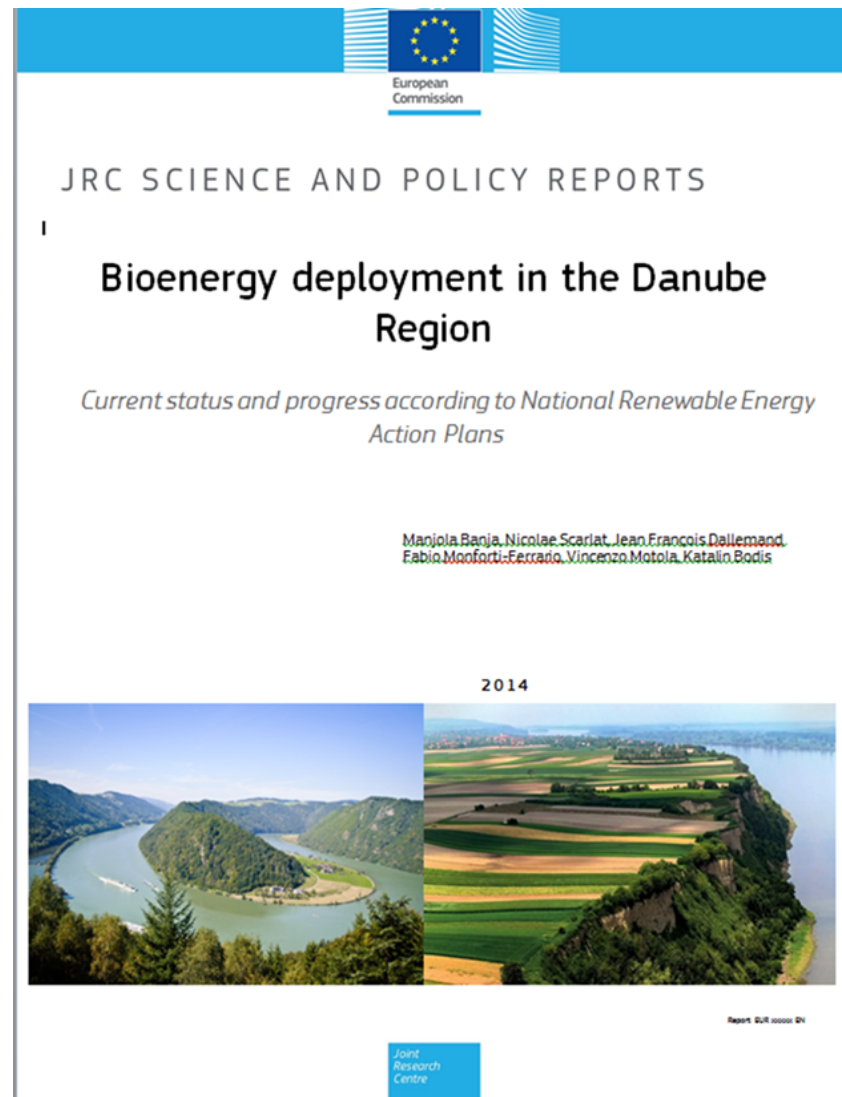
UA, MD, RS, BiH, AL, ME and FYROM

Sectors

- Heating/Cooling
- Electricity
- Transport

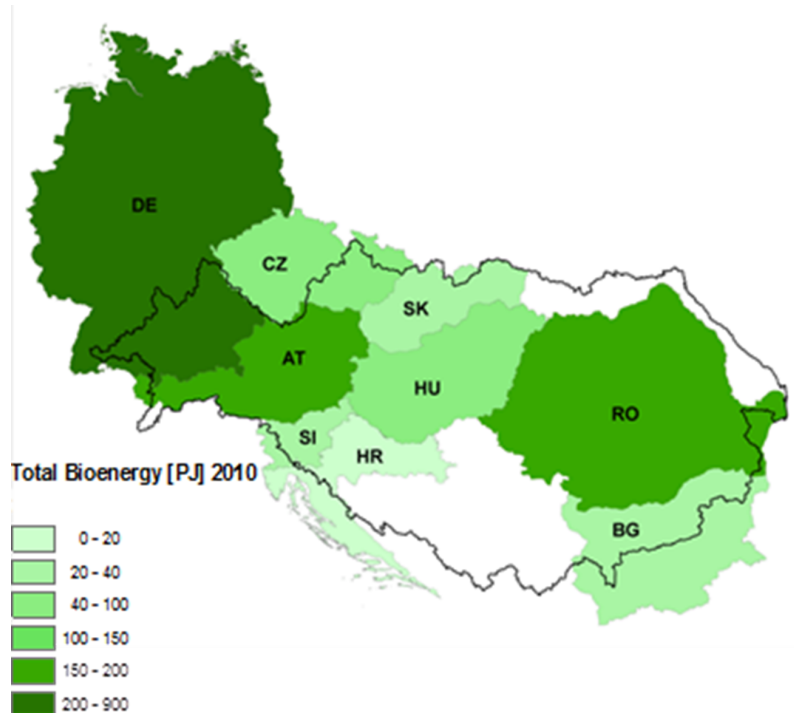
Biomass supply

- Forest
- Agriculture
- Waste



Bioenergy deployment in Danube Region

In 2010 bioenergy covered two-third of total RES in EU Danube Countries



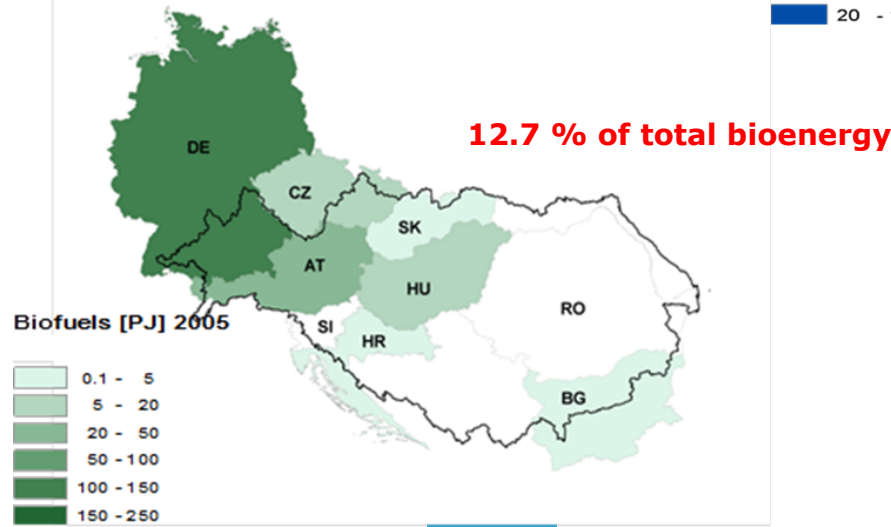
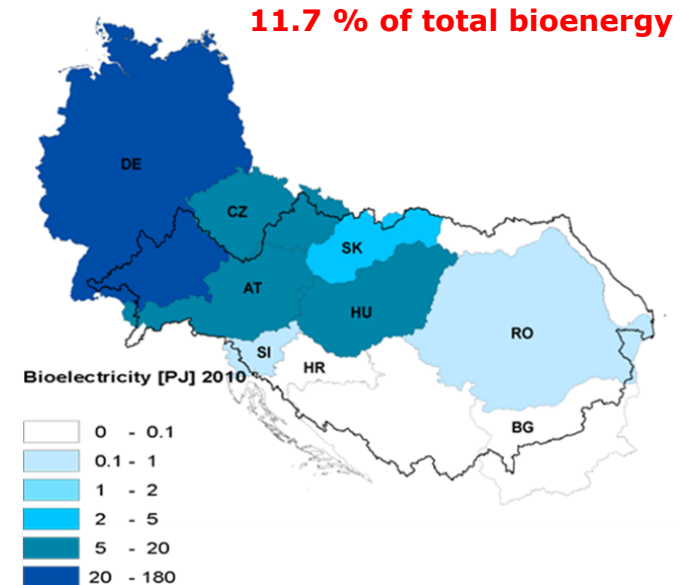
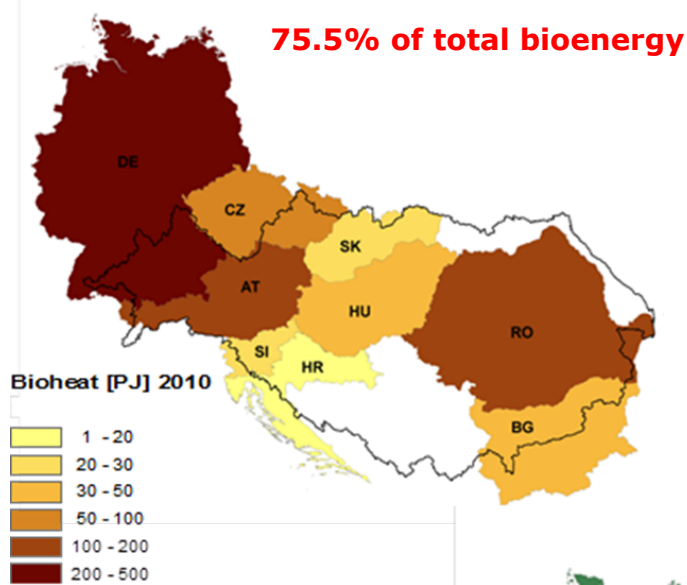
Expected growth of bioenergy in Danube Region

In 2020 bioenergy is expected to cover 57.8% of total RES in EU
Danube Countries



Bio-Heat, Bioelectricity and Biofuels in Danube Region – 2010

Bi-annual Progress Reports

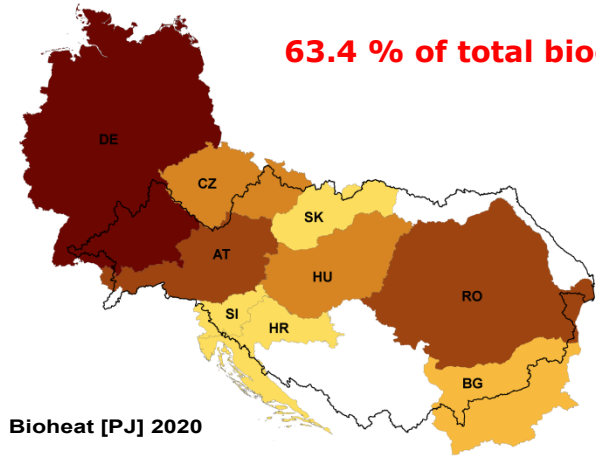




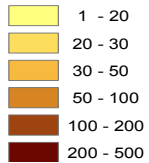
European Commission

Bio-Heat, Bioelectricity and Biofuels in Danube Region -2020 National Renewable Energy Action Plans

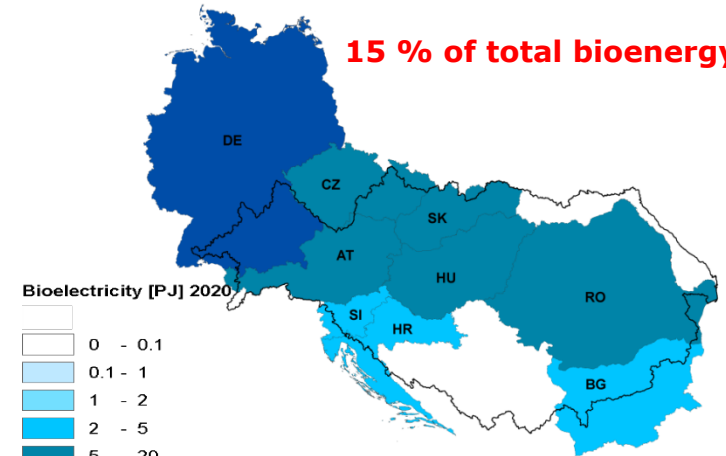
63.4 % of total bioenergy



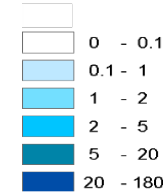
Bioheat [PJ] 2020



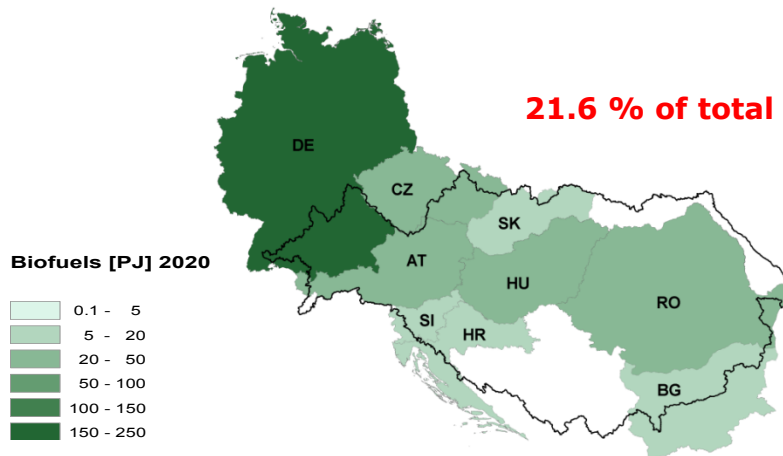
15 % of total bioenergy



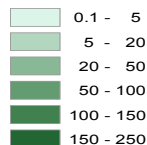
Bioelectricity [PJ] 2020



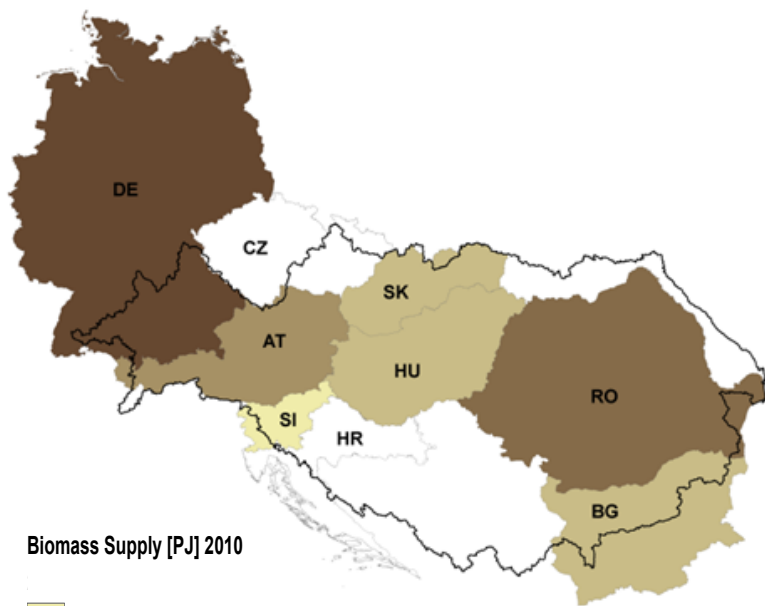
21.6 % of total bioenergy



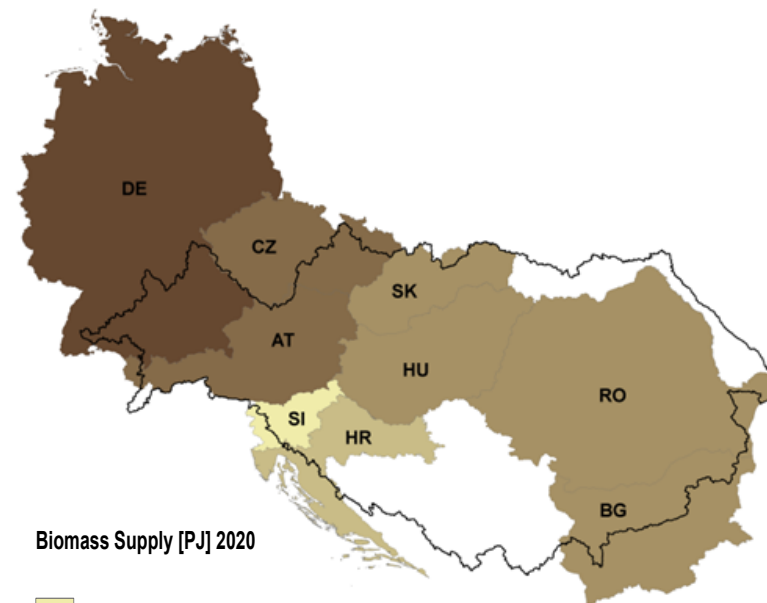
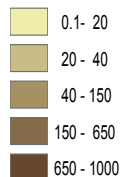
Biofuels [PJ] 2020



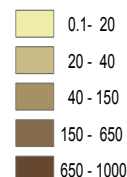
Current and expected biomass supply in Danube Region



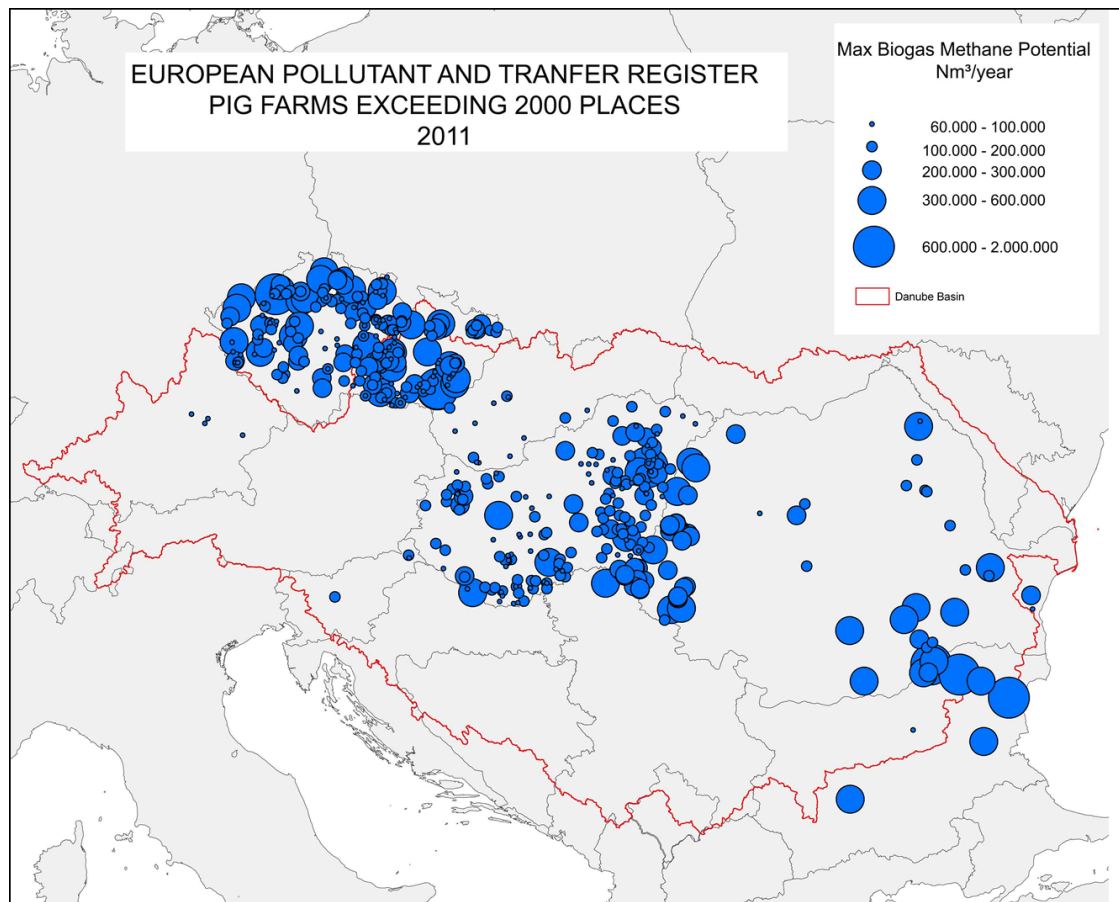
Biomass Supply [PJ] 2010



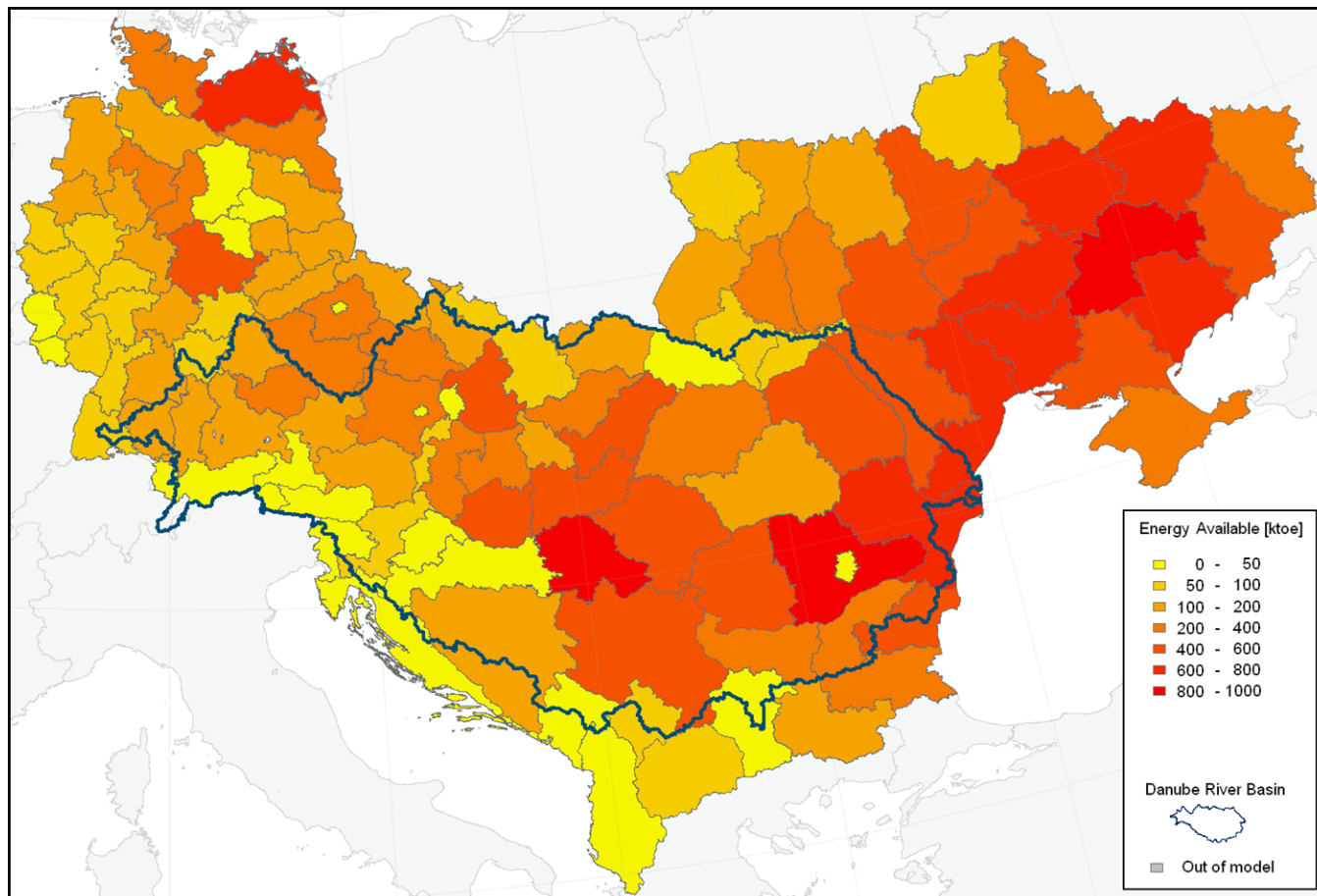
Biomass Supply [PJ] 2020



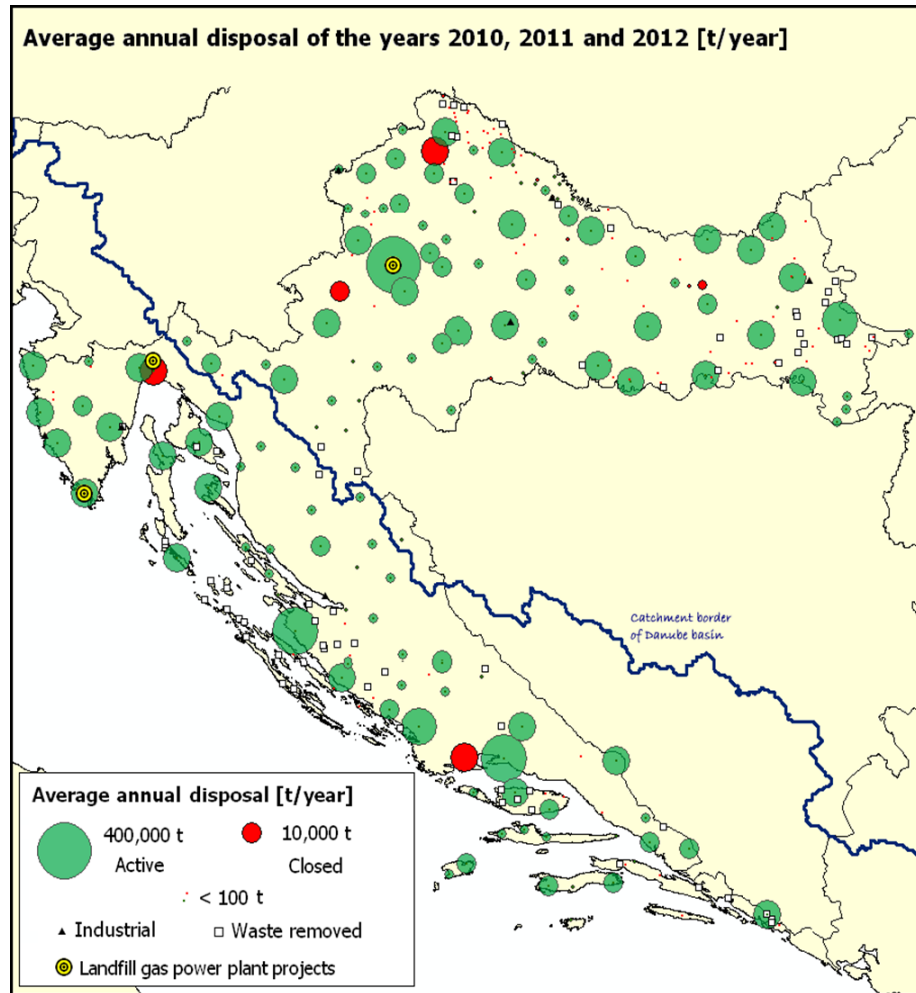
Biogas Methane Potential



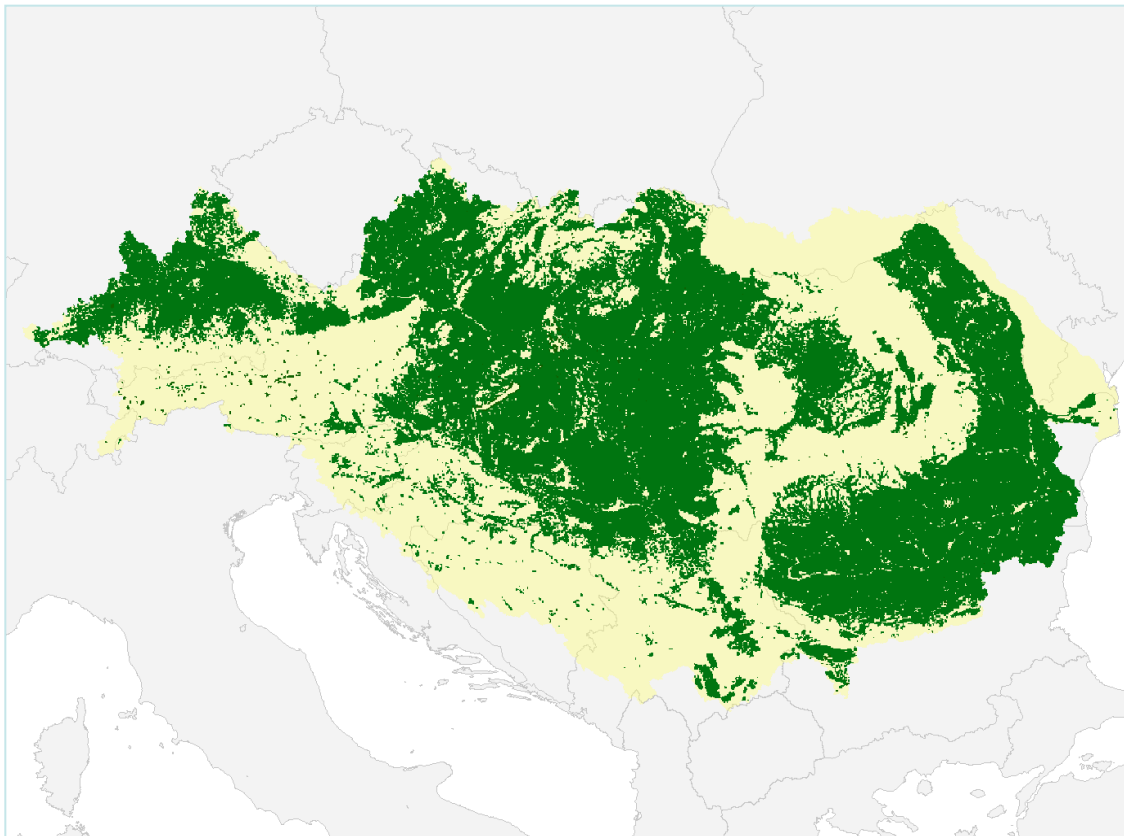
Energy potentially available from agricultural crops residues



Waste to Energy - Croatia



There are 23.060.694 hectares of arable land in the Danube Basin



Legend

Arable land CLC 2006



Challenges....

We need common data for ALL Danube River Countries
We need economic data on:

Energy Prices

Fuel

Electricity

Heating Energy (Coal, Oil, Wood ...)

Agricultural data:

Products, Yields

Water Consumption

Economic Value

Environmental Constraints

Thank you on your attention!

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