

Welcome!

Welcome to the parallel presentations on
DSS for the Case studies!

EURAC
research



Jecami

Jecami interface: theoretical hydro power potential



Pilot Region r.green

Step 1. Select the renewable energy source:

Forest Biomass **Hydro-power**

Hydro-power

Step 2. Choose the level of potential:

Theoretical **MFD** **Technical** **Economic**

Step 3. Select the output map:

Natural Capital **Potential** **CO2 savings** **Net present Value**

Step 4. Choose MFD as a percentage of the mean annual discharge(%):

Current: 25 50

Step 5. Choose the maximum length of exploited river (m):

100 400 800 Max

Step 6. Choose the price of energy:

0.1 0.2 0.3

Calculate results

The data are not already loaded to the Jecami system

Jecami interface: theoretical hydro power potential



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Jecami interface: theoretical hydro power potential



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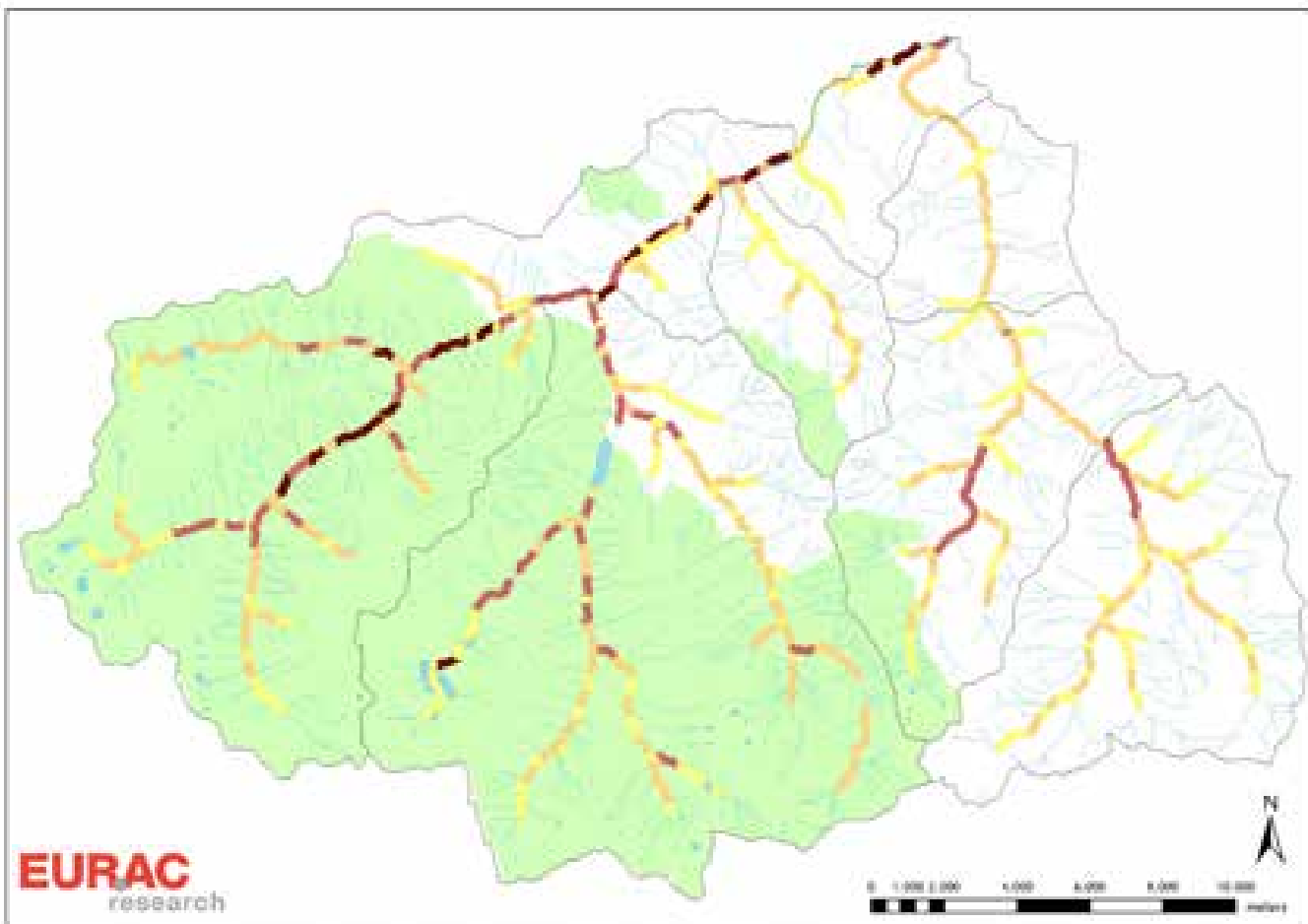
Step 6. Choose the price of energy:

0.1 0.2 0.3

Calculate results

The data are not already loaded to the Jecami system

Theoretical: potential map



Legend

potential power

 low

 medium-low

 medium

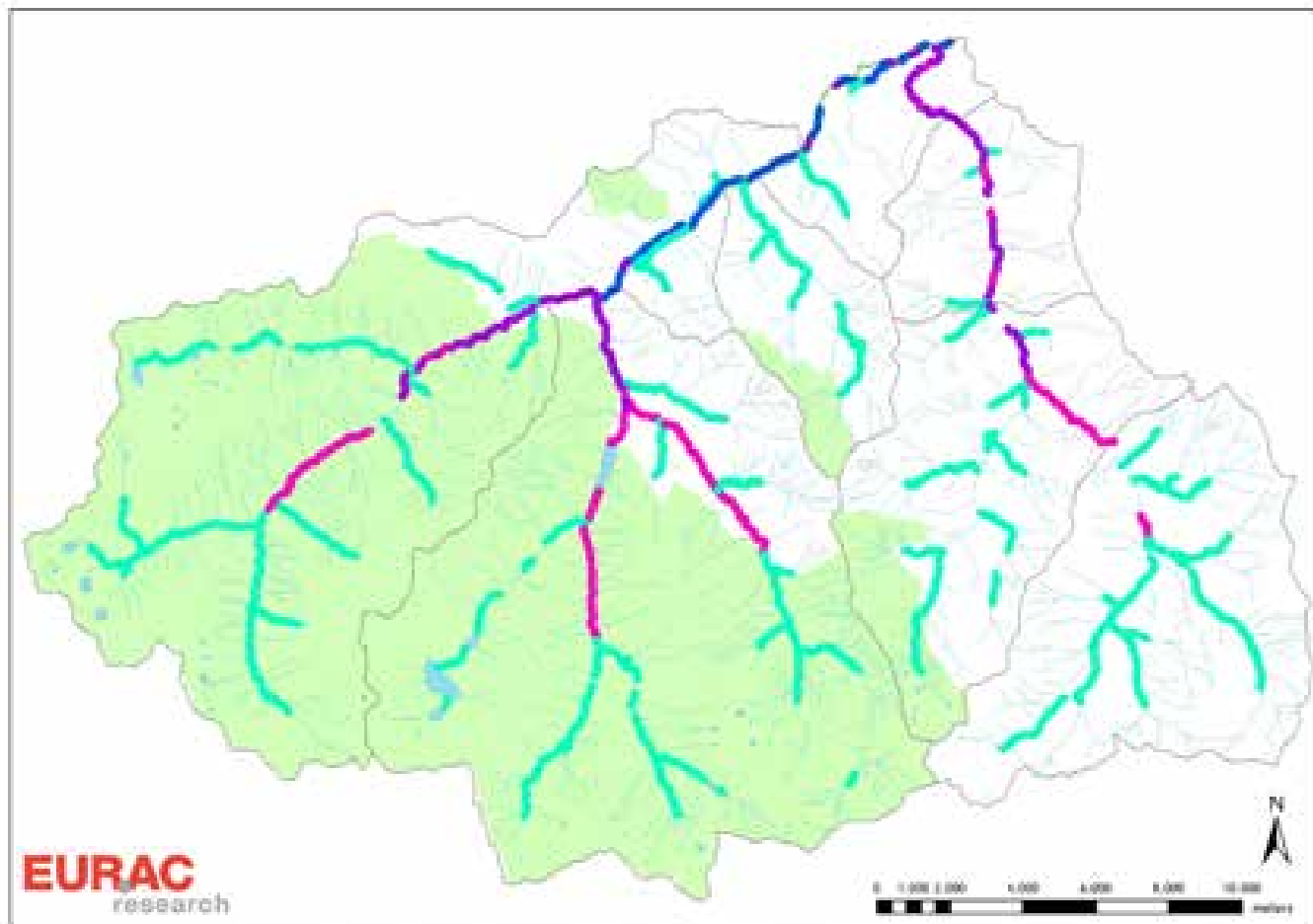
 high

 natural park

**Gesso and Vermenagna
valleys**



Natural discharge map

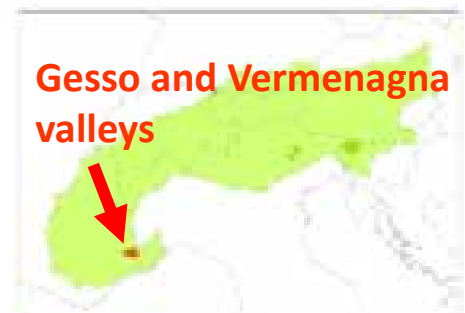


Legend

annual mean discharge

-  low
-  medium-low
-  medium-high
-  high

 natural park



Minimal Flow Discharge (MFD)



Pilot Region r.green

Step 1. Select the renewable energy source:

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Step 2. Choose the level of potential:

Theoretical MFD Technical Economic

Step 3. Select the output map:

Natural Capital Potential CO2 savings Net present Value

Step 4. Choose MFD as a percentage of the mean annual discharge(%):

Current 25 50

Step 5. Choose the maximum length of exploited river (m):

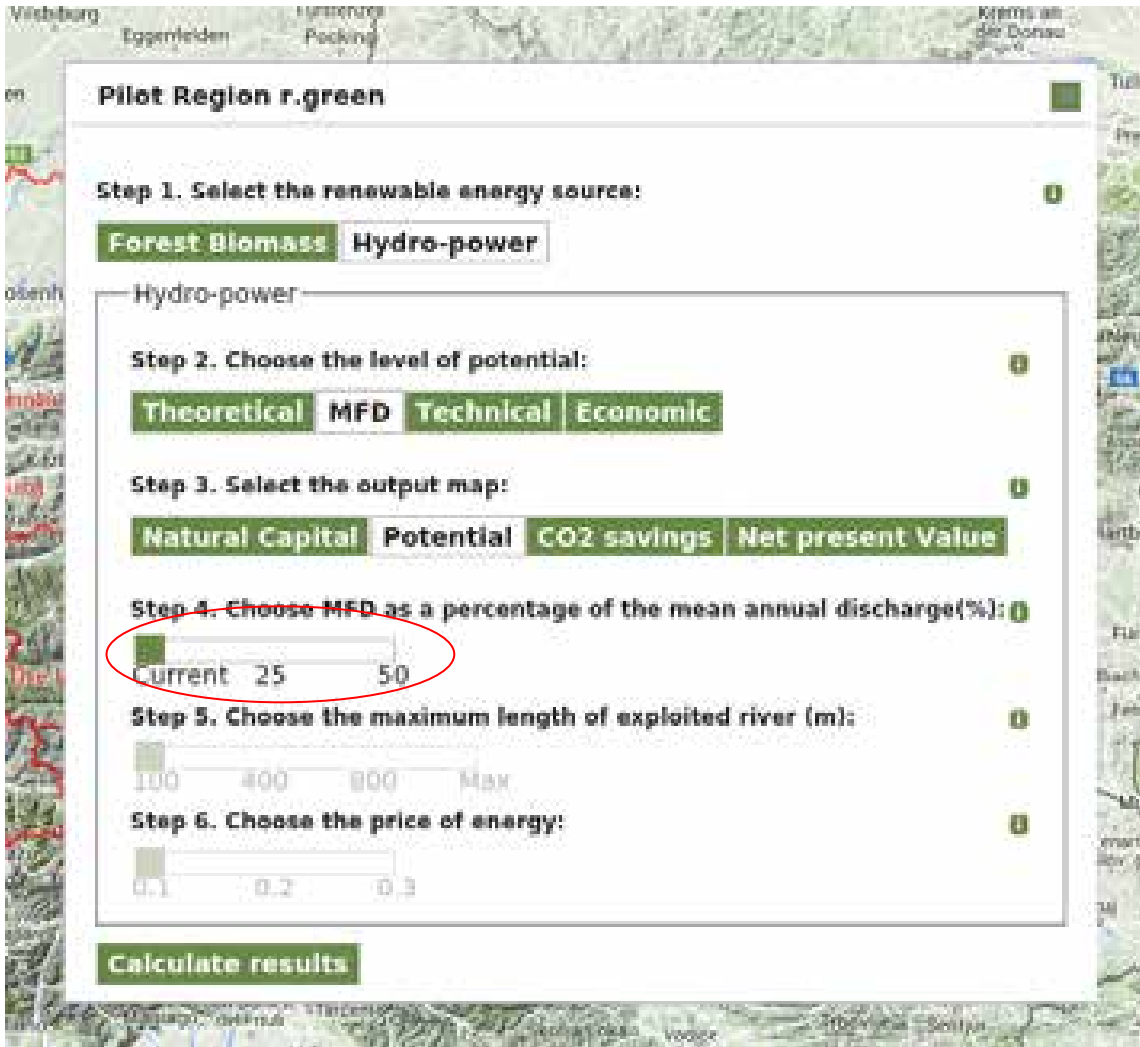
100 400 800 Max

Step 6. Choose the price of energy:

0.1 0.2 0.3

Calculate results

Minimal Flow Dicharge (MFD)



Pilot Region r.green

Step 1. Select the renewable energy source:

Forest Biomass Hydro-power

Step 2. Choose the level of potential:

Theoretical MFD Technical Economic

Step 3. Select the output map:

Natural Capital Potential CO2 savings Net present Value

Step 4. Choose MFD as a percentage of the mean annual discharge(%):

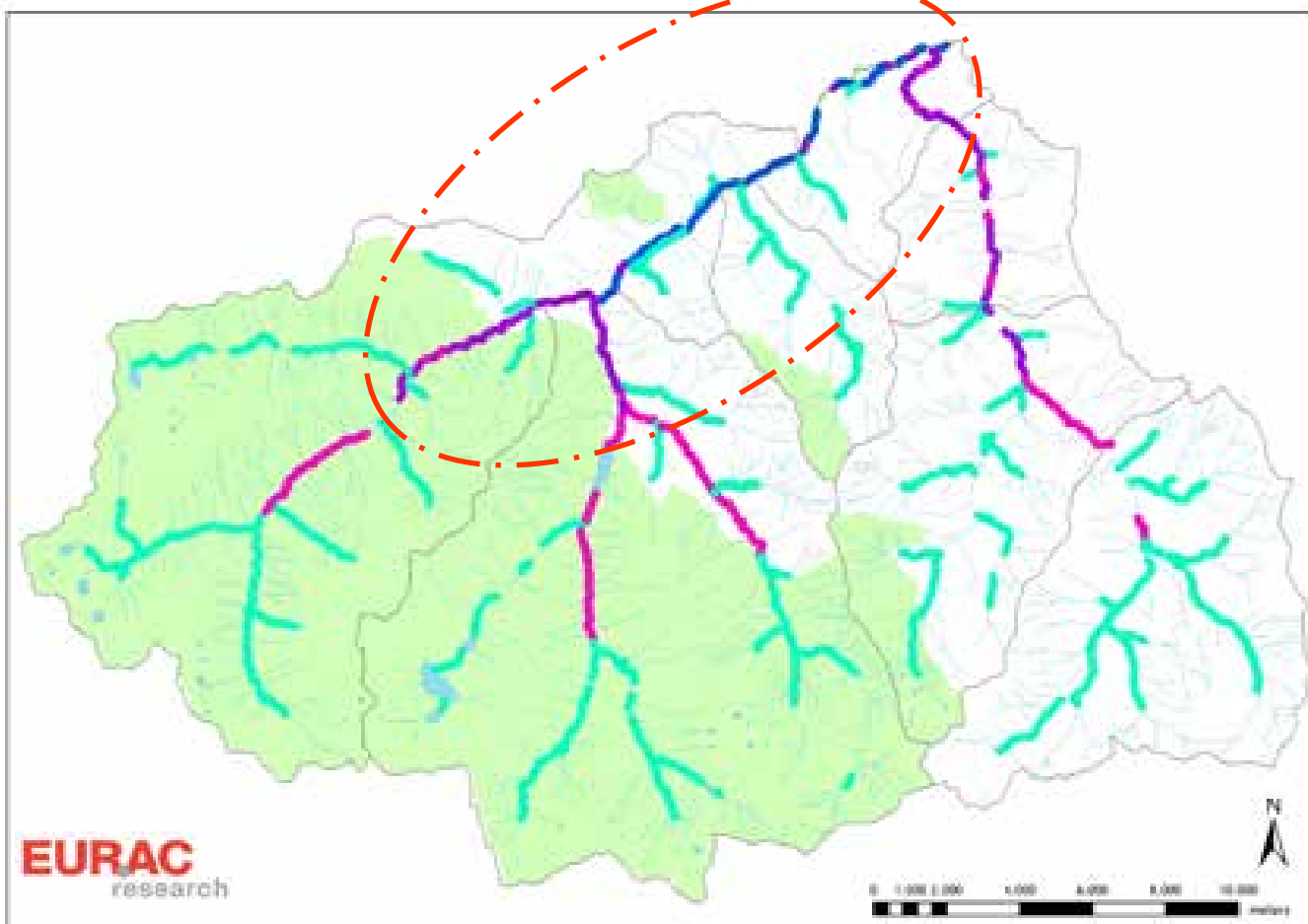
Current

Step 5. Choose the maximum length of exploited river (m):

Step 6. Choose the price of energy:

Calculate results

Natural discharge map

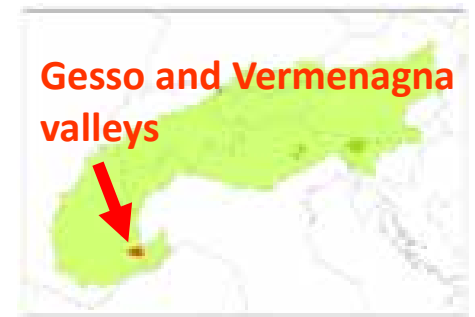


Legend

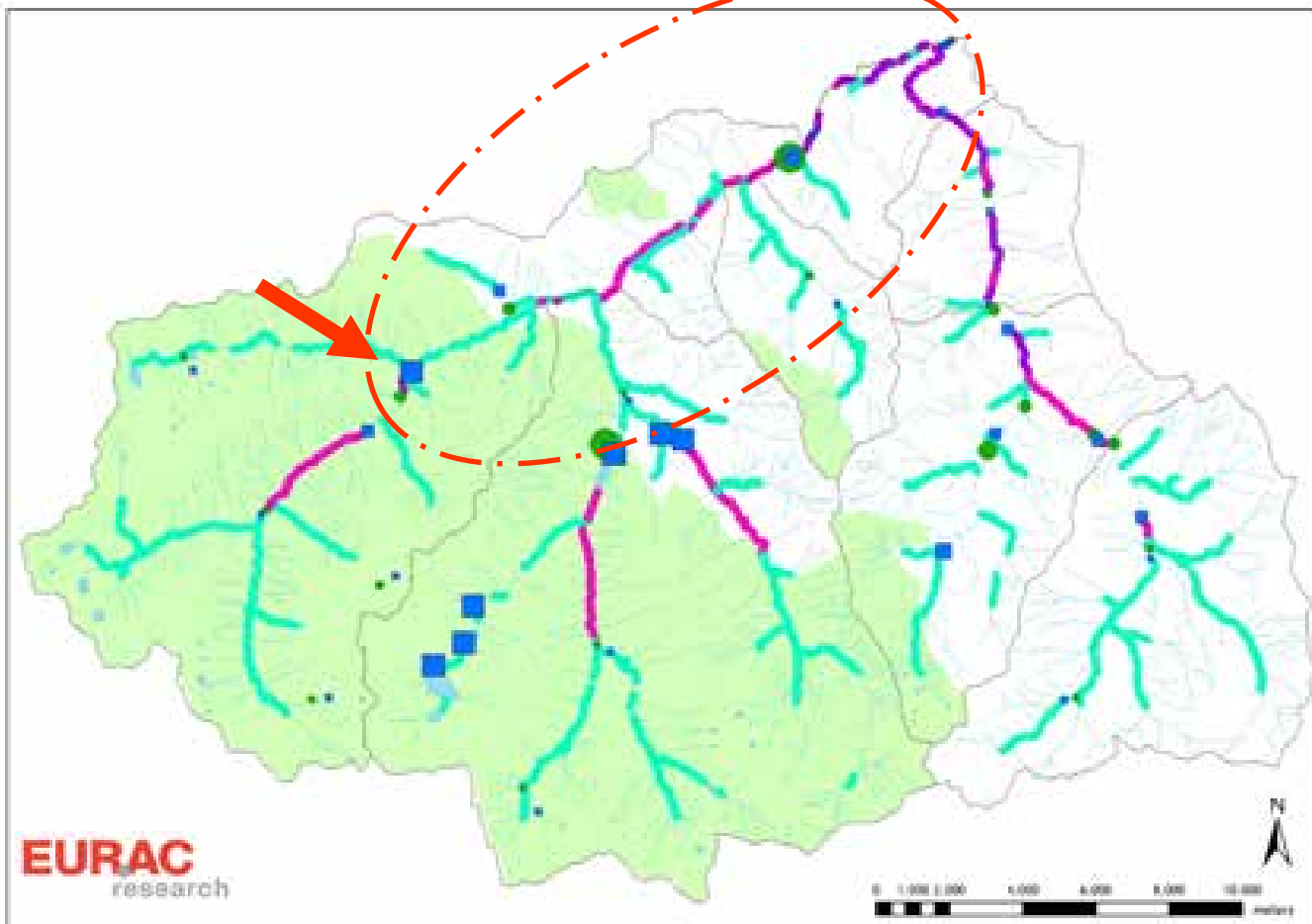
annual mean discharge

-  low
-  medium-low
-  medium-high
-  high

 natural park



Current discharge map



Legend

annual mean discharge

 low

 medium-low

 medium-high

 high

 natural park

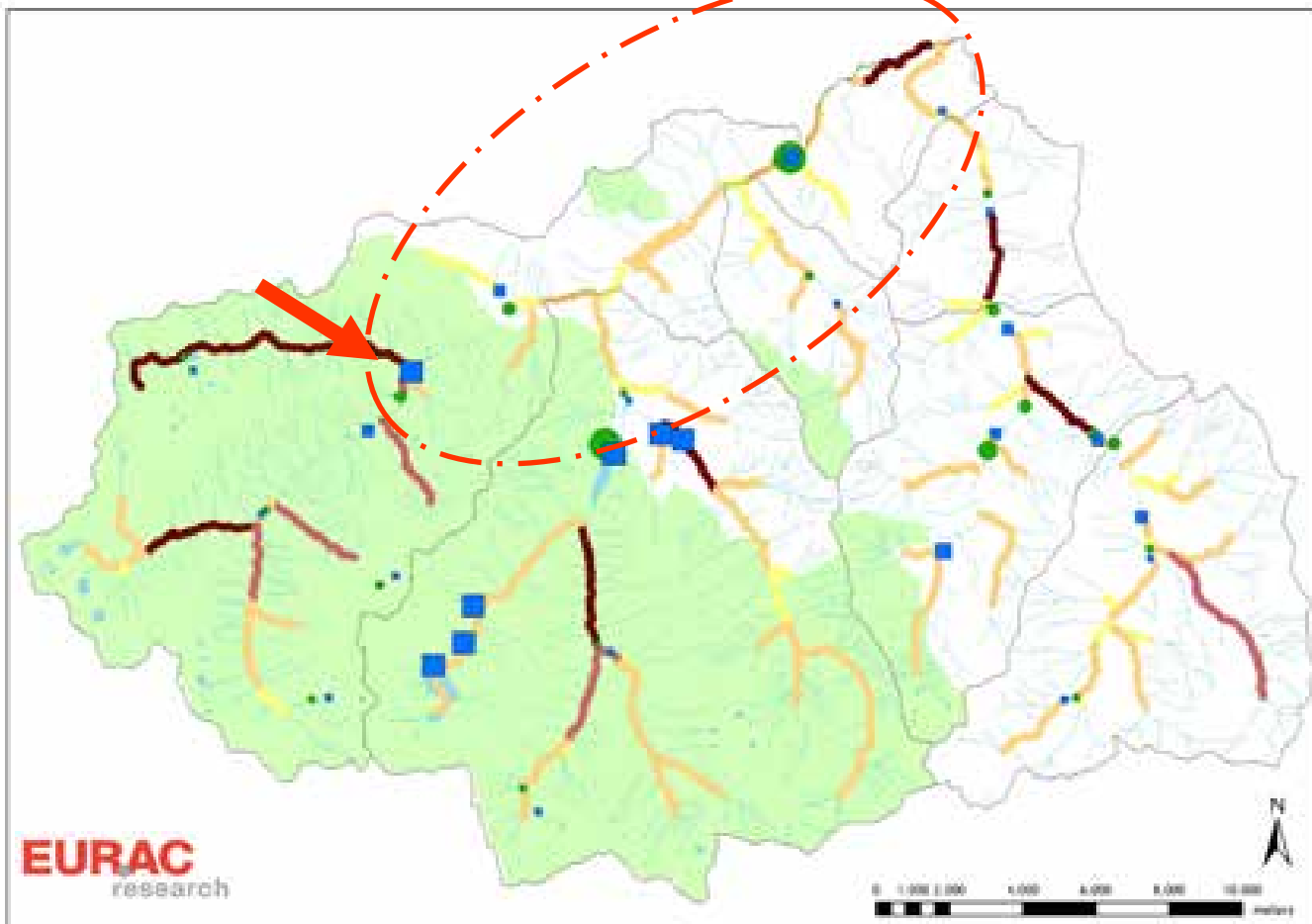
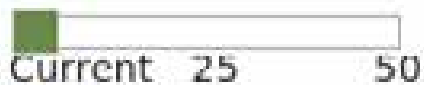
existing hydroelectric plants

 intakes

 restitutions

MFD: Current – legal MFD

Step 4. Choose MFD as a percentage of the mean annual discharge(%): 



Legend

potential power

 low

 medium-low

 medium

 high


 natural park

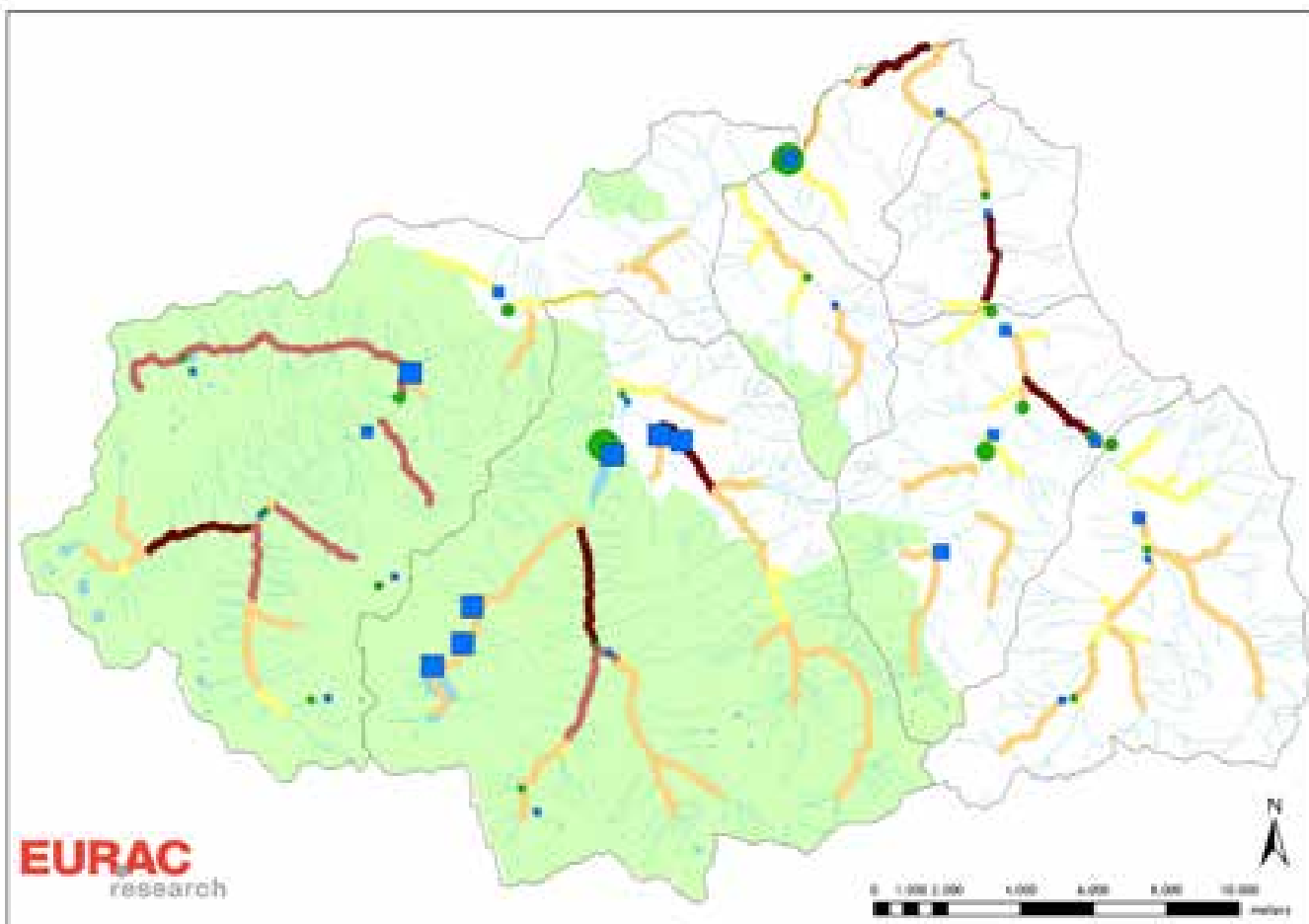
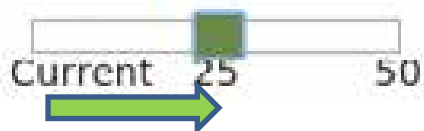
existing hydroelectric plants

 intakes

 restitutions

MFD: Current – 25% of Natural

Step 4. Choose MFD as a percentage of the mean annual discharge(%): 



Legend

potential power

 low

 medium-low

 medium

 high

 natural park

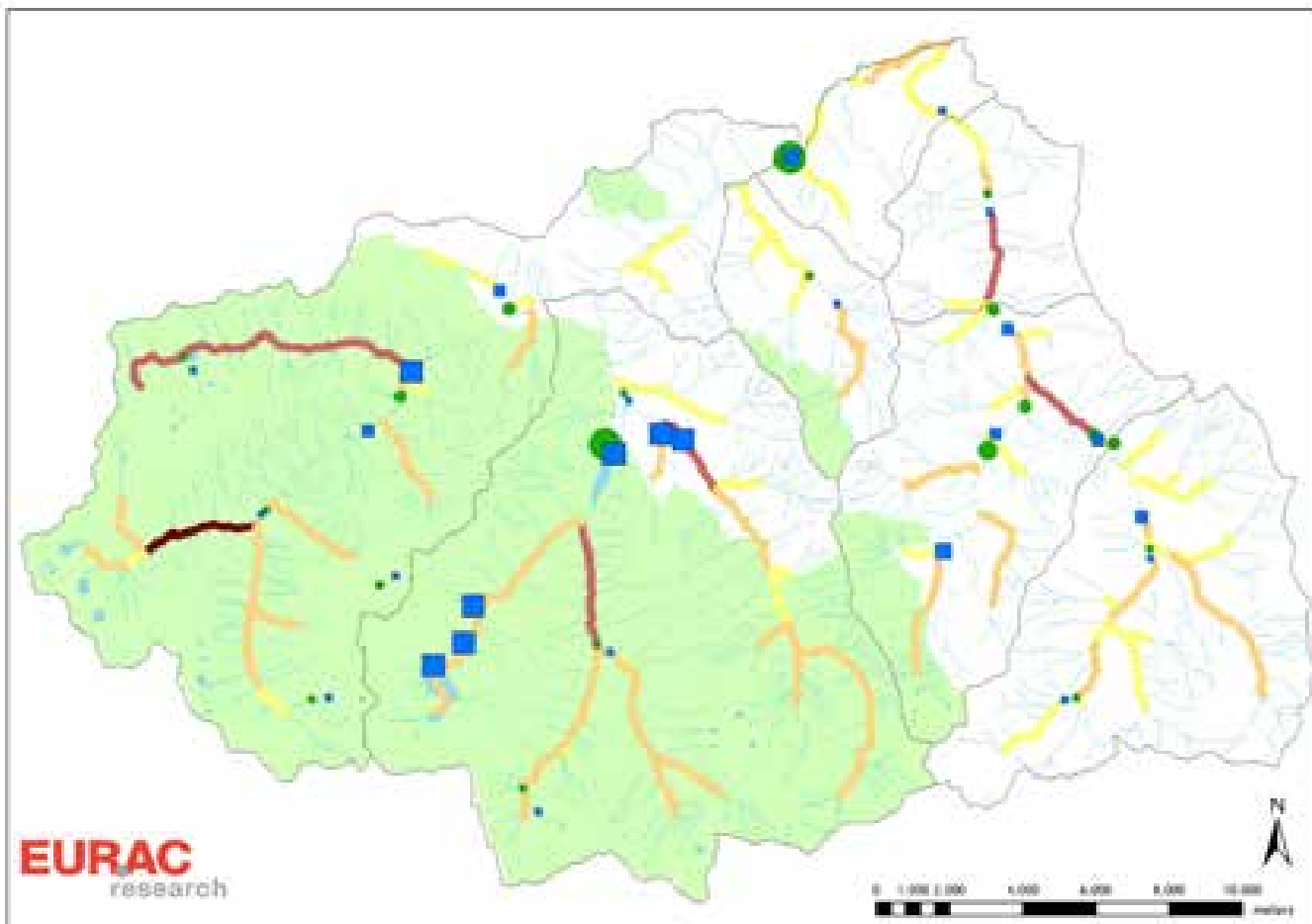
existing hydroelectric plants

 intakes

 restitutions

MFD: Current – 50% of Natural

Step 4. Choose MFD as a percentage of the mean annual discharge(%): 



Legend

potential power

 low

 medium-low

 medium

 high

 natural park

existing hydroelectric plants

 intakes

 restitutions

Technical



Pilot Region r.green

Step 1. Select the renewable energy source:

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Hydro-power

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Natural Capital **Potential** **CO2 savings** **Net present Value**

Step 4. Choose MFD as a percentage of the mean annual discharge(%):

Current 25 50

Step 5. Choose the maximum length of exploited river (m):


100 400 800 Max

Step 6. Choose the price of energy:

0.1 0.2 0.3

Calculate results

Technical



Pilot Region r.green

Step 1. Select the renewable energy source:

Forest Biomass **Hydro-power**

Hydro-power

Step 2. Choose the level of potential:

Theoretical **MFD** **Technical** **Economic**

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Natural Capital **Potential** **CO2 savings** **Net present Value**

Step 4. Choose MFD as a percentage of the mean annual discharge(%):

Current 25 50

Step 5. Choose the maximum length of exploited river (m):

100 400 800 Max

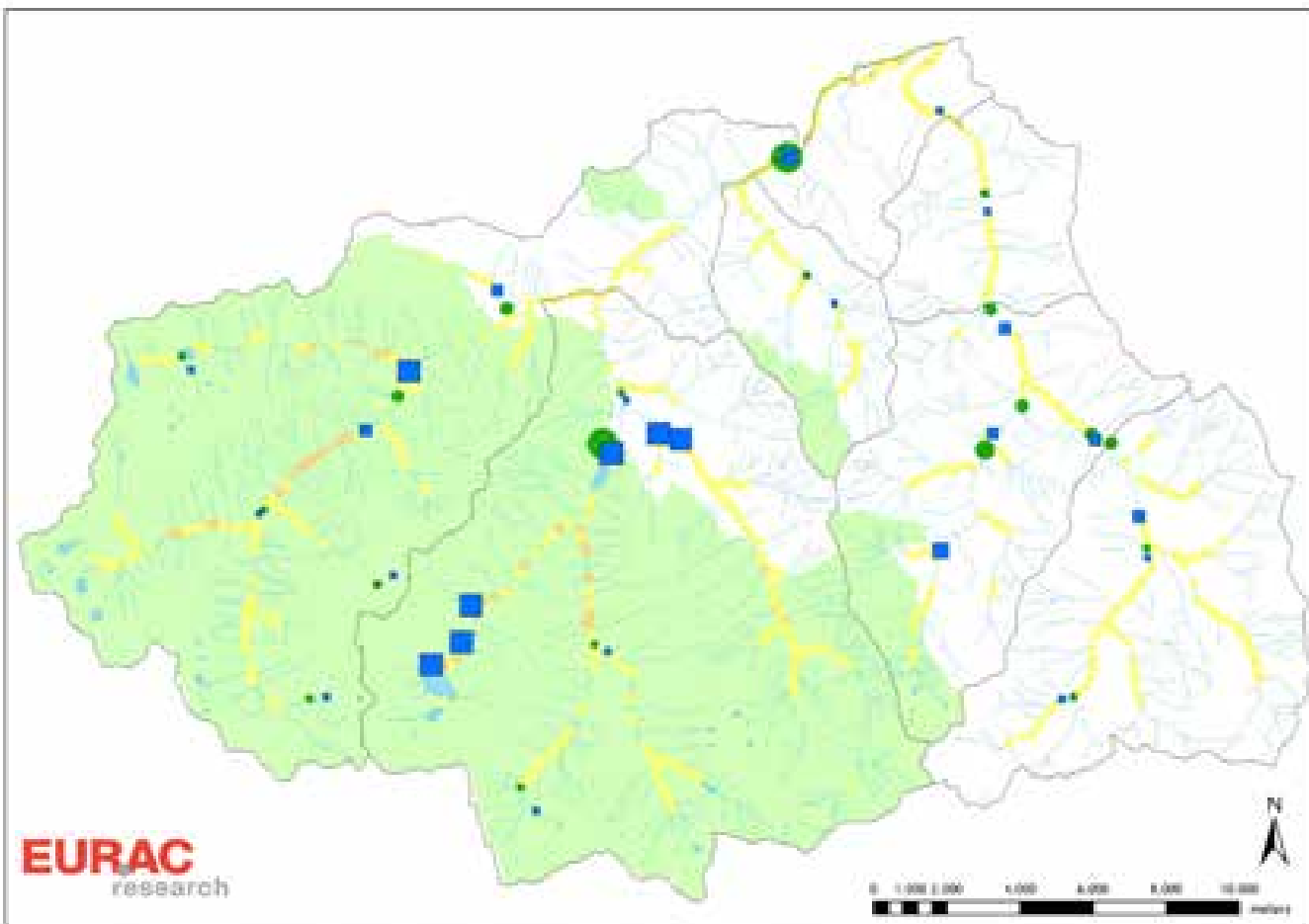
Step 6. Choose the price of energy:

0.1 0.2 0.3

Calculate results

Technical: 100 m

Step 5. Choose the maximum length of exploited river (m):



Legend

potential power

 low

 medium-low

 medium

 high

 natural park

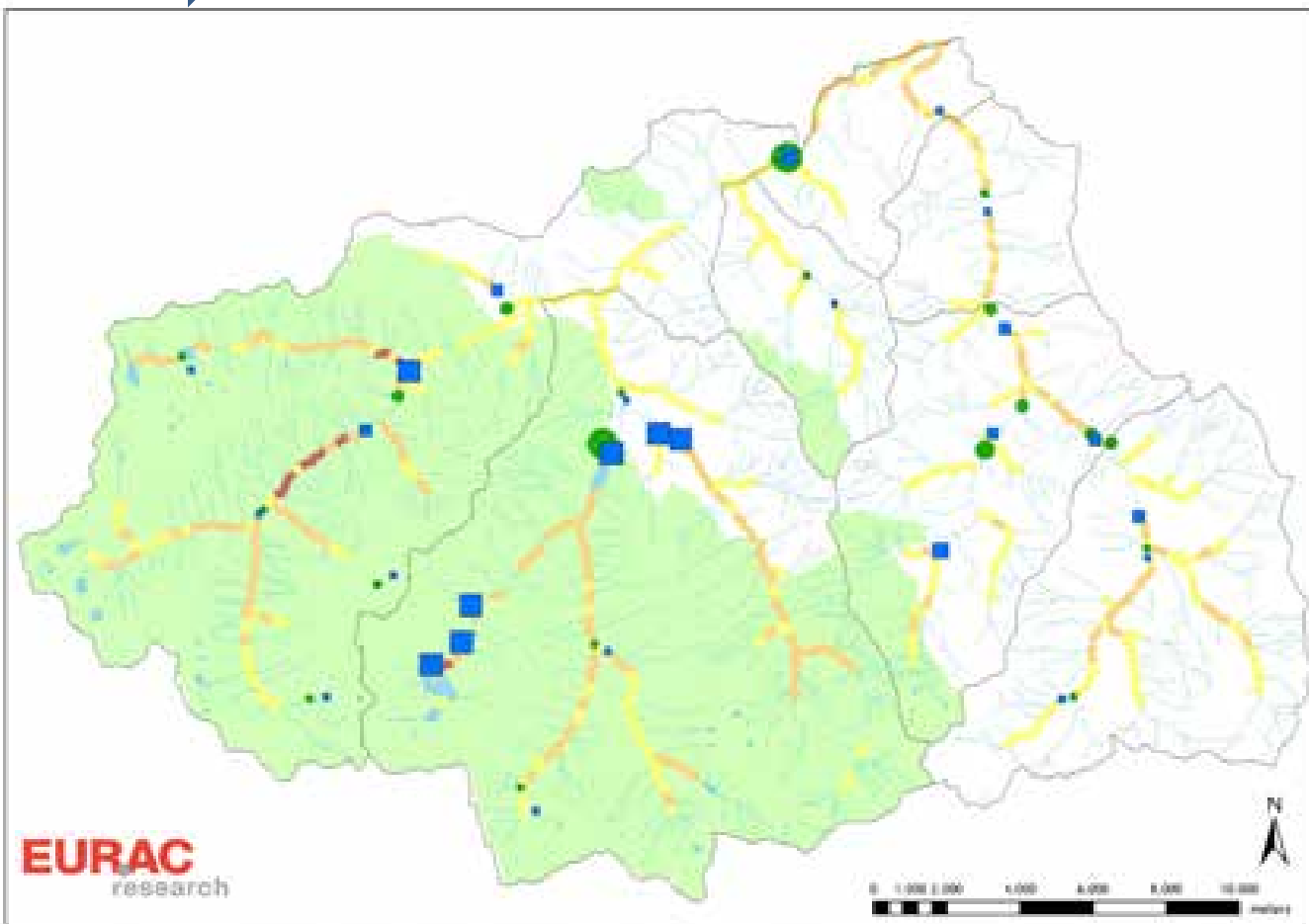
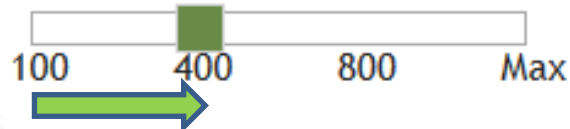
existing
hydroelectric plants

 intakes

 restitutions

Technical: 400 m

Step 5. Choose the maximum length of exploited river (m):




Legend

potential power

 low

 medium-low

 medium

 high

 natural park

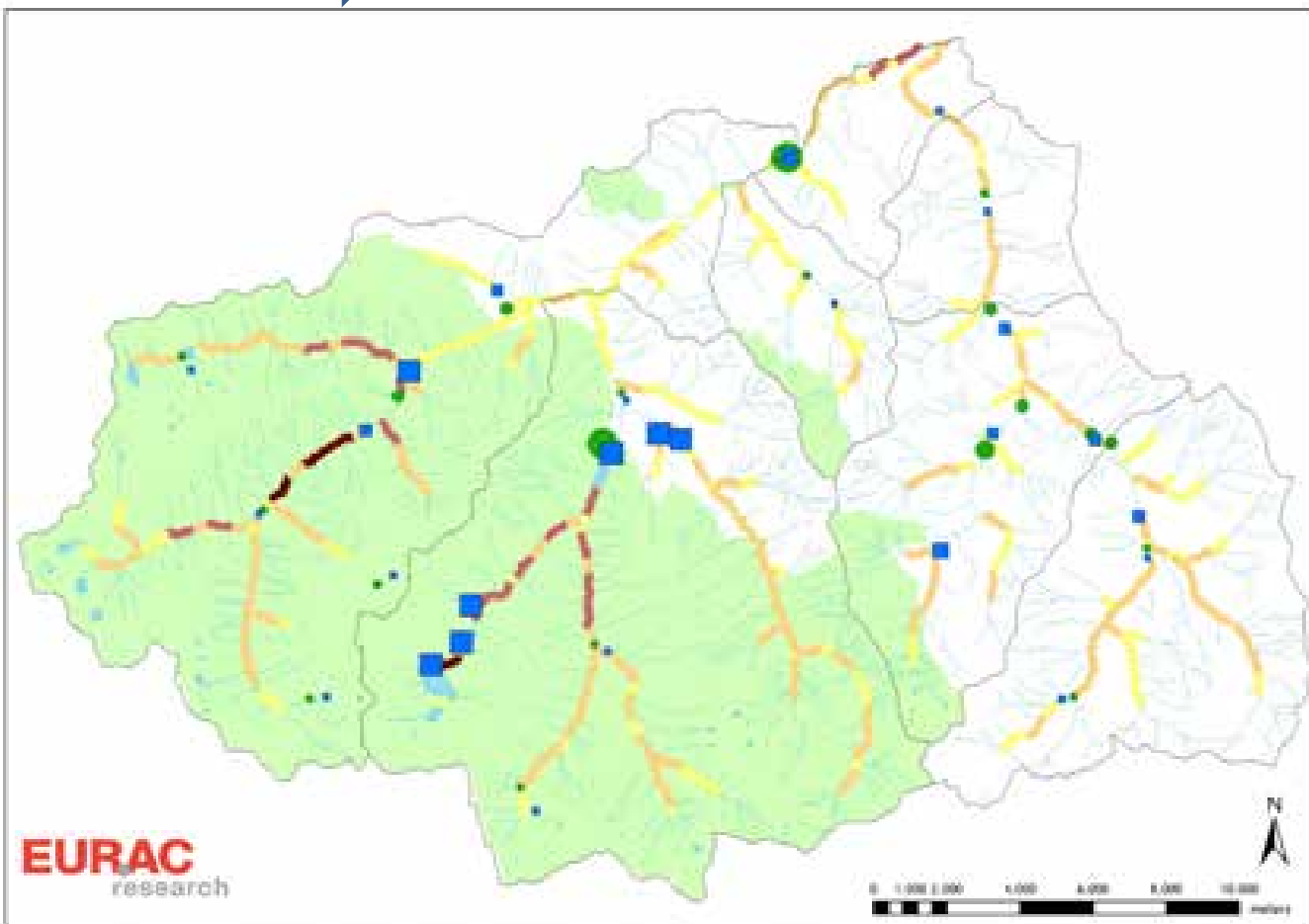
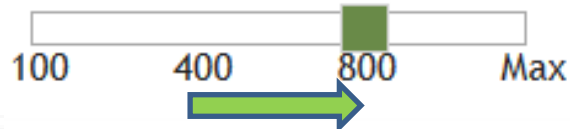
existing
hydroelectric plants

 intakes

 restitutions

Technical: 800 m

Step 5. Choose the maximum length of exploited river (m):



Legend

potential power

 low

 medium-low

 medium

 high

 natural park

existing
hydroelectric plants

 intakes

 restitutions

Economic

Pilot Region r.green 

Step 1. Select the renewable energy source: 

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Hydro-power

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Theoretical MFD Technical Economic

Step 3. Select the output map: 

Natural Capital Potential CO2 savings Net present Value

Step 4. Choose MFD as a percentage of the mean annual discharge(%): 

 Current 25 50

Step 5. Choose the maximum length of exploited river (m): 

 100 400 800 Max

Step 6. Choose the price of energy: 

 0.1 0.2 0.3

Calculate results

Pilot Region r.green 

Step 1. Select the renewable energy source: 

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Hydro-power

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Current 25 50

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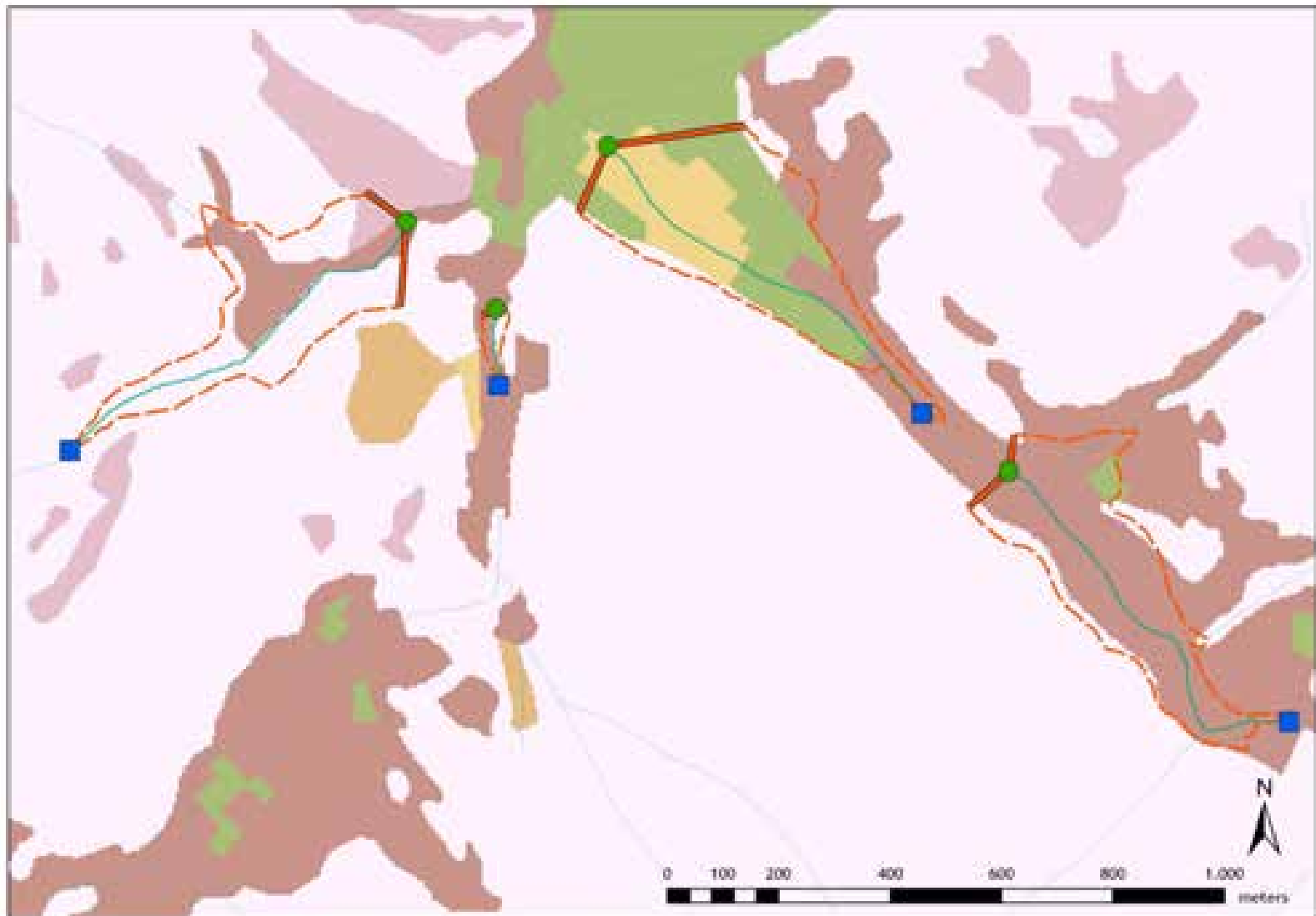

100 400 800 Max

Step 6. Choose the price of energy: 


0.1 0.2 0.3

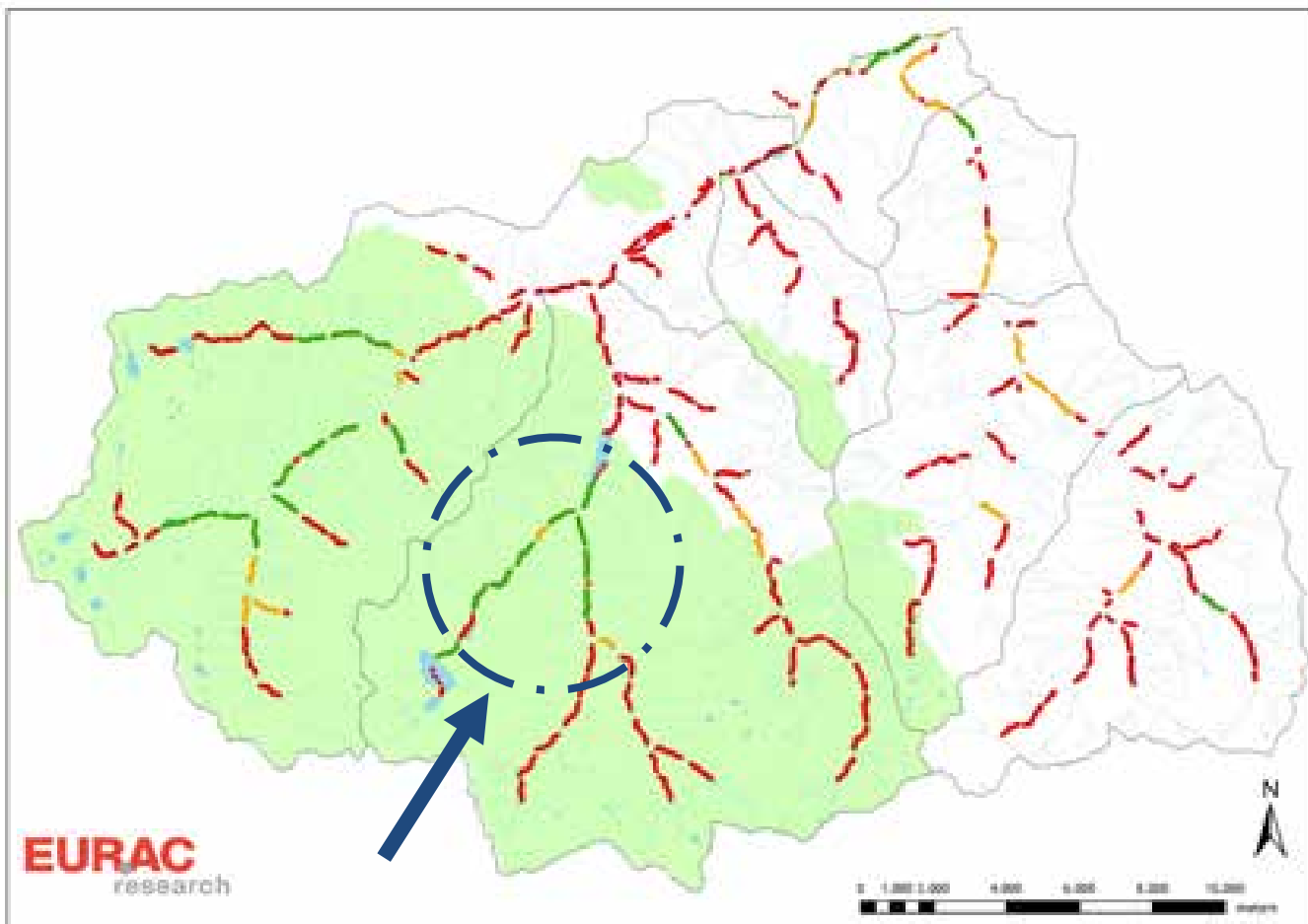
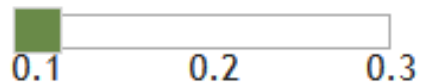
Calculate results

Land use and structure map



Economic: 0.1 €/kWh

Step 6. Choose the price of energy:



Legend

feasibility

 low

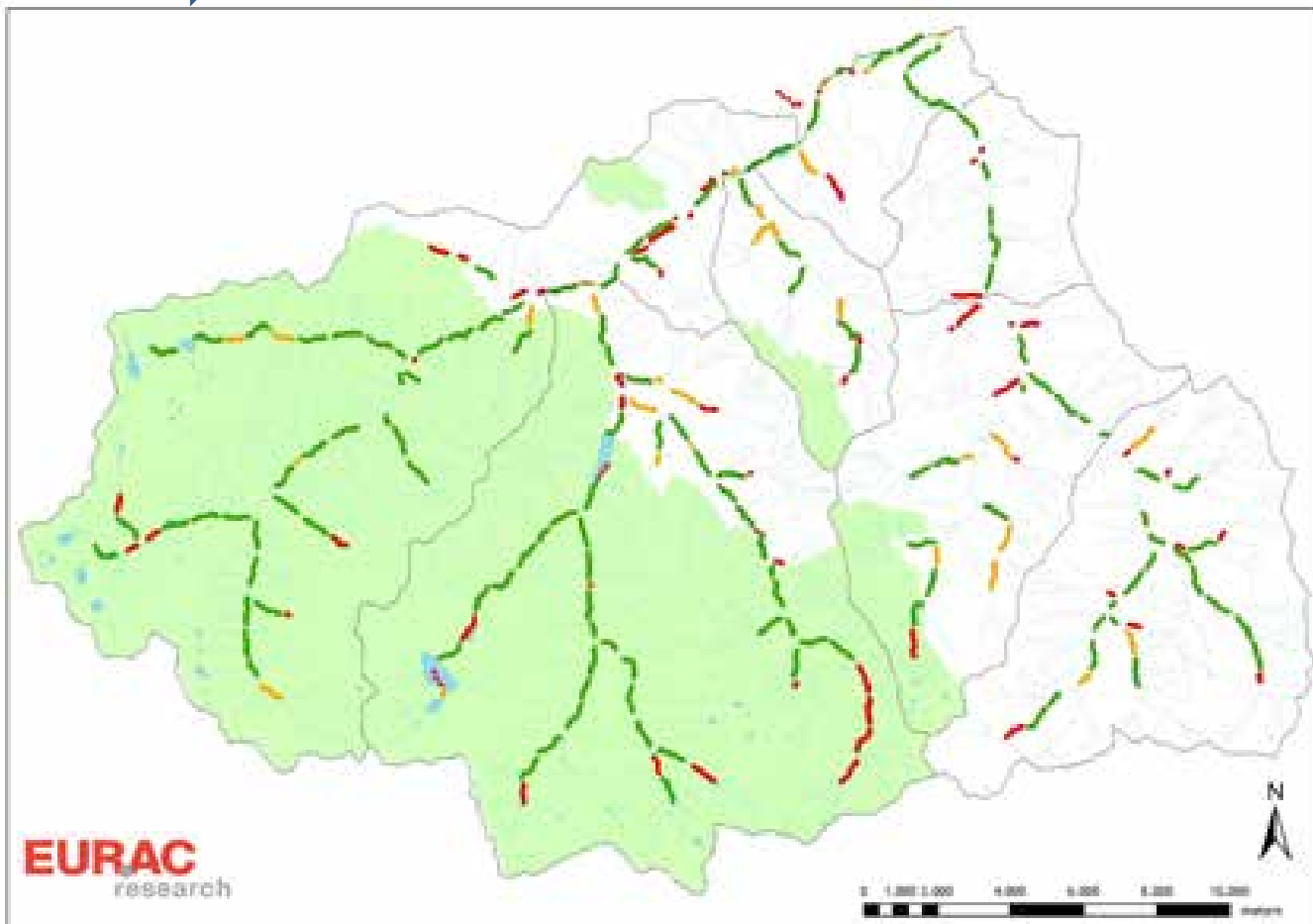
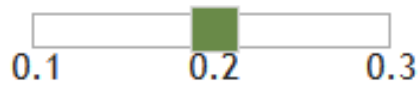
 medium

 high

 natural park

Economic: 0.2 €/kWh

Step 6. Choose the price of energy:



Legend

feasibility

 low

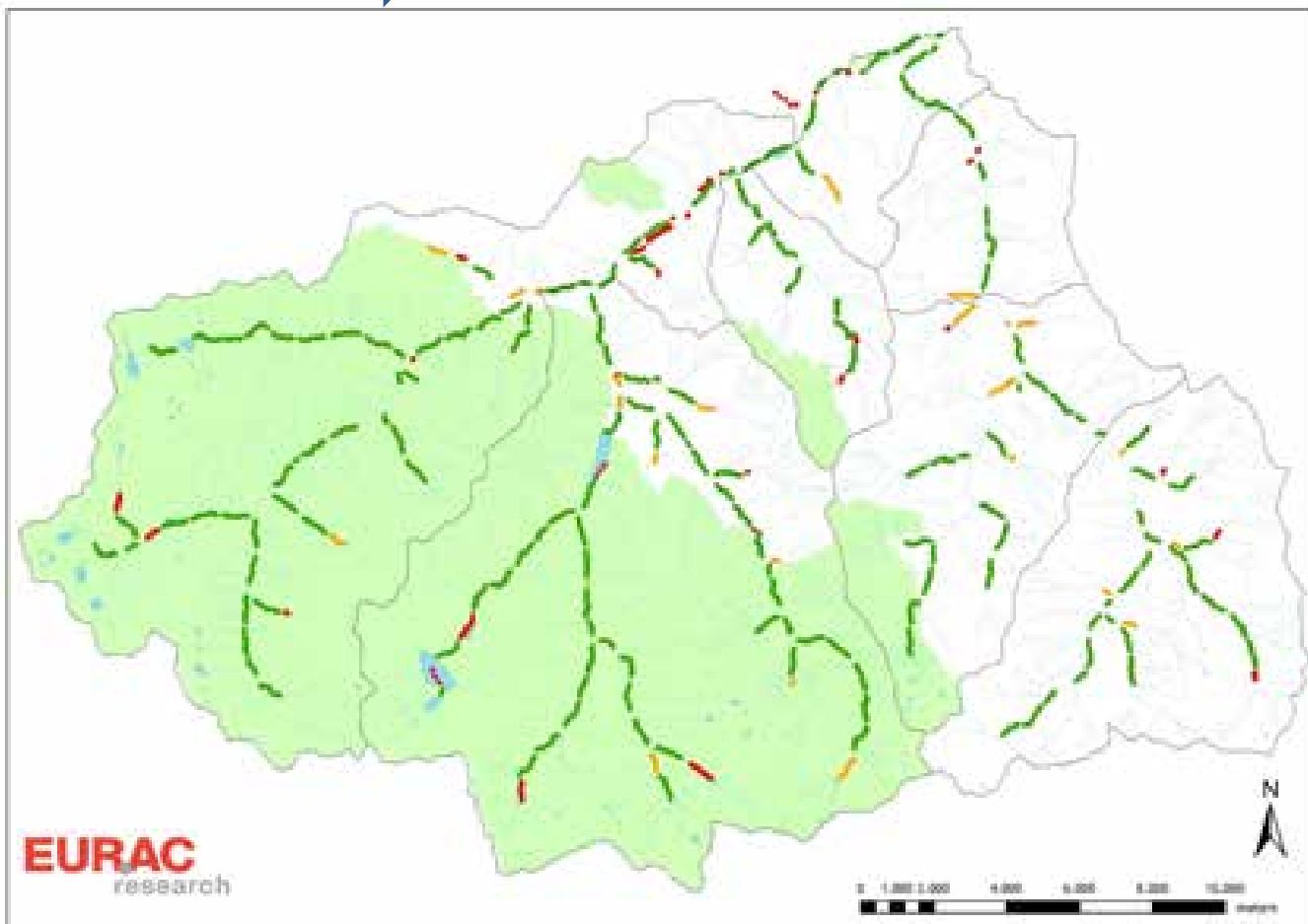
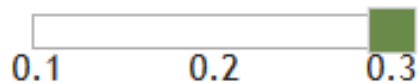
 medium

 high

 natural park

Economic: 0.3 €/kWh

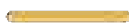
Step 6. Choose the price of energy:



Legend

feasibility

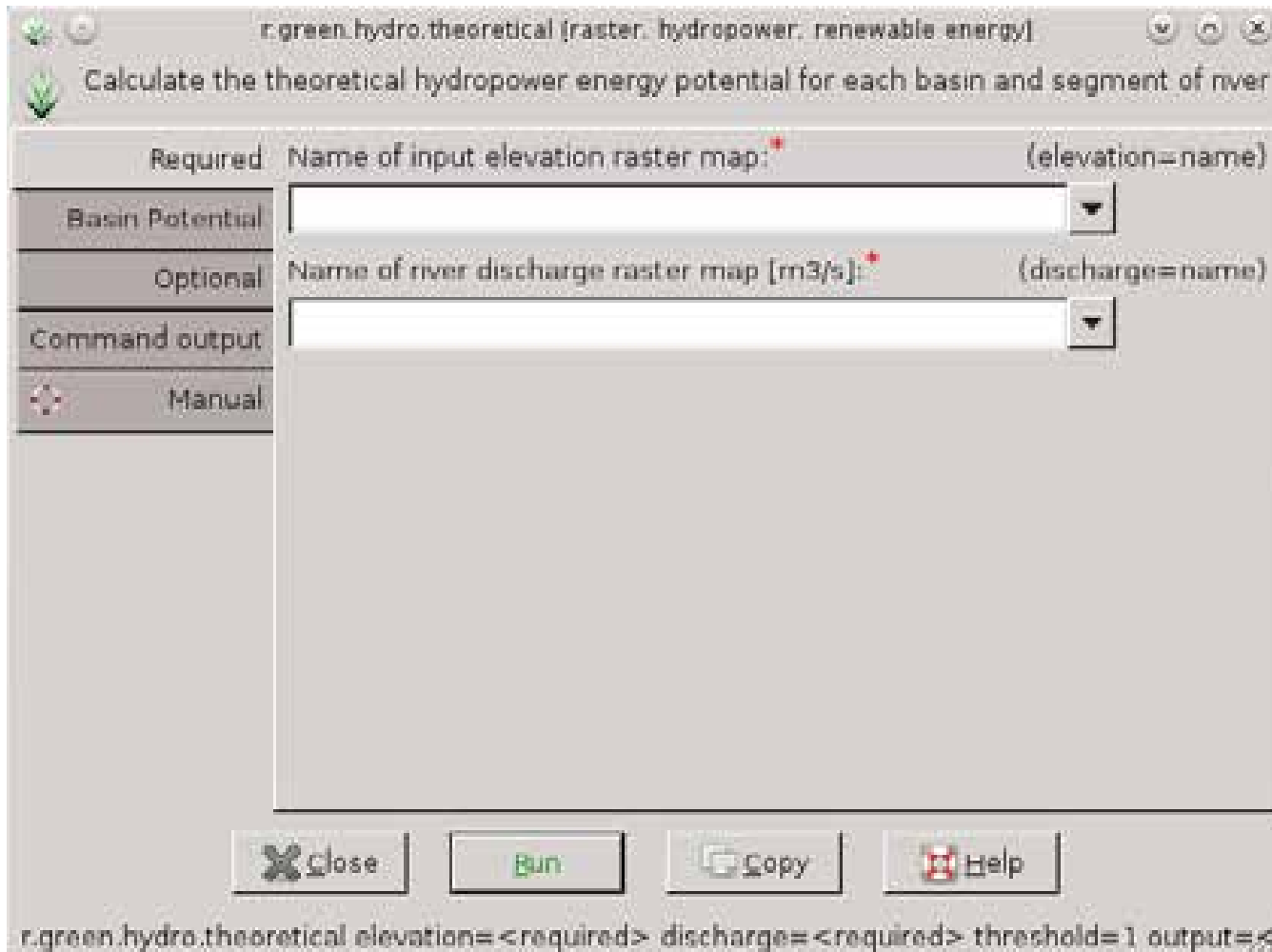
 low

 medium

 high

 natural park

How to create the scenarios



The model has been developed for GRASS and it is also available through a QGIS plug-in.

Welcome!

recharge  green

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DSS for the Case studies!

EURAC
research

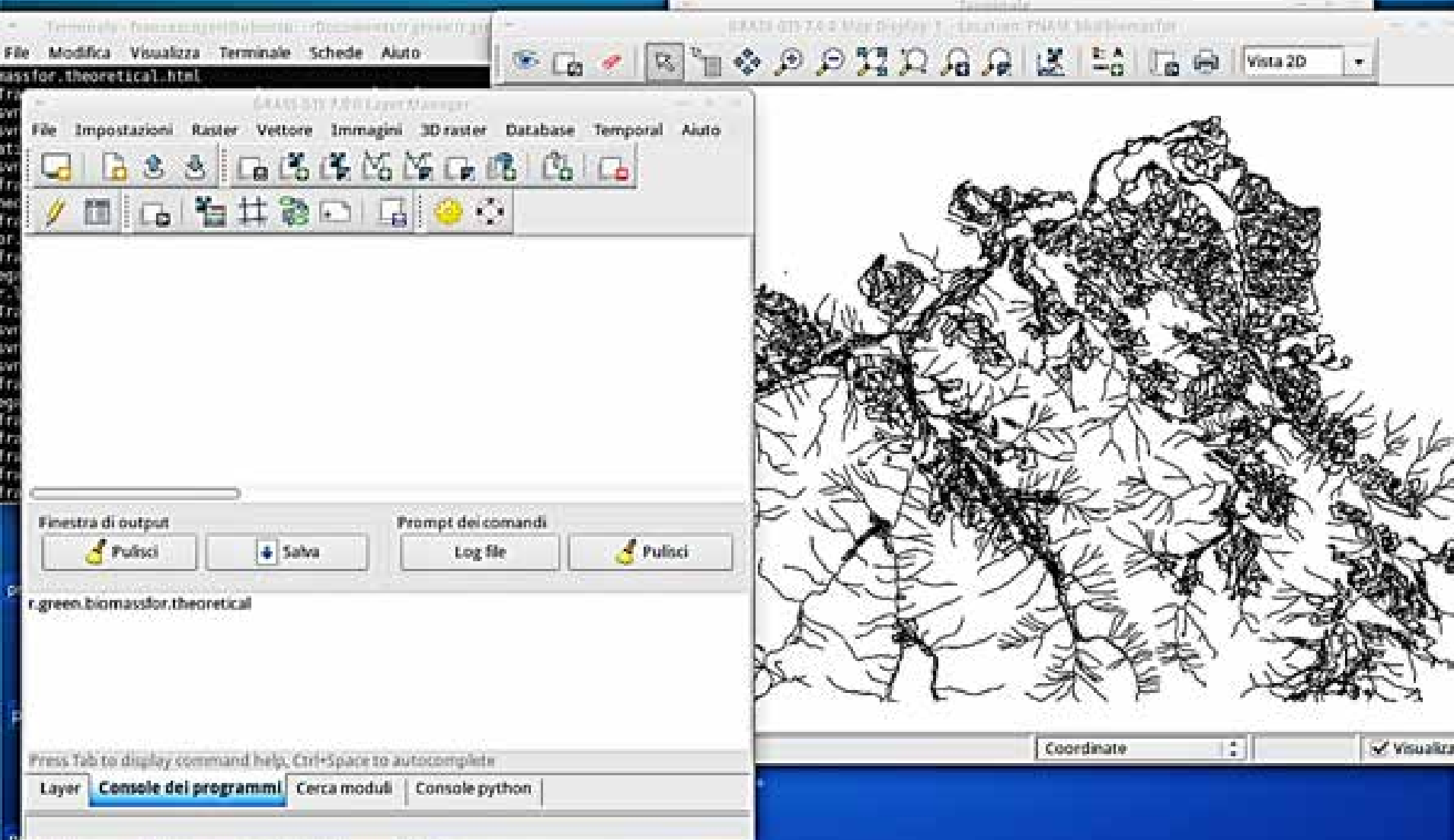


Grass & QGIS


May 21, 2015, Sonthofen

26

General overview of GRASS environment



The energy section with calorific parameters


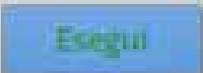


Base Energy Opzionale output del comando  Manuale

Energy for tops and branches in high forest in MWh/m³: (energy_tops_hf=float)
0.49

Energy for the whole tree in high forest (tops, branches and stem) in MWh/m³: (energy_cormometric_vol_hf=float)
1.97

Energy for tops and branches for Coppices in MWh/m³: (energy_tops_cop=float)
0.55

Chiudi dialogo alla fine

 Chiudi  Esegui  Copia  Aiuto

r.green.biomassfor.technical: cable crane parameters





Richiesto	Opt files	Cable Crane	Forwarder	Other	Energy	Opzionale
Percent slope lower limit with Cable Crane:						(slp_min_cc=float)
<input type="text" value="30."/>						
Percent slope higher limit with Cable Crane:						(slp_max_cc=float)
<input type="text" value="100."/>						
Maximum distance with Cable Crane:						(dist_max_cc=float)
<input type="text" value="800."/>						

r.green.biomassfor.technical: forwarder parameters

Richiesto Opt files Cable Crane **Forwarder** Other Energy Opzionale

Percent slope higher limit with Forwarder: (slp_max_fw=float)
30.

Maximum distance with Forwarder: (dist_max_fw=float)
600.

 Chiudi  Esegui  Copia  Aiuto

r.green.biomassfor.technical: other techniques parameters


Richiesto Opt files Cable Crane Forwarder **Other** Energy Opzionale

Percent slope higher limit with other techniques for Coppices: (slp_max_cop=float)
30.

Maximum distance with other techniques for Coppices: (dist_max_cop=float)
600.

r.green.biomassfor.technical: optional files

r.green.biomassfor.technical [raster, biomass] - + X

 Estimates the quantity of woody biomass obtained from a forest surface where extraction is possible given a particular level of mechanisation

Richiesto **Opt files** Cable Crane Forwarder Other Energy Opzionale

Vector field of roughness: (forest_column_roughness=string)

Vector map of rivers: (rivers=name)

Vector map of lakes: (lakes=name)

r.green.biomassfor.economic module

r.green.biomassfor.economic [raster, biomass]

Estimates bioenergy that can be collected to supply heating plants or biomass logistic centres and that associated with a positive net revenue for the entire production process

Richiesto Opt files Technical data Prices Costs Energy Opzionale

Name of vector parcel map: (forest=name)
particellare_merge@biomasfor

Name of vector boundaries map (boolean map): (boundaries=name)
Boundary@biomasfor

Vector field of wood typologies: (forest_column_price=string)
wood_types

List of wood assortments:price: (conditions=string)
beech=76,chestnut=52,oak=42,pine=35

Basename for economic bioenergy (HF,CC and total): (output_basename=name)
scenario_pnam1

Name of vector district heating points: (dhp=name)
WCP@biomasfor

Vector field of yield: (forest_column_yield=string)
yield

Vector field of stand surface that: (forest_column_yield_surfaceconstraint)

Chiudi Esegui Copia Aiuto

r.green.biomassfor.economic: list of costs

r.green.biomassfor.economic (raster, biomass)

Estimates bioenergy that can be collected to supply heating plants or biomass logistic centres and that associated with a positive net revenue for the entire production process

Richiesto Opt files Technical data Prices **Costs** Energy Opzionale

Felling and/or felling-processing cost with chainsaw €/h:	(cost_chainsaw=float)
13.17	
Processing cost with processor €/h:	(cost_processor=float)
87.42	
Felling and processing cost with harvester €/h:	(cost_harvester=float)
96.33	
Extraction cost with high power cable crane €/h:	(cost_cablehf=float)
111.44	
Extraction cost with medium power cable crane €/h:	(cost_cablec=float)
104.31	
Extraction cost with forwarder €/h:	(cost_forwarder=float)
70.70	
Extraction cost with skidder €/h:	(cost_skidder=float)
64.36	
Chipping cost €/h:	(cost_chipping=float)
150.87	
Transport with truck €/h:	(cost_transport=float)
64.90	

Chiudi **Esegui** Copia Auto

r.green.biomassfor.impact: co2 emissions

r.green.biomassfor.impact [raster, biomass]

Calculates impact and multifunctionality values

Richiesto | Opt files | Energy | Soil and water protection | **CO2 Emission** | Fire risk

Name for output CO2 emissions map: (output_basename_co2map=name)
pnam_co2

Name for output avoided CO2 emissions map: (output_basename_aco2map=name)
pnam_avoided_co2

Name for output net CO2 emissions map: (output_basename_nco2map=name)
pnam_net_co2

Name of Digital terrain model map: (dtm2=name)
dtm5m@biomasfor

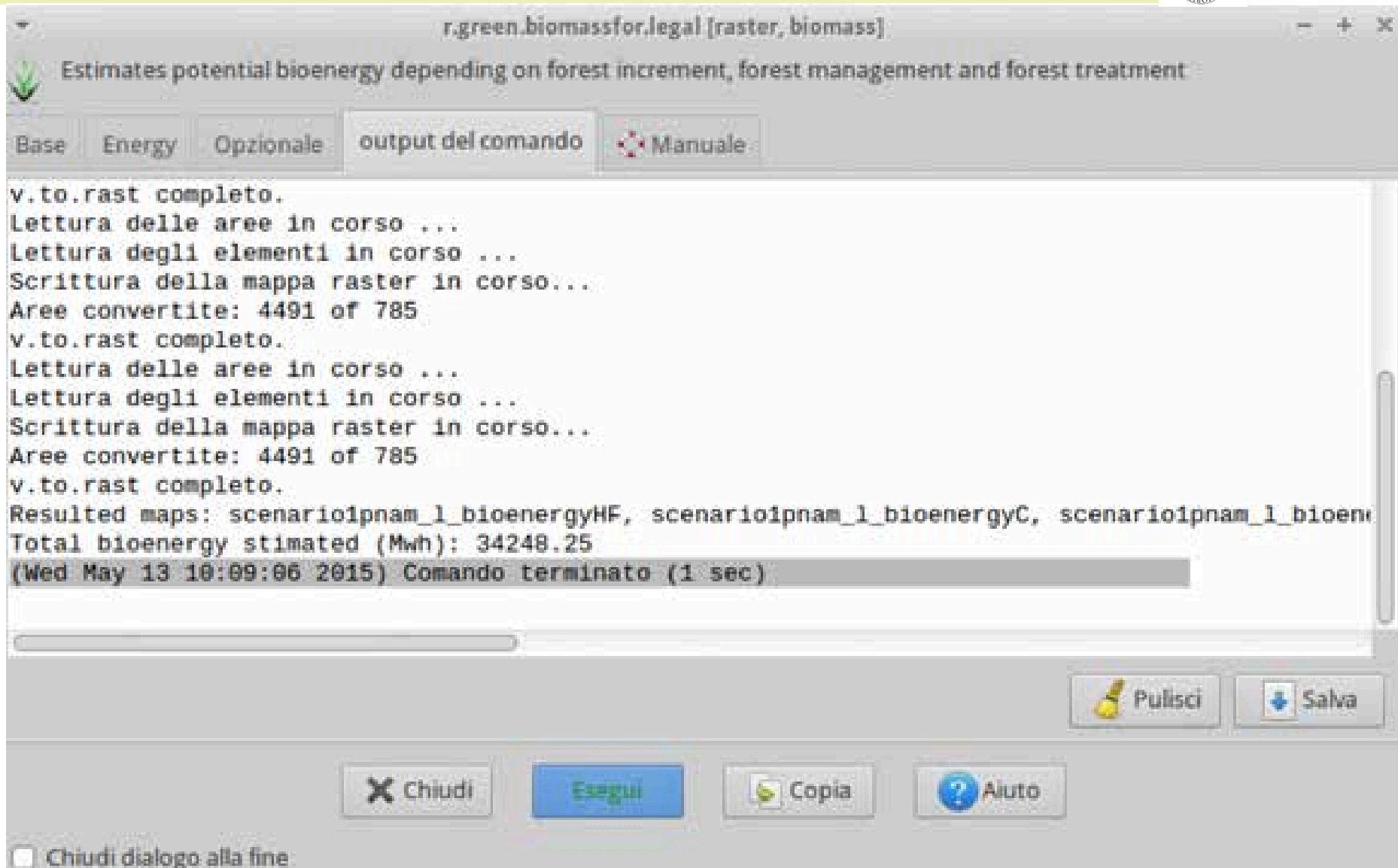
Soil production map: (soilp2_map=name)
soil_prod@biomasfor

Average tree diameter map: (tree_diam=name)

Aggiungi la mappa(e) creata nel layer tree
 Chiudi dialogo alla fine

Chiudi | Esegui | Copia | Aiuto

Example of final results of module (legal)



The screenshot shows a software window titled "r.green.biomassfor.legal [raster, biomass]". The window has a menu bar with "Base", "Energy", "Opzionale", "output del comando", and "Manuale". Below the menu bar is a text area containing the following text:

```
v.to.rast completo.  
Letture delle aree in corso ...  
Letture degli elementi in corso ...  
Scrittura della mappa raster in corso...  
Aree convertite: 4491 of 785  
v.to.rast completo.  
Letture delle aree in corso ...  
Letture degli elementi in corso ...  
Scrittura della mappa raster in corso...  
Aree convertite: 4491 of 785  
v.to.rast completo.  
Resulted maps: scenarioipnam_1_bioenergyHF, scenarioipnam_1_bioenergyC, scenarioipnam_1_bioeni  
Total bioenergy stimated (Mwh): 34248.25  
(Wed May 13 10:09:06 2015) Comando terminato (1 sec)
```

At the bottom of the window, there are several buttons: "Pulisci" (with a broom icon), "Salva" (with a save icon), "Chiudi" (with an X icon), "Esegui" (with a play icon), "Copia" (with a copy icon), and "Aiuto" (with a question mark icon). There is also a checkbox labeled "Chiudi dialogo alla fine" which is currently unchecked.

QGIS interface visualization (economic)

R.Green.Biomassfor.Economic

Required Opt files Technical data Prices Costs Energy Options Manual Output

Insert mandatory parameters

forest	particellare_merge
boundaries	Boundary
forest_column_price	tipologia
conditions	beech=67,chestnut=52,oak=45
output_basename	panm
dhp	WCP_8_id_1
forest_column_yield	yield
forest_column_yield_surface	Hectares
forest_column_management	management
forest_column_treatment	treatment
forest_roads	Strade_forestali
main_roads	Reticolo_stradale
dsm2	dem

Saving folder /home/guest/scenario

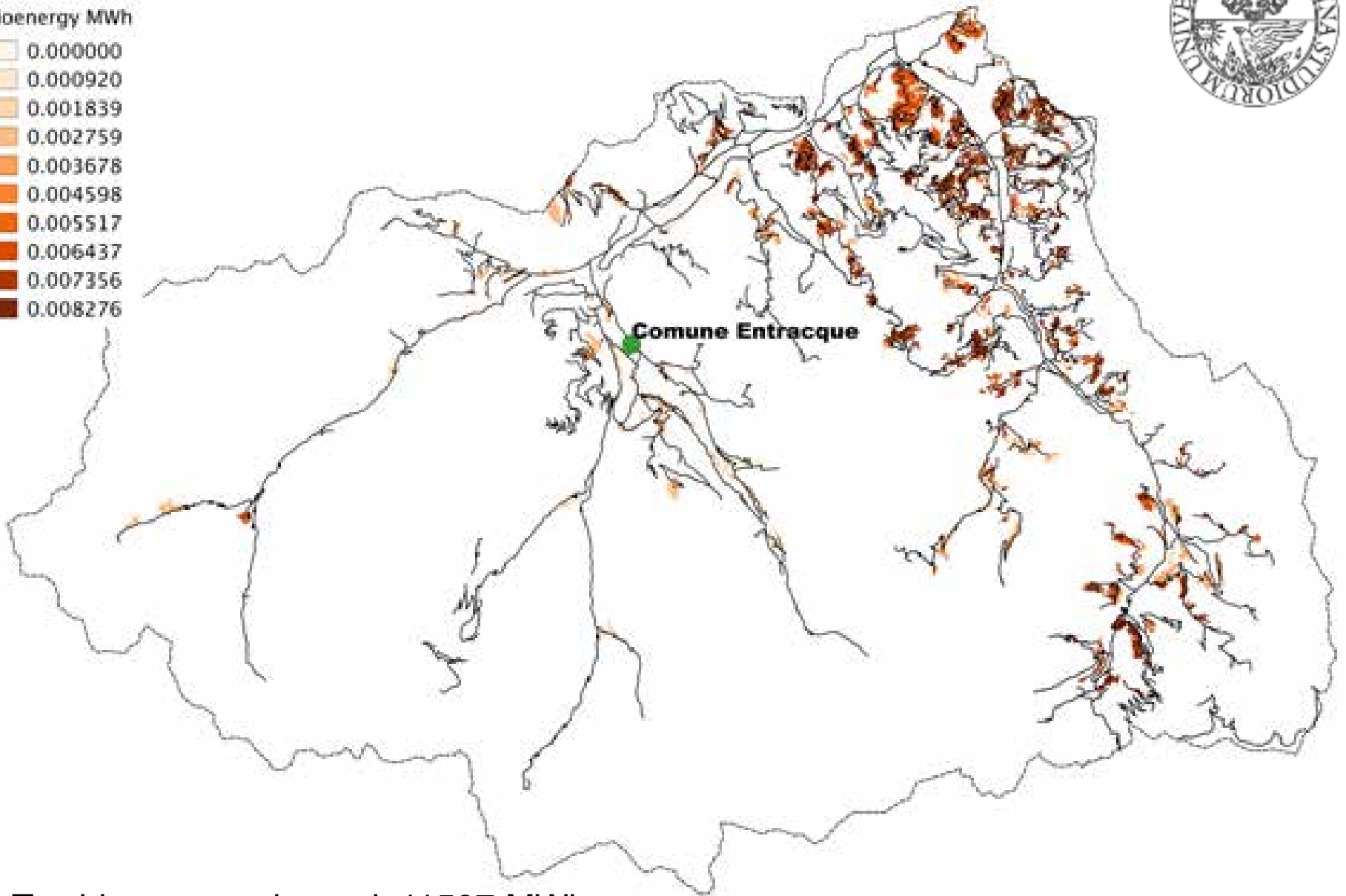
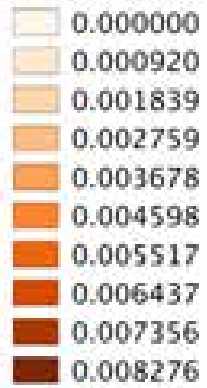
Working resolution 25

Map output



Legend

Bioenergy MWh



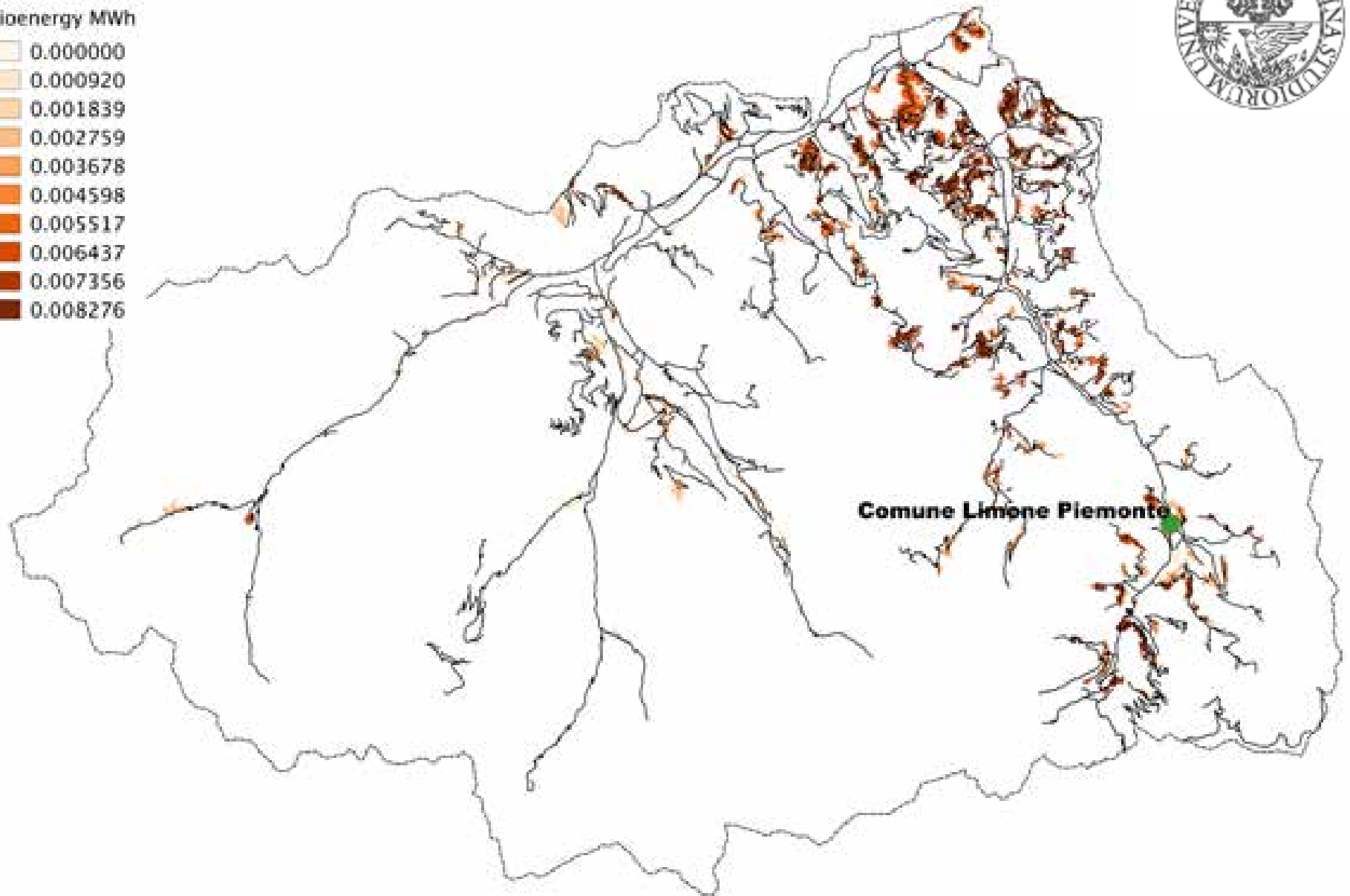
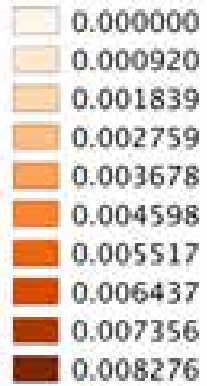
Tot. bioenergy stimated: 11597 MWh

Map output



Legend

Bioenergy MWh



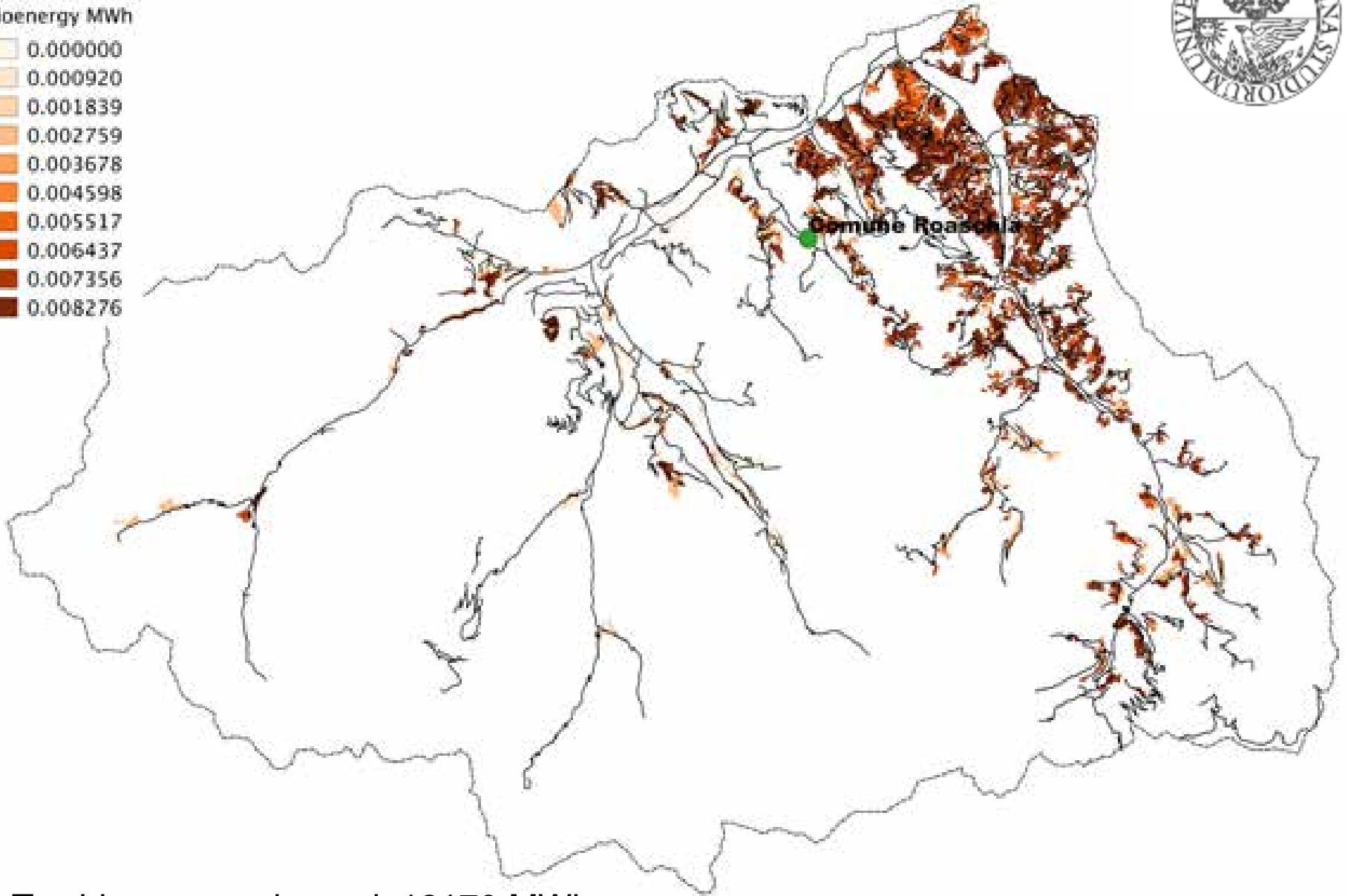
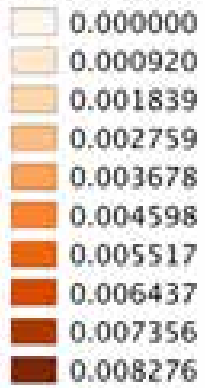
Tot. bioenergy stimated: 8875 MWh

Map output



Legend

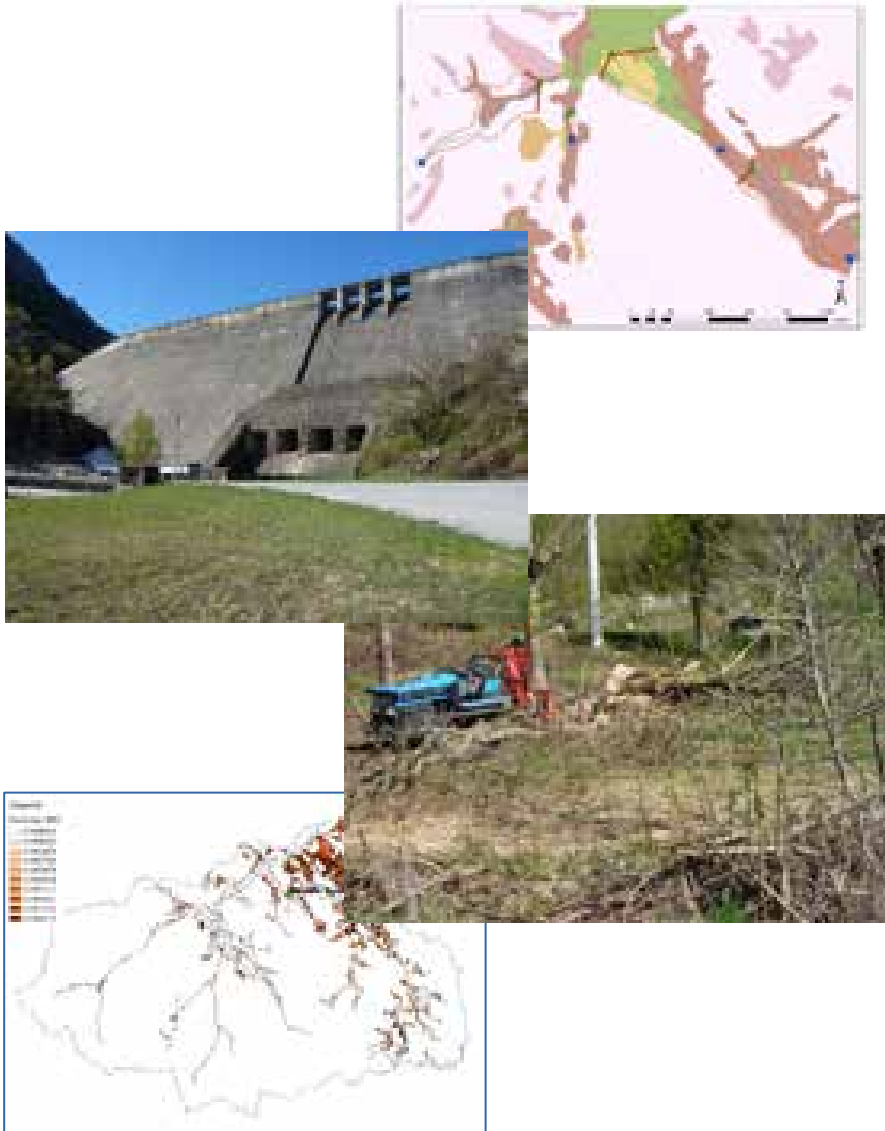
Bioenergy MWh



Tot. bioenergy stimated: 12170 MWh

Thank you for your attention!

recharge  green



Contacts:

r.green@eurac.edu

Detailed information on the software in the poster session



EURAC
research

