

Applying r.green.biomassfor to Pilot Regions

Marco Ciolli¹, Giulia Garegnani², Francesco Geri¹, Pietro Zambelli^{1,2}, Gianluca Grilli^{1,2}, Sandro Sacchelli², Ales Poljanec⁴, Francesca Miotello⁵, Alessandro Paletto³, Jessica Balest², Valentina D'Alonso², Giorgio Curetti², Daniele Vettorato²

1 Dipartimento di Ingegneria Civile Ambientale e Meccanica, University of Trento, via Mesiano 77, 38100 Trento, Italy email marco.ciolli@unitn.it

2 EURAC Research, Institute for renewable Energy, Viale Druso 1, I-39100 Bolzano, Italy

3 Consiglio per la Ricerca in Agricoltura e l'analisi dell'economia agraria (CRA), Forest Monitoring and Planning Research Unit, P.zza Nicolini 6 Villazzano, 38100, Trento, Italy

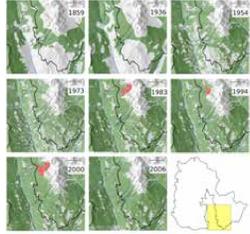
4 University of Ljubljana, Biotechnical faculty, Department for forestry and renewable forest resources, Večna pot 2, SI-1000 Ljubljana, Slovenia

5 Regione del Veneto, Department of Economy and Development in Mountain Areas, Palazzo Balbi - Dorsoduro 3901, I-30123 Venezia, Italy

Introduction

In energy planning, there is an increasing request to produce **future scenarios** to guide decision making.

The increase in forest coverage observed in most Alpine areas, where traditional farming and agricultural practices have been abandoned and forest biomass accumulated. The case represents Trentino, Italy, green colour represent forest coverage

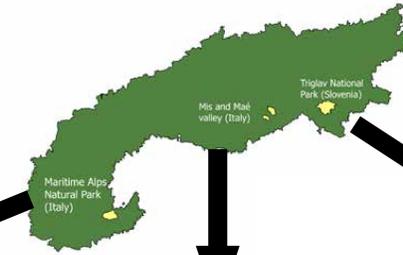


Park managers in alpine areas must deal with the growing demand of forest biomass to produce bioenergy. It is difficult to quantify the real biomass availability respecting technical economical and environmental constraints.

Objectives

During the project **recharge.green** different pilot areas were selected to test the energy DSS model that were implemented. Aim of this work is to show the results of the application of **r.green.biomassfor** model to **three pilot areas** to support the planning process by focusing on sustainable biomass production scenarios.

Location of the Pilot areas in the Alps: Gesso and Vermenagna Valleys, Piedmont, Mae and Mis Valleys, Veneto (Italy), Triglav National Park (Slovenia)



Methods

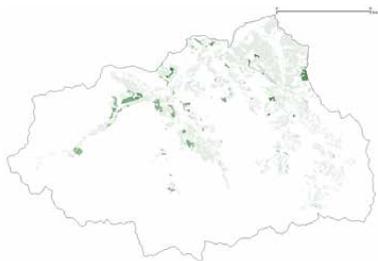
r.green.biomassfor is an easy to install add-on of **GRASS GIS** designed to assess the **forest bioenergy potential** from forest biomass using forest management data and a set of georeferenced information (Zambelli et al, 2012, Sacchelli et al. 2013, Garegnani et al. 2015)

The software **r.green.biomassfor** was developed with an user friendly interface. The software can be launched via GRASS or via QGIS



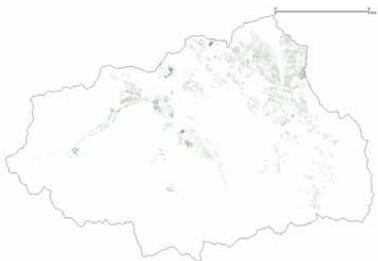
The model was used in a comprehensive process that included public consultation and expert opinion surveys.

Piedmont



40502
Mwh/y

Forest **bioenergy** potential is calculated spatially explicitly starting from a **theoretical** potential.



Legal and technical constraints reduce bioenergy to a more reliable amount
Legal: 30992 Technical: 25246 Mwh/y



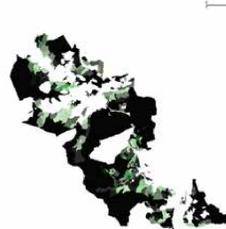
Economical constraints reduce the amount of bioenergy; here is represented a scenario with **12862 Mwh/y**. In Piedmont Scenarios with **different biomass plants** were requested

Veneto

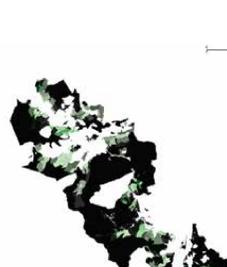


7922
Mwh/y

The **theoretical potential** represents the amount of energy that could be produced if all the forest residues are used for bioenergy.

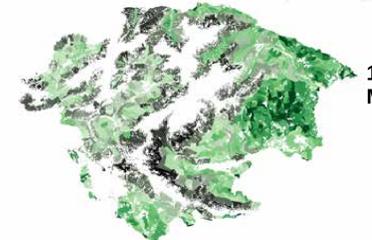


Legal constraints are determined by norms, technical are tied to technical solutions
Legal: 4069 Technical: 3598 Mwh/y



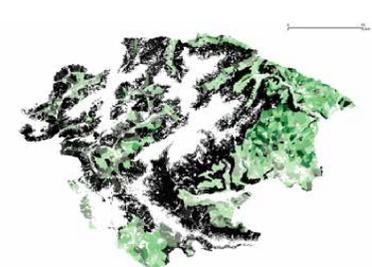
The results can be used to plan biomass plants number and location or to experiment solutions like, for Veneto, cut **along electric grids**; a scenario of **3133 Mwh/y** is represented

Triglav

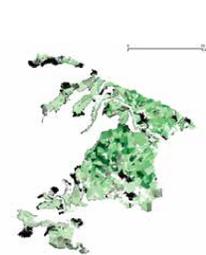


125559
Mwh/y

Theoretical potential must be transformed into something more **realistic** thus **technical** and **legal** constraints must considered



Parameters can be changed to complain with different norms or new technical solutions
Legal: 58478 Technical: 46077 Mwh/y



Bioenergy availability can be used to plan biomass plants number and location, in Triglav **different cut rates** were considered; A scenario of **45837 Mwh/y** is represented

Theoretical

Legal and Technical

Economic

Theoretical

Legal and Technical

Economic

Conclusion

Using a **rigorous scientific approach** **r.green.biomassfor** produced **plausible scenarios** useful in bioenergy planning calculating the amount of CO2 emission

All Pilot areas show an interesting amount of **sustainable bioenergy potential**

Pilot areas have **similar situations** but also **specific problems** tied to local environmental socio-economic conditions

Expert opinion surveys and participation of **local stakeholders** in defining alternatives that must be processed by the DSS guarantee the **best results** since allow for **tailored solutions**



Public participation highlighted that **short distribution system** model is preferable

Infrastructures, especially **forest road network** play a **crucial role** in economical sustainability

Even if **r.green.biomassfor** evaluation are **prudential**, **Ecological sustainability** must guide all management choices

r.green.biomassfor is Open Source software, and can produce **robust estimates**, the same approach can be reproduced elsewhere.

Essential Bibliography

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Recharge.green site: <http://www.recharge-green.eu/>