



Swiss biomass potentials for energy

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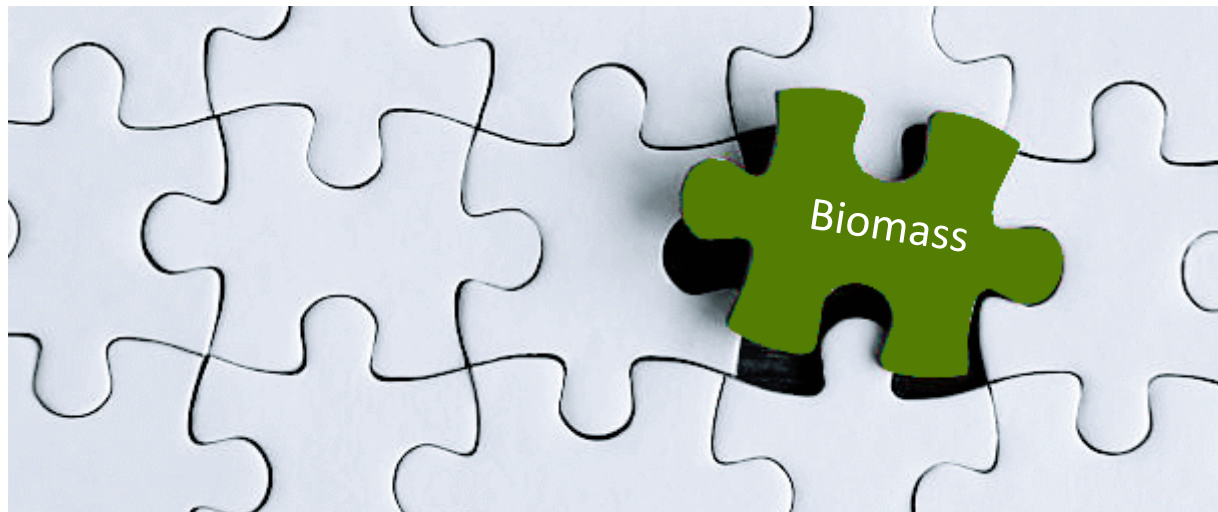


biosweet

Biomass for Swiss Energy Future
Swiss Competence Center for Energy Research

Introduction

The energy transition is underway....



Aim of the WSL study:

- Assessment of the Swiss biomass potential including:
 - The relevant restrictions (technical – economic – ecological)
 - And the spatial distribution.



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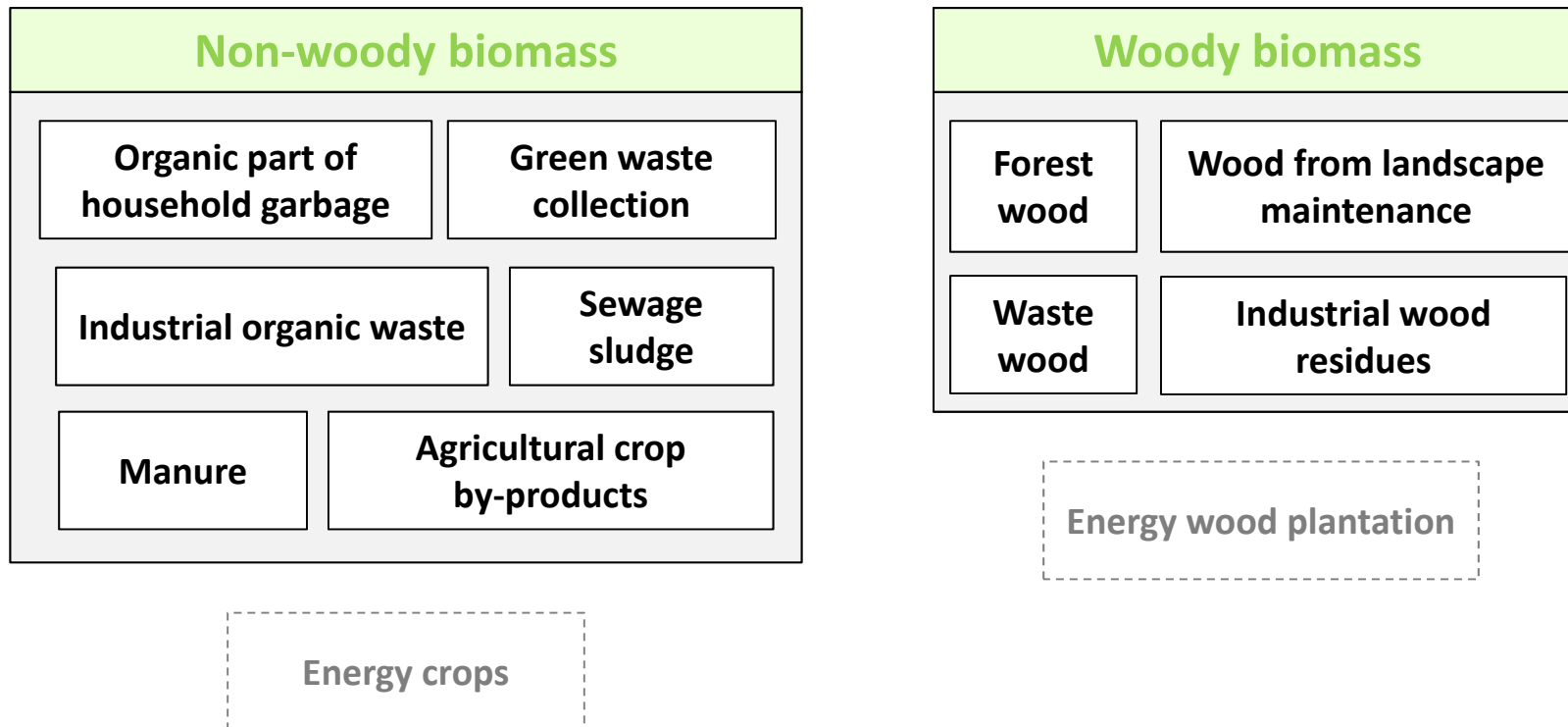
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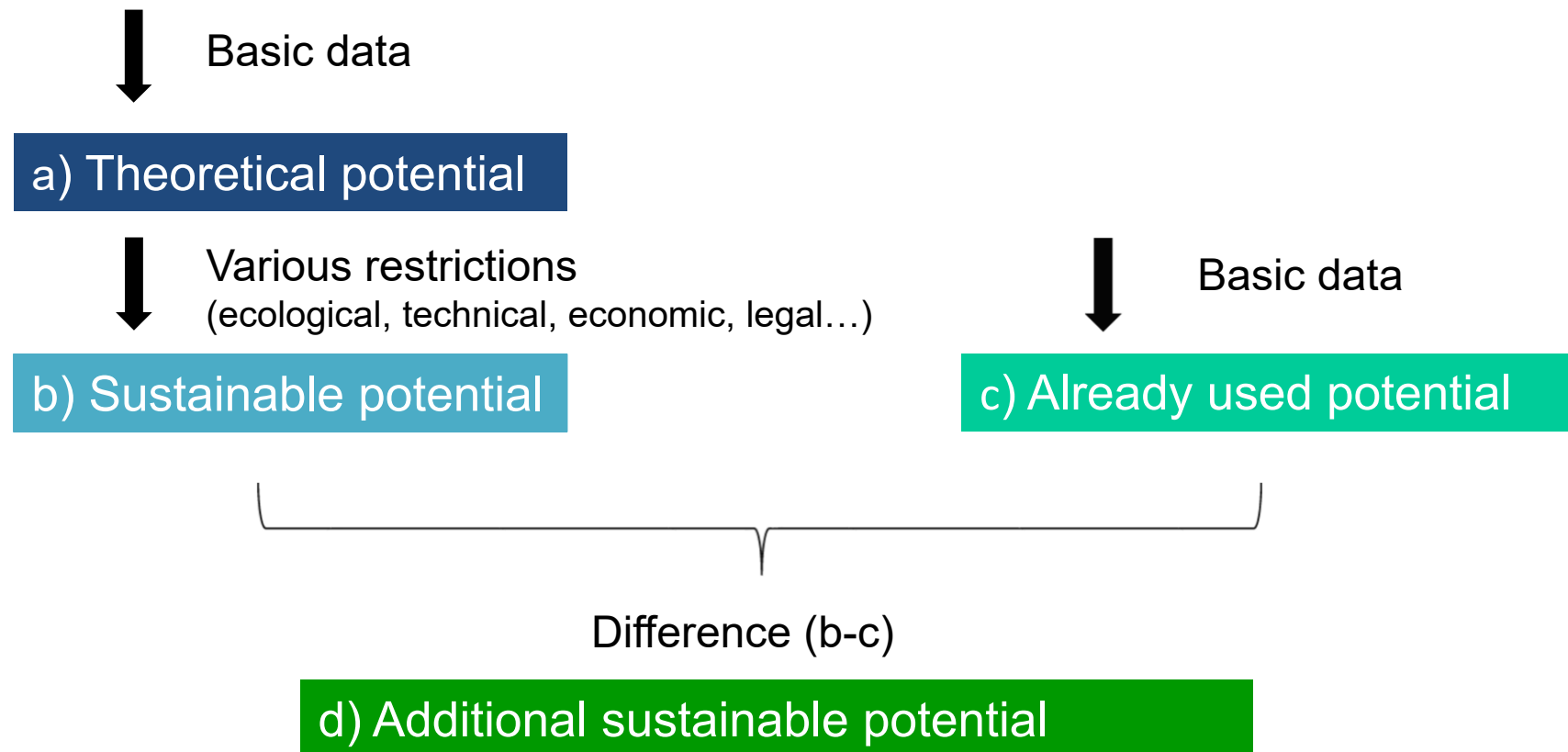


Biomass categories

BIOMASS

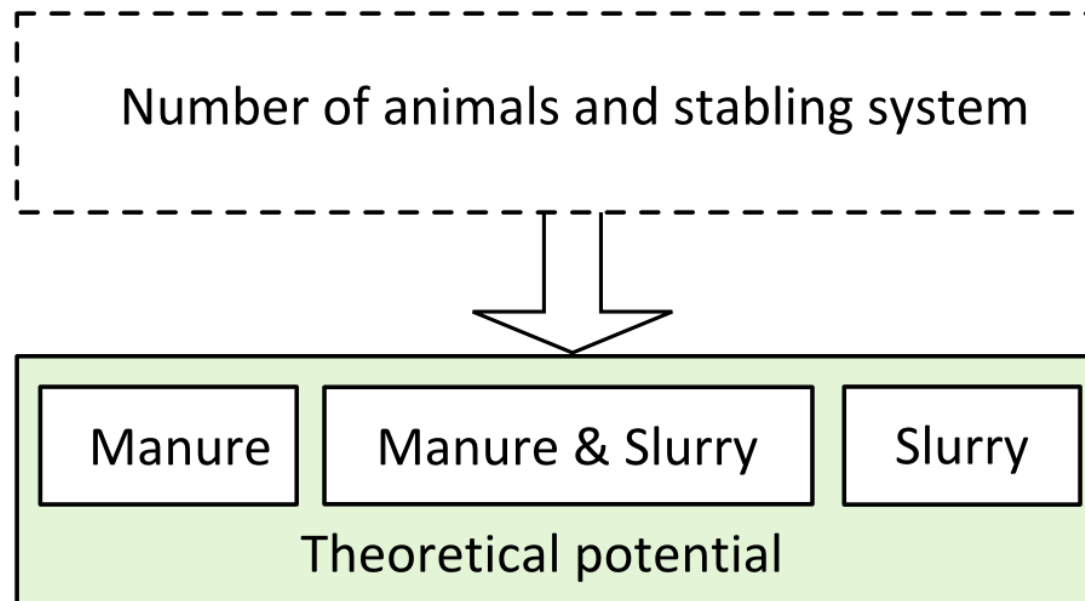


Potential levels



Calculation methods

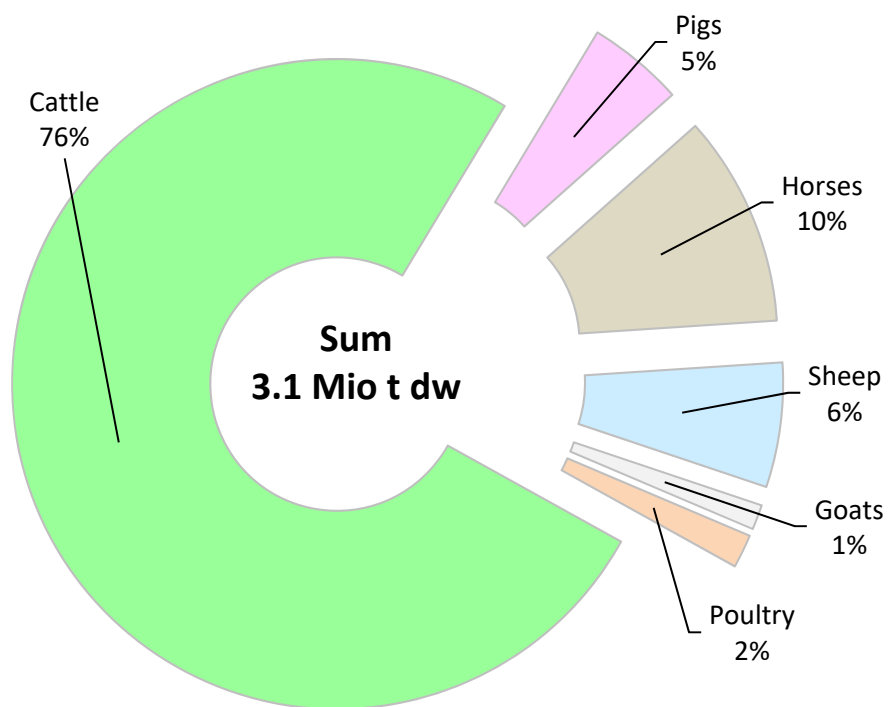
- Various methods have been developed depending on the biomass (existing statistics, new surveys...) — but which are all comparable (bottom-up, same time frame, potential definitions, units, etc).
- Estimation of the theoretical potential, using manures as example :



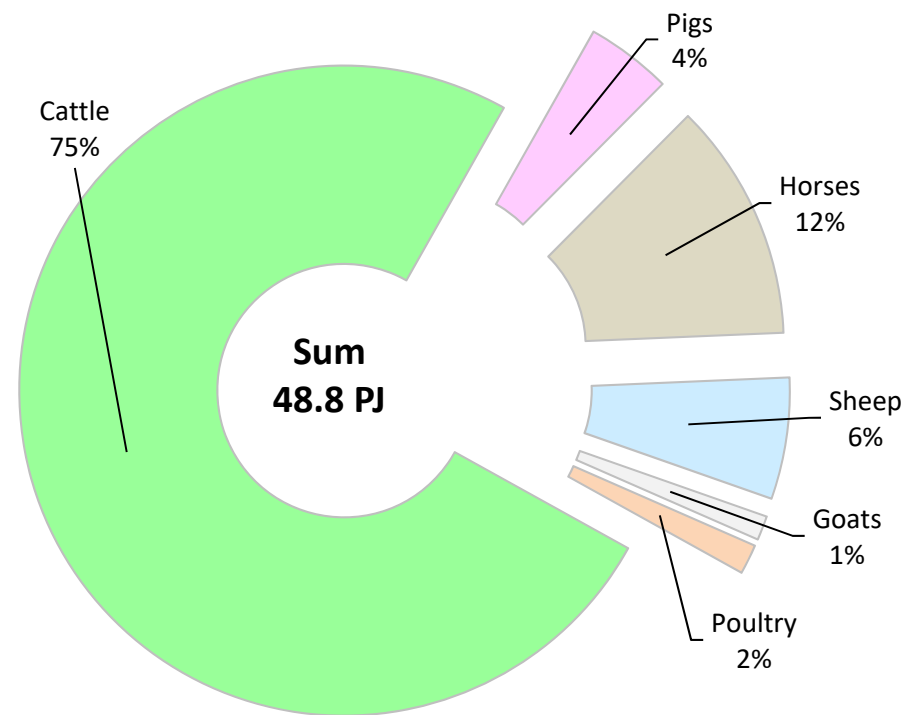
Method, using manure as an example

- Theoretical potential for Swiss manure, according to animal type (per year):

Dry weight, per animal type

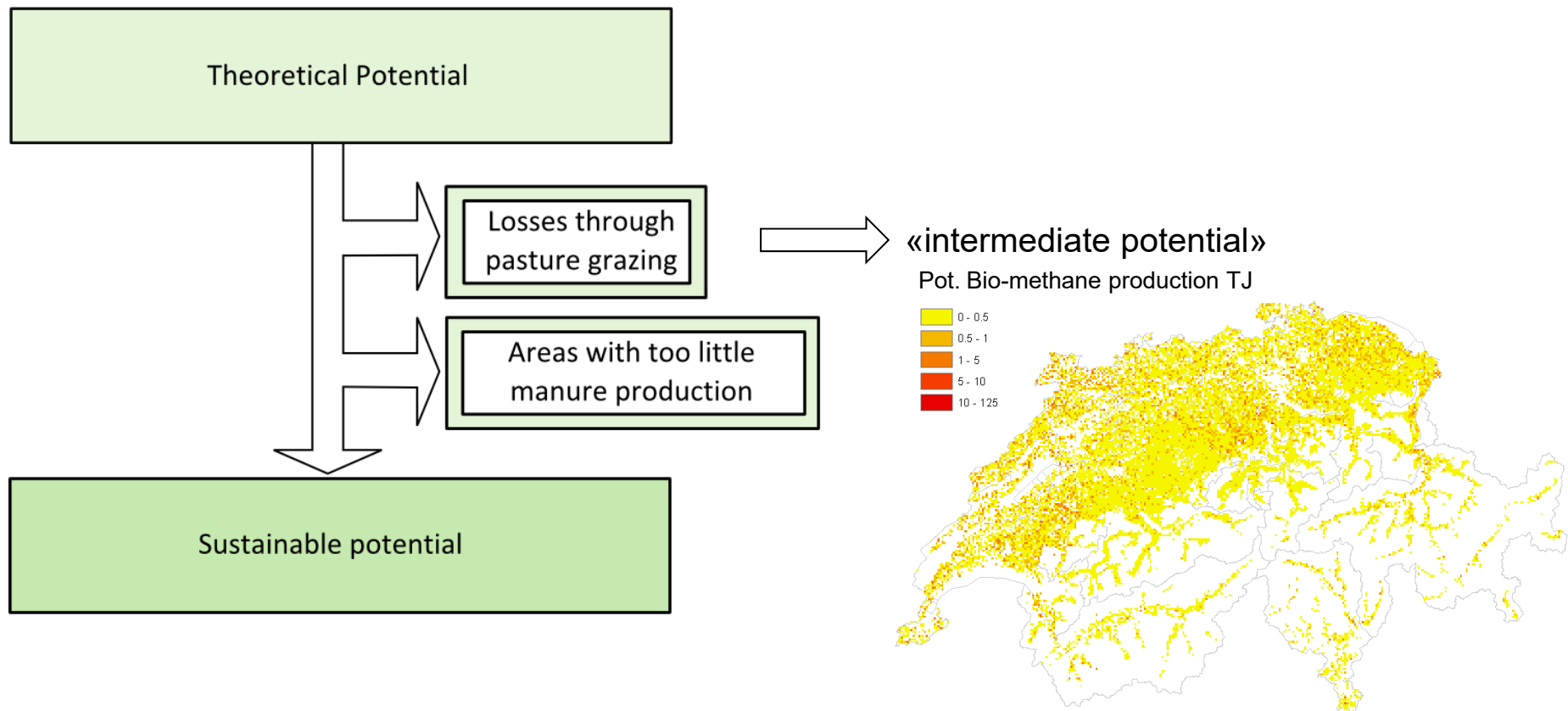


Primary energy content, per animal type



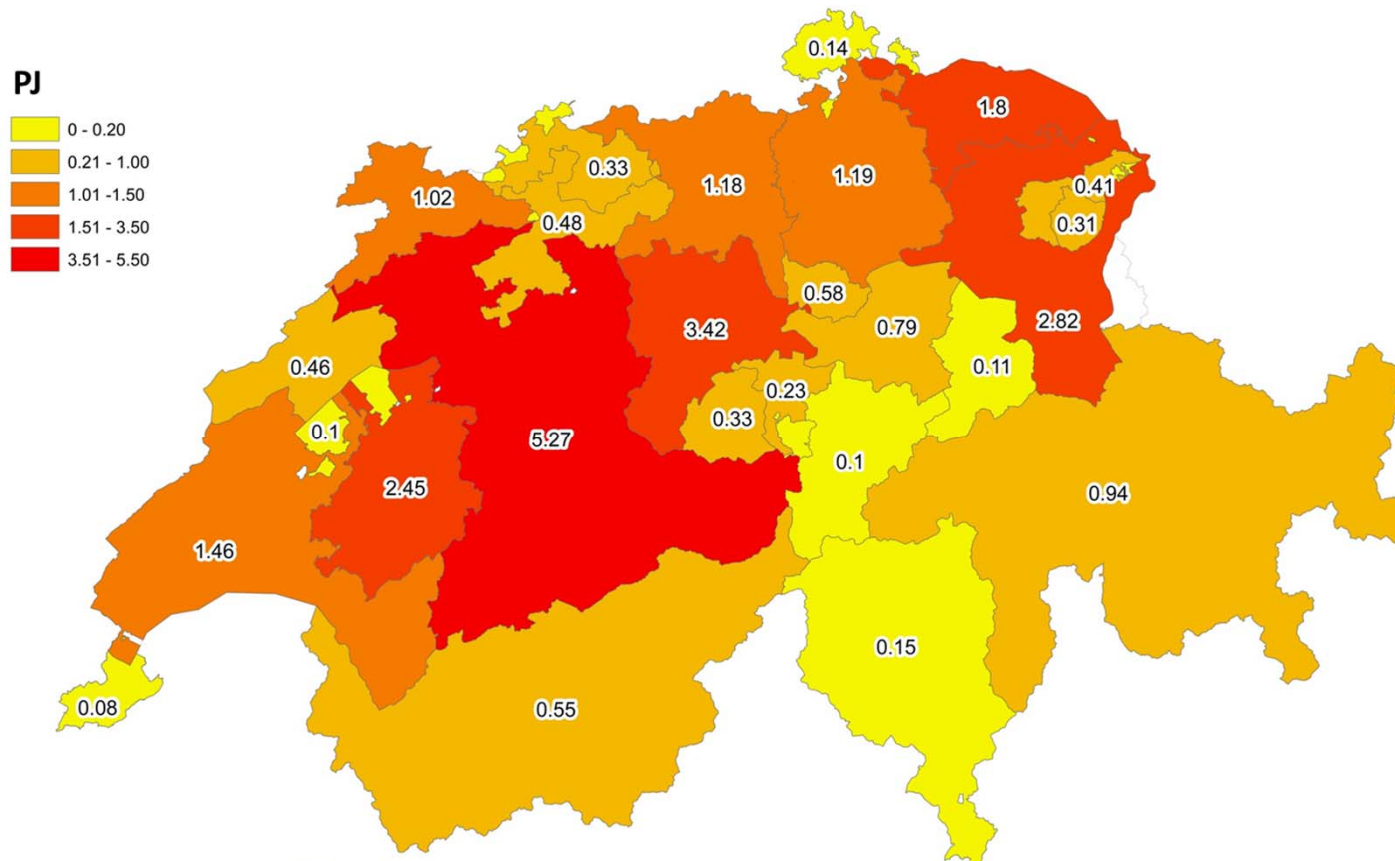
Method, using manure as an example

- Calculation of the sustainable potential:



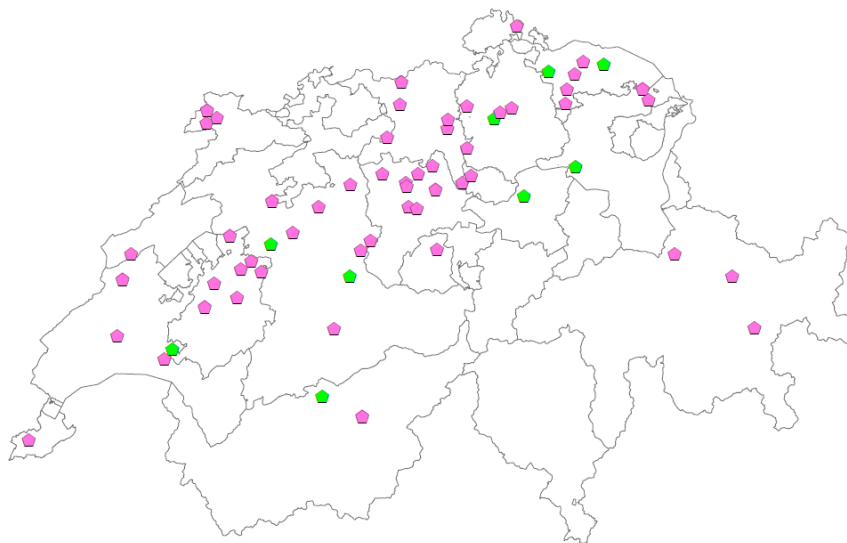
Method, using manure as an example

- Sustainable potential for Swiss manure: 26.9 PJ primary energy per year
- Cantonal distribution:



Method, using manure as an example

- Already used potential (existing agricultural biogas units):
Only a very small part is used today!



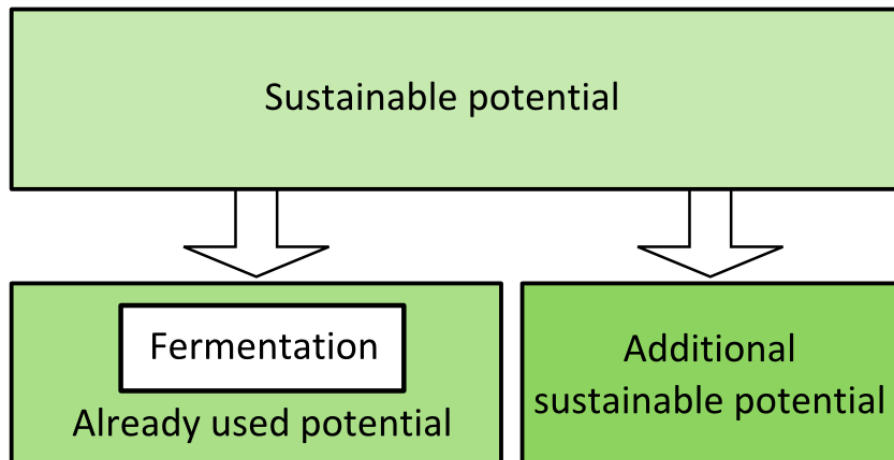
Power producers



On the free market

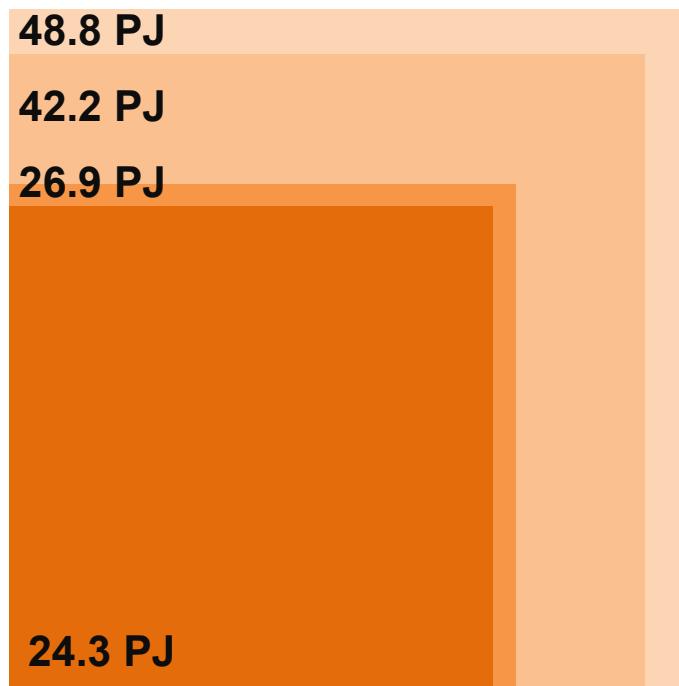


With subsidies



Method, using manure as an example

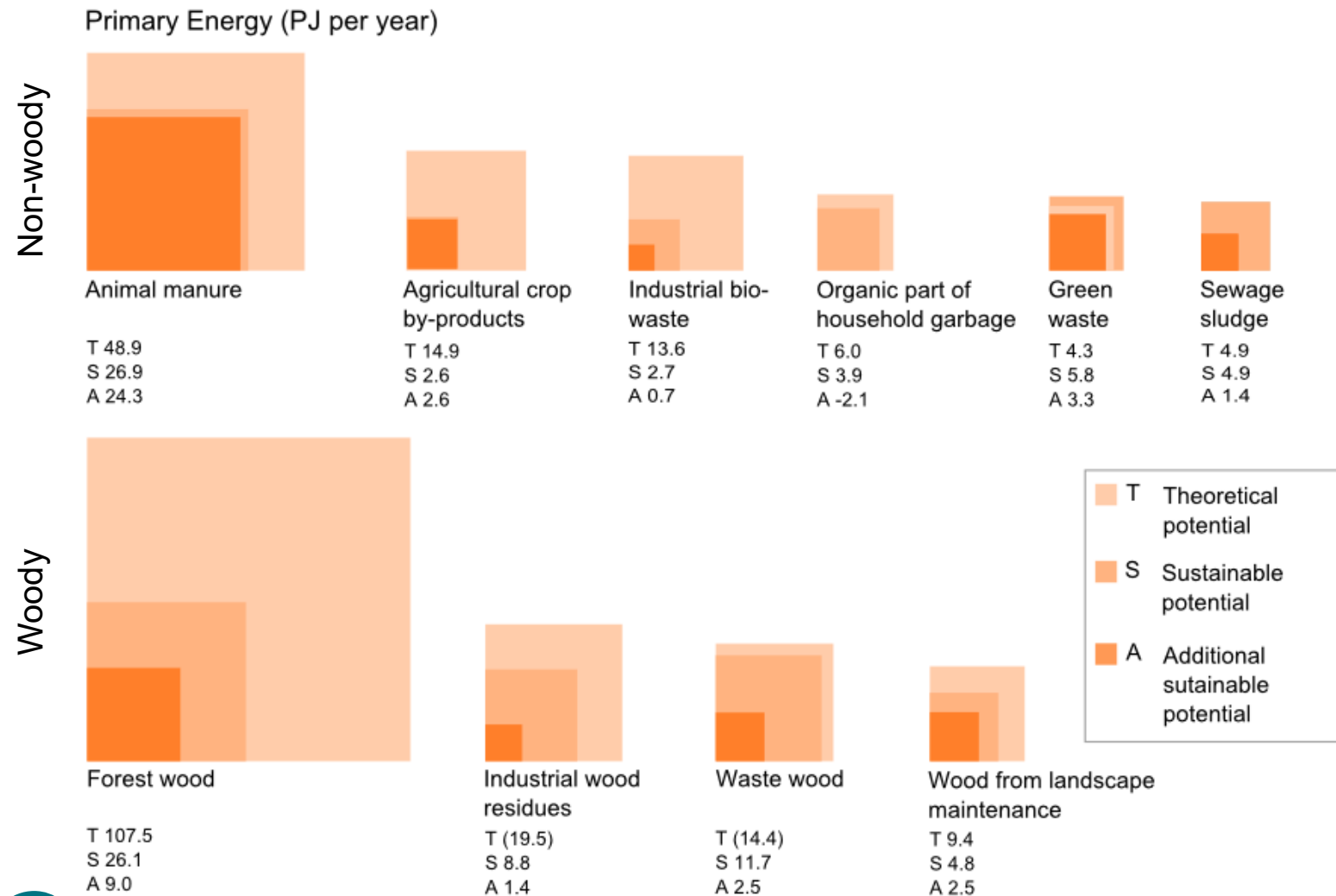
- Potential analysis, primary energy (PJ per year)



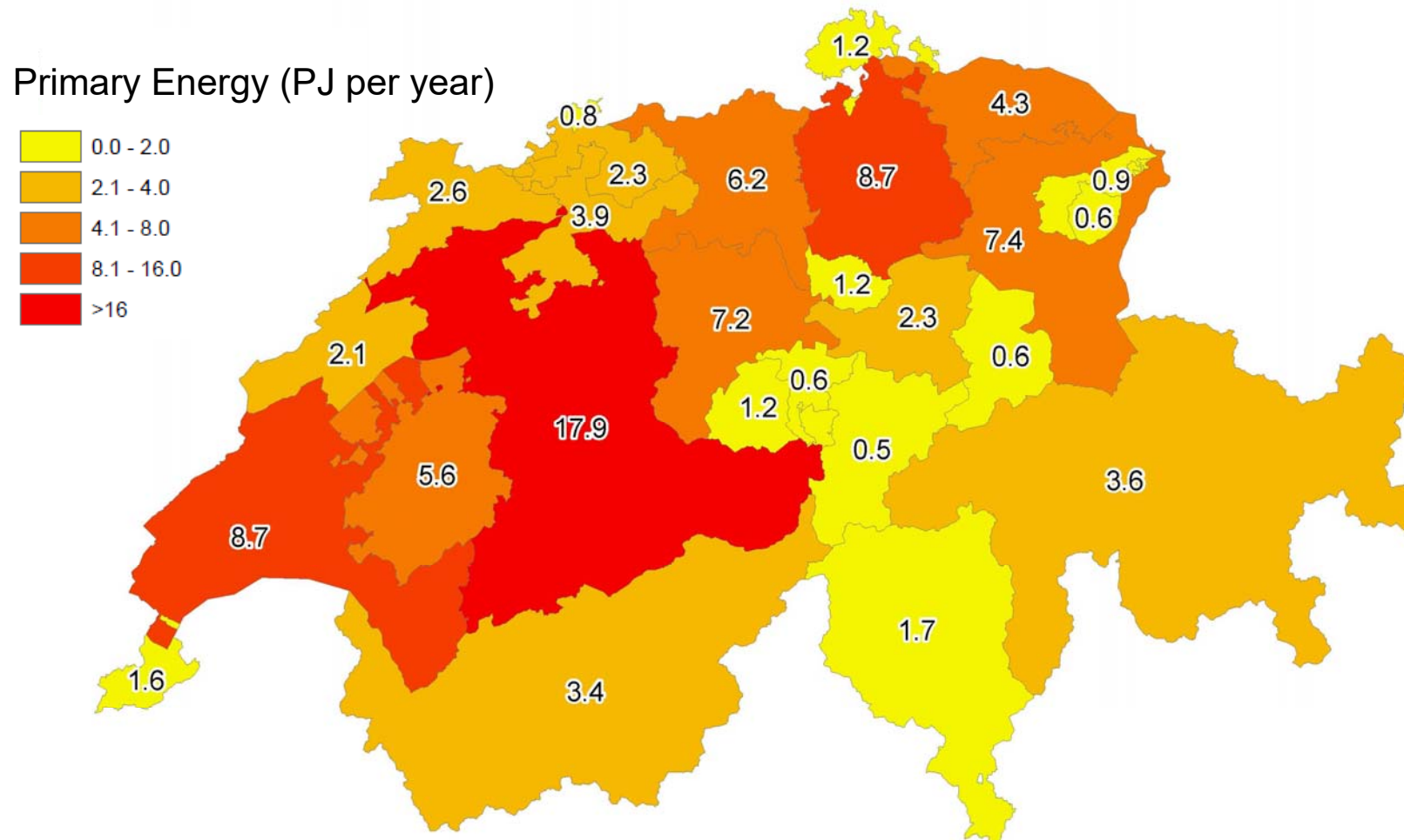
Legend:

- Theoretical potential
- Intermediate potential
- Sustainable potential
- Additional sustainable potential

Potential analysis, all biomasses

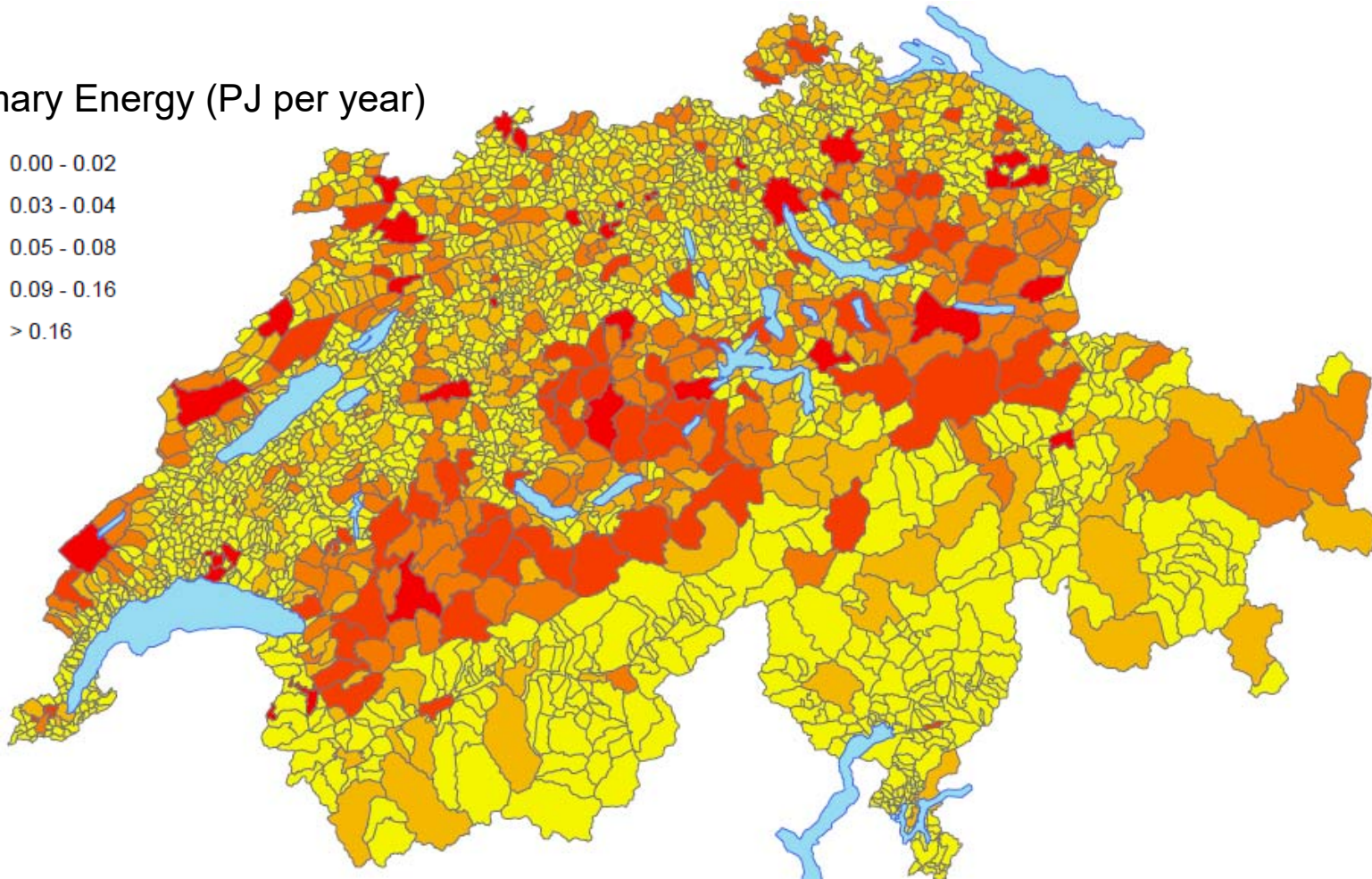
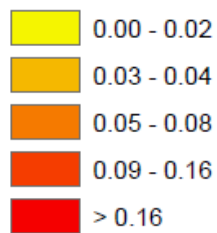


Sustainable potential of all biomasses



Sustainable potential of all biomasses

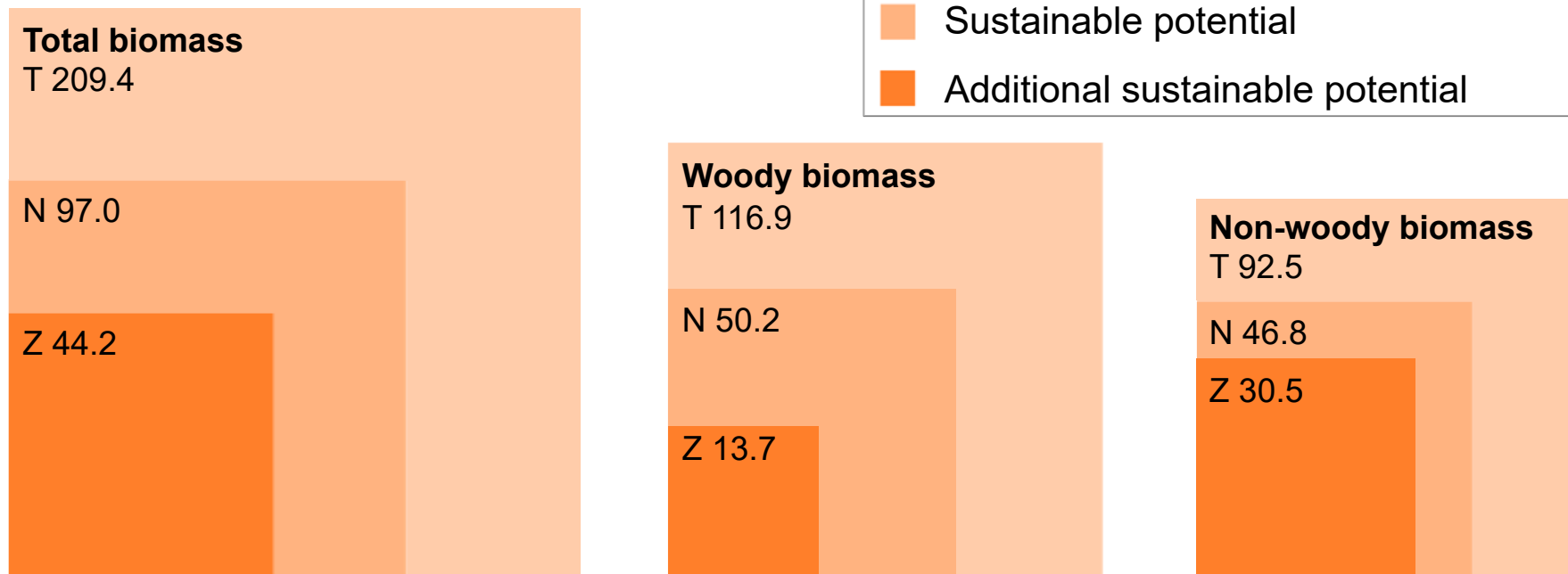
Primary Energy (PJ per year)



Conclusions

- The available quantities of biomass in Switzerland are limited. The largest potentials are those from manure and forest wood.

Primary energy (PJ per year)



Conclusions

Our study provides reliable biomass potentials:

- quantified in detail (different levels of potential),
 - geographically localized
 - estimated with comparable methods, definition and time frame.
-
- The available quantities of biomass in Switzerland are limited. The largest potentials are those from manure and forest wood.
-
- Results overview, Swiss biomass potential for energetic use:
 - Theoretical potential: ca. 200 PJ
 - Sustainable potential: 100 PJ (according to today's state of the art)
 - Total additional sustainable potential: 45 PJ

→ The whole is more than the sum of its parts (Aristotle)



For more details...

- Scientific publication:

Burg, V.; Bowman, G.; Erni, M.; Lemm, R.; Thees, O., 2018: Analyzing the potential of domestic biomass resources for the energy transition in Switzerland. Biomass and Bioenergy, 111: 60-69.

<https://doi.org/10.1016/j.biombioe.2018.02.007>

- Detailed technical publication (german):

Thees, O.; Burg, V.; Erni, M.; Bowman, G.; Lemm, R., 2017: Biomassepotenziale der Schweiz für die energetische Nutzung, Ergebnisse des Schweizerischen Energiekompetenzzentrums SCCER BIOSWEET. WSL Ber. 57: 299 S.

http://www.wsl.ch/dienstleistungen/publikationen/schriftenreihen/berichte/16618_DE

- Spatial data (geo.admin.ch):

<https://www.bfe.admin.ch/bfe/de/home/versorgung/statistik-und-geodaten/geoinformation/geodaten/biomasse/biomassepotenziale.html>

- Further outreach in several newspapers:



Datum: 30.08.2017

(24)heures

Le chiffre du jour

4,8 mios

Energie En tonnes de pétrole, c'est l'équivalent de l'énergie que pourrait produire au maximum chaque année la biomasse en Suisse, soit 209 pétajoules (PJ), ou 19% de la consommation brute totale du pays. Mais seu 97 de ces 209 PJ sont disponibles de manière durable, c'est-à-dire respectueuse de l'environnement et rentable. Sachant qu'actuellement la production de la biomasse s'élève à 53 PJ, la Suisse pourrait ainsi pratiquement doubler ce chiffre, selon une étude de l'Institut de recherche sur la forêt, la neige et le paysage (WSL), qui vient d'évaluer le potentiel énergétique de la biomasse en Suisse. ATS

And now.....

- These results provide a solid base for further studies and implementation e.g. :
 - In-depth assessment of the forest woody potentials (presented by Oliver Thees)
 - Transport of manure and forest wood for energy (presented by Vivienne Schnorf)
 - Manure fermentation benefits in terms of energy and GHG (presented by Gillianne Bowman)