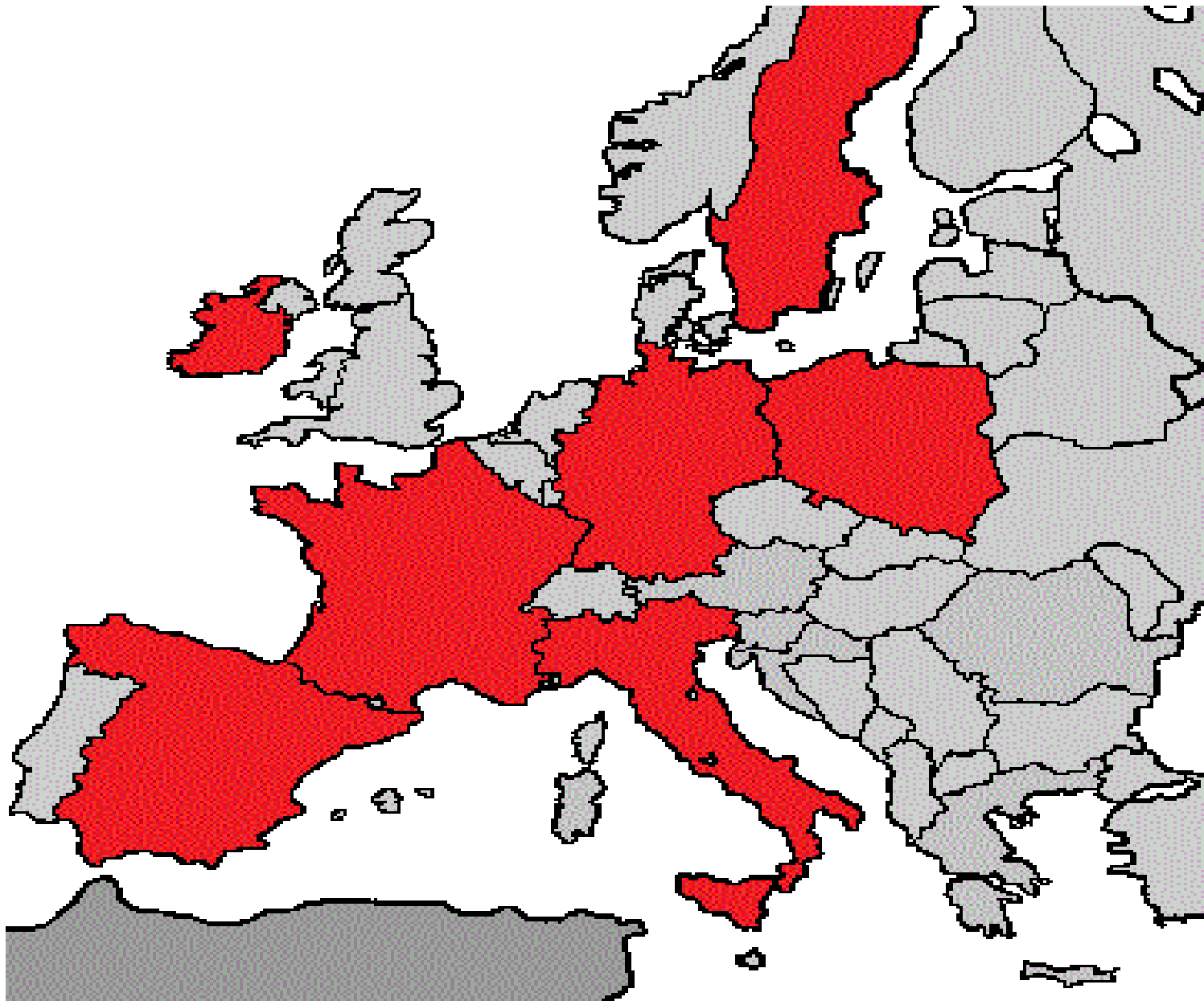




sustainable
small-scale biogas
from agri-food waste
for energy self-sufficiency

Remigio Berruto, Patrizia Busato
University of Turin, Italy



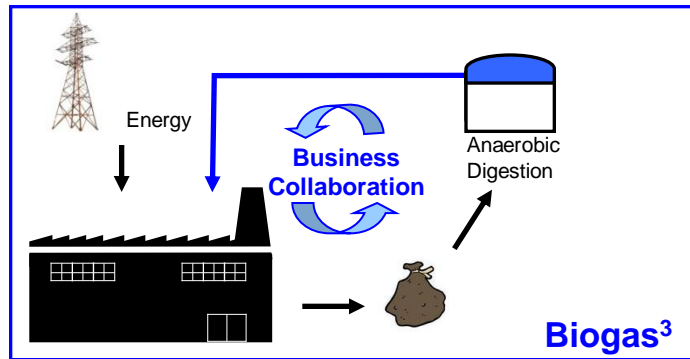
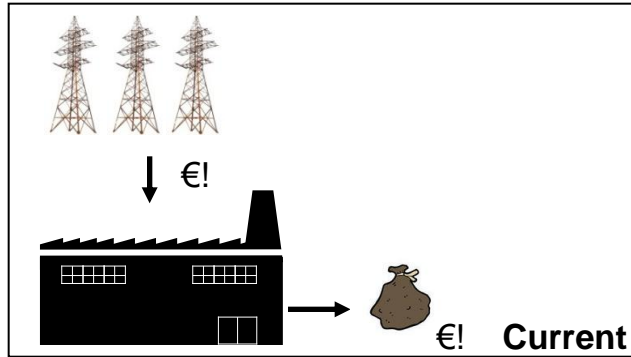
BIOGAS³

Sustainable Small-scale biogas production from agro-food waste for energy Self-sufficiency

Intelligent Energy-Europe (IEE)

www.biogas3.eu

@BIOGAS3project



Co-funded by the Intelligent Energy Europe Programme of the European Union

Contract N°:IEE-13-477

Date: from 01/03/2014 to 28/02/2016

Project partners:

ainia

centro tecnológico Spain

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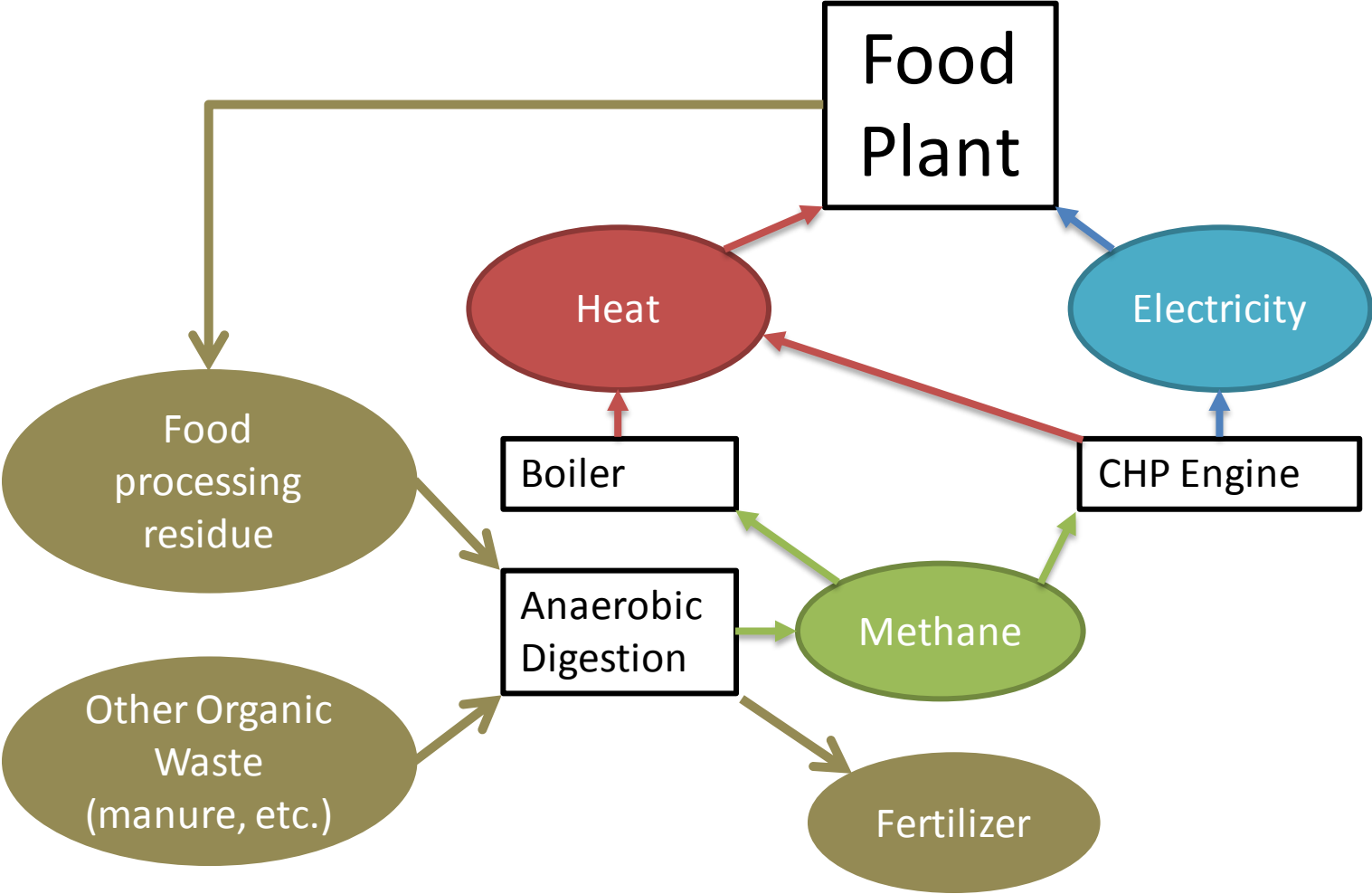
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DISAFA
Università degli studi di Torino

Biogas³ cycle



Free Feasibility study!!: e-mail: remigio.berruto@unito.it 335-454164

Which biomasses?



- Vegetable processed wastes, milling wastes, food wastes
- Animal processes wastes
- Manure, slurry from cow, pig, poultry

- Energy retrieved function of energy in biomass f(dry matter, protein, fat, fiber, etc.)

AD of slaughtering residues - pigs



Feed-in:
blood, stool parts,
slaughtering flotation
material, liquid fats: 39,2
t/d mix
Power: 999 kWe
1 digester 3.800 m³
1 post-digester 600 m³

year: 2010

**24 MWh daily → 1,63 t/MWh → energy sold 171,7 €/t+
Reduction in waste management costs**

AD of slaughtering residues – red meat



- Feed-in: red meat wastes, blood and depuration stream.
- Feed-in: 90 t/d mix
- power: 526 kWe
- 2 digestors of 1.900 m³ each
- Nitrogen removal: SBR
- year: 2009

**12,6 MWh daily → 7,12 t/MWh
energy sold 39 €/t +**

Reduction in waste treatment costs

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Non tech barriers:

- ***Need of new business models to reduce the high dependency on governmental support to renewable energy.***
- ***Need of scale-adapted technology models.***
- ***Need of energy demand management models.***
- ***Lack of knowledge, skills and confidence in small AD technology***
- ***Lack of knowledge by policy makers***



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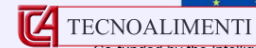
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Specific objectives

- To identify the end-user needs and difficulties encountered for implementation of AD technology in each participating country.
- To develop sustainable business collaboration models.
- To develop and promote small-scale AD models (<100 kW) including energy demand management models
- To build-up skills, awareness and networking also among policy makers
- Set the ground for new investments
- **Promote the sustainable production of renewable energy from the biogas obtained of agro-food wastes in small-scale concepts for energy self-sufficiency.**

Expected results

- Small-scale AD model – smallbiogas tool
- Handbook on biogas plants components and energy management models.
- Business collaboration models.
- Promotion, trainings (face-to-face and on-line), awareness and networking.
- Build-up of skills and awareness on small-scale AD.

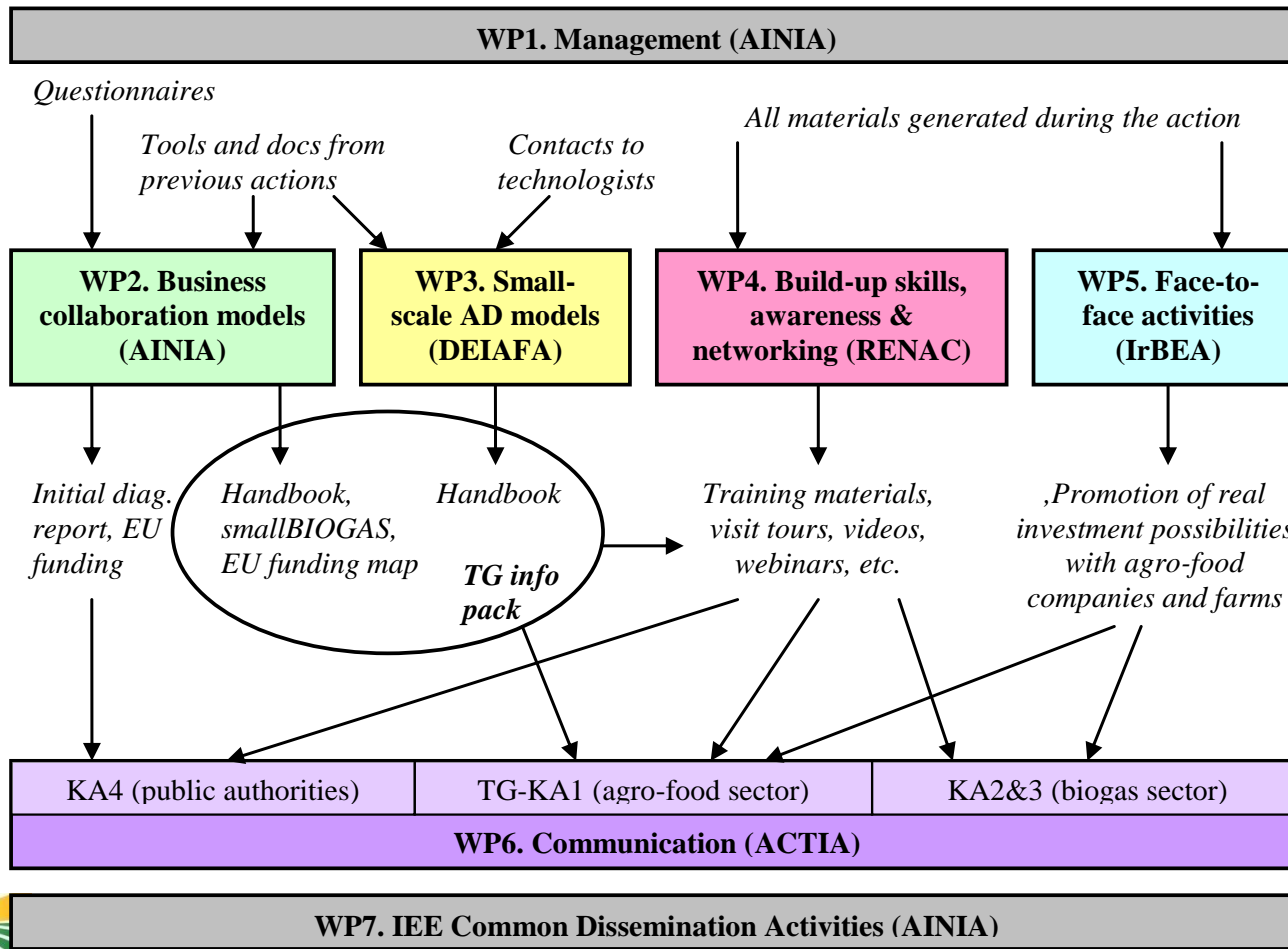
Main impacts

- Enabling policy: diagnosis of target groups, improvement of public bodies and policy maker's awareness.
- Preparing the ground for investment.
- Building capacities and skills.
- Changing behaviour & informing stakeholders



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Main steps:



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- ji** Institute for your Science Sweden
- unito.it** L'UNIVERSITÀ DI TORINO ON LINE Italy
- ACTIA** France
- renac** renewables academy Germany
- FundEko** Poland
- TECNOALIMENTI** Società cooperativa di ricerca e sviluppo tecnologica per il settore agro-alimentare Italy



Opportunities for the agri-food industry

- To improve their knowledge on the use of AD to make profit/sustainable energy/cut emissions
- **free assessment of the potential of biogas use for their own situation**
- To be supported with communication with policy makers

acknowledgements

- IEE program for funding of the initiative contract n. IEE-13-477
- Austep for provision of data on exploitation of agrifood waste by biogas plant installed in Italy



Thank you !! Questions?

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- Brochure available in pdf format