

# Combine: Converting organic material from European urban and natural areas into storable bioenergy



Ymddiriedolaeth  
Genedlaethol  
National Trust

Investing in Opportunities



This project has received  
European Regional  
Development Funding  
through INTERREG IV B.



INTERREG IV B



ASiantaeth Ynni  
**SevernWye**  
ENERGY AGENCY

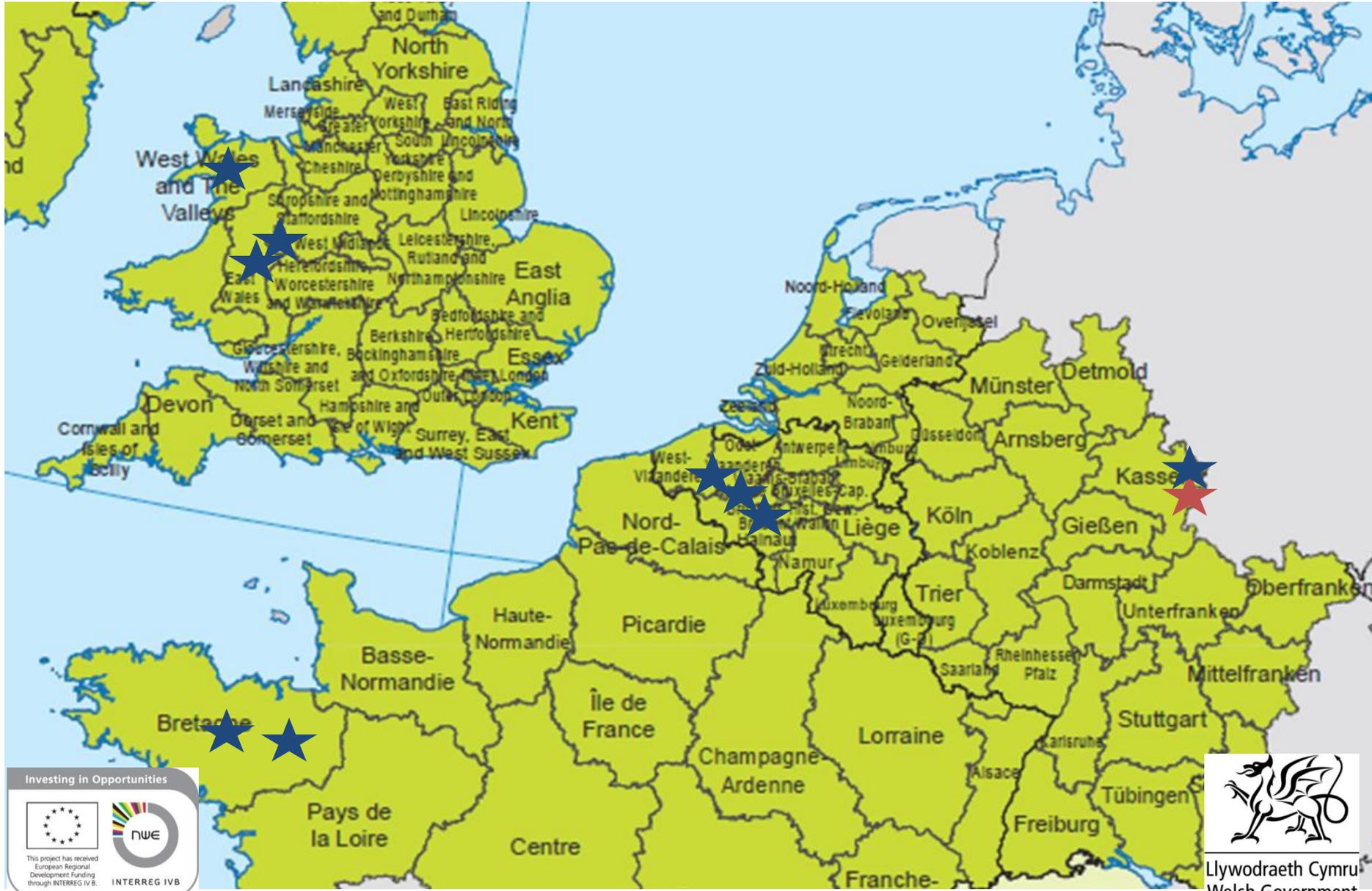


**Cwm Harry**  
*looking after where we live*



Llywodraeth Cymru  
Welsh Government

# An INTERREG IVb NWE project led by University of Kassel with partners in Belgium (Flanders), Germany and France (Brittany)



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INTERREG IV B



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Welsh Government



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*Lots of appropriate biomass*

*Lots of heat required for buildings  
that are impractical to insulate  
effectively. Existing investment in  
appropriate boilers.*



*A long history of SD innovation*

*Management of the AD plant at  
Ludlow – with spare heat*



ASIANTAETH YNNI  
**SevernWye**  
ENERGY AGENCY

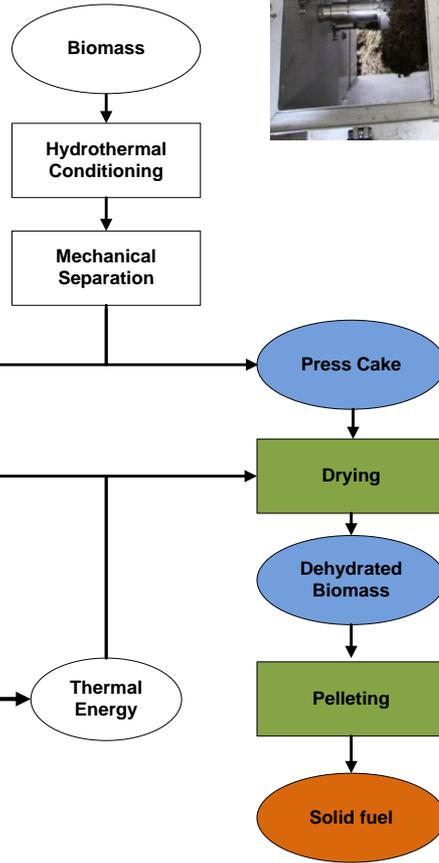
*Energy project management track record  
- especially in transnational projects*

*Lots of contacts and networking  
opportunities*

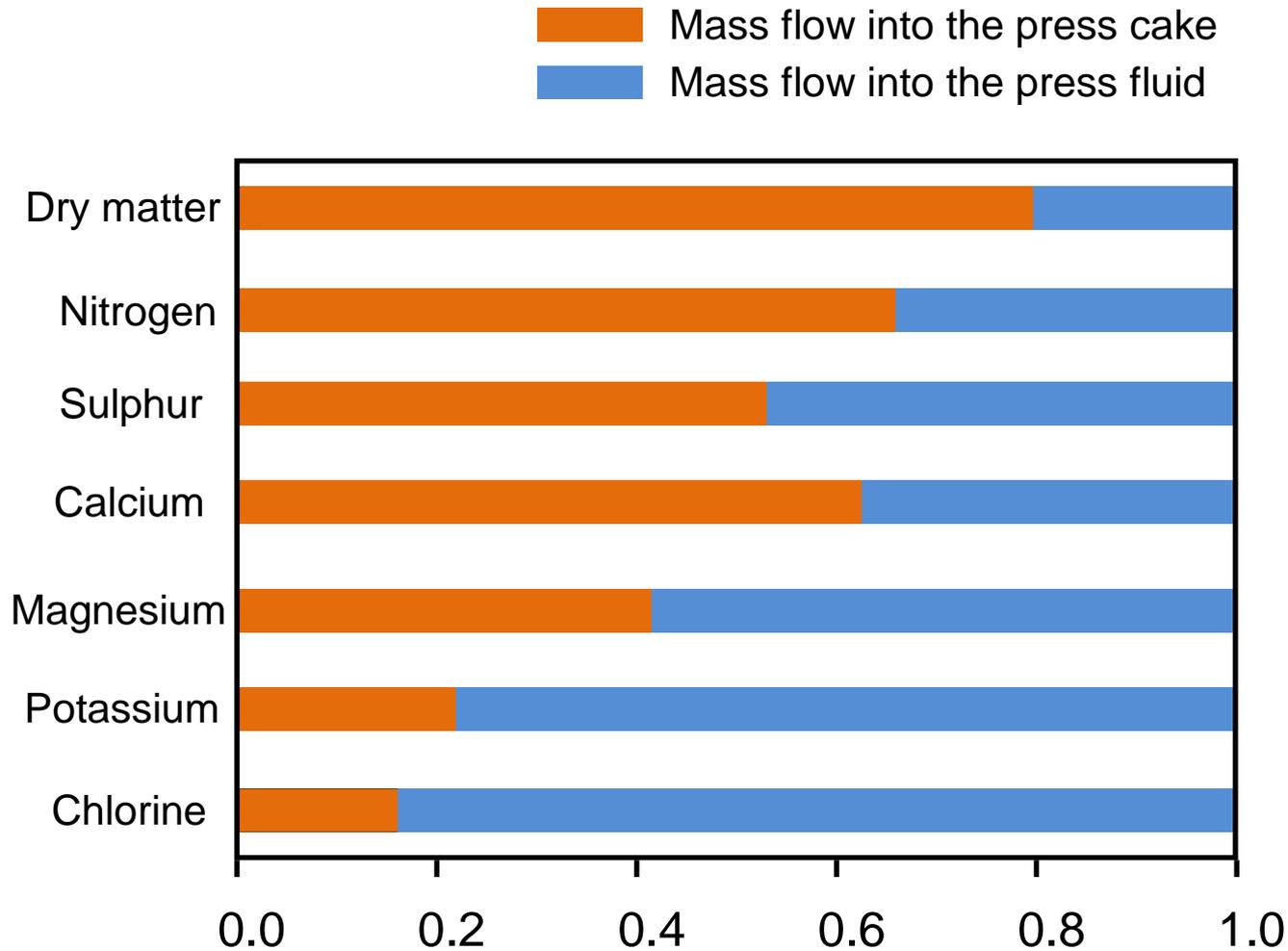


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# IFBB – Integrated Generation of Solid Fuel and Biogas from Biomass



# Nutrient flows during mechanical dehydration



# NO<sub>x</sub> emissions and Ash melting behaviour

- Two staged combustion oven required
- Ash melting temperature similar to woodchip
- Calorific value slightly lower than woodchip



# Combine feedstock material

- France – roadside verges  
former railways  
semi natural grassland
- Belgium – natural grassland  
contaminated grassland (mostly Cd and Zn)  
hedge clippings (mixed garden species)  
leek harvest residue  
Japanese Knotweed
- Wales – rushes / grassland  
Bracken  
European gorse



# How can Combine contribute to verge management?

- **Economics** – saleable product
- **Methodology** – French and Belgium partners investigating machinery
- **Safety** – French trials
- **Legislation** – all partners addressing issue of waste legislation

# Verge Harvesting Trial

- Yield, collection rates, composition, energy content
- Road verge vegetation used in AD plant to create biogas
- Living Highways Report (2006)



Asiantaeth Cefnffyrdd  
Canolbarth Cymru



Mid Wales  
Trunk Road Agency

# What happens next?

- Analysis of materials (C, H, N, S, K, P, Mg, Ca, Cl and trace elements)
- Combustion tests (NO<sub>x</sub>, CO, SO<sub>2</sub>, particulate matter, dioxins, furans)
- Reports (technical feasibility studies, life cycle assessments, regional development plan)
- Preparing investment – Cwm Harry

# Please contact us for more information

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