Introduction to NoAW's activities and results

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INRA, Montpellier, France

http://noaw2020.eu/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 688338

EU IDENTIFICATION CARD

ID card N°: **H2020 688338**

Full Name: **Innovative Approaches To Turn Agricultural Waste Into Ecological And Economic Assets**

Short name: **No Agricultural Waste - NoAW**

Coordinator: **INRA Montpellier France (N. Gontard)**

Partners: **32 (16 academic, 16 private/associative) 5 from China main land, Hong Kong, Taïwan.**

Total budget: **7.8 M€ - EC grant: 6.9 M€**

Starting Date: **01/10/2016**

Duration: **48 months**

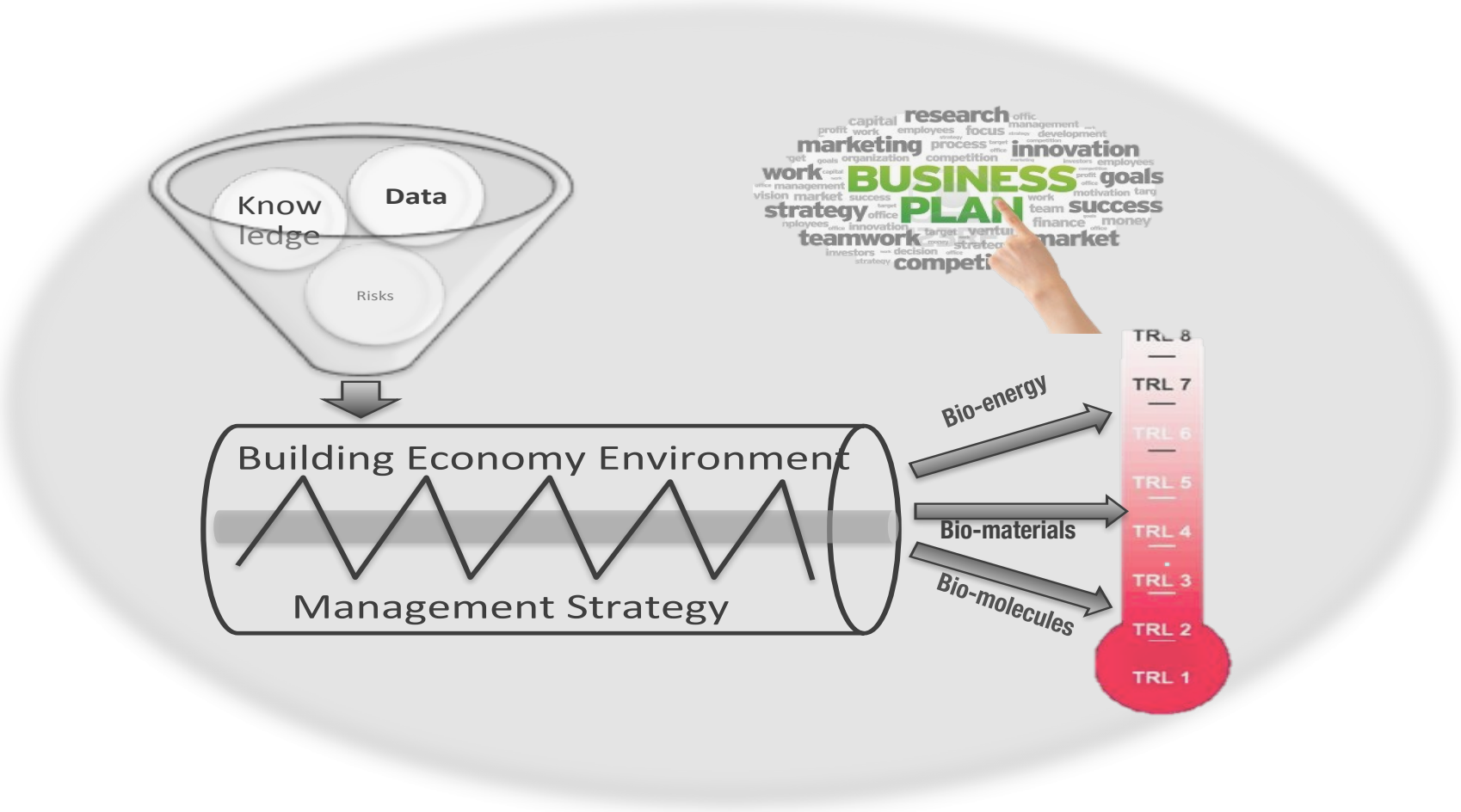
EU IDENTIFICATION CARD

Driven by a « zero-waste » society requirement**, NoAW** is about developing a circular economy approach applicable to agricultural waste on a territorial and seasonal basis.

Objectives: NoAW aims to pave the way for a sustainable agro-waste bio-refinery concept by shifting from an a-posteriori environmental assessment to an early eco-design approach.

Target: to unlock the potential of agro-waste to be converted into a portfolio of eco-efficient products: bio-energy, bio-fertilizers, bio-packaging and bio-molecules, in symbiosis with urban waste conversion.

NOAW'S CONCEPT: SCIENTIFIC HEART



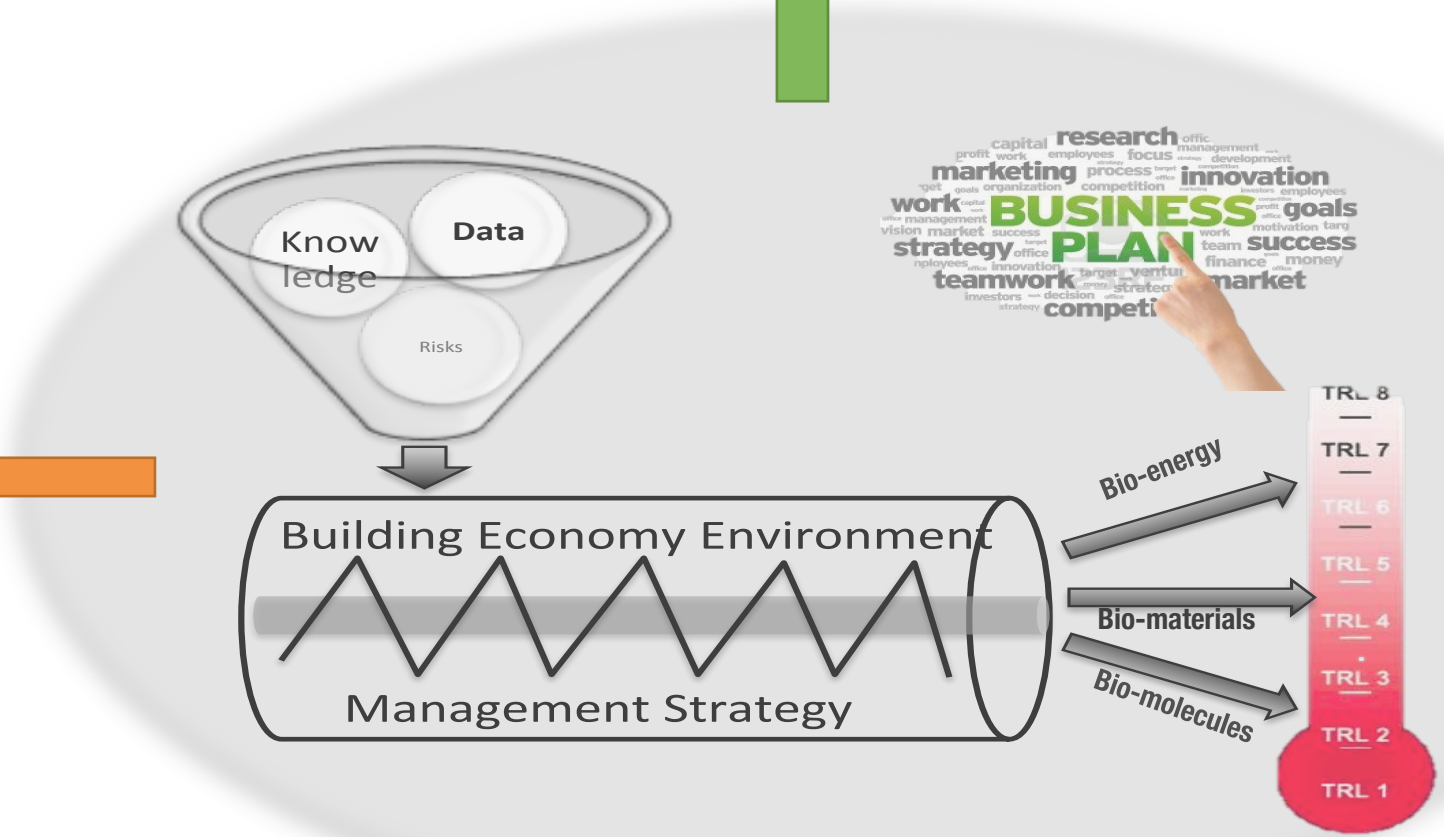
NOAW'S CONCEPT: IMPACTS

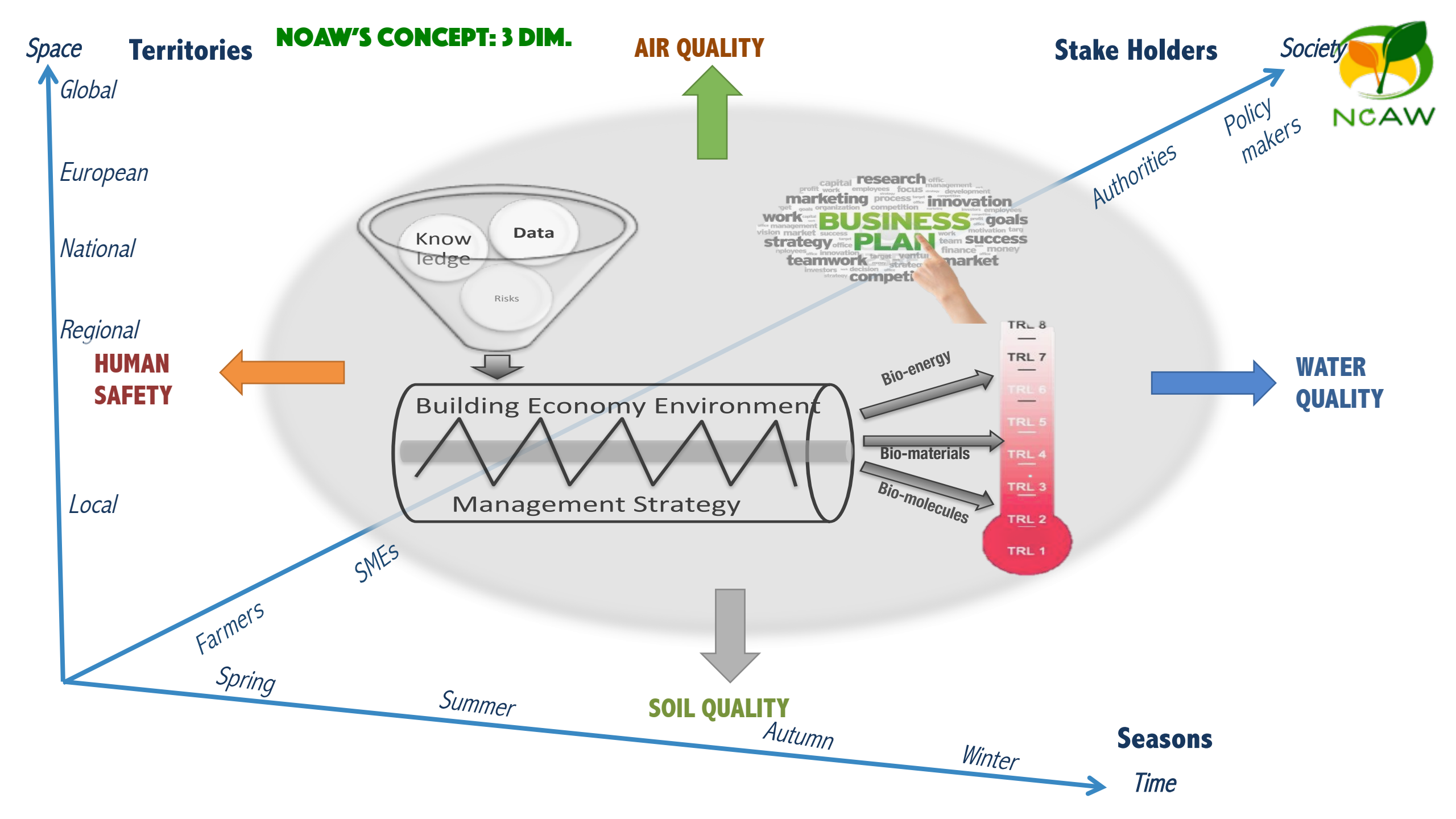
AIR QUALITY

HUMAN SAFETY

WATER QUALITY

SOIL QUALITY




Space
Territories
NOAW'S CONCEPT: 3 DIM.
AIR QUALITY
Stake Holders
Society
Global
European
National
Regional
Local
Authorities
Policy makers
NCAW
Know ledge
Data
Risks
research
marketing
process
innovation
work
BUSINESS
goals
strategy
PLAN
success
teamwork
market
HUMAN SAFETY
Building Economy Environment
Management Strategy
Bio-energy
Bio-materials
Bio-molecules
TRL 8
TRL 7
TRL 6
TRL 5
TRL 4
TRL 3
TRL 2
TRL 1
WATER QUALITY
SMEs
Farmers
SOIL QUALITY
Spring
Summer
Autumn
Winter
Seasons
Time

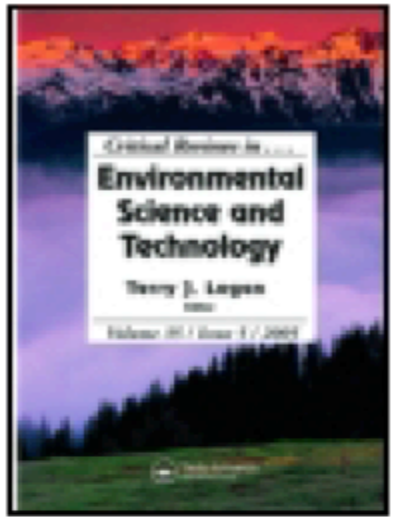
Concept of NoAW:

The concept of the NoAW consists in involving all agriculture chain actors at the territory level in order to:

A. **Develop innovative eco-design and assessment tools of circular agro-waste management** strategies and address related gap of dialogue, knowledge and data;

B. **Improve agro-waste resources use efficiency** by upgrading the most widespread mature technology and by eco-designing **innovative bio-processes and products**;

C. Ensure and accelerate the **development of new business concepts and stakeholders** platform for **cross-chain valorisation of agro-waste** on a territorial and seasonal basis.



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A research challenge vision regarding management of agricultural waste in a circular bio-based economy

Nathalie Gontard, Ulf Sonesson, Morten Birkved, Mauro Majone, David Bolzonella, Annamaria Celli, Hélène Angellier-Coussy, Guang-Way Jang, Anne Verniquet, Jan Broeze, Burkhard Schaer, Ana Paula Batista & András Sebok

THE STRUCTURE OF NOAW

-A-

Develop innovative eco-design and assessment tools of circular agro-waste management strategies and address related gap of dialogue, knowledge and data

THE STRUCTURE OF NOAW

WP1: MULTI-STAKEHOLDERS PLATFORM AND PERSPECTIVES on opportunities and challenges for a sustainable agro-wastes management

WP2: ASSESSMENT & STRATEGIC MANAGEMENT of agro-wastes

-A-

Develop innovative eco-design and assessment tools of circular agro-waste management strategies and address related gap of dialogue, knowledge and data

KEY ACHIEVEMENTS OF NOAW DURING THE 1ST PERIOD

WP1: MULTI-STAKEHOLDERS PLATFORM AND PERSPECTIVES on opportunities and challenges for a sustainable agro-wastes management

WP2: ASSESSMENT & STRATEGIC MANAGEMENT of agro-wastes

-A-

Develop innovative eco-design and assessment tools of circular agro-waste management strategies and address related gap of dialogue, knowledge and data

In WP1: European and Asian mirror KESP, 200 contacts, 30 members, 11 countries ✚ data management tools ✚ Decision Support System for agro-waste management technologies ✚ operational GIS application ✚ guide on key indicators for impacts and related methodologies

KEY ACHIEVEMENTS OF NOAW DURING THE 1ST PERIOD

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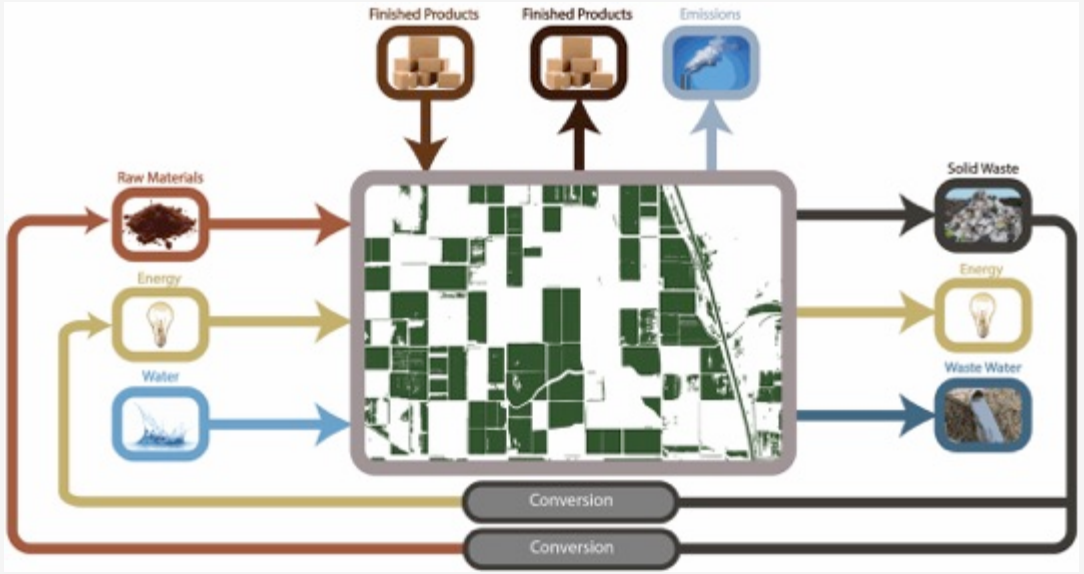

In WP2: hybrid TM-LCA methodology ✚ dynamic LCA ✚ early LCA based design tool ✚ case-studies selected ✚ data for MCE collected, SEA methodol.

THE STRUCTURE OF NOAW

WP1: MULTI-STAKEHOLDERS PLATFORM AND PERSPECTIVES on opportunities and challenges for a sustainable agro-wastes management

WP2: ASSESSMENT & STRATEGIC MANAGEMENT of agro-wastes

-A-

Develop innovative eco-design and assessment tools of circular agro-waste management strategies and address related gap of dialogue, knowledge and data

-B-

Improve agro-waste use efficiency by upgrading the most widespread mature technology (AD) and by eco-designing innovative bio-processes and products

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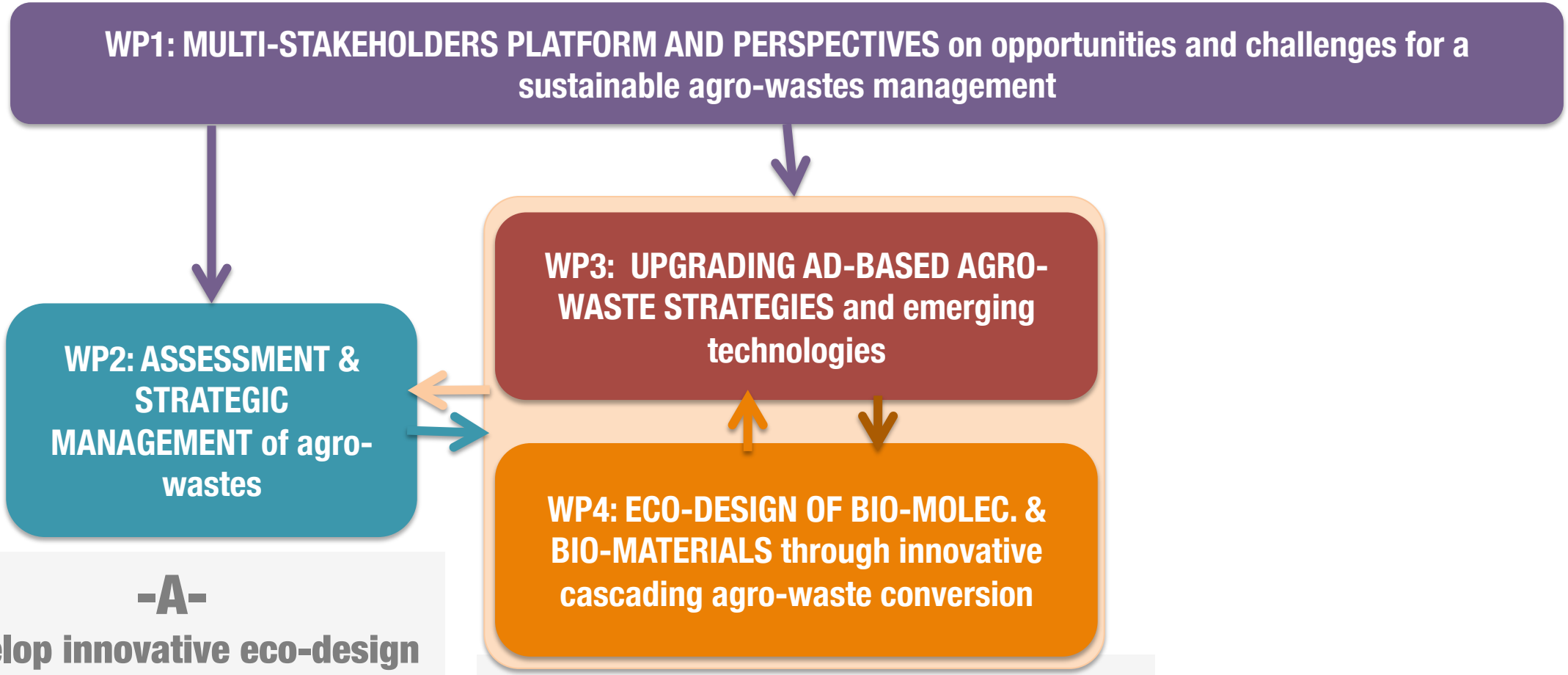

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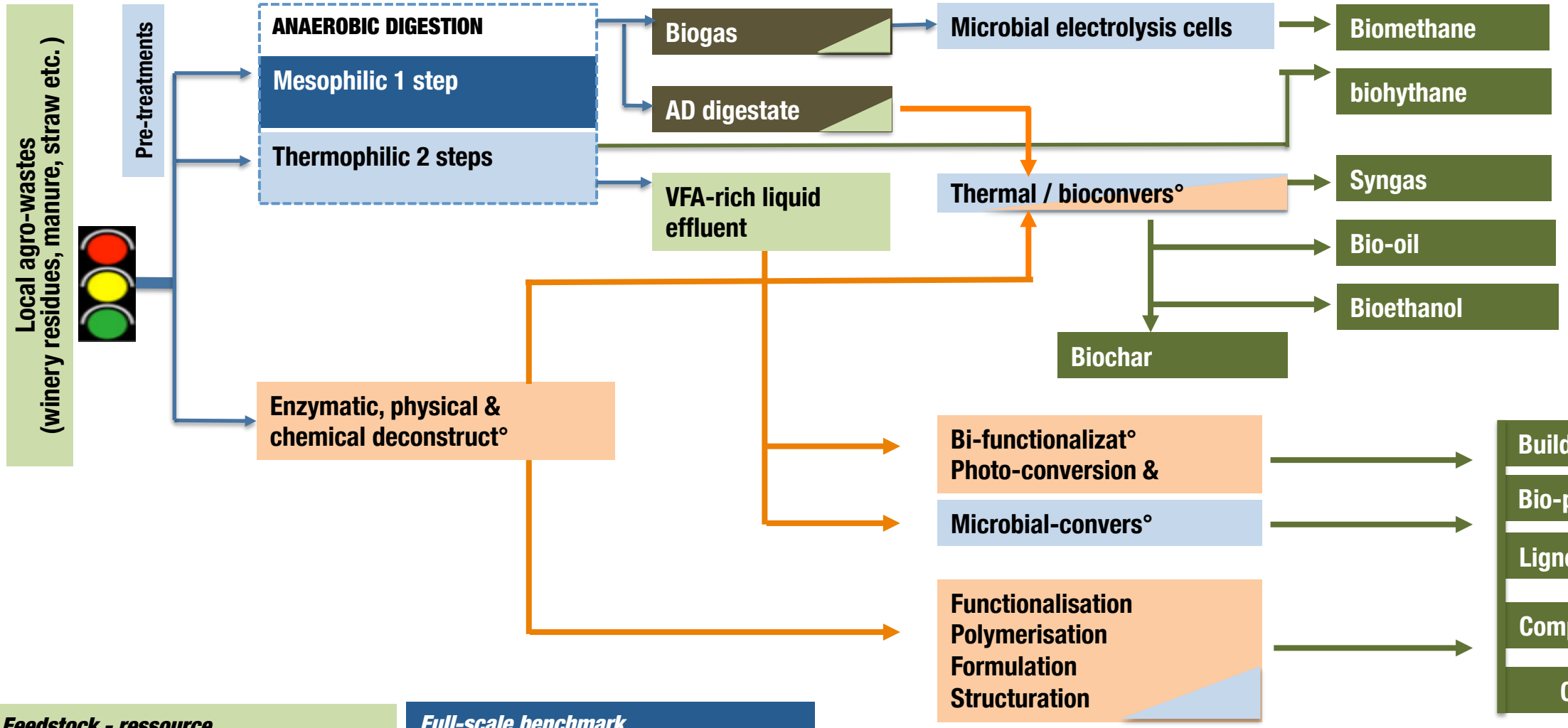
AGRO-WASTE REFINERY IN WP3/4

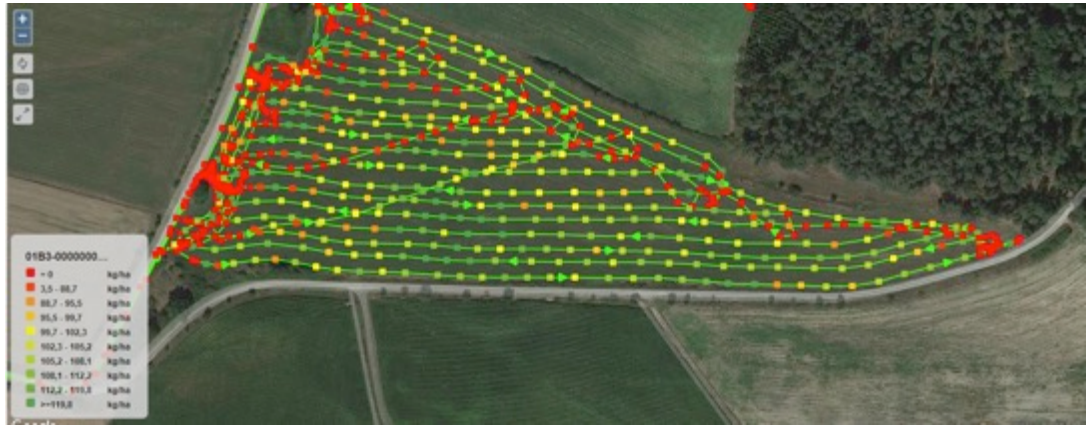
NCAW

No Agricultural Waste



Feedstock - ressource	*Full-scale benchmark*
Conventional end-products	*Pilot-scale emerging advances WP3*
Innovative end-products	*Lab-scale novel processes WP4*

KEY ACHIEVEMENTS OF NOAW DURING THE 1ST PERIOD



In WP3: Tool for sound use of AD digestate ✚ pilot rigs for bio-hythane product° from winery waste, straw, manure ✚ MEC for CO_2 bioconvers° into biomethane ✚ novel PHA pilot ✚ enzym. & wet oxidat° of ligno-cellulosic waste

WP3: UPGRADING AD-BASED AGRO-WASTE STRATEGIES and emerging technologies

WP4: ECO-DESIGN OF BIO-MOLEC. & BIO-MATERIALS through innovative cascading agro-waste conversion

-B-

Improve agro-waste use efficiency by upgrading the most widespread mature technology (AD) and by eco-designing innovative bio-processes and products

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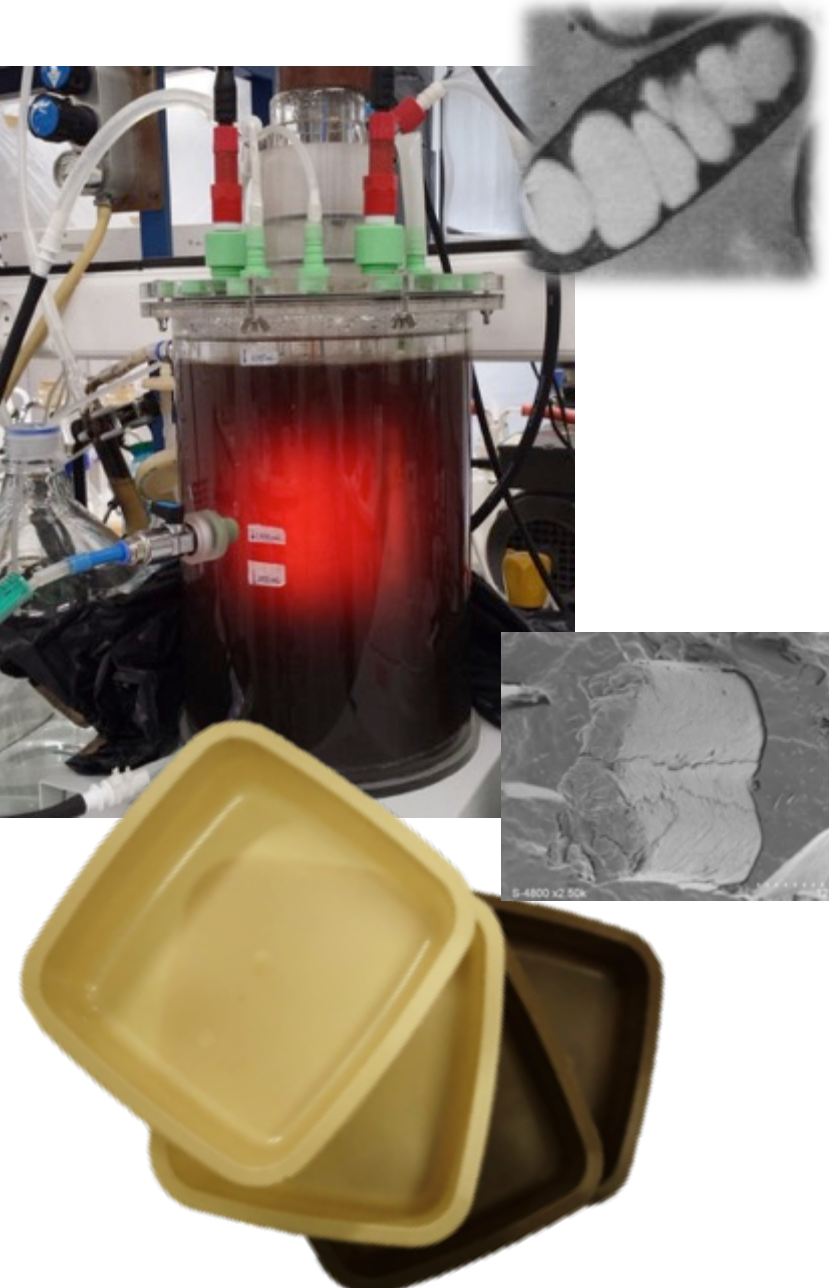

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In WP4: polyphenols extract from winery waste ✚ PHA/vine shoots trays ✚ succinic acid from mixed waste ✚ protein from potatoes waste ✚ bioelectrical AD's VFA function° ✚ PHA from photo-synthetic organism.

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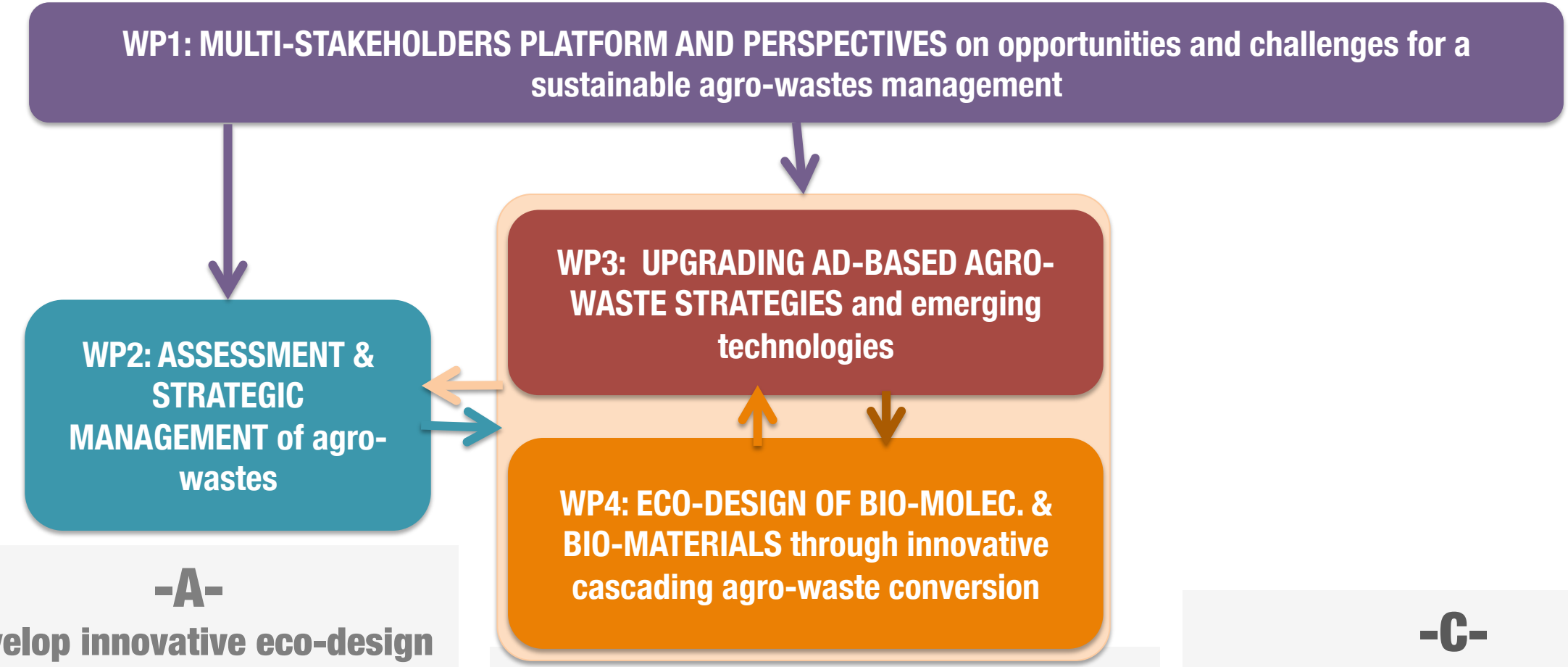

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Improve agro-waste use efficiency by upgrading the most widespread mature technology (AD) and by eco-designing innovative bio-processes and products

-C-

Development of new business concepts and stakeholders platform for cross-chain valorisation of agro-waste on a territorial and seasonal basis.

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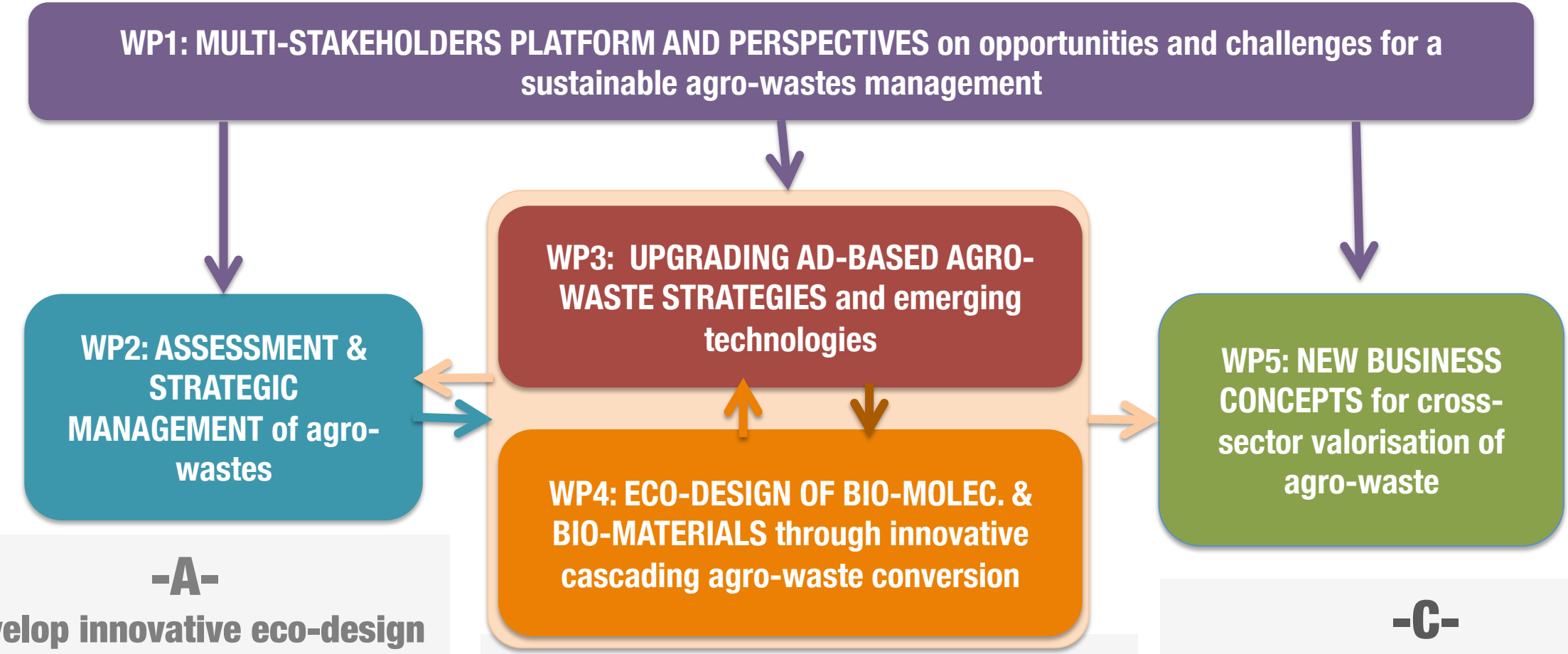

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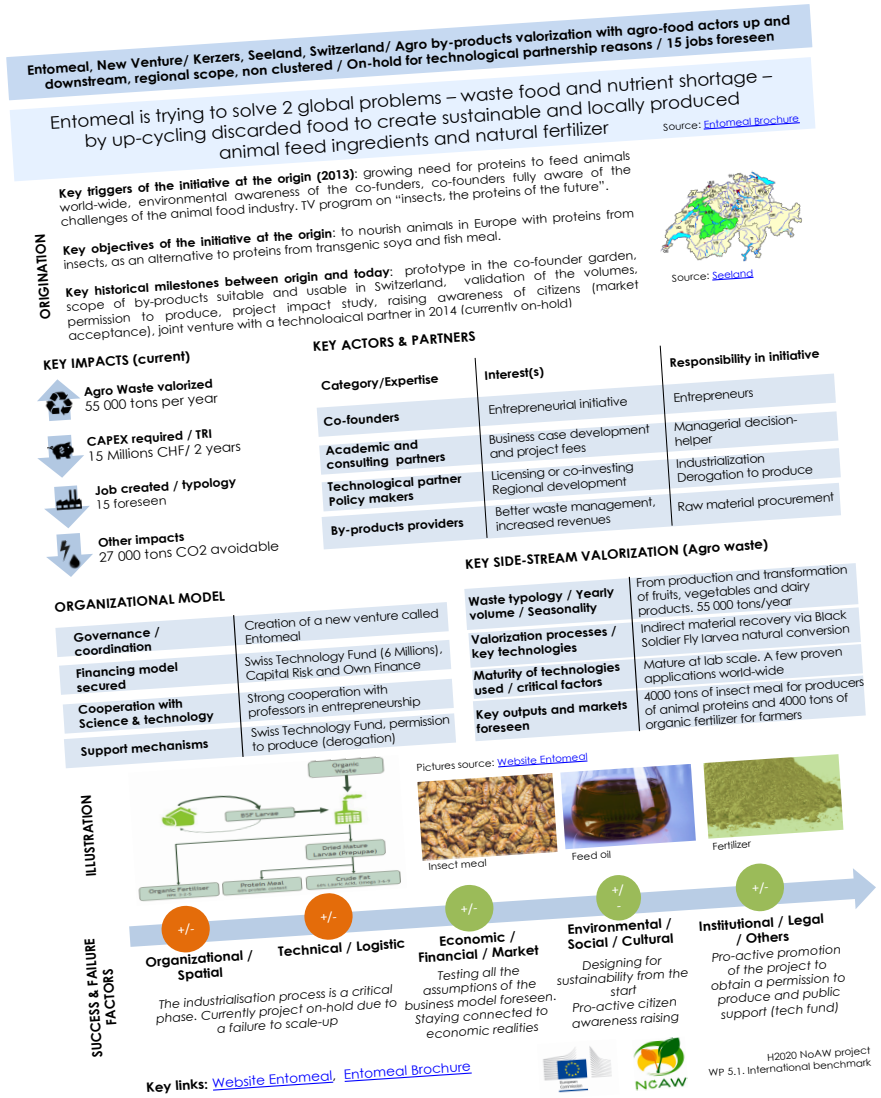

Entomeal, New Venture/ Kerzers, Seeland, Switzerland/ Agro by-products valorization with agro-food actors up and downstream, regional scope, non clustered / On-hold for technological partnership reasons / 15 jobs foreseen

Entomeal is trying to solve 2 global problems – waste food and nutrient shortage – by up-cycling discarded food to create sustainable and locally produced animal feed ingredients and natural fertilizer

Source: Entomeal Brochure

ORIGINATION

Key triggers of the initiative at the origin (2013): growing need for proteins to feed animals world-wide, environmental awareness of the co-funders, co-founders fully aware of the challenges of the animal food industry. TV program on "insects, the proteins of the future".

Key objectives of the initiative at the origin: to nourish animals in Europe with proteins from insects, as an alternative to proteins from transgenic soya and fish meal.

Key historical milestones between origin and today: prototype in the co-founder garden, scope of by-products suitable and usable in Switzerland, validation of the volumes, permission to produce, project impact study, raising awareness of citizens (market acceptance), joint venture with a technological partner in 2014 (currently on-hold)

Source: Seeland

KEY IMPACTS (current)

- **Agro Waste valorized** 55 000 tons per year
- **CAPEX required / TRI** 15 Millions CHF/ 2 years
- **Job created / typology** 15 foreseen
- **Other impacts** 27 000 tons CO2 avoidable

KEY ACTORS & PARTNERS

Category/Expertise	Interest(s)	Responsibility in initiative
Co-founders	Entrepreneurial initiative	Entrepreneurs
Academic and consulting partners	Business case development and project fees	Managerial decision-helper
Technological partner Policy makers	Licensing or co-investing Regional development	Industrialization Derogation to produce
By-products providers	Better waste management, increased revenues	Raw material procurement

ORGANIZATIONAL MODEL

Governance / coordination	Creation of a new venture called Entomeal
Financing model secured	Swiss Technology Fund (6 Millions), Capital Risk and Own Finance
Cooperation with Science & technology	Strong cooperation with professors in entrepreneurship
Support mechanisms	Swiss Technology Fund, permission to produce (derogation)

KEY SIDE-STREAM VALORIZATION (Agro waste)

Waste typology / Yearly volume / Seasonality	From production and transformation of fruits, vegetables and dairy products. 55 000 tons/year
Valorization processes / key technologies	Indirect material recovery via Black Soldier Fly larvea natural conversion
Maturity of technologies used / critical factors	Mature at lab scale. A few proven applications world-wide
Key outputs and markets foreseen	4000 tons of insect meal for producers of animal proteins and 4000 tons of organic fertilizer for farmers

ILLUSTRATION

Pictures source: Website Entomeal

Insect meal | Feed oil | Fertilizer

SUCCESS & FAILURE FACTORS

Organizational / Spatial (+/-)
The industrialisation process is a critical phase. Currently project on-hold due to a failure to scale-up

Technical / Logistic (+/-)

Economic / Financial / Market (+/-)
Testing all the assumptions of the business model foreseen. Staying connected to economic realities

Environmental / Social / Cultural (+/-)
Designing for sustainability from the start
Pro-active citizen awareness raising

Institutional / Legal / Others (+/-)
Pro-active promotion of the project to obtain a permission to produce and public support (tech fund)

Key links: Website Entomeal, Entomeal Brochure

H2020 NoAW project
WP 5.1. International benchmark

In WP5: review of international business & cluster concepts , success/failure factors ✚ collective and individual business and marketing strategies ✚ successfull business concepts ✚ Strategies for industrial ecology

WP5: NEW BUSINESS CONCEPTS for cross-sector valorisation of agro-waste

-C-

Development of new business concepts and stakeholders platform for cross-chain valorisation of agro-waste on a territorial and seasonal basis.

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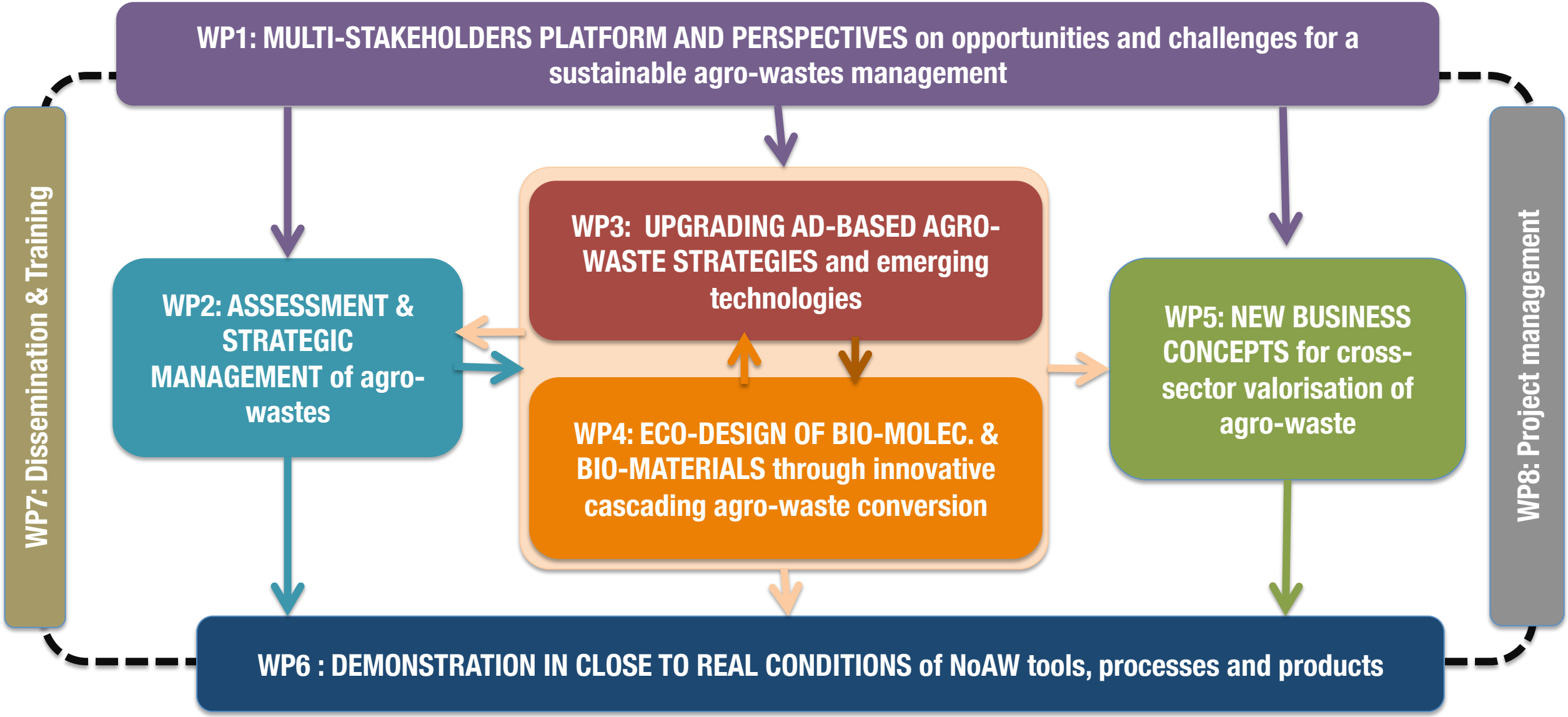

16 ACADEMICS = NOAW = 16 PRIVATES OR ASSOCIATIONS

THE PEOPLE OF NOAW

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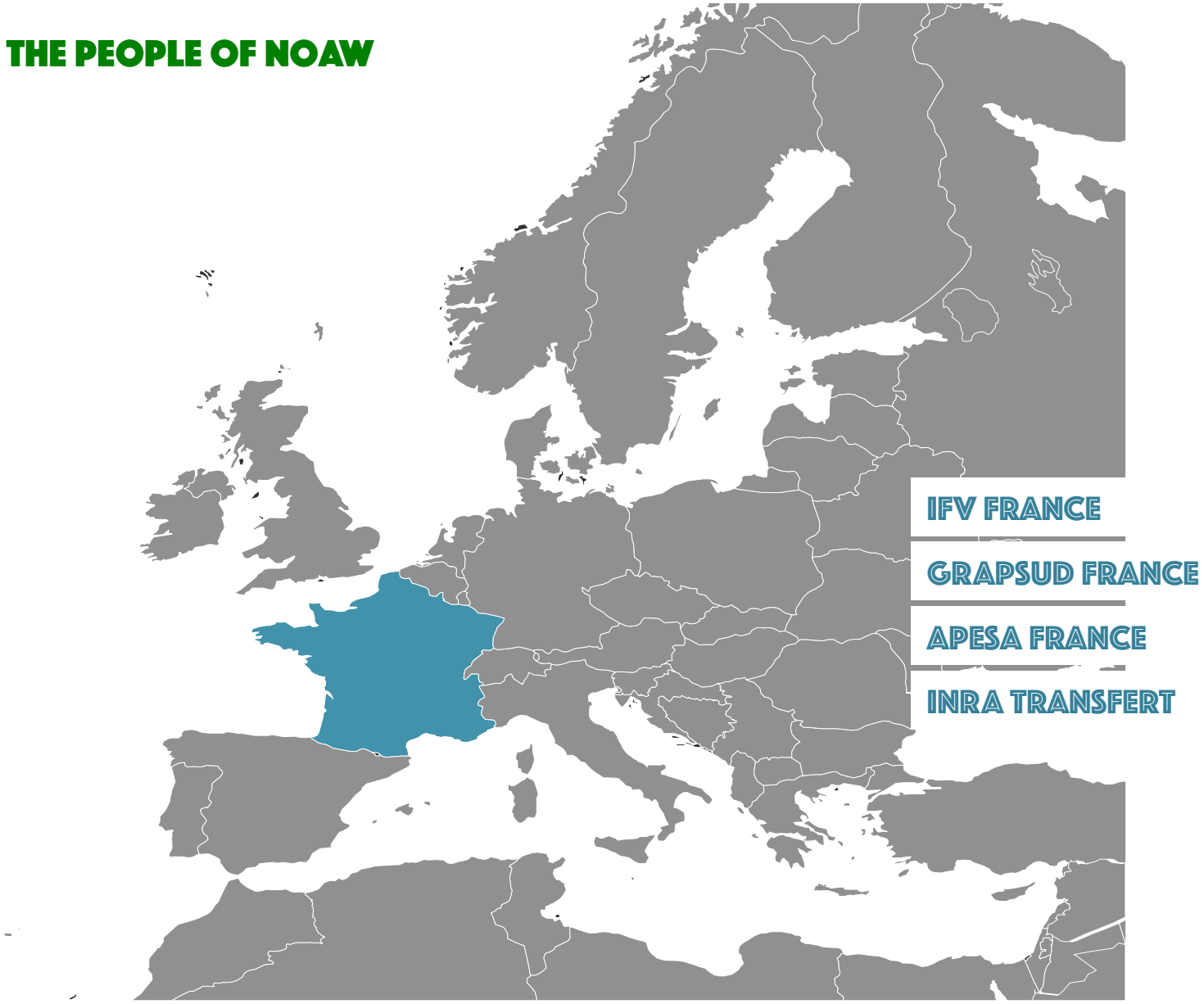

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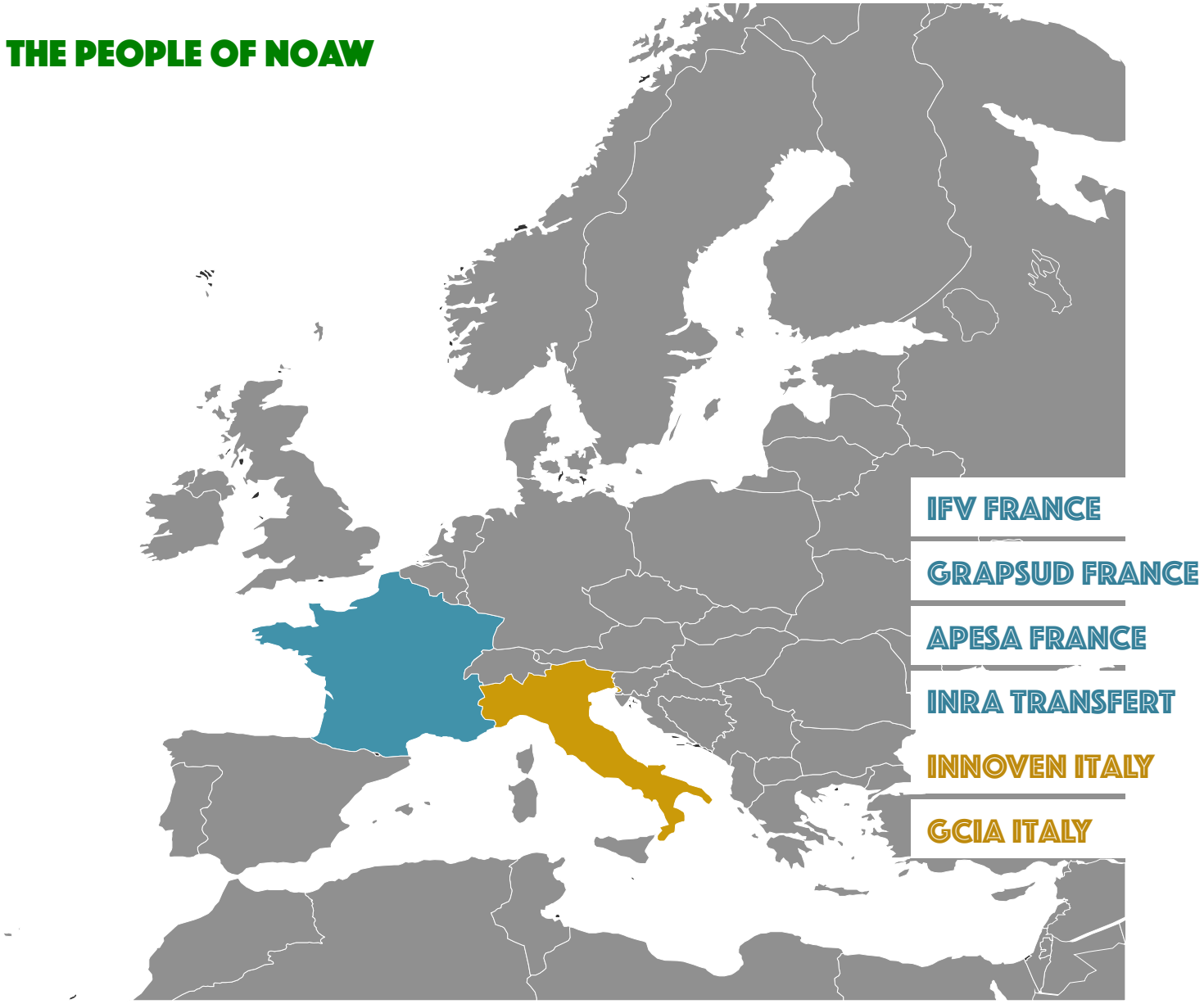

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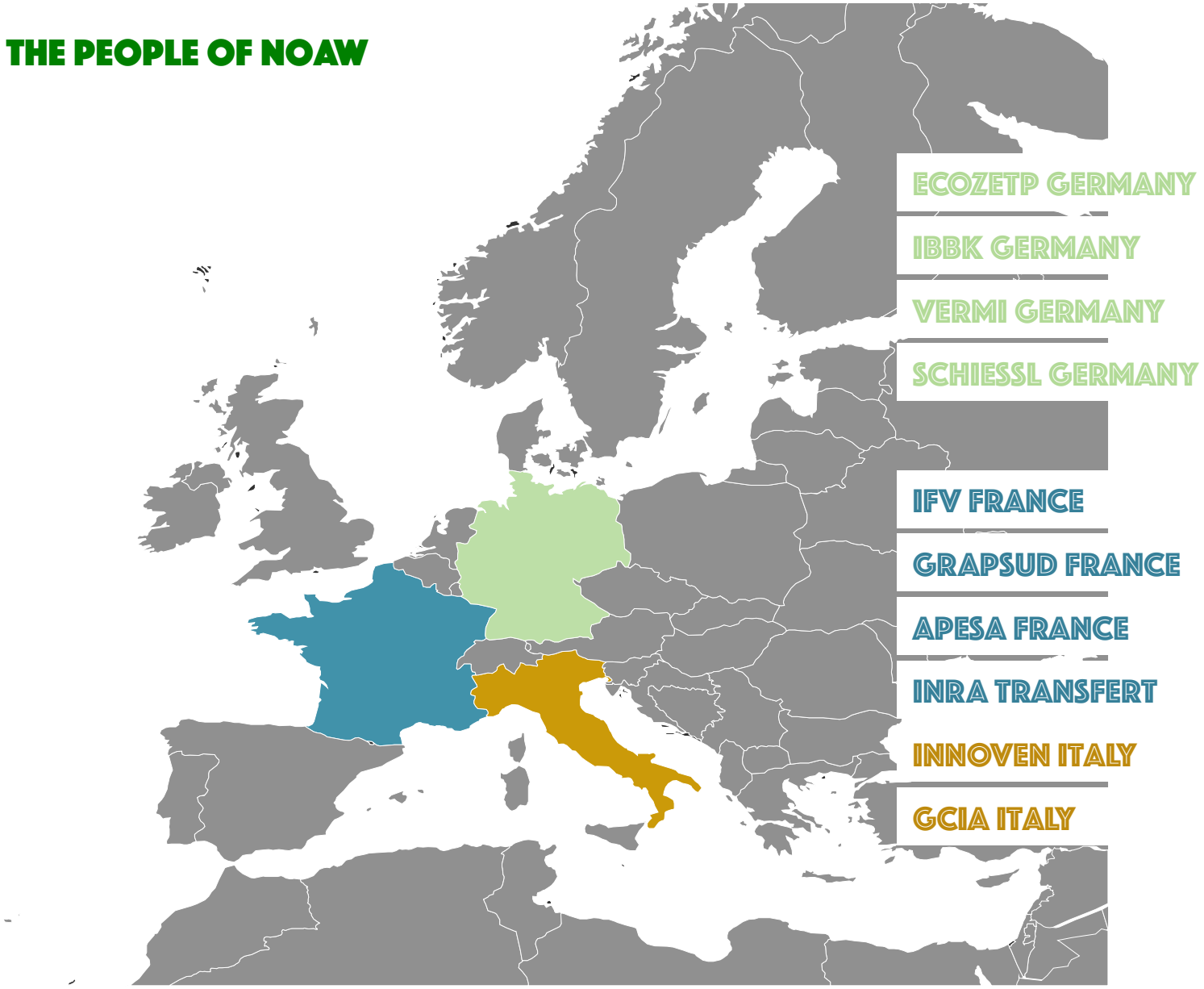

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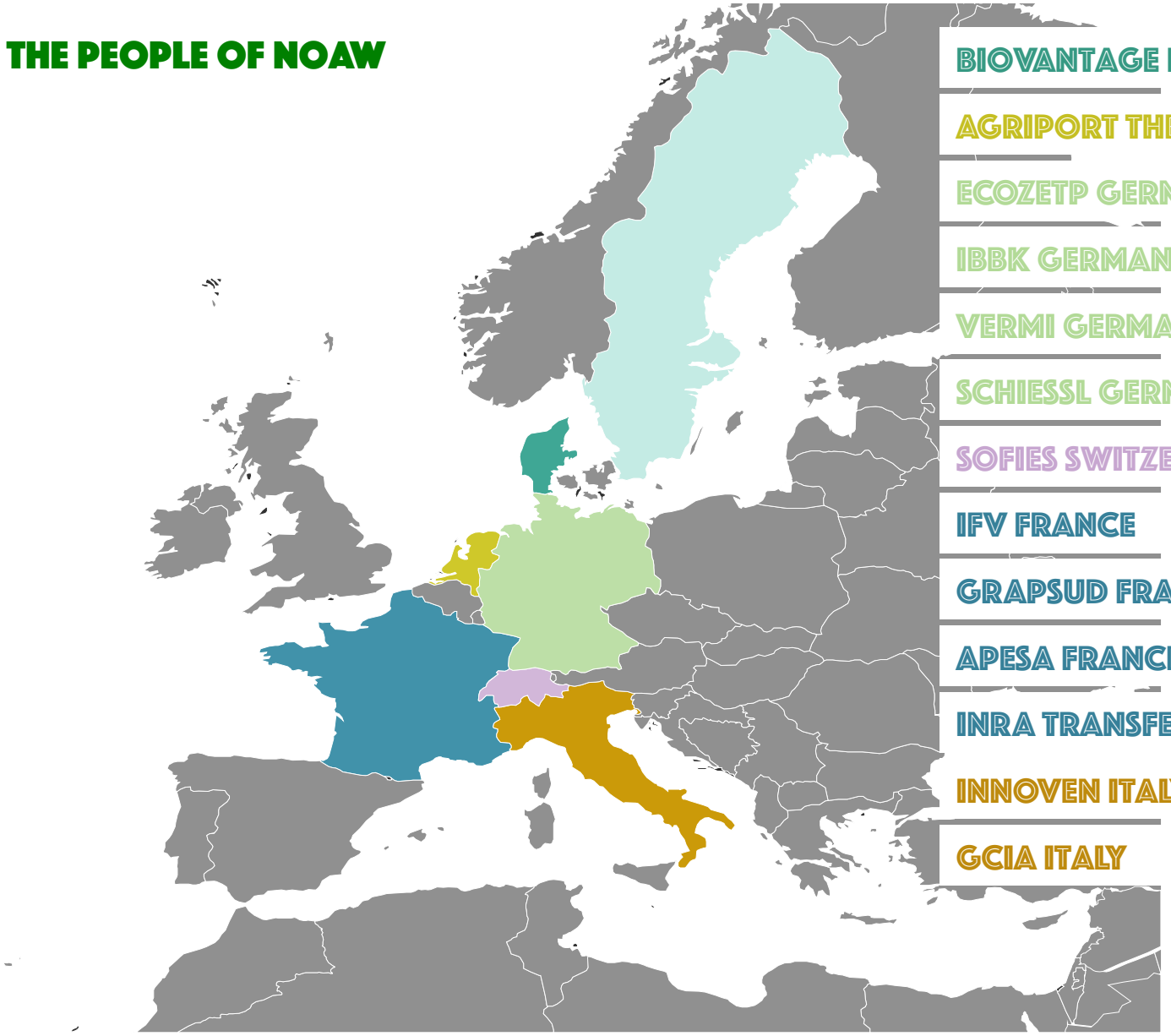

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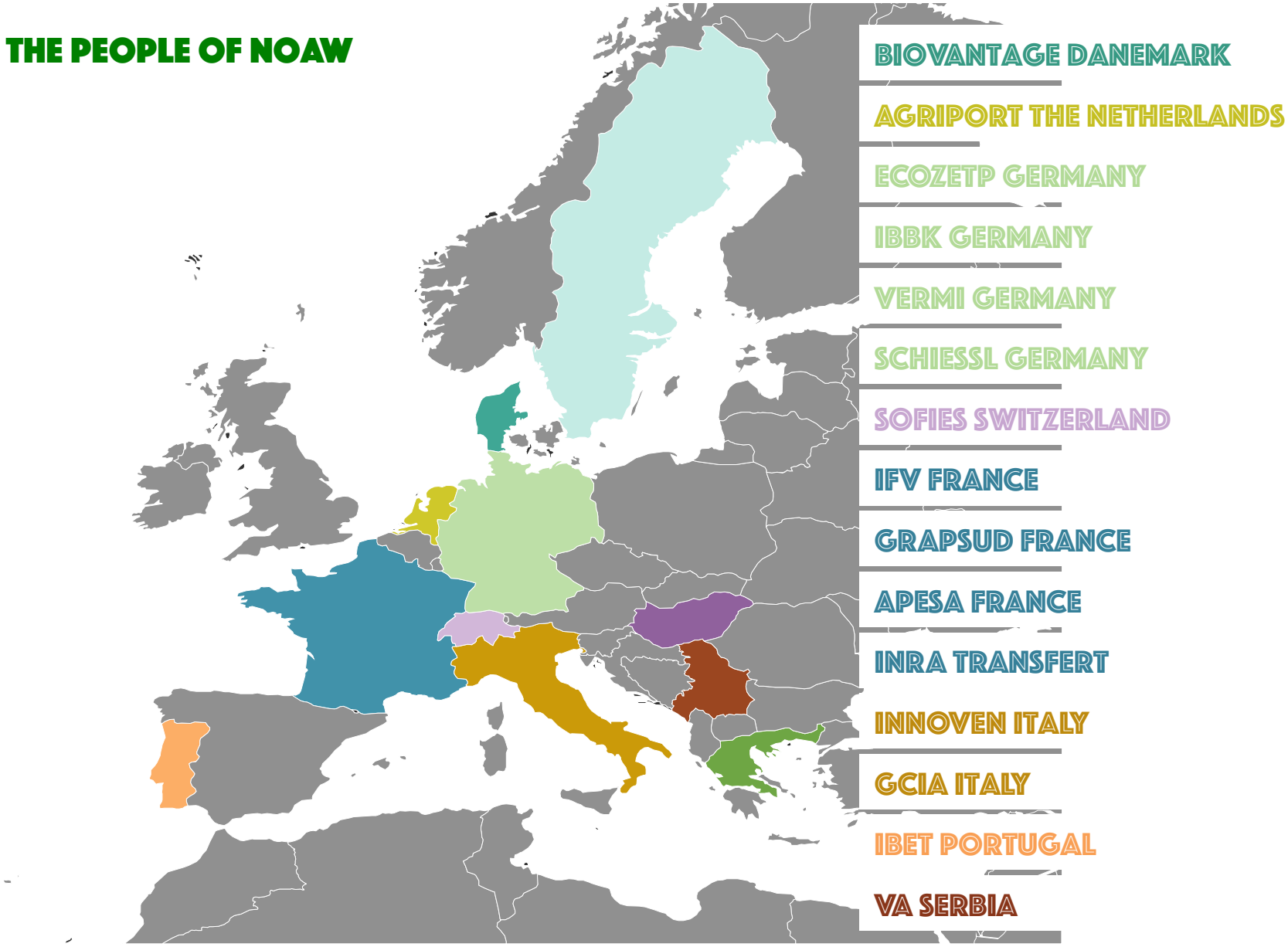

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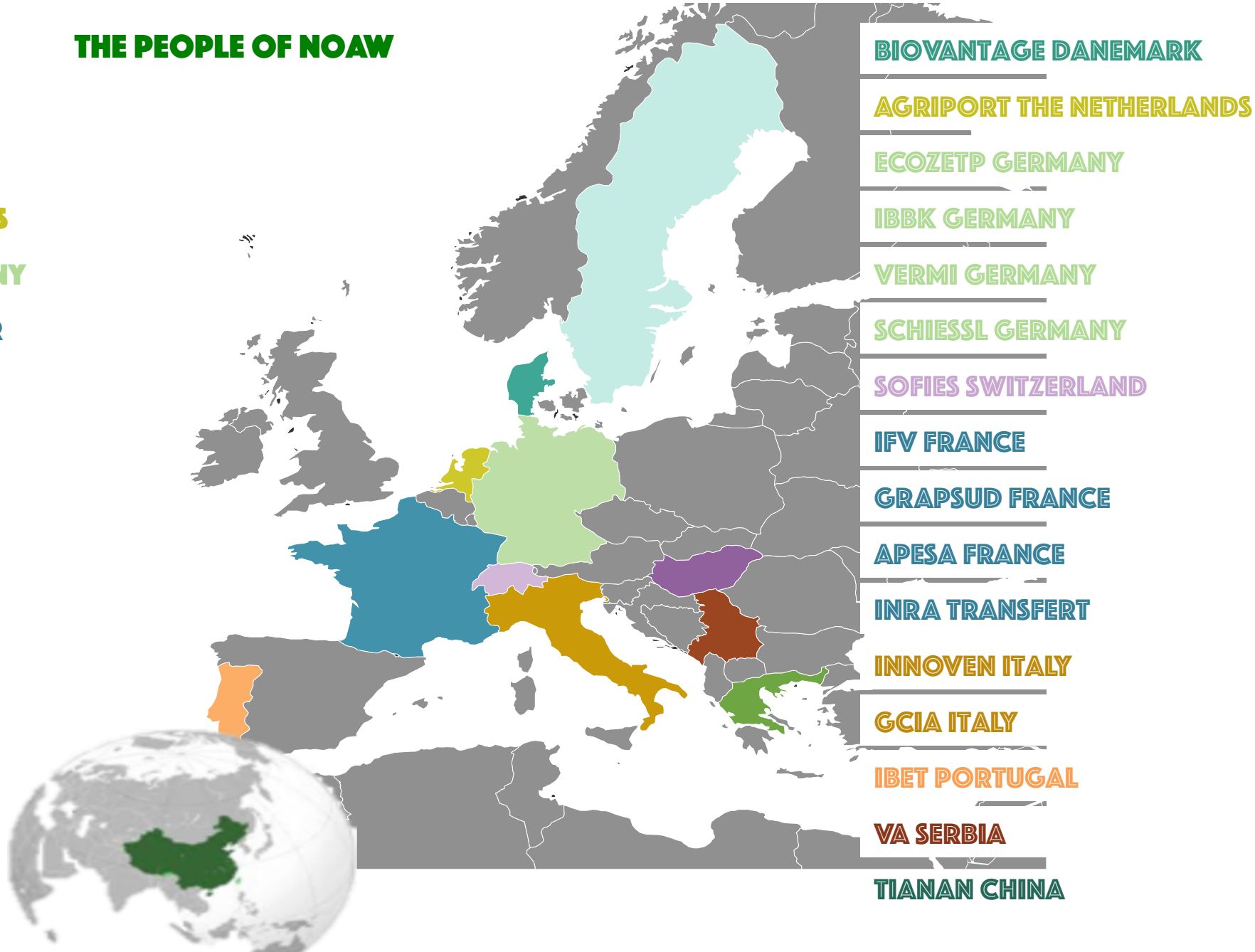

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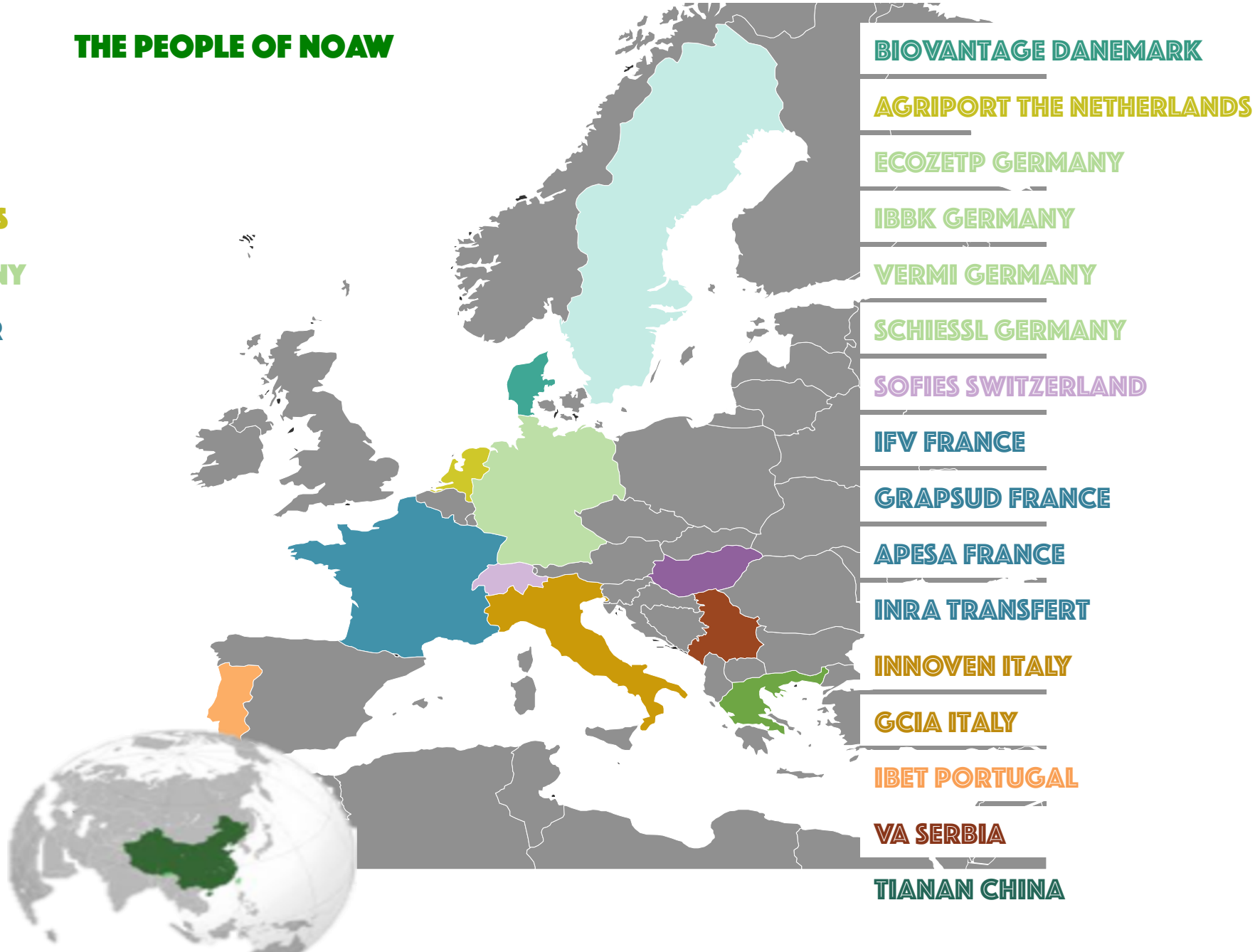

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