SCREEN Synergic CirculaR Economy across European regioNs

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BLC3 CAMPUS DE TECNOLOGIA E INOVAÇÃO

21, november 2017, KTN - CIRCULAR ECONOMY EVENT

Bioeconomy and Circular Economy: Smart Regions Concept

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TOP UNIVERSITY BUSINESS INCUBATOR UBI GLOBAL 2015 EUROPE TOP 10

TOP UNIVERSITY BUSINESS INCUBATOR UBI GLOBAL 2015 WORLD TOP 25

RegioStars Winner 2016

STARTUP EUROPE AWARDS 2017 *Finalist*

Circular Economy




Outline

- ✓ **BLC3**
- ✓ **Problems and Opportunities**
- ✓ **Bioeconomy and Circular Economy Concepts: Development Smart Regions**
- ✓ **BioREFINA-Ter project**

BLC3

- ✓ **BLC3 Association – Technology and Innoavation** (of Portugal) is a non-profitable association founded in May 2010, beginning its activities in September 2011;
- ✓ BLC3 strategic field of action includes: **Biorefineries, Bioindustries, Bioproducts, Bioeconomy and Circular Economy**;
- ✓ BLC3 brand and identity are associated with its flag and anchor project, the biorefinery project, being that **BLC3 derives from Lignocellulosic Biomass and number 3 from 3G** – Microalgae;
- ✓ The main objective is the **development of bioindustries, biorefineries and bioproducts** in order to replace petroleum derivatives, to minimize the forest fires effects and to valorise lignocellulosic resources, contaminated effluents and materials.

BLC3: Technologic and Innovation Campus (Infrastructures)

Recuperation of an abandoned infrastructure

TOTAL CAMPUS AREA: 3,8 ha

R&D (biorefineries): 2140 m²
-Total R&D Labs: 700 m²
-Scale up development: 750 m²
- Offices: 690 m²

Agrofood Market Testing - 750 m²

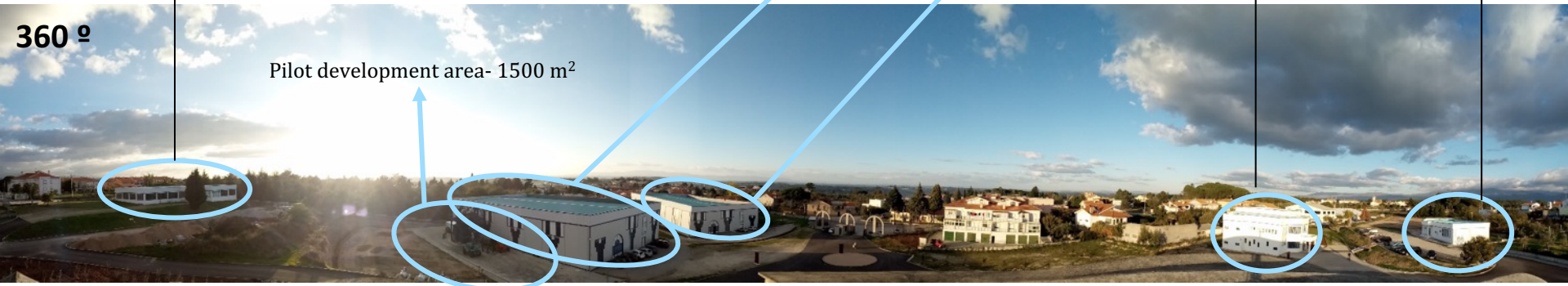
Support Centre For Innovative Ideas and Projects - 342 m²

R&D (plant biotecnology) - 145 m²

R&D (bioproducts and bioindustries) - 2100 m²

Incubation Centre- 403 m²

360 º



Pilot development area- 1500 m²

BLC3: Main R&TD areas

- ✓ The R&TD Centre is an excellence research and technological intensification centre, internationally recognized.
- ✓ R&TD Centre has a **transversal department** based on the **Bioeconomy and Circular Economy (Smart Regions)**, which is composed by **four vertical departments** with specific goals.

1.Citizenship

2. Energy and Territory

3. Environment and Life Quality

4. Agriculture and Food Technologies

The Problem and the Opportunity: Global Trends

- **1,5 million people** move to cities every day
- By 2050, **66 per cent** of the world's population is projected **to be urban**.
- Producing **70 percent more food** for an additional 2.3 billion people by 2050
- Global consumption of natural resources could triple to **140 billion tons a year by 2050**

The Problem and the Opportunity: case study Portugal

- × **1. 29 %:** unexploited territory with no economic activity;
- × **70 %:** has no agricultural potential;
- × **2.15 millions h/year:** annual average of burned area between 2001 and 2010;
- × **3. 33 %:** territory affected by forest fires in the last 30 years;
- × **800 – 1000 millions € :** annual economic losses resulting from forest fires;

- ✓ **Portugal is the EU country with the highest potential, per capita, for Biorefineries development;**
- ✓ **Portugal must meet until 2020, the integration of 4% of advanced biofuels (2nd G);**
- ✓ **Biorefineries are recent value-chains that allow the integration of bushes, heathland and other feedstocks being considered the "next industry" in XXI century.**

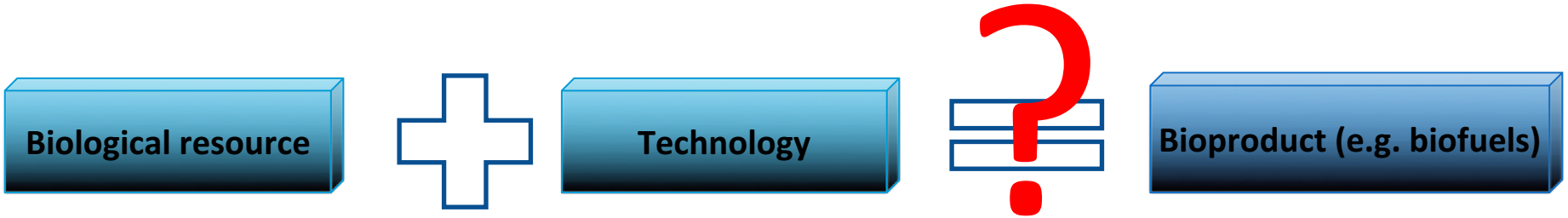
The Problem and the Opportunity: Large Forest/Rural Fires Effects

Annual economic losses: 860-980 millions Euros

Direct:

Indirect:

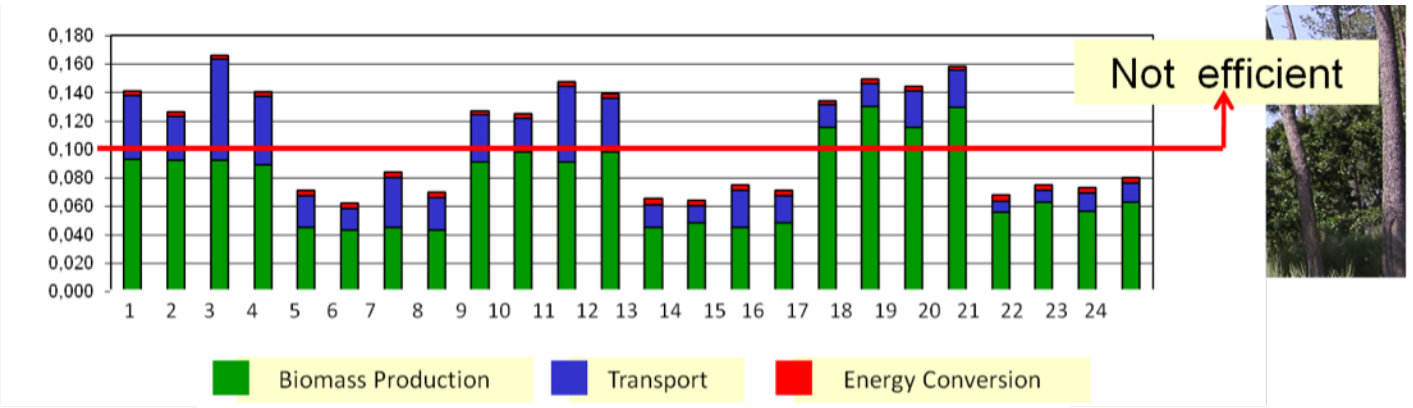
The Problem and the Opportunity: Lack of Energy Efficiency



The Problem and the Opportunity: Energy Efficiency

Energy Criteria: Portugal eletricity production is not efficient

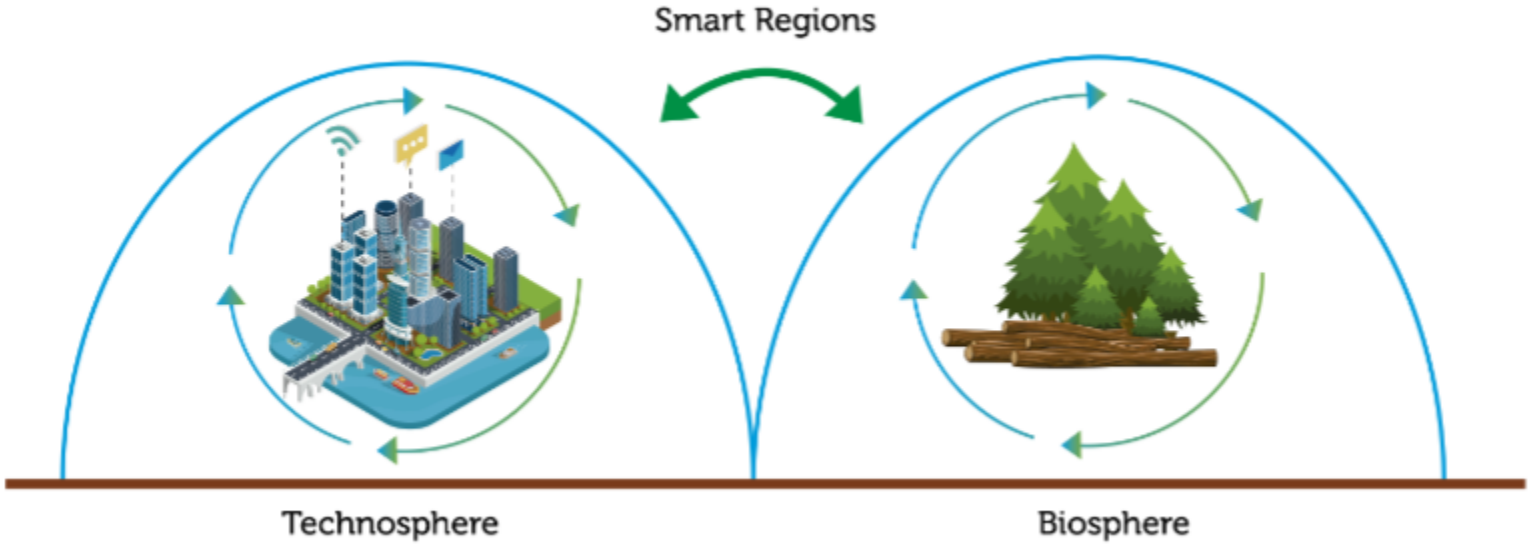
Energy Requirements (E_{req}= $MJ_{fossil}/MJ_{elec.}$) → $E_{req} = \sum E_{in,fossil,prim}$ → Life Cycle Energy Results [$MJ_{fossil}/MJ_{elec.}$]



An energy-efficient standard has been considered:

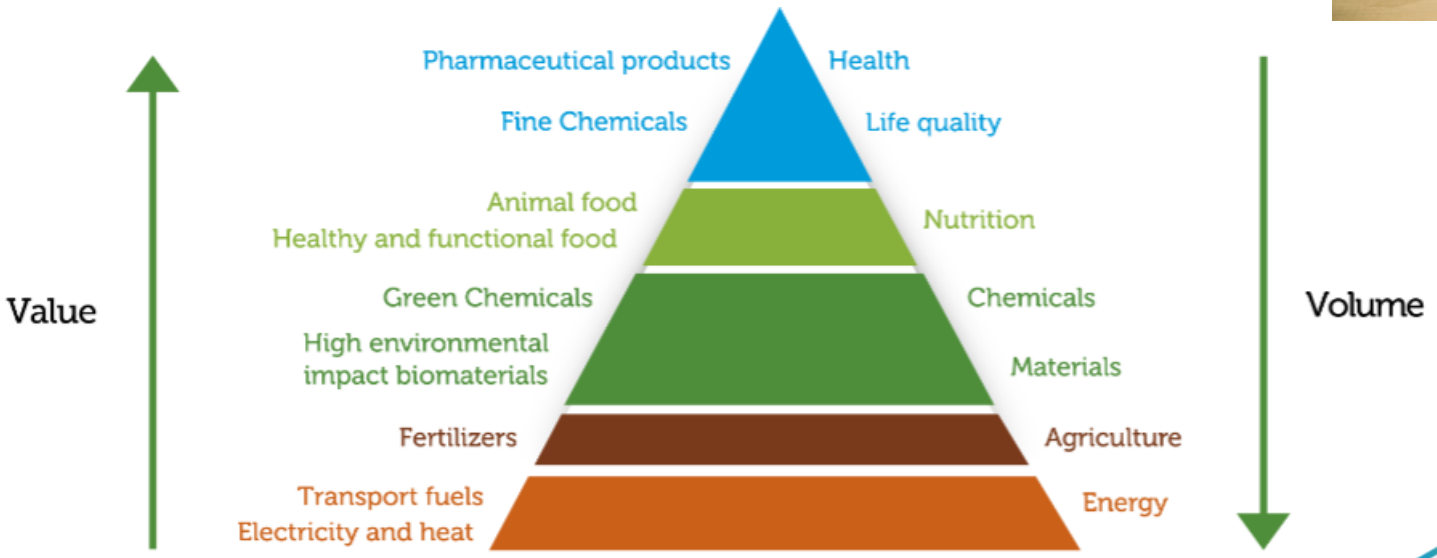
overall fossil LCA energy requirements should not exceed 10% of the electricity produced

Bioeconomy + Circular Economy



- ✓ The **Bioeconomy concept** includes the production of renewable biological resources and the conversion of these resources and waste streams into value added products (food, feed, bio-based products and bioenergy) = **the resources for technosphere human activity.**
- ✓ The **Circular Economy concept** increase the efficiency and life time of the resources to **decrease the pression in Biosphere.**
- ✓ **We need the integration Bioeconomy and Circular Economy to development smart regions concept.**

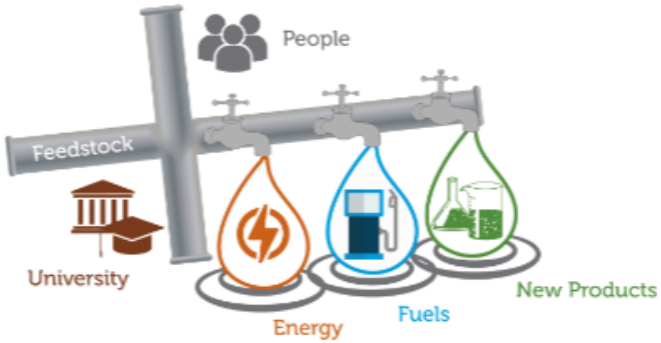
BioREFINA-Ter projet: Cascade Use of Resources: the Principle to Maximization the Economic Value Based on Biorefinerires Systems



BIOREFINA-Ter Project : Vision and Perspective

Microscale

Heterogeneous Lignocellulosic Biomass



Unexplored Territory

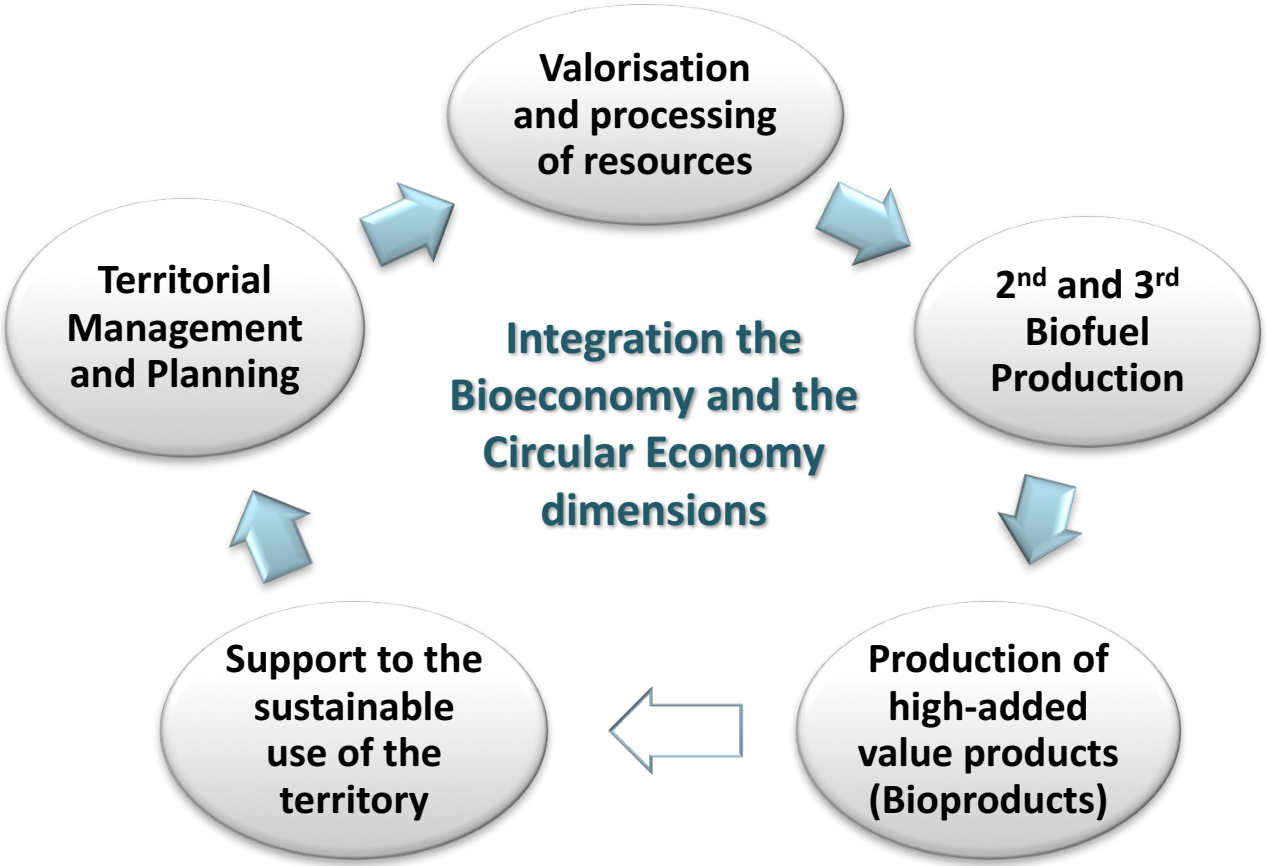
Industrial Symbiosis

Regional Symbiosis

Smart Cities

Verification of compilance with sustentability criteria for territorial use

BIOREFINA-Ter Project : the Circular Perspective



BIOREFINA-Ter Project : decentralized biorefinery to promote local development

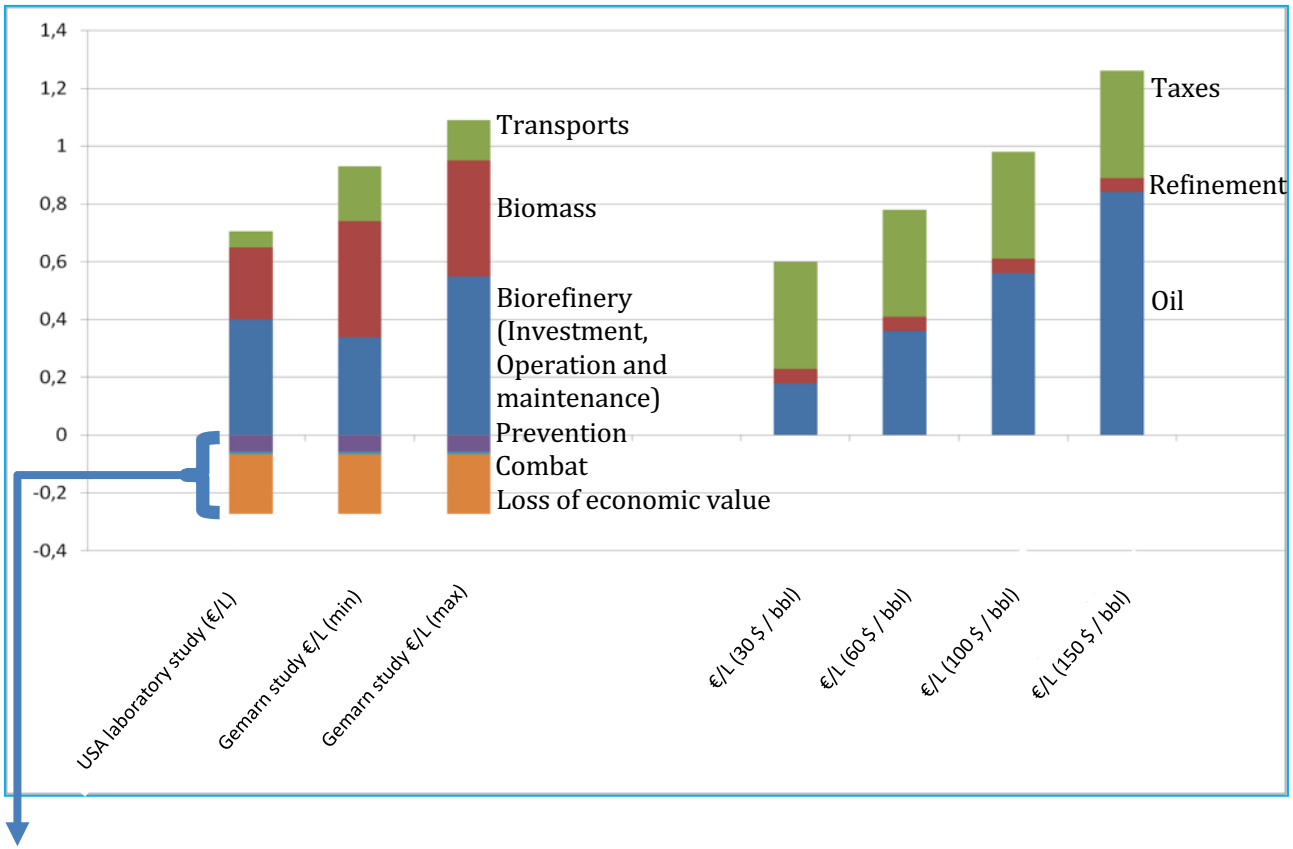
Industrial Symbiosis
- Energy Industry
- Agro Industry
- Chemical Industry
- Bioproducts Industry
- AgriFood Industry

Regional Symbiosis
- Rural Territory
- Smart Cities

- Decentralized Biorefinary to promote local development and the reduction of forest fires.

BIOREFINA-Ter Project: Provisional Production Costs

Cellulosic Diesel vs Petro Diesel for Portuguese reality



The technological maturity of bio-based industries has made this sector more competitive compared with the fossil sector.

Credits: Impact of forest/rural fires avoided

Note: Without considering other externalities: Biodiversity and ecosystems; Hydric Resources and tourism

RIS 3 Centre Region of Portugal:
High Alignment with Bioeconomy and Circular Economy

RIS3 Centre: it has 4 strategic platforms for Centre Region

Platforms	**VS**	**% alignment with Bioeconomy and Circular Economy**
1. Sustainable industrial solutions		80%
2. Enhancement of natural endogenous resources		60%
3. Technology for quality of life		20%
4. Territorial Innovation		66%

RIS 3:Research and Innovation **Strategies** for **Smart** Specialisation

Reflection 1 - Knowledge: weed need the convergence of generations

millennials-vs-boomers

Source pictures: http://cascadebusnews.com/millennials-vs-boomers-how-wide-is-the-gap-a-quiz/

Reflection 2 - 60 years of progress?

Thank you for your attention!!!

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