Vanguard Initiative

Network, Goals and Pilot Projects

Funding & Investment Needs
VI – network of many regions

- region
- industry based S3
- ambition
- political commitment (Milan Declaration)
- mobilizing and organizing industrial stakeholders in the region
- active participation in the network structure
- active participation in core activities
VI Methodology – 4 step approach

**learn**
- developing a scoping paper
- mapping questionnaire
- Identify lead regions and actors

**connect**
- matching events for complementary partners
- developing demonstration cases

**demonstrate**
- networked demonstration
- pilot lines and first-of-a-kind factories (TRL6-8)

**commercialise**
- launch of new ventures and start-ups
- new value chains (TRL 9)
VI Pilot Projects

Key features

- New industrial value chains
- accelerate market development
- industry-led cross-regional demonstration projects
- global competitiveness

5 Pilots (testbeds for systemic change)

- Efficient and Sustainable Manufacturing (Catalonia + Lombardy)
- High Performance Production through 3D Printing (Flanders + Norte + South Netherlands)
- ADMA for Energy related Applications in Harsh Environments (Basque Country + Scotland)
- New Nano-enabled Products (Skane + Tampere)
- BioEconomy (Lombardy + Randstad)
Funding & Investment Needs

• VI Demo Cases common objectives
  o establish (shared) facilities for demonstration of new technologies
  o facilitate access to (shared) facilities
  o lower technology uncertainty, risks and costs
  o stimulate industrial replication & upscale (hence market uptake)

• Each Demo Case =
  o combination of complementary demonstration facilities
  o group(s) of companies accessing infrastructure (TRL6-8)
  o industrial replication & upscale (if the above is successful) (TRL8-9)

• 3 types of Demo Cases
  o Challenge driven or technology driven
  o connecting existing infrastructures
  o building brand new demonstration infrastructure
  o connect & upgrade existing infrastructure (hybrid format)
**Different Investment Needs**

- **Category 1 Demo-Cases**
  - "Connecting what already exists"
  - Ca. 50% of VI demo-cases
  - Investment size: 0.5-10€ Mio

- **Category 2 Demo-Cases**
  - 10% to 20% of VI demo-cases
  - Investment size: +/- 10-50€ Mio

- **Category 3 Demo-Cases**
  - "Connecting & upgrading what already exists"
  - 30% to 40% of VI demo-cases
  - Investment size: +/- 50-200€ Mio (poss. even higher ...)

- **Creating / building new facilities**

- **Connecting existing facilities**

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*Vanguard Initiative*
New growth through smart specialisation
General Financial Structure – three layers

Layer 1
Basic Demonstration Infrastructures – Initial Costs related to the setting up of the infrastructures and platform.
Regional, national and EU Subsidies

Layer 2
Projects-related activities (within the platform; TRL 5-7/8) - Operating costs
Public Subsidies and private co-investments

Layer 3
Revenues generated from Replication/Industrial upscale and production

Notes:
- Layer 1 (to some extent Layer 2 as well) contains « non-profitable top » (hence the subsidies)
- Layers 2 & 3 can’t be functioning if « top » not financially secured (no bankable plan !)
- Layers inter-dependent; smooth flow between them key!

Public Support
(100% coverage ‘non-profitable top’ through public funds, structural)
(e.g. 50% subs, project based)
(Repayable Loans, Bankable Business Plan)
### Bio-Based industries: Context

Smart Pilot action: interregional partnerships for innovative projects

#### Technology Readiness Levels

<table>
<thead>
<tr>
<th>TRL 0: Idea</th>
<th>Unproven concept, no testing has been performed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRL 1: Basic research</td>
<td>Principles postulated and observed but no experimental proof available.</td>
</tr>
<tr>
<td>TRL 2: Technology formulation</td>
<td>Concept and application have been formulated.</td>
</tr>
<tr>
<td>TRL 3: Applied research</td>
<td>First laboratory tests completed; proof of concept.</td>
</tr>
<tr>
<td>TRL 4: Small scale prototype</td>
<td>Built in a laboratory environment (&quot;ugly&quot; prototype).</td>
</tr>
<tr>
<td>TRL 5: Large scale prototype</td>
<td>Tested in intended environment.</td>
</tr>
<tr>
<td>TRL 6: Prototype system</td>
<td>Tested in intended environment close to expected performance.</td>
</tr>
<tr>
<td>TRL 7: Demonstration system</td>
<td>Operating in operational environment at pre-commercial scale.</td>
</tr>
<tr>
<td>TRL 8: First of a kind commercial system</td>
<td>Manufacturing issues solved.</td>
</tr>
<tr>
<td>TRL 9: Full commercial application</td>
<td>Technology available for consumers.</td>
</tr>
</tbody>
</table>

→ Large investment size for BBI +- 124 million EURO (study EIB June 2017)
BIC and Vanguard Initiative sign Bioeconomy MoU

• Based on the Mou, the Pilot and BIC have agreed to work together on communication and awareness raising activities for mobilizing key stakeholders and promoting the importance of bio economy and bio-based industries.

• They have agreed to work together as equal partners on improving access to financial instruments and strengthening synergies between different funding schemestowards the creation of a more favourable investment environment.

• Lastly the Pilot and BIC have agreed to connect actors across regions and sectors along new value chains and to explore how the combination of different strengths can lead to a faster deployment of new technologies. Moreover, exchange of information related to BBI topics and Pilot cases will be promoted in order potential synergies to be exploited.
2.1 Use-cases (or industrial applications) addressed in the demo-case

The Pilot Network is seen as a *One-stop-shop* for delivering innovation services to the industrial end-users with a multi-regional approach.

<table>
<thead>
<tr>
<th><strong>Industrial Innovation Service Portfolio</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Life-cycle information management.</td>
</tr>
<tr>
<td>Environmental sustainability assessment</td>
</tr>
<tr>
<td>and LCA.</td>
</tr>
<tr>
<td>Patent and technology IPR searches.</td>
</tr>
<tr>
<td>Market analysis and business models.</td>
</tr>
<tr>
<td>Legislation review and innovation deals.</td>
</tr>
<tr>
<td><strong>Product and process certification.</strong></td>
</tr>
<tr>
<td>Business case validation and scenario</td>
</tr>
<tr>
<td>analysis.</td>
</tr>
<tr>
<td><strong>Circular economy training.</strong></td>
</tr>
</tbody>
</table>
2.1 Use-cases (or industrial applications) addressed in the demo-case

A detailed analysis of identified *sectorial Use Cases*, with industrial partners associated, has been performed, where more regions are involved. For each Use Case, a business case has been detailed including a *business plan* for the industrial take-up of the solutions.

<table>
<thead>
<tr>
<th>Regional/Cross-Regional Use Case</th>
<th>Involved Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite Recovery from Wind Energy System</td>
<td>Basque Countries, Saxony, Lombardy, Tampere, Scotland</td>
</tr>
<tr>
<td>Heavy machinery components remanufacturing</td>
<td>Tampere, Basque Countries, Lombardy, Saxony</td>
</tr>
<tr>
<td>Automotive parts remanufacturing</td>
<td>Scotland, Lombardy, Saxony, Norte</td>
</tr>
<tr>
<td>High-value TLC systems and Electronics Recovery</td>
<td>Lombardy, Tampere</td>
</tr>
<tr>
<td>Metal components reprocessing</td>
<td>Saxony, Tampere, Lombardy</td>
</tr>
<tr>
<td>Remanufacturing of e-motors</td>
<td>Saxony, Lombardy, Norte</td>
</tr>
<tr>
<td>Plastics recycling from WEEE</td>
<td>Flanders, Lombardy</td>
</tr>
<tr>
<td>E-mobility batteries remanufacturing for re-use</td>
<td>Lombardy, Saxony</td>
</tr>
<tr>
<td>Photovoltaic panels de-manufacturing</td>
<td>Flanders, Lombardy</td>
</tr>
<tr>
<td>Remanufacturing and retrofit of machine tools</td>
<td>Emilia Romagna, Lombardy</td>
</tr>
</tbody>
</table>
3 – Envisaged inter-regional nodes configuration

Flexible disassembly and inspection to enable component rebuild in transportation and Oil & Gas.

Pre-treatment technologies for remanufacturing of photovoltaic panels and end treatment techniques for thermoplastics.

Re-use of composites by thermal processes from aeronautic sector and wind energy system.

Recovery and re-use of metal scrap by plasma process.

Moulds and dies De-and Remanufacturing and repair.

Laser-based remanufacturing of the large machinery.

Design for re-use, repair and modification of aerospace, rail and automotive structure.

Sustainable Demanufacturing processes including human-robot cooperation for disassembly, electronics remanufacturing, key-metals and composite recovery and reuse by mechanical processes, for the automotive and electronics industry.

Reconditioning and upgrade of machine tools; conversion of aluminium and steel scraps into highly technological cellular materials.

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Key Issue: integrated pilot plant solutions, needed by industry to validate high-risk investments in circular economy businesses before the industrial implementation.
2.2 Who is working at the use cases?

More than 60 European companies, with a cumulative turnover of 32 B€ and with some 175,000 employees, and 69 universities and RTOs distributed among the involved regions are involved.

The stakeholders have signed Letters of Intent to participate to the definition of this Pilot Network and, in the case of future end-users, to access the pilot network and to carry on industrial take-up, in case of positive evaluation of the developed solution.
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Investment Needs across Layers: Mismatches and proposals (1/3)

- **Layer 1 - Initial costs – establishing the shared demo-infrastructure:**
  - Centrally managed EU fund to support the creation of innovation infrastructure (industry commons) with grants
  - Where no single party is able or willing to bear costs and risks
  - Mainly cover funding gap at layer 1 (partly at layer 2 also)
  - Avoiding complexity of multi-level government and multi-programme collaboration, as well as state aid issue (similar to H2020).

- **Proposed time-table:**
  a) **Post 2020**: Dedicated « EU Joint Innovation & Demonstration Fund »
     - Via FP9
     - Via ESIF (fall-back):
       - Expanded Interreg B
       - Interreg Europe + investment support mechanism (‘revised’ Regions of Knowledge 2.0)
       - Demonstration Initiative such as the Urban Innovative Actions initiative
  b) **2017-2020** = Joint & aligned call of Interreg B programmes
• Layer 2 - Operating costs of the interregional demonstration platform:

1. Easily accessible interregional vouchers’ system for SMEs, in order to fund feasibility studies and scale-up work in shared facilities, or

2. Combining regional (non-EU) subsidies to compensate for costs incurred to visits to demonstration facilities in other regions, or

3. A specific Vanguard Initiative “ERA-Net Co-Fund” (but for higher TRLs: demonstration + end-users) or

4. A reinforced and expanded MANUNET (for ADMA, higher TRLs), i.e.:
   - MANUNET III (2016-2021) to be expanded towards ‘Joint Programme Art 185 TFEU’ (dedicated budget for ‘research valorisation’) ?

- Short- to medium-term
- Medium-term
- Post-2022
• Layer 3 - Industrial upscale and replication:

1. Expanding scope and domains of application of the so-called “InnovFin Energy Demo Projects instrument” to cover broader industrial modernisation activities (“InnovFin ADMA”)

   e.g. Energy Demo Pilot =
   
   - loans or loan guarantees between €7,5M and €75M
   
   - « first-of-a-kind commercial scale demonstration projects in the fields of renewable energy, hydrogen and fuel cells »

2. ‘Fund-of-Funds’ for Industrial Upscale = multi-layered fund with input from e.g. regions, EIB/EIF, private investors etc.
# Investment Needs across Layers: Mismatches and proposals

<table>
<thead>
<tr>
<th>Layer 1</th>
<th>Initial costs – establishing the demo infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment existing solutions</td>
<td>No suitable instrument so far in cross-regional, pan-European setting. New solution(s) needed</td>
</tr>
<tr>
<td>Potential solutions</td>
<td>EU Joint Innovation and Demonstration Fund</td>
</tr>
<tr>
<td>Gap Analysis</td>
<td>Critical</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Layer 2</th>
<th>operating costs of the interregional demonstration platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment existing solutions</td>
<td>Some EU solutions in place under H2020 (I4MS, ActPhast, INNOSUP, Fast Track to Innovation, NMBP Pilot Production Network etc) but with uncertain access no structural solution</td>
</tr>
<tr>
<td>Potential solutions</td>
<td>EU Joint Innovation and Demonstration Fund</td>
</tr>
<tr>
<td>Gap Analysis</td>
<td>Moderate</td>
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<tr>
<th>Layer 3</th>
<th>industrial replication</th>
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<tbody>
<tr>
<td>Assessment existing solutions</td>
<td>New instruments (e.g. Energy Demo Pilot under InnovFin) but too restricted scope/application</td>
</tr>
<tr>
<td>Potential solutions</td>
<td>Expanded InnovFin (i.e. expanding the scope and domains of applications of the Energy Demo Pilot) ‘Fund of Funds’ for industrial upscale (multi-layered: regions, EIB(EIF, private investors)</td>
</tr>
<tr>
<td>Gap Analysis</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Critical**

**Moderate**

**Low**
Ongoing Initiatives

• Thematic S3 Platforms:
  ✓ Inspired by the Vanguard Initiative
  ✓ Involvement of VI Pilots
  ✓ On-going discussions about financing needs

• Reflection paper on Harnessing Globalisation

• Upcoming S3 communication

• Mid-term Review Horizon 2020 & WP 2018-2020
  Post-2020 reflection
  Future of Europe process

• VI Annual Political Meeting 20-22 November 2017 (tbc)
  + on going Dialogue at political level with EC
  (Cabinet Junker, Katainen, REGIO, GROW, RTD, EDUC, CONNECT)
Perspectives

• Exploring co-investment possibilities / blending of instruments

• FP9 and its industrial pillar / Strategy on Key Enabling Technologies

• An EU Joint Innovation & Demonstration Fund?

• An InnovFin ADMA?

• An interregional voucher system?

• A reinforced and expanded MANUNET? / A Vanguard Initiative/Industrial Modernisation ERA-net co-fund?

• State aid harmonisation
BioEconomy

- Bio-based aromatics
- Lignocellulose refinery
- Turning (waste) gas into value
- Biogas beyond energy production
- Aviation biofuel
- Food and feed ingredients from agro-food waste
- Food and feed ingredients from algae
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