**SMARTPILOTS**

**ACTION PLAN for the Region of Flanders**

**To be implemented and monitored**

**from April 2018 – March 2020**

# Regional Action Plan focusing on the improvement of the addressed policy instrument

*(draft template)*

**for**

# SmartPilots:
# Improving policies in support of shared pilot facilities to increase their impact on the Key Enabling Technology Industrial Biotech and the European Bioeconomy

## Part I – General information


Project: **SmartPilots**
Partner organisation: **Centre for Process Innovation Ltd.**
Other partner organisations involved (if relevant): **N/A**
Country: **United Kingdom**
NUTS2 region: **Durham Tees Valley**
Contact person: **Steven Pearson**
Email address: **Steven.Pearson@uk-cpi.com**
Phone number: **+44 (0)1642 447 312**


## Part II – Policy context

The SmartPilots programme started in 2016 with the main objective being to improve regional policies in support of Shared Pilot Facilities (SPF) to increase their impact on the Key Enabling Technologies (KET) within Industrial Biotechnology and the Bio-economy. Phase 1 of the programme has run from 2016 to 2018 and involved each of the project partners making a thorough, regional analysis of availability and use of funding mechanisms for SPFs and their users (through seven study visits and a questionnaire to relevant stakeholders). During three interregional seminars (direct/indirect support; international collaboration), the results of these regional analyses were compared and discussed. Best-practices were exchanged between the SPFs and the findings of the seminars summarised in Regional Factsheets, which form the basis for the Action Plans.

The Centre for Process Innovation (CPI) has gained valuable learning from participation in the seminars as part of the SmartPilots programme. This learning has specifically supported the Industrial Biotechnology and Biorefining (IBB) platform within CPI in two key areas:

1. Technology and capability development
2. Funding mechanisms and policy instruments.

Through shared learning with the other SPFs within the SmartPilots programme, CPI (IBB) has actively sought to develop technology and capability in:

1. Scale down modelling and downstream processing (Action 1)
2. Gas fermentation (Action 2).

Provision of this technology and capability via CPI to parties operating within the Industrial Biotechnology sector in the Tees Valley area and beyond will increase the chances of successful technology development. These two areas are addressed in more detail in Actions 1 and 2.

The extent to which SPFs support businesses and enterprises with technology development and commercialisation is largely dependent on the funding mechanisms available and policy instruments put in place to support successful partnerships. CPI operates on a third / third / third model for revenue, split public / private / public-private. The SmartPilots programme has provided CPI with an opportunity to discuss novel funding mechanisms such as voucher schemes and licensing models, the outputs of which will inform future strategy.

This Action Plan, however, is limited to suggestions for funding mechanisms and policy instruments directly applicable to European sources in conjunction with our regional partner, Tees Valley Combined Authority (TVCA). CPI regularly engages with TVCA to discuss and agree on how best to support delivery of the Strategic Economic Plan (SEP) released in 2016.

**Tees Valley Combined Authority (TVCA)**

TVCA released a Strategic Economic Plan (SEP) in 2016 that sets out the growth ambitions and priorities for the Tees Valley over the next ten years to 2026 and is being refreshed to create an Industrial Strategy that includes all of the latest priorities to improve, diversify and accelerate growth in the local economy to benefit businesses and residents. Since 2011, Tees Valley and local partners have secured £223 million which is set to deliver 11,620 new jobs and £1.47 billion of public / private investment. This includes £169.8 million of funding from the European Commission through the European Structural Investment Fund.

The SEP concluded that the Tees Valley area is highly productive; highly innovative; export intensive; and has growth potential to be realised. There are six growth generating themes identified in the SEP:

1. **Business Growth (increase jobs and businesses)**
2. **Research, Development, Innovation and Energy (commercialisation of knowledge)**
3. Education, Employment and Skills (ensure the labour market meets business needs)
4. Place (promote the Tees Valley area)
5. Culture (change external perceptions of the Tees Valley)
6. Transport and Infrastructure (improve regional transport links).

The two areas most relevant to CPI are points 1) and 2) above: business growth through attracting new companies to the region; and research, development, innovation and energy. Within the growth generating theme of research, development, innovation and energy, four key growth sectors have been identified, all applicable to CPI (if not specifically the IBB platform):

1. Advanced Manufacturing (materials, low carbon, engineering design and offshore)
2. Process and Energy (carbon capture, sustainable chemicals, biorefining)
3. Healthcare (biologics and digital care)
4. Digital (animation, solutions for advanced manufacturing).

As mentioned above, CPI regularly engages with TVCA to discuss and agree how to support delivery of the SEP. Initiatives such as the new CPI Biologics Centre at Darlington, and the Healthcare Futures Centre in development, are progressed with regular engagement with TVCA. However, the SmartPilots programme is not only limited to funding mechanisms and policy instruments directly applicable to European sources, but is also targeted towards the IBB platform within CPI. This Action Plan is therefore focused on funding

mechanisms and policy instruments directly applicable to European sources; and to the IBB platform within CPI.

**Brexit challenges**

On 23rd June 2016, the British public voted in a referendum to exit the European Union (Brexit). The official leave date has been set as March 2019, with an 'Implementation Period' after then, the precise period of which is unknown. Since the vote, UK funding mechanisms have effectively been under review regionally, nationally and also at a European level. There is therefore a great deal of uncertainty surrounding the funding mechanisms and policy instruments that will impact IBB. It was therefore deemed unproductive to develop an Action Plan focused on IBB initiatives to influence funding mechanisms and policy instruments directly applicable to European sources. In addition, when SmartPilots commenced in 2016, although CPI regularly engages with TVCA, they declined to be a partner on the programme. Therefore, it was also deemed unnecessary to seek formal approval of this Action Plan with TVCA, given its content (see below).

Given the uncertainties and challenges described above, the focus of this Action Plan will be on projects IBB have started since commencement of the SmartPilots programme that have utilised European funding sources (ERDF). These projects are specifically about the two technology capability areas defined earlier (scale down modelling and downstream processing; and gas fermentation) that were identified through engagement with other SPFs on the SmartPilots programme. In addition, Action 3 will describe the measures that will be taken to track the regional, national and European discussions surrounding Brexit that will directly impact the funding mechanisms and policy instruments available to IBB going forward.

**Action 1: IBB Scale Up Capability Programme (OC34R15P 0281)**

**Action 2: Circular Carbon to Product (CC2P): Building a Circular Carbon Economy (NWE723)**

**Action 3: Monitoring Brexit**

Part III – Details of the actions

**ACTION 1**

1. **The background** (please describe the lessons learnt from the project that constitute the basis for the development of this particular action)

This project is part of the Priority Axis 1 programme aimed at promoting research and innovation by providing the necessary open access capability to SMEs working within Industrial Biotechnology. Capability will be developed within CPI (IBB) in two key areas:

1. Utilisation of unconventional gas sources as low cost bioprocess feedstocks for green chemical production and food-chain products
2. Mitigation of commercial risk for SMEs by providing enhanced product isolation facilities to supplement internal investments in state of the art fermentation capability.

The second area above will comprise a fully equipped test laboratory for scale-down development of feedstock pre-treatment and product isolation: major cost drivers in commercial IB processes.

There is significant regional demand for IB scale up support from local SMEs (e.g. Calysta UK ltd, Terra Verdae Bioworks, Plaxica, and Chemoxy etc.) as well as providing attractive drivers for relocation of national SMEs to the Tees Valley area. This is directly aligned to the TVCA SEP growth themes of Business Growth; and Research, Development, Innovation and Energy. It is also directly aligned to the technology strategy of CPI (IBB) in the improvement and development of capability in the areas of scale down modelling and gas fermentation. As described above, identification of these areas was aided through shared learning with the other SPFs within the SmartPilots programme.

2. **Action** (please list and describe the actions to be implemented)

Please see section 9 for a description of the key monitoring activites to project completion and beyond.

3. **Players involved** (please indicate the organisations in the region who are involved in the development and implementation of the action and explain their role)

CPI is the sole recipient of the ERDF grant and will match fund remaining amount.

4. **Timeframe**

The project will be delivered over a 27 month period starting October 2016 and completing in December 2018.

5. **Costs** (if relevant)

The total budget for this work is £896k, with £538k coming from ERDF.

6. **Funding sources** (if relevant)

ERDF and CPI match

7. **Programme management related implications** (decision-making process, financing allocation plan, call preparation plan - terms of reference, timeframe)

The project has, and will, be managed through robust project management processes, using an experienced and dedicated CPI project manager.

8. **Expected impact and results of the policy improvement**

Providing three FTE researchers working in the improved research and innovation facilities, directly employed by CPI.

9. **How will the implementation of this action be monitored**

The project has been in delivery since October 2016 and has already achieved a number of milestones:

1. Equipment and construction procurement
2. Construction of the necessary lab spaces
3. Installation and Commissioning of equipment

The key activity to monitor to project completion is full testing of the installed equipment before moving into its use on collaborative projects to support SMEs and large companies in the IB space.

The project will then transition into the monitoring stage, with a target of providing three FTE researchers working in the improved research and innovation facilities, directly employed by CPI.

**ACTION 2**

1. **The background** (please describe the lessons learnt from the project that constitute the basis for the development of this particular action)

This grant application is part of the Priority Axis 1 Innovation programme aimed at enhancing innovation performance of enterprises throughout North West European (NWE) regions. NWE is producing a huge amount of solid and gaseous waste streams that can potentially serve as a feedstock for making new products, instead of causing environmental problems. Gas fermentation is one of the most promising technologies to make this happen. Solid waste is converted into biogas or syngas and can thus serve as a

gas fermentation feedstock, similar to flue-gas. Currently, a dozen gas fermentation technologies are in the research phase but encounter difficulties when scaled to viable business cases. This is mainly due to immaturity of gas fermentation processes and hardware, as well as regulatory, legislative and standardisation issues. In addition, due to the novelty of these value chains, investments are needed not only for the process but also to organise the logistics of waste gas supply.

CC2P will support the most promising gas fermentation technologies to reach successful implementation in the NWE territory. CPI (IBB) estimate that by 2030, 5-10% of flue gases in NWE will be used as feedstock for chemical production, using gas fermentation technology. CC2P will support the roll-out of the most promising gas fermentation technologies in the NEW territory.

2. **Action** (please list and describe the actions to be implemented)

Please see section 9 for a description of the key monitoring activites to bid and project completion.

3. **Players involved** (please indicate the organisations in the region who are involved in the development and implementation of the action and explain their role)

CPI (IBB) and Bio Based Europe Pilot Plant (BBEPP), who are also involved with the SmartPilots programme. These centres will be assisted by innovation service providers for Life Cycle Analysis (LCA) to assess and improve the suggested technologies. Cluster-organizations with the mission to build an environmentally sustainable economy will be involved (e.g. NEPIC). Regional development agencies that are considering C-sequestration possibilities to solve problematic flue gas or waste streams in their region will also be engaged. The list of partners identified at this stage are:

1. BBEPP
2. CPI (IBB)
3. Cluster industrielle Biotechnologie 2021 e.V. (CLIB)
4. Flanders Biobased Valley (FBBV)
5. North East Process Industries Cluster Limited (NEPIC)
6. Greenwin

4. **Timeframe**

The application has been successful at the expression of interest (EOI) stage and will be progressed as required by the funding body. Should the application be successful and the project starts, the work will occur over a time period of three years.

5. **Costs** (if relevant)

The total indicative budget is €5.92 million, with €3.55 million coming from ERDF.

6. **Funding sources** (if relevant)

ERDF

7. **Programme management related implications** (decision-making process, financing allocation plan, call preparation plan - terms of reference, timeframe)

The proposal and project will be managed through robust bid and project management processes, using experienced and dedicated CPI bid and project managers.

8. **Expected impact and results of the policy improvement**

1. Enable the commercial application of three gas fermentation processes in five years
2. The improvement of the techno-economic outlook of ten gas fermentation technologies
3. The transfer of one gas fermentation technology into demonstration phase

4. Improvement of regulation, legislation and standardisation of gas fermentation products
5. Increased understanding and public acceptance of gas fermentation products.

9. **How will the implementation of this action be monitored**

The monitoring activities can broadly be split into those required to progress the application to completion and project commencement; and those associated with delivery of the project.

CPI met with BBE in Ghent to discuss the next stages of the application process in March 2018. There were several actions from the Ghent meeting that will need to be addressed and monitored to move the application to the next stage:

1. understand both individual and collective work scopes and budgets
2. determine whether TVCA will be an associated partner with no allocated budget
3. quantify the budget required for dissemination activities associated with NEPIC – the initial application assumed only UK dissemination but this may need to be extended to Europe
4. understand the constraints around a potential voucher scheme to be used on the project.

In terms of objectives to monitor should the application be successful, these are:

6. enable the commercial application of three gas fermentation processes in five years
7. the improvement of the techno-economic outlook of ten gas fermentation technologies
8. the transfer of one gas fermentation technology into demonstration phase
9. improvement of regulation, legislation and standardisation of gas fermentation products
10. increased understanding and public acceptance of gas fermentation products.

These project objectives will be monitored during project delivery over three years, should the application be successful, and up to 10 years after completion.

**ACTION 3**

Due to the nature of this action, the below structure has been amended.

1. **The background** (please describe the lessons learnt from the project that constitute the basis for the development of this particular action)

As described above, there is a great deal of uncertainty surrounding the funding mechanisms and policy instruments that will impact CPI (IBB) going forward as the UK leaves the EU and transitions into a newly negotiated trading arrangement. Some of the possible outcomes are described below:

1. UK institutions continue to have access to EU funding sources in the current arrangement
2. UK institutions continue to have access to EU funding sources but cannot lead projects
3. UK institutions have limited access to specific-EU funding sources
4. UK institutions have no access to EU-funding sources.

For the above points, the UK government could respond in one of several ways, two of which are:

a. Increase budgets for research and innovation activities to at least replace the reduction in funding available through any changes in access UK institutions have to EU funding sources
b. Retain current national budgets for research and innovation activities, regardless of the impact of any changes UK institutions face regarding EU funding sources.

Obviously for CPI (IBB) and other UK institutions in the research and innovation space, the worst combination of the above potential outcomes would be 4) and b) where EU funding is completely lost but

the shortfall is not replaced through national funding mechanisms. To ensure this does not occur and CPI (IBB) can continue to provide the necessary facilities and capabilities to support technology development and SMEs in the IB sector, the below measures will be taken to track the regional, national and European discussions surrounding Brexit.

2. **How will the implementation of this action be monitored**

The UK and European landscape regarding funding mechanisms and policy instruments for research and innovation activities involves regional, national and European bodies in both the public and private sectors so is therefore incredibly complex. The below bodies are those which CPI (IBB) will continue to work with (amongst others) during the next few years to ensure continued access to the necessary funding to support the SPF in IBB:

1. Tees Valley Combined Authority (TVCA)

   As mentioned above, CPI, as a whole, engages with TVCA on a regular bases to discuss implementation of the SEP. The current discussions are focused on a new Healthcare Futures Centre which involves ERDF funding. There are key individuals within TVCA (e.g. Mayor, Managing Director and Business Director etc.) who CPI (IBB) will continue to engage with on a regular basis to keep informed on the regional impacts of EU exit negotiations.

2. UK Research and Innovation

   Operating across the whole of the UK with a combined budget of more than £6 billion, UK Research and Innovation brings together the seven Research Councils, Innovate UK and a new organisation, Research England. This is a fairly recent change to the UK research and innovation landscape, with CPI (IBB) previously being more focussed on Innovate UK, and Universities, the Research Councils. However, the merging of organisations into one body provides CPI (IBB) with an important stakeholder to engage going forward.

3. Department for Business, Education, Innovation and Skills (BEIS)

   BEIS published the UK Industrial Strategy in October 2017 which set out four grand challenges: Artificial Intelligence, Clean Growth, Mobility and Ageing Society. In order to address these grand challenges, CPI (IBB) and the High Value Manufacturing Catapult (HVMC) as a whole has an important role to play. It is therefore a key monitoring activity that CPI (IBB) continues to engage with BEIS to ensure there is an understanding and realisation of the importance of the HVMC, and therefore CPI (IBB), in delivering the industrial strategy. This should help mitigate against any potential funding shortfalls that ay results from the Brexit negotiations.

It is important that continued engagement with the above bodies addresses the challenges of Brexit and rapidly implements mitigation strategies in order to provide the necessary funding mechanisms to CPI (IBB) and other similar SPFs within the UK. This monitoring phase will continue until the UK has successfully transitioned to the new trade arrangement with the EU after Brexit.