Pioneers into Practice
Annex 07. Placement Activity Report (PIONEER)

This form aims to capture the main aspects of your placement in terms of your experiences and learning. Please provide as much information as you see appropriate although 300 words per answer would be a general rule.

Parts A-D must be completed by the pioneer.
Part E will be fulfilled by the pioneer only when the coach agrees upon, after careful consideration of whether the progress achieved over the placement may represent a Key Performance Indicator (KPI). The coach will provide support as needed.
Part F will be completed by the coach before this annex is submitted to the PiP regional coordinator and will remain confidential.

Date of the Placement (dd/mm/yy):	29/09/14 - 24/10/10
Name of the Pioneer:	Jason Selvarajan
Name of the Host:	BIOPOLUS Institute
Department / Division:	Research
Contact person / telephone:	andras.szollar@biopolus.org Andras Szollar / Tel: +361 445 0898, Mobile: +3630 927 5904
Name of the Coach:	Alice Bauer
Innovation Group:	Team 6: Climate Change Hub

PART A: PROJECT GOALS

A.1. BRIEF DESCRIPTION OF THE PROJECT. How did you tackle the climate change challenge during your placement?
BIOPOLUS Institute is a non-profit entity involved in bio-tech research and development. They focus on closing the urban water, food, waste and energy loops by integrating novel waste-water treatment, renewable energy and other green technologies into engineered ecosystems capable of distributed biological manufacturing, water and organic waste recycling.

My placement, along with fellow pioneers was focused on preforming a feasibility study for the Watermall concept. The Watermall is a decentralized and modular facility that contains showers, toilets and a closed loop water filtration system using BIOPOLUS technologies along with other services. Low-income |

urban areas have had big issues with providing sanitation and utilities to its residents because of the unplanned and unorganized nature of the settlements. Biopolus is well aware of the rapid growth trend of urbanization, especially in terms of unofficial settlements. The feasibility study focused on material and energy flows as well as profiling various slums to identify social and technical parameters that need to be understood for the development of the Watermall concept.

The main findings were understanding the dimensions, mass and energy flows of the facility and surrounding environment. Enough biomass circulates in these high-density areas to produce more than enough electrical energy for domestic consumption and the Biopolus water treatment technologies should enable abundant access to water. Only social barriers or a cheaper alternative implementation of domestic sanitation would stand in the way of Watermalls being successful.

A.2. What was the goal of your placement and how did that fit into the general aims of the organization and division?

My initial goal was to learn about aeroponic gardening systems as I work a lot with pipes and plumbing with my current project and was hoping to learn some tricks of the trade. Unfortunately, the aeroponic work at Biopolus was only at the conceptual phase and no practical work was being undertaken in this field as of yet.

The second goal of my placement was to develop the Watermall concept. Before my placement only some preliminary thinking had gone into the concept and most of the work was focused on generating marketing material. Social and technical details had only been partially described and no specific calculations had been made. The goal of my placement was to

1) Generate a list of parameters that are important for understanding slum dynamics in the context of the Watermall

2) To think of various technical and social needs in slums in the context of the Watermall

3) To consider various business models for these services

4) To model the size and operation on the various services in the Watermall

5) To document our findings in a way that future team members could build up off our work.

Biopolus is currently working on several proposals that range from selling their Biomakery concept to municipalities and private companies in Budapest and abroad. One project is also to provide a water treatment facility for the Budapest zoo. The Watermall is possibly the newest concept that they have but also one with the largest growth potential as the population growth in low-income urban areas is accelerating.

PART B: PERFORMANCE

B.1. Main achievements. What did you do and what were your results?

The various tasks that I performed were:

1) Generate a list of parameters that are important for understanding slum dynamics in the context of the Watermall

Most of the elements were developed during our initial research phase and workshop I. Additional parameters where added during the answering research phase where each pioneer investigated a single 'well documented slum'. New ideas arose that were not considered before and so were added to our list. In total we had over 100 parameters that we were trying to find a range for. The parameters ranged from physical to social, political, financial or technical aspects. Near the end of the project we tried to identify the most critical elements, which mostly seemed to be technical parameters as social aspects are more mutable.

2) To think of various technical and social needs in slums in the context of the Watermall'

This was mostly about adding additional value or marketing of the Watermall to locals to increase the usefulness and desirability of the Watermall. Things like having internet access or healthcare facilities integrated. While competition with local players was always a key factor we imagined that previously non existing and thus non competitive services would be the best, especially if they had something that required water as part of the process, such as bike/rickshaw washing or making beverages.

3) To consider various business models for these services

This was about researching and thinking of payment methods for using the services of the water mall and how to finance the facility. Local crowd funding, private-public ownership, subscription fees etc. We thought it would be cool if using toilets were free as the 'waste' is considered a raw material of value by the water mall but washing and showering would be a paid service.

4) To model the size and operation on the various services in the Watermall

This was perhaps more of a focus of the pioneers than the placement. When talking about 20- 50000 people the scale becomes unimaginable and so we set out to try and determine just how much water is needed and how much energy could be produced in relation to the surrounding slum as well as determining just how large the facility may have to be. This was important to understand how large an impact it would make on the lives of the locals, as a large facility would

then become an obvious attraction or meeting point, or then something to shy away from completely. In either case the impact would be significant.

5) To document our findings in a way that future team members could build up off our work.

This was done in the form of a report that linked all research material (in Google drive) together. We also elaborated on the spread sheet document that has over 100 calculations so that future team members would be able to understand and modify the calculations themselves.

B.2. What was especially new for you or for your host?

Definitely the best part of the project was working with other people that were as dedicated as I was to the work. This was the first time I had working on a project, where I wasn't required to be a manager or leader because the team members were equally capable and motivated. Of course we all had our specialities but that's what I'm referring too. Every once in a while we would work outside of the office so that our team would have more space and freedom to discuss the project in our own words without having to be polite to our hosts. We would meet in a café and discuss things and then work on our respective tasks. It was so great to look up after 20 minutes of working and see what others were doing and instead of them being on Facebook or responding to personal e-mails, they were immersed in their own part of our work. I really loved being with such a team and I think we all encouraged each other but in a nice and zero pressure environments. We all contributed in the hopes that our work is taken seriously and that our input will have a positive and lasting effect on the project.

It was fun. The team members were also incredibly kind and sharing – like many pioneers and I'm very happy to have met them and to have had such a positive experience.

Having so many pioneers at the same time was also new for the host and they really enjoyed the interplay and commended our efforts.

B.3. What did you learn?

On the technical side I had actually done a lot of similar projects like this, just as small projects for my studies. Especially in terms of bio waste, bioenergy and food production and I always felt that plants should be a more integral part of waste water treatment so the basic concepts where all there for me already. Seeing it actually work (at the Organica test facility) was very insightful.

I think the biggest lesson that I learned was that I should focus more on producing marketing material and selling my idea instead to trying to prove that I can make it work on a technical level. The technical stuff will always be figured out but there's not much point in making it, if there's no one there to buy it. This

is something I've known for a long time (leanlaunchlab).

I learned that I have practical skills that are valuable in the real world. Yes, yes, of course I knew that, but to enter a workplace and realize that my skills are useful and possibly more effective than what was previously being done is both refreshing and encouraging.

B.4. Which were the main challenges/problems? How did you manage them?

I think the main challenges where related to time management. At the onset of the work placement and through our discussions with the hosts the complexity and size of the problem we were to tackle seemed to grow tremendously. The worry was that there would be no way to answer all the major questions in the time and resource constraints that we were working with. How could we assess the willingness of people to walk a distance of X m to use the bathroom or to take a shower without actually being there? Generally the material that we'd find would be either answering different kinds of questions or be anecdotal which is where the reliability of the data came into question. We overcame these issues by trying to find as many sources as possible (journals and various websites) and trying to find a middle ground for the data.

One of the ideas of the project was to identify key parameters for slums in such a way that the data could be used to model a water mall, on top of this, the idea is that the water mall is highly modular and adaptable to basically all climates and social groups. Our job was then to tie all of these things together, which seemed overwhelming, and even more difficult to answer as we learned more about the social and technical differences of these places. In the end we tended to agree that while we could continue the modelling with technical parameters, it would be far too difficult and probably erroneous to go too far on the social aspects without having contacts in each of these sites.

In fact our hosts accepted this and suggested to the bosses that sooner or later they should have hire an intern from one of the slums that they are interested in to quickly and effectively get the answers that they're looking for. It would be much more interesting to do this.

B.5. Please confirm your participation in the PiP activities linked to this placement (domestic or international)

Domestic Placement	
Introductory Workshop	
Crucible I	

International Placement	X
Innovation Festival	
Crucible II	

PART C: COOPERATION AND SUSTAINABILITY

C.1. Which possibilities do you see in continuing the collaboration with your host organisation?

I have a start-up that is developing a shower that filters and reuses shower water. The technology allows a user to take a shower of indefinite length but only use 10 litres of water, which is the equivalent of one minute of normal showering. If the Watermall were to incorporate our shower design the total water and energy footprint would be reduced greatly. Of course the Watermall is already doing this on a much larger scale and heat exchangers could be incorporated in the plumbing system to compensate for heat energy losses but our shower is still much more efficient and would easily allow for the monitoring of shower usage trends and behaviours which would be invaluable information when designing and implementing Watermalls past the prototyping stage.

This would reduce the required size of water storage tanks and reduce the total size of the water mall. Furthermore it may be possible that a scaled version of our filter design could be used to cost effectively produce drinking water out of the processes black and grey water. In the long term it would even be possible to relocate the showers into the tenants houses as the price of the system goes down and the wealth and standards of living within the slums go up. Perhaps this kind of model could even be considered for the Watermall, where it's a temporary structure that aides in the development of the slum, but ultimately isn't required for basic sanitation and water needs as a miniaturized version of the technology moves into the homes of the tenants.

I'm also very fond of increasing the quality of life in slums and refugee camps, especially when it comes to environmental technologies so I hope that our partnership continues in the future along these lines.

C.2. What is the link with your own work? Which part of your placement experience did you take home?

I would like to implement my technology in slums and refugee camps some time in the near future. My goal would be to improve the quality of life in these places and reduce costs and inspire the youth about the possibilities of the future at the same time (with technology and social innovation). I learned a lot about slums and the challenges that they face when implementing large programs especially in the context of the attitudes of some of the people that live there. I realized that the issue is tremendously complex and definitely would require a lot of on site investigation in collaboration with locals in order to implement with a lasting

effect. Like with any water program.

I also relearned the importance of marketing. When we first came up with the idea of the shower we pitched it to my class as a ready company (owned by someone else) and presented the concept as a ready product to gauge the reactions of my classmates. It was quite surprising to find that Biopolus had essentially done a similar thing whereby they had produced a large amount of marketing material but only had a theoretical or conceptual understanding of the product that they were selling. I realized that I should go back to doing the same, while I've been working so hard for the last years to prove that I know how to implement my ideas and research and measure it's capabilities, I should have simply worked on the marketing material much more to sell my idea as a finished product.

C.3. How will you share what you have learned within your organisation and externally?

Since I'm basically the chairman of Looploop and one of the founders of Showerloop I use the information that I've learned in every dimension of my work. I use the theoretical and practical knowledge that I've gained throughout the PiP program to strategize on what I will do in the future and try to make my products succeed in a market place that desperately needs it.

As far as the Watermall goes, as I'd mentioned before, I often think about similar projects, but now that I had the time to look into it I feel that I'm more prepared when considering my technology and others in these environments. I also know that I'm capable of modelling and designing much larger installations. I believe that these skills will help me share my ideas in a better way.

I'm also very familiar with working with small teams but Mar and Lukas were so incredible polite and nice to work with that I think it has changed my attitude on how to work with others.

I have already given a lecture at Metropolia University of Applied Sciences in Vantaa Finland to environmental engineering students on Climate KIC and the importance of entrepreneurship as a means of solving big problems in the world. I hope they took it to heart.

C.4. Please provide an overview of the sustainability of your placement activities/projects

Placement:

Budapest has excellent public transportation so I used the trains and trams to get to and from work everyday. This is very efficient and the vehicles were almost always full (as you'd expect during the 'going to work time') so the carbon emissions were low. I also travelled to Budapest from Finland via Ferry, bus and train, which was really cool. It was the first time I ever took such a long trip and I really enjoyed that I had enough money to travel in the lower carbon way. Of

course it is much more expensive, something like 3 times more expensive, and I wouldn't have done it without the money from the PiP program, so that's great.

As far as the project itself is concerned there is definitely a potential for a huge impact environmentally, ecologically, economically and socially. The local environment would be greatly improved with a reduction of bio waste accumulation in local water streams (which are often overburdened), the environment would also be improved with reduced emissions all around by reducing the amount of methane entering the atmosphere and providing clean energy and cooking fuel to the residents. The reduction in water consumption would also greatly improve the local ecosystems. With a proper system in place water and energy prices for the residences would go down meanwhile it would increase the stability and security of the water supply adding to political, social and health benefits. Finally there are the social gains which have been mentioned somewhat but they would be a product of all other benefits; increasing quality of life, health, security and stability and there's also a lot to be said to be able to have privacy and especially to enjoy a warm or cool shower, which is my main focus lately. Everyone that's gone camping or had a broken boiler realizes just how nice a shower is – it's civilization basically and so I think that just being able to take a shower every now and then will have big positive impacts down the road that we can't even foresee yet.

PART D: QUESTIONNAIRE

Please answer the following query, taking into account 1 is fully disagree and 5 is fully agree

Experience assessment

Have you contributed to some improvements in the host entity or in its environment?	1	2	3	**4**	5
Have you gained knowledge, contacts, and experience during your placement that will be used in your future professional career?	1	2	3	**4**	5
Do you think this experience can contribute to the fight against climate change?	1	2	3	4	**5**
Have you received enough assistance before and during the placement in order to properly fulfil your commitments with the programme?	1	2	3	4	**5**
Will you recommend this experience to others?	1	2	3	**4**	5

Placement assessment

Have you enjoyed a safe and comfortable work	1	2	3	4	**5**

environment?					
Have you had an easy integration in the host environment?	1	2	3	4	**5**
Has the host contributed to the development of the project?	1	2	3	4	**5**
Please, assess the overall experience during the regional placement	1	2	3	4	**5**

Please point out other comments, suggestions and complaints, if any:

The other Pioneers are a huge resource that can help international pioneers /outreach pioneers to adapt to a new environment and save countless time and energy showing them the ropes of the city and systems.
I.e. which phone connection is best, where to get the monthly card from, who they could rent a room from or do so as a group, etc…

There should be a guidebook with all the essentials, in fact… it would be really really cool if the regional coordinator would meet the Pioneer on day 1 or 2 and give them a bag with everythign that they need (1 month bus pass, or a bicycle, maps, a sim card with internet Access, contact info, some info one where to go, where to eat (cheaply), etc… It wouldn't even matter if the pioneer had to pay for it… the person getting all that stuff would collectively save the pioneers hundreds of hours.

At least if I was a regional coordinator that is what I would do.

Also it really would be good if we would have the contact info of the fellow pioneers in advance, this way we could rento out a mansión together.

PART E: KEY PERFORMANCE INDICATORS

The following Key Performance Indicators (KPIs) for the PiP programme relate directly to the KPIs set out by Climate-KIC in its Business Plan 2014:

- At least 180 people on a 'triple-helix' professional development programme.
- At least 360 experiments for place-based learning.
- 50 business cases/models worked on.
- 40 new knowledge transfer agreements.
- 40 novel advances in organisations, services and business plans.

Ideally, the output of a placement should involve, at least, one KPI. One single project/activity may produce more than one KPI, either under the same category or covering different types of KPIs.

E.1. Key Performance Indicators coming up from this placement (related to Climate-KIC Business Plan).

If the pioneer has generated or contributed to a KPI, please indicate which one of the following:
    x☐ New business case / models / project proposals
    ☐ Knowledge transfer agreements
    ☐ Novel advances in organisations, services and/or business plans
    ☐ None
Please, describe the key facts of this contribution

- - -

In order to properly identify the achievements reached during the 2014 programme, the following templates have been prepared to be fulfilled by the pioneer only when the coach agrees upon, after careful consideration of whether the progress achieved over the placement may represent a Key Performance Indicator (KPI). The coach will provide support as needed.

KPI 1: Business Cases/Models or Project Proposals

Pioneer (Name & Cod.)	Jason Selvarajan
Host (Name & Cod.)	BIOPOLUS Institute Research andras.szollar@biopolus.org Andras Szollar / Tel: +361 445 0898, Mobile: +3630 927 5904
Name of the Business Case / Project	Watermall
Name of Regional Coach who provides support	**Gábor Zsembera** **Climate-KIC Central Hungary Region Pannon Pro Innovation Services Ltd.** cell: +36 30 948 5526 email: gabor.z...@ppis.hu web: www.climate-kic.org
Description of the Business case/model or project proposal worked on (opportunity, target group, contribution to Climate Change, potential impact, etc) (Please quantify) - max. 300 words	More than two thousand million people worldwide live in slums. These areas are characterized by a rapid and unplanned expansion, lacking access to basic infrastructure (water, sanitation, energy, etc.). The business case we propose is a Watermall facility, its main functions are providing drinking water, toilets, laundries and showers, as well as community services. The grey water is reused and recycled into energy production (biogas and electricity) and food. The target group is the people living in low-income urban areas, which lack services required to address the basic human and societal needs. The business case we propose uses an alternative circular approach for closing the urban water, food, energy and waste loops. In this sense, it is an alternative for providing urban infrastructure in a climate-smart integrated way including, for instance, decentralized water recycling and reusing waste nutrients for a way of food production in the category hydroponics. The escalating challenge of the coming decades will be to provide enough food,

	water, energy and consumable goods for an exploding urban population. This alternative is a feasible way to improve sustainability of living and quality of life in low-income areas. A Watermall tackles challenges around climate change by offering this basic services in an efficient way and closing the system of resources management in a financially sustainable way.
Who will implement the business case/model worked on (who has the property: host, pioneer, third party, combined, partners, etc.)	The project is designed to be marketed and implemented by BIOPOLUS (who will have the property) with local stakeholders/partners.
When is it foreseen to be implemented (Next steps and estimated schedule of the Business Case/ Project)?	The business case is in an initial phase, and next steps are to find impact investors and implement a pilot project. These steps will provide the possibility to test the existing technical solutions and refine the idea. Next steps are: 2015- Fund Raising 2016- Feasibility Study 2017- Pilot project 2018- Regional demo-sites (2 or 3) 2020- Business global roll-on 2025- Reaching at least 100 million slum dwellers
How has the pioneer contributed to the business case / model worked on. Role of the pioneers in the BC/ Project. (providing the basic idea, developing a previous idea, collaborating in the documentation gathering, exploring the market situation, etc) (Give references).	The main contribution of the pioneer was to developing a previous idea, the Watermall facility. In first place the pioneer worked, in a team of three pioneers, exploring the market situation. In order to do so they searched for information about social and technical factors influencing whether a Watermall would be useful and how it would be designed in different situations. The team gathered documentation about three case studies for this purpose and also worked on developing the community aspects of the business model. In addition, the information was used to do a first assessment of the business case and to design a technical model. The technical

| | model was a first step to see how a Watermall looks like (technical functions, services, area needed, etc.) |
| | |

Another role of the pioneer was to further develop the business case in order to find impact investors in the near future. The team of pioneers analyzed and outlined value propositions for the Watermall project considering different possible clients (NGOs or local communities) who may have different interests. The role of BIOPOLUS is to offer a climate-smart solution for providing infrastructure in areas disconnected to the existing networks, increasing the living standards and the environment. After this work, the Watermall is soon to be presented to investors.

References: the contact person in BIOPOLUS is Andràs Szollar, andras.szollar@biopolus.org.

| **Further information/proofs** (Abstract of the business idea with reference to relevant KIC activity; partners / entrepreneurs involved; pictures, website, comments, reactions, reports, letters of support, etc.)
This information should endorse the above-mentioned info. | As previously mentioned the idea is still in an initial phase and the pilot project has not been implemented yet. We have participated in improving a brochure about the Watermall project but it is not finished yet and still in an internal version. In the web of BIOPOLUS you may find information about the 'Biomakeries'. A Watermall is in fact, one type of 'Biomakery' specifically designed for urban areas that lack basic infrastructure.

For general info visit www.biopolus.org.

For info about the 'Biomakeries' visit http://www.biopolus.org/news/2013/11/biomakery-building-the-result-of-integrated-technological-building-services-and-ecological-modelling/#more-365 |

KPI 2: Knowledge transfer agreement

Pioneer (Name & Cod.)	
Host (Name & Cod.)	
Name of Project	
Name of Regional Coach who provides support	
Description of the Knowledge transfer agreement (type of transfer: patent, trademark, know-how, copyright, etc)	
Who is involved in the knowledge transfer (host, pioneer, third party, combined) **and type of contract**: licensing, sales, consultancy	
When it is foreseen to be implemented (Next steps and estimated schedule of the knowledge transfer)	
How has the pioneer contributed to the knowledge transfer (providing the knowledge, developing a previous idea, etc) (Give references)	
Further info/proof: contract with above information (details may be blackened if necessary) or a written statement of the KIC partner adopting the knowledge (with the above information) that states how it is being adopted. This information should endorse the above-mentioned info.	

KPI 3: Novel advances in organisations, services and business plans

Pioneer (Name & Cod.)	
Host (Name & Cod.)	
Name of the Project	
Name of Regional Coach who provides support	
Description of the novel advance (organisation, service, business plan) **and how it helps to fight against Climate change** (max.300 words)	
When it is foreseen to be implemented (Next steps and estimated schedule of the knowledge transfer)	
How has the pioneer contributed to the novel advances in organizations, services and products (providing the advances, developing a new service or product, etc)	
Further information/proof (written statement of the KIC partner/host/organization adopting the novel advance pictures, website, comments, reactions, reports, letters of support, etc) This information should endorse the above-mentioned info.	

PART F: VALIDATION

Please provide an assessment of the adaptation, performance and progress of
the pioneer over this placement (max. 300 words):

Model water mall according to our parameters

Field trip to Dél-Pest Organica Ltd Wastewater treatment plant

I hereby confirm that the statements and information in this application form are
true and correct to the best of my knowledge and belief.

Continuation of thespread sheet model and prepare presenation - Give

Given its quality, I recommend the adoption of the above-mentioned KPI as
outstanding product of this placement. The proofs supporting this KPI have
been checked and validated accordingly. [Remove if not applicable]

Begin final reporting - also included more work, 3d modelling and more

Continuation

Date & Coach's signature

19.11.2014

Date & Pioneers signature

19.11.2014

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