May 2019

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URBAN INNOVATIVE ACTIONS
The Urban Lab of Europe !

The Earth Cycle project
Journal N° 1

Project led by the ***City of Sevran***

CIRCULAR
ECONOMY

European Union
European Regional
Development Fund

Région
Hauts-de-France

The Earth Cycle Project

The **EARTH CYCLE** project seeks to foster a new urban planning development model based on the use of locally excavated soil from major construction sites. Project partners will develop a full industrial process and ecosystem to produce certified earth construction materials from the reuse of soil extracted as part of two major subway stations' construction works. The project will design an experimental mobile production plant which will produce four different pilot building materials (bricks, panel of clay, wall coating and earth with fibers) to be tested in local urban development projects. Partners will set up an Earth Cycle Observatory to assess the materials flow and provide evidence to foster the replication and upscaling of the industrial process. Along with technical and engineering works, Earth Cycle partners will closely involve citizens throughout the project and train local companies and entrepreneurs to create further circular economic opportunities.

Partnership

- City of Sevran
- Great Paris Developer - GPA
- Greater Paris Transportation - SGP
- Quartus
- Antea Group - earth building specialist company
- Joly&Loiret - earth building specialist company
- IFSTTAR (French institute of science and technology for transport, development and networks)
- Sciences-Po Paris; ENSAG (Architecture, Environment and Building Cultures)
- Amàco - higher education and research institutes
- CRATERRE - higher education and research institutes
- Skills for Employment - NGO

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1 Executive summary

In this first Journal, we are going to present the policy context behind the project at regional, national and EU levels. We are going to explore how earth construction has become an attractive alternative and how the Earth Cycle project is rooted within this historical revival of earth construction. Furthermore, we will take a glimpse at three important objectives:

- Re-localisation of materials;
- Re-localisation of money; and
- Re-localisation of knowledge.

In addition, we will focus on the future perspective and current questions around the right scale, Industry 2.0 and the demand factor.

2 Introduction

Heating and cooling associated with buildings represent 35% of the global energy consumption. In the meantime, cement, the main component of concrete releases 5 to 8% of human related CO_2 emissions during its production. These numbers are forecasted to increase with the growing demand for infrastructure and housing. It is then crucial to reduce the environmental impact of building materials and the energy consumption of buildings.

On a global scale, approximately 59 billion tons of resources are mined each year and 85% is used in the construction sector. With the increasing housing demand and socio-economic achievements, the demand for aggregates will raise rapidly in the coming years, putting more pressure on gravel producers and increasing the risk of illegal mining. Meanwhile, excessive aggregate extraction has ecosystem consequences, affecting biodiversity, the water supply, land losses, climate, etc... Although it is alarming, a discrepancy exists between the magnitude of the problem and the public awareness. Natural islands can disappear while artificial ones appear through extreme exploitation of ecosystem (legally or not), but very few actions are taken. In Europe, thanks to strong environmental policies, fragile ecosystems are protected from resource extraction. But this creates as a consequence, a very strong pressure on resource availability. Studies reveal that aggregates are becoming scarce around cities. Supply distance for natural sand and gravel are increasing. In Paris, gravel is usually conveyed from a distance of more than 300 km. And it must be reminded that concrete is made of cement and aggregate and that for each ton of cement used, one needs seven tons of aggregates.

Urbanization and construction not only consume a tremendous amount of resources, they also generate a massive amount of waste materials. Reports from Eurostat show that in Europe, the construction sector dumps 400 million tons of inert excavation material each year into landfills and the recycling rate of construction waste is extremely low. Actually, recent initiatives have mainly considered construction and demolition waste such as concrete and steel as a key focus for recycling. This had led to the development of recycling concrete, which successfully reuses crushed concrete in new concrete. However, excavation materials, meaning materials that are extracted before the construction to leave the space for underground parkings and foundation represent 3 times more materials than construction and demolition waste. Considering these materials, mineral construction waste, including excavation material, is the largest waste category in Europe and the flow of these excavation materials represents roughly the flow of virgin materials currently required to build new constructions. For Paris and its immediate suburbs, 190 million tons of natural resources are needed every year while 160 million tons are dumped in landfill.

French law about energetic transition (loi TEPCV) voted on august 17th, 2015, calls for massive construction waste reduction: -50% of waste put in landfill in 2025 in comparison to 2010. In the case of greater Paris global project, a state branch (DRIEE – Regional state department for energy and environment) has issued studies in early

2012 to show that the actual infrastructure couldn't reach this objective, with the current ways of fabricating our cities. At a regional level, Ile de France voted in June 2015 a plan for construction waste reduction and wants to foster construction waste reuse at a local level "in situ".

In 2011, the European Commission redefined its commitment to reduce GHG emissions by 40% by 2030 and 80-95% by 2050 compared to 1990. These targets and strategies are currently under revision to align the European Union's climate action targets with the well-below two degree target of the Paris Agreement (2015). To meet these targets, all sectors must reduce their emissions, especially the energy, building and industry sectors. The construction sector is clearly identified as an important player to meet the commitments to GHG reduction in the Paris agreement.

2.1 In this situation, earth construction is becoming an attractive alternative.

By definition, earth is formed by the slow mechanism of rock degradation and by the complex mechanism of particle migration. For construction purposes, the earth used is the inorganic part of the soil and is an assemblage of gravel, sand, silts and clays in different proportions. A physical analogy exists between conventional concrete material and earth material in term of the physics of grains particles. Concrete is a mixture of gravel, sand and cement while earth is composed of gravel, sand, silts and clay. The difference however is that cement is used as a concrete binder whereas clays are used as natural earth binders. Unstabilized earth material is among the building materials that have the lowest environmental impact because it is locally available and does not require any further processing and transportation. Moreover, at end of the building's life, earth elements when exposed to the environment, will erode and return to nature to follow the geologic cycle of matter. It is the best example of closed loop recycling.

The heritage of earth buildings is present worldwide. Due to the diversity of the earth and the constraints of standardization, earth construction has promoted self-builders who build in accordance with the climate, labour and material available. The further we go back in history, the more earth seems to be the natural material choice for construction. Archaeological findings reported by Kathleen Kenyon describe the first earth brick excavated from the city of Jericho dated 10'000 years ago. Ancient examples of earth construction include the use of the rammed earth technique to erect the Alhambra Palace in Granada (Spain) built in the 10th century and part of the Great Wall of China built 2'000 years ago in Gansu. On the African continent, the use of wattle and daub, cob or adobe brick techniques allowed the construction of influential and beautiful architectural edifices such as the great mosque of Djenne in Mali and the great mosque of Kairouan in Egypt during the late 7th century. During the Ming Dynasty, most Chinese architecture was based on wood wattle infill with daub, cob and earth brick. In the Rimac Valley in Peru, residences were built in adobe although the rammed earth was still the predominant building technique in central and South America. Dating back three hundred years, in the Rhone-Alpes region of France, a large number of earthen buildings are still inhabited and exhibit excellent performance in terms of structural stability, durability and comfort. During the same period, rammed earth construction was widely used in Europe, especially in Germany, where the six-story house built in 1828 by the industrialist Jacob Wimpfen in Weilburg an der Lahn is the tallest earth building to date in Europe. The promotion of rammed earth was due to the initiative of the professor of rural architecture Francois Cointeraux (1740-1830) [33], who gave a good definition of the technique: "*Rammed earth or "**pise**" is a process by which houses are built from earth [...]. It consists in compacting layer by layer; between two wooden planks, separated by the thickness of an ordinary wall; a given amount of earth prepared for this purpose. Compacted in this way, the earth binds, takes consistency and forms a homogeneous mixture that can be erected to heights suitable for dwelling."*

Nevertheless, after the Second World War, in a market-driven industrializing society, concrete and steel turned into the preferred choice of architects and engineers and by the end of 1960, building with earth had become obsolete. Nonetheless, a few architects and builders were interested in using the material for construction to respond to social, demographic and economic problems. This was the case of Hassan Fathy, Egyptian architect and environmentalist involved in mud brick and appropriate technology as explained in his famous book *"Architecture for the Poor"*. From 1941 to 1953, he used earth and the Nubian vault technique in Gourna (Egypt) to build 7'000 houses with the Gournis people at a low cost. Later, in 1979, the French association *CRATerre*, in an inspiring movement of eco-friendly construction for the people, built with local partners more than 10'000 units of social housing in Mayotte, considering the environment, the local culture and the context. Professor Normando Barbosa in Brazil also led the "appropriate technology movement" in construction by promoting the production of interlocking compressed earth blocks. He pushed forward a national initiative for building schools and affordable housing using earthen material and available resources. Despite the commitment of these precursors, earth construction as well as appropriate technology has not yet achieved its target of mass housing. According to Paul Polak, the main reason was that "*the appropriate technology movement was led by well-intentioned thinkers instead of hard-nosed entrepreneurs designing for the market*".

To pursue the revival of earthen architecture, in the early 1950's, Germany developed the first building codes for earth construction with the DIN regulation, which was revised by Lehmbau Regeln. Later, research laboratories such as *CRAterre* started working on the standardization of earth as a building material. Their manual of earth construction was published in 1989 and the standards on compressed earth blocks in 1998. In the United States, new pioneers such as Simone Swan and Rick Joy built rammed earth houses in the states of Arizona, Utah and New Mexico. Today, due to environmental concerns and the intrinsic properties of the material, talented architects such as Wang Shu, Kere, Heringer, Klinge and Rauch pursue their predecessors' work. They brought earth material to the forefront, with architecture awards going to earthen projects. Anna Heringer (Austria) and Roswag-Klinge (Germany) won the *Aga Khan Award for Architecture* in 2007 for the METI School in Bangladesh: a hand-made earth construction using adobe and compressed earth brick techniques. One of the *RIBA Award* winners in 2009 was Mu Jun (Hong Kong) for the Maosi Primary School. Francis Kere (Burkina/Germany) won the *Gold Global Holcim Award* in 2012 for a secondary school made with rammed earth and compressed earth block in Burkina Faso. Even the

2012 *Pritzker Prize* (considered as the nobel prize of architecture) went to Wang Shu. He built a teahouse in Ningbo (China) in 2006, in which the main structure was rammed earth wall. In Switzerland, Martin Rauch (Austrian) together with Boltshauser Architekten AG renovated the Schulpavillon Allenmoos II with a veranda made of rammed earth columns, an earthen floor stabilised with casein and walls covered with an earth plaster. The ceilings of the Triemli hospital (Zurich) were renovated with earth plaster, in order to improve air quality inside the hospital. Another famous project is the construction of the new herbal center of Ricola in rammed earth, by the renowned architects Herzog and de Meuron, winners of the 2001 *Pritzker Price*.

Through all these examples, we can see that earth construction is deeply rooted in the history of humanity. It has a clear social component that was put forth through the appropriate technology movement. It has also a clear attraction power for a new generation of architects. However, insofar as the appropriate technology movement has failed to reach mass scale, beautiful contemporary projects are mostly bounded to public-sector construction and niche markets.

The current question is therefore can we develop projects led by hard-nosed entrepreneurs that can transform this production-push situation to a demand-pull market driven context?

3 Earth Cycle: A brief project description

The Earth Cycle project is rooted within this historical revival of earth construction, but with some specificities that we would like to stress out in this first Journal. In Paris region large infrastructure works are underway, partly linked with the Olympic candidacy of Paris for 2024, partly linked with long overdue improvement of infrastructure network of an agglomeration that grew up to 15 Millions inhabitants. This causes extreme large production of excavation materials that can't be handled in existing landfill sites which have already exceeded their storage capacity. In this context, Earth Cycle wants to activate all the different stakeholders involved along the value chain of construction and provide sustainable alternative to the use of excavation materials. 12 partners are actually involved in this project and cover all needed competence, from excavation to construction. *Société du Grand Paris*, building the new underground metro line in Greater Paris, is the main provider of raw matter. Its characterisation is the responsibility of *Antea Group*, which is a private company, and acts as an expert in earth management and control data systems of the materials. The transport and processing of the soil which has to be as environmentally friendly as possible will be assessed by IFSTTAR, a leading research organism in urban metabolism. The transformation of this raw matter into a material will be done by *Amàco*, research centre and expert in development of alternative building materials. But to produce building products, one needs a production facility which will be developed by Joly and Loiret architecture office. The assembly of these new building materials requires architecture expertise, provided by *CRAterre*, *Architecture, Environment and Building Cultures, Research Unit AE&CC*. Also, a good architecture and constructive technique is useless without people building it. Earth construction requires specific skilled workers that will be trained by "*Compétences Emploi*" a non-profit organisation. Finally, a construction project to raise from the ground requires developers that will transform a raw land into a viable place where the construction project can take place. *Grand Paris Aménagement* and *QUARTUS* are focused on this part. Project management is ensured by the *City of Sevran*, Urban Authority, with the assistance of GPA. Sevran will also facilitate the construction of the factory on its territory and promote raw earth materials in urban projects.

3.1 Earth Cycle to re-localise materials

A standard construction process would excavate material and deposit it in landfill. At the same time, it would extract virgin aggregates from far away, wash them, sieve them and re-assemble them while mixing them with cement to produce concrete. In the Earth Cycle project, the objective is to produce building materials directly with the material excavated on site. Or to be more accurate, with the large quantity of excavated materials generated by the infrastructure work from the development of the Greater Paris.

This process is expected to reduce transport, to reduce landfill as well as pressure on natural resources like sand and gravel. However, to do so, one needs to diversify the building materials used. Actually, using excavation material can't be done in conventional concrete. Cement doesn't perform well in association with the clay present in these materials. One needs to develop earth based building materials. That's why Earth Cycle is aiming to produce bricks, but also mortars, plasters and earth panels. They could replace, respectively, fired bricks, cement based mortars and plasters and gypsum plaster boards.

The use of excavation materials is not often done in earth construction, except for local self-build houses. In urban environment, it is very rare. Among the few initiatives in Europe, one can cite terraBloc, a Geneva based company who produces compressed earth blocks from excavation materials. They have regular construction works with public or private owners. They build for new construction as well as for renovation and they use the earth from the site or, when bigger volumes are needed, excavation materials from other sites within the city of Geneva. BC architects and studies in Brussels also produce compressed earth blocks as well as mortars and panels. Their initial architecture and engineering office is now expanding to include BC materials to offer building products made with the excavation materials of greater Brussels. Terra Bloc as well as BC materials have both a fixed production unity where most of their products are made, but they are also able to delocalise this production and move directly on site to use locally available material in cooperation with the client.

Earth Cycle is therefore embedded in a larger dynamic of reusing excavation material. In every large city centres, being Geneva, Brussels or Paris, the lack of storage facilities for excavation materials, the pressure on the virgin material availability and the growing awareness for health and environment lead to similar initiatives. The originality of Earth Cycle lies more on the combination of stakeholders than on the building materials themselves. In Earth Cycle, the lead is coming from the political side.

3.2 Earth Cycle to re-localise money

Cost is one of the main parameters in the evaluation of the feasibility of a construction project. Cost could be defined as a measure of the resources consumed for the completion of an activity or the creation of a product. Many methods exist that are employed to facilitate economic decision making in a project and are related to the evaluation of cost at different phases. But while most of the available assessment studies allow to quantify the costs of the different activities, they seldom assess the source of these costs (materials, labour, etc.) and their spatial distribution (whether the suppliers and subcontractors are located close to the project or not). It is true that the construction sector provides 18 million direct jobs and constitutes approximately 9% of EU's GDP, but what about the production of the building materials used in the construction? Construction companies, like all European industry sectors, have considerably increased their productivity over the last decades. Jobs are still required on a construction site but fewer and fewer are needed on a production site.

The clear political objective of the Earth Cycle project is to re-localise and rematerialize the flow of money involved in the construction sector, by creating local employment through the use of local resources. Science Po and IFSTTAR as research institutes will assess the consequences of this economic transformation. They will develop methods that could empower decision makers (local authorities, governmental agencies or potentially also individual developers) with additional tools so that they can take better-informed decisions, ranging from the choice of materials and suppliers to the selection of project alternatives (e.g., different materials). By mapping the flows and providing a clear picture of the economic relationships in a project, one can have significant impact on the local socio-technical system.

Previous initiatives of re-localization of economic production facilities do exist. One can cite for instance "Ambiance Bois" which re-localized timber construction in the centre of France, but this has not often been done in an urban context. With the first industrial revolution and the need for workforces in factories, urban population exploded. However, business activities changed in the 1970s with a de-mechanisation of the EU and the development of the service sector so the Earth Cycle project is clearly very original and crucially needed if we want to reactivate this social fabric. Bricks are back in town and with them workers jobs and employment. At least this is the clear ambition of the Mayor of Sevran.

3.3 Earth Cycle to re-localise knowledge

The current economic system has pushed for embedding knowledge in the material rather than in the act of applying the material. For instance, a mortar bought in a conventional retailer will contain up to 20 different admixtures (very small quantities of very specific components that will transform the properties of the mortar). A conventional mortar is able to be very fluid with a small amount of water. It is fluid and easy to apply on the wall, but as soon as it is applied, it becomes stiff enough so that it doesn't fall from the wall. This property is reached with the use of a plasticizer that will liquefy the mortar, combined with thickening agents that will act only when the spreading has stopped. A conventional mortar is able to set very fast in order to gain early strength, but at the same time, it can be removed easily if one has made a mistake, and be reapplied elsewhere. To do so, the very early chemical reaction that provides some strength needs to be reversible, at least during the first 2 or 3 hours; then, a second irreversible reaction will take place, which will give the mortar its final strength. This is achieved with very fine adjustments of chemically active binders, a higher amount of aluminium phases to favour the initial precipitation of particles that will provide a little strength and be reversible and a later precipitation of stronger particles to give the final mechanical properties to the mortar. Finally, robustness to drying when the mortar is applied on hot environment is provided with water retainers. Cracking during drying is avoided with shrinkage compensation agent, etc... All this leads to the addition to up to 20 different admixtures in a very common mortar. But it also leads to the fact that the skills required to apply it well are relatively low, due to all the knowledge embedded in the material. This can be resumed to a shift from craftsmanship to engineering. The craftsman being on site, while the engineer is in the factory.

Earth Cycle and earth construction in general will take the opposite strategy. The material is simple (maybe just some fibres are added to the mix in order to give better strength to the final mortar). However, its application on the wall requires higher skill level. This will be provided through training of workers. The non-profit organisation Compétences Emploi is aiming to train local unemployed people to work with this material. The Earth Cycle project, by producing earth materials as well as by training workers who will use it, aims to transform the construction sector and more generally the local employment scheme in Sevran. For once, walls are unifying people and as the mayor of Sevran has stated at the launch conference: the production of a brick brings esteem. One can be proud of the work done, proud of the material, proud of the place. It brings a much needed self-esteem in underprivileged suburbs.

4 Future perspective and current questions

The project has just started. Motivation among participants is very high. Ideas and initiatives are bubbling everywhere. Exhibition, training, raising awareness among public employees. Exhibition and discussion with inhabitants. Earth Cycle is not a factory yet, but as a project, it is already clearly emerging. Nevertheless, key questions are also already there.

4.1 Concentration vs decentralization: What is the right scale?

The core objective of the Earth Cycle project is to build a production factory inside the city of Sevran that will allow to produce the 3 types of building material the project wants to promote. But even if all actors are firmly convinced about the interests, will the population accept the project?

The ideal of a brick production to cement the population around a common project can be tough to push when the associated nuisances might be brought up by some parties. Noise, dust, truck traffic for raw material coming and building materials leaving… these are classic industrial problems that have been solved classically in two ways: moving industries out of town or increasing the efficiency of the production site. The first option is clearly in contrast with the project’s goals, but the second option raises a difficult dilemma. Actually, to increase the efficiency, for instance by using dust collectors or a noise absorber, one usually needs a higher investment level, which can be recovered through a gain in productivity, for example by purchasing more powerful machines or by increasing automatization. This has been the historical trend of heavy industry, which has pushed the sector to become more concentrated, with fewer people employed and often outside main urban centers. On the contrary, going for non-industrialised production reduces drastically the productivity and makes production costs explode. The products are therefore more expensive, which reduces penetration in the market. That doesn’t mean that the production is not economically viable, but just that the market is reduced to high-end products favoured by a reduced strata of the society.

What is the right level of mechanisation, what is the right amount of production? These decisions ultimately control the constraints associated with the production (given the amount of workforce and the level of safety equipment for the production chain). The choice of the scale ultimately defines the price of the product and the location of the factory. Until now large factories have moved out of town to produce cheap and reliable products for the construction industry and small shops remained in town to produce high-end products for a selected clientele. Is there a happy medium? This is the bet of Earth Cycle. It is possible as all stakeholders are truly involved for its success, but the choice of the production scale will determine all the evolution of the project.

4.2 Can Industry 2.0 be non-digital?

To move away from classic heavy industry and a simplified approach of production in urban area, one needs to consider the tech revolution, the Industry 2.0 and all associated digitalised techniques. Actually, the last 5 to 10 years have seen an explosion of new business models that have reinvented classic production schemes, transformed our cities and production facilities. On-demand delivery for instance allows reducing drastically the scale of production, even for industrialised products, as long as we can produce them with new digital tools. 3D printing allows to produce unique steel pieces on demand, without requiring an installed steel production facility with costly moulds, which would require to produce a large amount of pieces, which in turn creates the need for a large amount of storage and therefore can only be done out of town. Therefore, the penetration of digitalisation in classic construction has enabled the re-emergence of small factories in cities. Construction industry has so far been quite reluctant to jump in the field of digitalisation. Alternatively, should we say that construction industry has not been "uberised".

However, the Earth Cycle project has clearly another business model. Here there are no smart technologies to inform "la fabrique" (the production factory) about new needs, no smart-phone to put in relation masons and experts. «La fabrique», clearly wants to implement a new fabric for the city, but without digitalisation as an anchor point. Will it work; can it come later with a fabrique 2.0? The next 6 months will shed more lights on these risks.

4.3 A demand driven project: game changer within European initiatives

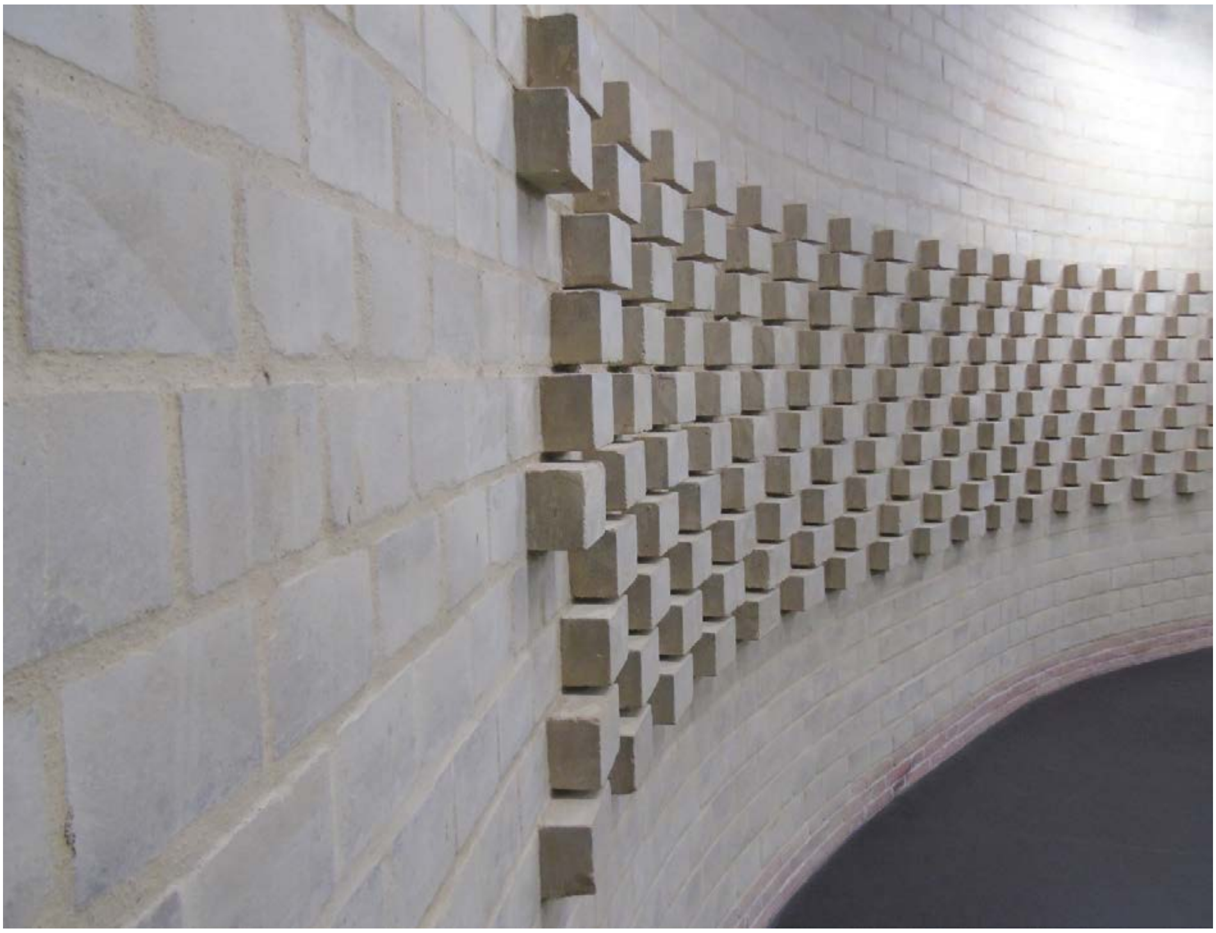
To come to a conclusion and evaluate risks and opportunities of this initiative, one needs to point out the clear and crucial singularity of this project, compared to all previously existing initiatives. It is a demand-pull organisation rather than a production-push one. Appropriate technologies movements in the early 60's as well as current earth renewal initiatives by architects or brick producers are all based on the development of a technology that should infuse in the society because one believes it is the right technology for the concerned persons. However, without incentives to use this "so seen" appropriate technology compared to a conventional one, except our willingness to protect the environment or to increase the sense of the community, people won't use this technology. Without a market, no producer can survive.

Here, the framework is very different as the developers are on board. Because they can fix for instance a certain amount of earth products in their constructions, it is sure that Earth Cycle will have a market. A small captured market in the beginning that can allow gaining assurance and competitiveness in order to conquer at a later stage other emerging markets.

This difference in the business model clearly distinguishes the Earth Cycle project from classic appropriate technology initiatives that have so far never reached the mass market.

Diversity of earth, Grand Ateliers (Photo credit: Amàco)

Diversity of compressed earth bricks (Photo credit: Amàco)



Compressed earth brick wall in Cornebarrieu, France (Photo credit: Daria Ardant)

5 Implementation challenges

Earth Cycle is facing inherent challenges that will have to be overcome in the next phases.

Challenge	Level	Observations
Leadership for innovation	Low	The Earth Cycle project has a strong support at several levels. The municipality is strongly involved and is pushing this project to emerge. But possible changes of political majority at next elections could change the agenda.
Public procurement	Low	The site is secured. The difficulty will be to build the factory, but challenges more related with strategic technological choices than public procurement
Adopting participative approach	High	For this project to work, it is essential to have an acceptance of the population. Noise, dust, traffic are threats that opposition to the project could play with. Integrating this project into a participative approach is therefore a key challenge.
Monitoring and evaluation	Low	Targets and objectives are quite clear. KPIs set and just need now to be fulfilled.
Financial sustainability	Medium	Due to the fact that the project is demand driven, it will be possible to set the right level of expenses that can be covered by a known demand. However, with this be sufficient to achieve the right level of production and functioning need to be explored.
Communication with target beneficiaries	Low	Politicans, municipalities, city developers, construction companies, material producers have very high expectations on what Earth Cycle can deliver. As the project will be at a demonstration scale which won't be able to solve all the excavation material landfill problems in the region, communication with target beneficiaries to manage expectations and explain how the gap between the Earth Cycle project and the overall vision of a low carbon low resource consumption city is crucial.
Upscaling	Low	If the Earth Cycle proved to be financially sustainable, multiple initiative can follow this project. Hundreds of earth cycles are needed in Paris region to deliver the right level of service. But as the handling of material is a local problem, this upscaling will be done by multiplication of factories and not extension of the existing one. The upscaling is therefore not a crucial challenge, once the first project is proved to be viable.
		Project specific challenges
Technical readiness	Low	The technology developed is known and should be able to be implemented in conventional construction sector
Legislative readiness	High	Earth construction is legally feasible, but the lack of accepted norms and standards can be a hurdle for a wide implementation. Furthermore, the raw material even if being a natural and untransformed material is considered as a waste material as it comes from excavation work. The status changes of waste to product can lead to some legal difficulties.

6 Conclusion

This Journal focused mainly on setting the stage and presenting the policy background behind the Earth Cycle project. In the next edition, we will give you more insights into the nitty-gritty of the day-to-day implementation, management, challenges and the way to overcome them. Stay tuned!

Urban Innovative Actions (UIA) is an Initiative of the European Union that provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges. Based on article 8 of ERDF, the Initiative has a total ERDF budget of EUR 372 million for 2014-2020.

UIA projects will produce a wealth of knowledge stemming from the implementation of the innovative solutions for sustainable urban development that are of interest for city practitioners and stakeholders across the EU. This journal is a paper written by a UIA Expert that captures and disseminates the lessons learnt from the project implementation and the good practices identified. The journals will be structured around the main challenges of implementation identified and faced at local level by UIA projects. They will be published on a regular basis on the UIA website.

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