



Green Living Lab

# Green Living Lab

Advisory research for opensource + art + education project

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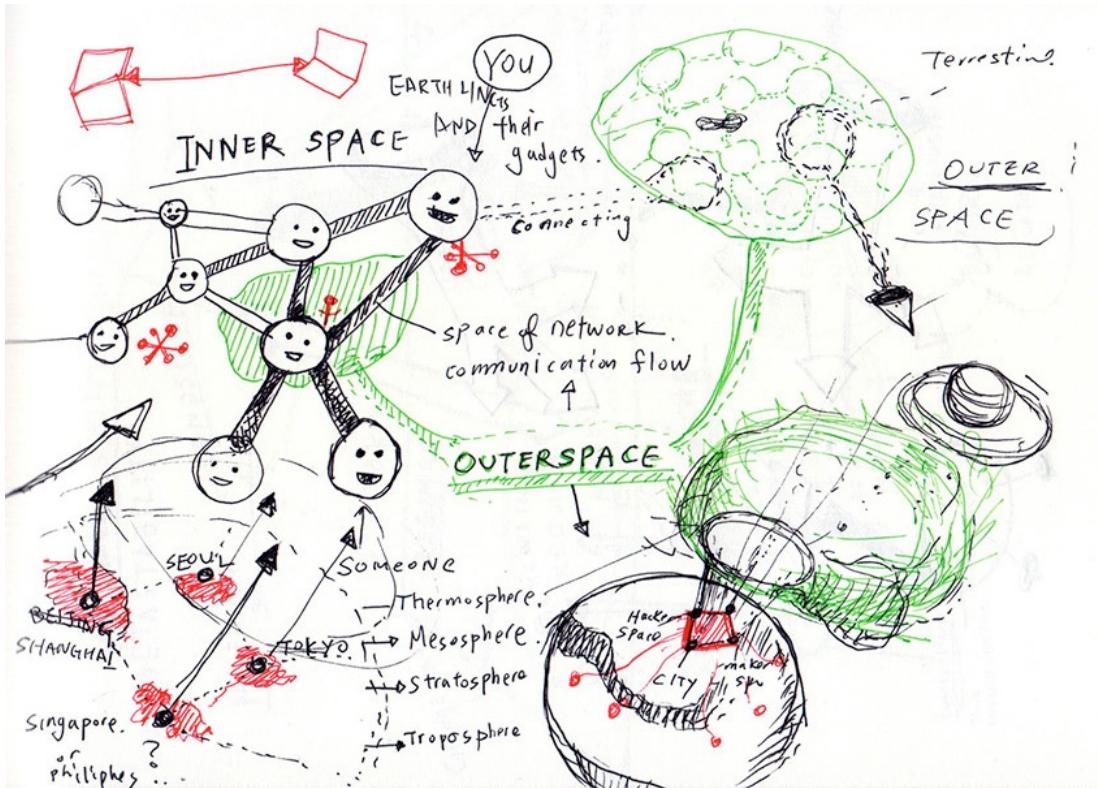
2015

2016



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Environmental health is a shared matter of concern and there is rapidly growing public interest in how to respond and engage with these issues productively and creatively.



The exchange between science, technology and art does not happen easily or naturally. First of all, these disciplines have distinctive ways of engaging with the world. Science provides a way of analyzing the world. Technology is a way of examining and shaping the world. Art is a way of questioning the world.<sup>1</sup>

<sup>1</sup> This phrase from a conversation with Tega Brain, an artist working with environmental data.



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# General Information

## Purpose

This is preliminary research for an open source art project about urgent environmental issues in East Asia. The purpose of this research is to provide practical guideline for a technical research institution to commission an art work in the public space. The commission has special interest in advocating green technology. Critical mass of engineers and scientists, policy makers and activists are engaged with improving ecosystem health and biodiversity. Their research and activity provides the context for this art project and its position in the world. Artist and the commissioning institution will collaborate to build strategies for public engagement and outline the core principles of the project. The institution and project coordinators will search for potential candidates for collaborators and cooperators in the region of focus. The outcome from the project is created in effect from the art work, and does not necessarily take the form of a deliverable product or experience. The research also presents some propositions for further steps over years and foreseeable outcomes from the project. This research is conducted as part of my advisory effort for Green Technology Center in South Korea.

In Asian cities that are the core mechanisms of globalization and massive urbanization, environmental issues have been foreshadowed by more immediate needs for urban habitat and economic growth. As urban pollution and natural deterioration becomes more apparent in every corner of these cities, policy makers and citizens alike are becoming increasingly aware of the urgency of responding to declining environmental health. Among the wide range of issues in Asian cities, the following topics are selected based on the possibilities of engaging with the general public through art project.



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Growing number of factories that use coal to generate energy and metropolitan life style of its consumers are the key cause of the loss in contact with the emergent situations. Metropolitan communities find themselves confronting environmental issues only at the moment of natural disaster, war, or conflict or in the gradual push expansion of the city due to gentrification.

There is a potential to utilize the under appreciated public spaces for artistic intervention and creative experimentation. By connecting communities coexisting in cities, art project can have large impact by opening up alternative space free from the restrictions of zoning and urban development. The edge effect, as mentioned above, can turn consumer culture into that of participation culture, engaging with environmental issues such as the recovery from natural disasters.

Among the newly found potential public space, there's a contingent optimism toward Hackerspaces. Hackerspaces are community run co-working space with hardware tools to support making of physical prototypes. The term Hackerspaces and Makerspace are often used interchangeably because the distinctions can be arbitrary. Most of the time, people who frequent Hackerspaces focus on electronics and low level programming and appreciate D.I.Y aesthetics and Punk ethics. Makerspace focus on craft and hands on projects. It is generally more accessible to wider range of citizens, including youth and elderly. Fab Lab (Fabrication Laboratory) focus on rapid prototyping, such as CNC and 3D printing technologies, and it is sometimes connected to local industries. For the purpose of this research, I will be using Hackerspace as a global term that encompass all three types of spaces. As creative inquiry into examining changing landscape, Hackerspaces have potential to become platform to problematize social conditions and create alternative political space of change. This research propose a shared project for network of Hackerspaces and its community in East Asia that can build new commons to engage with the environmental issues with the global public and their respective local community.



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## Mission statement

Art in the realm of science and technology often oscillates between propagation and embodiment. There are art work that is made explicitly in alignment with the direction of a scientific community, or commissioned by a client for technical purpose. For example, graphic representation of bio-diversity in certain natural environment. That is an attempt at making an artistic representation of scientific fact and illustration of data. While that is ‘artistic’ in a certain capacity and meaning, art and artists have potential to make greater impact by embodying the science and technology and reflecting on what these practices leave out.

The common shortcoming of Art and Science project comes from underestimating realistic challenge of coordinating production of art work. It is not advisable to pair up artist and scientist to make new project together, unless there has been a growing trust between two parties over time. The historical examples, such as Experiments in Art and Technology from 1970s prove that art and science collaboration only happens when individuals from the distant fields are compelled to achieve something together. ‘Speed dating’ method of pairing artists and professional from another field will most likely lead to an immediate failure because their interest may not be aligned. The role of commissioning institutions is critical in managing schedule for collaboration and cooperation. Also it is important to set realistic expectations in terms of support from collaborating scientists and institutions. Some times, it is more effective to outsource technical development than developing in support of research institute.

The hybrid of science, technology and art does not happen easily or naturally. First of all, these disciplines have distinctive ways of engaging with the world. Science provides a way of analyzing the world. Technology is a way of examining and shaping the world. Art is a way of questioning the world.

Art project, that embodies science and technology can become a vehicle to change policy (thus politics of public space), affect human emotions (thus sublime experience as



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opposed to repulsion of documentary) and bring awareness in the general public (thus building public knowledge). This research will introduce some example of such project and reasons of it's meaning.

## Expected outcome

The primary outcome of the project is meaningful exchange between artists and local communities in East Asia about environmental concern, focusing on air quality. It will also serve as an opportunity for the commissioning organizations to build a creative platform for future collaboration. In turn, the participants can benefit from exposure to the wider audience and raise awareness about air quality.

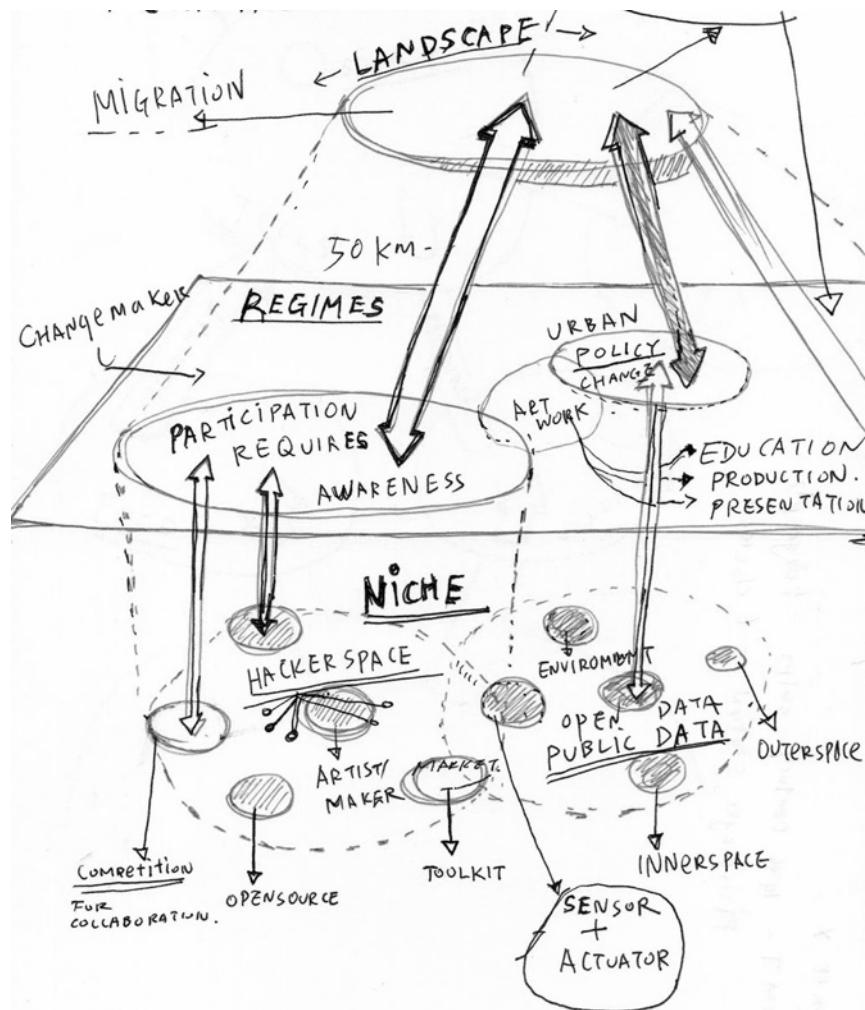
By combining scientific research and artistic intervention, the project will deal with issues of air pollution in cities from Korea, Japan and China. Participating artists and community will create original work that embody the technical and social possibilities. The final outcome will include original art work, custom tool kit (Software and hardware) and archive of public participation. It will also include photo and video documentation from the process as well as final presentation from competition. Artist and commissioning institution need to arrange key milestones for the project, especially to concentrate effort for press and media in three or less events throughout the whole project.

Artists have the imaginative skills that enable them to take affective actions even with minimal resources. Most artists that work on the intersection of art and social practice, operate with small budget and rely on support from the participating community and collaborators. Such free cooperation is only possible as artist builds trust with the community. One thing which can help artists to realize project efficiently in an environment that is foreign to her or him is to partner with local institutions and grassroots organizations. The commissioning institution, which has asked the artists to make work, can support the project by connecting with foreign organizations and community. Institutional support plays a big role in realizing projects that are primarily based on process and participation. In the end, what artists and institutions desires is to examine a



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common intersection of interest, which is minimal in execution with maximum effect in outcome. To make this happen, the institution needs to provide ample support for local research and community outreach and minimize administrative burden associated with realizing project in the public sphere, such as permits for access to space, safety of participants and etc.



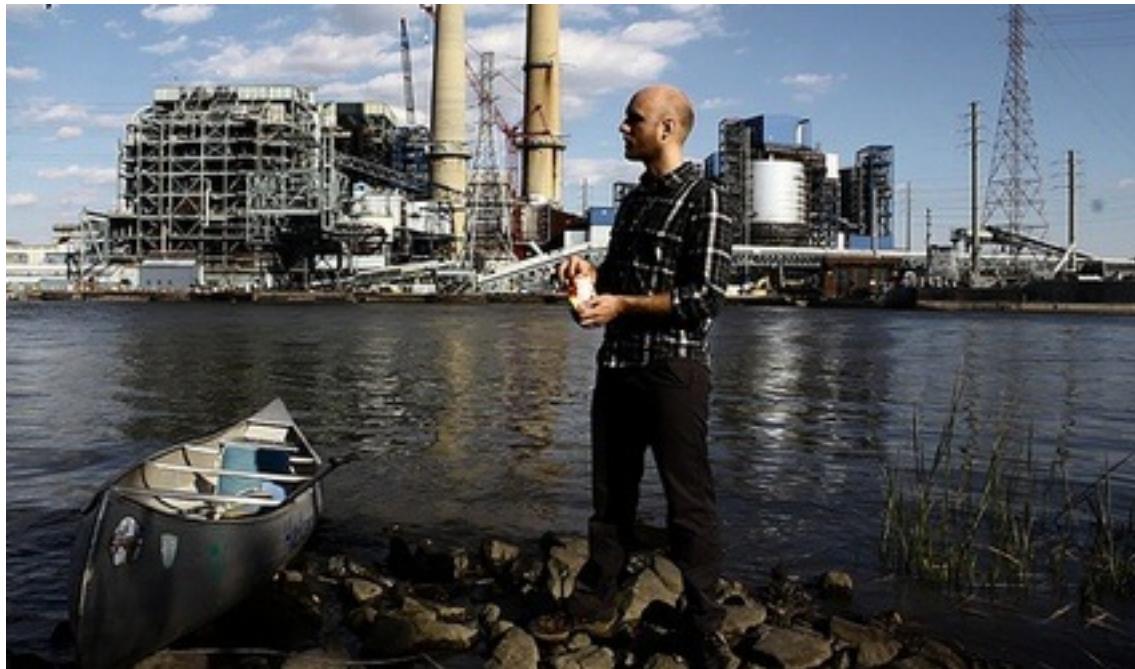
Projection of Green Living Lab's social impact.



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## Examples

Examples of artist working with environmental data and opensource technology.



Jonathan Cohrs<sup>2</sup> creates alternative narrative for production of collective memory around taste. BACK WATER follows a group of city dwellers as they spend 10 days exploring a new frontier of toxic waste dumps and abandoned factories. The team is confronted by natural elements such as wildfires and flood-tides, and as toxic spills threaten their water supply the fear of the mysteries this environment contains is palpable. As the journey travels downstream, an environment that initially felt inhospitable begins to feel more welcoming than the world that surrounds it. It is against this backdrop of birds and factories, open sky and highway overpasses, the explorers contemplate what it means to adapt and live in a man-made world, reminded of the contradictions inherent in such a landscape.

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<sup>2</sup> <http://joncohrs.com/>



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### Mary Mattingly's Mobile Architecture project

Waterpod™<sup>3</sup> was a floating, sculptural, eco-habitat designed for the rising tides. It launched in the summer of 2009, navigate down the East River, explore the waters of New York Harbor, and docked at several Manhattan piers on the Hudson River before continuing onward. The Waterpod™ demonstrated future pathways for water-based innovations. As a sustainable, navigable living space, the Waterpod™ showcased the critical importance of the environment and art, serving as a model for new living, d.i.y. technologies, art, and dialogue. It illustrated positive interactions between communities: public and private; artistic and social; aquatic and terrestrial while exploring the cultural richness of New York's five boroughs and beyond. By visualizing the future, the

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<sup>3</sup> <http://www.thewaterpod.org/>



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Waterpod™ embodied self-sufficiency and resourcefulness, learning and curiosity, human expression and creative exploration. Through its dilatory, watery peregrinations, the Waterpod's intent is to prepare, inform, inspire, provoke, and fortify humanity for tomorrow's exterior explorations.

## II. Activities

### **2014 Preliminary Plan for the project**

For its inaugural year, Green Living Lab will engage in issues of air pollution in East Asia by supporting artistic intervention in public space. Green Living Lab aims to promote public awareness of air pollution by embodying sociological and technical possibilities through artistic expression.

#### **Concept**

What is happening in the common space in the sky these days? What are the long term effects of air pollution in cities and rural area? What can we (artists and makers) do as civic participants, to examine effects of air pollution and make small changes that can lead to a lasting impact? This is a proposal for hybrid of art, technology, social practice that will foster new generation of citizen scientists and artist.

The project will develop tool kit that can aggregate large and complex data sets about air quality, through sensor input as well as connecting to the database provided by Green Technology Center and institutions affiliated with Green Technology Center.



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The tool kit will be initially developed by commissioning qualified candidate (potentially a group of media artist, hacker, developer), and expand with support of opensource community. The tool kit will be used as the principle building block for GLL's education program and mobile architecture in public space throughout later phase of the project. The first phase will complete with an open ended competition, geared toward young adults (age 15~25) in participating countries, will lead toward wider participation outside from diverse background.

## Participation

The professionals in the field of public policy, civil engineering and environmental science address environmental issues at large. The work of many artists and activists often attempt to make incremental changes with tools and resources available to them. There is also much important work conducted at the intersection of these fields, often without formal decisions to make quantified effects and sustained practice. The following are categories of work that need to be understood in order to contextualize the proposed project. These include:

- Work done by the governmental organization and corporations: Data collection, Emergency response, Policy change and etc
- Work done by non governmental, non for profit organizations: Scientific research, Press and media advocacy, Green philanthropy and etc
- Work done by activist and artists: interventions and creative process, exhibition and performance and etc

While such an arbitrary category limits appreciation of cybernetic potential to integrate varying levels of large and small impact, the three categories can be useful to think about realistic effect a project can have in short duration.



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It is important to avoid underestimating the complexities of issues related to the environment and what are known as ‘wicked problems’ These are problems without a single technical solution and the factors involved in the issues may often be in conflict with technical solutions to the other related issues. Thus, even though a specific environmental problem might require a response with a technical dimension, often these problems are not only related to science and technology, but also to a complex combination of social, cultural and political factors.

We must adopt a new notion of geography and attempt to map un-mappable territory. Some of the remarkable developments within science and engineering have been within open source and community engaged initiatives lately. They are initiatives that are not only technical, but also equally weighted to social and aesthetic purpose. Open source and community driven initiatives have huge potential (inspired by D.I.Y, Citizen science, Public access and etc) for developing a culture of public awareness and environmental stewardship and to augment human and natural coexistence.

### **Green Living Lab Tool kit**

Green Living Lab will commission an original tool kit, an opensource hardware and software package that serves as a wireless Input and Output board. The board can take sensor data of various environment conditions and can also control a range of actuators including motors and lights by using combination of microcontroller(Arduino or Teensy) and microcomputer (Raspberry Pi or alternative).

The Tool Kit consists of various environmental sensor, custom printed circuit board (shield) and a micro controller. Custom shield will be designed by the commissioned artist. Some elements of the kit will be produced specifically for the project in addition to the combination of mass produced modules available from various vendors.

The goal of Tool Kit commission is not to make yet another microcontroller or shields, but to bring together cost effective and time saving kit that many people can use to



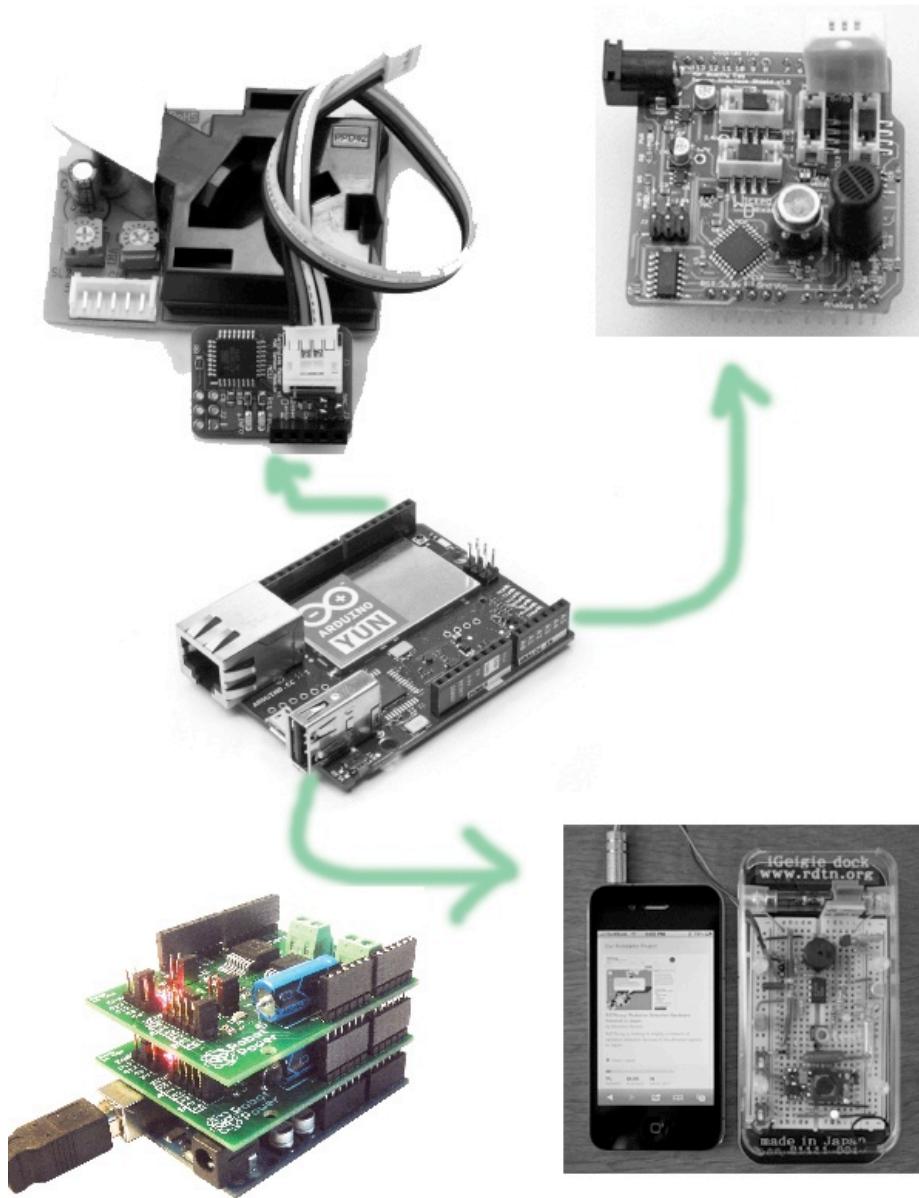
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understand air pollution. Thus product design and user interaction is equally important as technical development. Commissioning institution and artist will decide after initial prototyping stage one best strategy to use the existing resource and necessary custom development for the project. The Tool Kit is not an attempt to reinvent the wheel, but to bring many wheels together to bring accessibility into environmental sensing and deliver lasting impact on the public awareness.

Design and code of GLL tool kit will be published open source with credits to Green Living Lab and Green Technology Center in September, 2014.



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## **Input board**

Default sensors: Temperature sensor<sup>4</sup>, Carbon Monoxide sensor<sup>5</sup>, Humidity sensor<sup>6</sup>, Nitrogen Oxide sensor<sup>7</sup>

Add on sensors: Sulfur Dioxide sensor<sup>8</sup>. Geiger counter, Dust sensor: Shinyei Model PPD42NS Dust Sensor

Example: DIY Geiger counter

Tokyo Hackerspace launched the day after the disaster and has worked to expand the sensor network with Safecast<sup>9</sup> (formerly RDTN) and Geiger Maps JP, two sites that aggregate and visualize radiation data. The project focuses on collecting and distributing more up-to-date radiation information than is being released by the government in an effort to keep Tokyo residents calm<sup>10</sup>.

## **Microcontroller**

Function: To log data from Input board. The custom software will have default sketch to collect four sensor inputs, store data and broadcast to Green Living Lab website.

Platform: Arduino Yun and Raspberry Pi

Communications: Wireless shield for RF and Internet communication

“If you were to design a control panel for a microwave, you could use an AVR like Arduino. It could drive the LCD, interface with the buttons, and sense the conditions inside the

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<sup>4</sup> [http://www.st.com/web/en/catalog/sense\\_power/FM89/SC294](http://www.st.com/web/en/catalog/sense_power/FM89/SC294)

<sup>5</sup> <https://www.sparkfun.com/products/9403>

<sup>6</sup> <http://www.adafruit.com/products/386>

<sup>7</sup> <http://www.alphasense.com/index.php/products/nitrogen-dioxide/>

<sup>8</sup> <http://www.alphasense.com/index.php/products/sulfur-dioxide/>

<sup>9</sup> <http://rdtn.org/>

<sup>10</sup> <http://inhabitat.com/tokyo-hackerspace-develops-hacker-run-diy-radiation-monitoring-network-for-japan/>



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appliance. You could have also used a device like Raspberry Pi or BeagleBoard, but it would be overkill for the task. Now if your microwave needed a high resolution multi-touch LCD that Tweeted what you were cooking while checking your stocks”<sup>11</sup>

### Output board

Heavy Load Transistor: DC Motor control

Digital output Pulse width modulation

Shift register: extended digital output

Reference:



Air quality egg internal hardware<sup>12</sup>

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<sup>11</sup><http://www.adafruit.com/blog/2012/06/18/ask-an-educator-whats-the-difference-between-arduino-raspberry-pi-beagleboard/etc/>

<sup>12</sup><http://shop.wickeddevice.com/product-category/air-quality-egg/>



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A project aiming to give citizens a way to participate in the conversation about air quality. It is composed of a sensing device that measures the air quality in the immediate environment and an on-line community that is sharing this information in real-time. It is a community-developed, open source project that is driven by people who care about the air they breathe.<sup>13</sup>

### Functionality

GLL Tool Kit has three major functionalities that are designed to educate the people using the device. The primary goal of its function is to provide cost effective method for amateur participants to get complex data about air quality. These functionalities, as well as hardware and software specification is a preliminary draft designed as a point of reference, not a bill of material or design guideline.

Input module provides easy access to sensing air quality in areas where such informations does not exist or the information is difficult to obtain. It is important to design the Tool Kit for easy assembly and repair in case of hardware failure.

Processing module runs software to aggregate and process the collected data. The Tool Kit is provided with custom software and includes library and code examples in OpenFrameworks (C++ development library), Homebrew (Software package for Internet of things), and other languages that are geared toward beginners such as Python.

Output module actuates physical output, such as motor, light as well as transmission and communication over wireless network. It is most likely to be built on top of Arduino Yun and custom shield with discreet components. Hardware of each tool kit will cost roughly about \$250~350 per unit. The cost of production depends on the number of units produced in whole and it can be adjusted according to needs of the project.

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<sup>13</sup> <http://airqualityegg.wikispaces.com/AirQualityEgg>



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First prototype will be built from existing hardware and software platform. The primary source will be coming from Seeed Studio's Grove system<sup>14</sup> and Sensordrone<sup>15</sup>.

#### Environmental Monitor

Have you ever wanted to get your daily weather report based on data from your garden instead of obtaining a more generic report from your TV or mobile phone? Sensors in this category help you monitor and report on your environment with minimal effort. They can also help you chart everyday fluctuations in temperature, measure air quality, sense light, and assess other elements in your immediate environment.



Grove System.



Sensordrone.

<sup>14</sup> [http://www.seeedstudio.com/wiki/GROVE\\_System](http://www.seeedstudio.com/wiki/GROVE_System)

<sup>15</sup> <http://sensorcon.com/sensordrone/>



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## Data collection and outcome

Visual presentation from participants learning process is the primary goal of this project. Commissioning institution and executive committee will need to understand the project as artistic endeavor as opposed to technical challenge.

There are two kinds of data that will be available for participants. The primary data sets, provided by research institutions associated with GTC, will include macroscopic overview of air quality in the region. The data collected by participants and artists are also valuable source of material to incorporate into the narrative. The initial research and prototyping phase is designated to further exploration of the kind of data to be collected and its meaning. Select members from the executive committee will provide guide in defining the scope of data.

Currently, the input module has Temperature, Humidity, Carbon Monoxide, and Nitrogen Dioxide sensors as default. The list of sensors here is same as that of Air Quality Egg. It is the standard sensor input that can be collected with low cost sensors. I also suspect Nitrogen Oxide sensor and Dust sensor will be useful for use in East Asia. However, these list can only be final after in depth research in the current air quality sensing techniques and available tools. That is the task to be shared by executive committee, commissioned artist and commissioning institution.

The initial milestone for this project is creating a platform where participants can learn to visualize environmental data. The secondary milestone is to conduct workshops and other forms of public engagement that the participants can create narratives that will serve as a connection with the data. The narrative can be made in form of video, performance or game.

On the other hand, there is a clear educational agenda for the data collection. The education and participation will lead toward mapping the air pollution through interactive visualization. GLL Tool Kit and related workshops are platforms for new citizen participants



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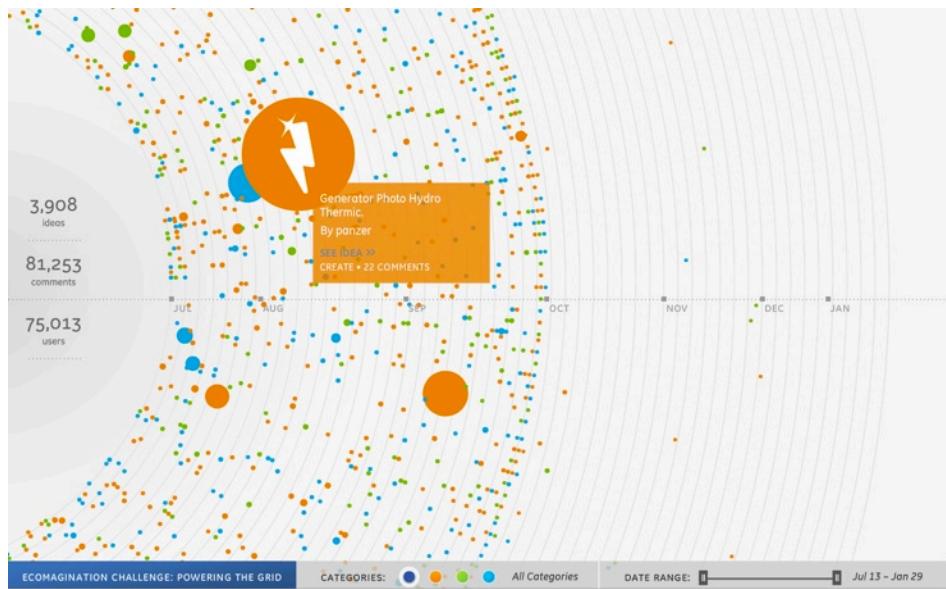
(students, artists, hackers and general public) to have a chance to build new perception and engage with the issues of air pollution in meaningful ways.

Expected outcome will be dynamic website that composites various visualization from participants, video of projects in use and physical prototypes of actuators in installation.

The idea of a new geography incorporates a map of open data, a growing list of practitioners, and a space for experimentation and fruitful failure. Mapping, not in the sense of cartography, but to connect dots in far away places. Mapping in a sense of using technology to address social issues, and to engage a social strategy in a way that addresses the shortcomings of science. That kind of mapping is done by artists, social workers, teachers and activists. Artists can address environmental issues in ways that scientists are not aware of. Artists work in the space of culture, they build new images and stories of reality as well as developing a social fabric in ways that scientists cannot. This project address the gaps and shortcomings of science, aiming to augment it, provide new ways of engaging with traditionally scientific issues and work symbiotically with scientist.



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Data visualization includes GE's Data visualization challenge<sup>16</sup>.



Air quality balloons<sup>17</sup>

<sup>16</sup> [http://visualization.geblogs.com/visualization/ecomagination\\_challenge/](http://visualization.geblogs.com/visualization/ecomagination_challenge/)

<sup>17</sup> <http://www.instructables.com/id/Air-quality-balloons/>



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### GLL Tool kit developer's role and responsibility:

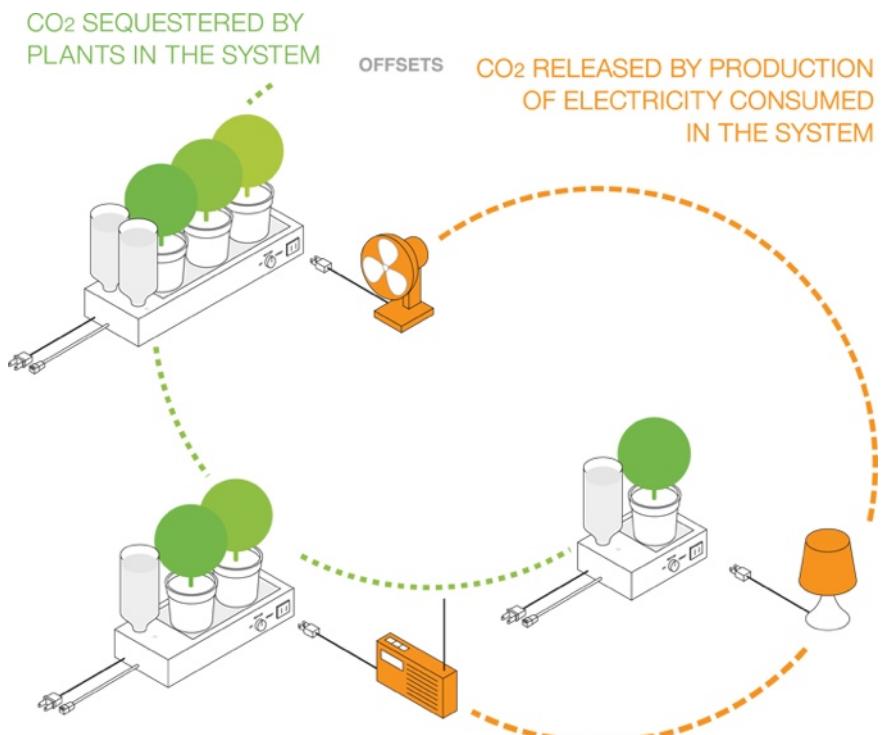
Role	Responsibility
Technical team	Hardware design and prototyping. CAD and EAGLE. Software design: C++, Python, Arduino
Design and storytelling team	Storytelling team makes technology and design available to the public. Role of storytelling team includes copy editing and live archiving through blogging and social media. Storytelling team may be one person if they are qualified for rapid communication and responsible.
Project manager	communication between GTC, executive committee and artists and participants.

Reference project:





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Usman Haque's Natural fuse<sup>18</sup> is a micro-scale carbon dioxide overload protection framework that works locally and globally, harnessing the carbon-sinking capabilities of plants. Generating electricity to power the electronic products that populate our lives has consequences on the amount of carbon dioxide present in the atmosphere, which in turn has detrimental environmental effects. The carbon footprint of the power used to run these devices can be offset by the natural carbon-capturing processes that occur as plants absorb carbon dioxide and grow. "Natural Fuse" units take advantage of this phenomena.

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<sup>18</sup> <http://www.haque.co.uk/naturalfuse.php>



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"In Open Burble<sup>19</sup>, members of the public come together to compose, assemble and control an immense rippling, glowing, bustling 'Burble' that sways in the evening sky, in response to the crowd interacting below. This massive structure, the form of which the public has themselves designed, exists at such a large scale that it is able to compete visually in an urban context with the skyscrapers that surround it."

## Education

Research and development of the tool kit will be undertaken by groups of artists and hackers for a period of one month in May, 2014. Their contribution will be made open source by commission for the GLL Tool kit. It will also be used as the core material for a competition for citizen participants to make positive change in their local environment. GLL tool kit will be used as the primary teaching tool for a wide range of local participants in target cities in East Asia. Educational outreach holds great importance in Green Living Lab. It will host intensive training sessions in software and hardware development to access environmental data of the neighboring region. Green Living Lab will engage participants

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<sup>19</sup> <http://www.haque.co.uk/openburble.php>



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from three Asian cities and special focus will be given to young adults and university students as the potential participants.

The tool kit can be used to answer following questions.

- What kind of data can be collected from the environment? (especially regarding air quality)
- How does scientific institutions collect data and how is it managed?
- How to aggregate various data and make it meaningful?

The aggregated information and documentation will be published in GLL website. The website can use Internet of Things service such as Xively to connect different data sets to the overall map.

#### **Education team role and responsibility:**

Utilize GLL tool kit to teach about environmental issues and encourage participants to take actions in their life.

Team of 3 educators will take role of lead teacher, technical support and documentation and communications expert. Each educator will engage with the participants through hands on activity. University students can be lead by an experienced

Example:

The Scrapyard Challenge Workshops<sup>20</sup> are intensive workshops run by Jonah Brucker-Cohen<sup>21</sup> and Katherine Moriwaki<sup>22</sup> where participants build simple electronic projects (both digital and analog inputs) out of found or discarded “junk” (old electronics, clothing, furniture, outdated computer equipment, appliances, turntables, monitors, gadgets, etc..).

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<sup>20</sup> <http://www.scrapyardchallenge.com/>

<sup>21</sup> <http://www.coin-operated.com/>

<sup>22</sup> <http://www.kakirine.com/>



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So far the workshops have been held 58 times in 14 countries, on 5 continents with 3 different themes including the MIDI Scarpayard Challenge where participants build simple musical controllers from discarded objects and “junk”, DIY Wearable Challenge where they create wearable tech projects from used clothing, and the DIY Urban Challenge where they work on public space interventions and other projects.

#### Central Park Zoo: Electronic Design & Construction



This workshop focuses on the creative use and misuse of recycled electronics, gadgets, computers and their integration with urban wildlife. Students are exposed to methods of dismantling old technology and reinventing new forms of interfaces that could interact with urban birds both in their original habitat and within the zoo environment.



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### Mobile architecture

Green Living Lab will host public events (intensive education sessions, community lectures, public performance) in a mobile architectural unit that responds to environmental data and human presence through GLL tool kit. Mobile architecture is designed as a spatial interface between community and the environment. The space within Mobile architecture needs to be configurable according to the needs of installation and performance that engage with the audience. Mobile architecture will provide facility for participatory workshop for university students and local community. It is a space for creative inquiry into examining changing environmental landscape. As an art work, mobile architecture of GLL have a potential to become platform to problematize social conditions and create alternative political space of change. The specific design of mobile architecture will be determined by vision of the participating artist and local situations, and it should reflect the overarching theme of GLL's propositions for social change.

Mobile architecture team role and responsibility:

Role	Responsibility
Architect	Design mobile architecture unit from the guideline from GLL to design and fabricate low cost
Technical team	Integration of architectural design, rapid prototyping and fabrication into GLL Tool kit
Shipping team	Transportation and repair of the mobile architecture unit.

Reference:

Advisory research



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CTR Form<sup>23</sup>, SOA<sup>24</sup>

Reference project:

The Sprachpavillon was the central element in a touring exhibition in Austria as part of the 'European Year of Languages'. The pneumatic form provides an soft interface between the interior and exterior spaces which activates the surrounding urban context through subtle natural and dynamic artificial lighting. The internal media terminal represents an experimental approach to the expression of languages in a visual context through means of architecture/design, film, and typography. The architectural, graphic and human entities revolve and interact around this point in space eliminating borders, boundaries, and obstacles and thus emphasizing the fluidity of space itself.<sup>25</sup>

## Competition

Executive committee, comprised of International artists, engineers, policy makers will spearhead competition process. They will advise the project and serve as judging committee for the competition. The competition will be targeted toward university students in 5 universities in South Korea. Their challenge is to create an open source project that use GLL Tool Kit to express possibilities to build public awareness of air quality.

Intensive workshop session on 8.10~15 will prepare the participants for the competition. During that time, participants will learn to use GLL Tool Kit and build team work to prepare for the competition. The competition entry will need to have following items.

- Proof of original concept from writing, diagram or illustration
- Working prototype for the concept and application
- Documentation of real life implementation of the project in local community

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<sup>23</sup> <http://ctrplus.com/>

<sup>24</sup> <http://www.societyofarchitecture.com/>

<sup>25</sup> <http://www.veech-vma.com/2008/exhibition-event/sprachpavillon-inflatable-mobile-structure/>



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When starting an interdisciplinary project as such, the group of people involved in the project must examine flexible systems to measure the success and shortcomings of the project. Unless the project has a very clear goals about its objectives and outcomes, it is easy to under appreciate small successes made throughout the project, or overrate small victories that will not lead to substantial change. An example of a measuring system for participatory art is primary qualitative results based on quantitative framework. It can be about a number of visitors to the space and the average time which they spent at the laboratory in relation to the quality of work produced for and at the laboratory. It is also important to assess progress of participants in reference to their initial visit and early assignments as opposed to generalized notion of good, bad or so so. Thus the idea of competition becomes problematic in this kind of work, where the winner (who may have the most clever idea or beautiful execution) is awarded with cash compensation.

### Evaluation

The niche created by the GLL project is mainly hacker space in mobile architecture unit and tool kit which can collect and activate environmental data. The regimes affected by the niche is creation of original art work, possible change in urban policy and fostering of new public. These issues will build toward changing landscape, reflecting migration of avian species, and other environmental change.

As a project that challenges convention of art in the public space, there are opportunities to invert such dichotomous division between winning and losing, good and bad and attention and neglect. One strategy is to make a system where everyone who has participated gets some kind of award, a system where participating matters more than winning the first place. Art hack day is an example of more horizontal method in having rapid collaboration on art and technology. Another option, less horizontal however possibly more acceptable than juried competition, is to have a peer review system where participants vote on project ideas, game mechanics such as 'not allowing participants to



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'vote for their own project' may be effective as well. And from that point, when an idea is selected on popularity, everyone in the program may participate in one of the projects. At the point of selection, there may be a leader in the project, possibly someone who proposed the project in the first place, but they may well be managed by a group of directors, and work on collaborative project. The shortcoming of this method is that clear division of labor and specialty makes this likely method of dividing into familiar jobs which they created in short time's notice.

The number of competition participants must be addressed. There are alternative models of competition, where the focus is not about winning prize but to create a sense of community and support dialogue. A competition may result in conference. An outstanding example is 7/7 curated by New Museum in New York City, where they pair up an artist with a technologist for a day long collaboration. The following day is framed as a symposium of ideas, presenting experimental thoughts that could otherwise would not have out.



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### III. Organizational Structure

#### The role of the Executive Committee

Role	Responsibility
Artist	As an International artist working on the intersection of art, technology and environment, the artist will provide advise for aesthetic and poetic elements of the project. Artist will also be available for consultation regarding performance and exhibition of the competition.
Scientist	A scientist or engineer working in the field of environmental science with expertise on air quality in East Asia. Ideal candidate will have field experience in monitoring and interpreting air quality data, and can provide technical and conceptual guideline for artists in charge of GLL tool kit. Scientist will also be available for public lecture hosted at GLL mobile architecture unit.
Policy maker	A policy maker working in the field of Environmental conditions and international relations. Policy maker will guide artists and participants to make realistic propositions for their ideas to take shape in the world. Policy maker will also be available for public lecture and consultation.

Executive committee are three or four expert who are inspired to support public awareness of environmental issues and will offer guide to participating artists and public through



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public lecture and mentorship. Their major contribution will also include judging participants work for final competition.

Reference for Role and Responsibility:

Canary project: <http://canary-project.org/>

Margaret Palmer: <http://www.palmerlab.umd.edu/>

Center for urban pedagogy: <http://welcometocup.org/>

These candidates are reference to find local (Korean) candidates.

#### **Expected budget:**

Total budget: 50000000 won

Coordinators: 2 person. 7 months contract (5.15~9.15): total 10000000 won

Coordinator R&R: 1 person is in charge of communication between many figures involved in the project, 1 person is in charge of technical support for artist, educator and architect.

Commissions: Tool kit + Architecture + Education - total 25000000 won

GLL Tool Kit R&D: 10000000 won

Architecture: 10000000 won

Education: 5000000 won

\*Artist/Architect/Educator's fee do not exceed 20% of their commission budget.

Remaining budget is allocated for production, design, and transportation. These three categories may be given to a single entity: research group, hackerspace or studio.



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However, it may well be divided into two groups, one focusing on Tool kit and another focusing on architecture and education.

Competition(citizen workshop (including competition): 15000000 won

\*Competition budget includes cost of campaign, intensive workshop and prize as well as PCO company.

Executive committee: 3 persons- total 5000000 won

\*Executive committee is provided with symbolic honorarium, not salary.

## IV. Membership for Participants

### Requirement

University students or young maker/ artist/ hacker.

Must come in as a collaborative team or come as individual who are looking to be part of new collaboration.

Interested in Green technology and environmental issues.

### Schedule

4.1~5.22: Preliminary research

5.23~6.1: Search and hire 2 coordinators

6.1~5.9: Search and contact artist, architect and educator to execute the project

6.10~7.30: Commission and delivery of GLL Tool Kit and GLL Mobile Architecture

8.1~8.15: Commission GLL Education program



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8.20: Open call for participants

8.20~25: Education program in Seoul, South Korea with artist, architect, educator

9.1: Competition deadline

9.10: Competition ceremony

## V. Future plan

2015

In 2015, upon execution of GLL version 1, the next step will be collaboration with Chinese hackerspaces and institutions.

The complex paradox of Chinese air pollution is the result of heavy use of coal and rapid industrialization. The complex second life of electronic objects in India are result of economic necessity. Korean urbanization is leading an intense disparity between urban and rural areas. Massive plans for river and water development are leading to unforeseen change in ecosystem. As creative inquiry into examining changing landscape, hackerspaces and makerspaces have potential to become platform to problematize social conditions and create alternative political space of change. On that note, I propose realistic prospects to consider for this project.



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New Chinese Creative Maker culture is blooming. There are Nanjing makerspace<sup>26</sup>, Beijing makerspace<sup>27</sup>, Leiphone maker page<sup>28</sup>, Xin Che Jian Hackerspace<sup>29</sup> Chaihuo Makerspace<sup>30</sup>, Tsinghua University<sup>31</sup> to name a few. Chinese makers are producing interesting projects on the borderline of products and creative exploration of technology. Air Quality Kite<sup>32</sup> is a good example of local projects that are responding to the need of community awareness of environmental change. Air Air<sup>33</sup> is an auxiliary product for smart phone users to get sensor data of their air and living environment. Also there is a project which mixes fashion with environmental awareness but having plants in side of clothes with Wearable Computing<sup>34</sup>.

#### Example project

Haze霾 is a wearable air quality detector, which is a strong appeal for people to pay attention to issues of air pollution, a very serious issue facing China today.<sup>35</sup>

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<sup>26</sup> <http://www.do-idea.org/>

<sup>27</sup> <http://www.bjmakerspace.com/>

<sup>28</sup> <http://www.leiphone.com/tag/%E5%88%9B%E5%AE%A2>

<sup>29</sup> <http://xinchejian.com/>

<sup>30</sup> <http://www.chaihuo.org/blog/>

<sup>31</sup> <http://blog.chinamakerspaces.org/>

<sup>32</sup> <http://www.chaihuo.org/blog/archives/2424>

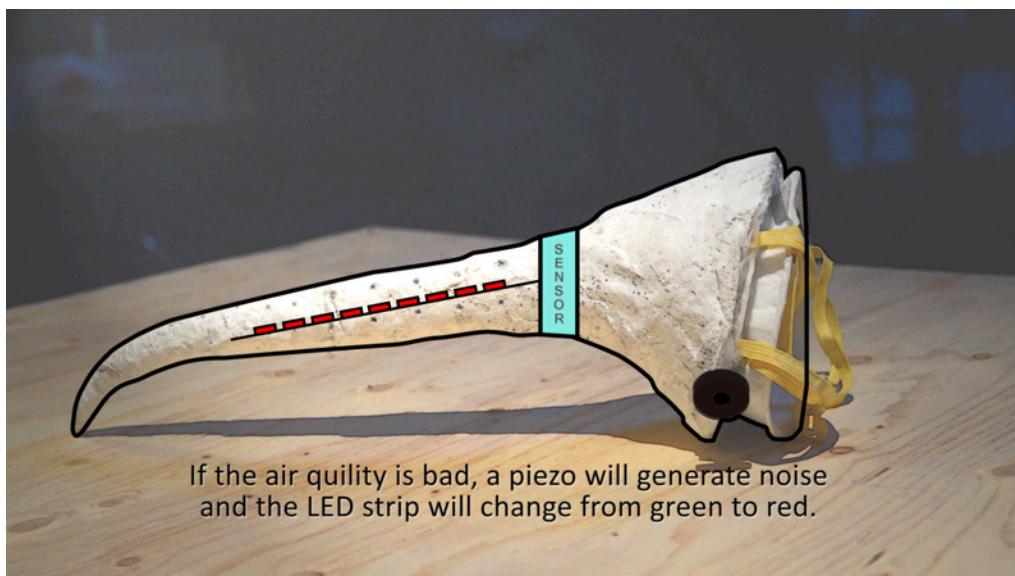
<sup>33</sup> <http://www.airair.info/>

<sup>34</sup> <http://blog.chinamakerspaces.org/?cat=260>

<sup>35</sup> <http://www.oxxv5.com/Haze>



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Shanzai culture is celebrated by the local makers as well as overseas maker taking advantage of economic custom fabrication. Taking its name from the city of Shenzhen, Shanzai are knock off products as well as one of kind custom products. As the electronics become increasingly modular and interchangeable toward global standard, it is becoming



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easier to prototype an interactive hardware/ software with very little experience. Shanzai promise new kind of custom fabrication, ‘on demand’ electronics and software.

"Shenzhen is a unique environment for passionate makers with an entrepreneurial spirit. The region displays an open manufacturing culture (called Shanzhai) that is aligned with the open-source spirit of the global maker movement. Shanzhai manufacturing culture is characterized by autonomy, openness, and agility. It works through an informal, highly distributed social network of factories, design houses, component markets, vendors, and assemblers"<sup>36</sup>.

India has a diverse kinds of makerspaces that have been operating for few years. In case of New Delhi, there are Headstart Hackerspace, Moonlighting Delhi, Sarai and WhitehatGuru.ne. Another fascinating aspect of Indian maker culture, driven and maintained not only by planned obsolescence, there is a large population of garbage picker and fixers. Thus the production and transportation of E-Waste can have different meaning to India.

2016

In 2016, there will be even more opensource works done by hackers and community members around the world. The impact and efficiency of such project varies greatly from place to place. At any rate, mobilization of collective R&D envisions alternative to centralized work done by governmental or academic institutions.

Green Living Lab will continue with collaboration with East Asia and beyond. There are remarkable initiatives in Australia and New Zealand. For example, Carbon Arts Is an Australian based curatorial initiative by Jodi Newcombe.<sup>37</sup> Tega Brain creates interactive installation reacting to environmental data and changing landscape.

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<sup>36</sup>[http://www.slate.com/blogs/future\\_tense/2014/04/06/shenzhen\\_maker\\_faire\\_manufacturing\\_hub\\_is\\_also\\_home\\_to\\_the\\_chinese\\_diy\\_movement.html](http://www.slate.com/blogs/future_tense/2014/04/06/shenzhen_maker_faire_manufacturing_hub_is_also_home_to_the_chinese_diy_movement.html)

<sup>37</sup><http://www.carbonarts.org/>



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### Example project



Tega Brain's Coin-Operated Wetland partners a laundromat with a wetland system. 'Like wetlands all over the world, this one has been in a difficult relationship with humanity for years, filtering water, making it drinkable again, only to be called "a nasty swamp" and threatened with development. Can the wetland find a secure domestic arrangement within the charming laundry?'<sup>38</sup> She has also run fishing for environmental data workshops.<sup>39</sup>

On the other side, critical exploration can take tactical turn, such as works by Superflex.  
<sup>40</sup> Another example is Angelo Vermeluen runs Biomodd workshops that partners biology

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<sup>38</sup> <http://tegabrain.com/Coin-Operated-Wetland>

<sup>39</sup> <https://vimeo.com/19349234>

<sup>40</sup> <http://superflex.net/tools/supergas>



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with computational systems devised from e-waste<sup>41</sup>. Futurefarmers is a collective that creates new system for public engagement and research.

“A temporary public art project that coincided with the Environmental Protection Agency’s National Brownfield conference and the city of Philadelphia’s 2015 Green initiative. A windmill-powered architectural intervention, Soil Kitchen rehabilitated an abandoned building into a multi-use space where citizens enjoyed free soup in exchange for soil samples from their neighborhood.”<sup>42</sup>

At this phase, Green Living Lab will sustain its research and public outreach efforts with support of Green Technology Center and other partnering institutions.

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<sup>41</sup> <http://www.biomodd.net/>

<sup>42</sup> <http://www.futurefarmers.com/#projects/soilkitchen>