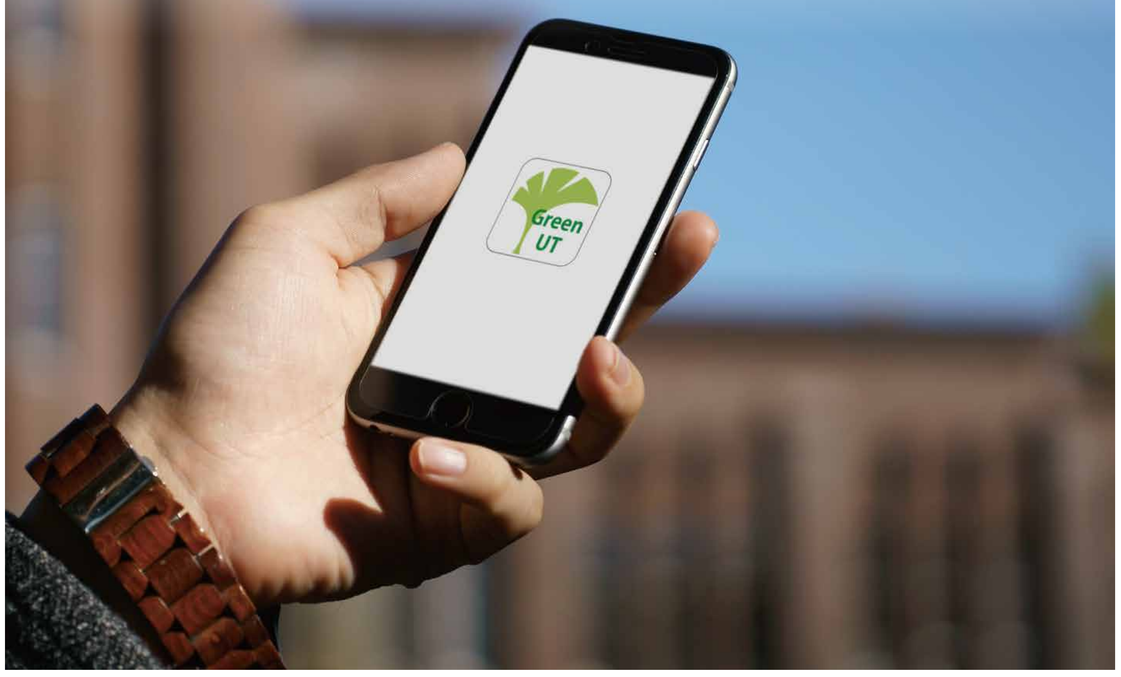
APP for Green UT



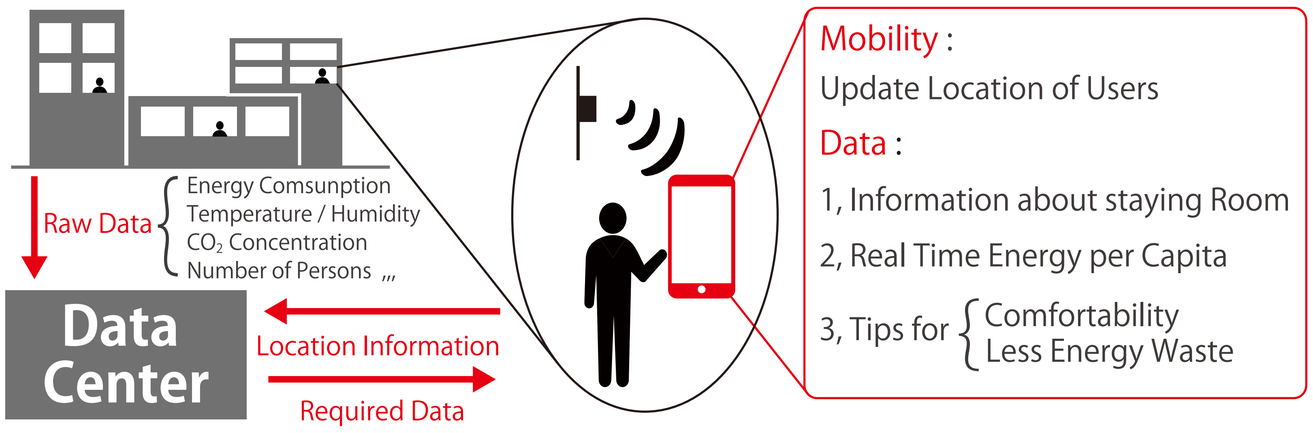
Credit

TSCP Student Committee
The University of Tokyo,
Graduate School of Engineering,
Department of Architecture, Akashi Laboratory
宮田翔平 Shohei Miyata
川崎裕太 Yuta Kawasaki
The University of Tokyo, Faculty of Law
宮本知典 Tomonori Miyamoto

APP + Evaluation = Less Energy Waste + Comfortability

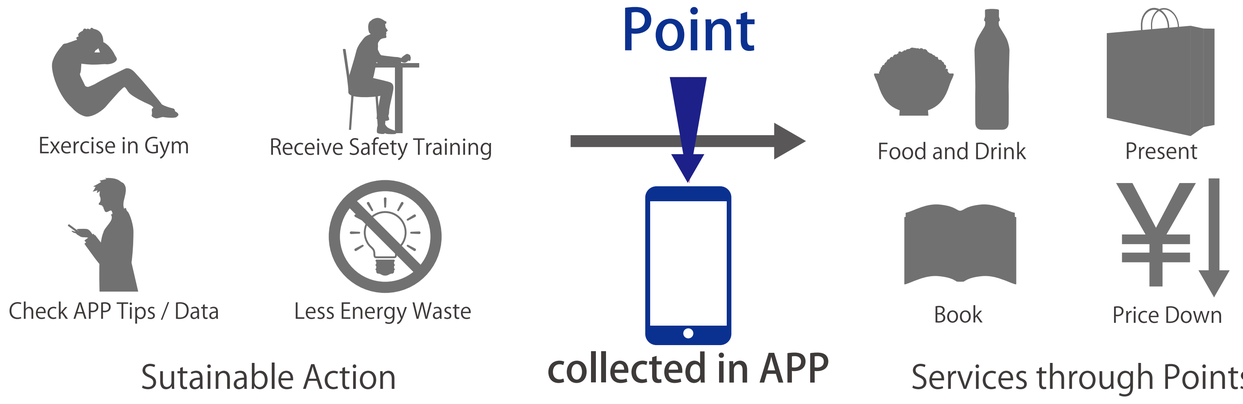
APP

Our proposal is a system which encourages campus constituents to take sustainable action with the App for smartphone. Installing sensors (thermometers, hygrometers, Beacon, etc) and applying unified protocols to each sensor, we get room energy consumption data, environment data and each user's positional information. By these data, we evaluate the environment and energy consumption of the room and offer valuable data to each user. For example, based on the data, the App will inform the users of the tips on sustainable action.



Evaluation

In order to make the users to be willing to take the sustainable action, you need some incentive. Of course, we also consider the incentive in our proposal. In the App we are developing, you can store and use points. You will obtain points if you take some relevant actions which contribute to sustainability - less energy consumption, healthy, safety and intellectually productivity. For example, you can get some points if you go to the gymnasium, attend a safety guidance, walk a lot, check the Tips on sustainable action, reduce energy consumption, or improve the air environment in your room. And you can use the points to buy some goods in the school store or get large serving in the cafeteria.



Intellectual Productivity

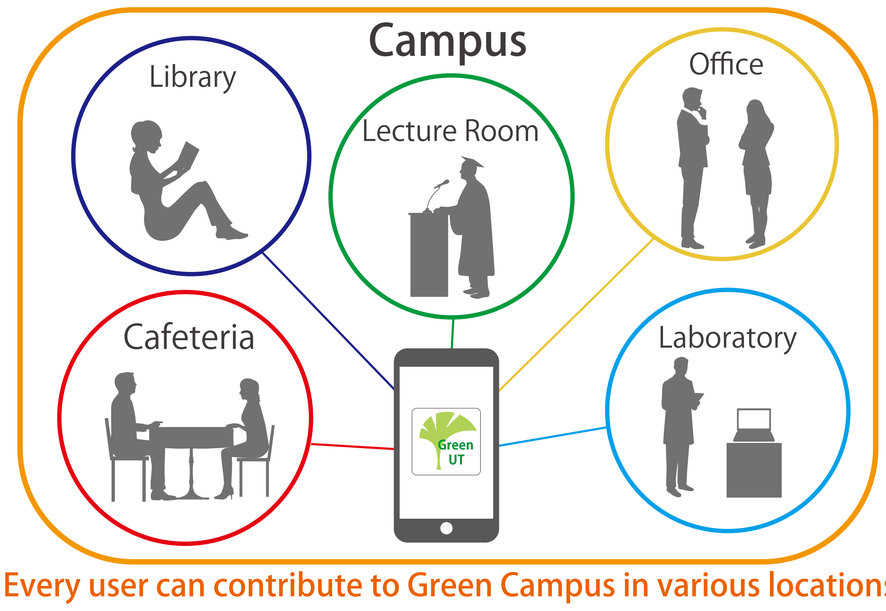
tips for controling air-condition

Health

recommendation for exercise, healthy food

Safety

advice about how to use experimental devices



Every user can contribute to Green Campus in various locations

Today, most of constituents of the university of Tokyo have a smartphone. If we give the members some information like a notice of waste energy or an advice to ventilate on their smartphones which are connected with protocols in each room, we can encourage them to do sustainable action efficiently.
To realize this idea, we will develop a new system and application.
In order to encourage campus members relevant action, we will evaluate their behavior from some measuring data and a questionnaire. By saving electricity bill, we get financial resources and give exemplary members some goods and services as an incentive to do sustainable action.
As preparation activity, we introduce the systems and application to the Chemistry Building and hold a Green Labs competition in this building. Specifically, we promote "lower the sash" and the appropriate use of air conditioner.
By this project, we intend not only improve the conditions of this building but also make the use of this experience and improve the function of the appreciation.
Eventually, we aim to introduce this system and application to whole campus.

Project Flow

Apply for Global University Climate Forum

Global University Climate Forum is an event where many students from all over the world gather to realise sustainable society. It is held by IARU(International Alliance of Research Universities) and ISCN(International Sustainable Campus Network).
We, TSCP (UTokyo Sustainable Campus Project) Student Committee, have got the chance to participate it.

Project Scheme

We aim to construct a project which make our campus sustainable with involving many students and the faculty. In this project, we are going to publish an application for smartphone which helps us behave more sustainably, and construct a system which diffuse the application into whole campus.

Cooperate with TSCP

It is indispensable to cooperate with TSCP. TSCP (UTokyo Sustainable Campus Project) is a fomal organization which aims to achieve low-carbon campus. In the phase we implement the project, it is necessary to cooperate with TSCP. In present, we have discussed many times and developed the project.

Analyze CO2 Emission in Campus

We made a model to visualize CO2 emission in campus (picture above). We found that experimantal buildings emit more CO2 than non-experimantal buildings. TSCP has tackled to reduce energy consumption in non-experimantal buildings, therefore to reduce CO2 emission from experimantal buildings is important in present.

Green Labs Competition

At first, the application will be implemented in experimantal building - Chemistry Building. We will develop the application through this trial. The applicaiton facilitates users to behave more sustainably - reducing energy for lighting and air conditioning, and improve indoor air quality. We are going to hold Green Labs Competition - a competition to assess how much laboratory menbers contribute to sustainable campus - in Chemistry Building. We also aim the application to be used widely.

Discuss with the faculty in Chem Bldg.

To implement Green Labs Competition, it is necessary to obtain periossion and cooperation from the faculty in Chemistry Building. Therefore, we had meetings with professors who are representatives of the building. In that meeting, we explained the project and professores were cooperative. We found that users (the faculty and students) are also interested in the way to live and study sustainably, and this application will be acceptable to the users of Chemistry Building.

present

Contents of APP

Three functions blow are main contents of the app.
1)System to assess sustainable behaviour
2)Tips to help sustainbable behaviour
3)Extra function convenient for campus life
1)To facilitate sustainable behaviour is the most important purpose in this project. Behaviour evaluation in terms of sustainability can be a guideline for sustainable behaviour. In present, we are developing evaluation system in terms of not only energy saving but also commuting and recycle.
2)In the meeting with professor in Chemistry Building, he advised us that what to do specifically should be arranged systematically. We are going to install them as 'Tips' in the application.
3)Any applycation would be meaningless if it is not usually used. Auxiliary functions which support campus life will be added. This will help the application be installed widely.

Incentive

Incentives for sustainable behaviour will help the application be used by more people. To make waste less, it is important to take care of waste everyday. Therefore, incentives which facilitate users to use the app everyday are desireable. For example, we can get discount ticket for cafeteria. It is important to design fair exchange system between sustainable behaviour and incentives. Of course, we are going to cooperate with oelated organizations in campus.

Install Sensors

To amplify energy conservation and intellectual productivity, we are going to install sensors for temperature, humidity, CO2 concentration, and positional information. Each sonsor can contribute to sustainability, and some papers show it. Some problems will be found through the implementation, and we will develop the system as the solution.

Construct Network

In this Campus, "Standard-Data-Model for Wide-Area-Network of UT " is drawn up by Woking Group for Examination of Telecommunication Regulations managed by TSCP.
This model shows the form of data collected by BEMS (Building Energy Management System) and enable to manage and control big-data and server easily. Spreading this model is needed to check and calculate Energy Comsunption and control some building equipment with APP.

Develop APP

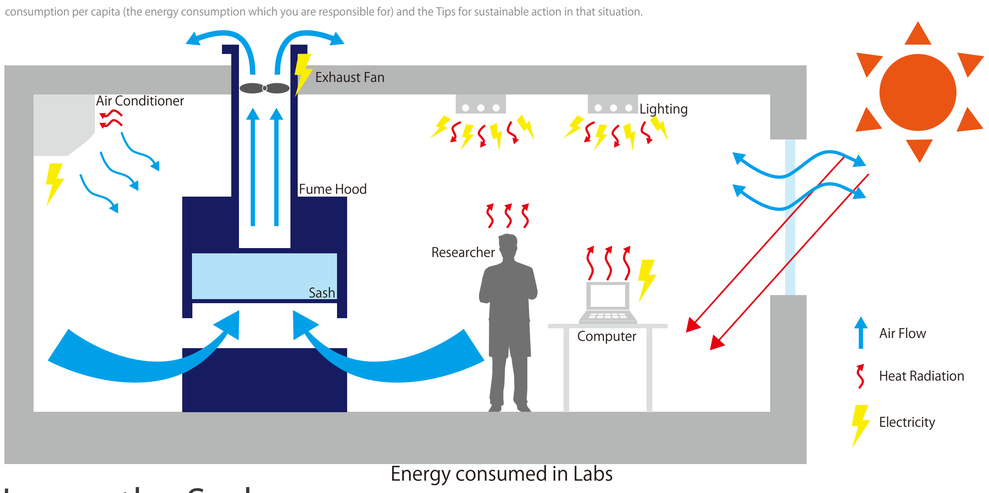
We plan to develop APP with labolatory of Information Science and Technology. For this laboratory, through developping APP, research about APP contents and user-interface can be conducted.
Eventually, this project is conducted with company familiar with APP technology.

Spread APP for all members in Campus

In final target, APP is aimed to be available for all members such as students, faculty and other office-workers in Campus.
In addition, This system can be available for research subjects for various fields and based on these research results, APP will be improved in the future.

Experimental Building + APP for Green UT

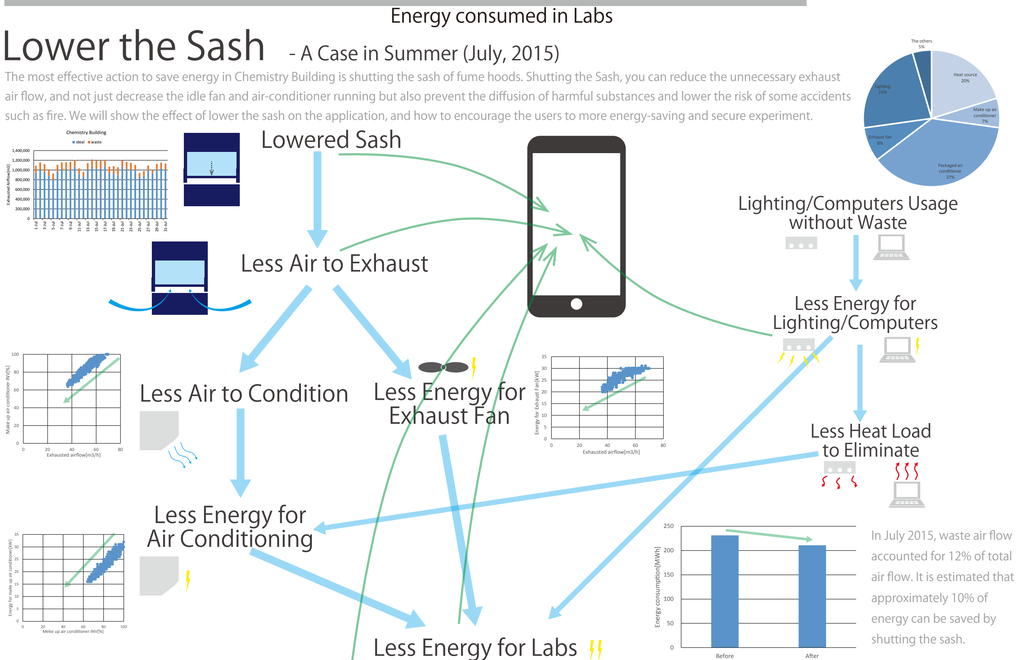
As the first step, we will install the system and the application in the Chemistry Building. In the chemistry laboratories, the App will inform the users of the potential for reduction of the energy consumption by shut the sash of Fume Hoods in the room. This will encourage the users to shut the sash. If you are in just a classroom without fume hood, the App will inform you of the energy consumption per capita (the energy consumption which you are responsible for) and the Tips for sustainable action in that situation.



Energy consumed in Labs

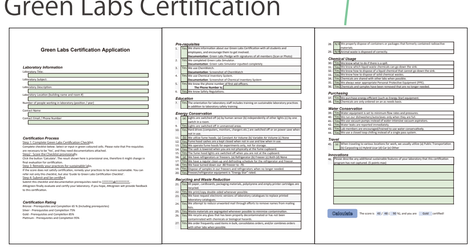
Lower the Sash - A Case in Summer (July, 2015)

The most effective action to save energy in Chemistry Building is shutting the sash of fume hoods. Shutting the Sash, you can reduce the unnecessary exhaust air flow, and not just decrease the idle fan and air-conditioner running but also prevent the diffusion of harmful substances and lower the risk of some accidents such as fire. We will show the effect of lower the sash on the application, and how to encourage the users to more energy-saving and secure experiment.



In July 2015, waste air flow accounted for 12% of total air flow. It is estimated that approximately 10% of energy can be saved by shutting the sash.

Green Labs Certification



Green Labs Certification is a system which assesses experimantal laboratories in terms of not only energy consumption but also chemical usage and recycle, and so on. We can learn how to study sustainably throught this certification.

Education

APP + Safety Training

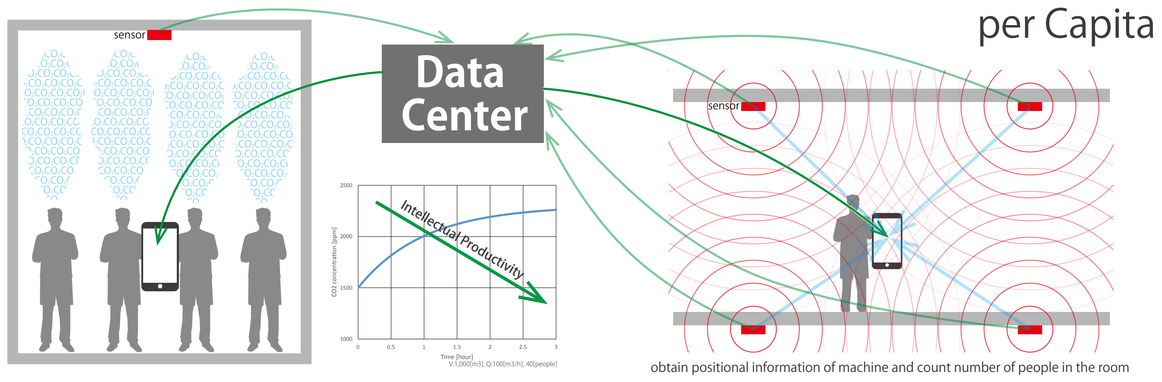
APP + Tips for Sustainability

At the annual safety training for learning chemical usage, we are going to explain that the action for safety such as lowering sashes can contribute to save energy.
In addition, we are going to show systematically how to live and study sustainably in campus. This will help understand what we should do for sustainable campus.

Non-Experimental Building + APP for Green UT

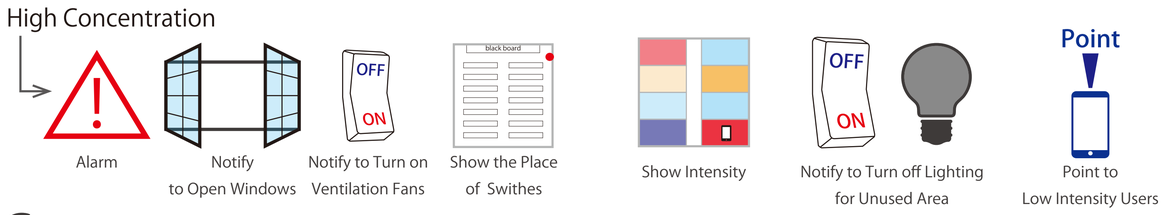
CO_2 Concentration Control

Energy Consumption per Capita



obtain positional information of machine and count number of people in the room

High Concentration



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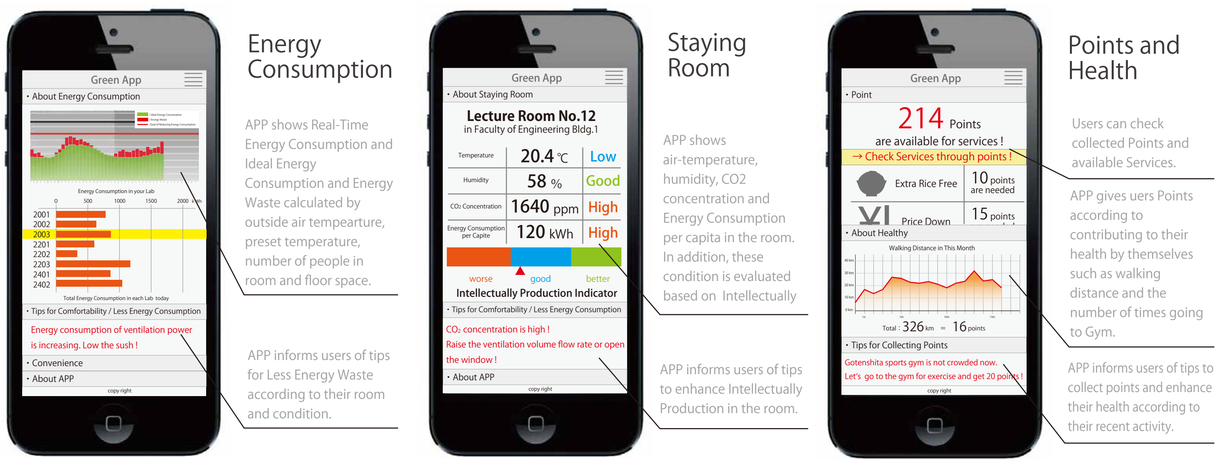
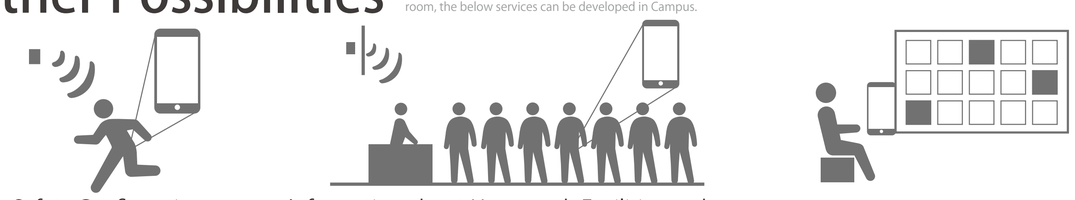


Other Possibilities

This APP can be available for other services except for the above contents. Particularly, with APP function of using number of people in the room, the below services can be developed in Campus.



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