How will emerging Science and Technology like AI-IT affect climate change policy?

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志ある卓越。　東京大学　THE UNIVERSITY OF TOKYO　Discover Excellence.

Expectation and Existing Gaps

➢Facing the global issues, people expects policy and emerging science and technology to provide solutions.

➢However, gaps exist everywhere.

☞Global issues like climate change need urgent action.

☞Society, policy and STI interact speedier. Policy is divided in layers and fields.

☞Emerging science and technology have intrinsic problems.

☞Global issues, policy, science and technology are discussed disciplinarily and non-holistically.

Climate change is an urgent issue

EDITORIAL

Time's up, CO₂

orty years ago this summer, a small group of atmospheric and ocean scientists met in Woods Hole, Massachusetts, to project the future influence on Earth's climate from atmospheric releases of carbon dioxide (CO₂) from fossil fuel combustion. Frank Press, head of the United States Office of Science and Technology Policy and Science Adviser to President Carter, requested that the National Academy of Sciences conduct the study for the benefit of policy makers. On the basis of then-current trends, the committee, led by Jule Charney of the Massachusetts Institute of Technology, assumed that atmospheric CO₂ concentrations would reach double the preindustrial values sometime in the first half of the 21st century. They calculated that as a result, the average global surface temperature would increase by 3° ± 1.5°C, with the greatest warming at high latitudes—the first assessment of its kind. The Charney committee also noted in the models a lag on the order of decades between CO₂ release and the resulting temperature rise. This delay, from disequilibrium effects with the ocean, masks pending temperature increases long before they are apparent.

Fast-forward to 2019, and

Hurricane Lane devastated Hawaii in 201...

*"The sci...
better ...
what nou...*

The ...

We face an urgent ... climate change

Our nation, our states, ou... urgent problem, climate c... the Industrial Revolution, ... than 615 billion tons of ca... causing the planet to war... the past. This warming is ... processes. Americans are ... change impacts on comm... Peoples, and on ecosyste... water quality and access, ... and the economy. While c... everyone, the most sever... who are least able to cop... greenhouse gases such a... climate change more sev... United States are working ... of climate change and red...

Urgent Statement by the President of Science Council of Japan on Climate Change and Call for Action

To all citizens of Japan,

We have all greatly benefited from modern civilization, but we are now at a crossroads.

If we continue down the current path, by around 2040 temperatures will increase more than 1.5°C compared to pre-industrial levels. Weather and water-related natural disasters will increase, biodiversity loss will progress, and our livelihoods, health, and safety will be at risk.

To avoid this path, we must start decreasing global CO₂ emissions immediately, and must steer our course drastically to achieve net carbon neutrality by mid-century.

The path of action to take is not simply one of discomfort and burden, but rather one where we can achieve a prosperous society through changing our economic and social systems such as our energy, transportation, urban, and agricultural systems. The world, including Japan, is starting to take action, but at a much-too-slow pace.

We hope that you will join the movement to speed up change, be it by making choices in the economy related to production, consumption, investment, and distribution, and/or by proactively speaking out and taking action. We researchers are also committed to collaborating closely with citizens.

3

> AI and ICT

Singularity: AI capacity will go beyond all human intellectual power.
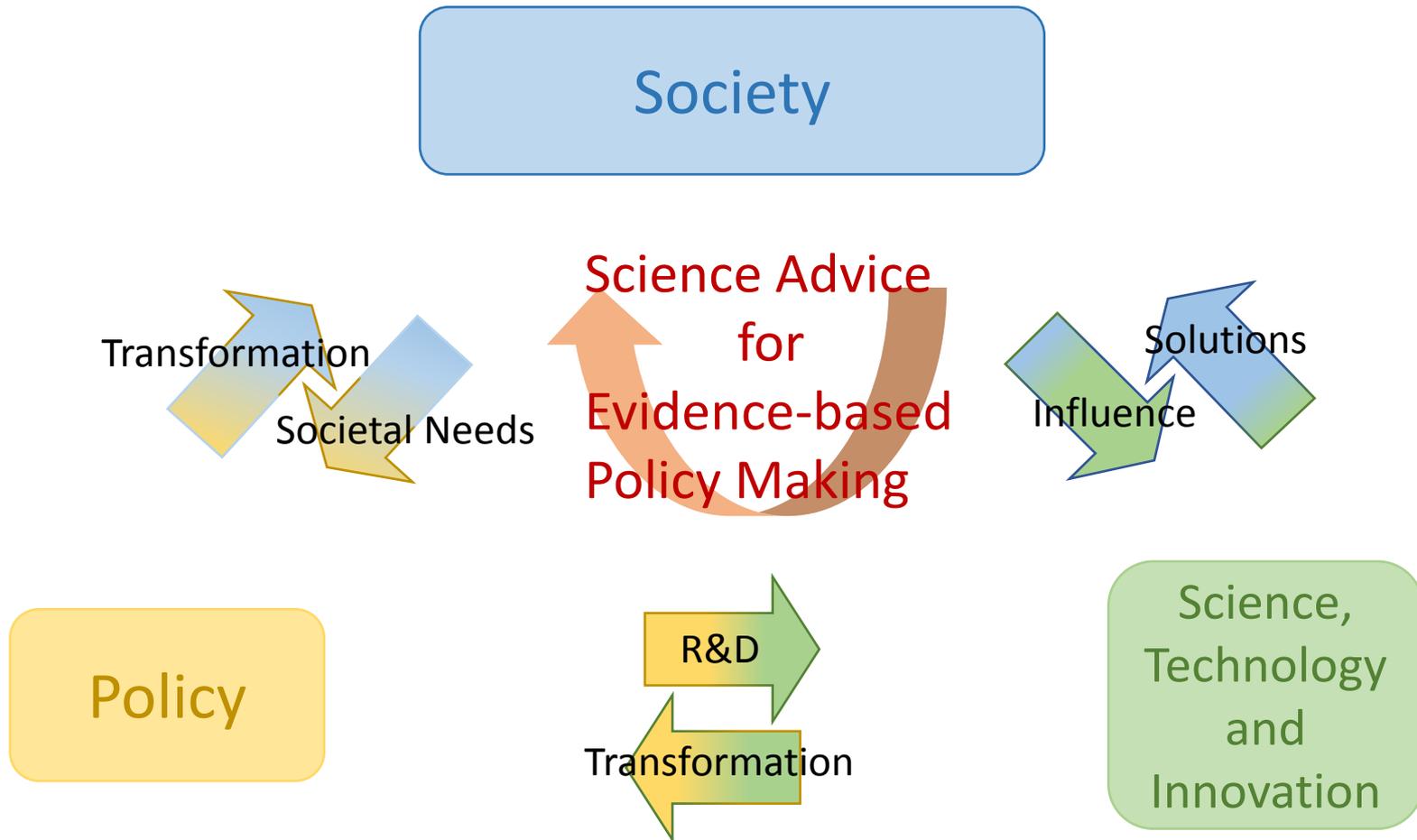
Who has autonomy, AI or human?

> Gene Editing

To design and to create new function of living creature is now possible.
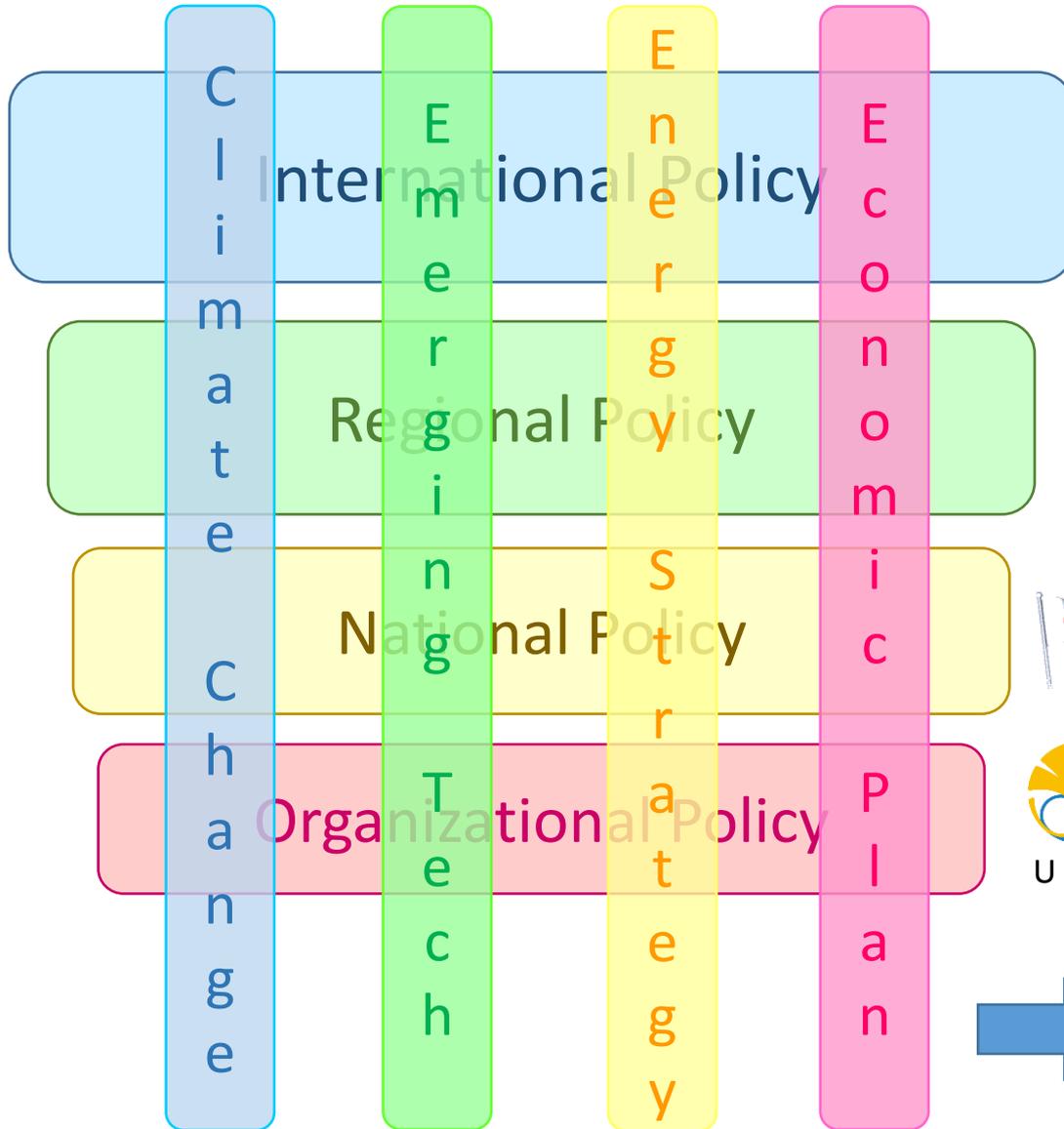
Create what and for what?

> Humans have been creating emerging technology.

> Thus humans can and must decide the way.

Policy in Different Layers and Areas

International Policy

Regional Policy

National Policy

Organizational Policy

Climate Change

Emerging Tech

Energy Strategy

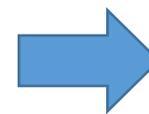Economic Plan

Policy, Action and Policy Advice

SDGs

ICSU Report
A Guide to SDG Interactions:
from Science to Implementation

IIASA
The World in 2050 initiative

ASEAN Next

UNESCAP SDGs

SDGs Action Plan
S&T Basic Plan (Society 5.0)
Strategic Energy Plan
AI Strategy

U Tokyo

Future Society
Initiative

UTokyo FSI
The University of Tokyo
Future Society Initiative

Harmonization among policies are required

Society 5.0

➢ Appeared first in2016 on 5th Science and Technology Basic Plan

➢ Scoping the forthcoming future society with requirement

AI Strategy

➢ Implementation strategy formulated by the Government

➢ Defining Government actions under the over all concept and strategic goals affecting whole Japanese society

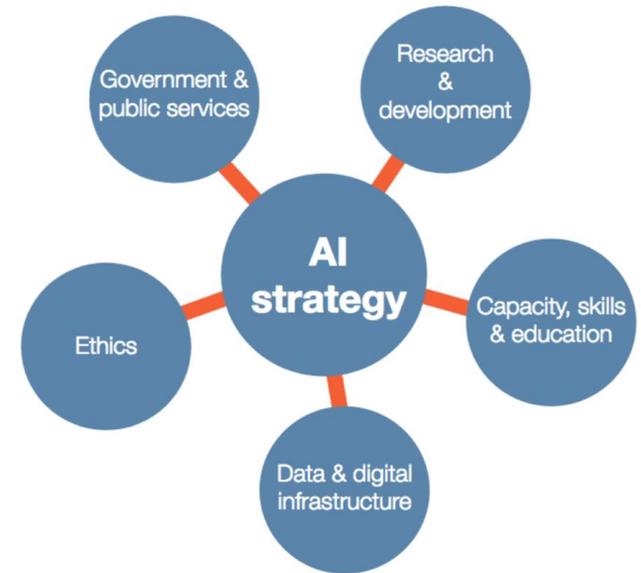Society5.0

Japan's AI Strategy

Concept

> Human dignity- Diversity & Inclusion-Sustainability

Strategic Targets

> Human capacity building

> Competitiveness

> Technology system

> International Harmonization

Government Action

> Infrastructures: Education, R&D, Data basis, Support of entrepreneur

> Ethics: to be shared in society in general

Explicit and concrete linkage to global issues is required

UN STI Forum advised major points

1. **crosscutting potential of STI**;

2. importance of **capacity building**;

3. importance of **stakeholder engagement**;

4. need to make the business case for **private sector investment in innovation for the SDGs**;

5. importance of **roadmaps for tracking progress**;

6. centrality of **ICT infrastructure** expansion to current development and STI efforts;

7. need to focus on **match-making** between existing problems and existing solutions; and

8. necessity for the STI Forum to conduct a **"horizon-scanning" exercise on the changes happening in the STI field**

Identified by Bill Colglazier, Co-Chair of the TFM 10-Member Group and will be reported to High Level Political Forum in July

AI-ICT have enormous possibility

ICT realized real-time control.

➢ JST **CREST** Program: Energy Management Project

Research Supervisor: Masayuki Fujita(Professor, Tokyo Tech)

Creation of Fundamental Theory and Technology to Establish a Cooperative Distributed Energy Management System and Integration of Technologies Across Broad Disciplines Toward Social Application
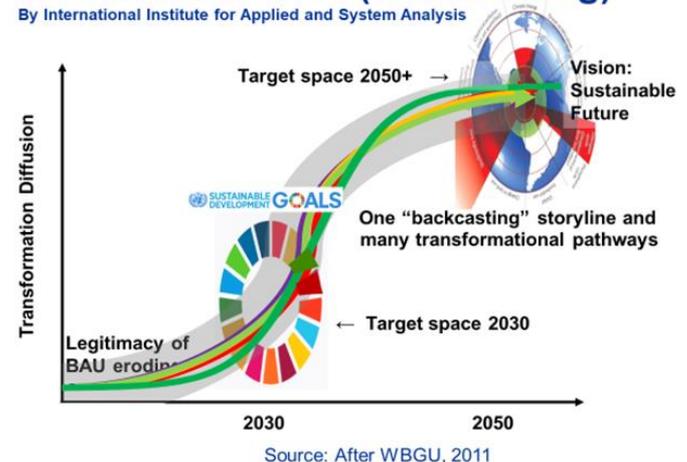
EMS

ENERGY Management SYSTEM

AI and big data will make simulation more precise.

➢ Better prediction will inform policy better suggestions and options.

➢ Fact based convincing evidences will be obtained.

➢ Counter "fact" to Alternative fact

➢ Better scenario can be possible

The World in 2050 (TWI2050.org)
By International Institute for Applied and System Analysis

Transformation Diffusion

Target space 2050+ →

Vision: Sustainable Future

One "backcasting" storyline and many transformational pathways

SUSTAINABLE DEVELOPMENT GOALS

← Target space 2030

Legitimacy of BAU eroding

2030   2050

Source: After WBGU, 2011

Automated driving cars and traffic control by AI will minimize energy consumption.

Solar Kiosk Service for Off-grid Areas

"WASSHA"
provides a new experience for people in off-grid areas with affordable, accessible and safe electricity through Solar Kiosks based on Digitalgrid technologies developed in the University of Tokyo.

By indicating social system which utilize mobile money and local kiosks, "Wassha" has been broadly accepted up to 800 locations and over 240,000 people in 2016. This project is highly recognized for its contribution to the regional education and economy. WASSHA received invitation to summer Davos meeting Idea's lab in 2014.
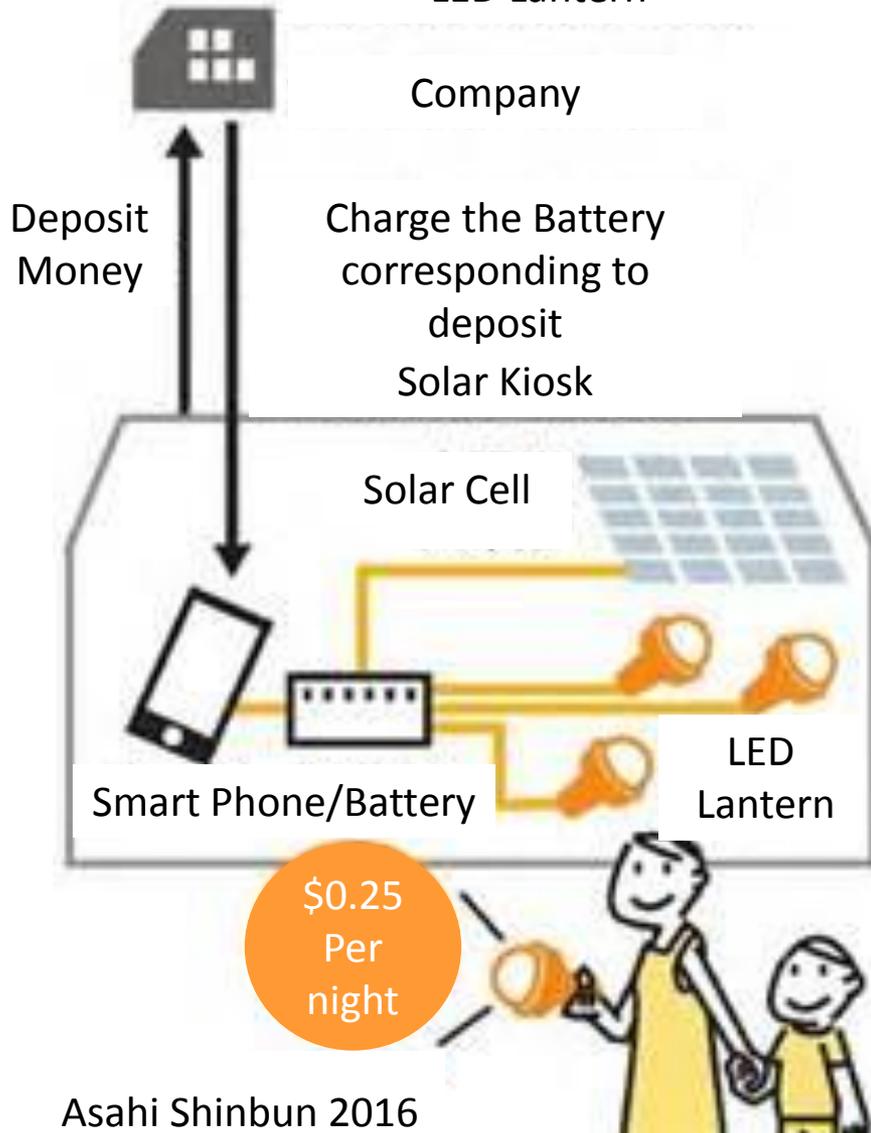
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Solar Kiosk Service with Digitalgrid

WASSHA

Educational Support

Contribution to local economy growth through electrification

Business Model of LED Lantern

Company

Deposit Money

Charge the Battery corresponding to deposit

Solar Kiosk

Solar Cell

Smart Phone/Battery

LED Lantern

$0.25 Per night

Asahi Shinbun 2016

Necessary elements
- Sustainable business model with both cost recovery and user-friendly price setting

- Robust Solar Cell
- Smart phone based finance system
- Efficient battery
- Advanced LED

Key knowledge
-Various technology (soft and hard)
-Business model

AI–ICT is facing its own problem(s)

➢ AI faces ethical, legal and societal issues.
- ✓ Explainable AI is required.

➢ Big data will soon go over recording capacity.
- ✓ Breakthrough for data recording is required.

➢ ICT and AI needs huge scale of semiconductor production for memories and CPU using vast energy.

➢ The world-top class supercomputer consumes electricity worth one nuclear power stations.
- ✓ Energy effective computer like quantum computer is required.

☞ Cutting edge AI–ICT Policy should harmonize with needs of global issues.

We must behave wisely.

➢Science and technology is neutral by nature; it will play either a good role or a bad role.

➢We can and must decide with our ethics, value and will. Else, we will be a slave of ST.

➢We can clearly indicate our will by establishing 'wise' policy. Policy will advance with progress of society and ST.

Thank you very much for you attention.