# 持続可能な開発目標(SDGs)

内閣府作成資料(2017)



ロゴ:国連広報センター作成

#### 日本自身の課題に関係が深い目標の例 ⇒実施には、多くの国内省庁が関係。

- ●成長・雇用 ●クリーンエネルギー ●イノベーション ●循環型社会(3R: Reduce Reuse Recycle 等)
- ●温暖化対策 ●生物多様性の保全 ●女性の活躍 ●児童虐待の撲滅 ●国際協力 等 1

# Session 2 Green Growth through SDGs - Interactive Collaboration among Global Cities and Regions -

# [Presentation]

- 1 Integrative Actions toward Sustainable Circular Ecological Cities and Regions Tsuyoshi Fujita, NIES, Japan
- 2 The most recent progress of IPCC-AR6 Yong Geng, Professor, Shanghai Jiao Tong University, China
- ③Climate Village as Low Carbon Actions in Indonesia Rizaldi Boer, Bogor Agricultural University, Indonesia
- 4 From Local Renewable Energy toward SDGs; social innovation of Stadtwerke from Germany; Guido Wallraven, Saerbeck City, Germany
- 5 Climate Change Adaptation in Japan; Mimi Nameki, Center for Climate Change Adaptation, Japan

# 16<sup>th</sup> Kawasaki Eco-Business Forum November 13th, 2019

# Integrative Actions toward Sustainable Circular Ecological Cities and Regions

Prof. FUJITA, Tsuyoshi

Director of Social Environmental Systems Center,
National Institute for Environmental Science, Japan
Specially Appointed Prof. of Tokyo Inst. of Tech.
Co-Authored by
Dr. K.Gomi, Dr. M.Fujii ,Dr. S.Maki, Dr. Y.Hirano

### **Hurricane Maria: Devastation in Puerto Rico**









# SDGs Promotion Headquarters (third meeting) relating to working with local governments, June 9<sup>th</sup>, 2017

### (Excerpt from Prime Minister's statement)

"Sustainable Development Goals, or SDGs, are important efforts that all countries, both developed and developing, are responsible for. Japan's standpoint is from that of providing security for people, and through our leadership we plan to realize a society in which no one is left behind, and in which each and every individual can demonstrate their abilities.

Focusing on July's UN report and September's UN General Assembly meeting, I will once again provide

instructions regarding the following 3 points (Abridged)

Second is the promotion of SDGs in the regions. These are sure to contribute to the invigoration of localities. I request that related cabinet ministers work together to consider policies to promote regional efforts to achieve SDGs, as well as implement these policies.

Held June 9, 2017 (at Prime Minister's Office)



### Eco-cities, Smart Cities and SDGs Future Cities

- Eco-Model Cities since 2008; 23cities Low-carbon Unification Initiatives for Cities/Regions
- Future Cities since 2011; 11 cities

The creation of successful examples to be spread throughout Japan and internationally



# [Inclusion • Integration] Efforts to local governments

Welfare - Health

Education



Environment • Energy • Water

Industry • Tourism • Agriculture

# Promoting Local Government SDGs for Invigoration of Localities

Aim Materials from Promotion of Overcoming Population Decline and Vitalizing Local Economy, Cabinet Office, Japan

OInitiatives for achieving SDGs in local governments contribute to the realization of locality invigoration. OInitiatives for achieving SDGs by local governments will be publicly sought and cities proposing outstanding initiatives will be selected as an **SDGs FutureCity** and strong assistance will be provided by the Government Offices Taskforce for Promoting Local Government SDGs. O10 pioneering initiatives will be chosen as Local Government SDGs model programs and financial support provided. (FY2018 estimated budget is 400 million yen (new)) **SDGs FutureCity Initiatives** 2030 **Demonstration of** Select cities ofsuccessful examples **Local government SDGs** ustainable model programs 1 Initiatives for promoting Communicate examples of local government SDGs development success from selected cities ① Creation of a synergistic effect Creation of a future that should be shared in through comprehensive initiatives in the vision

- Creation of a system
- •Reflects on various plans etc.
- 2 Implementation of programs for achieving SDGs

- three aspects of economy, society, and environment
- 2 Construction of a **self-directed** virtuous cycle
- (3) Cooperation with diverse stakeholders

Japan and other countries.

- Holding events
- Educational programs for a broad range of ages etc.

Based on the Comprehensive Strategy for Community, People, and Work Creation 2017 Revision (Cabinet Decision 12/22/2017)

**Government Offices Taskforce for Promoting Local Government SDGs** (scheduled for establishment in January 2018)

Office for Promotion of Overcoming Population Decline and Vitalizing Local Economy in Japan, Cabinet Office (Office)

Ministry of Internal Affairs and Communications

Ministry of Justice

Ministry of Foreign Affairs Ministry of Finance

Ministry of Education Culture, Sports, Science and Technology

Ministry of Health Labor and Welfare

Cabinet

Secretariat

Ministry of Agriculture, Forestry and Fisheries

Reconstruction

Agency

Ministry of Economy Trade and Industry

Cabinet

Office

Ministry of Land. Infrastructure. Transport and Tourism

National Police

Agency

Ministry of the Environment

Financial

Services Agency

Ministry of Defense

Consumer Affairs

Agency

community

#### 環境省 一部総務省、厚生労働省、経済産業省、国土交通省連携事業

#### 地域循環共生圏(日本発の脱炭素化·SDGs構想)

− サイバー空間とフィジカル空間の融合により、地域から人と自然のポテンシャルを引き出す生命系システム −



# **Local Energy Pilot Projects for SDGS**

(1) Circular Industrial Parks

**2**Local Energy System

3 Strategic Land Use Planning

# Industrial Symbiosis and Urban Industries to empower cities by circularization

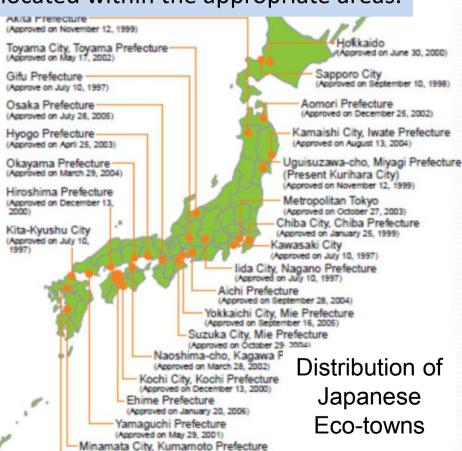


# Eco-town area as demonstration project for Sound material cycle society

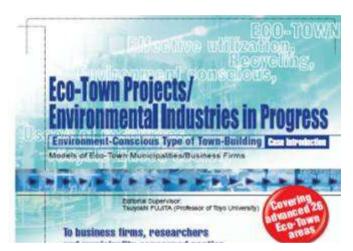
METI & MOE approved Eco-Town Plans for 26 areas as of the end of January 2006, and they provided financial support to 62 facilities located within the appropriate areas.



Forming the basis of capacity that totally 2.18 mil t of wastes were treated



(Approved on February 6, 2001) 01. 5 ----



Edited by Prof. Fujita, T., Published by METI,,2006

Distribution of Total **Investment Subsidy** Total Investment projects in 24 Eco-Towns 600mil. US\$

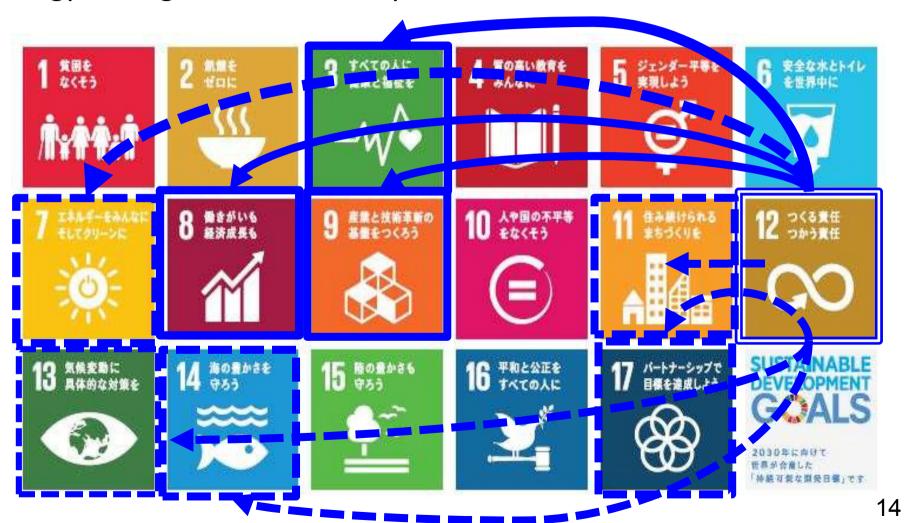
Distribution of 60 projects in 24 Eco-Towns 1.6 bil.

Berkel and Fujita et. al., Environment, Science and Technology, 2010

#### Variation of Eco-Industrial Parks(EIP) Strategies in Eco-towns **Green Institute Rural Area URBAN REDEVELOPMENT CITY-FARM** (Minneapolis) TYPE EIP Kitakyushu COLLABORATION Cape Charles Sustainablearm retail & sale\* **Technology Park** TYPE EIP (Virginia) Hokkaido **Ecological** consulting **Ecological** equipment company\* manufacturing Environmental Compost Information Sustainable technology **EIP Center; Demonstration Business** research company\* building\* Support Environmental data bank CCR Fuel Cell Collaborative marketing purchase Chen and ·Waste collection and recycling -Eco-material, Recycled Material -Design for environment Fujita et. al.. cious Euro, J. of stem Environmental Residential Clean Energy education\* Operation Supply System **Districts** Environmental\ **Energy Storage** communication Akita, Osaka lrban Area∖ Svstem\* Research, AL SYMBIOSIS Fertilizer TYPE EIP Cement factory Organic waste Methane fermentation Chemical factory Composting Plastic Heat recycle center' **Brownfield** Neighborhood Power olant\* Collaboration reverse logistics District heat supply **Building material** recycle center\* Petro chemical **PRODUCT** Industrial symbiosis type **Industrial** complex REMANUFACTURING Kawasaki, Minamata TVDE EID **Water Front**

### SDGs Cities from Circular Economy

- Circular region through local circularization and energy management
- Information and infrastructure system for resource circularization, local energy management and eco-system utilization



# **Local Energy Pilot Projects for SDGS**

(1) Circular Industrial Parks

2 Local Energy System

3 Strategic Land Use Planning

# **Newest Smart Community underway in Fukushima**





#### Shinchi Town,

Soma-Futaba Region, Fukushima Prefecture

Population: 8,247 / Households: 2,754 /

Area: 46.35 km<sup>2</sup> (As of Jan. 1st, 2017)

### SDGs from Local Energy Business

Sustainable rebuilding projects through collaborative planning among town planning, industrial development and local energy system



Multi sectoral energy management /housing/commertial/agriculture

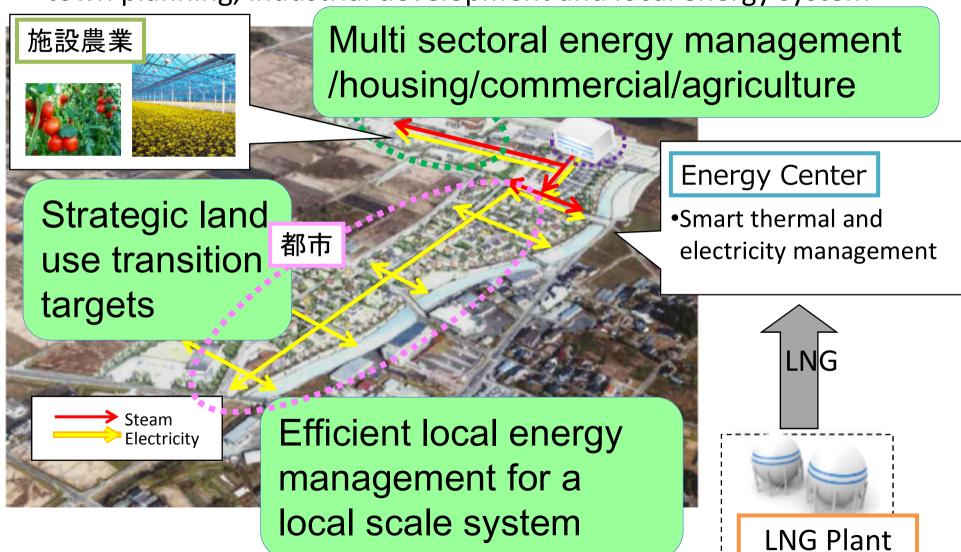
> **Energy Center** Smart thermal and

> > LNG LNG Plant

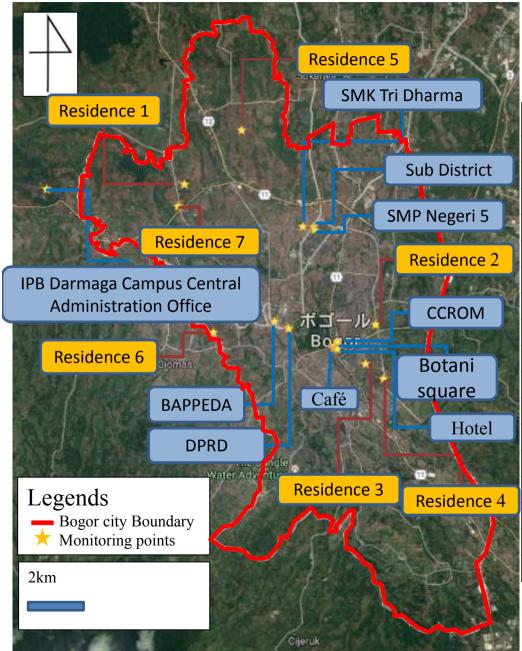


# Local Energy Based Urban Rebuilding Project in Fukushima

Sustainable rebuilding projects through collaborative planning among town planning, industrial development and local energy system



# Distribution of Monitoring System in Bogor City



# We have been monitoring about 180 points in Bogor city since FY 2014

	Sensor	Area [m <sup>2</sup> ]
CCROM	15	243
Hotel	16	413.8
Café	6	150
Admin	46	?
Residence 1	4	68
Residence 2	6	80
Residence 3	4	87
Residence 4	12	210
BAPPEDA	13	377.8
DPRD	7	1021.6
Sub District	10	587
Botani square	10	42000
Residence 5	3	99.4
Residence 6	3	137.1
Residence 7	4	156.4
SMP Negeri 5	6	2600
SMK Tri Dharma	6	8000

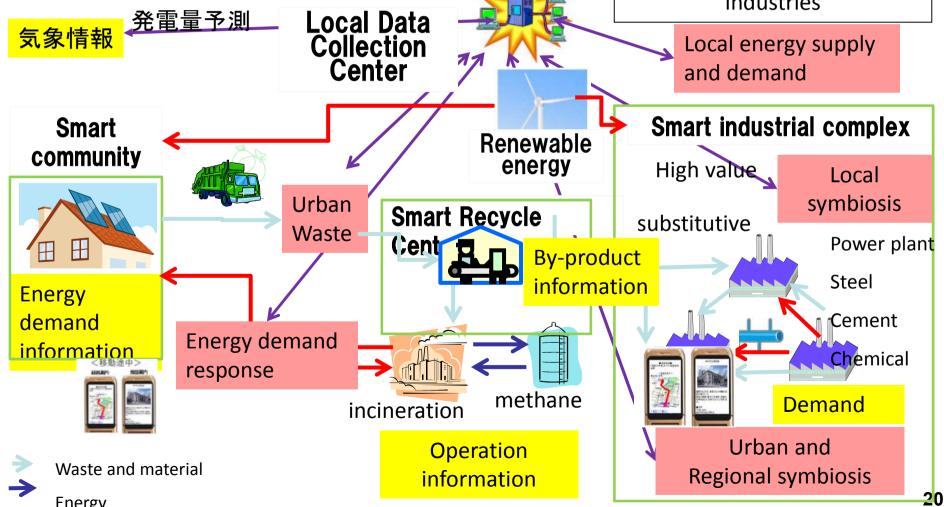
## **Smart Symbiosis Initiatives for Eco town Innovation**

Smart ICT network will promote and complement the synergetic network functions among stakeholders

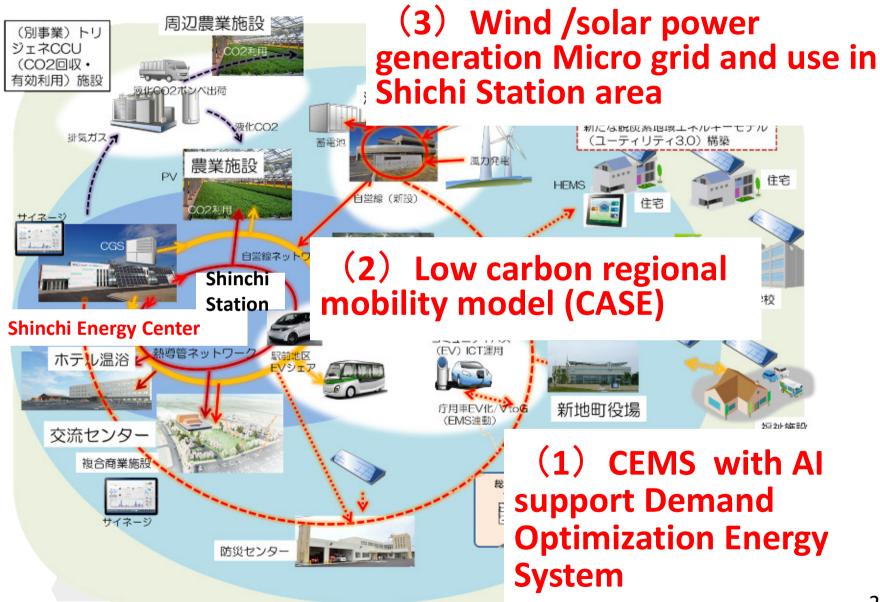
Energy and consumption demand control system for urban sectors

Information support for optimizing local and regional material and energy circularization

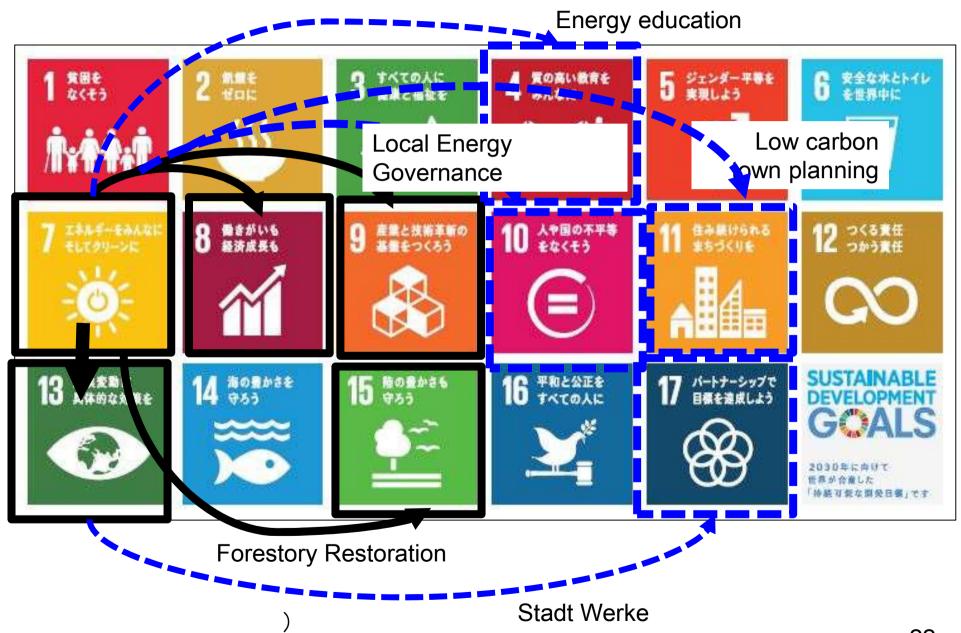
Smart industrial complex supported by synergetic information network among industries



# Future Design for Fukushima Circulating Ecological Sphere



# SDG Piliot Projects from Local Energy Policies



# Scope plan of low carbon Future Scenarios for Cities

- ◆Cloud EV city
- Hydrogen station compact town development
- EV cloud storage
- ◆Hydrogen energy

CO2 free hydrogen production Hydrogen production base Hydrogen storage etc

#### ◆Large scale

- Renewable energy · Mega, meso solar
- Wind power (land/ocean)
- Biomass (forest, methane, algae) Blue carbon etc
- ◆Start based smart city
- DR, digital grid
- Thermal energy network
- Society 5.0 type regional service
- ◆ Cascade woody society

Wood sorting technology Construction material utilization system (CLT, laminated wood, interior material, craft material) Cogeneration biomass energy Woody compact city

◆ Regional group that utilizes information network

Inter-district communication using CT Public services that utilize ICT Remote Hometown Support System

- ◆Human resource and education
- University base office invitation
- · SDGs Policy Platform

◆ Hybrid

**Transportation** 

- Automatic operation network
- Personal mobility, barrier-free walking network

#### ◆Smart mobility

- MAAS (Mobility-as-a-Service)
- Public transport network
- Traffic congestion prediction, traffic control

#### ◆ De-fossil type compact network

Compact zoning and network services from a long-term perspective Formation of urban industry symbiosis district

- Regional circulation symbiosis type land conversion that utilizes local resources, materials
- ◆ Reconstruction business. science tourism
- Ecotourism, town development regeneration, network tourism of Public car sharing Transportation ray industrial development base,

atural park

Economy

### **Town planning** Circular

#### Regional energy

#### 2030 2040 2050 Shinchi future revival project

#### Future-oriented environment creation recovery

- Zero CO2 emissions due to fossil removal
- Population recovery by regional innovation
- Local revitalization

#### Information infrastructure of regional circulation symbiosis **Knowledge platform**

#### **◆**Smart wellness

Smart longevity health service Robot, drone delivery Smart personal monitoring etc

#### ◆Future-oriented green area finance

Commercialization support base TIF bonds etc. ESG investment Green Bond, Funance Real RE 100 company invitation

- ◆Safe and secure regional environment information sharing network
- Cooperation with environmental information telemeter system etc.
- Risk communication · Environmental awareness improvement information system
- Local circulation symbiosis business real time information sharing

- ◆Climate change Adaptation Strategic urban area downsizing Regional Adaptation Consortium Disaster prevention infrastructure construction
  - Low carbon complexes in energy intensive industries Wide area base of material type industry

LNG base cold energy business Local production and consumption cogeneration in LNG thermal power plant

Decompression distributed supply in LNG pipeline

Zero carbonization by highly efficient CCS business

- ◆ Industry symbiosis type smart agri facility and system Development Risk Information Network
- Consumer, distribution real-time information network

Thermoelectric carbon dioxide supply by trigeneration Sixth industrialization business including processing sales

- ◆Closed loop recycling High added value recycling Sorting center Solar panel recycling base EV storage battery reuse base etc
- ◆ Technologies that support the realization of circular economy
- Logistics optimization mainly for venous logistics
- Sharing economy
- Service of goods

#### Policy Scenario Design Process for SDGs Model Cities and Regions **Dialogue Local Information Staristics** with · GIS Population, Industries, (500mgrid) **BAU** Local <2010年、2015年> **Scenarios** Governments Diagnoses of Scoping **Future** Cities and **Focal Policy** Scenario Regions Area / **Simulation** Goods/ Bads Resea-**Pilot Project** rch Design 章 单 程 明中·电视人员会15 002 417 108 📻 📴 Conso-**SDGs Policy** rtium **Policy** Key **Inventory SDGs Local Indicators** Indicators138 **Global SDGs** 24 **Indicators**

#### Revised by authors from the Material of Cabinet Local Indicators from Japan for HDPF in UN, NY Office Local SDGs Committee, Local Indicator WG as Official Local SDGs indicators for Japanese Cities SDGs Policy Key IndicatorsOuantified) 1.2. 1.2. 1.3. 1.5 1.5 1.b 1.a. 2 3 .1 SDGs Policy Key Indicators 2.3. 2.5 (To Be-Ouantified) 2.1. 2.2. 2.2. 2.3. 2.5 2.a 2.b 2.c. 3.2. 3.2. 3.3. 3.3. 3.3 3.3 3.4 3.5 3.5. 3.6 3.7 3.8 3.9. 3.9 3.9 3.b. 3.d. 3.3 3.7. 3.8. 3.b. .2 4.X 3.X 4.2. 4.3. 4.4. 4.5. 4.6 4.7 4.a 4.b 4.c 3.X .1 .1 .1 **∮** 5.2. 5.2. 5.3. 5.3. 5.4. 5.5 5.5 5.6 5.6 5.a 5.a. 5.b. 5.c .2 2 1 .1 À 6.1. 6.3. 6.2. 6.3. 6.4. 6.4. 6.5 6.5 6.6 6.a .1 .1 7.3. 7.X 7.X 7.1. 7.b. 7.X 2 8.4. 8.4. 8.8 8.8 8.1 8.a. 8.b. 111 .2 .1 0.1 0.2 1 9.1. 9.1. 9.2. 9.2. 9.3. 9.3. 9.5 9.5 9.a .1 10.1 10. 10. 10.3 10. 10. 10. 10. 4 4.1 5.1 6.1 7.1 7.2 a.1 b.1 c.1 11.1 11.3 11. 11. 11. 11. 11. 11. 11. 11. 11. 11. 11.X 11. 11.2 11. 11. 5.2 3.2 4.1 5.1 6.1 7.1 7.2 a.1 b.1 b.2 c.1 12. 12.1 12.2 12.2 12. 12. 12. 12. 12. 12. 12. 12. 12. 4.2 5.1 6.1 7.1 8.1 .2 3.1 4.1 a.1 b.1 c.1 13.1 13.1 13.1 13. 13. 13. 13. 13. 0 3.1 3.2 a.1 b.1 14.1 14. 14. 14.2 14.3 14. 14. 14. 10 5.1 6.1 7.1 b.1 15.1 15.1 15.2 15. 15. 15. 15. 5.7 15. 15. 15. 15. 3.1 4.1 4.2 5.1 6.1 .1 8.1 9.1 b.1 a.1 c.1 16. 16. 16. 16. 16.1 16.1 16.1 16. 16. 16. 16. 16. 16. 16.9 16. 16. H THERE 2.2 5.2 10. 10. 1.4 2.1 2.3 3.1 3.2 4.1 4.2 5.1 6.1 6.2 7.1 7.2 8.1 a.1 b.1 2 17.1 17.2 17. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17. 17.1 17. 17. 17. 17. 17. 17. 17...... ∰ .1 3.2 4.1 5.1 6.2 7.1 8.1 9.1 10. 13. 14. 15. 6.1 17. 18. 3.1 6.1 11. 12. 18. 18. 19. 19. 1 2 3 2 25

# SDGs Key Indicators for Policy Planning

# SDGs Focal Projects for Model Project Planning

Smart ICT Cities

**Local Energy Business** 

Local Transit System

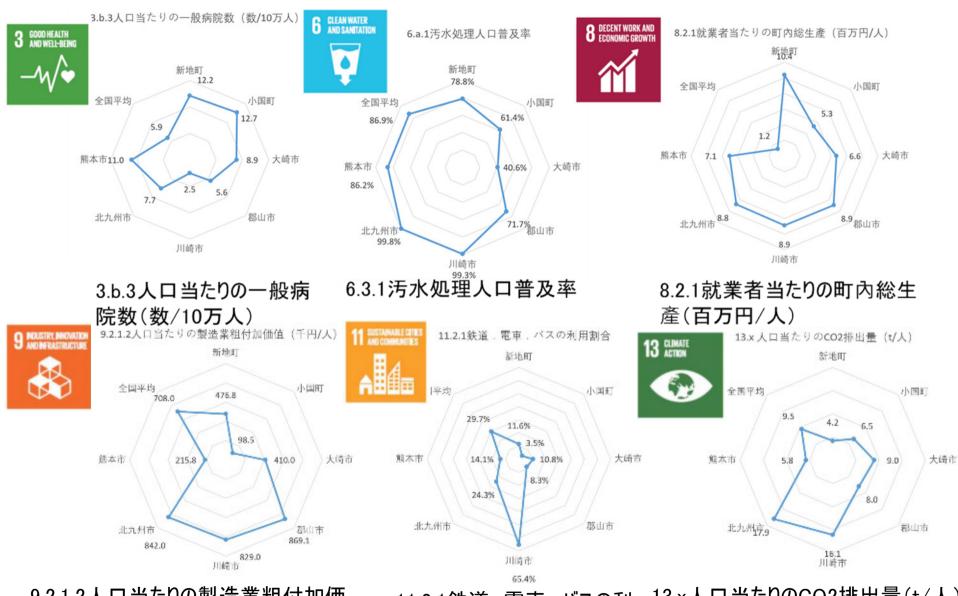
Local Circularizing Business

I	μu	I Ca L	OS OF POLICY PL
	Goal	Indicator(GI)	(LI)
	15a 8384	1.1.1	目対的貧困割合
	12	2.1.2.2	<b>上産額ベースの食料自給率(各都道府県の食料生産額/食料消費仕向額)</b>
	3 191876.	3.4.1	心血管疾患、癌、糖尿病の死亡率
	-W.		心血管疾患、癌、糖尿病の死亡数/総死亡数/
	4 255	3.b.3	人口当たりの一般病院数(一般病院数/人口)
	Mi	4.1.1	中学登校者割合((中学校在学者数-不登校者数)/中学校在学者数) 
	455	4.2.1	歳未満の入院者割合(5歳未満の入院者数/5歳未満人口)
	MI	4.a.1.2	学校におけるコンピュータの設置状况率
	1	6.3.1	<b>5水処理人口普及率</b>
		6.a.1	人口当たりの下水道費 (下水道費/総人口)
	o	7.1.1	人口当たりの電力エネルギー消費量(電力エネルギー消費量/人口)
	7=	7.2.1.4	<b>新エネルギー発電割合(新エネルギー発電量/最終エネルギー消費量)</b>
	g serven se	7.5.1	- ネルギー消費量当たりの県内総生産(県内総生産/エネルギー消費量)
	71	8.2.1	<b>戊業者当たりの県内総生産(県内総生産/就業者数)</b>
	R INCOME.	8.4.1	人1日当たりのごみ排出量(家庭部門)
	21	8.5.1	<b>片働者の平均時給(平均所得/所定内+超過実労働時間)</b>
		8.5.2	<b>卡業率(完全失業者数/労働力人口)</b>
	îíí	8.9.1	県内総生産当たりの観光消費額(観光消費額/県内総生産)
	S more	9.2.1.2	人口当たりの製造業粗付加価値額(製造業粗付加価値額/人口)
		9.4.1	具内総生産当たりのCO2排出量(CO2排出量/県内総生産)
	S management	9.5.1	具内総生産当たりの研究開発費(研究開発費支出総額/県内総生産)
	₩.	9.c.1	インターネット普及率
	10 man	10.2.1	祖対的貧困世帯割合
	(₽)	10.4.1	労働生産性(付加価値額/従業員数)
	11 STRANS	11.2.1	失道. 電車. バスの利用割合
	H. ETERNIST	11.3.1.3	人口自然增減(出生数-死亡数)/総人口
	Alde	11.6.1	<b>廃棄物の最終処分割合(最終処分量/ごみ総排出量)</b>
	2 50%	12.2.1	人1日当たりのごみ排出量(家庭部門)
	$\infty$	12.4.2	ョ害廃棄物割合(その他廃棄物/廃棄物の総搬入量)
	Ö	12.5.1	リサイクル率
	13 200	13.1.1	災害等の自然外因による死亡者割合(災害等の自然外因による死亡者/人口)
	0	13.X	人口当たりのCO2排出量(CO2排出量/総人口)
	150	14.4.1	人口当たりの漁獲量(漁獲量+養殖收穫量)/総人口
	hita	15.1.1	
		16.1.4.1	人口当たりの刑法犯認知件数(刑法犯認知件数/総人口)
	U marine	17.1.2.1	
	*	1/.8.1	インターネット普及率
	17 ===== (A)		地域サポーターを設置している市区町村の割合
	197		<u> </u>

SDGs Key Indicators (Prototype) for Policy Design

through Co-Planning Process

# Comparative Diagnosis of Cities by SDGs Key Indicators (2010)

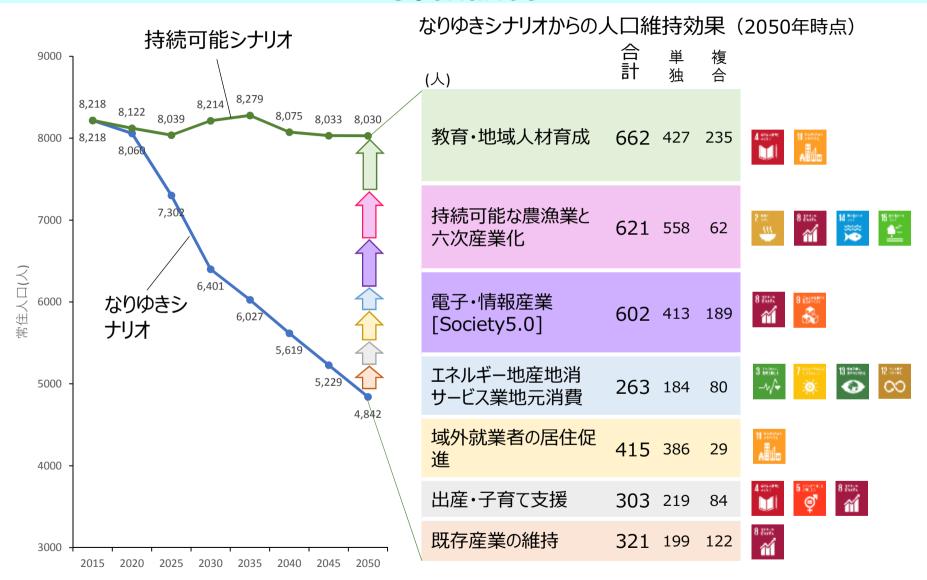


9.2.1.2人口当たりの製造業粗付加価 値(千円/人) 12.5.1ごみのリサイクル率

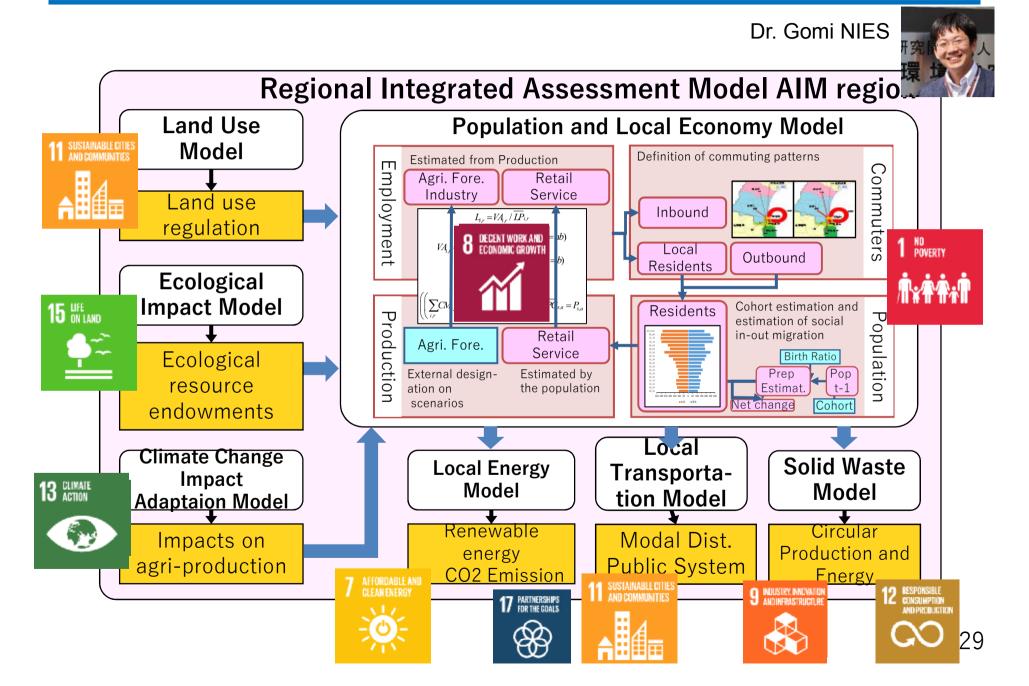
11.2.1鉄道. 電車. バスの利用割合

13.x人口当たりのCO2排出量(t/人) 14.4.1人口当たりの漁獲量(t/ 万人) 27

# Socio Economic Environmental Forecast of Future Scenarios



# AIM Regional Model to Quantify the SDGs Accomplishments



### Interactive Eco-policy Simulation System in Asia

# Fukushima Shinchi Township

**Community Assist Tablet Network** 



National Institute for Env. Studies

# **Urban Spatial Analysis**

Local environment diagnosis

# **Integrated Modelling**

Future scenario assessment

# Planning for Sustainable Future



# Simulation for recovery roadmap



# Tech. and policy inventory

- -low carbon tech
- -circulation tech
- -industrial symbiosis
- -policy / regulation
- -land use control

### Discussion materials for Interactive Simulation

#### Interactive Scenario Simulation in Fukushima

#### **Stakeholder Meeting Research Team** Sharing scenario storylines and 2019 4quantification tools Preparatory discussion Preparation Local data base design Steered by IPB, BAPEDA, NIES Start up of Stakeholder meeting 2019 06 Model Simulation Definition of Scenario Scope 20196 Choice of Focal Policy Area and Tech (BAU) future 1<sup>st</sup> Stakeholder Focal Scope and Participation Design Meeting Technology spectrum BAU Future scenario output 2005年比-70% \* \* \* \* \* \* \* \* \* \* Focal Policy Area Options (Household Quantification of alternative Energy/ Transportation / Waste) scenario simulations for focal 20198 SDGs Future Scenario 2<sup>nd</sup> Stakeholder policy fields and technology options Meeting Sustainable future scenarios Alternative Scenario design and 2019 10 Priority setting among scenarios simulation for quantification 3<sup>rd</sup> Stakeholder Extension toward action plans

Meeting

### Selected list of recent publications in the related topics

- Seiya Maki, Shuichi Ashina, Minoru Fujii, Tsuyoshi Fujita, et.al (2018); Energy consumption monitoring system
  and integrative time series analysis models case study in the green city demonstration project in Bogor City,
  Indonesia, Frontiers of Energy, in press
- Remi Chandran, Tsuyoshi Fujita, et.al.(2018); Expert networks as science-policy interlocutors in the Implementation of a Monitoring Reporting and Verification (MRV) system, Frontiers of Energy, in press
- Yi Dou, Takuya Togawa, Liang Dong, Minoru Fujii, Satoshi Ohnishi, Hiroki Tanikawa, Tsuyoshi Fujita (2018)
   Innovative planning and evaluation system for district heating using waste heat considering spatial configuration: A case in Fukushima, Japan. Resources, Conservation and Recycling, 128, 406-416
- Yujiro Hirano, Kei Gomi, Shogo Nakamura, Yukiko Yoshida, Daisuke Narumi, Tsuyoshi Fujita (2017) Analysis
  of the impact of regional temperature pattern on the energy consumption in the commercial sector in Japan.
  Energy and Buildings, 149, 160–170
- Yujiro Hirano, Tsuyoshi Fujita (2016) Simulating the CO2 reduction caused by decreasing the air conditioning load in an urban area. Energy and Buildings, 114, 87-95
- Yong Geng, Tsuyoshi Fujita, et.al. (2016) Recent progress on innovative eco-industrial development. Journal
  of Cleaner Production, 114, 1-10
- Hiroto Shiraki, Shuichi Ashina, Yasuko Kameyama, Seiji Hashimoto, Tsuyoshi Fujita (2016) Analysis of optimal locations for power stations and their impact on industrial symbiosis planning under transition toward lowcarbon power sector in Japan. Journal of Cleaner Production, 114, 81-94
- Satoshi Ohnishi, Minoru Fujii, Tsuyoshi Fujita, et.al. (2016) Comparative analysis of recycling industry development in Japan following the Eco-Town program for eco-industrial development. Journal of Cleaner Production, 114, 95-102
- Takuya Togawa, Tsuyoshi Fujita, et.al. (2016) Integrating GIS databases and ICT applications for the design of energy circulation systems. Journal of Cleaner Production, 114, 224-232
- Minoru Fujii, Tsuyoshi Fujita, et.al. (2016) Possibility of developing low-carbon industries through urban symbiosis in Asian cities. Journal of Cleaner Production, 114, 376-386

# Thank you for your Attention