Smart City Planning by NSRI

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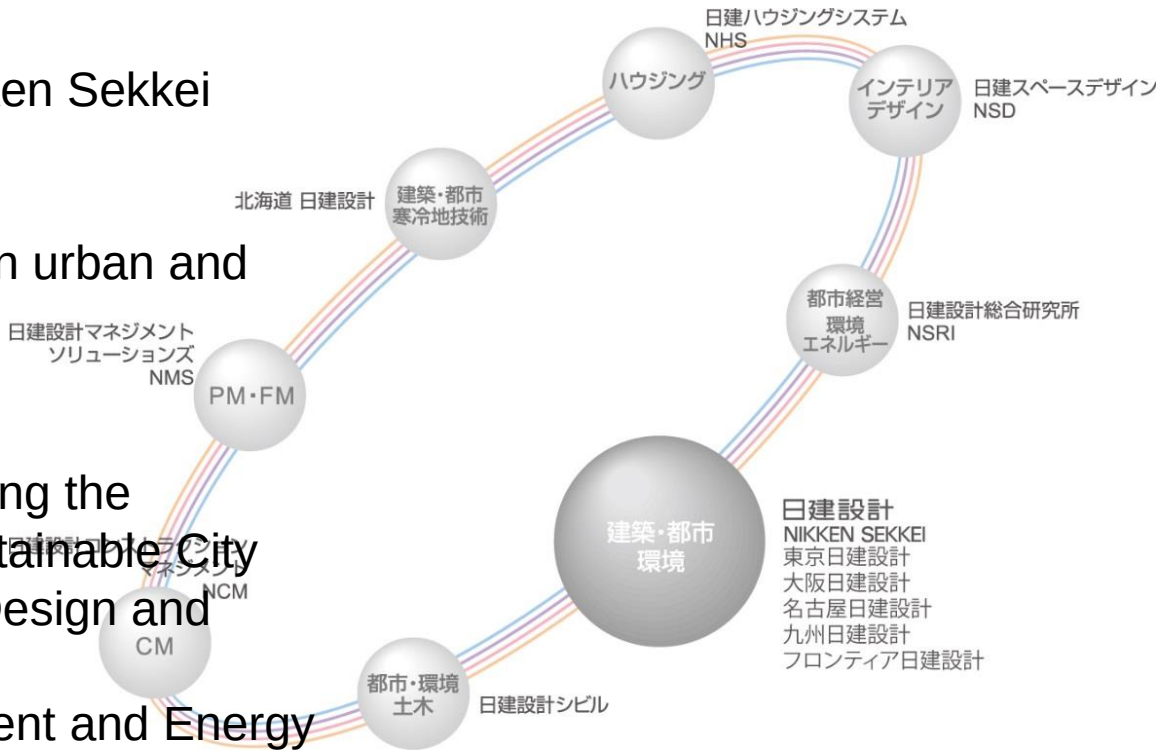
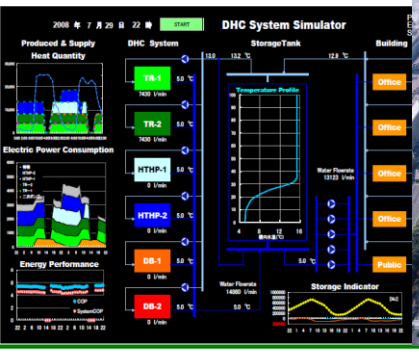
Nikken Sekkei Research Institute (NSRI)

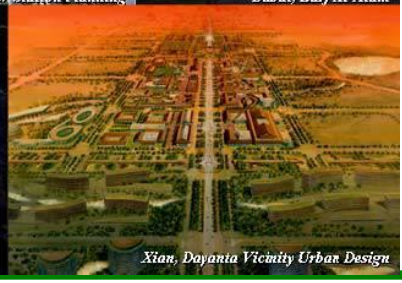
Founded as Consulting firm of Nikken Sekkei Group in 2006

Over 70 experts globally engages in urban and environmental projects.

[SERVICES]
- Policy making, Planning, Supporting the Implementation for Smart City, Sustainable City
- Urban Environment and Energy Design and Operation Support
- Analysis, Simulation for environment and Energy
- Consulting Business Scheme (PPP,PFI)

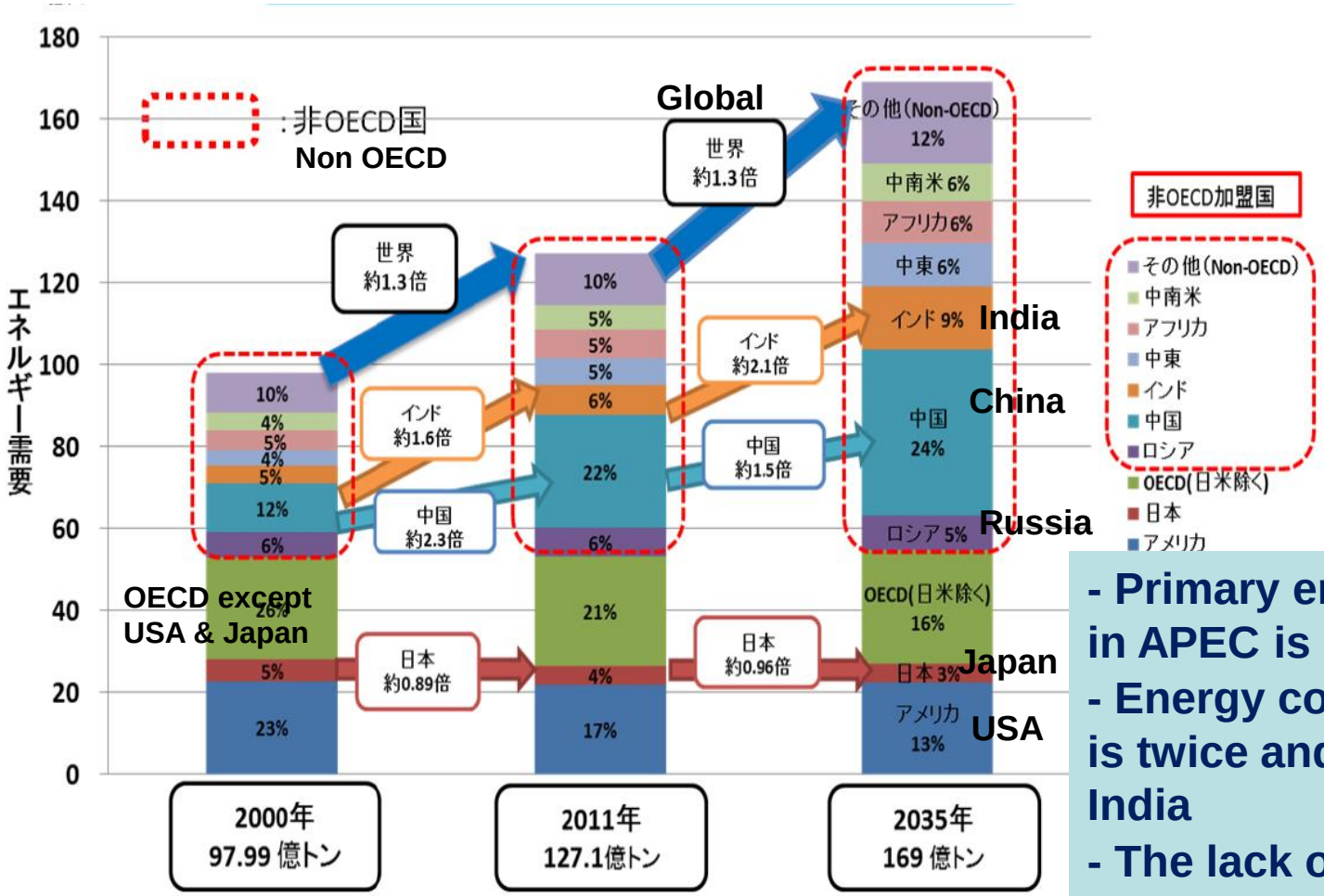






1. Background for Smart globally

Global Energy Crisis caused by Economic Growth in Asia



【出典】IEA World Energy Outlook 2013

- Primary energy consumption in APEC is 61% of the world
- Energy consumption in China is twice and catching up by India
- The lack of Fossil energy source is coming near (coal :122 years, Oil :42 years, natural gas :60 years (from a research point of view)

2. Planning Strategy for Smart City

Firstly, Form the balanced comprehensive Smart Target and Concept from the Urban planning standpoint !

【Urban Structure】
- Compact urban design, TOD

Red : Environment, Energy
Blue : Quality of Life (QOL)
Green : Both red and Blue

【Low Carbon Building】
- Aiming nZEB
- Higher priority on Energy efficiency in a Community

【Low Carbon Transportation】
- LRT, BRT
- EV, PHEV

【ICT Infrastructure】
- Security, Safety
・QOL (Quality of Life)

【Area Energy Supply】
- Thermal and Electricity Community Grid

【Renewable and Untapped Energy】

【Area Management】
- Area Energy Management（AEMS）

【Resources & Waste Management】
- 3R, Thermal use

【Urban Natural Environment】
- Environmental Friendly by Greenery

TOD : Transit Oriented Development, LRT : Light Railway Transfer,
BRT : Bus Rapid transit, QOL : Quality of Life

3. Example in EU From the urban Planning standpoint

Enhancing the QOL（Quality of Life) is the key factor for Smart in EU

＜Retro Fitting＞

Amsterdam Smart City, Netherlands

市内の各所において様々な取組。気候ストリートにおいては、商店主がスマートメーター設置

Malaga Smart City, Spain

海岸沿いエリアにおいてスマートグリッド、EV、風力・太陽光発電等の実証実験。（NEDO協力）

＜Brand-new Development＞

＜”Smart” oriented concept＞

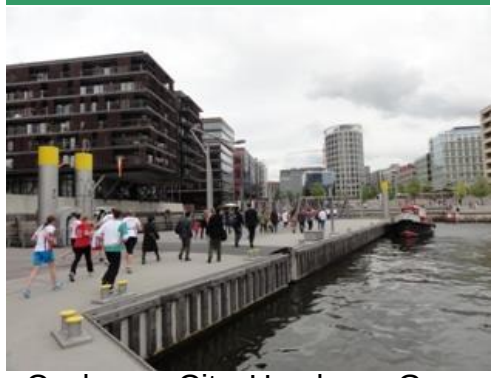
Lyon Confluence, France

再開発エリアにおいて、省エネビル、エネルギーマネジメント、EV等の実証実験（NEDO協力）

Royal Seaport, Stockholm

スマートライフをコンセプトとして、ハマルビー・モデルにスマートグリッドを付加

＜”Eco” oriented concept＞



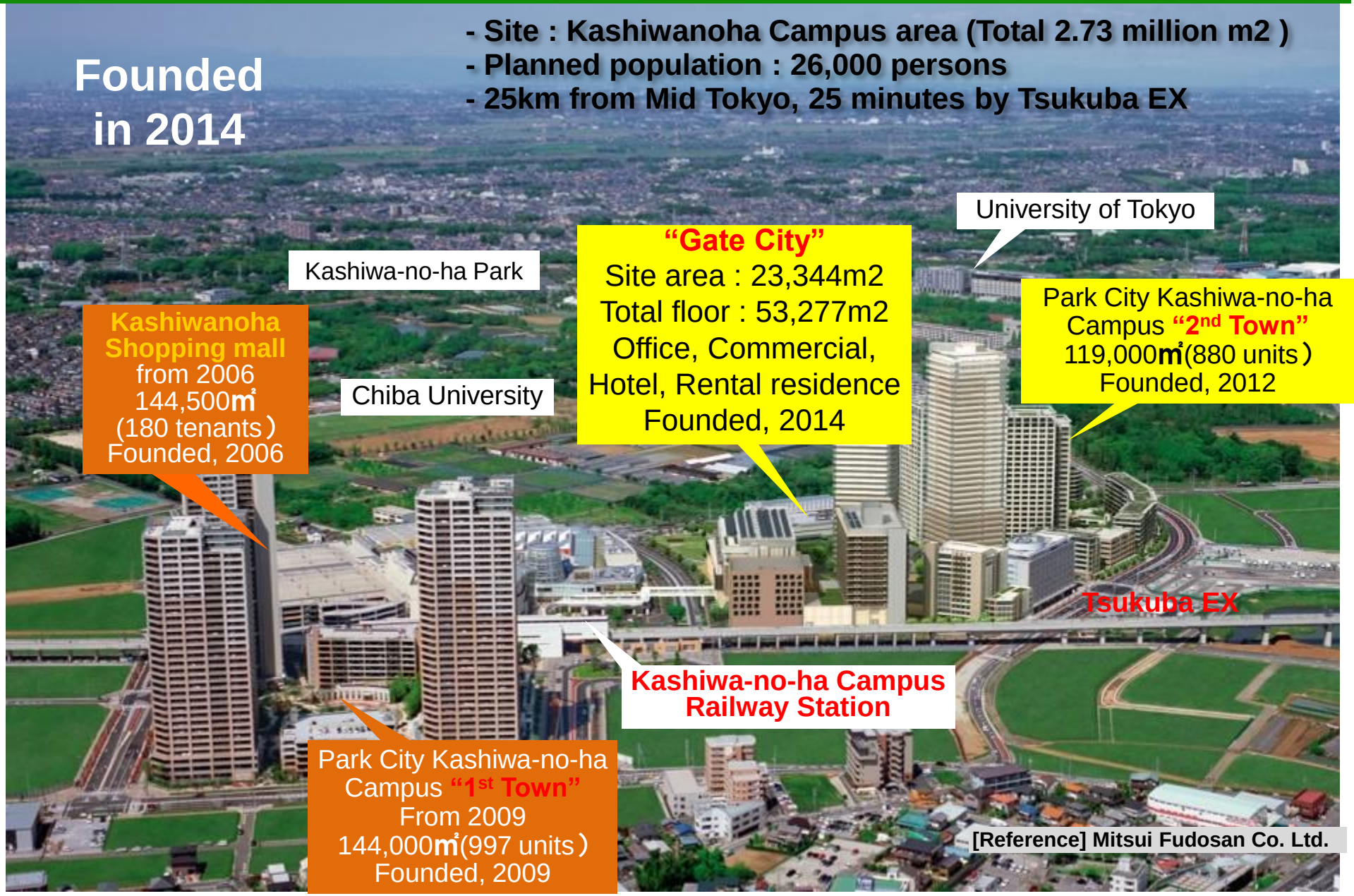
Cuxhaven City, Hamburg, Germany

港湾部における都市再生。建物レベルの環境配慮、歩行者にとって快適な街づくりを展開

Hammarby Shostad, Stockholm

ブラウンフィールドにおける都市再生。ハマルビーモデルと呼ばれる資源循環モデルを実践

4. Kashiwanoha Smart City



4. Kashiwanoha Smart City

Comprehensive **Smart** vision of Kashiwa-no-ha Smart City

Environmental-friendly City

- Centralizing regional energy management
- Saving, creating, and storing energy
- Encouraging sustainable localization in food and energy
- Low-carbon urban transportation
- Maintaining lifelines during disasters

City of Health and Longevity

- Engaging in regional collaboration for disease prevention and preventive care
- Ensuring full social participation of the elderly population
- Using information and communication technology for inter-generational interaction

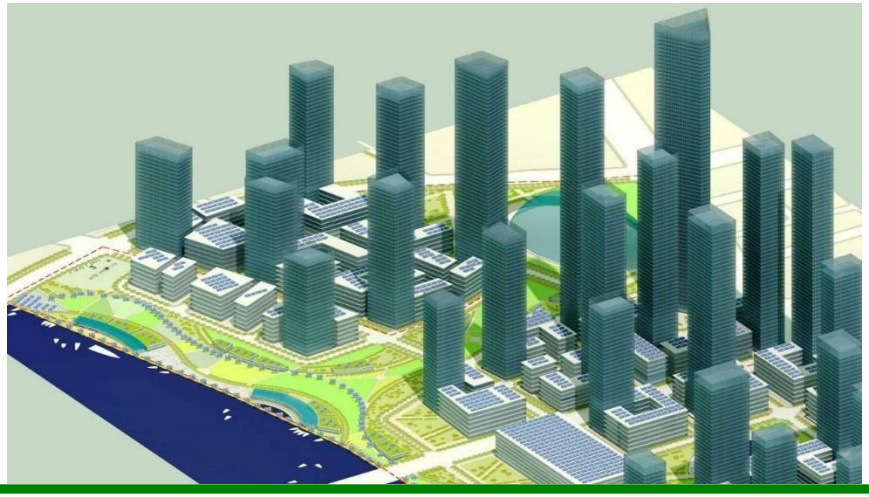
City of New Industry Creation

- Supporting local start-ups that utilize cutting-edge Japanese technology
- Fostering new industries that can provide a solid foundation for a green economy
- Creating a world-leading community of innovative start-ups

Safe, secure, and sustainable Smart City

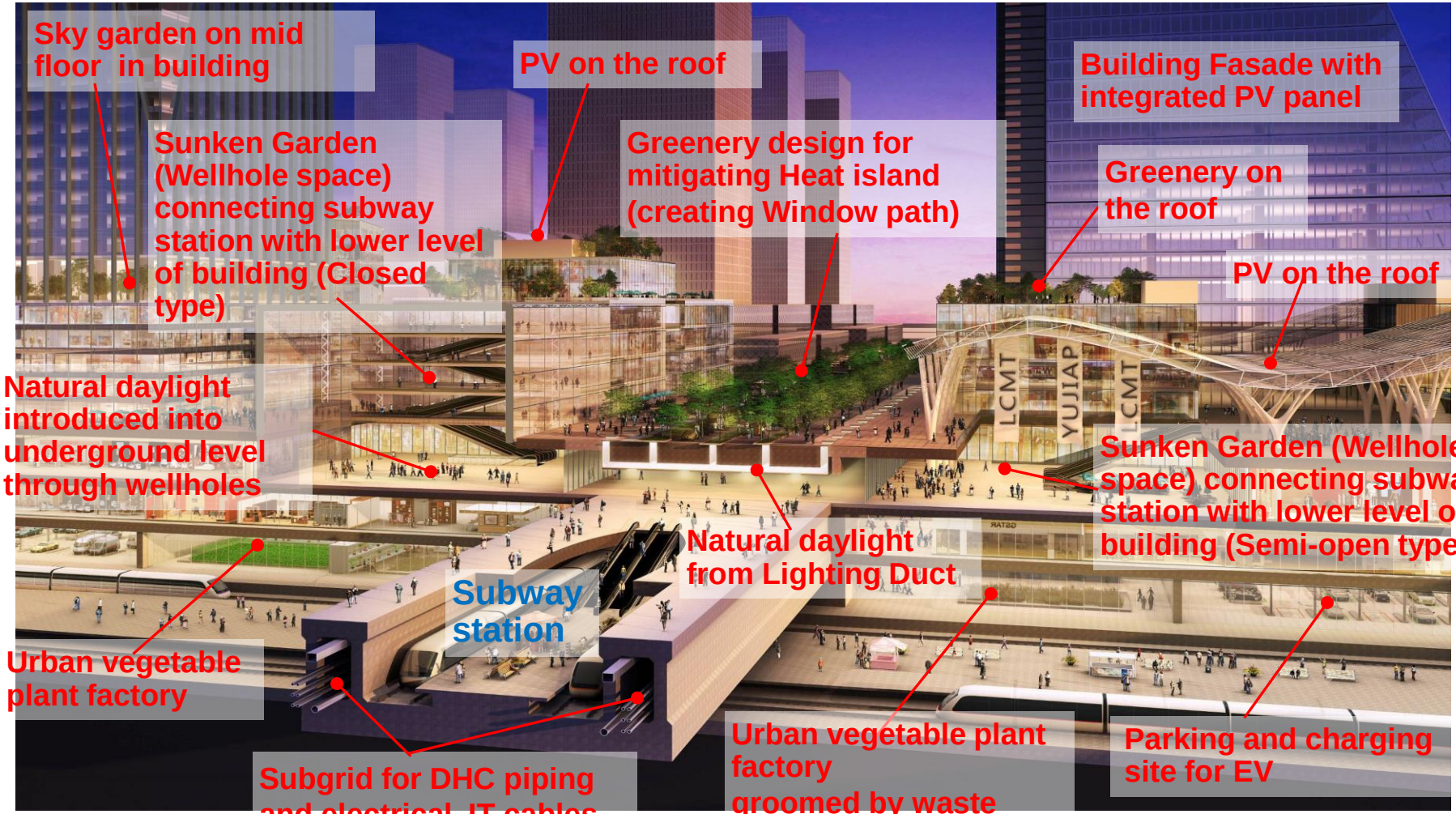
5. Tianjin Yujiapu APEC LCMT Phase1, Tianjin, China

- The Central Business District occupies 4km2 with a total construction area of 9,500,000m^2
- Planned daytime population is 500,000 and 50,000 in nighttime.
- Construction is ongoing in some par of precedent development area.



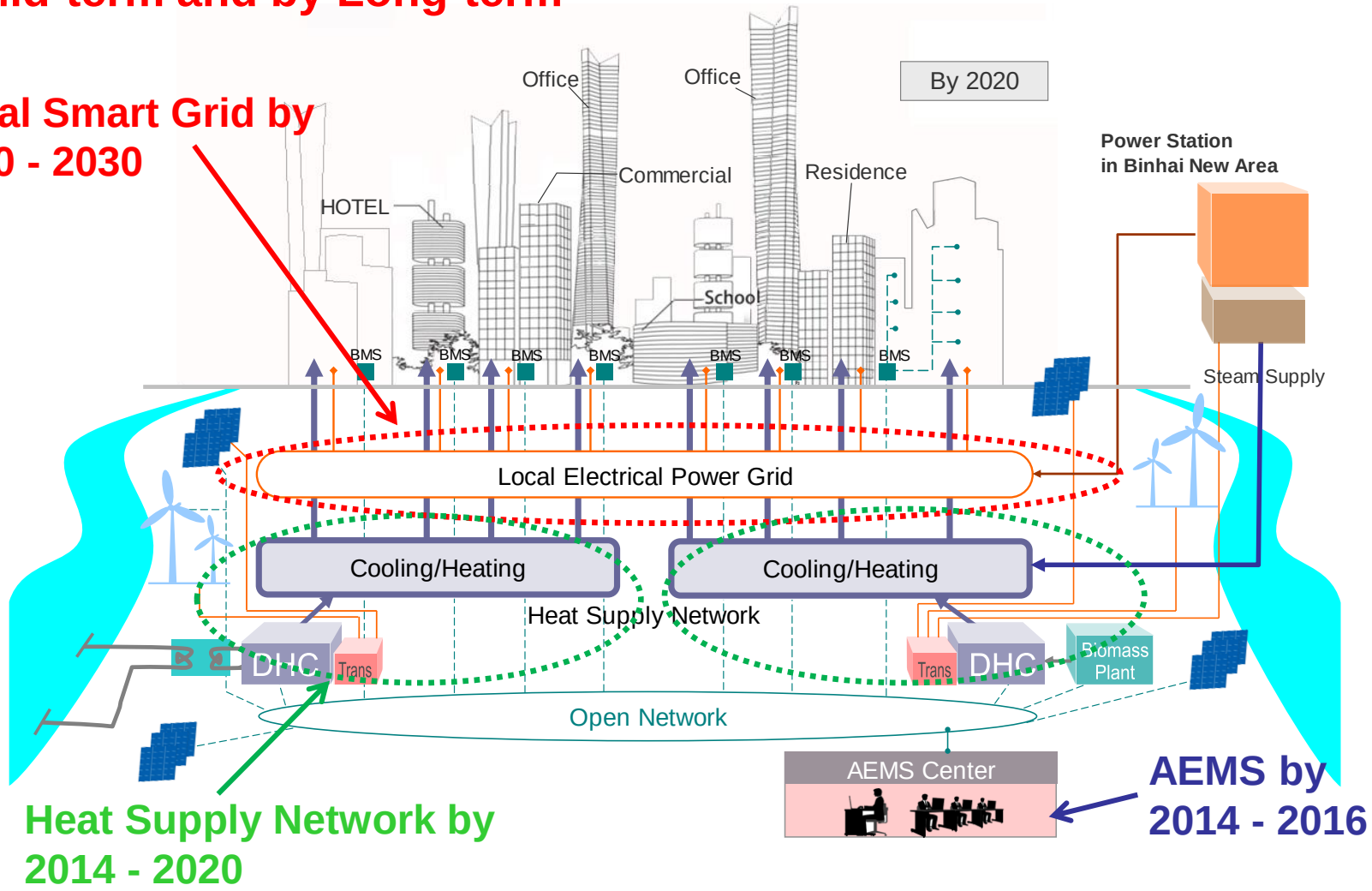
5.. Tianjin Yujiapu APEC LCMT Phase1, Tianjin, China

Compact and TOD (Transportation Oriented Development)



5. Tianjin Yujiapu APEC LCMT Phase1, Tianjin, China

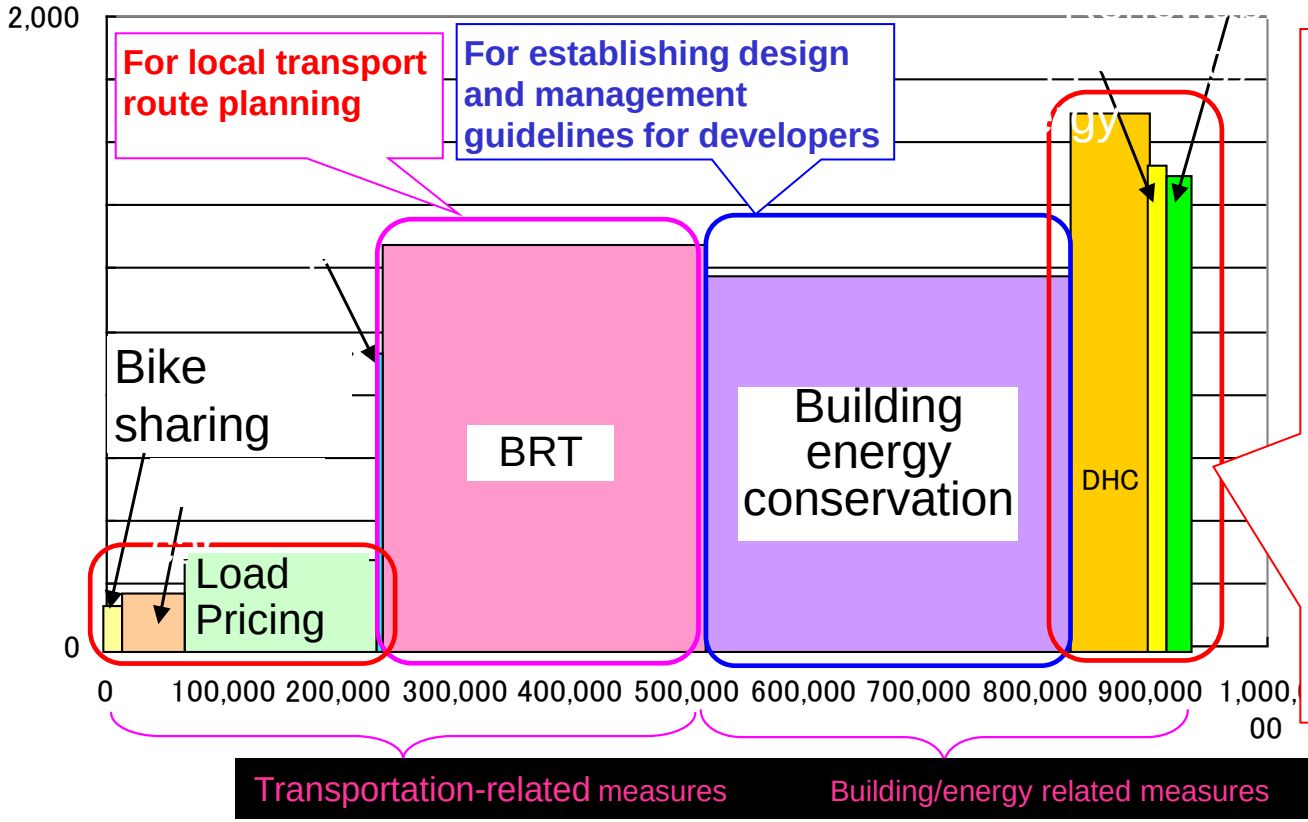
Prepare appropriate plan of Area Energy Network and AEMS by Mid-term and by Long-term



5. Tianjin Yujiapu APEC LCMT Phase1, Tianjin, China

Justify the choice of Smart Measures by comparing the performance of costs and energy efficiency

Example of cost performance plot



Business planning for:
- Technical specification
- Business profitability
- Recruitment requirements

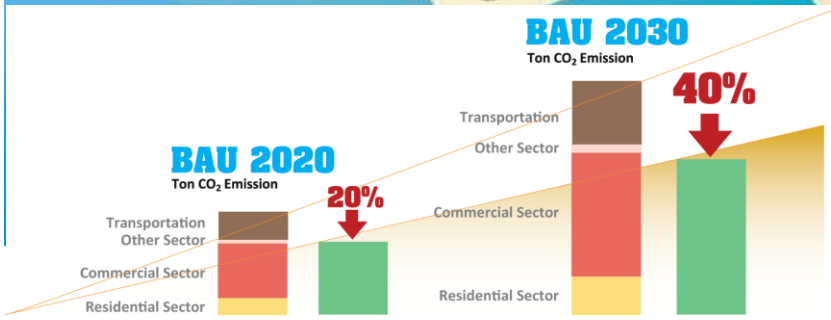
<Technologies>
- DHC + Cogen
- Smart Grid (Cogen + PV + biomass)
- AEMS+ Ubiquitous Network
- Transportation measures

6. Samui Island APEC LCMT Phase2, Thailand

SAMUI'S SMART GRID MODEL

Aim to become the first Smart Resort Island in Asia

- Island area : 228km2
- Population : 53,000 persons
- Tourists : 900,000 persons/year
- 1 hour fright from Bangkok



- **Smart Grid & energy self-reliance**
- **Building renovation (and new construction) guidelines for resort hotels**
- **Eco-lifestyle (including eco-tourism)**
- **Biodiversity and smart use of local natural resources (e.g coconut)**

6. Samui Island APEC LCMT Phase2, Thailand

Aiming the implementation of “ Island Grid “

SAMUI'S SMART GRID

Supply side

Electricity power supply

Small hydro power

Wind power

Biomass power

CGS

PV

Smart Grid

AEMS Center

Demand side

Hotel

Office

Commercial

residential

Smart mater

Smart mater

Smart mater

Smart mater

Smart mater

EV

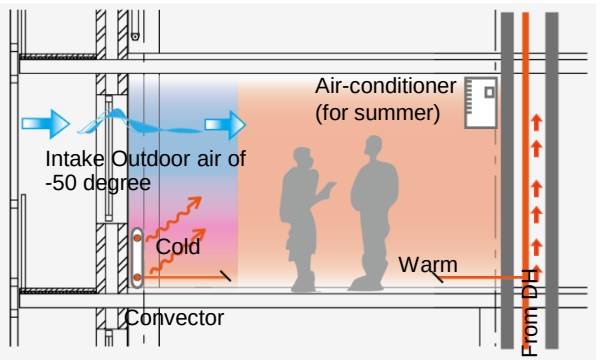
AEMS : Monitoring and Control on both Demand side and Supply side

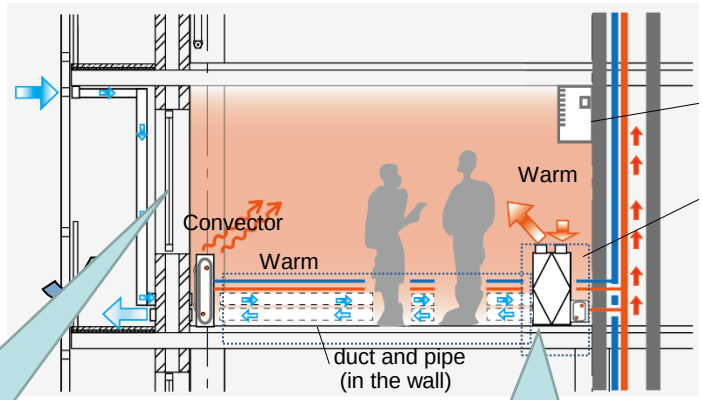
7. K-City, Krasnoyars City, Russia

- K-City project is the development of residential area in Krasnoyarsk City.
- This project is now on going for construction as the first Smart residence in Russia.
- Advanced low energy and Smart life supported by ICT are the characteristic point of view.

Aiming Advanced High Efficient Low Energy Households

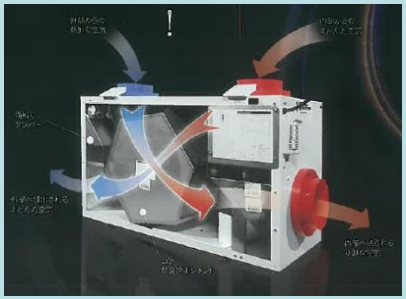
30% energy reduction is achievable by installing high performance windows and reducing the outside air load.





Detail of Super type window

Coefficient of overall heat transmission

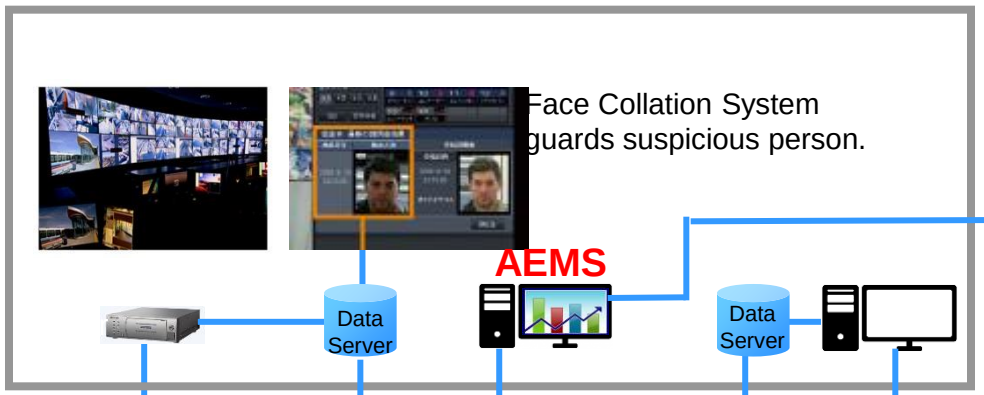


Sensible heat exchanger unit

7. K-City, Krasnoyarsuk, Russia

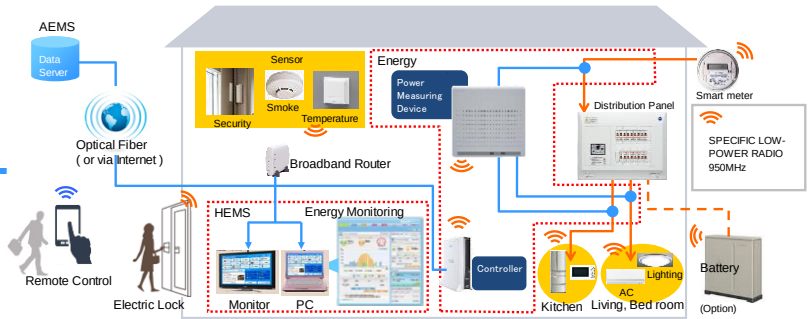
Securing House Energy Management, Safety and Security in residence

Comprehensive ICT Network for Security

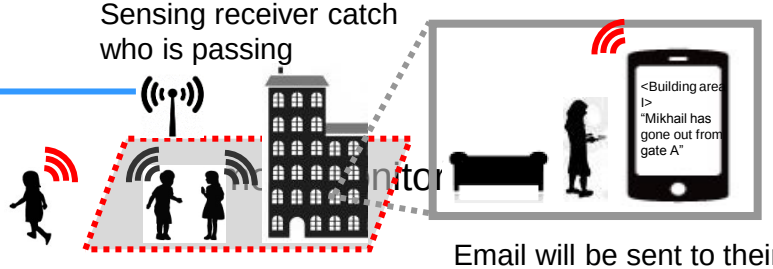


maintain the security of by carrying out a patrol

HEMS



Sensing receiver catch who is passing



Kids hold RFID tag

Email will be sent to their family automatically and make attention

[Reference] Products of NEC, Hitachi, Toshiba, etc

Annex

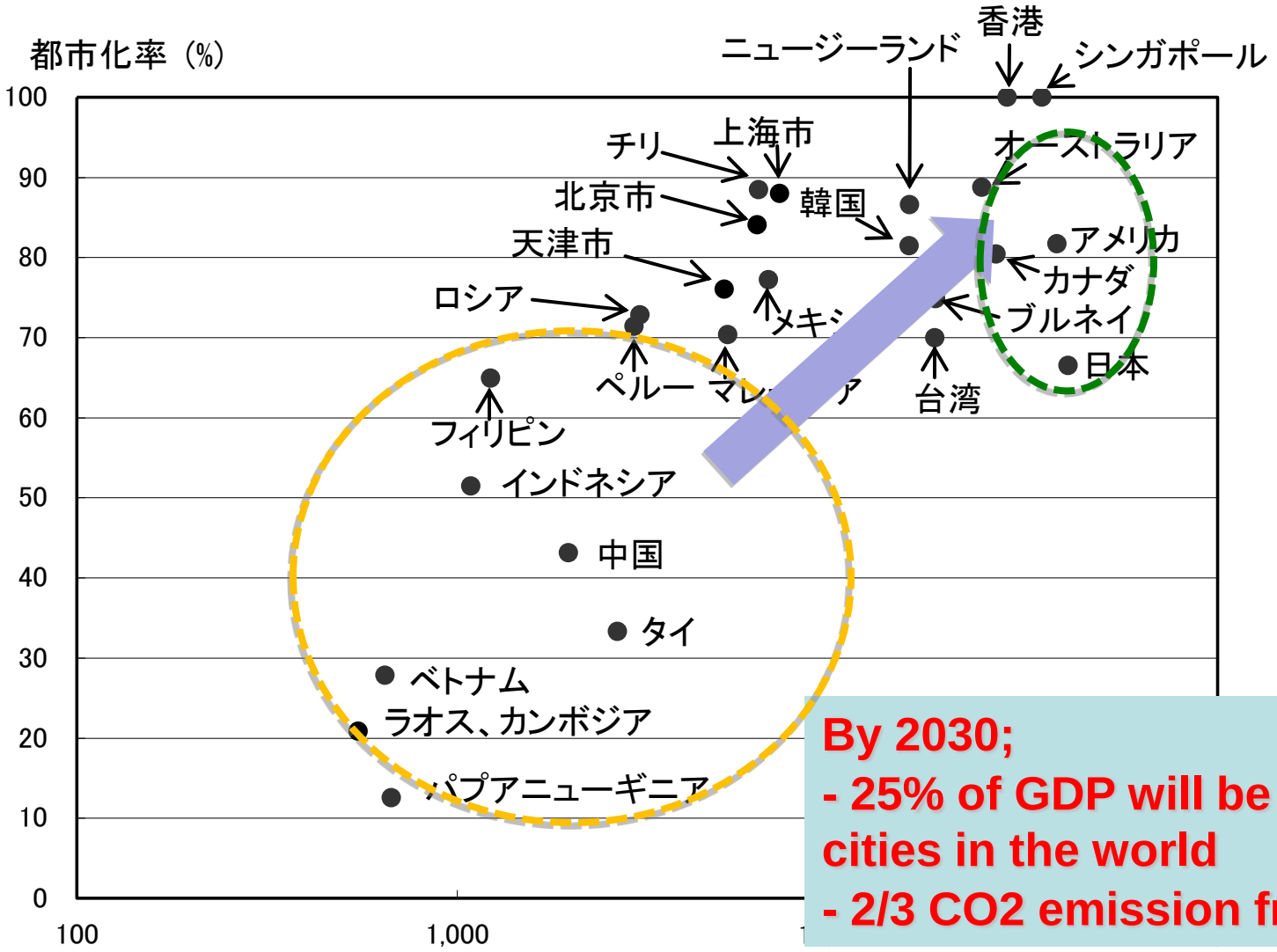
4. Kashiwanoha Smart City

Micro Grid in Kashiwanoha as community revel
Coexistence both Commercial grid and Micro grid

Gate Square can cover 60% when temporary power down and 20% when black out in diseases.
3 day's power supply will be ensured in Kashiwanoha area

Background　ますます“都市化”が進む

2/3 of world population will live in cities

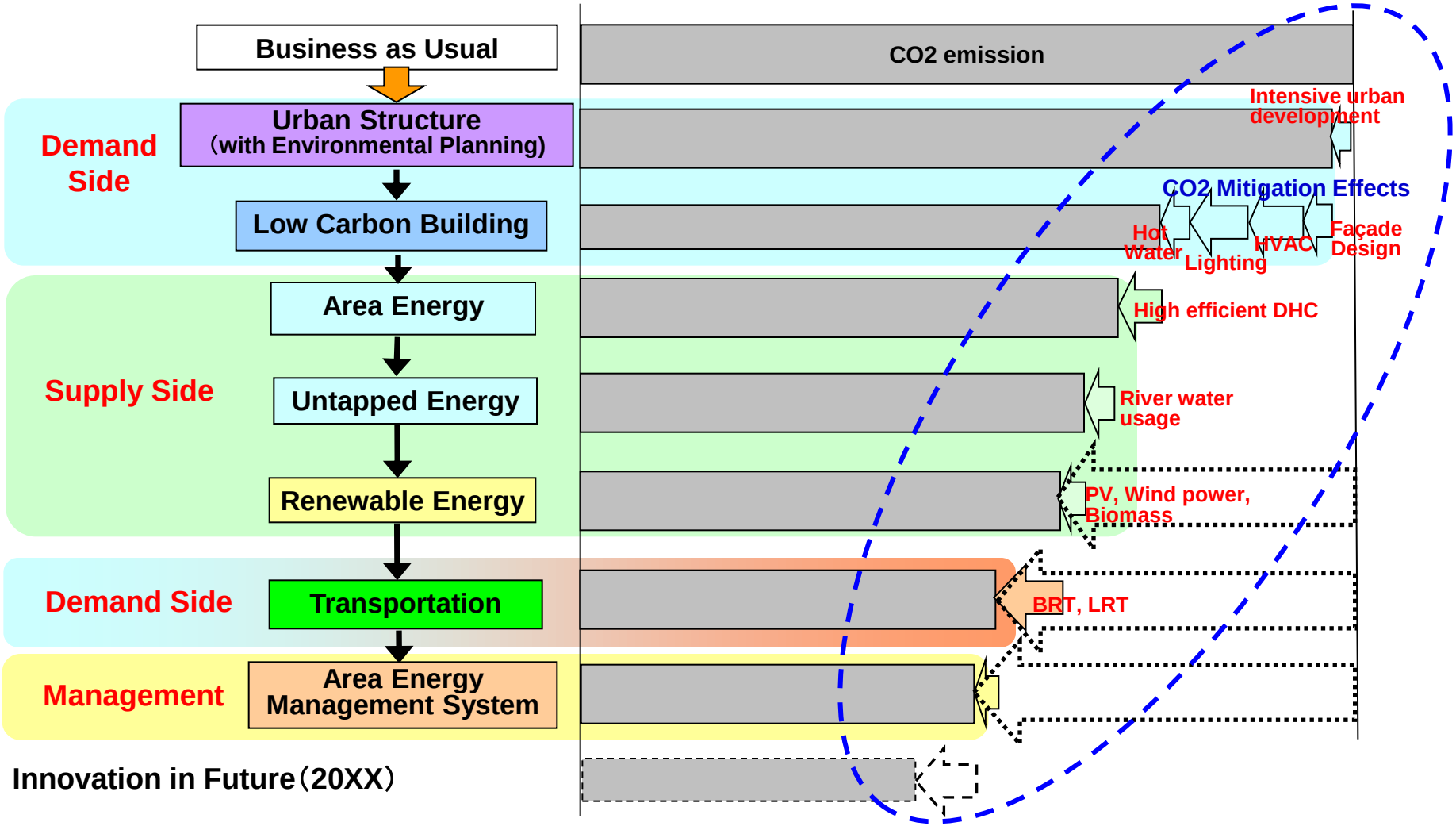


By 2030;
- 25% of GDP will be from top 10 cities in the world
- 2/3 CO_2 emission from Cities

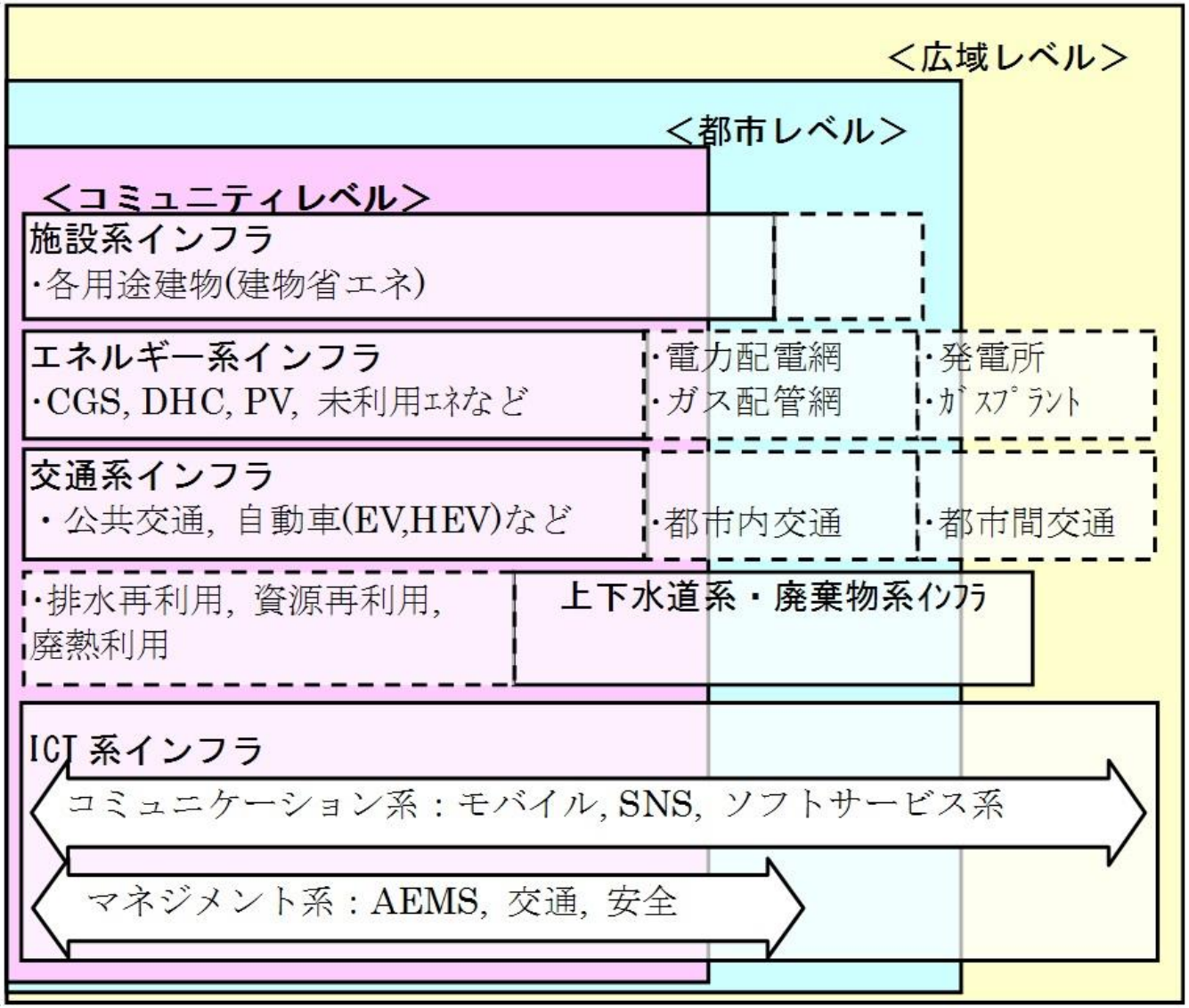
出典："APEC Energy Statistics 2008", Energy Working Group, November 2010.より作成

Hierarchy Demand side Design

Setting Integrated Low Carbon Target both Comprehensive and Sub categories



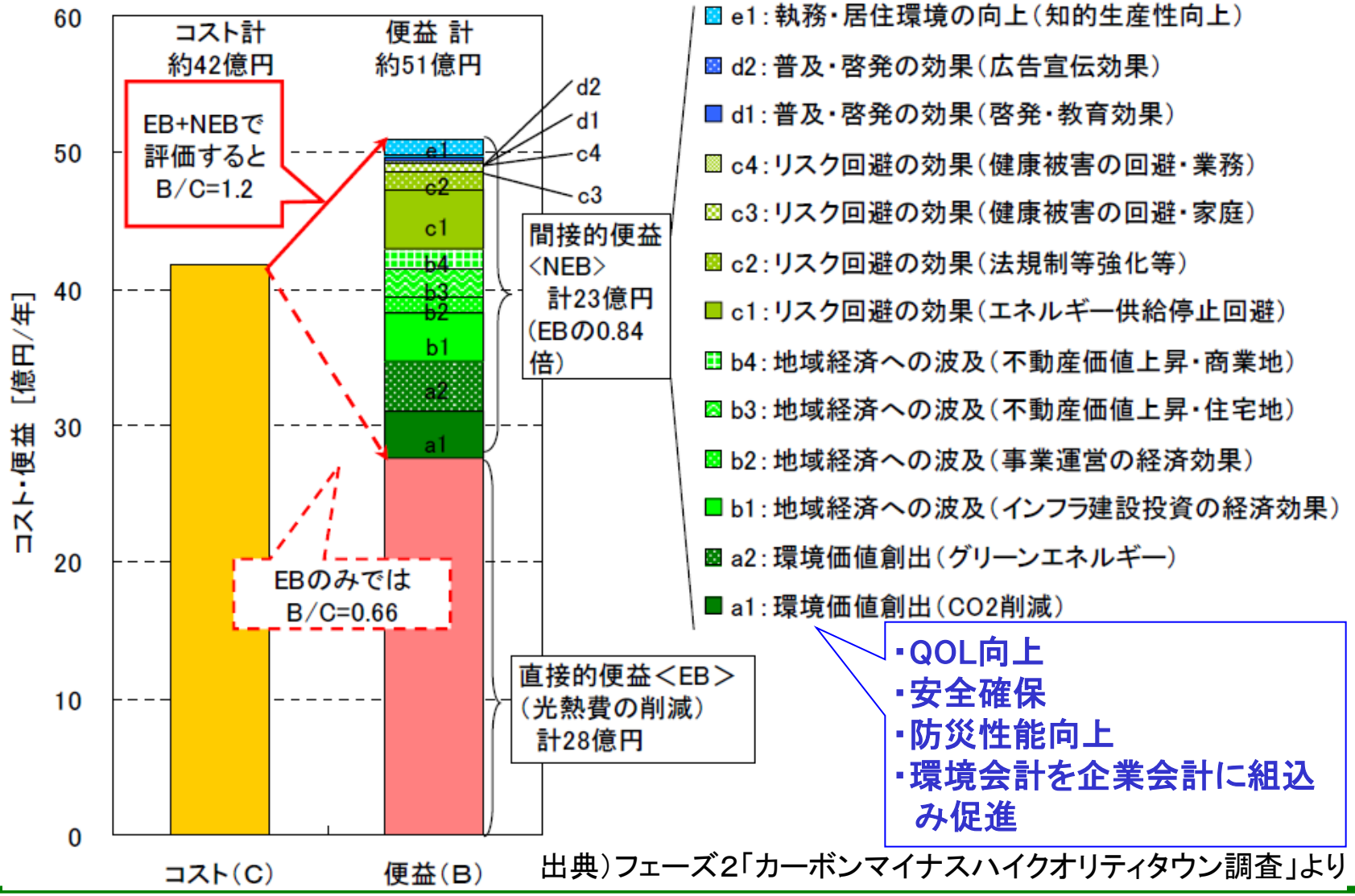
Smart technologies in each scale of Urban



スマートシティ「実現」のために重要なこと

Consider both Direct benefit and Indirect benefit !

NEB（Non-Energy Benefit)を考慮した場合の評価結果例



- QOL向上
- 安全確保
- 防災性能向上
- 環境会計を企業会計に組込み促進

出典）フェーズ2「カーボンマイナスハイクオリティタウン調査」より