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Planning of Green ILC community coexisting with the region(Green ILC)

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(Advanced Accelerator Association Promoting Science and Technology)

What is the success of attracting ILC?

Will ILC have any impact on the local environment?

In recent ILC attracting activities in Japan,

it is necessary to explain the contribution of ILC to the region in order to gain understanding to the general public and to raise expectations.

“Regional contribution” and “sustainability” are important themes.

WG analyzed successful examples of community development and narrowed down the 3 themes of the ILC community plan, as follows.

1. Coexistence with ILC and local communities, contribution to the region

To Reduce environmental burden
and to bring about local human resource utilization and economic cycle.

2. Creating “a multicultural international city”

For the success of ILC,
it is important to create “a multicultural international city”
where scientists and their families move to the region
and Japanese creative human resources and companies interact.



3. Sustainable community management that attracts creatives

To sustain the value of the ILC community and further evolve into advanced region.

Philosophy of GreenILC

In order for a large-scale business like ILC to be accepted by the region, It must be a sustainable project that reduces environmental burden and coexists with the local communities and contributes to the region.

The following policies have been compiled for local contribution by ILC.

Forest and heat link ILC and the region

- 1-1. Development of a **“Thermal Eco Community”**
that effectively uses waste heat from ILC and the region.
- 1-2. ILC community development of **“Wood First”**
to utilize rich forest resources in the region.

1-1. Thermal Eco Community

1-1. Thermal Eco Community/Forest and heat link ILC and the region

Contribute to the region by creating a “Thermal Eco Community” near ILC that effectively utilizes the high-capacity mid to low temperature (40-70 °C) waste heat generated during ILC operation.

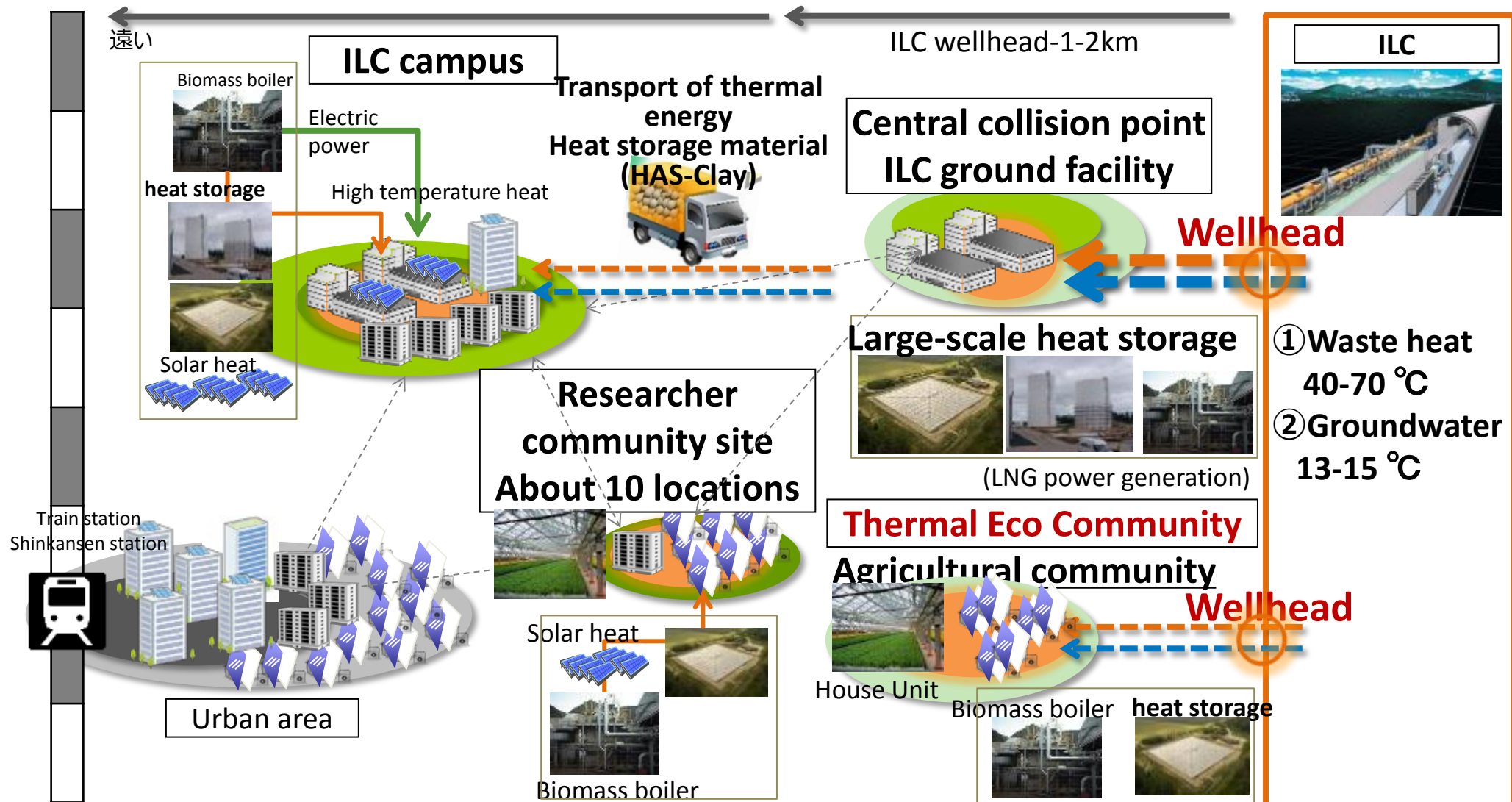


Develop a “Thermal Eco Community” that uses renewable energy such as solar heat and “unused biomass” born from rich forest resources and granary areas.

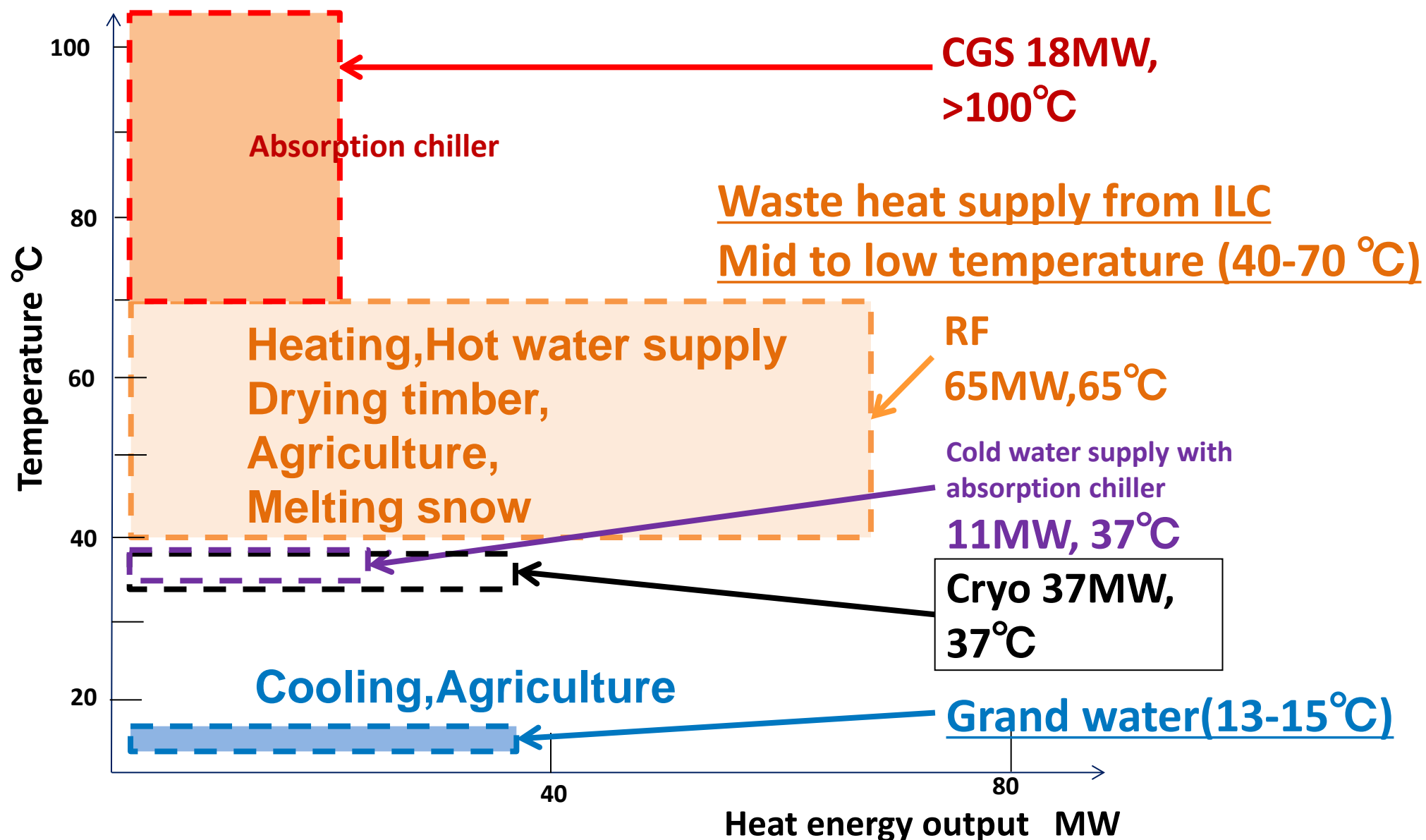
1-1. Thermal Eco Community / Effectively utilize ILC waste heat

Creating a society that effectively uses solar heat, woody biomass, unused waste heat from industries, etc.

After ILC operation, it becomes a base for waste heat supply.



1.1 The diagram of temperature and energy output of waste heat



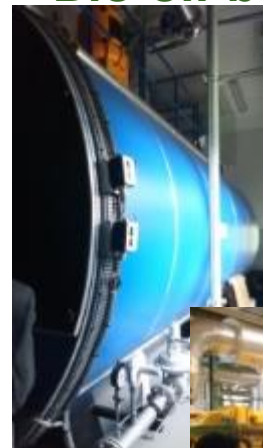
1-1. Thermal Eco Community /Denmark 4th generation heat supply business

It is a sustainable project that is built with a partnership funded by local residents and that is operated and maintained by itself.

■ Solar thermal plant (27MW)



■ Bio oil boiler

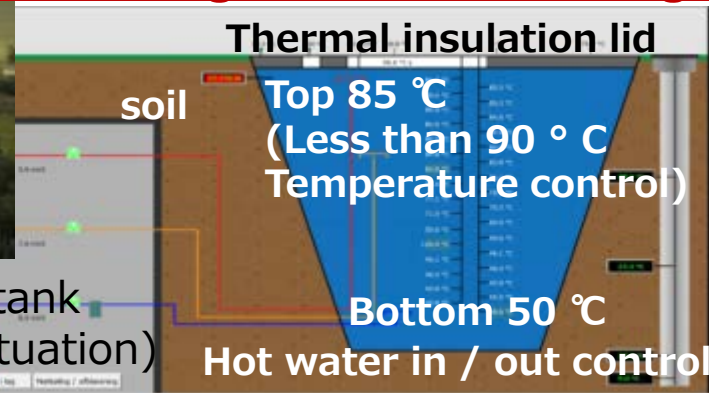


■ Natural gas boiler 30%

Equalizing heat demand with large-scale heat storage



■ Large-scale heat storage tank (Corresponding to daily fluctuation)



Reduction of heat loss and efficient conveyance

■ Heat piping



Return temperature 30~40°C

Mid-low temperature range supply at 70 ~ 75 °C

■ Consumer equipment



Thermal Eco Community × Agriculture

1-1. Thermal Eco Community / Waste heat use agriculture base

Aggregate abandoned farmland, establish agricultural production bases that supply unused waste heat and CO₂, and attract agricultural corporations.

Agricultural production corporation

Agricultural production ~ distribution ~ sales

Waste heat and waste CO₂ agriculture / aquaculture complex



• Site-Construction-Maintenance

Government / local farmers

Provision of abandoned farmland
or consigned farmland

ILC wellhead-1-2km

Central collision point
ILC ground facility

ILC



Wellhead

**Supply of waste heat,
cold groundwater
and waste CO₂**

- ① exhaust heat
40-70 °C
- ② Groundwater
13-15 °C

Biomass • CGS



ILC Campus



1-1. Thermal Eco Community × Agriculture

[Agricultural Production Corporation] AEON Agri-Creation Hanamaki Farm

ILC waste heat is also effective for agricultural use.

ILC waste heat (mid to low temperature range) can be used for agriculture-house heating

It should be possible to reduce the utility cost, which accounts for 1/3 of the expenditure.



The viewpoint of selling overseas is important

ILC gathers cutting-edge scientists. Easy to expand overseas if appealed by agriculture.

Triggered by ILC

It should be an agricultural showroom made with the international standard "Global GAP"

1-2. Wood First Community

Regional forest



Wood First Community

Wood chip manufacturing

Effective use of unused wood resources



Heat / CO2 fertilizer

Woody biomass boiler



ILC campus and community

Make all campus community buildings wooden.



Accelerator Laboratory example (CERN@ Around Geneva)

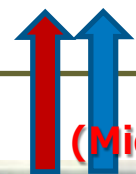


Community Site@Sofia Antipolis)

Wooden accelerator facility (PSI Facility@Zurich)



Wooden farm house (Rikuzentakata)



4th generation heat supply (Mid-low temperature heat supply)

ILC waste heat

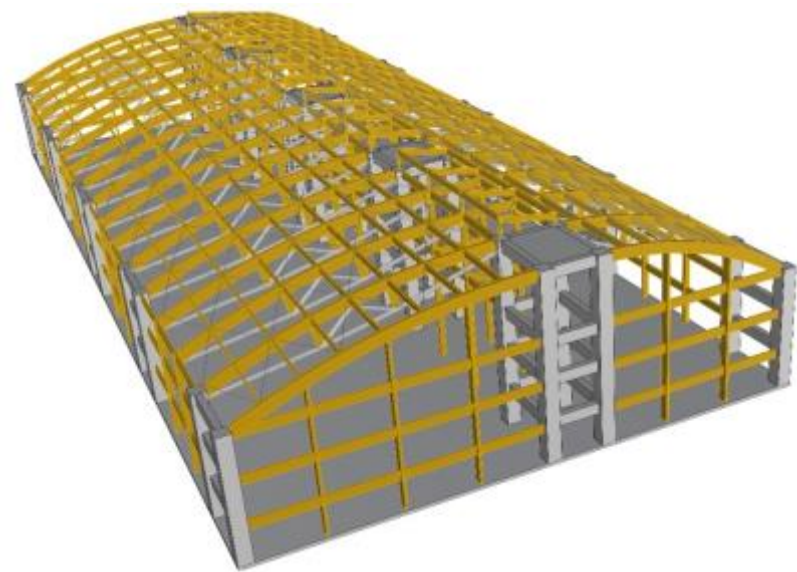


Seasonal heat storage



1—2. Wood First Community / **Ripple effects**

Examining economic ripple effects when ILC buildings are made into wooden structures.



■ Model plan

- One-story house

Total floor area: 6,000m² (50m × 120m)

- RC structure for foundations, columns and earthquake-resistant walls

Comparison of economic ripple effects with other structures as steel or wooden

- **Use “Red pine(Akamatsu)” for wood.**

“Red pine” is abundant in the region and suitable as a structural material, but the utilization rate for building materials is less than 40%, so the use promotion for building materials is desired.

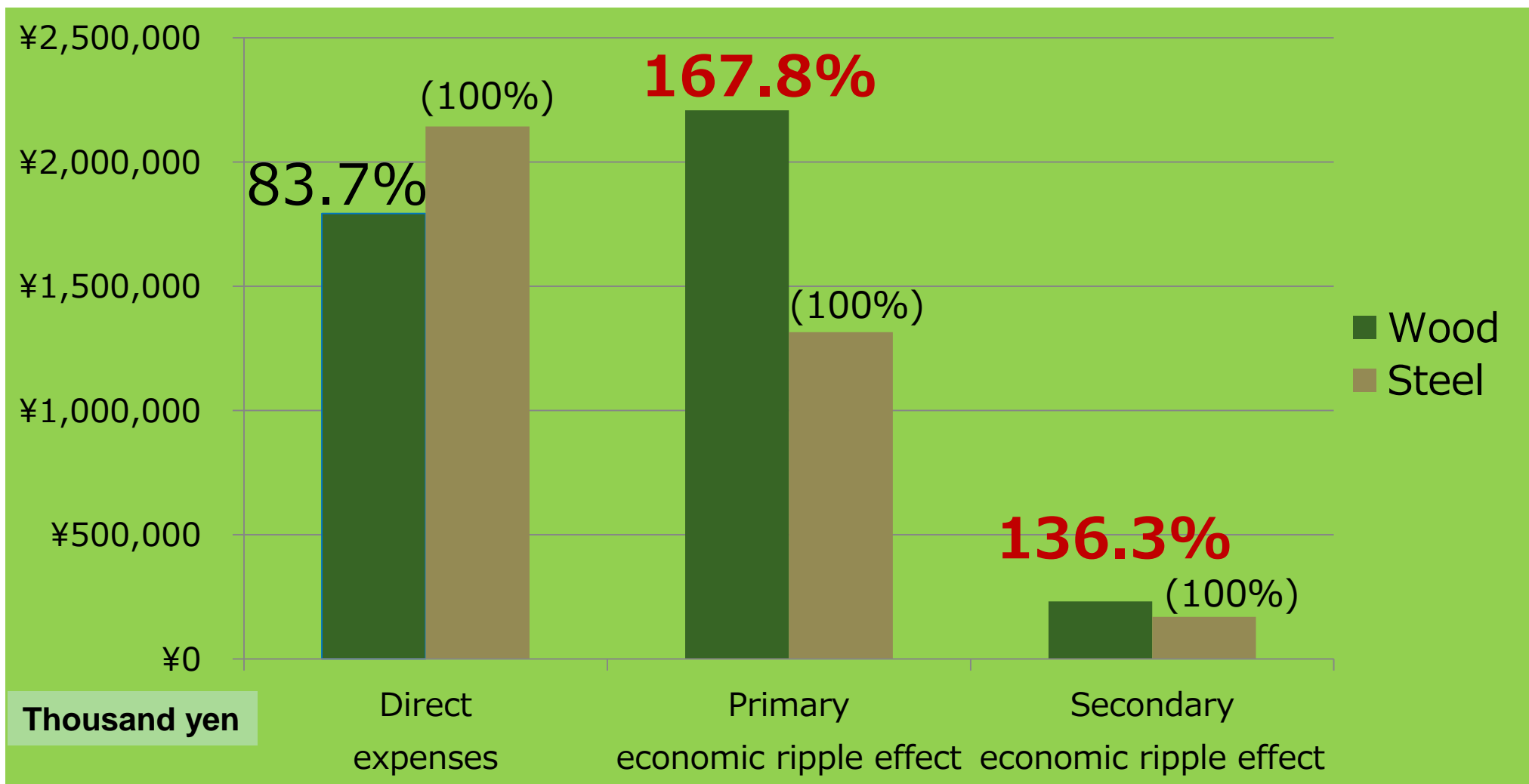


PSI SLS Wooden Facility @ Switzerland

1—2. Wood First Community / Ripple effects

Examining economic ripple effects when ILC buildings are made into wooden structures.

**In contrast to steel structures,
wooden structures have a very high economic ripple effect.**



Significance of creating “**Thermal Eco Community**” and “**Wood First**”

- **Expanding the possibility of utilizing renewable energy and unused waste heat in the region**
(ILC and other industrial waste heat, solar heat, etc.)
- **Expansion of heat use to primary industries such as agriculture, forestry and aquaculture**
- **Through the use of wood resources, contribute to the region and create a sustainable cycle**
- **It is possible to use local materials, local construction and maintenance.**
- **Long-term service** • **Low cost**

2. Community design and management

2. Community design and management

For community sites for researchers and families to be launched in advance after the start of ILC construction, we investigated success stories of community planning, and area management.

① CERN (Switzerland, France)

- ✓ Multi-cultural international research city
- ✓ ILC precedent case



② Sofia Antipolis (France)

- ✓ Europe's largest science park attracting creative layers and advanced research and development



③ Letchworth 'the Garden City' (UK)

- ✓ The world's first garden city that lasts more than 100 years
- ✓ Sustainable town development



2. Creating a multicultural international city

- 2-1. Establish community sites that take advantage of the attractiveness of each region. (**Distributed at an appropriate scale in various locations**)
- 2-2. Establish a “**lifestyle campus and community site**” that supports **the work-life integration of scientists and their families**
- 2-3. Initiatives for **coexistence with local communities**

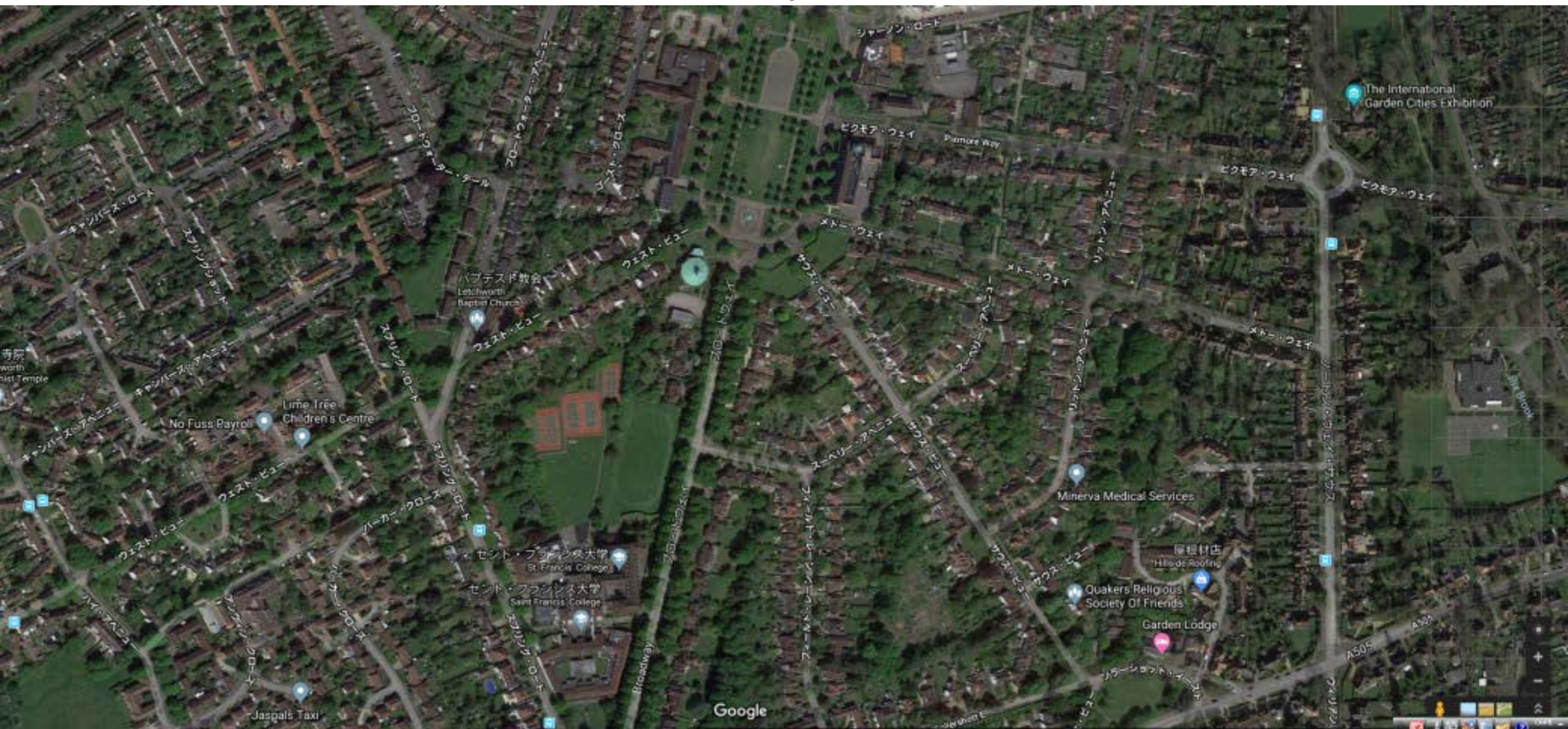
3. Sustainable community management that attracts creatives

- 3-1. **Management by a sustainable business organization**
- 3-2. **Growth management** that promotes ‘**knowledge transfer**’ and industry creation

Letchworth 'the Garden city'

Area management for sustainable town development

Letchworth “ the Garden City ”



115years

The first country city in the world
Development work started in 1903
Town management by Letchworth Rural City Heritage Association

Garden City

- ① Green common and village green
- ② Supplying fresh crops from the green belt
- ③ Economic and beautiful house with good energy efficiency



Commercial / business area

Terraced House

Community planning

④ Housing lots of various sizes and various houses

⑤ Proximity to work and residence

school

Area management

- ⑥ Management organization implements community development
- ⑦ Share land and operate with leasehold rights
- ⑧ Development profits are returned to the community



田園都市レッチワース、レイズ・アベニュー（1936年の写真）



田園都市レッチワース、レイズ・アベニュー（1955年の写真）



田園都市レッチワース、レイズ・アベニュー（1969年の写真）



田園都市レッチワース、レイズ・アベニュー（2010年の写真）

http://d.hatena.ne.jp/baby_theory/20120821/p1



田園都市レッチワース（Google ストリートビュー、2009年）

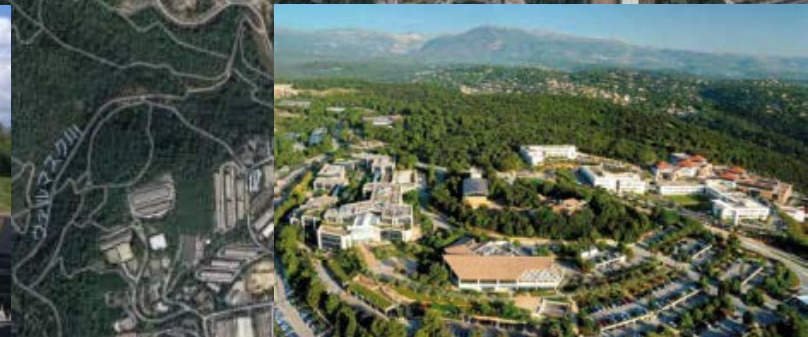
**Regeneration of the
central city
Maintaining proximity to
work and residence**

Sophia Antipolis

Work-life innovation campus that coexists with nature
Growth management

50years

- ✓ Work-life innovation campus that coexists with nature
- ✓ Growth management with appropriate scale, distributed placement and stage development



Community site example (Sofia Antipolis residential area)

✓ Both individuals and families can have a pleasant private life.
and work from anywhere



● 200-300 residential communities

▪ various types of houses

such as detached houses, terrace houses, apartment houses, etc.

▪ Park ▪ Sports complex ▪ School facility

There are hotels, supermarkets, restaurants, golf courses nearby.

Community Design Code

Sustainable community development that coexists with forests and nature

- Community of appropriate size (200-300 units)
- All wooden
- Green garden community

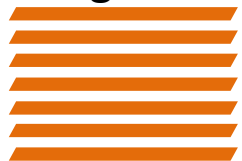
Abandoned farmland

→ **Agricultural complex**
(heat supply)



Energy local production for local consumption

4th generation district heat supply



Large scale heat storage

- Solar heat plant
- Unused biomass heat use
- Unused waste heat recovery



Wooden Residence

Residence

Greenbelt and **Agricultural complex**

Central green park

Sports Facilities
Square and Marche
Child facilities
Restaurants
Hotel

Residence

Old city Area (local community)

- Efforts to foster exchange between communities
- Improve regional brands in the old city

Main road



For the next generation Evolving town development

● Growth management of community

(Returning development profits to the community)

● Incorporate cutting-edge technology

(Society 5.0/ICT・AI)

- Healthcare
- Mobility
- Human resource matching
- robot service / guidance

Test site for research on ILC-related companies
(medical, healthcare, robots, ICT, etc.)

Aiming to be a community site
that takes advantage of the uniqueness of Japan
and the goodness of Tohoku and Kitakami areas

Companies and creators that shift to rural areas

(Kamiyama-cho, Tokushima Prefecture, satellite home office)

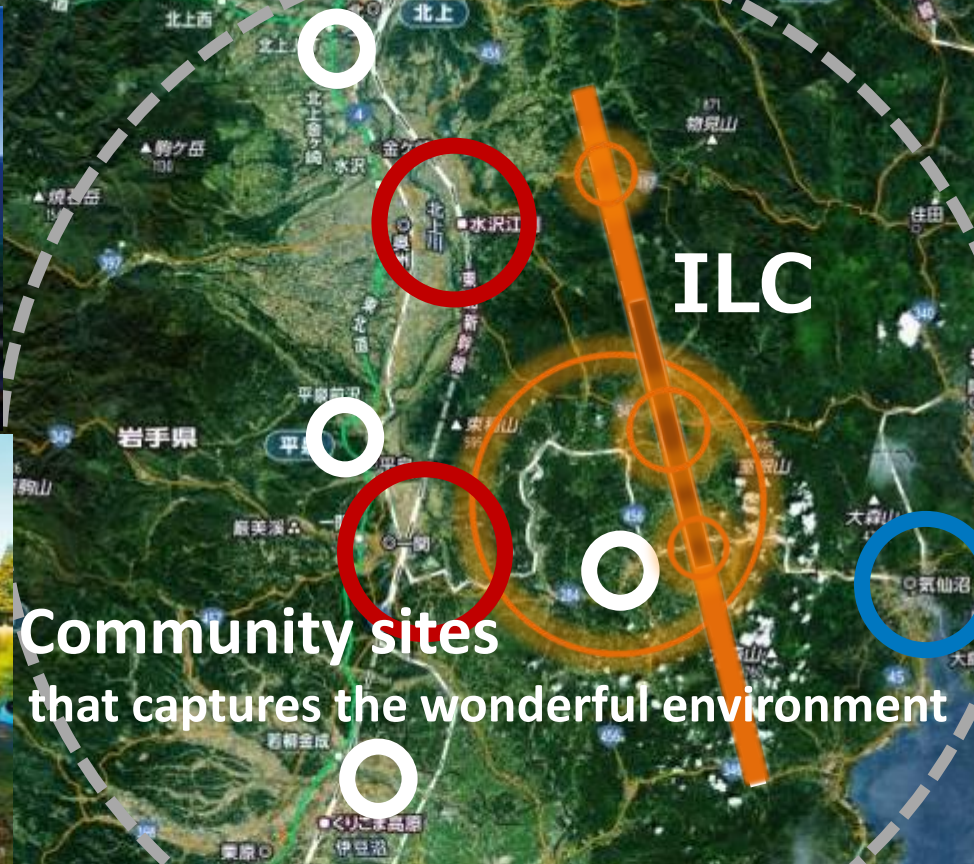
**While enjoying life in a region rich in nature,
An increasing number of people are engaged
in creative corporate activities.**

- Securing excellent human resources in rural areas
- Introduced satellite offices for corporate BCP
BCP (Business Continuity Plan)
- Equipped with an advanced IT environment
that allows remote work with the city center
without stress.



Distribute community sites that take advantage of the favorable environment

Attractive community sites will be located within a 30-minute drive from the ILC campus.

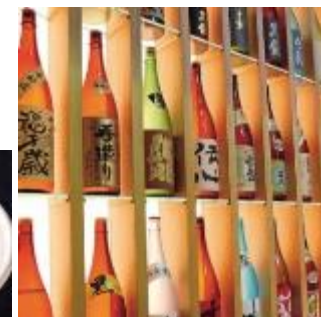


Community sites
that captures the wonderful environment



Community Sites to enjoy the goodness of the region and a cutting-edge lifestyle

Have you live in ILC communities
that fully utilizes the goodness of Tohoku and Kitakami areas



Town development that takes advantage of
cutting-edge technologies and know-how from around the world

Drone delivery, automatic driving car, robot work, 4th generation heat supply



Thank you for listening

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