

Sapporo's Urban Management and Roles of the Underground Path

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ABSTRACT

The city of Sapporo plans to change its focus and aims to become a compact city by effectively utilizing the existing infrastructure to revitalize and rediscover the city.

The first project is the development of an additional underground pedestrian path to connect the existing underground pedestrian paths and facilities in the downtown area. By creating an expanded network of approximately 6 km of underground pedestrian paths, it will link the city's two major commercial districts, encouraging the development of private sectors, increasing economic viability, and livening up tourism-related activities in the downtown core.

The second project is to implement the optimum use of existing air conditioning system as well as the use of cold-thermal energy by utilizing one of the region's resources: snow. This energy system will be developed together with the underground pedestrian network.

1. SAPPORO'S CHARACTERISTICS AND METHODS OF TOWN DEVELOPMENT

The city of Sapporo is located at 43° north latitude, the same latitude as Rome and Marseille, yet it has an average annual snowfall of approximately 6 meters with an accumulation of approximately 1 meter. On average, the city has approximately 48 days of below freezing weather each year. Sapporo is one of Japan's major cities, growing to a population of approximately 1.9 million since it was declared a city 140 years ago in the late 1860's.

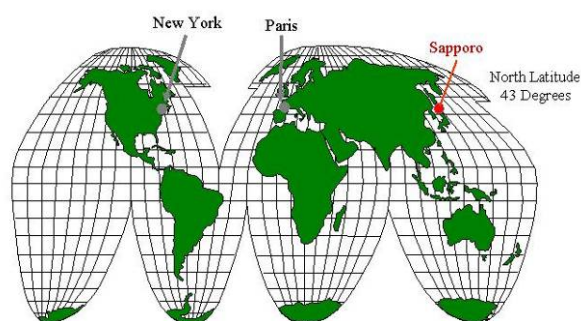


Fig. 1. Location of Sapporo City

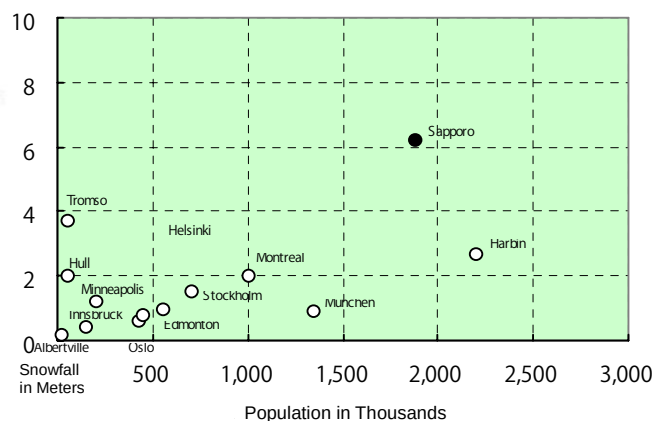


Fig. 2. Amount of Snowfall & Population of Major Cities in the Northern Hemisphere

Over the next 100 years, the city grew rapidly until the population surpassed 1 million. In 1972 the city's roads, water service, sewers, subways, and underground shopping areas developed rapidly as the city hosted the 11th Winter Olympic Games. This helped accelerate improvements to the city's urban infrastructure, resulting in the city spreading over a wide area in a low-density manner. However, this type of city development lead to an inefficient use of energy, increasing carbon dioxide emissions, and losing the natural environment, thereby worsening the planet's environmental problems and reducing the quality of the environment and life within Sapporo.

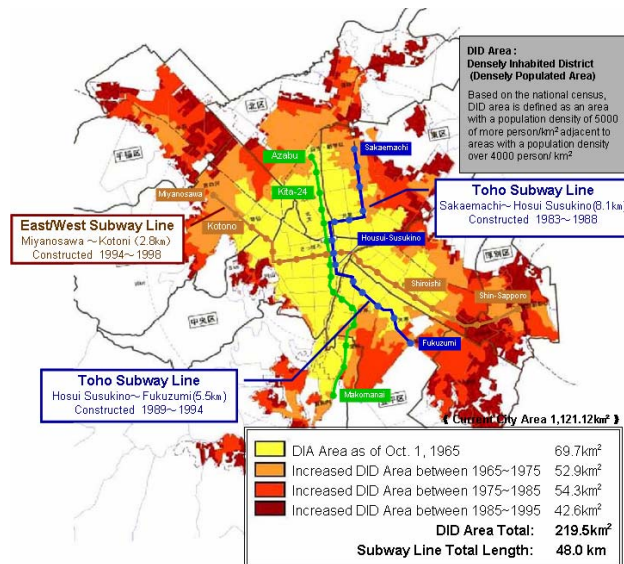


Fig. 3. Expansion of Concentrated Populated Areas and Subway Expansions

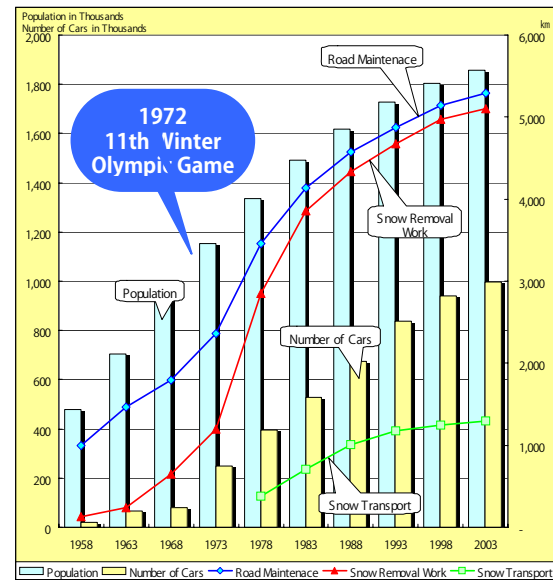


Fig. 4. Sapporo's Measure Taken for Snow

It is speculated that the rate of population increase will slow down in the near future due to a decrease in birth rate and an aging society emerges. While under continuous financial restrictions, the city hopes to revitalize the urban areas and to create a scenic city.

In order to put a stop to urban sprawl, the city now plans to change their focus and aim to become a compact city by effectively utilizing the existing infrastructure to revitalize and rediscover the city.

The first project is the underground pedestrian path development, which will connect the existing underground pedestrian paths and facilities in the downtown area. This is the introduction of the city's new strategic planning targeted toward the downtown area, which will result in meeting citizens' needs and improving public services. Furthermore, the city of Sapporo is aiming toward an environmentally-friendly planning strategy for urban revitalization and developments, actively promoting environmental and energy management activities while preventing global warming.

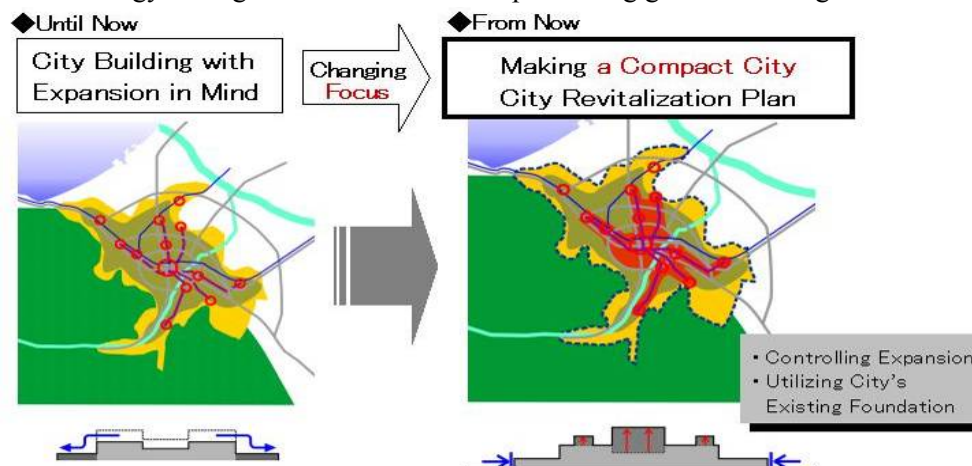


Fig. 5. Revitalizing the City of Sapporo by Becoming a Compact City.

2. SAPPORO'S URBAN MANAGEMENT AND ROLES OF THE UNDERGROUND PEDESTRIAN PATH

2.1 Sapporo Ekimae-dori underground pedestrian space project

In 2000, the fourth term composite plan aimed toward an attractive and energetic development for the center of the city. In 2002, a detailed development plan was established, and the "City Revitalization Project" was appointed as a national project.

The priority of the project is to create a city within which one can walk and live an abundant life. The project plans to control traffic in the center of the city, develop underground paths around the Sapporo Station, Sousei River Street and Odori, and also develop the water supply and shopping areas.

Above all, the current development of Sapporo Ekimae-dori underground pedestrian path is the most important undertaking for the revitalization of the city. This project will connect the existing Subway stations and underground shopping areas, forming a network of approximately 6 km of underground pedestrian paths. It will connect the two leading commercial areas located around the Sapporo Station and Odori / Susukino respectively. The total cost for the project is approximately 25 billion yen. About half of the cost is supported by the federal government, with the city paying the rest. The city hopes that the consumption level will increase and the economy will be positively influenced by creating safe and comfortable walkways that are unaffected by the weather, allowing shoppers to move about freely in the heart of the city. As well, by encouraging the buildings located above the paths to join underground, businesses will flourish and add to the liveliness of the underground shopping area. This will then encourage the buildings in the adjacent areas to redevelop, creating a ripple of positive economic effect. For example, the purpose of this underground space is not just to be a pedestrian path, but a multi-purpose, diverse area for providing information, allowing creative advertisement of commercial announcements, citizens' activities, events open to the public, enterprise events, etc. This will contribute to the city's revitalization by way of social mobility, redevelopment and profit.

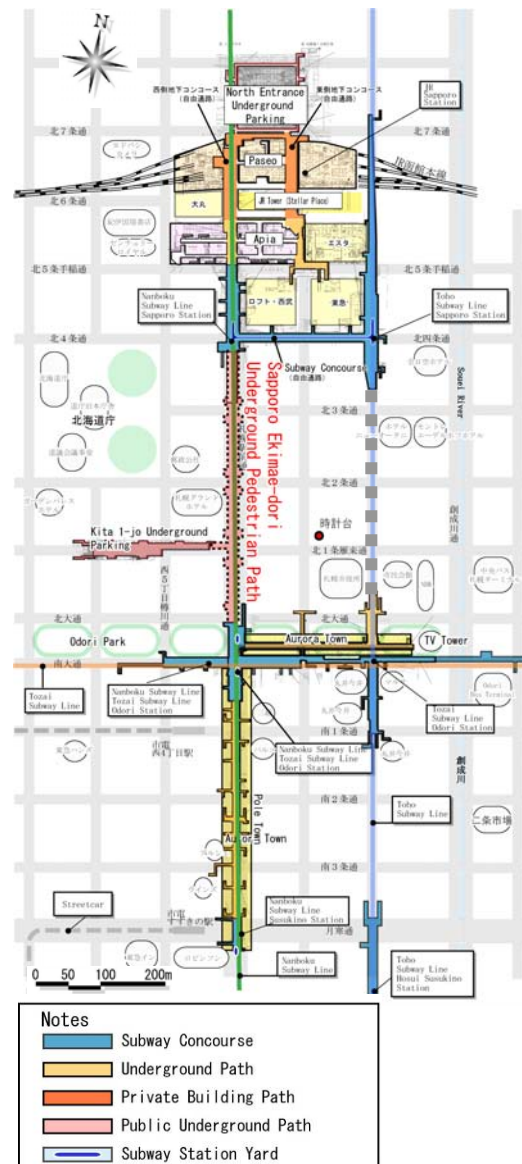


Fig. 6. Network of Underground Pedestrian Paths



Fig. 7.
Present State of
Sapporo Ekimae-dori



Fig. 8.
Image of Sapporo
Ekimae-dori Underground
Pedestrian Path

2.2 The use of new environmentally-friendly energy

The second plan for the city revitalization project is to become a city that uses readily available resources as a source of energy. Collaborating with the University-Industry Service, the city plans to introduce cold-thermal energy using snow, which causes lower environmental damage.

The city of Sapporo has been enabling its citizens to freely go about even in the snowy winter time by putting in an annual investment of 10 billion yen for snow removal.

Using other cities' precedents as a reference, the financial result for this service, depending on the amount of snowfall, is estimated at approximately 6 to 12 times the investment amount. If the city continues to develop in the urban sprawl manner and it keeps investing money into snow removal services, the areas for snow removal will widen and the tax revenue will dwindle until the snow removal service becomes only an obligation with no return, thereby causing a weakening of the city's financial situation.

Therefore, the city aims to become more compact and control the environmental burden by developing this underground pedestrian path. The area's energy plants and natural gas, air conditioning and heat conduit network will be connected and developed together with the path for Sapporo to become a city that uses energy that has low environmental damage.

The north square at JR Sapporo Station is equipped with an underground snow reservoir to melt the snow from city center. The city will implement a system using the reservoir and use the energy gained from melting the snow to provide air conditioning to the surrounding buildings exchanging heat.

2.3 New form of citizen participation

By networking the existing underground facilities and paths, Sapporo hopes for an increase in tax revenue. As stated above, the city is actively seeking to strategically develop itself to become a city that uses efficient energy that has a low burden on the environment. As well, the city has been putting on workshops for 1000 citizens, and local enterprises have also been putting on conferences in order to secure capable people and organization.

On October 3, 2006 Sapporo established a municipal foundation act. Citizens and administration can share necessary information for city building, allowing the citizens, enterprises and administration to work together and participate in their own city building efforts in various ways.



Fig. 10. Situations in City Center

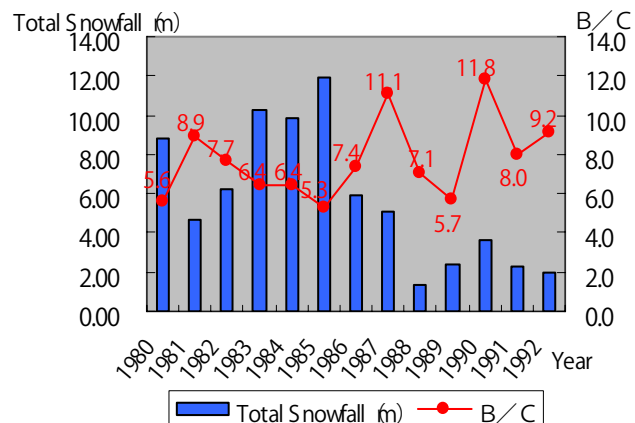


Fig. 11. Ripple Financial Effect of Snow Removal Work
Financial loss by snow / operation, equipping, maintenance cost

Loss = Difference of Frequency in Road Use X Cost of Road and Maintenance X Size of Land

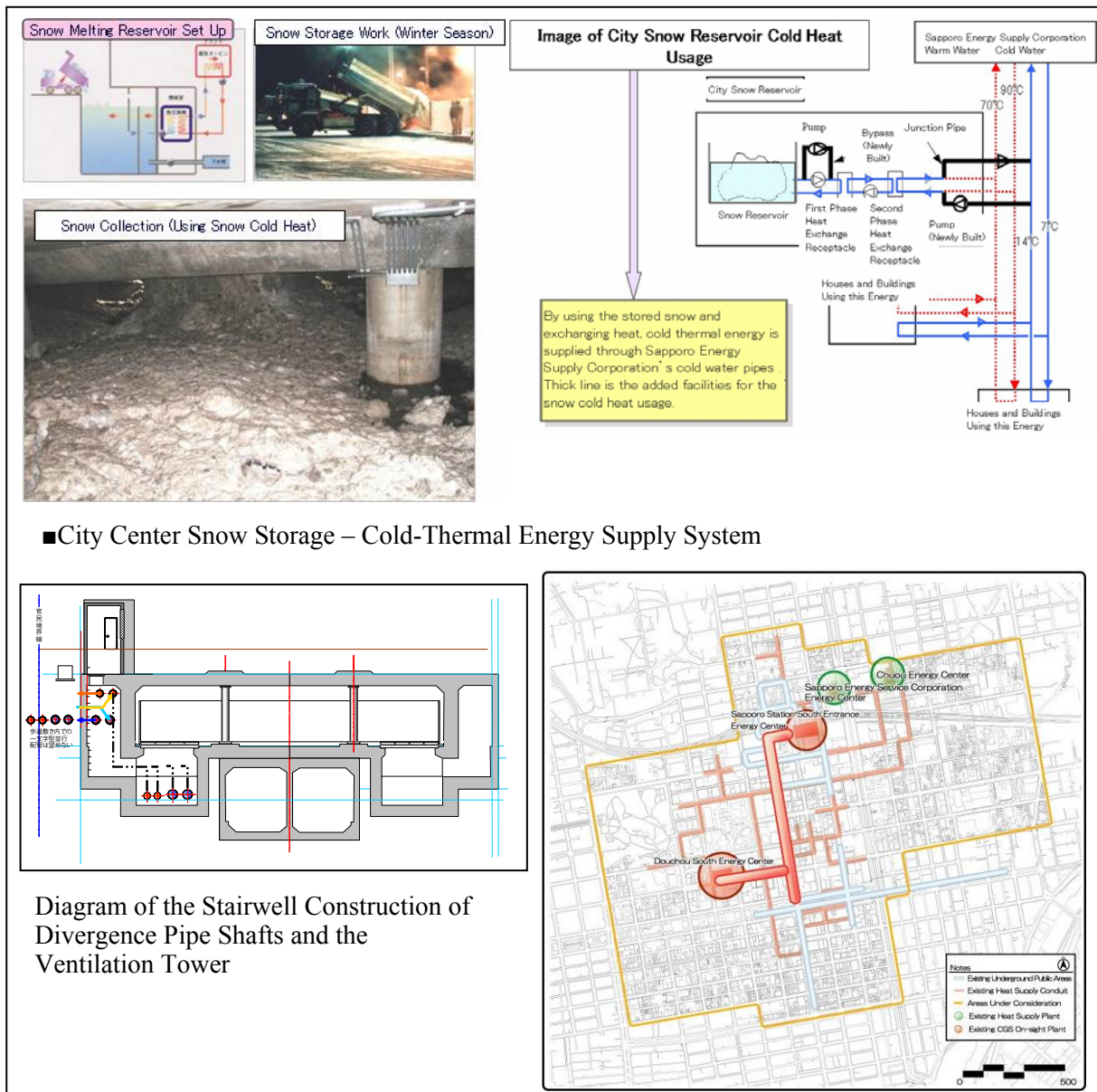


Fig. 12. Sapporo City Center Energy Network.



Fig. 13.
Sapporo Dream Street Citizens Workshop

3. SUMMARY

As mentioned above, Sapporo plans to revitalize the city by working together with its citizens and enterprises to become a place where one can walk and live an abundant life.

This will be accomplished by connecting the two leading commercial areas, thereby allowing people to freely move about, and also encouraging private sectors to better develop their businesses and areas. The plan is estimated to have a positive financial affect of approximately 23.2 billion yen. Also, by equipping the network of heat conduits connecting to the area's air conditioning plants, the city plans to produce energy that has a low effect on the environment.

The city, working together with its citizens and enterprises plan to continue with their city revitalization plan, but these are also suggestions for all other cities located in the northern sphere, as other cities experience similar circumstances. Sapporo is eager to exchange information with other cities in the northern sphere, to achieve better city development together.

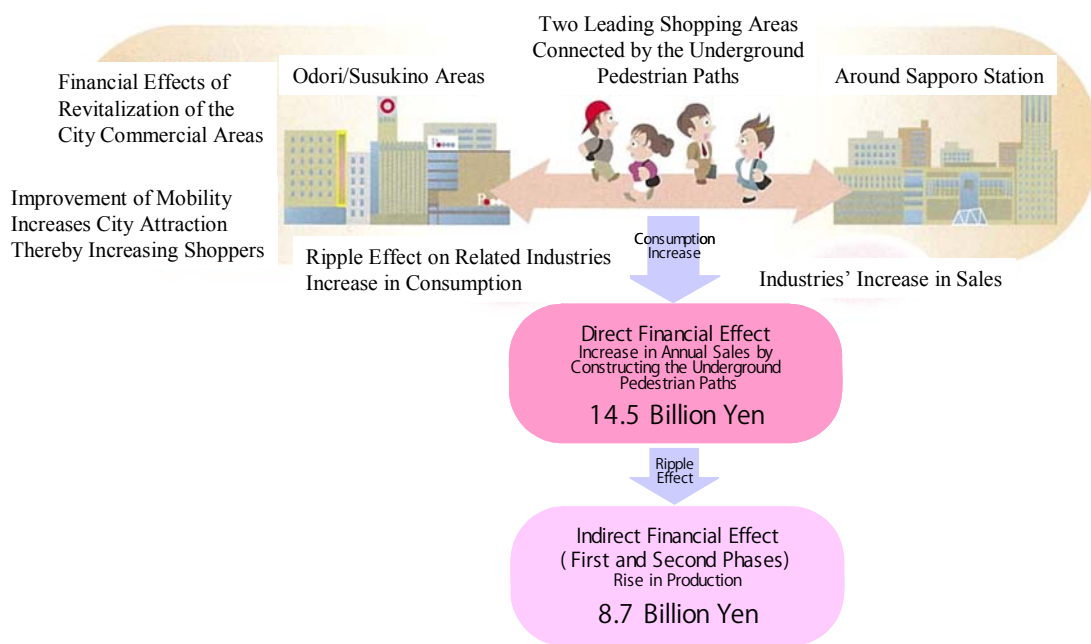


Fig. 14. Financial Effect by Constructing Sapporo Ekimae-dori Underground Pedestrian Path
Estimated Profit $14.5 + 8.7 = 23.2$ Billion Yen