

# OPPORTUNITIES OF RECYCLED INDUSTRIAL WATER IN THAILAND FROM EXPERIENCES OF JAPAN

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## TRUE STRENGTH OF JAPAN: Experience of water saving during rapid economic growth period ahead of Asian experiences

The per capita water volume in Japan is ranked 91st among 156 countries in the world. The per capita annual precipitation is about one-third of the world average and the per capita annual volume of water resources is about 50 percent of the average. **This shows that Japan has never been rich in water** (Ministry of Land, Infrastructure and Transport, Japan; METI (2008)).

On the other hand, Japan improved water-saving technologies and water demand-supply measures to tackle water pollution problem from increased demand for industrial water and water environment issues in the 1970s. **By its efforts, Japan realized efficient water use with sustainable economic development and consumption growth with constraints of limited water resources. This promoted technological advancement especially recycled water** as showed in figure 1.

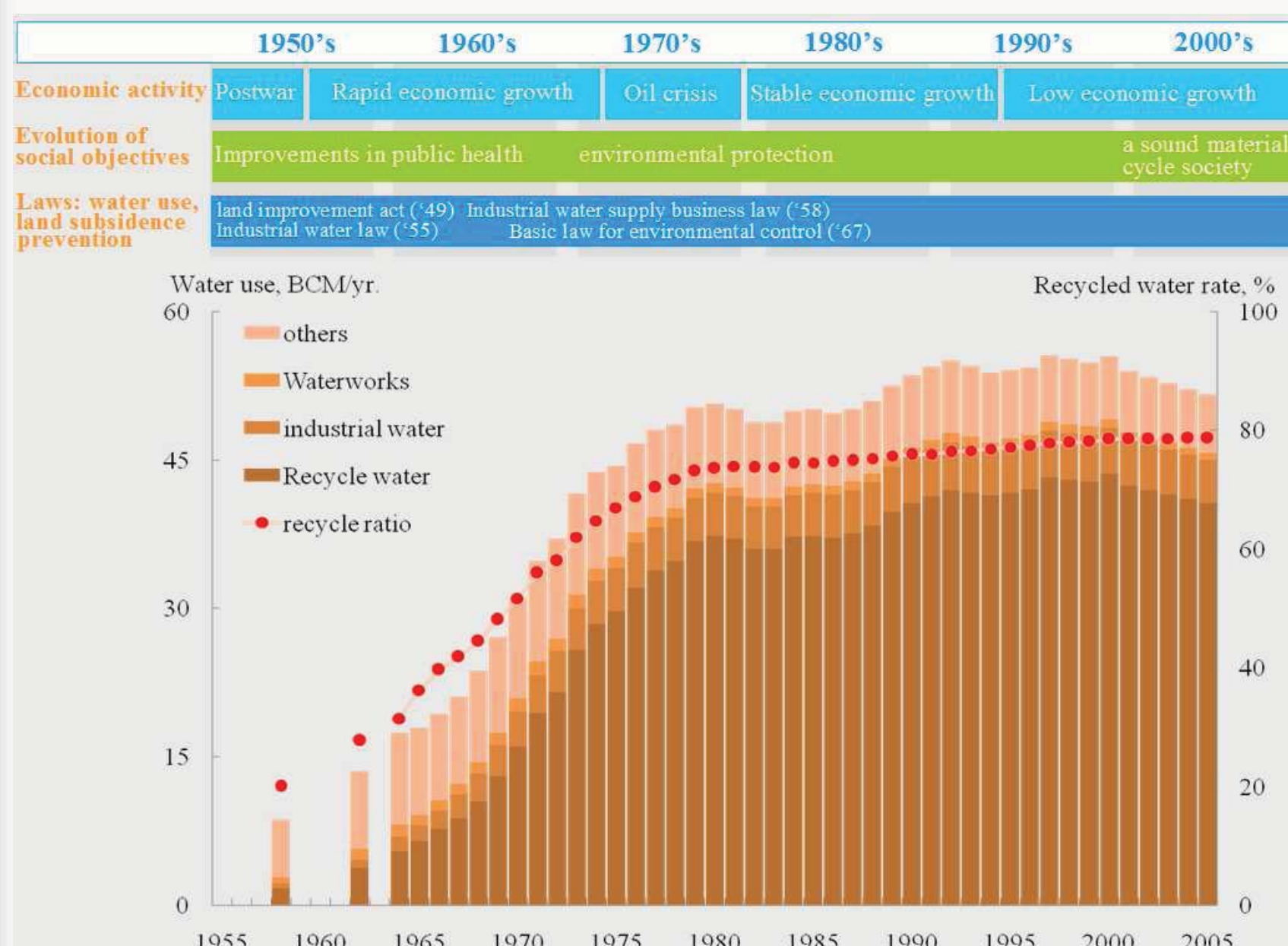


Figure 1. Recycle water with economic development and laws  
Source: edit from raw data of METI

## IDEA IN BRIEF: Case of Japan

- Japan gained technological and knowledge superiority from its experience of pollution and water-saving and lack of abundant water
- Recycle water was initially supplied as a substitute for groundwater to control land subsidence in Tokyo and Kanto area.
- The industrial recycle water has been fully achieved from 1958 with supported water legislation systems.
- The average of recycle rate of all industry types is 80 % and approximately 90 % in petroleum, metal, and motor vehicles sectors.

## Recycled water in Japan

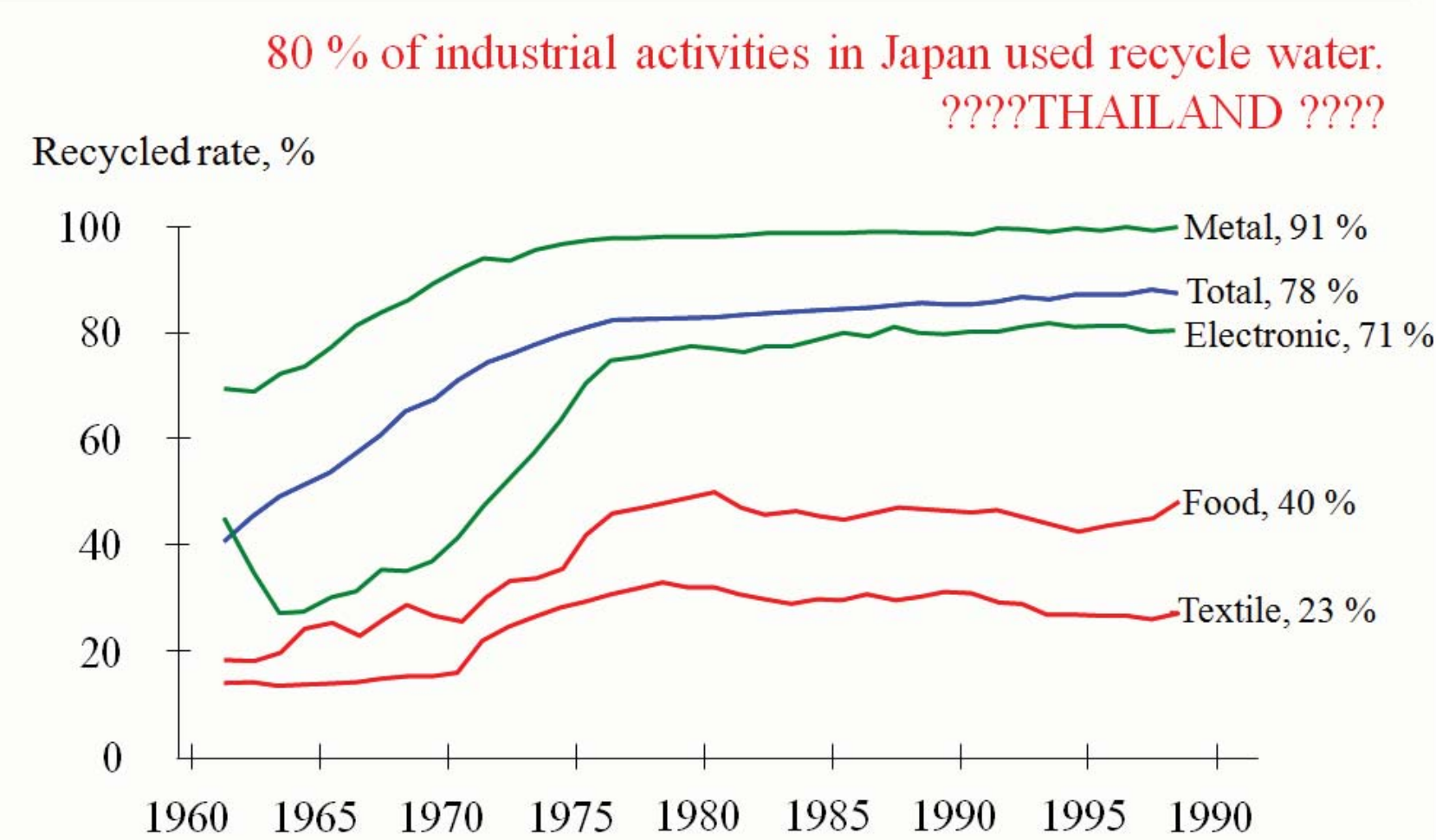


Figure 2. Recycle water in Japan  
Source: edit from raw data of METI

In fact, Japan has one of the highest per capita GDP in spite of water scarcity compared to international standards (40,455 US\$ of GDP per capita and 3,400 m<sup>3</sup> of water resources per capita; World Bank(2009)). This was made possible as a result of **improvements in the recycling rate of industrial wastewater** (approximately 80 % in figure 1.) and a **reduction of revenue loss caused by water leakage**, etc (34 % in Asia, 4 and 7 % in Tokyo and Osaka; Japan, and 30 % in Bangkok; Thailand.) It is indicated that Japan has relatively efficient water system operations.

Water-related problems in both quantity and quality are becoming more severe in Asian countries, including Thailand. **Thailand especially Bangkok and vicinities is like Japan in the 1970s** when it faced the same problems as a result of pollution, land subsidence and economic growth. Japan demonstrated that the economy can grow with a limited amount of water by overcoming difficulties through water-saving efforts and industrial technology. Its experience serves as a role model for Thailand who are now facing water problems. It is important for Japan to contribute to solving global water problems by utilizing its wisdom. (METI (2008))

## Recycled water in Thailand

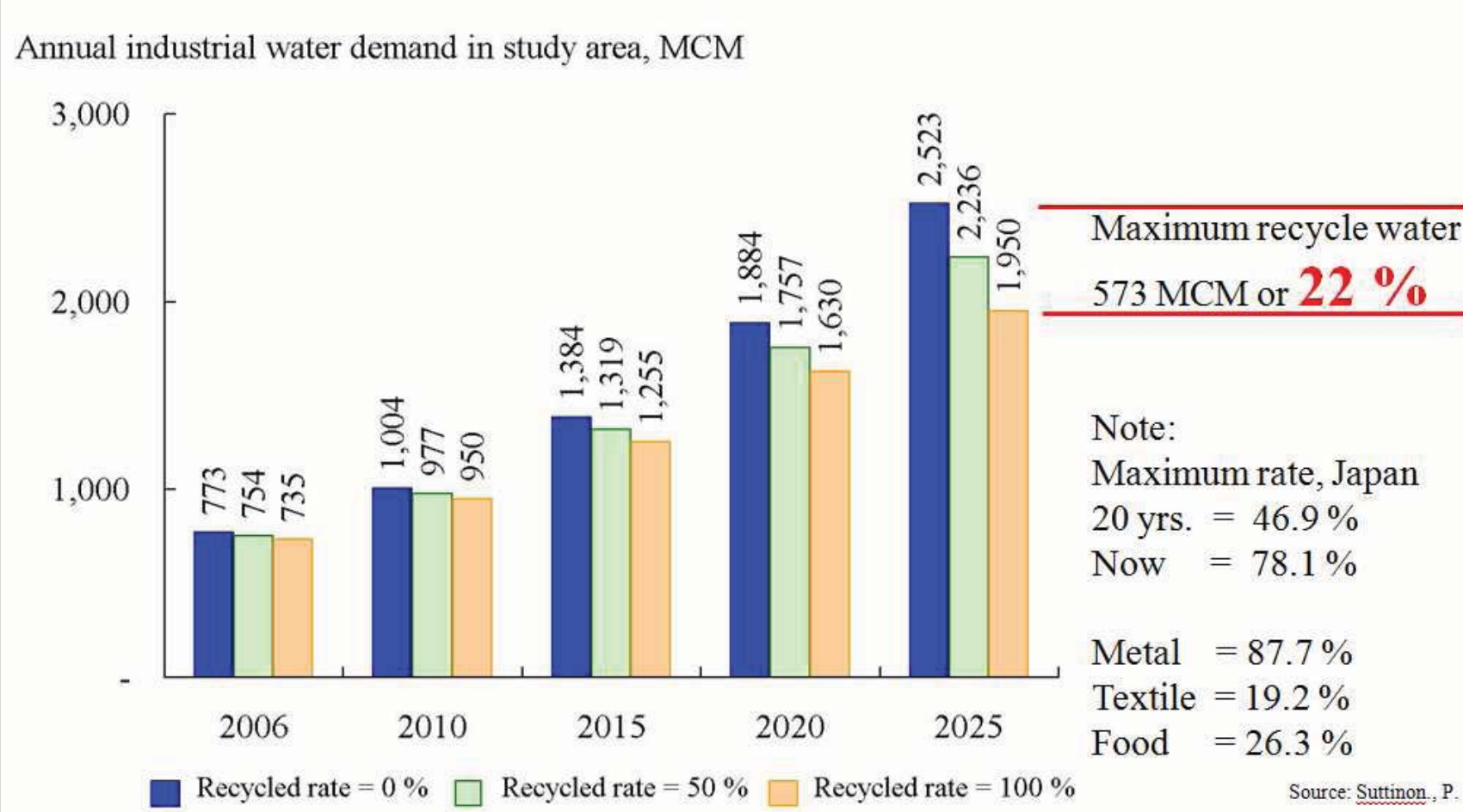


Figure 3. Possible recycle water in Japan  
Source: model results, SUTTINON, P. (2008)

## IDEA IN BRIEF: Case of Thailand

- Thailand is like Japan in 1970s with economic development with water pollution, land subsidence and lack of knowledge and technology.
- Recycle water seems to be one of powerful tools; however, capacity and cost are the important issues for implementation.
- Combination of water demand and supply schemes is the best solution for Thailand such as leakage reduction system, legislation system, recycle water with 3R, industrial water, and the other measures.

According to Suttinon P (2008), **the maximum recycle water capacity in Thailand is approximately 22 %** within next 20 years after implementation. The main reason is that the industrial structure of Thailand and Japan is largely different. In Japan, main industry is high-technology products which can use recycle water in production and utility process. On the other hand, main industrial types in Thailand consumed much water are textile, food and beverage sectors. They can use recycle water in only utility process such as cooling system and boiler. Recycle water is unacceptable for raw material, washing, and the other process in production. However, **it can save water approximately 573 MCM. It works like a dam without new source of freshwater.**

It seems to be that only recycle water is not the solution for Thailand. **One of the interesting tools is industrial water.** Industrial water refers to water drawn from water-supply systems (industrial water-supply systems), which supply industrial water inadequate for drinking or **it is tap water without chlorine.** It is suitable for some industries which chlorine will react with chemical substances in process such as textile sector.



Figure 4. Industrial water schematic diagrams  
Source: edited from Japan Industrial Water Association, <http://www.jiwa-web.jp/>