

An interview with Norihito Tambo,
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The Anatomy of New Cities

How Should Water Supply and Wastewater Systems Be Organized on a Planet with 10 Billion People?

The Challenge of Creating Self-contained Cities While Remaining Open to the World



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The History of Water Metabolism of Cities

From transporting water to localized, energy-intensive water systems

Historically, since Roman period, urban metabolism of water has been carried out by a gravitational transportation of clean water taking upstream in a hydrological cycle. History shows that water has always been taken for the many advantages it offers, and used to flush away unwanted objects. Waterworks systems are constructed to obtain some required quality and quantity water for human life, and sewage works systems are managed to flush away unwanted objects by mixing them with clean water introduced. Cities in Western Europe in the Middle Ages had a definitive border in the form of castle walls. Outside the walls was farmland, and beyond that farmland was deep forest where wolves like the one in Little Red Riding Hood might jump out. Urban systems, production systems and nature conservation systems as we think of them today remained clearly separate. Water was plentiful, and the natural environment blossomed both upstream and downstream from cities. Feudal domains in Edo Period Japan were established in specific watershed areas. There were forests upstream, farmland midstream, cities downstream, and then the sea. Many of feudal domains were established in various watershed area, with dividing mountains representing the boundary of the domain.

Watershed areas (basins) were characterized by plentiful water that permitted the development of transport systems to carry it in one direction – from upstream to downstream – and this facilitated access to water for various social and personal uses. Many things were achieved using water as a universal media. However, it is important to note that this massive transport system

came into being when there was a much smaller population than today, and a comparatively abundant supply of natural water. By the 19th century the population had increased, and simply flushing away waste caused problems and hazards for people downstream, which led to concerns promoting sewage and wastes water treatments. Sewage and wastes water treatments became vital to avoid friction with others.

Contrary to such historical transportation system driving aquatic metabolism of cities, Singapore can be seen as a bold example of a manmade localized circulatory system depending highly on fossil energy systems. In Singapore, rain falling on the island is stored behind dams in costal bays and at river mouths. Extremely advanced processes purify the water before it joins the water supply. This is the country's primary source of water. Its secondary source is highly treated sewage. In Singapore this has been coined "NEWater," which is water recycled from sewage. And, since these methods are not enough, Singapore has also begun the desalination of seawater. This type of local circulatory system differs from civil engineering systems used to transport water from natural hydrological circulation since Roman times — it is characterized by massive energy consumption to obtain quality water through chemical and industrial engineering. To obtain 100,000 metric tons of fresh water through seawater desalination, the system must consume 300,000 to 400,000 kilowatt-hours of electricity. On the other hand, you would need only around one thousandth of that energy on a gravity-fed water system. Whether it be the recycling of highly treated reclaimed sewage, or the desalination of seawater, localized water circulatory systems require large amounts of energy.

The Story of Water and the Energy Revolutions

Thanks to three stages energy revolutions, the massive transport of energy and water is now possible.

Gravitational aqueduct systems carrying water for

human use began in Rome, and as water transport technologies and pumping energy became more readily available in recent times we can build immense waterworks systems without difficulties. The largest of

these in the world is for Greater Tokyo — it can supply over 6 million tons of water a day. In comparison, London supplies around 3 million tons, New York around 4 million tons. So, how did the energy that supports this evolve?

Energy in ancient times and the Middle Ages was completely dependent on local energy resources, primarily waterwheels and windmills at the sites. This was the first stage of energy supply systems. Flour was ground using waterwheels and windmills, but the energy was only available on site. Modernization came about through the development of the steam engine. Steam engines could be used to pump water anywhere, as long as coal was available, and the result was the dispersal and spread of motive energy. This was the 2nd stage of energy supply systems. This was the biggest accomplishment of the modern industrial revolution. The third energy stage (revolution) occurred with the generation and use of electricity.

The End of Megalopolises

The establishment of megalopolises has meant abandoning water and energy self-sufficiency

The Tokaido megalopolis in Japan is the biggest in the world. A megalopolis consists of several metropolises ranging linearly in order to improve their integrated activities. The maximum size of a metropolis would be limited by the distance in which daily metabolism of water, food and the other daily supplies, and collection and disposal of wastes and refuse controls are effectively performed by a local (city or metropolis) government. The Tokaido megalopolis depends on massive transport systems to support the whole industrial activities of megalopolis, bulk transportation systems using the ocean to import resources and then export products back over the sea. I believe that the first winner in the recent globalization was Japan. Japan made use of a land mass which could normally hold only 40 to 50 million people by the green system, and made it possible for a population of 127 million to live there by the megalopolis system, all the while achieving the second highest GDP in the world.

Towards a New Middle Age

Evolution that leads not to growth but to improve quality of life

The transition to a new age has begun. I feel we are entering the 'New Middle Ages.' Each city will be of a size permitting it to be self-sufficient, and water will be obtained from the watershed area where the city is based. The question will remain, what about energy? In the end we will depend on solar-based (renewable natural) energy, but the time required to get to that point will be a major concern, because renewable energy now makes up only one percent of all energy sources.

History does never go backward; instead it turns over with a spiral upward movement. In Middle Ages, societies were both on closed systems with respect to regional material balance (self-sufficient) and social behaviours and mental systems (religious). The Renaissance and the French Revolution fully opened societies up in both

Electricity, once generated, becomes a source of energy (a medium of energy transportation) that can travel seven and a half times around the Earth in a second, and can be transmitted anywhere. The modern conveniences of today stand at the pinnacle of these three energy revolutions. Major waterworks and sewerage systems entirely depend upon the electrical energy and civil engineering infrastructure constructed by iron pipes and pumps. Today we have capability to transport water from a rivers basin to another in distant regions or countries without technical difficulties, which means we have to maintain socially balanced relations with each other, or face international conflict. However, I believe we are now in a transition period that creates opportunities for the development of self-contained systems using water from local watershed areas, instead of transporting it over extremely long distances.

The next largest megalopolis after Tokaido is that along the east coast of the United States, which includes Boston, New York, Philadelphia, Baltimore and Washington D.C.; however, its production is only around 40% that of the Tokaido megalopolis. There are no other notable megalopolises in the world, and it might be that Japan is the only country to create the structured organization worth calling the megalopolis.

Coastal plains extend along much of the Tokaido megalopolis over 1,000 kilometers with well-developed seaports and a highly industrialized hinterland to support them. Japan was the first in the world to produce a high-speed train transportation system (the Shinkansen), a remarkable system demonstrating how humankind is able to create an information-intensive activities through the transportation system. Thus, various elements of the Tokaido megalopolis have been joined into a unified whole.

However, we cannot forget that a megalopolis develops can only being after its people abandon self-sufficiency in food, energy and water.

material balance and mental restrictions. Mass balance was achieved by open systems; trade spread throughout the world and colonies were established. There was an essential shift from self-contained (closed) systems to an open world with open mind.

At the later stage of growing modern world, we are gradually entering into an age where the fate of the entire planet lies in the imbalance of resources and population to be sustained, and a time of severe overpopulation (environmental period: later modern) is coming.

I feel that our greatest challenge in this later modern (environmental restriction) times will be whether we can develop a self-containing (closed) system on a strict material balance between resources and consumption in all activities at any regions taking into account the limited physical capacity of the Earth, while continuously developing the open value system that human beings obtained and developed throughout in our modern

civilization as our essential value system.

I do not know if we will be able to keep our mindsets and our use of raw materials independent of each other. A world where metabolisms are self-contained (closed), yet our minds remain open – is this possible? If we can make that happen, I am sure humankind will press ahead. I have great hopes in the intellectual strength of developed countries that are steeped in modern civilization.

To meet these challenges, what will become of cities? Urban population groups of 1 million people will probably remain, but what about groupings of 10 million or even 30 million people? People in modern times have pursued growth by single-mindedly boosting their accumulation of things. We have advanced as a result, but in a world divided by extreme urbanization on one hand, and large-scale agriculturalization to support it on the other. High-speed, large-scale transport systems have

connected all this together, with societies consuming huge amounts of energy and resources. Growth has become the objective, and yet growth is now harder to hope for, given the limits of the global environment. We must think of how to relate cities with their surrounding agricultural land, how to link them to the conservation of ecosystem diversity, and how to ensure humankind's future with the limited energy and land available. People will need the new technology and rational thinking of a world with limited resources, but they are afraid that such a world will lead to the end of growth.

What is growth, exactly? I believe that development is an improvement in quality. Growth, like a child becoming an adult, is the continued enlargement of a form. There will not be any more growth for this world. People talk about sustainable development, but I feel that development is an evolution that comes as quality improves.

Embassy Visit & Interview

Putrajaya: Administrative Functions Relocated to a City Offering a Pleasant Working and Living Environment

DATUK MD.SOM SHAHARUDDIN,
Ambassador of Malaysia
Embassy of Malaysia



Overview of Malaysia

Q. Before we get into the transfer of administrative functions to Putrajaya, I'd like to ask you to give a brief overview of Malaysia.

A. Malaysia, which gained its independence from the British on 31 August 1957, consists of thirteen states and three federal territories namely the Federal Government Administrative Center of Putrajaya; the capital city of Kuala Lumpur; and Labuan, an island which is located off the coast of Sabah. Geographically, the nation is separated by the South China Sea into two similarly sized regions, namely Peninsular Malaysia and the Malaysian Borneo. Malaysia shares its land borders with Thailand in the Peninsular and Indonesia and Brunei in the Borneo, and maritime borders with Indonesia, Singapore, Philippines and Vietnam.

Peninsular Malaysia is well connected through a network of highways. The long stretch North-South Expressway connecting the states of Perlis in the north and Johore in the south was fully completed about 20 years ago while the scenic Gerik-Jeli Expressway connecting the east and west part of the Peninsular in the north was completed about 30 years ago. The East Coast Expressway connecting the capital city Kuala Lumpur with the East Coast States was recently completed about five years ago. These extensive links of highways have indeed provided excellent connectivity within the Peninsular Malaysia. In the Malaysian Borneo, the section of the Pan Borneo Highway connecting Sarawak, Brunei and Sabah was completed in 1997.

Upgrading works on the Pan Borneo Highway to connect more cities and townships in both Sabah and Sarawak are still ongoing so as to provide better connectivity within the Malaysian Borneo region.

Background to the transfer of administrative functions to Putrajaya

Q. Could you tell us about the purpose and current situation regarding the transfer of administrative entities from Kuala Lumpur to Putrajaya?

A. Malaysia began its search for a new Government administrative centre in the late 1980s during the tenure of the then and fourth Prime Minister of Malaysia, Tun Dr Mahathir Mohamad. The main purpose of the relocation is to disperse some development away from Kuala Lumpur so as to ensure the capital city will continue to have adequate supply of land to continue developing as Malaysia's principal business and financial centre. The relocation is also aimed to ease the overcrowding and congestion of Malaysia's largest city, Kuala Lumpur. It was thus agreed in the early 1990's that while Kuala Lumpur will remain as the country's capital city as well as premiere financial and commercial centre, Putrajaya will

Meanwhile, the long coastline particularly in the west coast of Peninsular Malaysia is also home to many major international ports including Port Klang, Port of Tanjung Pelepas and Penang Port, which have through the years handled voluminous cargoes from and to many of Malaysian's important trading partners including Japan.

Malaysia is also truly been blessed with natural beauties ranging from long coastline of great sandy beaches as well as scenic mountains and well-preserved thick forests that are homes to a variety of distinctive flora and fauna species. Among the notable tourism spots in Malaysia include the Taman Negara or National Park in Pahang; the Redang and Tioman Islands which are both located off the coast of Terengganu; the Mulu National Park in Sarawak; Sipadan Island which is located off the coast of Sabah, and the Mount Kinabalu National Park in Sabah. It is worth noting here that Mount Kinabalu National Park is not only home to the highest peak in the Southeast Asia but also to the well administered orangutan conservation center which the partners also include several Japanese NGOs and organisations. Blessed with these abundant natural beauties and rich multiracial and multicultural landscape, Malaysia has been undertaking extensive tourism promotions over the years with Japan as one of our primary market. In fact, despite the unfortunate Great East Japan Earthquake last year, tourist arrivals from Japan into Malaysia in 2011 were relatively encouraging with 380,675 arrivals. We do hope to attract more Japanese to not only visit Malaysia but also participate in one of our long-stay tourism programs including homestay and the "Malaysia, My Second Home" program.

play the role of the new Federal Government Administrative Center. The New Federal Government Administrative Centre is then named "Putrajaya" in honour of Malaysia first Prime Minister Tunku Abdul Rahman Putra al-Haj for his invaluable contributions to the nation.

The Government was also hopeful that the relocation of Government offices to Putrajaya could further improve government efficiency with the implementation of e-government and other measures as the respective Ministries and agencies will be located nearby to each other. In addition, the relocation would alleviate the shortages of office space and high rent which the various federal agencies had to endure in Kuala Lumpur then.

A site at Prang Besar in the district Sepang, which has now become Putrajaya, was chosen in view of its strategic location between Kuala Lumpur and Kuala Lumpur International Airport (KLIA). The new Federal Government Administrative Center which sits on a magnificent 4,931 hectares of land is located, approximately 25km south of Kuala Lumpur and 20km north of the Kuala Lumpur International Airport (KLIA).

Q. What is unique about Putrajaya, the city?

A. One of the unique characteristics of Putrajaya, which was completed within just five years after its construction started in 1995, is it presents Malaysians with a new experience where nature and technology come together to benefit the community as the new city emphasizes the preservation of its eco-system. It is built according to a series of comprehensive policies on land use, as well as the clear-cut provisions and guidelines on transportation, utilities, infrastructure, housing, public amenities, parks and gardens.

Planned as a garden and intelligent city, 38% of the area is reserved for green spaces by emphasizing the enhancement of natural landscape including parks, lakes and wetlands.

Ties with Kuala Lumpur

Q. Given that Parliament is still located in Kuala Lumpur, in what way does the city of Putrajaya relate to Parliament?

A. Although the Parliament as well as the National Palace or Istana Negara continued to remain in Kuala Lumpur, the relocation of Government offices from Kuala Lumpur to Putrajaya has so far been dealt with very well and positively by both members of Parliament and government officials as well as the general public. As part of the efforts to further improve the system as well as to further ease the movement of Cabinet members and relevant government officials between Putrajaya and Kuala Lumpur during Parliament sessions, the Honorable Prime Minister of Malaysia Dato' Seri Mohd Najib Tun Abdul Razak had introduced changes to the schedule of the weekly Cabinet meeting. Under the new changes, the Cabinet meeting will be held on Friday instead of the usual Wednesday when the Parliament is in session, which would normally take place in March, June and September each year with each session on average lasted between 60 to 80 days.

Future Outlook for Putrajaya

Q. Are there any challenges facing Putrajaya's future development?

A. Being a relatively new city, Putrajaya's main challenge both for the near and distance future would be maintaining the perfect balance and proper order of all of its unique eco-system and well-planned township as its population grow. Currently, the estimated resident population of Putrajaya is around 68,000 people while the estimated working population is approximately 35,000 workers. Once fully completed, Putrajaya is expected to cater for a resident population of 350,000 people and a working population of 500,000 workers.

The centerpiece of the city is the 600 hectare man-made Putrajaya Lake as its principal landscape feature that also serves as a climate moderator. In addition, a network of open spaces and wide boulevards were also incorporated to the plan. It was Malaysia's biggest project and one of Southeast Asia's largest with estimated final cost of US\$ 8.1 billion. The entire project was designed and constructed by Malaysian companies with only 10% of the materials imported.

The uniqueness of Putrajaya is further enhanced by its twin city, Cyberjaya. Cyberjaya is positioned as an ICT hub, not only for Malaysia, but for the region. It is the nerve centre of the nation's ICT projects and aspirations, the Multimedia Super Corridor (MSC). Being located within the MSC region, Putrajaya is also being developed as an intelligent city. Multimedia technologies have been and will continue to be incorporated in the development of Putrajaya so as to further facilitate communication and interaction between Government offices, between the Government and the business community, as well as between Government and local population in the city and the general public in Malaysia. Together Putrajaya and Cyberjaya symbolize Malaysia's hopes to be a key player in global ICT development.

The Plenary session of the Parliament only takes place four times a week from Monday to Thursday and as such the holding of the Cabinet meeting on Friday when the Parliament is in session would definitely ease the movements of the members of Cabinet between Putrajaya and Kuala Lumpur.

In addition, each of the 24 Federal Ministries are also allocated with at least one temporary office at the Parliament building when the Parliament is in session so as to facilitate the coordination and cooperation within the Ministry as well as with other Ministries and members of Parliament.

Even in the event the relevant members of Parliament and government officials have to frequently travel between Kuala Lumpur and Putrajaya, it would not pose any difficulty as the distance between the two cities is only 25 kilometers apart. The traveling time between both cities has also been shortened from the average 45-60 minutes to only within half an hour with the completion of the Maju Expresses in 2007.

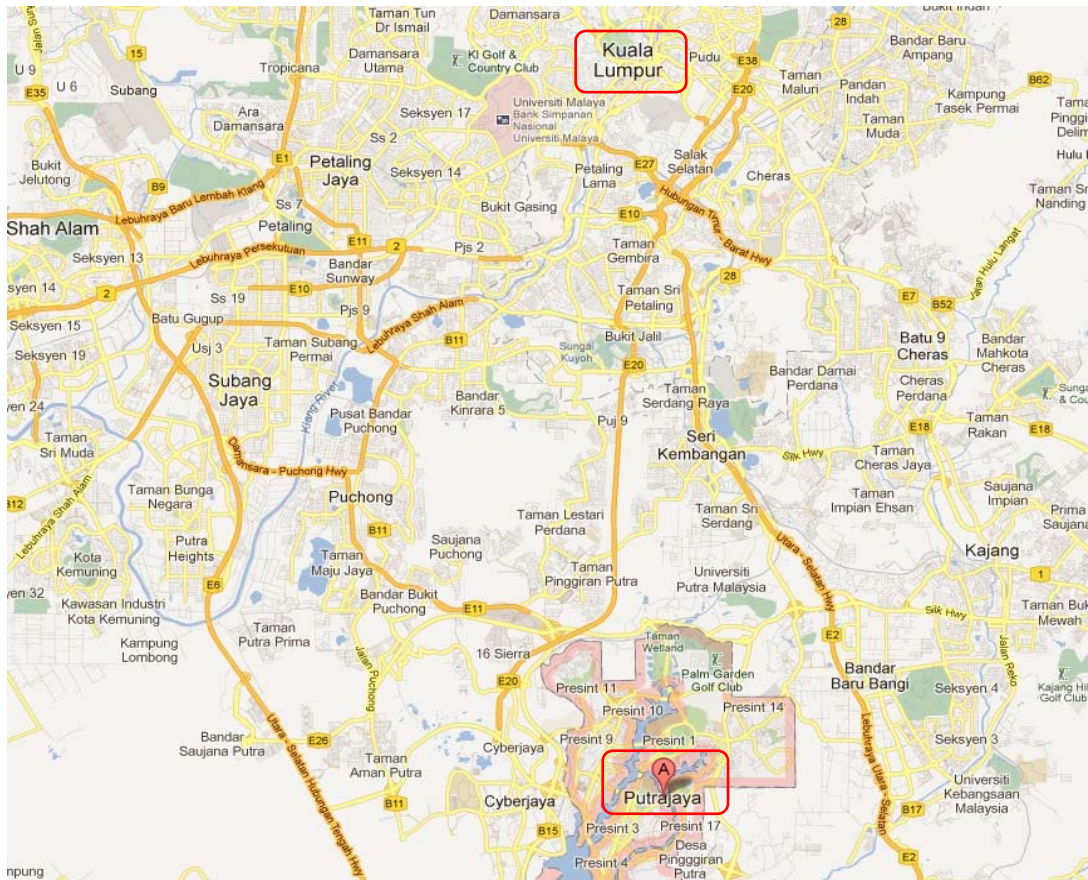
Although at present everything seems orderly in Putrajaya, the same could not be guaranteed once its population increased as it would definitely be more difficult for the local authority to keep everything according to the plan particularly with regard to traffic, parking spaces, and of course in maintaining the law and order. Despite all these challenges, I remain steadfast that Putrajaya will continue to showcase the best in design and technology application and become a city of choice not only among Malaysians but also expatriates from all over the world..



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