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## Part 2: Policy Errors, Successes and White Elephants

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The development policy for major projects has had a somewhat patchy success rate in terms of sustainability. Some of the examples of questionable developments are:

- 1) Narita Airport: Located at over 60km away from downtown Tokyo, the site location has resulted in countless millions of person-kilometre travel, many by road, for over three decades when expansion of the existing Haneda Airport into Tokyo Bay would have been a better solution;
- 2) Aichi Expo 2005: Although the theme of the expo was 'Love of the Earth', the creation of the site required deforestation of a large area, and the planning for legacy use of the structures has not lived up to expectations (Figure 12);
- 3) SSAWS Indoor Ski Dome, Funabashi: An example from the private sector. Built at a cost of US\$400 million in 1993, its height of 100m made it the largest indoor ski dome in the world. Average annual losses of US\$17 million forced its closure and demolition in 2003 to make way for Japan's first IKEA store (Figure 13).



Figure 12: Aichi expo site



Figure 13: SSAWS indoor ski dome



Figure 14: Shinkansen high-speed train



Figure 15: Tokyo bay aqua line

On the other hand, there are plenty of technological and infrastructure successes:

- 1) The Shinkansen high-speed rail network: With the first section between Tokyo and Osaka opened in time for the 1964 Tokyo Olympics, this system has now been running for 43 years. The network has been expanded throughout Honshu and partially into Kyushu. The frequency between Tokyo and Osaka is one train every six minutes for most of the day, running at around 300km/hour (Figure 14). Many trains are also now offering double-deckers to maximise capacity. After carrying over six billion passengers, there has, so far, not been a single fatality or injury;
- 2) Hybrid cars: Although the technology is not strictly within civil engineering, the introduction of the first commercial gasoline/electric hybrid car in 1997 by Toyota has been a great contribution to emissions control and fuel economy in the region and worldwide. After initial sales only in Japan, the Prius model is now seen worldwide and is currently

the most economical car sold in the United States;

- 3) Tokyo Bay Aqua Line: A 14km bridge-tunnel combination that links Kawasaki with Kisarazu in Chiba was completed in 1997 at a cost of US\$11 billion (Figure 15). An artificial island known as Umi-hotaru (sea firefly) links the bridge and tunnel sections, and houses restaurants, rest areas and amusement facilities. The toll is less than US\$30 and this has made the link very popular – customers are grateful for the reduction in journey distance by 86km and the subsequent reduction in emissions can only be a good influence on the sustainability of Tokyo's urban transport.

An overall assessment of one country's contribution to its own or wider sustainability is difficult. It is encouraging in Japan's case to note that, whilst road development has been very intense over the last two decades, none of the enthusiasm for rail has been lost.

In fact, although the number of cars owned in Japan has been rising, the distance travelled by car per capita has been falling (Figure 16) and is currently only about 13 km per day on average.

Although it is greater than the figure for rail distance travelled mentioned earlier (about 8 km per day), the distance travelled by car per capita is still less than half of the figure for many other developed countries (about 30 km per day in the United Kingdom or 68 km per day in the US).

### THE REGION AND THE WORLD

The significance of the Asia Pacific regional CO<sub>2</sub> emissions within the world total is made clear in Figure 5. Looking at the region's emissions historically helps to clarify the differences (Figure 17). The importance of China's policy on the emissions issue over the next decade or so is clear from

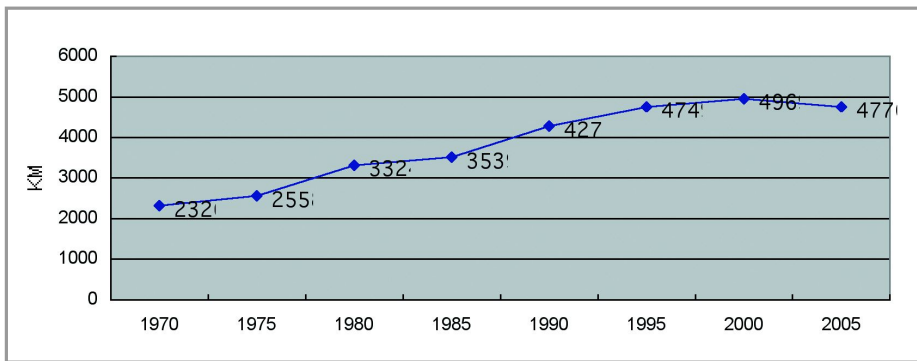


Figure 16: Annual distance travel led by road PFR cap

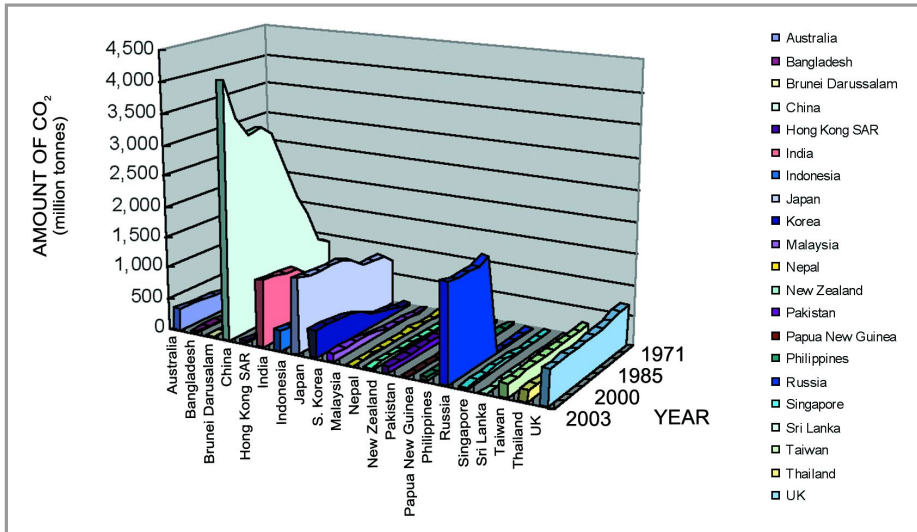


Figure 17: CO<sub>2</sub> equivalent energy use emissions country

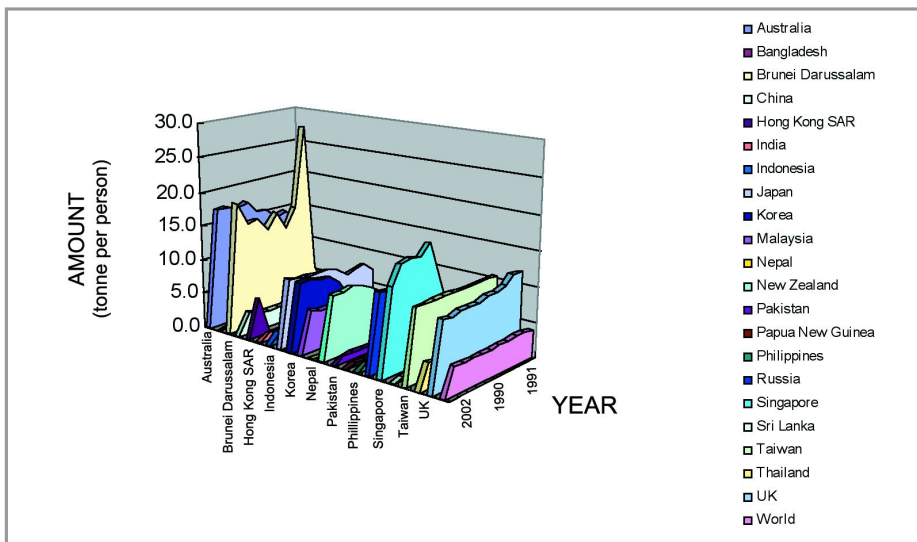


Figure 18: CO<sub>2</sub> equivalent energy use emissions per CAPI

these data. It is the only one among the large emitters in the region to show aggressive growth in emissions. India, Japan, Korea and Russia are all showing essentially static data.

If this data is converted into per capita emissions, the impression is rather different. Figure 18 shows such data and

suggests that Australia, Brunei and Singapore have the most amount of work to do in improving their CO<sub>2</sub> footprint when considered on an individual basis.

Perhaps an even fairer assessment might be made by looking at the amount of CO<sub>2</sub> emissions per dollar GDP. This would give an indication of how hard

each country is producing or contributing to the local and world economy versus how much damage it is doing at the same time – a kind of greed/effort ratio. The lower the ratio, the cleaner and less greedy are its citizens' behaviour. The emissions data is reworked in this way in Figure 19.

In this form, the data suggests that Hong Kong, India, Japan, New Zealand, the Philippines and Sri Lanka have been reasonably responsible in their creation of wealth, whereas other countries in the region, particularly Brunei and Russia, tend to give preference to trade over concern for the environment.

Countries that have maintained their forests may, and indeed have argued, that their contribution to emissions control is boosted by the carbon sink effect. Since all the countries in the region are capable of sustaining large areas of forest, it may be better to include an acknowledgement of this in any assessment index.

In the graph shown in Figure 20, the values in Figure 19 have been divided by the proportion of forested land in each country to arrive at a suggested 'environmental sustainability damage index' for each country. According to this scale, Russia is still assessed as fairly damaging, but is now joined by Papua New Guinea, New Zealand and Australia.

## CONCLUSION AND DISCUSSION

Japan has reached a reasonably steady state in many of the important indices investigated in this paper. Population, GDP, land use, home sizes, car and train use; these are now essentially at fairly constant levels. There is no internal conflict, low crime rate, low unemployment rate, low inflation (or mild deflation), 100% literacy, a low number of HIV cases, malnutrition, alcohol and drug problems.

By and large, the social and economic frameworks have been shown to be sustainable by two decades of actually maintaining them at stable levels. Thus Japan is perhaps in an enviable position of being able to concentrate all efforts on addressing the issues relating to sustaining the environment, whether it is at the national, regional or global level.

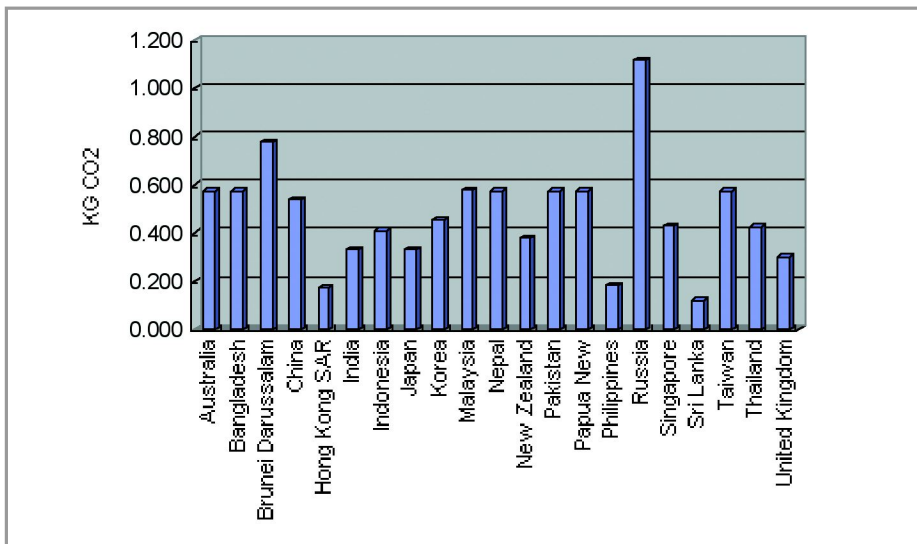


Figure 19: CO<sub>2</sub> Equivalent ommissions per dollar GDP (2004)

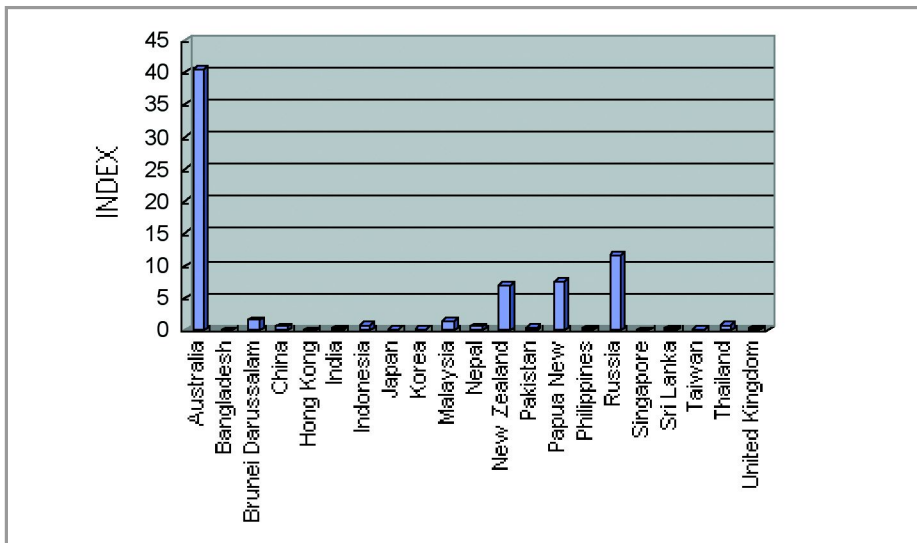


Figure 20: Environmental sustainability damage index by count

Based on the evidence of the data presented, Japan is contributing strongly to the most dominant issue of our environmental problems, emissions control. The developed countries simply cannot continue to be selfish and be irresponsible regarding the use of cars in their present format. Japan's two-edged approach, using cutting edge rail transport and hybrid car development, seems to be the best amongst the nations studied in terms of reducing transport's carbon footprint.

Energy production has benefited from nuclear and hydroelectric production, but wind and solar power have still not made a significant contribution. The development of renewable sources, especially wind, is a priority for Japan and most other nations in the region.

Japan now needs to take a much more proactive role in leading the region towards a more sustainable environmental approach in the future. Possible vehicles for this might be the ASEAN and APEC groupings of nations, or more directly for engineers, via the relevant engineering bodies in each nation. The Japan Society of Civil Engineers is currently considering the production of a State of the Nation report modelled on that published by the ICE as a way to increase national awareness and influence government policy.

Considering the whole region, the evidence suggests that between the two size-dominant countries of India and China, the former has been more successful so far in containing its emissions while maintaining economic growth. China's economy has perhaps

been growing too fast to allow measures to mitigate environmental damage to catch up. With such a large population and so much more potential growth, the real future of sustainability in the region, and perhaps the world, depends greatly on their approach to the environment.

Australia and New Zealand do not emerge particularly well from the analysis of any of the main data. As developed and stable countries, it would seem that there is a much wider scope for them to address and to lead on environmental issues, both nationally and regionally. For Australia, an initiative to help balance its non-participation in the Kyoto Protocol would be welcomed.

Although not normally in a position to control government policy, civil engineers are in a strong position to influence public opinion by virtue of their technical understanding of the issues and the ability to design solutions for key infrastructure. The provision of sustainable infrastructure, energy and shelter are now central to the planet's future, and as engineers, we surely have a duty to contribute to the fullest. ■

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## Note:

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