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BICYCLE FRIENDLY ROADS ARE SAFER FOR ALL USERS

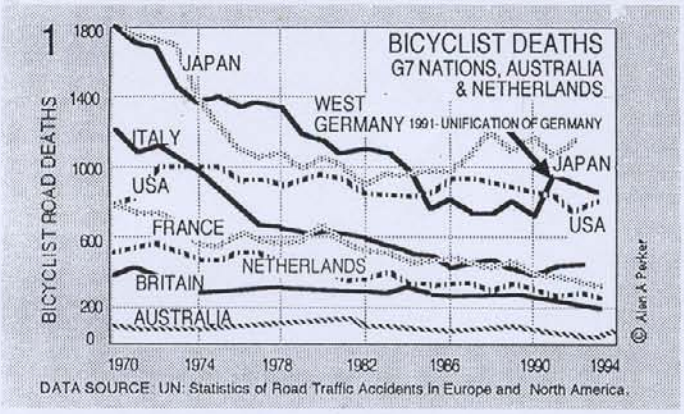
By Alan A. Parker, Vice-President, Town and Country Planning Association

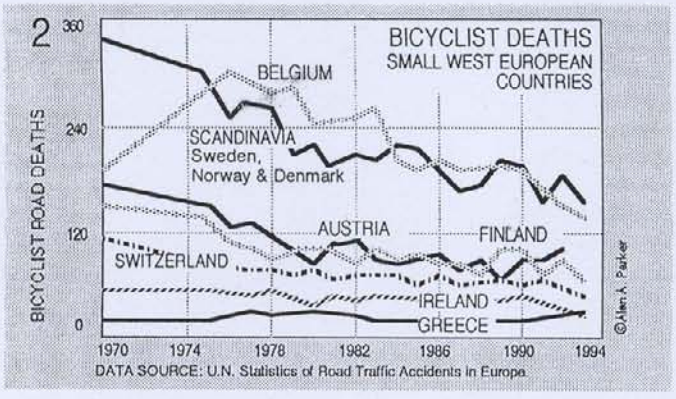
LEARNING FROM WORLD BEST PRACTICE

The central argument presented here is that the safest passenger transport systems in the developed world with the lowest road death rates are both bicycle friendly and more energy efficient. The developing countries and the former Soviet bloc countries should be looking to Japan, (Hooke 1991) the Netherlands (Parker 1994) and Scandinavia for their long term transport solutions. Furthermore, as the worlds fleet of 500 million cars kills around 270,000 people every year, bicycle transportation needs to given priority in every country because it is part of the solution to creating a non-violent transportation system.

Statistical data, for road deaths and vehicle ownership trends since the 1950s for all road users and bicyclists are presented in a compact graphical format for 17 non communist countries with a total population of 770 million people. Cyclist death rates per 100 million bicycle kms travelled are compared for three countries and national data on the bicycle trips and greenhouse gas emissions in ten countries is charted. These graphs show that the post World War 2 boom in car use resulted in an epidemic of road deaths and a decline in bicycle use till around 1970. Since then the road trauma epidemic has been gradually brought under control and bicycling is becoming safer. By way of comparison limited data is provided for 15 countries of the former Soviet block.

Of the 32 western and former Soviet block countries referred to in this study, very few have created a well developed bicycle infrastructure over the last two or three decades. Worse still a recent WHO studies (Seymour 1996) in the developing world and the former Soviet block countries, the bloody history of post World War 2 road trauma is beginning to repeat itself. Cyclists are being driven off the roads in nearly all of these countries. The death rate per 10,000 registered vehicles in many of these countries is 20 times more than in the USA, today. The few countries that now have a relatively safe cycling environment have high levels of bicycle use, lower road death rates per 100,000 population and lower per capita greenhouse gas emissions. These examples of world best road safety and transport planning practice clearly show that the bicycle is part of the solution in reducing road trauma for all road users and in creating a more sustainable transport system. By providing the infrastructure to maintain high levels of safe bicycle use , all countries will be better able to cope with oil depletion and the need to reduce greenhouse gas emissions early in the next century.





THE 17 NATION ROAD SAFETY RECORD

100 years ago on the 17th of August 1896 the motor car claimed its first pedestrian victim in England. It is timely to remember that the convenience of the car has its dark side with over ten million killed, millions more crippled and severely brain damaged and 400 million seriously injured world wide. Just as many unprotected road users, that is pedestrians, bicyclists and motor cyclists have been killed as the drivers of motor vehicles since 1896 (Hamer 1996). By the next Olympics another 1.2 million people will have been killed worldwide and by 2010 motor vehicles are likely to kill 500,000 people a year.

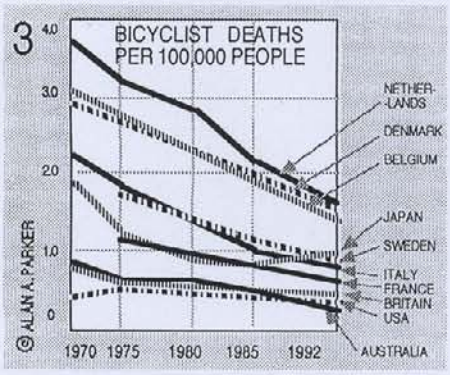
The Car dominated transport systems of the developed nations have always been a health hazard about which far too little was ever done until the pile of body bags hit the political arena. In the USA, the UK and Australia many more people where killed on the roads than in the American civil war, World Wars 1 and 2, the Korean and Vietnam wars combined. Fortunately in the developed world the fatal linear link between the increase in car ownership and car accidents was broken around 1970 in 15 out of the 17 countries. Sadly that link not been broken in most other countries and in a few years the costs of road trauma will be an increasing burden on the economies of all developing countries. The stage is set for a repeat of the motorised holocaust and bicyclist bloodbath of the 1950s and 1960s.

Graph 1 shows the decline in fatal bicycle accidents in G7 Nations, Australia and the Netherlands from 1970 to 1994. Graph 2 shows the decline in bicyclist road deaths in 9 small European countries from 1970 to 1994. With the exception of Greece there has been a reduction in bicyclist road deaths. Since 1970 there has been an increase in population, so if cyclist deaths are expressed as a death rate per 100,000 people the decline is even more marked as is shown on graph 3, especially given the increase in vehicle ownership rates per 1000 people shown on graphs 4 and 5. From 1970 the death rate trend is down in 15 countries but not all of them are shown on graphs 4, 5, 6. 7 and 8 because all the trend lines would have created visual confusion. Australia and the countries with the largest populations are all shown and one or more of the smaller countries with a bicycle friendly road system.

Another way of comparing the safety of cycling between countries is to use the number of deaths per million bicycles in use as a measure. These data are of limited use because they are only available for only seven countries out of the 17 studied and the method of estimating the number of bicycles in use varies from country to country and are subject to some error. These data and estimates for Australia are shown on graph 6. Apart from confirming the improved safety of cyclists generally the death rate per million bicycles is of limited use.

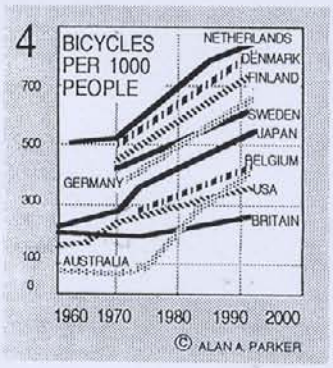
What is really needed is the death rate per 100 million vehicle kilometres travelled by age group and sex, but that is not available for the 17 countries and death rate per 100,000 population is used as the key indicator in this section.

Improved safety for cyclists does not exist in isolation from improved road safety generally because 90% of fatal bicycle accidents involve a collision with a motor vehicle. Despite increases in car use the death rate per 100,000 population from all road deaths (shown on Graph 7) has dropped dramatically

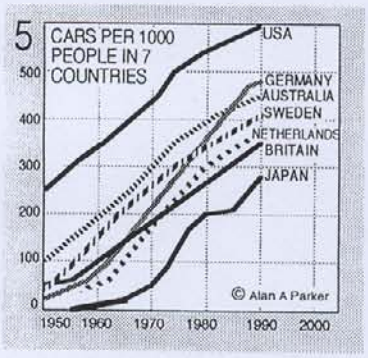


since around 1970. Even if we ignore population growth and show the decline in just the number of road deaths, the downward trend is most marked (graph 8). This also applies to the USA (which is not shown on graph 8) where total road deaths dropped from 52,600 in 1970 to 39,200 in 1992.

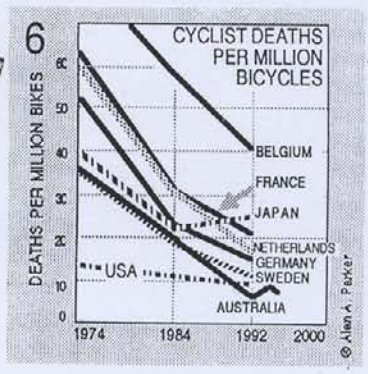
From 1945 to around 1970 when the death rate from all road accidents went up with increasing car ownership (graph 7) cycling groups in many countries complained bitterly that they where virtually being driven off the roads. This was true even in the Netherlands and in the sixties there was also a much higher proportion of badly trained and sometimes drunk drivers. Indeed, France had the Worlds worst death rates for road accidents and cirrhosis of the liver.



Drink driving was a major problem in most other countries with the exception of Japan where the police treat drunk driving most severely but patiently assist drunks to get on trains to go home. In Japan and Europe good public transport services are a great road safety asset. Not only do they reduce the amount of driving but they get the drinking classes to where they want to go without endangering others. In Sweden special prisons for driving offenders only were set up to deal with this problem and have been very successful. There are now proportionally far fewer drivers with high levels of alcohol in their blood in all 17 countries.



Since 1970 a combination of better roads and safer cars, more stringent driving tests and driver education, vigorous traffic law enforcement and more recently the use of new technology with laser speed guns, computer technology, and the use of automatic speed detection cameras from 1990 have all contributed to a decline road deaths. The USA and France have the worst road death rates and neither country provides much in the way of bicycle facilities. In the developed world only a few countries provided a mix of separate paths, lanes on the roads and low speed limits on minor roads and other road safety improvements that retain high levels of bicycle use.



Graph 7 shows that the three countries with the lowest road death rates, Sweden, Netherlands and Japan, have a good bicycle infrastructure and organised integration of bicycles with the rail system. (Parker 1993).

The idea that providing bicycle facilities will just increase the road toll by encouraging cycling is a myth subscribed to by many Anglo-Saxon transport planners. In the Netherlands they greatly increased bicycle use and replaced a high proportion of short car trips with bicycle trips (Louise 1992) thus making better use of their car fleet. They reduced the number of bicycle casualties since the early 1970s by investing in bicycle infrastructure.

CYCLISTS DRIVEN OFF THE ROADS IN FORMER SOVIET BLOCK COUNTRIES

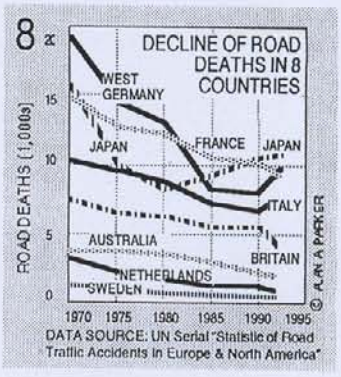
By way of comparison the road safety record of the 15 countries in the former Soviet block and Yugoslavia was never as bad as it was in 16 western prior to 1970 because they discouraged car use and relied to a much greater extent on public transport. However, current road traffic conditions are not bicycle friendly (Lepik 87) (Ruzicka 1987). Recent visitors report that the new decision makers see increasing car use as a symbol of progress and that death on the roads is a socially acceptable form of violence just as it was prior to 1970 elsewhere.

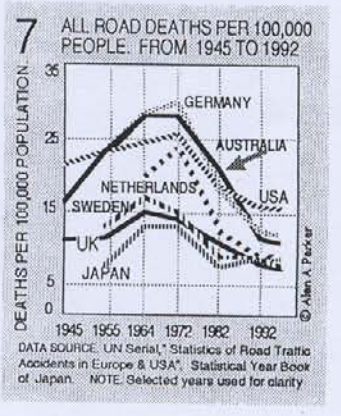
The peak road death rate for the western countries on figure 7 was between 15 and 33 per million around 1970. In 1970 the east European death rate was much lower ranging from from 9 to 18 deaths per 100,000 population but since 1985 the death rate has been increasing as is shown on graph 9. We can only estimate how many regular bicycle users there are in the old Soviet block countries. The newspaper of the international bicycle industry (Cycling Press 1995) in its estimate of world bicycle ownership quoted figures of 40 million bicycles in the USSR in 1987, 5 million in Rumania in 1982, and 3.5 million in Hungary in 1982. In total there are likely to be at least 70 million bicycles in regularly use today in the CIS and Eastern Europe and most of them would be used as a means of transport.

There is very little hard information on cycling safety in the former Soviet block countries apart from the number of cyclist deaths since 1989. However, there is some eastern European data going back to 1970 which is shown on graph 10. These bicyclist deaths approximate to a death rate per 100,000 people because of zero population growth in these countries. Graph 10 indicates that there has been no reduction in the cyclist death rate since 1970 which means that transport cycling has a most uncertain future given the low level of car ownership in these countries.

There were 3,500 cyclist road deaths in former Soviet block countries in 1992, (UN 1994). Given the current attitudes of the free market economic reformers, cyclist deaths will probable increase to around 6,000 per year. The bloody history of western road trauma is now repeating itself and will continue to do so unless car use is highly regulated and the growth in car use constrained. The 100 million people who will have to survive in poverty for many years yet in what was once the Soviet Union will be even more disadvantaged if they cannot use the humble bicycle in relative safety for transport.

Note that the the death rate trends for China and India (graph 9), with very low levels of motor vehicle ownership, are already as as high as in the UK, Sweden, Japan and the Netherlands





NETHERLANDS IS PERCEIVED TO BE SAFER FOR FEMALE CYCLISTS

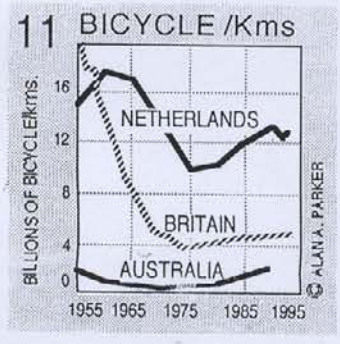
The best way to measure bicycle safety is by the number of deaths per 100 million kms ridden,

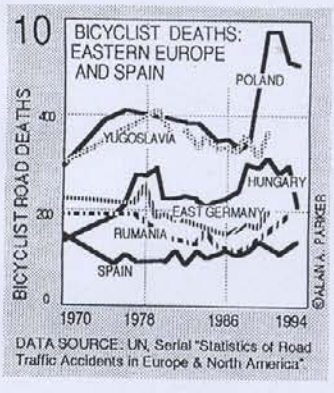
but these data are unavailable for most countries. There is no systematic measurement by most governments of bicycle use as there is in the Netherlands. Despite the the huge difference in bicycle travel in Australia, the UK and the Netherlands some comparisons are possible (Parker 1994). Graph 11 shows this writers estimate of Australian bicycle kms based on an extension of 1984-85 data (INSTAT 1989). The Australian data cannot be extended beyond 1990 because the introduction of compulsory helmet wearing resulted in a very large and partly unknown reduction in bicycle use by secondary school students (Robinson 1996).

The central purpose of figures 11 and 12 is to show the overall 30 year trends in all three countries, and the increase of bicycle use and decrease in the bicycle death rate since 1975. In Australia bicycling and motoring are now much safer than in 1970 despite a 6.4 million increase in the Australian population, 4.6 million more more cars and 5 million more bicycles. The so-called bike boom arrived in 1974 and bicycle sales increased at 8.2% per year from 1975 until 1990 and more bicycles were sold than cars for many years. However, compared to the Netherlands which has a very similar population there much less cycling done particularly as a means of transport by women. The Netherlands and Australian have similar populations but six times as many men and 17 times as many women choose to cycle most days (Parker 1994).

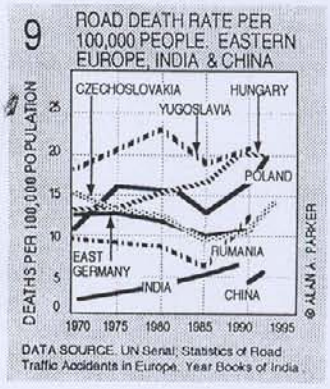
In Britain, Australia and many other countries far fewer women than men ride bicycles. This is because women are generally more traffic sensitive than men and do not like riding in mixed traffic on main roads and hate mixing it with trucks and buses (Elliot 1985). Women are more disadvantaged in terms of the transport options available to them because of poor bicycle facilities. In the Netherlands there are networks of separate bikeways and 30 km speed limit in mixed traffic areas women feel more secure. This is why as many women cycle as men. Clearly cycling may be much safer than ever before in Australia and the UK but it is still not as safe as the Netherlands and the intetion of the government according to the Dutch Bicycle Master Plan is to halve the death rate by 2010.

Britain which in terms of urban density is similar to the Netherlands, has a very good road safety record (see figure 7) for all road users, but the rapid decline in bicycle use between 1955 and 1975 was not arrested because of the failure to invest in the necessary bicycle infrastructure between 1975 and 1994. It is very significant that the recent British Royal Commission on the Environment was aware of these deficiencies and recommended better bicycle facilities to encourage a fourfold increase in cycling in the UK from 2.5 % of trips to 10% of trips(Hamer 1994). Practical experience in the Netherlands and the accident data clearly show that the safest road systems are those where the bicycle is used instead of the car for many short trips and where the annual government investment in bicycle facilities over many years is around $10 per person per year at 1990 prices. After 20 years of investment in bicycle facilities one billion $ A was spent in six years implementing the Dutch Bicycle Master plan (Wellemen 1995).

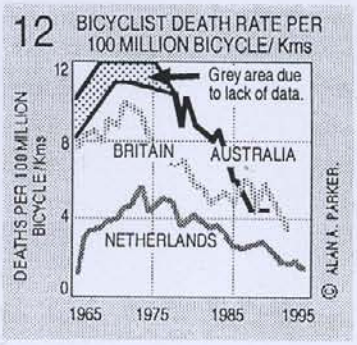




DATA SOURCE: UN, Serial "Statistics of Road Traffic Accidents in Europe & North America".



DATA SOURCE. UN Serial; Statistics of Road Traffic Accidents in Europe. Year Books of India.

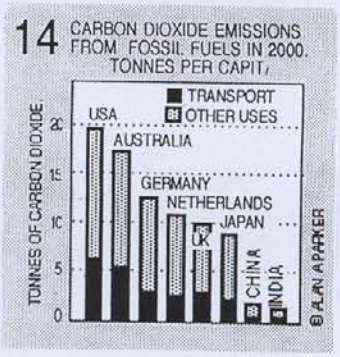


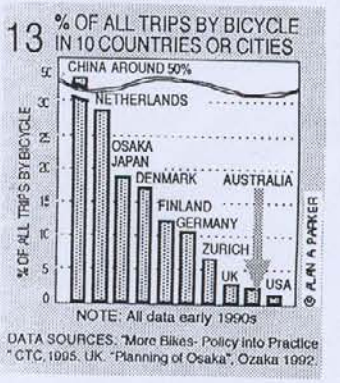
ROAD SAFETY AND REDUCING GREENHOUSE GAS EMISSIONS

The developed countries with the lowest levels of bicycle use shown on bar chart 13 have the highest levels of carbon dioxide emissions shown on bar chart 14. Indeed only 0.7% of all passenger trips are made by bicycle in America compared to 28% in the Netherlands, 20% in Japan (including bike/rail dual mode.), 18% in Denmark, 15% in Switzerland and 12% in Finland . On a per person basis compared to Australians in 1992, the Dutch and Japanese use only half the road transport energy, while the Dane and the Swede use only two thirds The American per capita use of road transport energy was 40% higher than for Australians. (Hamilton 1994)

The Netherlands and Denmark, have invested more per person on bikeways for the last thirty years because it was recognised that cyclists are entitled to equal rights of access; hence the recognition that funding bicycle infrastructure is a national responsibility. Likewise in Japan there has been $250,000 million a year investment in secure bicycle storage facilities particularly at railway stations and there are over 3 million bike rail commuters. The Japanese like the Dutch have 30 kmh speed limits on local roads and footpaths are designed for shared bicyclist/pedestrian use. Clearly, bicycles are an integral and important part of the more sustainable transport systems in the developed world. Bicycles may not be the foundation stone of the transport system as they are in China but a highly developed bicycle infrastructure is clearly a prerequisite of a sustainable society in the developed world. Clearly if we want to create a more non-violent transportation system motoring and cycling must both be made safer at the same time. Public transport, which was always much safer, has to be improved so that more people can use it and use bicycles to access it. There is now an opportunity to greatly increase bicycle use, make all passenger travel safer and reduce greenhouse gas emissions from the passenger transport sector.

The Japanese (Parker 1993 A) and the Dutch (Wellemen 1995)(Parker 1994) already have long term plans for passenger transport in place that include encouraging bike/rail travel, public transport generally and bicycle use and they expect to





DATA SOURCES. "More Bikes- Policy into Practice" CTC, 1995. UK. "Planning of Osaka", Ozaka 1992.

reduce the number of road accidents by the year 2000 as a consequence. No such transport/land-use plans exist in most countries and bicycle infrastructure funding is inadequate. Without major investment in bicycle infrastructure and low speed limits in residential areas there is not much of a future for the bicycle as a means of transport. The transport poor may use a bicycle out of necessity but few other will choose to do so.

CONCLUSION; THE BICYCLE IS NOT A PROBLEM BUT PART OF THE SOLUTION

1. The collective experience of governments in regulating car use and modifying driver behaviour is that transport systems can be made far safer than they are today for all road users . 2. World best road safety and transport planning practice in the Netherlands, Denmark, Japan and Sweden clearly shows that the bicycle is part of the solution in reducing road trauma and the creation of a non-violent and more sustainable transport system. The bicycle is wrongly regarded as an accident problem in most countries. 3. Building bicycle infrastructure has got to be given priority for the foreseeable future as it has been in the Netherlands for the last 20 years. The next step is to stop subsidising car culture, recoup the external costs of car use by taxation and other measure and then investing these savings in more benign forms of transport .

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The power-assisted PEDCON bike manufactured by Merida Industries of Taiwan, under the leadership of President Ike Tseng, will make its long-awaited appearance on the Japanese market in March 1997. Introduced at the Japan International Cycle Show, the PEDCON attracted more interest than any other power-assisted bicycle at the Test Riding Corner. The model to be marketed in Japan, an even newer, improved model, is awaited with anticipation. At Merida, where the company's aim, according to President Tseng, is "to make the bicycle a high-tech product", the headquarters plant in Taiwan is currently conducting tests on automated robots to be used to produce aluminum frames, and at the same time is shifting mass production operations to its China plant in Sh Merida takes an optimistic approach in implementing its plans. 1997 plans include producing one million bikes at the Taiwan and China plants in combination.

Tseng: "I'd be happy to see power-assisted bikes make up one-tenth of the bicycle market in Japan. First, we're going to concentrate on Europe in 1997. We've already decided to begin supplying leading manufacturers in Germany and the Netherlands by the end of 1996. Production plans include 30,000 PEDCON bikes, which of course will be manufactured at our headquarters plant in Taiwan, because production in China can't match Taiwan in terms of cost. There are too many problems with engineering and precision. At any rate, when the time comes that we can sell them on the domestic market in China, we'll take power kits and do only the assembly

Tseng: "In 1997, we plan to invest NT$200 million in PEDCON production lines and in robot automation of aluminum frames. Beyond 1997, we foresee that most assembled bikes will consist of high-end bikes with aluminum frames, so with that in mind, we're currently testing automated robots at our Taiwan plant which will eventually be used to manufacture aluminum frames. We'll be shifting most items that can be mass-produced to our China plant. Our sales and production figures for 1997 have been set at NT$3 billion and 600,000 bikes for our Taiwan plant, and NT$1.2 billion and 400,000 bikes for our China plant, for a total output of 1 million bikes. We plan to ship 60% of our 1997 output from both plants to the U.S., 30% to Europe, and 10% to Japan. Those are the three markets we've decided to focus on, in that order."

Taiwan Production of Powered Bikes Expected to Reach 78,000 in 1997

200,000 Bikes Predicted for 1998; 90% Destined for Japanese Market

According to a report released by Taiwan's Industrial Bureau of Economic Affairs Department and the Bicycle Research & Development Center, the country's production of power-assisted bicycles is expected to reach 78,000 bikes in 1997 and to grow to 200,000 bikes in 1998 (this year's production will be around 8,100 bikes). Ninety percent of total production is destined for the Japanese market.

Taiwanese manufacturers are already producing independently developed systems, and demand for exports to Japan is expected to serve as the primary impetus behind the production.

Taiwanese manufacturers already involved in research and development of power-assisted bikes include Giant, Merida, Ideal, Neobike, Omnio, Kosmos, Elebike, and several others. Elebike and Neobike have already begun test marketing in Japan.

Preparations to handle legal aspects are underway in Taiwan as well, and recently the Industrial Bureau of Economic Affairs met with officials from the Transportation Department and other related organizations to define CNS levels for power-assisted bikes.

The standards are largely in conformance with Japanese standards, and are stricter than those required by Germany. The Transportation Department has also made an attempt to place age restrictions on power-assisted bike riders, but due to a number of factors the regulations have not been enacted.

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ECOLOGICALLY
SUSTAINABLE
TRANSPORT

Contact : Secretary
Alan A. Parker ,
50 Stirling Street,
Footscray VIC 3011,
PH. (03) 9689 3693