



# Road pricing Necessity or nirvana?



# Foreword

Road congestion costs the Australian economy \$13 billion each year and this figure is expected to grow to \$20 billion by 2020. Road pricing could help manage demand and raise revenue for reinvesting in roads and public transport – but is Australia ready?

Road pricing, or the concept of charging directly for the use of road space, is not a new idea.

The most widely recognised road pricing scheme currently in operation, London's Congestion Charging Scheme, was introduced in 2003 but the planning and principles behind the scheme can be traced back for 30 years.

Successful price-based schemes have been implemented in many developed overseas economies. Aside from London, major congestion-based cordon and area road pricing schemes are also operated in Singapore, Stockholm and Milan. Distance-based heavy vehicle schemes are in operation in Germany, Austria and Switzerland, and being considered in other European economies.

## **What are we trying to achieve?**

Road pricing is intended to link drivers' choices with the actual costs they impose on the transport system. Pricing can better match the demands of road users with the available capacity or 'supply' of road space. This can encourage people to use roads more efficiently – by taking alternative modes of transport, consolidating trips, or travelling during less busy times of the day.

A rudimentary form of road user pricing is already in place in Australia with fixed charges including registration, stamp duty and other taxes, tolls and fuel levies applied to vehicle use.

The Henry Tax review recommended a congestion tax varied by time of day and revenue initially used to finance public transport and levy vehicle charging based on mass and distance.

Public acceptance of any variable or direct road user charge will require reforms to these existing charges, a substantial proportion being reinvested in public transport and political and bureaucratic courage.

The introduction of variable or direct road pricing is generally seen as a way of satisfying two main objectives:

- Managing demand
- Raising revenue for reinvesting in roads and public transport.

Finding a balance between both objectives can be a challenge – that is, if demand is managed successfully, fewer people will use the roads where charges are applied, therefore raising less revenue, and vice versa.

Policy makers need to consider how the pricing signals they are setting will impact upon users' behaviour and in turn, how this will affect the objectives.

Winning over public support will not be easy, so policy makers need to be innovative in developing road pricing policies and in its implementation in order to meet road users concerns.

This document raises some of the key issues and identifies several of the primary options for road pricing.



# Managing demand

The demand for any service can be significantly affected by variations in its pricing. The same principle applies to road space. Increasing the direct cost of road space can impact upon its desirability and result in positive changes in travel behaviour.

Applying a direct price on road usage can encourage people to make more 'informed choices' about the way they use the network.

Because users are required to pay the 'real' costs of using the road network (e.g. impacts on infrastructure and environmental damage), this can reduce the number of people using the road network at the busiest times of the day.

With the application of better price signals, users may change their mode of travel (e.g. walk, cycle or catch public transport), change their time of travel to a less busy period, or find an alternative to enable them not to travel at all (e.g. working from home).

All of these outcomes contribute to fewer cars and less congestion on roads.

## Congestion as a demand management tool...

It is often forgotten that congestion itself is a demand management tool – the more congested a road (or network) is, the more consideration a driver is likely to give to changing the time that they travel or choosing a different travel mode.

In the absence of direct charges for road use, individual drivers give little consideration to how their decisions impact on other uses of the road network i.e. the contribution they make to congestion.

## The cost of congestion

There are many different ways to measure congestion.

The Bureau of Infrastructure Transport and Regional Economics (BITRE) suggests that 'avoidable' road congestion costs the Australian economy \$13 billion per year and is forecast to grow in the future. It is estimated that around three quarters of these congestion costs relate to value of lost time to private and business travellers. But what do these costs mean in reality?

To the average motorist, congestion means frustration, wasted time and reduced productivity.

To commercial users of the roads, it means added delivery times, decreased reliability and increased costs. And to everyone living in urban environments, road congestion is a major contributor to environmental pollution.

Would the average motorist be willing to pay to have congestion reduced?

How much would need to be charged for them to change modes or the time that they travel?

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Road congestion is estimated to cost the Australian economy \$13 billion per year, but what does this mean to the average motorist?



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Following the introduction of the London Congestion Charge some average speeds increased by only 2 km/h. Would this be enough for Australian motorists?

#### How bad does the problem need to be?

Everyone agrees that congestion is a problem, but how bad is it really?

There will always be some level of congestion on our roads. How bad does the problem need to be for people to accept that road pricing is actually needed? Overseas experience suggests that the 'congestion situation' needs to be significant, and worsening, for motorists to accept a charge.

For example, in London in 2002, 50% of businesses perceived that the impacts of peak-time congestion to be either critical or very bad for their business. This is reflected in pre-charging speeds within the Charging Zone of around 20km/h (for cars in the AM peak) – speeds which had been steadily falling since the mid 1970s. Average speeds increased following the introduction of the charge, but only slightly (by approximately 2 km/h). Conversely, on roads around the charging zone, average speeds decreased slightly.

From this perspective, congestion was reduced – traffic volumes decreased in the charging zone and speeds increased, resulting in better demand management.

For the motorists paying the charge, were these outcomes worth the cost? For certain motorists driving into central London the answer might be yes – or at least they were prepared to bear the cost.

But would this be enough for Australian motorists? Would they be prepared to pay for a 2 km/h increase in speeds?

Is congestion in an Australian context 'bad enough' to warrant road user charging? And what will happen if we continue to 'do nothing'? When will it get 'bad enough' and will it be too late to effect meaningful change?

# Raising revenue

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Unless the problems with existing road user charges are clearly explained and understood, there is a risk that road pricing will be seen as the next ‘great big tax on everything’

Not only can road pricing help manage ‘problems’ associated with the transport system, but it can also provide a remedy for another key challenge – how to generate revenue that can be reinvested in road infrastructure and public transport programs, or allocated to other parts of the economy.

Policy makers are interested in the concept, considering the revenue that is generated by road pricing schemes introduced around the world.

The London congestion charge generates (gross) revenue of approximately \$380 million per year. The German Heavy Goods Vehicle charging scheme generates around \$5 billion per year.

## Is it possible to solve transport problems and get a revenue benefit at the same time?

If road pricing is needed to address a specific problem at a specific location, the answer could be yes.

However the extent to which the travelling public are likely to accept new fees and charges without reductions to existing taxes will depend on several factors, including:

- How bad the transport problems are that need to be solved?
- How much will be charged?
- Who and how many people are likely to pay additional charges, and?
- Whether or not increased travel costs can be passed on to others?

Road pricing schemes covering broader networks and not just specific locations may require considerable effort to sell to the general public.

Variable distance and/or time of day based charges levied across large areas (e.g. cities, regions or states) can be complex and are likely to be unacceptable without broader reforms.

This creates a different kind of challenge for government – how to convince the public that significant reforms to existing taxes and charges are worth the effort. Unless the problems associated with existing road user charges are clearly explained and understood, there is a strong risk that road pricing will be seen as the next ‘great big tax on everything’.



### Impacts on road users

There is also the question about which groups road pricing impacts. Is road pricing nothing more than a tax on the rich that allows the well off to continue driving and congesting the roads unabated? Evidence from London suggests that drivers on lower incomes report more difficulty in paying the charge.

Survey results from the Western Extension indicated that 40% of respondents from lower income households had changed their travel behaviour as a result of the introduction of the charge, compared to 17% of higher income households.

Of the 40% in lower income households, equal proportions reported to have increased and decreased their travel by car, with those increasing their travel seeking to 'make the most' of having paid the charge.

Designing a scheme that is 'revenue neutral' is one strategy that can be used to gain public support, however this can be difficult to achieve in practice.

There are likely to be winners and losers in any road pricing scheme. Pressure to provide concessions to certain road user groups can reduce revenue and weaken other objectives of a pricing scheme at the same time.

Defining the objectives of a scheme is important.

Any revenue goals should be clearly identified from the outset as these can influence the way that a scheme is designed.

For example if the overriding objective is to generate revenue, then it may be better to impose a fixed charge for use of a particular road or travel into a certain area rather than impose a more comprehensive network wide scheme.

Unless a substantial proportion of initial revenue is directed to either road funding or to public transport it is unlikely to gain public acceptance.

# The benefits

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Designing a scheme that is ‘revenue neutral’ is one strategy for gaining public support, but this can be difficult to achieve in practice. Pressure to provide concessions to certain road users can reduce revenue and weaken other objectives of a pricing scheme at the same time.

The benefits of road user pricing are easy to identify – reduced road congestion... free roads and increased government revenue. While these may be exciting from a transport policy perspective, there can also be some tangible and achievable benefits to everyday road users and the community as a whole. These can include:

#### **Better utilisation of existing infrastructure**

There is little doubt that Australian roads experience significant congestion at several periods throughout the week.

In the absence of space, funding and willingness to ‘build our way out of the problem’, there needs to be some consideration given to better use of the infrastructure we already have.

The application of direct pricing to the use of roads is one step towards achieving better use of infrastructure through behavioural shift.

#### **Deferred or redirected infrastructure spending**

Congested roads mean increased demand for funds to maintain and improve these roads.

Increased demand can require increases in capacity e.g. lane widening, increased turning bay provision or duplication. These options are expensive and the increased capacity can quickly be outstripped by demand. Better demand management can mean that these investments can be deferred and funds redirected to other useful purposes.

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## Existing road user charges prevent motorists' from thinking about the real costs of private vehicle travel – road damage, congestion costs and environmental damage – and do little to influence their travel choices.

### Introduction of pricing signals to road users

Many road users currently view the use of roads as 'free'. While most motorists understand that they pay a fixed registration fee for the use of their vehicles and many are aware of the Federal Government's fuel excise levy, few understand the real cost (economic, financial and environmental) of the use of their motor vehicles.

The user-pays concept is readily understood when it comes to other assets, such as water or electricity and pricing based on time of day or peak demand is also well understood, through peak train fares and peak and off peak electricity pricing.

However, these concepts have not readily translated to road usage, with relative flat pricing mechanisms for vehicle use – once the fixed fees are paid, many motorists feel that they should travel by car more frequently in order to get value for money from fixed fees.

These pricing structures prevent motorists from thinking about the real costs of private vehicle travel – road damage, congestion costs and environmental damage – and do little to influence their travel choices.

A direct link between the real costs of road travel and the prices levied on this travel can provide an opportunity to influence motorists' decisions and the potential to change their choice of travel. If a motorist knew that a journey of a certain distance would cost a certain amount of money at a certain time of day, how readily would he or she undertake that journey compared to the current situation where roads are perceived to be 'free'?

### Travel time and cost savings

Reduced congestion means reduced travel time.

For the average motorist or commercial road user, this translates directly into time and cost savings. Additionally, any system which uses a reduction in fixed charges (e.g. registration) as an alternative for more variable charges will 'reward' those drivers who use their vehicles less and penalise those who travel more.

This has the potential for some significant cost savings for those who use their cars infrequently.

### Additional government revenue

Depending on the structure of any pricing scheme applied, it can generate significant financial benefits for government.

As cities grow and demand for infrastructure and transport increases, any additional sources of revenue for government can be utilised in the provision of this infrastructure. There is overwhelming evidence to suggest that where revenue raised through road pricing is directly attributed to public transport or general transport improvements, public acceptance is greatly increased.

Can a scheme which operates on the basis of revenue neutrality or reducing fixed motoring charges still raise revenue for these transport improvements?

Is there a trade off between public acceptability and government investment potential?

# What are the options?

The table below identifies some the main options for road pricing, considering their strengths, weaknesses and relevance to the Australian context.

Option	Network wide road user charges	Cordon pricing	Corridor pricing
<b>What it is?</b>	A comprehensive approach to charging for road use within large areas or across whole road networks. Prices can be set in a variety of ways, e.g. a fixed 'base charge' for travel across on any part of the network, separate charges for travel in urban and regional areas, differential time of day based schemes across whole urban road networks or a combination of these.	Charges are levied for vehicles entering a defined zone within an urban area.	Pricing is applied to various major roads (or portions of roads) within a network. May also include HOT (High Occupancy Tolling) Lanes where high occupancy vehicles may use a lane for free while single occupant vehicles pay for using the lane. Potential to apply variable pricing through peak periods.
<b>Advantages</b>	<ul style="list-style-type: none"> <li>Establishes a consistent and fair approach to charging for road use which, unlike registration and other fixed charges, is linked to actual road use</li> <li>Provides an opportunity to introduce differential charges between urban and regional networks reflecting different costs associated with infrastructure provision and costs etc</li> <li>Introduces the concept of 'money following the vehicle', addressing distortions associated with various state and Commonwealth road user charges.</li> </ul>	<ul style="list-style-type: none"> <li>Motorists who choose not to pay the charge change their travel behaviour, reducing traffic</li> <li>Revenue is raised through those who continue to use their vehicles and pay the charge</li> <li>Reduced congestion can result in improved travel times.</li> </ul>	<ul style="list-style-type: none"> <li>Potential to achieve network-wide objectives</li> <li>Motorists who choose not to pay charges use alternative routes or change travel behaviour, decreasing demand on major arterials</li> <li>Reduced congestion can result in improved travel times and more reliable journeys</li> <li>Revenue is raised through those who continue to use their vehicles and pay charges during busiest and most congested periods.</li> </ul>
<b>Disadvantages and barriers to implementation?</b>	<ul style="list-style-type: none"> <li>May necessitate significant reforms to existing road user charging arrangements requiring strong Commonwealth and State Government co-ordination and commitment</li> <li>May require the use of expensive technology to under pin the system</li> <li>Concept of network wide distance/time of day variable charge may be difficult to explain to road users.</li> </ul>	<ul style="list-style-type: none"> <li>In order to succeed, cordon pricing is best applied where private vehicle travel is focused heavily on a particular centre</li> <li>Can impact upon existing private motorway concessions</li> <li>Capacity of public transport in major centres already reaching its limits, giving motorists limited opportunities to change their mode</li> <li>Can cause increase in traffic in surrounding non-charged areas.</li> </ul>	<ul style="list-style-type: none"> <li>Can increase traffic on surrounding local roads</li> <li>Can impact upon existing private motorway concessions</li> <li>Public resistance at paying for something previous perceived as 'free' may need to be offset by reductions in fixed motoring costs.</li> </ul>
<b>Could it work in Australia?</b>	Yes, but only in the long term. A network wide road pricing system is likely to require an overhaul of existing state and Commonwealth charges and/or the introduction of supporting technology such as GPS.	Unlikely. The low density and increasingly decentralised nature of Australian cities is likely to work against the effectiveness of a cordon charge. Congestion tends to be dispersed rather than focused on a single centre	Yes. Many urban roads are already subjected to tolls, however there would need to be a more holistic view taken on its application.

# Is technology really the answer?

## The role of technology

Questions relating to technology are important but should be considered after more fundamental issues have been resolved. Some key issues associated with technology as discussed below.

When it comes to technology, it is important to prevent a situation of the 'tail wagging the dog'. The use of a particular technology must be judged on its capacity to deliver the aims of the scheme – rather than the opposite, whereby the principles of a scheme are compromised to facilitate the use of particular technology.

Being overly prescriptive and 'picking winners' can also be risky. Service providers should be given an opportunity to develop innovative, leading edge solutions which satisfactorily deliver the scheme's objectives at the best value for money and reliability.

## Is technology really the answer?

The concept of road pricing inevitably generates a lot of discussion about technology.

Recent advances in electronic positioning systems have led to renewed interest in the concept of road pricing, but is technology really that important?

The Singapore Road Pricing Scheme was introduced in 1975, but until 1998, it was a manual system based on paper transactions. Even in its 'low tech' form, the scheme was highly successful. By 1988 the scheme had achieved a 31% reduction in traffic relative to pre-1975 levels, despite a 77% increase in the total vehicle population.

The main types of technology associated with road pricing schemes are:

- Global Navigation Satellite Systems (GNSS) such as the US Global Position System (GPS)
- Dedicated Short-Range Communications (DSRDC) systems using tags and beacons and wireless communication systems (e.g. electronic tolling technology)
- Closed Circuit TV (CCTV) and Automatic Number Plate Recognition (ANPR).

Evidence suggests that DSRC technology is probably best suited to geographically constrained schemes with high volumes of traffic, e.g. schemes relating to cordons or specific roads, whilst GPS-based systems are more suited to geographically extensive distance-based schemes.

CCTV and ANPR technology, which form the basis of the London scheme, are now regarded by many as inferior compared to GNSS and DSRC technology.

Beyond these generalisations, there are no hard and fast rules about which form of technology may be right for a particular scheme. Because each system has its own limitations, a combination of different forms of technology is likely to be needed in any scheme, particularly if a more comprehensive network wide scheme is being considered.

The main problem with technology relates to cost. The London Congestion Charge required an investment of around \$400 million, whilst around \$3 billion was invested in the German Heavy Goods Vehicle charging scheme. Large up front expenditure is required before any revenue is collected, and costs can be much higher if broader transport system improvements (e.g. public transport) are made prior to schemes being introduced.

Operating costs are also important. Choosing the wrong type of technology can add significant cost to operating a scheme over its life. Urban schemes, which may require multiple forms of technology, can be expensive to provide but generate less revenue to network wide schemes because they apply to a smaller population base. The costs of running parallel manual schemes for vehicles without the required technology can also be disproportionately high. In the German Heavy Goods Vehicle scheme, manual charging represents more than one third of total operating costs, but comprises only 10% of all transactions.

# The policy landscape – where to start?



The real challenge is knowing where to start. The road pricing debate often implies that the concept could be introduced in the near future and yet it seems to have been '5 years away' for the past 30 years. Aside from the COAG Road Reform Process for heavy vehicles (see below), most Australian governments have been reluctant to take a formal position on road pricing, and it is generally treated as an area of 'watching brief'.

A summary of recent key policy developments that have generated a growing interest in road pricing are shown in the table below. Road pricing was most recently identified within the Henry Tax Review (2010), but to date the Commonwealth Government has not expressed an intention to pursue its recommendations.

## Major developments in road pricing

Policy/platform	Overview
COAG Review of Urban Congestion Trends, Impacts and Solutions (2006)	The Council of Australian Governments (COAG) commissioned a Review of Urban Congestion Trends, Impacts and Solutions (2006), which concluded that there was no single 'silver bullet' solution to rising congestion pressures but a need to package together supply and demand-side measures. It urged consideration of price-based measures, including parking charges, variable tolling and congestion pricing, noting the success of price-based measures implemented overseas.
ATC Model Pricing Approaches (2008)	The Australian Transport Council (ATC), in November 2008, agreed that jurisdictions will cooperate in modelling the congestion, network, socio-economic and emissions outcomes of various targeted pricing scenarios. This work led to a critical review of the capabilities of Australian capital city transport models to model pricing approaches to congestion management and options to address limitations.
COAG Road Reform Plan (2009)	COAG has agreed to the reform of road freight infrastructure pricing in order to provide better price signals for freight infrastructure providers and users to enable Australia to meet more efficiently the forecast growth in the national freight task. The COAG Road Reform Plan (CRRP) was developed in response to the Productivity Commission (PC) Inquiry on Road and Rail Freight Infrastructure Pricing. The plan includes a transition to incremental charges for heavier loads, and will also examine institutional reform, pricing, and business systems.
The Henry Tax Review (2010)	The Henry Tax Review, released in May 2010, recommended that "State taxes on motor vehicle use and ownership, including motor vehicle registration, transfer (stamp) duty and taxi licence fees, should be replaced with efficient user charges where possible." In addition, the Henry Review recommended that on routes where road freight is in direct competition with rail that is required to recover capital costs, heavy vehicles should face an additional charge on a comparable basis.

At the state level, road pricing has had the most discussion in NSW. In October 2010, the NSW Opposition Spokesman on Roads, Andrew Stoner, said that he supported uniform congestion tolling within Sydney, but as a long term proposition that would require significant improvements in public transport first. Various industry discussion papers have recommended the development of more consistent charging arrangements on toll roads as a way to fund infrastructure improvements and move towards a more comprehensive road pricing scheme (see papers by SAHA and others in further reading).



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Where to start? Agree on the objectives; run trials; investigate the unknowns; support the COAG Road Reform Process.

#### **Making road pricing a reality – the next steps**

Developing a comprehensive network wide scheme at the state or federal level is clearly not a realistic proposition, at least not within the next 5 to 10 years. The reforms likely to be required to existing state and Commonwealth charges would require a significant amount of time to reach agreement on, assuming there is a desire to make the reforms in the first place.

Government agencies need to look at practical and achievable ways of introducing greater price signals into the road transport market. In the short to medium term, this could involve the following actions:

#### **Agree on the objectives – revenue raising, demand management or both**

The debate needs to move beyond the theme of ‘road pricing is a good thing’ to talking about the specific problems that road pricing could resolve. The impact of congestion needs to be better understood if the debate is to move forward. A congestion free network is impossible to achieve – the question is how much are we willing to accept. Is congestion actually getting worse, and if so exactly where and when is it a problem? Time series data for congestion and average travel speeds is surprisingly difficult to find for a number of our major cities. Providing more transparent information about road network performance is essential so that we can agree on the problems that need to be solved.

#### **Run trials on problematic corridors**

The road pricing debate proposes major changes to the way our transport system currently works, and how motorists pay for use of that system. We need to think about the immediate ways of introducing price signals into the market. Trials and pilot schemes are a great way to test ideas. These can take a variety of forms, e.g. introduction of variable distance and/or time of day pricing on problematic motorways or corridors. Addressing other distortions, such as subsidies and cash back schemes, would be another positive first step.

### **Investigate the unknowns – system operating costs**

When it comes to road pricing, system operating costs are the 'elephant in the corner'. Is it acceptable to introduce a new way of charging for road use if one fifth of revenue needs to be spent on running scheme itself? The potential costs associated with different options are not well understood. The costs of administering the current system of road user charges across different states also needs to be better understood before we can properly understand the benefits of moving to a new system. Further research into travel behaviour (i.e. responses to new pricing arrangements) and emerging forms of technology is also needed.

### **Support the COAG Road Reform Process – road pricing for heavy vehicles as a first step**

Road pricing is already underway for heavy vehicles via the COAG Road Reform Process – the freight industry knows that it's coming but most other groups and the public do not. Heavy vehicle reforms could provide a platform for the longer term rollout of a broader mass-distance-location pricing regime, as well as the further harmonisation of existing fees and charges. Commitment should be given to the established reform process including the expansion of these reforms to give regard to their role as a mechanism for a national approach to a road pricing scheme for all vehicles.

### **Road pricing – making the right move**

The case for introducing road pricing is compelling – failing to address congestion will constrain growth of the national economy. However for road pricing to tackle congestion effectively, four principles must be adopted in policy development and implementation.

- Establish clear objectives – revenue generation, demand management or both – and ensure that these are clear and well understood at all times
- Mobilise the States and Commonwealth through COAG for a co-ordinated approach
- Focus on the economic case in the scheme design. The political and public case will 'follow the money' if the scheme is sound
- Start planning now as schemes can take 5–10 years to implement. The scale of congestion means the costs of delay are enormous. Putting this in context, the benefits of addressing congestion effectively could dwarf other much-debated investments such as NBN and Queensland reconstruction. We need to act now.

# Further reading

Saha International (2010), 'Urban Transport Challenge: A Discussion paper on a Role for Road Pricing in the Australian Context', Discussion paper prepared for Infrastructure Partnerships Australia

Castalia (2010), 'Urban Transport Challenge: Driving Reform on Sydney's Roads, Discussion paper prepared for Infrastructure Partnerships Australia

Ministerie van Verkeer en Waterstaat (2010) Road Pricing in the Netherlands: Overview', 13 January 2010

Australian Transport Council (2009) COAG Road Reform Plan Phase I Report: Report prepared for the Council of Australian Governments

Evans and Peck (2009), 'Delivering the Missing Links to Sydney's Motorway Network'

Bureau of Infrastructure, Transport and Economics (2008), 'Moving urban Australia: can congestion charging unclog our roads', Working Paper 74, Canberra.

Broaddus, A. (2008) 'Tolling Heavy Goods Vehicles: An Overview of European Practice & Lessons from Germany', Presentation to the 2008 Annual Meeting of TRB Congestion Pricing Committee, January 16, 2008

## Other information sources

Transportation Research Board Congestion Pricing Committee – See <http://www.trb-pricing.org/>

COAG Road Reform Plan – <http://www.roadreform.gov.au/>

Transport for London Congestion Charging Impacts Monitoring Reports – [www.tfl.gov.uk](http://www.tfl.gov.uk)

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# For more information

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