

Towards more sensible decision making on infrastructure building

Contribution to the third Pan-European Transport Conference

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"Whatever one's views, there is certainly sufficient contrary evidence to counsel against blindly attributing large indirect benefits to public investment. "

Jacques Girard and Christopher Hurst, EIB Papers Nr 23
European Investment Bank, July 1994.

"Building infrastructure is not the only answer. In many cases indeed, it has become an increasingly unrealistic option because of its costs, both financial and environmental. "

Transport Commissioner Neil Kinnock,
Speech at the Third Pan-European Transport Conference in Helsinki, June 1997

"A new definition of the link between mobility and economic growth also has consequences where infrastructure policies are concerned, in that they can ensure that the best possible use is made of existing networks and that the emphasis is on their upkeep rather than on seeking, first and foremost, new investments. "

Resolution on Transport and Infrastructure Development,
European Conference of Minister of Transport (adopted April 1997)

"Without adequate programming there is a risk that available funds will be dispersed without achieving, in most regions, the minimum level of performance that the basic transport system should provide or the synergies expected from its integration. "

Dr. Mateu Turró, European Investment Bank
Speech at the Third Pan-European Transport Conference in Helsinki, June 1997

In line with these quotes, this T&E paper argues for more rational decision-making on the construction of new infrastructure by improving economic assessments and taking into account the environmental concerns and costs. This will not only help save Europe's natural and cultural heritage from disturbance or destruction, but also help to avoid wasting large sums of money.

0. Summary

1. We may be making the wrong decisions

Many European policy papers on infrastructure re-iterate the expectation that investments into new infrastructure will provide a boost to the economy, to employment and to cohesion. However, economists have long called into question this belief. The issue was already raised over 25 years ago World-Bank by economist Ken Gwilliam, and the last few years further work, including empirical evidence, points in the same direction: **there is no economic justification for a blanket assumption that infrastructure building is good for the economy or employment. There is also severe doubt that infrastructure construction is a good tool for increasing cohesion.**

Congestion nowadays is another important reason for infrastructure building, especially roads. However, it is questionable if this is going to be an effective solution, as new road space tends to generate additional traffic. Furthermore, road building is likely to be a second-best solution as compared to more accurate pricing. Road pricing geared to manage traffic demand will most likely leave society as whole better off.

Needless to say, the effects of both construction and use of infrastructure, notably roads, on the environment are usually large, and negative. The emphasis on roads increases this damage. Although environmental concerns are usually taken up at some point in the decision making on infrastructure, the economic costs of environmental damage usually are not.

The problem is that these three considerations are not, or not sufficiently, reflected in current infrastructure policy and decision making. This means we may be making the wrong decisions! Clearly, there is need for more sensible decision making based on more accurate analysis.

The good news is that this message is getting through to a number of important people and institutions in Europe. Recent statements by the ECMT, the EIB and Transport Commissioner Neil Kinnock indicate that the tide is slowly turning. What is urgently needed now is a change in actual policy: a huge improvement in decision-making on infrastructure. This will not only help save Europe's natural and cultural heritage from disturbance or destruction, but also help to avoid wasting large sums of money.

2. Improving infrastructure decision making

In order to come to more rational decision making, decision makers should:

1. Ask the right questions.
2. Improve the analyses, notably the cost-benefit analysis
3. Give the environment the serious consideration it deserves in the final decision.

1. Ask the right questions

There is a strong political drive to push ahead with infrastructure projects regardless of the real costs and benefits. The reasons behind this are both political and linked to decision making mechanisms. A few of the reasons are the expectation that new infrastructure is *always* good for the economy, employment and cohesion, even if this is not supported by any scientific evidence. Furthermore, congestion problems are very visible. Thirdly, decision makers often have no insight in alternative to infrastructure investments. But they are also not confronted with any negative consequences arising from their decisions. This leads to a systematic under-estimation of the cost-related risks. Another point is that infrastructure plans often have their place on the agenda for a long period. This leads to many stakeholders becoming committed to the project, providing a strong bias to continue the project regardless of the outcome of any analyses.

What is needed is a more sensible approach based on a broader view. The first thing to do is ask the right questions:

- 1) What is the problem we are trying to solve? E.g. congestion, un-employment etc.
- 2) Is building infrastructure the optimal response to that problem? If so, upgrading or new construction? Which mode has the highest benefits?

If infrastructure indeed is the answer, the infrastructure planning itself can be improved by the next two steps.

2. Improve the analyses, notably the cost-benefit analysis

The approaches to infrastructure planning and assessment vary widely across Europe. Often, however, a basic cost-benefit analysis (CBA) is used, not only by governments but also by multi-lateral development banks. These assessments have an aura of scientific legitimacy which is unjustified as long as they are not substantially improved. This paper lists a large number of flaws in existing assessments. They largely concern the underestimation of costs, the over-estimation of benefits and the exclusion of environmental costs.

3. Take more balanced decisions on environment

It is important that the environmental considerations are part of the decision making process from an early stage. If this is not the case, the options may first be narrowed down on economic grounds, thus excluding the first-best solution from an environmental point of view.

Useful instruments are programme-level Strategic Environmental Impact Assessments (SEAs), project-level Environmental Impact Assessments (EIAs) and national and international nature protection legislation like the EU Habitats Directive. But in the end it is up to the national government (and in case of the Habitats directive the EC) to give them the necessary weight.

Those effects which can be monetarised should be taken into account in the cost-benefit analysis. Other costs, like loss of natural habitats and damage to the landscape are more difficult to work out, and some things are just about impossible to work out, like the loss of welfare caused by children not being allowed to play in the streets. But just because they are unquantifiable does not mean they are not of value - quite the contrary. Therefore the ultimate aim should be to arrive at a socio-economic multi-criteria analysis in which many factors, social, environmental and economic (including monetarised environmental costs) are evaluated.

3. Conclusions and recommendations to policy makers and financing institutes

a) Realisation that the ground rules of transport policy have changed

The political climate and indeed the basic rules of transport policy-making are changing. Examples are the political and scientific developments on external costs, and the fact that in many parts of Europe new transport infrastructure has a different impact on the economy now than it has done in the past. *Politicians and policy makers should therefore stop using arguments which are out of date to justify current transport planning and should recognise that transport reality has changed.*

b) A change in rhetoric

It has now become clear that there is no scientific basis to support claims that infrastructure investments *in general* boost economic growth and employment, nor that they are the best way to stimulate regional development. *Politicians should immediately stop using unfounded claims that road building will stimulate the economy, employment and regional development.*

c) Improved decision making on infrastructure

In order to come to more rational decision making, decision makers should:

- Ask the right questions
- Improve the assessments, notably the CBA
- Give the environment the serious consideration it deserves in the whole decision process.

d) Review regional and development policies within and outside EU

In view of the strong doubts on the effectiveness of infrastructure investments to improve cohesion, and considering the huge sums of money available for regional development, it is essential that policies in these areas are given a complete review. The revision of the Structural Funds Regulations in 1999 provides an excellent opportunity for the EU to devise a more sensible regional policy. Governments of Central and Eastern European Countries must seriously ask themselves if their efforts to construct long-distance high speed links are really

the most efficient use of resources. And financing institutes like the World Bank, the EBRD and the EIB urgently need to re-evaluate the effects of their loans on the regional and national economies and the environment.

1. Introduction - we may be making the wrong decisions

Many a European policy paper on infrastructure re-iterates the expectation that investments into new infrastructure will provide a boost to the economy, to employment and to cohesion. Even now, few European policy-makers would even consider to question this "common knowledge". By contrast, economists have long called into question the belief in the generalised positive economic effect of infrastructure investments. The issue was already raised over 25 years ago World-Bank by economist Ken Gwilliam, and the last few years further work, including empirical evidence, points in the same direction: there is no economic justification for a blanket assumption that infrastructure building is good for the economy or employment. The EIB even goes so far in saying that "there is actually some evidence to suggest that 'excessive' public investment hinders growth" [Hurst, 1994]. Furthermore, there is also severe doubt that infrastructure construction is a good tool for increasing cohesion. None of this doubt, however, seems to be reflected in current infrastructure policy and decision making.

Another important reason for building new infrastructure, especially roads, is congestion. However, it is questionable if this is going to be an effective solution, as new road space tends to generate additional traffic. Furthermore, road building is likely to be a second-best solution as compared to more accurate pricing. Road pricing geared to manage traffic demand will most likely leave society as whole better off.

Needless to say, the effects of both construction and use of infrastructure, notably roads, on the environment are usually large, and negative. The emphasis on roads increases this damage. Although environmental concerns are usually taken up at some point in the decision making on infrastructure, the very real economic costs of environmental damage usually are not.

The problem is that these three considerations; a) the doubtful effect on the economy, b) the in-efficiency in solving congestion and c) the environmental costs are not, or not sufficiently, reflected in current infrastructure policy and decision making. This means we may be making the wrong decisions! Clearly, there is need for more rational decision making based on more accurate analysis.

The good news is that this message is getting through to a number of important people and institutions in Europe. Recent statements by the ECMT, the EIB and Transport Commissioner Neil Kinnock (see quotes on the first page of this paper) indicate that the tide is slowly turning. And even if the main reason behind the call for more efficient investment is the scarcity of funds, indeed the environmental argument is also gaining ground. So what is urgently needed now is a change in actual policy: a vast improvement of decision-making on infrastructure. This will not only help save Europe's natural and cultural heritage from disturbance or destruction, but also help to avoid wasting large sums of money.

2. What are we actually trying to achieve?

2.1. Asking the right questions

Judging from policy statements, infrastructure is often meant to cure many ailments. The official and implicit aims of the EU TENs for instance are: not only to ensure sustainable mobility, but also to stimulate growth and competitiveness, strengthen cohesion and on top of that help to protect the environment. This seems quite a broad range of objectives....

A sensible approach would be to first ask two questions. Firstly, one should ask: "What is the problem we are trying to solve?". Once that is made clear, the next central question is: "Is infrastructure the best solution?".

The most prominent problems, which infrastructure is meant to solve, are:

- improving accessibility
- relieving congestion
- stimulating regional development
- boosting economic growth and employment.

The following sections look into the question if infrastructure is the most effective solution for these problems.

N.B. As roads are generally taken to be the first and most important mode in relation to these problems, the next sections will focus on that mode. However, most of the argumentation is equally true for rail, air or waterways.

2.2. Improving accessibility vs. expanding capacity

The first two of the above mentioned problems which infrastructure is meant to solve, accessibility and congestion, are interlinked. At an early stage of constructing a road network, new links will improve accessibility. But at a later stage, more links will only expand road capacity without actually providing new connections where none existed before. New links will then do relatively little to improve average travel speeds, as the infrastructure network has arrived at the top of the S-shaped growth curve, and is subject to the law of diminishing returns. Once a road network has reached this stage it is likely to be much more efficient to start managing demand, rather than respond to the growing demand by road building. And the most appropriate instrument for demand-management is road pricing.

It is important to realise that this growing demand for transport is not a fixed given, but a variable of the transport price. Moreover, transport demand is kept artificially high: across Europe, the current price of transport does not reflect the real (marginal) cost - e.g. costs of congestion, emissions, noise and accidents are not included in the price. This situation is not optimal, leading to a loss of welfare. In other words, more accurate pricing leading, among other things, to lower (growth of) transport demand, is good for the economy.

We can conclude that in most cases congestion can be more efficiently tackled by pricing measures than by road building. A more practical reason why building new infrastructure as a response to congestion is not likely to be an effective solution is that new roads tend to generate more traffic. A larger, but equally congested road may be the expensive result.

2.3. Stimulating regional development, employment and economic growth?

a) Benefits of new infrastructure

The theoretical economic benefits of new road links arise from two principle effects: the consumption and the production effect. These effects may, however, easily be overestimated.

The consumption effect

Additional roads allow people to travel cheaper, faster and/or more comfortably. This leads to an increase in welfare. This benefit is likely to be reduced, however, by newly generated traffic leading to renewed congestion, so that the net gain in travel-time may be much lower. There may also be adverse effects on parallel railway lines, also reducing the net welfare.

The production effect

New road connections allow companies faster, cheaper or more reliable transport. In theory, this in turn has an effect on productivity and competitiveness. This happens in three ways:

- cost savings in transport lead to lower product prices, which lead to higher demand.
- cost savings in transport lead to cheaper production, which leads to a better competitive position and allows market expansion
- improved infrastructure attracts new companies to the region.

In reality, however, the above positive effects are often much smaller or even non-existent [see for example Hey 1996; Rietveld 1996; McKinnon 1996]. Some examples of the mechanisms at work are the following.

- It is by no means certain that firms can transfer productivity gains into reductions of transport costs. For instance, the actual time savings are often too short to permit worthwhile re-deployment of the vehicle and driver.
- In most sectors transport takes up such a small share of total production costs that transport time savings have a negligible effect on these production costs, and thus on product prices.
- Even if companies manage to reduce production costs, this will only lead to higher demand if the demand is reactive to prices. Price-elasticity varies between sectors. The impact on a regional economy therefore is more dependent on the economic structure (e.g. type of products produced in the region) than on the improved infrastructure.
- The effect of improved connections of a peripheral region to central regions depends on the characteristics of the region. Only if the region's competitiveness (e.g. wage costs, productivity, economies of scale...) outweigh the strength of the central regions

- will the effect be positive.
- Empirical evidence shows that re-location of businesses mainly takes place *within* a region.

All in all, the benefits of new or improved transport links are extremely uncertain. Only thorough case-by-case analysis can determine the exact outcome. And even then, they should be carefully balanced against the costs.

Effects on employment

Inevitably, investments into infrastructure will create jobs. But as this is the case for any investment, the employment generated during the construction phase can never serve as an argument in favour of infrastructure building.

The longer-term employment-effect is a secondary consequence of infrastructure building: increases in employment should result from increases in economic activity. This is, however, extremely uncertain. Many economists doubt the positive effects on employment [see Bröcker 1996; Hey 1996; Rietveld 1996]. In a paper for the European Investment Bank, Hurst states that the effects are unclear, and adds that in the short term even "unemployment may be exacerbated" [Hurst 1994].

b) Costs of new infrastructure

Environmental and social costs

Both the construction and the use of new infrastructure connections will entail environmental damage. The road or railway form a barrier for wildlife and a visual intrusion in the landscape. Furthermore, taking into account the increase in traffic after a new link is completed, the increased emissions of noxious and greenhouse gases, noise, segregation and possibly accidents will have to also be taken up as real costs of the infrastructure.

Financial costs

Furthermore, the financial costs of the investment should be taken into account. Welfare is directly affected because money invested into infrastructure is no longer available for other purposes. But welfare is also affected if the investments have a long term effect on GDP growth.

c) The net result - need for efficiency in investments

The final question is not if a new road generates economic benefits, but whether these benefits are large enough to justify investments. The principle factor is the rate of return on investment, which should be calculated by adding the consumption and production effects and subtracting the costs of environmental damage. Only if this rate of return is larger than the rate of return of private investments is there a justification for construction. Or, as Prof. Bröcker says, "If this is not the case building the road is not worth the effort" [Bröcker 1996].

In a paper for the European Investment Bank (EIB), Girard and Hurst confirm this, arguing that it is not level of investments, but the efficiency, or the rate of return, of the investments which determines economic growth. In order to improve the efficiency, or rate of return, of investments a much more thorough analysis is necessary. The same argumentation can be found in the contribution of the European Conference of Ministers of Transport (ECMT) and the EIB to the Third Pan-European Transport Conference in Helsinki, June 1997¹. In these papers both the EIB and the ECMT argue for improving efficiency in infrastructure investments, in particular by taking into account transport demand management (e.g. road pricing) in the infrastructure planning [Turró 1997, ECMT 1997].

These conclusions of the EIB and ECMT largely overlap with the main message of this T&E paper (see sections 4, 5, and 6).

d) Conclusions on economic growth, employment and cohesion

The above mentioned EIB paper says "There is certainly sufficient contrary evidence to counsel against blindly attributing large indirect benefits to public investment". This was one of the conclusions T&E has drawn from its work on "Roads and Economy". There is no way to assess the net economic effect of a new infrastructure link but on a project-by-project basis. A generalised statement on the economic effects of infrastructure is simply not possible to make. Therefore, the sweeping statements often heard from politicians and policy-makers are inevitably based on thin air.

As such, the recent European Commission working paper on "The Likely Macroeconomic and Employment Impact of the Trans-European Transport Networks" [European Commission, 1996] is a dangerous document. It concludes that the macro-economic effects of the TENs will be positive, based on the simple extrapolation of one single priority project to the whole of the TENs. It assumes that "the cost-benefit ratio for the PBKAL project² is representative of the T-TENs as a whole". This is, of course, not wrong as an exercise, but extremely dangerous because politicians will use the conclusions as hard evidence, whereas actually the estimations of the net benefits are incredibly soft.

As for *employment*, if anything the structural effects of infrastructure investments are uncertain. Increases of employment during the construction phase can of course never be an argument in favour of infrastructure building - any investment would have a similar effect.

Finally, where *cohesion* is concerned, from recent literature it becomes clear that the

¹ The ECMT contribution was adopted by the Transport Ministers of all ECMT member countries in Berlin, April 1997.

² High-speed rail link Paris-Brussels-Köln-Amsterdam-Luxembourg.

perceived positive effect of new transport links to regional development is also uncertain. In certain regions it may be positive, in others neutral, and in others it may even be negative. But the crux is: there are likely to be other, much more effective ways to improve cohesion than road building. This means we can attain a better effect for less money. This again means that much of the regional development funds may have been used ineffectively -wasting our money.

2.4. Consequences for decision making

It is clear from the above that infrastructure decisions are often based on incorrect assumptions. Or, as the EIB puts it: "The efficiency of public investment could be raised through greater preparatory work, the consideration of wider options and tougher selection criteria for infrastructure projects". In other words: infrastructure decision-making must be improved. A good place to start is with the cost-benefit analysis.

Current decision making on infrastructure building normally includes a cost-benefit analysis (CBA) of the individual projects. These analyses are usually rather incomplete. The assumptions regarding economic costs and benefits are often arbitrary. Furthermore, CBAs usually do not take into account environmental costs. The following section described how such analyses can and should be improved.

This does not mean that with an improved CBA all factors are covered. According to Hook [Hook, 1994], several governments are turning towards different forms of decision making, notably multi-criteria analysis. T&E agrees that an economic analysis alone does not suffice for a final decision. Incorporating environmental costs in the economic analysis and in general improving the estimations of costs and benefits helps move towards more sensible infrastructure decision making. But the final decision will always be a value judgement.

The consequences for decision making are further outlined in section 5, the political recommendations in section 6.

3. Improving cost-benefit analyses

The approaches to infrastructure planning and assessment vary widely across Europe. Often, however, a basic cost-benefit analysis (CBA) is used, not only by governments but also by multi-lateral development banks. These assessments have an aura of scientific legitimacy which is unjustified as long as they are not substantially improved. The following section identifies the major flaws in existing assessments. It should be noted that the overview is not meant to be exhaustive, nor are all gaps expected to exist in all assessments in Europe. Nevertheless, the improvements suggested are generally applicable and can help improve CBAs in any circumstance. This section is mainly based on "Kosten-batenanalyses for infrastructuur" by De Wit [De Wit 1997; see also Hook 1994].

Major flaws in Cost-Benefit Analyses

Estimations of welfare and traffic growth do not take account of demand management

The main welfare gain from new infrastructure is to do with increased traffic speeds. However, new roads are thought to generate additional traffic - a notion which is gaining wider acceptance [SACTRA, 1994]. If this traffic generation effect is not included in the CBA, the welfare gain due to faster travel may be overestimated.

Furthermore, current transport prices do not reflect all costs. Linking prices closer to costs ("fair and efficient pricing") would lead to higher efficiency and lower (growth of) transport demand. This means the "first-best" solution for congestion is more likely to be road pricing than construction of new infrastructure. Furthermore, road pricing is very likely to become a reality in the near future. Therefore it would be better to include this "first-best" scenario in the CBA.

The ECMT supports this approach in a broader sense. It says that traffic forecasts which form the basis of infrastructure planning should include "new assumptions which influence mobility", which may also include traffic calming, physical planning or changes in lifestyle. Not doing this may lead to important errors. Or, as the ECMT puts it: "... to incorporate or transpose forecasting models and analytical models too hastily can result in serious errors which are very costly when it comes to heavy investment." [ECMT 1997].

Costs in general are estimated too low

Often the construction costs are estimated on a budget which proves to be too tight at a later stage. However, the partners in the infrastructure development feel committed to the project, so that no re-evaluation takes place. It would be advisable to be explicit about which costs to include to at least partly alleviate this problem.

Benefits of alternative investments are not considered

Although economic and employment effects arising *during the construction phase* are very real, they do not concern *extra* employment and production. Alternative investments would also have produced these effects. Therefore the direct economic effects from infrastructure construction are no valid argument in favour of the project. This is far too often ignored in political discussions.

But indeed, infrastructure investments can also produce positive effects on *structural production and employment*. Such effects are usually broadly outlined in the CBA. However, the same investment in any other area is likely to stimulate production and employment in the

same order or magnitude. Ignoring this in the CBA is a fundamental flaw.

Effects of attracting new economic activity are extremely uncertain

Often the attraction of new businesses to (re-)locate near the new infrastructure is included in a CBA as a substantial benefit. However, the accuracy of the estimates of these effects is extremely low. Wishful thinking can lead to huge overestimation of these effects in CBAs.

Positive growth effects of new infrastructure not based on any scientific evidence

In addition to direct effects on economic activity, new infrastructure is sometimes also assumed to produce extra *growth*. This is highly questionable. Apart from the fact that it is difficult to distinguish between cause and effect, the assumptions made in relation to growth effects are often rather simplified. In an EIB-paper Girard and Hurst note that large public investments may even reduce growth, rather than stimulate it. Therefore, considering current knowledge, growth-inducing effects from infrastructure must be excluded from the analysis.

Limited scope of analysis omits employment and production effects on other regions

It is important to differentiate between project effects and macro-economic effects. The project effect, e.g. extra economic activity brought to the region by a new infrastructure link, may well be at the expense of activity in neighbouring regions. In that case the net macro-economic effect on national level is much lower, and indeed could be zero.

Limited scope of analysis omits effects in other countries

Extra production and employment can also be brought about by attracting activity from neighbouring countries. The question then arising is whether the analysis takes into account any parallel infrastructure improvements in the neighbouring country which could offset the competitive advantage. There is therefore a clear risk that the net benefits are overestimated.

In any case, if international competition is at the basis of (part of) the benefits, the CBA should be explicit about this.

Environmental costs are not included in the calculations

The costs linked to environmental effects of new infrastructure are substantial and real. They comprise of costs (among others) of emissions, noise, land use, visual intrusion, loss of biodiversity. Methods for quantifying some of these costs are well developed. These costs, also covering the extra emissions and noise due to newly generated traffic and extra economic activity, should be included in the cost-benefit analysis. It should be noted that experience from the Netherlands shows that the costs of noise and land use, for instance, are often grossly underestimated³.

³ The Dutch experience is that the costs of noise abatement measures like insulation of dwellings etc. are often underestimated at an early stage of the project. The cost of land use are also estimated too low if the analysis takes the price per m² before the transport link is planned. However, land prices rise enormously once the plans for the new transport link are approved. This higher price is the real price to be paid when buying the land for the construction.

Other environmental effects will be not quantifiable (yet). This does not mean, however, that they have no value. They should be taken into account in the final analysis, as described in section 5.

Impact of public financing on welfare not covered

If a government finances new infrastructure from the national budget, this leads to higher taxes, or the absence of a tax-reduction. If the government borrows money, the interests put pressure on the government budget over a number of years. Either way, the tax payers are bearing the burden. It should be noted that, according to economic theory, extra taxes disturb the economy by putting on a so-called "excess burden". This excess burden leads to loss of welfare. A correct CBA also includes this effect in the analysis.

Impact on other modes not sufficiently covered

In cases where non-motorised transport or rail travel are predominant modes, the construction of new roads can have a large negative effect on these modes. Traffic attracted to the road sector from public transport or rail will lead to higher operating costs per passenger in those modes, imposing real costs on society. Non-motorised travellers may suffer more accidents and pollution, or are literally driven off the road⁴. These effects are rarely covered in CBAs.

Distribution effects

A cost-benefit analysis gives insight in all costs and benefits. But what it does not do is indicate to whom the costs and benefits are allocated. Fairness and political openness would require that at least the winners and losers are clearly identified. The main stakeholders are:

- the infrastructure users
- the institutes or companies who manage and provide the infrastructure in use (e.g. an airport)
- the tax payers

Most often it will be the tax payers who will carry part of the financial burden, to the benefit of the infrastructure users.

A word about the zero alternative

A crucial factor for the outcome of the CBA are the assumptions for the base-scenario, the zero alternative: the case in which no infrastructure is constructed. As mentioned above, it is a major flaw that alternative public spending is not considered. Such alternatives could be a different public project, structural tax reduction, a one-off tax rebate, or saving the money in order to start the same project a year later.

⁴ This kind of situations will be rare in Europe, but are very prominent in third world countries.

Due to the models used and the data available it may be difficult to consider some of these options. However, if this situation means that our current analysis is inevitably flawed and incomplete, it seems wise to improve the planning and models, rather than stumble along with no change.

4. The general thrust in favour of infrastructure building

The above section describes how flaws in CBAs can be corrected. But how ever analysis is improved, it is always up against a considerable bias, a general thrust in favour of building infrastructure regardless of the outcome of the CBA.

There are a number of different reasons behind the bias in favour of new infrastructure. The following most common ones were listed by De Wit in "Kosten-batenanalyses voor infrastructuur".

Firstly, there are two politically important issues.

- *The expectation that new infrastructure is always good for the economy*
In these times of huge political interest in stimulating employment and economic growth, this very prominent argument in itself is often sufficient to ensure a huge thrust for infrastructure investments, even if -as outlined in section 2- this generalised argument is not supported by any scientific evidence.
- *Congestion problems are very visible*
The prominent lack of space on motorways easily leads to the conclusion that therefore more road space should be provided. Important questions are mostly left unasked: a) will this solve the problem?, b) are the costs for new infrastructure in proportion with the gain in travel time and c) are alternative solutions, e.g. road pricing, not cheaper and more effective?

Secondly, reasons for the bias for infrastructure arise from the decision making mechanisms:

- *Money is set aside for infrastructure*
Long before any analysis is made, large sums of money are reserved for infrastructure investments. This alone seems to provide an independent force to go and spend this money, regardless of the desirability of new infrastructure.
- *Lack of knowledge of alternative tools*
Employment is a key political issue in most European countries. Some governments furthermore have set targets for economic growth. In response to the pressure this puts on them, governments decide to invest in infrastructure for lack of other ideas.

- *Those making the decisions do not face the risks, leading to under-estimation of costs*
The decision makers who opt for infrastructure construction are not confronted with any negative consequences arising from their decisions. Firstly, a long time will pass between the decisions and the actual realisation of the project. Secondly, most of the financial risk is carried by the tax payers, who have little influence on the decision making anyway. This situation leads to a systematic under-estimation of the cost-related risks.
- *Long-term planning of infrastructure leads to commitment*
Infrastructure plans often have their place on the agenda for a long period. This leads to many stakeholders becoming committed to the project. This commitment provides a strong bias to continue the project regardless of the outcome of analyses.
- *Influence of business on decision making*
It is because of the assumed huge benefits attributed to infrastructure that business can have considerable influence on political decision making. As the business sector expects to be a winner from infrastructure provision (the tax payer being the loser), there is even more pressure on governments.

An example of how infrastructure planning gets a life of its own is the current main-port approach in the Netherlands. The expansion of Schiphol airport and the Port of Rotterdam, the new high-speed rail links and the dedicated freight railway line towards Germany (Betuwelijn) are the spearheads of Dutch transport policy. In June 1997 a report for the governments Scientific Council for Government Policy [Pols, 1997] concluded that this approach is riddled with flaws, and that a more comprehensive policy geared towards innovation rather than distribution is likely to produce much better results for the Netherlands as a whole. In other words: the Dutch should rethink their most basic strategy for economic development! The case in point is that it will be extremely difficult for Dutch policy makers to even conceive an economic and transport policy without these large projects. In this sense, infrastructure policy is much like a supertanker, extremely difficult to make change its course once it is set in motion, even if it threatens to run aground.

Modal bias in policy

Apart from a clear bias in favour of infrastructure building, there is also a bias for certain modes. This is especially true for rail vs road.

Transport policy in Western Europe shows an interesting contradiction in policy and practice. Whereas many political statements indicate that rail should be favoured as the cleaner mode, investments have long been largely made in the road sector. In 1980, 65% of all transport investments in Western Europe went into road building. In 1994 this percentage was 68. The figures for rail investments are 18 and 12 respectively. Nevertheless, for a moment it seemed that the tide was turning, with 8 of the 14 Essen priority projects (which form part of the EU-TENs) being pure rail projects. However, even if politicians are becoming convinced of the importance of rail transport, private investors clearly are not:

most of the EU's high-speed rail (HSR) priority projects are in serious financing problems.

In Eastern Europe the principle that rail may be good is certainly less prominent than in the West. It is to be hoped that CEE governments realise what a huge asset they have in the existing dense rail network. Upgrading and developing this can help avoid the road-based approach which has led to so much environmental and economic problems⁵.

It should be noted that the political bias "rail = good" also needs more nuance. From an environmental point of view, an increase in rail transport and travel is only positive if the net environmental effect is positive. This means that for instance the HSR link between Madrid and Sevilla, which has resulted in a reduction of air travel between these cities, is an environmental beneficial one as far as emissions and energy use are concerned. The Amsterdam-Brussels link, however, will most likely have a negative environmental effect because most of the travellers previously took the more efficient intercity train, or did not travel at all.

It is important to take into account not only the environmental effects resulting from use of infrastructure but also from the infrastructure itself. Examples of the latter are the segregation of the landscape and direct disturbance to nature areas. Rail is generally less damaging than roads, but the effects of HSR are more important because of fences which block animal migration, and the requirement for straight lines making it difficult to avoid nature areas.

Modal bias in lending procedures

Especially in the case of Central and Eastern Europe, where much of the infrastructure is built with financial support from multi-lateral development banks like the World Bank and the European Bank for Reconstruction and Development, and most importantly the European Investment Bank, the requirements and procedures for getting loans are a crucial factor. Of these, the World Bank has most opened up to public scrutiny, which has enabled a critical review of the lending procedures. It appears that these procedures inherently favour road over rail. If this is the case in the World Bank lending, it may well be the same in EBRD and EIB context.

The World Bank bases its decisions for lending on two types of analysis. An Economic Rate of Return (ERR) analysis, comparable to a CBA, determines the net social benefit of a project. Projects are also subjected to a financial analysis, which determines the ability of the borrower to recover costs. Interestingly, whereas funding decisions on rail and public transport projects are based on both types of analysis, road projects are only assessed with a

⁵ The European Commission's green paper "Towards Fair and Efficient Pricing in Transport" estimates the environmental and social costs, including air pollution, noise, accidents and congestion, to be 250 Billion Ecus per year. These are very real costs to the West European society.

ERR. The crux is that often rail and public transport projects have side agreements which focus on cost-recovery, i.e. reduction of necessary government subsidies (as determined in the financial analysis). However, similar requirements are never applied to road sector loans. In other words, as Hook states: "By tolerating or not properly investigating the level of road subsidies, while pushing to eradicate rail subsidies, past World Bank lending may have, perhaps unintentionally, helped to shift the balance of state subsidies towards road based modes in some cases." [Hook, 1996].

5. Improving infrastructure decision making: better economic analysis and integration of environmental concerns

5.1. Current decision making

Decision making on infrastructure involves a number analyses and considerations. Apart from the cost-benefit analysis, EU member states also have to carry out environmental assessments. Decision making includes:

- *Cost-benefit analysis (CBA)*. The CBA determines the net economic effect of the planned project for the society as a whole. It (officially) has a large bearing on the final decision to start construction.
- *Environmental impact assessment (EIA)*. EU Directive 85/337/EEC requires an EIA to be carried out on project-level, and is compulsory for projects over a certain size. The outcome of the EIA, however, can legally be ignored in the final decision.
- *Strategic environmental impact assessment (SEA)*. In December 1996 the European Commission published a proposal for a Directive on "the assessment of the effects of certain plans and programmes on the environment". Once this proposal is adopted, it will require governments to carry out an assessment of the environmental impact of plans and programmes, and open this to public scrutiny. Again, there will be no legal requirement to actually take anything of this analysis into account in the final decisions⁶.
- *Further judgement on nature protection requirements*.

In addition to the EIA and SEA, there is national and international nature protection legislation. Examples of the latter are the EU Habitats Directive (92/43/EEC) and the Wild Birds Directive (79/409/EEC). The Habitats Directive is the most important; disturbance in those areas may only take place in cases of "absence of an alternative solution" and of "overriding public interest"⁷. Depending on the country, national

⁶ This SEA should not be confused with the SEA for the whole of the EU transport TENs, which is currently under preparation in the European Commission. This SEA, as required by the TEN Guidelines, assesses the total environmental impact if the TENs as currently planned are constructed.

⁷ Sadly, the case of the A20 motorway in Germany has proved that this legislation does not provide great protection in reality, especially because the "overriding public interest" was not very convincing in this case.

requirements for protection of national nature conservation areas may be stronger than the international laws.

- *The general thrust for infrastructure.* As described above, the most important factor driving the decision to start construction is often not based on solid CBAs or environmental assessments, but rather on the general political drive for new infrastructure.

5.2. Improving decision making

In order to improve decision making in this respect, improvements are needed on three levels: firstly on the level of policy, secondly on the analysis itself, and thirdly in the way the environmental considerations are taken into account in the final decision.

a) More rational approach to transport and economic policy

The most important change needed is reversing the seemingly automatic thrust for building new infrastructure.

As described in section 4, there is a strong political drive to push ahead with infrastructure projects regardless of the real costs and benefits. An important improvement would be to provide decision makers with the correct information. They should be (made) aware that infrastructure is not the magical cure for unemployment or congestion, and that alternative public spending is worth investigating. There is an important role for press, NGOs and scientists to get the message across to politicians and officials. These should, of course, also be open-minded enough to accept that the long-held myths prove not to be true.

But the mechanisms of decision making also need to be changed. What is needed is a more sensible approach based on a broader view. The first thing to do is ask the right questions (as already outlined in section 2):

- 1) What is the problem we are trying to solve? E.g. congestion, accessibility, unemployment etc.
- 2) Is building infrastructure the optimal response to that problem?
- 3) If infrastructure seems to be the answer, further questions one should ask are:
 - is new infrastructure required, or is upgrading existing links sufficient?
 - and which mode will bring the greatest benefit?

The infrastructure planning itself can be improved by the next two steps.

b) More accurate analysis

The CBA can be substantially improved on many points, as described in section 3.

This paper will not go into detail on how the analyses in EIAs and SEAs can be improved. We just note that the quality of EIAs varies gigantically across Europe. A (theoretical) improvement of the text of the EU Directive will do little or nothing to change this. The

disparity is due to the fact that several EU members states had little or no experience with EIAs before the EU Directive came into force. It also has to do, however, with differences in environmental commitment between member states.

c) More balanced decisions on environment

The outcome of the CBA should feed into the broader and final decision making in which further environmental considerations are included. (If the outcome of the CBA is negative or negligible, there is of course no need for further analysis - building the road is not worth the effort).

SEA and EIA can be used to determine the least damaging programme/plan or route respectively. For complete insight, it would be advisable to also analyse the environmental effect of a zero-option, a situation in which no infrastructure is built (as with the CBA). If a government takes the environment seriously, it will opt for the least damaging route, and also consider a zero-option in case large environmental destruction is inevitable. EIAs, SEAs and Habitats Directive have little or no legal impact on the final decisions regarding infrastructure. It is up to the national government (and in case of the Habitats directive the EC) to give them the necessary weight.

What is needed in general is the realisation that environmental qualities like quietness, clean air, and unspoiled countryside are truly welfare factors, and should be treated as such. Those effects which can be monetarised should be taken into account in the CBA. Other costs, like loss of natural habitats and damage to the landscape are more difficult to work out, and some things are just about impossible to work out, like the loss of welfare caused by children not being allowed to play in the streets. But just because they are unquantifiable does not mean they are not of value.

Therefore the ultimate aim should be to arrive at a socio-economic multi-criteria analysis in which many factors, social, environmental and economic (including monetarised environmental costs) are evaluated according to a set of criteria, leading to a ranking of alternative projects. The final choice about building infrastructure is always a matter of the relative values that a society puts on its social and natural heritage, it should not be determined by economic analysis alone.

6. Conclusions and recommendations

Recommendations to policy makers and financing institutes

a) Realisation that the ground rules of transport policy have changed

The political climate and indeed the basic rules of transport policy-making are changing. Firstly there is a growing recognition that transport users must be gradually made to pay the

full costs of their use, including social and environmental factors. Secondly, the social and environmental costs which can and should be included in infrastructure CBA are better identified and quantified now than they were a couple of decades ago. Thirdly, in many parts of Europe new transport infrastructure has a different impact on the economy now than it has done in the past. The law of diminishing returns appears to apply, in that every new infrastructure link does much less to increase accessibility and reduce travel times than the previous one.

The main implication of these changes in the transport-political climate is that a new pricing policy is needed. The new policy should not just take into account external costs like social and environmental factors, but also reflect the impact of different types of road use such as charging motorists more for driving on congested roads at peak times than on quieter roads during off-peak times. Once more accurate prices are being charged, we can get a better indication of the true demand for transport.

Politicians and policy makers should therefore stop using arguments which are out of date to justify current transport planning and should recognise that transport reality has changed.

b) A change in rhetoric

It has now become clear (as described in section 2) that there is no scientific basis to support claims that infrastructure investments *in general* boost economic growth and employment, nor that they are the best way to stimulate regional development. At Pan-European level this has fundamental implications for the trans-European transport networks, which are often referred to as a major tool for boosting the economy and employment and improving cohesion.

Politicians should immediately stop using unfounded claims that road building will stimulate the economy, employment and regional development.

c) Improved decision making on infrastructure

In order to come to more rational decision making, decision makers should:

- Let go of infrastructure as the preconceived solution for the problem(s)
- Ask the right questions (see section 5).
- Improve the assessments, notably the cost-benefit analysis
- Give the environment the serious consideration it deserves in the entire decision making process.

These recommendations are also valid for multi-lateral banks like the EBRD and EIB, which have a large influence on developments in South, Central and Eastern Europe. The banks can

and should stimulate and help implement the best policies. As the ground rules for policy have changed (see above), this should also be reflected in the banks lending policy. Thus, a bank should also ask itself the two questions mentioned above. Secondly, the banks can improve their own analyses as well as the final weighting of the environmental, social and economic interests. And finally, they can improve their own internal procedures and educate their staff to better understand and incorporate environmental considerations.

d) Review regional and development policies within and outside EU

In order to stimulate development of the regions, large sums of money have been poured into infrastructure, and most of that into roads. Between 1990 and 1995 the EU spent 3300 million ECUs on road building [European Commission, 1995]. Most of this money came from the Structural and Cohesion Funds, with the principal aim of stimulating development of relatively poor regions. A further sum in the same order of magnitude was spent on transport in the form of EIB loans. In Central and Eastern Europe a total of just under 4 billion ECUs was spent on transport between 1990 and 1995 (mainly loans⁸). Of this money 66 went into roads, 27% into rail [Bina, 1997].

In view of the strong doubts on the effectiveness of infrastructure investments to improve cohesion, and considering the sums of money available for regional development, it essential that policies in this areas are given a complete review. The revision of the Structural Funds Regulations in 1999 provides an excellent opportunity for the EU to devise a more sensible regional policy. Governments of Central and Eastern European Countries must seriously ask themselves if their efforts to construct long-distance high speed links are really the most efficient use of resources. And financing institutes like the World Bank, the European Bank for Reconstruction and Development and the European Investment Bank urgently need to re-evaluate the effects of their loans on the economy and the environment.

⁸ IBRD, EBRD, EIB, EIF, IDA, PHARE and TACIS.

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Improving infrastructure decision making - saving money and the environment

At the Third Pan-European Transport Conference taking place in Helsinki, 23-25 June 1997, many statements were made about the need to invest in infrastructure in order to stimulate the economy, employment and cohesion. Few people will realise that these statements are not based on any scientific evidence, and that economists have long called into question this "common knowledge". Still, a recent EIB paper says that "there is certainly sufficient evidence to counsel against blindly attributing large indirect benefits to public investment". In other words: infrastructure building may be a very in-effective way of spending our money. The same paper argues for more improved assessments before making investment decisions.

Needless to say, the effects of both construction and use of infrastructure on the environment are usually large, and negative. As long as the very real costs of environmental damage are not included in the analyses, these are bound to be wrong. Clearly, there is need for more sensible decision making based on more accurate analysis - and this was T&E's message to the decision makers present in Helsinki.

The good news is that the ECMT, the EIB and Transport Commissioner Neil Kinnock called on the Helsinki conference for increased efficiency and more accurate analysis rather than blindly investing money into infrastructure. What is urgently needed now is a change in actual policy: a huge improvement in the decision-making on infrastructure. This will not only help save Europe's natural and cultural heritage from disturbance or destruction, but also help to avoid wasting large sums of money.

About T&E

The European Federation for Transport and Environment (T&E) is Europe's primary non-governmental organisation campaigning on a Europe-wide level for an environmentally responsible approach to transport. The Federation was founded in 1989 as a European umbrella for organisations working in this field. At present T&E has 29 member organisations covering 19 countries. The members are mostly national organisations, including public transport users' groups, environmental organisations and the European environmental transport associations ('Verkehrsclubs'). These organisations in all have several million individual members. Several transnational organisations are associated members.

T&E closely monitors developments in European transport policy on EU, OECD/ECMT and UN-ECE level. T&E frequently publishes reports on important issues in the field of transport and the environment, and also carries out research projects. One example is the 1996 project "Roads and Economy", resulting in a state-of-the-art overview of the current knowledge on the effects of road building on the economy, employment and cohesion.

The list of T&E publications annexed to this paper provides a picture of recent T&E activities.