Summary of projects and results from topic **Economics and Pricing**

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1. INTRODUCTION AND METHODOLOGY

The Center for Traffic and Transport, DTU has produced this report to summarise the conclusions of the activities undertaken on the key topic as part of Work Package 2 of the PORTAL project.

1.1 Methodology

In order to get an overview of the different projects within **Economics and Pricing**, we used the Internet as our main source of information. The most frequent used websites were:

- The Community Research and Development Information Service site [http://www.cordis.lu]
- The Extra database at European Union on-line [http://europa.eu.int/comm/transport/extra/].
- The European Platform of Mobility Management EPOMM [http://www.epomm.org]
- The Google web search [http://www.Google.com]

These databases provided us with very different amounts of information about our projects. Some projects had their own website, available deliverables from different work packages, articles, reports etc. Other projects were very difficult to find results from: some because information concerning the project were classified or not located on the Internet; others due to fact that they were still running and final results were not found yet. Common for all projects was that it is not easy to either locate high profile experts or find information on their work fields. In cases of few or none results we contacted the project co-ordinator, asking for help to find final reports, names on experts etc.

After screening the project's available materials, a standard IPR letter was sent to the project co-ordinators in order to determine the present status of the materials. Panu Kuosmannen provided the IPR letter.

It should be noticed that there are very few demonstrations sites mentioned in this Key Topic Report, which is due to the fact that the sites primarily are cities participating in projects on trial basis.

2. PROJECTS UNDER "ECONOMICS AND PRICING"

The topic **Economics and Pricing** has 13 projects allotted. These projects will in the following be mentioned by the program they were/are carried out in.

4th RTD Framework Programme for Transport Research and Development.

- Acceptability of Fiscal and Financial Measures and Organizational Requirements for Demand Management (AFFORD)
- Concerted Action for Transport Pricing Research Integration (CAPRI)
- Co-operation for novel city electronic regulation tools (CONCERT-P)
- European Project for Toll Effects and Pricing Strategies (EUROTOLL)
- Cost Evaluation and Financing Schemes for Urban Transport Systems (FISCUS)
- Pricing European Transport Systems (PETS)
- Capabilities of advanced traffic management tools (PRIMA)
- Trans modal integrated urban transport pricing for optimum modal split (TRANSPRICE)
- Models for transport environment and energy – version 2 strategic transport policy analysis (TRENEN II-STRAN)

4th Framework Programme for Telematics Application Research and Development

- Co-operation for novel city electronic regulation tools (CONCERT)

5th Framework Programme, Competitive and sustainable growth

- Co-ordinating Urban Pricing Integrated Demonstrations (CUPID)
- Designs for Interurban Road Pricing Schemes in Europe (DESIRE)
- Pricing Road Use for Greater Responsibility, Efficiency and Sustainability in Cities (PROGRESS)

2.1 Description of the key-topic 'Economics and Pricing'

"**Economics and Pricing**" consist of a wide range of elements, but they can be grouped into three main categories; (i) Transport costs and pricing, (ii) Pricing schemes and (iii) Acceptability and evaluation. The projects in the categories are:

2.1.1 Transport costs and pricing

CAPRI facilitated dissemination of research results of projects dealing with the pricing of transport and tried to build up a consensus on policy implications. Completed.

EUROTOLL provided transport policy makers with information on the potential effects of different types of road pricing and tolling strategies. The project sought to validate the effectiveness of pricing measures in 10 cases and centres on using road pricing as a congestion management tool. Completed.

The aim of **FISCUS** was to provide a methodology for evaluating the social costs (internal and external) of urban transport systems. The research also looked at cost allocation practise in urban areas with a view to identifying feasible and effective means to finance urban transport systems. Completed.

TRENEN II-STRAN aimed to develop a set of strategic models of urban and inter-urban passenger and freight transport and to use these models in assessing pricing policy options. Completed.

PETS had the objective of informing the Commission on the current situation regarding the pricing of transport modes in member countries and to forecast the consequences of moving to a more appropriate price structure and level. Completed.

2.1.2 Pricing schemes

CONCERT tested different demand management tools based on telematics solutions in order to promote the use of public modes of travel instead of car usage. CONCERT ran parallel to the CONCERT-P project. Completed.

CONCERT-P was CONCERT's 'transport-twin sister'. This was a further assessment of the potential of demand management policy instruments such as pricing and evaluation of the impacts. Completed.

DESIRE aims at assessing inter-urban road pricing schemes for heavy vehicles. On-going.

PROGRESS has the overall objective to demonstrate and evaluate the effectiveness and acceptance of integrated urban transport pricing schemes. On-going.

TRANSPRICE had the purpose to demonstrate and assess pricing strategies that are co-ordinated across transport modes, identifying effects on modal split and public acceptance. Completed.

2.1.3 Acceptability and evaluation

AFFORD's objective was to show that marginal cost pricing measures both are efficient and effective. It identified institutional and political barriers to the implementation and acceptance, and shows how to overcome them. Completed.

CUPID will provide and advance the state of the art knowledge on urban transport pricing schemes through a European level cross-site assessment of demonstration and implementation results. On-going.

PRIMA analysed the reasons behind the acceptance or non-acceptance of road pricing schemes and produce policy recommendations and guidance for implementation of urban road pricing. Completed.

2.2 Results of AFFORD

AFFORD deals with urban transportation problems, especially urban transportation pricing. The project takes its starting point in the paradox between economic theory (which suggests marginal cost pricing is the right solution the transportation problems) and practical experience (which suggest that marginal cost pricing may be hard to implement). AFFORD investigates this paradox and its possible solutions.

The **Results** from AFFORD concludes that the task of implementing marginal social cost pricing can be very difficult due to the great number of behavioural dimensions connected to both marginal cost and marginal cost pricing, but also the many categories of external costs complicates the implementation. Additionally the different behavioural dimensions can simultaneously affect several cost categories. Another result shows that marginal cost transport pricing may give rise to a substantial welfare benefits for the urban European populations. Depending on local conditions and on policy instruments, annual welfare gains may typically amount to 100-400 euros per capita, as measured by the willingness-to-pay within the affected urban population. Issues relating to the use of the revenues may prove absolutely critical in assessing the potential efficiency benefits available from adopting practical marginal cost-based pricing for urban transport in European cities.

Three interesting book can be mentioned as **materials**:

- "Operationalisation of Marginal Cost Pricing within Urban Transport", VATT Research Report No. 63 written by David Milne, Esko Niskanen and Erik Verhoef.
- "Acceptability of Urban Transport Pricing", VATT Research Report No. 72 written by Jens Shade and Bernhard Schlag.
- "Economic and Equity Effects of Marginal Cost Pricing in Transport", VATT Research Report No. 71 written by Fridstrøm L., Minken H., Moilanen P., Shepherd S., Vold A.

The AFFORD **website** is located at www.vatt.fi/afford, and the final summery report can be downloaded at ftp://ftp.cordis.lu/pub/transport/docs/affordrep.pdf

Experts on AFFORD are Professor Esko Niskanen from the Government Institute for Economic Research who was co-ordinator of the project. Bernhard Schlag and Jens Shade from The Technical University in Dresden were responsible for the behavioural dimensions. Lasse Friedstrøm from The Institute of Transport Economics, Norwegian Centre for Transport Research, Department of Safety and Environment was mainly dealing with road pricing strategies and risk analysis and David Milne from the University of Leeds handled the transport modelling.

Leading educational institutes that were involved in AFFORD are: the Dresden University of Technology department for Traffic and transportation psychology, Germany, who are specialists in mobility psychology and acceptability. The Institute for Transport Studies, University of Leeds in the United Kingdom provided results on the modelled user and system response.

AFFORD did not have any demonstration sites and therefore none possible **study visits**.

2.3 Results of CAPRI

CAPRI was commissioned to facilitate the exchange of information and results from research projects dealing with pricing of transport. CAPRI drew evidence from different projects, mainly projects from the European Commission's 4th Framework: EUROTOLL, QUITS, PETS, TRANSPRICE, and TRENEN II STRAN. The project span from pricing on the principal passenger and freight modes, to urban and interurban travel.

Available **materials** on the CAPRI project are:

- Final Report "Concerted Action on Transport Pricing Research Integration CAPRI"
- Final Summery report "Concerted Action on Transport Pricing Research Integration CAPRI"
- "General Economic Principles of Pricing Transport Services"
- "Valuation of Transport Externalities"
- "Road Transport Pricing Issues"
- "Rail, Other Public Transport and Air transport pricing"

The first mentioned material is the final report and it is therefore the most relevant with regard to conclusions of the project. The last four reports are presentation papers; which were used as background information on specific aspects of transport pricing for Committee meetings, they are furthermore attached as annexes to the final report.

The CAPRI **web page** is located at http://www.its.leeds.ac.uk/research/index.html, and a copy of the final summery report can be downloaded at the CORDIS web page: http://www.cordis.lu/transport/src/capri.htm.

The **results of the project** are grouped according to six themes: (A) recommendation for pricing principles – infrastructure use by all modes; (B) recommendations on valuations of externalities; (C) Road pricing – urban and inter-urban; (D) Rail and other public transport; (E) Air transport; and (F) Conclusions on likely impacts of implementing efficient pricing. Some of the results that were found were;

- A need for a comparative analysis of alternative transport policies in order to determine the relative net economic benefits on urban road pricing.
- A need for large-scale demonstrations in order to get a better understanding of driver behaviour.
- US examples showed that complex pricing systems where road charges vary accordingly to traffic levels and hours are effective and can be accepted by the public.
- European studies showed 5-20 % of drivers would change behaviour by introducing road use charge as departure time, route, destination, mode switch to public transport or park and ride.
- Acceptability by the users is more easily obtained where the users have choices.
- Public opinion on road pricing can be more favourable if revenues are used on public transport or other forms of transport.

Many **experts** were connected to the CAPRI project both due the complexity of the project but also to the fragmented organization of the project. Chris Nash from the University of Leeds was the project co-ordinator; Stef Proost from Katholieke Universiteit Leuven dealt with the economical principles of Transport Pricing Services; Werner Rothengatter from Universitaet Karlsruhe worked on rail and air pricing; Klaus Rennings from Zentrum für Europäische Wirtschaftsforschung and Andrea Ricci, ISIS Italy considered transport externalities; Manos Vougiokas from EURO TRANS CONSULTING LIMITED and Lionel Clement from Isis France worked on issues from road transport pricing.

Leading educational institutes that were involved in CAPRI were: The University of Leeds (UK); Universität Karlsruhe (D) and Katholieke Universiteit Leuven (Be).

2.4 Results of CONCERT

The CONCERT project investigated the use of smart demand management tools to promote public travel instead of car transport. The project was based on sites in 8 European cities in order to measure the strength of different telematic techniques as tariff incentives, integrated payment with smart cards, public access terminals, road use management/restraint and multimodal information for travellers. The participating cities were; Barcelona, Bologna, Bristol (ELGAR), Dublin (CAROLAN), Hannover (MOVE), Marseille, Thessaloniki and Trondheim (TRON1), due to problems the sites in Bologna were not completed. The demo sites were designed to assess the user

acceptance of these telematics technologies and the impact that the demonstrators have upon travel behaviour. The CONCERT project ran parallel with the CONCERT-P project, which focused on the pricing /restraint work.

The CONCERT **Results** revealed that the integrated payment systems - that increases the convenience of means of payment or that promote loyalty of specific market segment- had a marginal impact on choice of urban transport mode. However innovative tariffs for changing road usage are seen to have significant behavioural impact. In the Trondheim case with congestion pricing, the varying morning tariffs produced time-of-day shifts reducing car usage up to 17 % and the environmental pricing in Bristol caused a 15 % reduction in car travel. It has not been possible to measure impacts from locations with multimodal travel information. The user acceptance findings were however markedly positive and surveys indicate considerable long-term potential for mode shifts.

The results concerning public acceptance of the road pricing demonstrations indicate that charging at point of use is a concept that people favour, specifically when it is compared with forms of taxation and when the revenues are used to increase the choice of alternatives.

The **materials** on CONCERT consist of a final report and several deliverables. The final report "CONCERT Project (TR1013) COOPERATION FOR NOVEL CITY ELECTRONIC REGULATING TOOLS Barcelona * Bologna * Bristol * Dublin * Hannover * Marseille * Thessaloniki * Trondheim" can be obtained by contacting Barcelona Tecnologia S.A Besides and an overview of the deliverables can be found at the CONCERT **web page** http://btsa.es/concert/ and are available at the CORDIS **website.** http://www.cordis.lu/telematics/tap_transport/research/projects/concert.html

- D 3.1 Evaluation plan
- D 6.2 Results & Main findings on chained mobility products
- D 7.2 Results & Main findings on integrated payment and information integration: Marseilles pilot
- D 8.2 Results & Main findings on pricing and restraint: Barcelona, Bristol, Thessaloniki and Trondheim pilots
- D 8.3 Pricing & restraint strategies: guidelines for European Policy Development
- D 9.2 Mobility data integration (please contact the project coordinator to obtain this deliverable)
- D 10.1 interim report on City business plans
- D 10.2 Smart demand management business plans

Four of the cities have produced interactive websites as a part of the project. They can be visited at following web pages:

- MOVE, the Hannover project http://www.move-info.de/welcome.html
- STRADIVARIUS, the Marseille project http://www.lepilote.com/
- "How to go to..." the Barcelona project http://www.tmb.net

- TRON,Trondheim http://www.aksess.no/vegvesenet/concert/concert_eng.html

The Hannover, Marseille and Barcelona websites are the existing multimodal Internet travel information sites.

There are neither **high profile experts** nor **leading educational institute** in CONCERT since different local authorities have carried out the work. Simon Hayes from Barcelona Tecnologia S.A. has been the coordinator of the CONCERT project.

2.5 Results of CONCERT-P

CONCERT-P ran simultaneously with CONCERT. CONCERT-P aimed to demonstrate and evaluate the use of road pricing measures to change modal split in urban areas. CONCERT-P's key interests were characterizing the behavioural responses of participants and identifying how to overcome operational barriers. CONCERT-P concentrated on three test sites namely Trondheim (TRON2), Bristol (ELGAR) and Barcelona, two projects with road pricing and one with access control.

CONCERT-P is thought to be one of the first projects to demonstrate that road pricing tariffs can be configured to achieve different types of behavioural impacts – including mode switching. It is interesting to notice CONCERT-P found route switching not to appear as a primary behavioural **result**. The CONCERT-P road pricing measures were deliberately configured to simulate cordon-based schemes and the opportunities for route switching were intentionally minimised.

The access control in Barcelona can be seen as an effective way of extending parking control and for promoting non-motorised travel in central city areas. The main advantage is that this revised system is far more operable for the authorities point of view, with only minimal intervention required by police officers in the control centre.

Road pricing has proved to an effective way of reducing car traffic. Both Trondheim and Bristol accomplished reductions in trips by motorists by 10-20 % clearly depending on the tariff level. The Trondheim results suggest furthermore that if the principles of marginal cost congestion pricing were applied to urban road networks, then the primary impact would be a temporal spreading of congestion – with fewer trips during the peak interval and more car trips in the shoulder periods adjacent to the peak. The Bristol result provides the first indications of the road charging and environmental conditions under which a significant number of car drivers would be induced to switch to public transport. The Variable Message Signing showed marginal improvements.

Another interesting finding was that greater institutional problems were encountered in building integrated payment demonstrators than in realising reward-type road pricing demonstrations.

CONCERT-P also contains series of recommendations both at a Pan-European level and at a national level.

The only available **material** from CONCERT-P is the final report "CONCERT-P Cooperation for novel city electronic regulating tools" published by the European Commission, Transport Research 4th Framework Programme Urban Transport ISBN

92-828-7972-0. The report also contains some results from the CONCERT project. Further basic information about CONCERT-P can be viewed at the CORDIS **website** http://www.cordis.lu/transport/src/concertp.htm or at the European Union On-line Knowledge Centre for results from the Fourth Framework Transport RTD Programme's website http://europa.eu.int/comm/transport/extra/concert-pia.html.

There are neither **high profile experts** nor **leading educational institute** in CONCERT-P since different local authorities have carried out the work The coordinator of CONCERT-P was Simon Hayes from Barcelona Tecnologia S.A., Spain.

There are no **study sites** connected to CONCERT-P.

2.6 Results of CUPID

The main aim for CUPID is to promote state of the art knowledge on urban transport pricing schemes through a European cross-level site assessment of city demonstration project results to produce robust policy recommendations and to widely disseminate the results. An important part of the assessment will be the liaison with the demonstration cities, gathered in the PROGRESS project and guidance for other cities interested and willing to take another step towards the introduction of pricing schemes.

Since CUPID runs until 2004, no final **results** have been published.

Materials like deliverables, newsletters etc. from CUPID will be available at the CUPID official website: www.transport-pricing.net. At the moment deliverable 3: FAQ and the first CUPID newsletter are available.

CUPID has several **experts** connected: Dr. Andrea Ricci from ISIS Italy is a charge of environmental and energy issues and assessment; Jose Manuel Viegas from Transportes Inovacao e Sistemas, Italy is in charge of the external concertation; Prof. Bernard Schlag from Dresden University of Technology, Germany will take care of social and political issues; Professors Anthony May and Christopher Nash from the Institute for Transport Studies, University of Leeds will provide links to wider pricing issues and the work undertaken by the CAPRI project; Dr. Terje Tretvik from SINTEF, Norway will monitor and report on the selection, design and validation of demonstration systems.

Leading Educational Institutes on this subject are the University of Leeds in United Kingdom and Dresden University of Technology in Germany.

There are no **study sites** connected to CUPID.

2.7 Results of DESIRE

DESIRE will assess inter-urban road pricing based on case studies. The research seeks to deliver designs for future inter-urban road pricing schemes for heavy-vehicles. One

objective is to assess schemes according to their capability to apply the principle of marginal cost pricing to road transport. The expected output of DESIRE is a set of recommendations that allow exploiting pricing to render more efficient the use of the existing transport infrastructure. In parallel to the case study validation, DESIRE will provide a forum for experts from manufacturers, infrastructure operators and academia to get informed and express their views on recent developments in the area.

Several **experts** are linked to this subject as Professor Jose Viegas from the Portuguese company Transportes, Inovacao e Sistemas; Mr. Erling Hvid from COWI, Denmark, Andrea Felix from RAPP, Basel; René Neuenschwander from ECOPLAN in BERN; Lionel Clément ISIS, France and Max Herry from Vienna.

DESIRE is on going and no **results of the project** have yet been published. Present no **materials** is available, but at the CORDIS website a project description can be displayed. There are no **study sites** connected to DESIRE.

2.8 Results of EUROTOLL

EUROTOLL had the objective of ascertaining how high charges need to be pushed in order to change drivers' behaviour. The project is concerned with tolling strategies and driver reactions. The project is based on results from case studies,. Following items were subject to research of possible transferable results: price sensitivity/demand reaction, social/individual acceptance, user information, communication aspects, internalisation of external aspects, and management of congested networks EUROTOLL consisted of 10 case studies in five different countries.

The EUROTOLL **results** can be sorted into three groups: (i) Demand reactions in response to TDM strategies; (ii) Effects of integration of information and pricing in TDM; (iii) Policy issues regarding tolling strategies.

Conclusions about road user behaviour the results can be cautious ranked: (i) If allowed by the pricing scheme, the most favoured reaction patterns are trip-retiming and route choice. (ii) Regarding re-timing of trips, if the scheme contains a time-related component, the patterns normally is successful. (iii) Due to route choice changes, the impact of TDM on the capacity usage of road infrastructure is quite successful, too. (iv) Concerning modal shift, TDM schemes partially show fewer impacts than mentioned before. (v) In general, freight transport is expected to react with more rigidity to TDM strategies.

In relation to the integration of information and pricing EUROTOLL points out the importance of giving a minimum of information in order to understand the pricing scheme and find alternative routes. Good information strategies consist of three components; pre- and on-trip information and demonstrations of alternatives and their advantages. EUROTOLL concludes that strategies to integrate pricing measures and information provision are capable to reinforce each other's positive effects. Integration strategies should not be limited to providing pricing information via modern information technologies (telematics), but rather aim at an increasing awareness of pricing measures and alternatives. In this sense integration means the integration of transport mode overlapping information as well.

The policy conclusions are that of a need for diversification of pricing methods. If one is interested simultaneously in the objectives of financing the road network, demand management and internalisation of environmental costs, then a combination of general national taxation and local specific taxation has to be applied. So, taxation proportional to the consumption of energy (fuel taxes) must be combined with local systems of toll to take account of local problems of pollution (under the angle of the damage or the avoidance approach) and of congestion.

Interesting **Materials** from EUROTOLL is especially the final report. It is published by the European Commission, Transport Research 4th Framework Programme Urban Transport ISBN 92-828-7006-5. A summery report can also be downloaded at the CORDIS websites http://www.cordis.lu/transport/src/eurotollrep.htm. There are also two other interesting reports:

- "Results of Case Studies, deliverable No. R11/I"
- "Proceedings of Seminar on Tolling Strategies and Experiences".

The first report contains detailed information's on the different case studies. The seminar report is an outline of the presentations and discussions from the EUROTOLL seminar on the 7-8th July 1998. The seminars objectives were to disseminate the results of the case studies and confront these with other EC projects.

Experts from EUROTOLL are professor Yves Crozet and Charles Raux both from L'université Lumiére Lyon 2. They were in charge of the economic aspects of the project and developed a cross table between pricing objectives and pricing options. Lionel Clément from ISIS, France was in project coordinator and senior expert for the French case studies and linked with the theoretical aspects.

Leading educational institutes that were involved in EUROTOLL were: L'université Lumiére Lyon 2 in France; University of Pantras, Greece and University of Cologne from Germany.

2.9 Results of FISCUS

FISCUS analysed the existing cost allocation methodology and fiscal schemes as well as planned and/or new ones that will be conceived in the project as a response to observed gaps and weaknesses. It addresses two main issues: evaluation of real transport costs, internal and external; and the financing of urban mobility.

The **Results of the project** is gathered in a report. This final output is a European handbook for evaluating real urban transport costs and designing financing schemes for urban transport systems. The handbook enables decision-makers to carry out cost comparisons between public transport and private car over the same journey out from an evaluation of real transport costs (internal and external) for the various urban transport modes (bus, tram, rail, private transport, water transport, underground, walking and cycling).

The handbook aims to provide

- a consistent approach to the whole costing and financing of problem of mobility in urban areas;
- a series of procedures for estimation of the most relevant items of urban mobility costs, clearly indicating what are the features of the urban landscape and background that more strongly contribute to the increase or decrease of each of those cost items;
- a list of archetypal financing schemes, indicating the merits and risks of each of them, as well as a small collection of packages of such schemes, which can be considered as an example of rather "pure" forms, not claiming to be ready for adoption in real situations – where several type of constraints will always be present - but allowing easy perception of the type of solutions that have to be sought in a wide range of real situations:
- Synthetic inputs of possible ways to make the policy approach to the issue of total coverage of mobility costs at the urban level, trying to identify the main "solution building path" in connection with the political priorities that might be defined by the respective authorities

A lot of **Materials** has been produced on FISCUS. The handbook can be downloaded at the Europe on-line website http://europa.eu.int/comm/transport/extra/final_reports/FISCUS.pdf and a copy of the final summery report can be found at the CORDIS website http://www.cordis.lu/transport/src/fiscus.htm. General information's on the project can be viewed at FISCUS own **website** http://www.tis.pt/proj/fiscus/fiscus.htm.

The FISCUS consortium has also produced a number of deliverables, the most interesting are:

- D1: Report on methodological framework to assess financial schemes, 1998.
- D2: Report on methodological framework to evaluate real transport costs, 1999.
- D3: Guide for the evaluation of real transport costs, 1999.
- D4: Design of new financing schemes for urban transport, 1999.
- D7: Report on CEEC Situation and Practice, 2000.

Experts from FISCUS are: Project coordinator professor Jose Viegas from Transportes Inovacao e Sistemas from Portugal; Professor Werner Rothengatter from University of Karlsruhe, Germany; Professor Chris Nash, University of Leeds, Tomas Otterström from EKONO Energy Ltd, Finland; and Stefan Winkelbauer Technische Universität Wien, Austria.

Leading educational institutes that were involved in FISCUS are: University of Karlsruhe, Germany; University of Leeds, United Kingdom; Technische Universität Wien, Austria.

2.10 Results of PETS

The main objective of PETS was to forecast the consequences of moving to a more appropriate price level and structure in transport pricing. PETS took its starting point in the assumption that the basic principles of first and second best pricing policies are well known but that there is a lack of understanding of how to put these principles into practice. The five case studies illustrated what changes in pricing policy would result from the introduction of more appropriate pricing schemes, i.e. the PETS pricing principles, and what the consequences on aspects such as modal split and route choice would be. The five case studies included 4 passenger studies and 3 freight case studies: the Cross Channel case study, the Transalpine case study, the Finnish case study, the Oslo to Gothenburg case study and the Lisbon case study.

The PETS **Results** concludes a methodology for calculating marginal social costs for all modes exists, though many of the valuations remain subject to considerable uncertainties. PETS has shown that a purely commercial approach to transport pricing is not appropriate and may drive prices in a wrong direction. When measuring externalities for pricing purposes, is it important to estimate the marginal external cost rather than starting with the total cost and then dividing it by the amount of traffic, because there are many non-linearities. Effects of moving to a more efficient pricing system are likely to be diverse due to differences among the countries and their starting points. Further extension of deregulation and commercialisation may not necessarily benefit rail transport. Another interesting finding from PETS is that a move to more efficient pricing does not always benefit the environmentally friendly modes. Finally in the case of road freight there is under-charging of long distance road freight due to the taxation system of fuels. This makes a clear case for reforming road freight vehicle taxation and introduce a charge based on vehicle characteristics and the distance travelled.

PETS has many deliverables, the most important **materials** are:

- D1: Review of current situation
- D2: Transport pricing principles.
- D7: Internalisation of externalities
- D9: Cross Channel case study
- D10: Transalpine freight case study
- D11a: Finnish case study
- D11b: Oslo-Gothenburg case study
- D12: Lisbon case study

The summery final report can be downloaded at http://www.cordis.lu/transport/src/pets.htm. The complete final report can be viewed at the http://europa.eu.int/comm/transport/extra/final_reports/strategic/PETS.pdf

Dr Jan Owen Jansson from Linköping University (S) and Gunnar Lindberg, Dalarna University, (S) took care of the theoretical aspects. Peter Christensen TOI, Norway,

Prof Werner Rothengatter from Universitaet Karlsruhe (D), Prof Jose Manuel Viegas TIS, Portugal and Gunnar Lindberg dealt with the internalizations of the externalities.

University of Leeds (UK), Universidad de Las Palmas de Gran Canaria (ES), Universitet i Linkoeping (SW), Universitaet Karlsruhe IWW (DE), Technische Universitaet Wien (AT) are all **leading educational institutes** that were involved in PETS.

No **demonstration sites** are connected to this project.

2.11 Results of PRIMA

The basic aim of the PRIMA project is to produce policy recommendations and guidance for the implementation of road pricing systems in Europe. This is done by an assessment the acceptance of road pricing in urban areas; an evaluation of the optimal designs of road pricing schemes and decision making processes thereby taking account not only of what is technically feasible but also of the acceptability of different schemes; and through an identification of barriers towards implementation of electronic urban road pricing systems and to develop a guideline showing how to remove these to reach the goals as stated above. The participating cities are: Oslo, Barcelona barriers. PRIMA is based study cases of eight cities, each case is implemented and analysed, Lyon, Marseille, Stockholm, Rotterdam, Bern and Zurich.

The **Results** from PRIMA are very practical orientated. A databank was build up, comprised by the information's from the public surveys, questionnaires and interviews. Out of this material a three-stage decision process was developed, which can be used as support by cities that consider introducing road pricing schemes.

PRIMA also gives advices on the acceptance for urban road pricing, and the following conclusions can be drawn: acceptance relates to perceived benefits. Traffic problems must be evident as well as that road pricing is a part of the solution.

- Acceptance relates to availability of alternative modes of transport. Improved public transport should be part of the policy package.
- Acceptance relates to the level of charges. Fairly low starting levels are needed.
- Acceptance relates to distributional effects. Compensating measures should be considered regarding groups whose welfare will decrease by the pricing scheme because of e.g. location of housing, workplace and service centres.
- Acceptance relates to the design of the decision making process needed for introduction, discussion and implementation of the pricing scheme.
- Acceptance relates to the negotiation abilities of the involved levels of government. A bottom-up strategy initiated from the urban area is essential but supplementing top-down strategy is also needed.
- Acceptance relates to communication efforts initiated in the beginning of the decision making process.
- Acceptance relates to earlier road pricing experiences

- Acceptance relates to the general privatisation trend
- Acceptance from a majority of the citizens cannot be expected.

The **Material** from the PRIMA consortium consists of four deliverables and an information brochure. The first deliverable encloses a comparative overview of the transport system in the 8 chosen cities; Oslo, Stockholm, Lyon, Marseille, Zurich, Bern, Barcelona, Rotterdam. The document presents also the state of the art regarding road pricing acceptability and barriers, based on a literature review, as well as on road pricing and tolling experiences throughout the world. The final report analyses the reasons behind the acceptance or non-acceptance of road pricing schemes and produces policy recommendations and guidance for implementing urban road pricing in Europe.

- D1: "Comparison of transport system in case cities and state of the art regarding acceptability and barriers".
- D2: "Survey, Interviews and Media Analysis. Structure, Questionnaires and Results".
- D3: "Assessment of urban road pricing schemes and implementation processes"
- D4: Final report " Ways and means to increase the acceptance of urban road pricing"

All materials can be downloaded from the PRIMA website, which is located at: http://www.certu.fr/internat/peuro/prima/prima.htm. The final summery report can be displayed at the CORDIS website at: http://www.cordis.lu/transport/src/48328.htm and a copy of the final report can be downloaded at the Europe online website: http://europa.eu.int/comm/transport/extra/final_reports/road/PRIMA.pdf.

Experts from PRIMA were: project coordinator Pr. Björn Hårsman from INREGIA (S) who also took care of the Oslo and Stockholm case together with Börje Johansson from the Swedish KTH; Marc Ellenberg from CERTU (Fr) worked on the Lyon and Marseille cases; Peter Güller from SYNERGO (Ch) looked upon Zurich; René Neuenschwander from ECOPLAN (CH) worked on the Bern case; Jordi Julia from the Spanish Barcelona Regional was concerned with the Barcelona case and Oscar Martijn, from the Dutch company BEATT dealt with Rotterdam. Thierry du Crest from CERTU

The Royal Institute of Technology in Sweden was the only **Leading educational institutes** that was involved in PRIMA. There are no interesting demonstration sites to PRIMA.

2.12 Results of PROGRESS

PROGRESS is a research and demonstration project into road user charging in cities. Its overall objective is to demonstrate and evaluate the effectiveness and acceptance of

integrated urban transport pricing schemes to achieve transport goals and raise revenue. The project centers on eight sites developing and demonstrating road pricing schemes: Bristol, Copenhagen, Edinburgh, Genoa, Gothenburg, Helsinki, Rome and Trondheim. Across these sites, a number of road pricing concepts and technologies are being developed and demonstrated. In addition, to support the marginal cost pricing concept, some sites will be looking to integrate road pricing tariff structures and payment methods with those of public transport and parking.

PROGRESS is an on-going project and will end in 2004, and no **results** have been published yet. CUPID is closely connected to PROGRESS and provides guidance and assistance to the participating cities.

A lot of **material** is being produced to this project and PROGRESS has got their own **website**, http://www.progress-project.org/, where information and future report will be available here. Present the Interception report deliverable 1 can be found there. Of other interesting links on the Internet can be mentioned the websites of the Copenhagen project AKTA www.akta.kk.dk/ and the Rome project ATAC www.atac.roma.it/trasroma/presento/T4/inglese/progress.htm.

Experts on this project are: Professor Christiane Bielefeldt from TRI; Guy Hitchcock from TTR; Eirik Skjetne SINTEF and Risto Kulmala from Technical Research Centre of Finland all dealt with evaluation; Ian Catling from Ian Catling Consulting and Jonas Sundberg VBB, SWECO AB took care of technical aspects.

Involved **leading educational institute** are: Technical University of Denmark, Robert Gordon University, Napier University, University of Westminster and University of Rome

The demonstration sites on PROGRESS are the participating cities and they will look specifically at aligning road pricing tariff structures and payment methods, many of the sites are provisional, so **study visits** are not so interesting.

2.13 Results of TRANSPRICE

TRANSPRICE aimed to demonstrate and assess pricing strategies that are co-ordinated across the modes. Additionally TRANSPRICE evaluated the potential benefits of various mode choices-in urban transport pricing measures, identifying effects on modal split and public acceptance.

The **project results** from the modelling show in terms of cordon pricing that the total distance travelled in car can be reduced with 5-20% for cordon toll levels between 1-3 EUR

Road use pricing has proved to be an effective way of changing modal split from car use to public transport and Park & Ride. The effectiveness depends on city characteristics. Road use pricing should be considered when parking pricing measures alone have been found to exhaust their effectiveness. Furthermore road use pricing should be considered as a part of a package of demand management measures, in order to increase its effectiveness and acceptability.

Integrated payment systems should be implemented to support the implementation of transport pricing measures; they can have small but significant impacts on their own.

- Intermodality improvements, such as Park & Ride and integrated ticketing should be implemented together with transport pricing measures in order to enhance the impact of pricing measures.
- Use of the road use pricing revenues affects the acceptability of pricing measures; hypothecation of revenues for investments within the transport and environmental improvements sectors of a specific urban area substantially increases the potential public acceptability.

In conclusion, an effective trans modal integrated urban transport pricing strategy should combine packages of pricing measures, payment systems, intermodality and public transport improvements, in a comprehensive transport planning and management framework towards sustainable mobility.

TRANSPRICE has produced a lot of **material** four deliverables and some papers. Some of the papers can be downloaded from TRANPRICE **website** http://gridlock.york.ac.uk/transprice/. The summery of the final report can be displayed at http://www.cordis.lu/transport/src/transpri.htm.

Experts in this area are Prof. Eliot Laniado from Politecnico di Milano (I); Prof. Andres Monzon, Universidad Politecnica de Madrid (ES), Prof S. Olof Gunnarsson Chalmers University of Technology (S), Dr David Milne University of Leeds (UK), Prof Bernard Schlag Technische Universitaet Dresden (G), Prof Matti Pursula Helsinki University of Technical, Laboratory of Transportation (Fin)

Leading Educational Institutes within this project are: Politecnico Di Milano, Univeridad Politecnica De Madrid, University of York, University of Dublin –Trinity College, Technical University of Graz, Dresden Technical University, University of Leeds, and Helsinki University of Technology.

The demonstration sites in TRANSPRICE are the five cities:

- **Athens** - Vignette based road use pricing with park & ride and as a secondary activity an evaluation of the effects of the reintroduction of a monthly pass for all public transport modes.
- **Como** - Access control in the Villa Geno tourist area with a permit system for residents and duration based parking payment system for visitors
- **Madrid** - Park & ride with integrated ticketing and an evaluation of the effects of tariff integration by monthly pass for all public transport modes ten years after its introduction.
- **Leeds** - multi service smart card application for parking and public transport and attitudinal research into potential for modal change through changes to parking, park & ride and public transport prices.
- **York** - Investigation into effects changes to central area parking and park & ride tariffs, effects of introduction of multi-use smart cards and generalised cost changes through bus priorities.

2.14 Results of TRENEN II STRAN

TRENEN II STRAN analysed different combinations of pricing and regulatory instruments in order to identify optimal combinations to solve environmental, energy and pure transportations problems. It involved six urban case studies; Amsterdam, Athens, Brussels, Dublin, London and Mestre, and three regional case studies; Belgium, Ireland and Italy. TRENEN II STRAN aimed to develop strategic models for the assessment of pricing reform in transportation and their application to the European Union. The strategic models should analyse two types of policy problems; measuring the gap between present and efficient prices across all modes, and measuring the potential of different types of pricing instruments to improve the pricing of transport. The TRENEN model maximises a weighted sum of the consumer and producer surpluses, tax revenues and external effects by selecting a set of policies under constraints.

One of the **Results** of the project was development of the economic models, which can compute optimum prices for transport in specific cities and countries. These prices consider external costs, taxes and resource costs. The case studies made comparisons between current and optimal prices. The findings show that the discrepancy between current prices and external costs in congested urban conditions are often considerable. The consumer price for using a car in peak periods only covers one a third to half of the total marginal social cost due to unpaid parking and external cost of congestion. The consumer price in off-peak periods the prices are closer. Optimal pricing scenarios indicate price increases by 100 - 250 % for car travel in peak periods.

For interurban transport pricing inefficiencies are generally less significant. Prices of peak period car and truck use do not cover congestion costs. Bus transport is typically heavily subsidised and under-priced. Rail freight and inland waterways have prices that re reasonably in line with social costs.

The case studies from TRENEN II-STRAN indicate the relative performance of different pricing policy instruments as: Parking policies, Improved car emission technologies, Fuel tax policies, Reduced subsidies to public transport and Simple congestion pricing.

One of the **materials** on TRENEN II STRAN The final report ”TRENEN II STRAN: Policy analysis for externalities in road transport: 0models and result” is published by the European Commission, Transport Research 4th Framework Programme Urban Transport ISBN 92-828-7815-5. A summery of this report can be found at the CORDIS website http://www.cordis.lu/transport/src/trenenii.htm among with other general information’s. Of other interesting material is Deliverable 8a: New Model Developments Urban Software and Documentation by Kurt Van Dender, Stef Proost and Sara Ochelen from Katholieke Universiteit Leuven, Belgium.

Experts from TRENEN II STRAN are: the project coordinator Stef Proost, Katholieke Universiteit Leuven, Belgium, and Bruno De Borger from Universiteit Antwerpen.

Leading educational institutes that were involved in TRENEN II STRAN are the Katholieke Universiteit in Belgium, Trinity College Dublin, Technical University of Athens, University of Kent at Canterbury, Vrije Universiteit Amsterdam, Universiteit Antwerpen.

The demonstration sites connected to this project are the participating cities and regions: Brussels (BE), Dublin (IE), Bologna (IT), Amsterdam (NL), Athens (GR) and

three regions of Belgium, an Italian region and Ireland. None of them are suitable for **study visits.**

3. RECOMMENDATIONS FOR NEW MODULES

The projects allocated in key topic "Economics and Pricing" contain many interesting aspects and findings, and many of them could be used as input to education and training material. Following subject fields are covered by the screened projects:

- Public acceptance and behavioural aspects: Information campaigns, revenues usage, mode and route switching,
- Modelling tools for scheme assessment.
- Transport Demand Management measures: road usage pricing, ring tolling, area pricing and parking restrictions.
- Charging techniques: smart cards, GPS, integrated payment systems
- Pricing strategies: marginal cost pricing, marginal social cost pricing, peak-hour pricing, congestion and environmental pricing.

These topics found in the screened projects can serve as input for different disciplines like engineering, economics, legislation, behavioural studies, telematics and computer modelling.

4. FINAL CONCLUSIONS

There are many interesting material accessible on *Economics and Pricing*, but not much could serve as useful or innovative input for training material in its present form. Most of the material is rather theoretical and tends to aim towards experts and decision makers. A lot of projects related to Economics and Pricing are only produced as research reports and deliverables and hardly any 'popular' material such as brochures, video's, handbooks etc.

Additionally it should be noted that it is not always easy to get hold of existing materials from the different projects. Therefore, PORTAL not only has the important task to develop new material on the basis of existing content, but also to improve and optimise the dissemination and distribution of existing materials. An effort should be made to place relevant material like reports, articles etc available on the Internet and link to the different websites and web pages.