Nordic Road Charging Cooperation
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Summary and recommendations

The European Union continues to put pressure on member states to introduce road user charging in order to implement the principles of “user pays” and “polluter pays”. The Eurovignette collaboration of time-based charging for heavy goods vehicles will gradually disappear in the future, due to a will to introduce distance-based charging. However, distance-based charging has shown to be challenging, politically risky and relatively expensive. Therefore several distance-based charging projects have been postponed in Europe.

The EU ambition of the interoperable European Electronic Toll Service has yet not been implemented. Current interoperability is made in small “islands” within or between neighbouring countries. EasyGo is a very good example where cross-border interoperability exists for DSRC-based road toll systems in the Nordic countries.

The markets for road tolls are limited in the Nordic countries, making investments in technology and institutional preparations expensive. This study suggests that Denmark, Finland, Norway and Sweden create a common platform and a co-operation for “next generation road charging”, i.e. making it possible to handle the existing road tolls, as well as future systems, using the same technology in all countries. Each country should still be able to make decisions about introduction, purpose, use and tariffs. However, together the countries can achieve cost efficient solutions that maximize the socio-economic benefits of road tolls, as well as making it easier and more secure for users. The platform should handle key issues as:

- Privacy
- Compliance and Enforcement
- Security
- System complexity, precision requirements and business rules
- Roadside equipment
- Operations model
- Charging area
- A “fall-back service provider”

In the end this could reduce the cost of investment and operation significantly, as well as reduce the risk of future projects. An important requirement is to fulfil the EU intention on interoperability and European Electronic Toll Service, taking all the relevant EU directives into account.

The development of a common platform does not come without challenges. The identified challenges are the political and public acceptance, legal and institutional issues as well as the time aspect. It would probably take several years to implement a common platform.

To develop a common platform it’s recommended to start a joint project, which explores the potential and creates a prototype to demonstrate the possibilities. The project should address the challenging, but important, questions not yet solved by the directive and the decision on EETS. The project should gather important stakeholders from authorities, EasyGo and other expertise from each of the Nordic countries.
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1 Background

Several new road tolls and user charges have been introduced in Scandinavia during the last two decades. Norway has a particular long tradition of road tolls to finance the construction of new roads. The first electronic road toll was introduced in Norway already in the 1980’s and since then the number of toll stations has been extended from time to time.

The Øresund Bridge, on the border between Denmark and Sweden, as well as the Svinesund Bridge, on the border between Norway and Sweden, are financed through road tolls. These bridges opened for traffic in the year 2000 and 2005 respectively. Since then, Sweden has introduced congestion charging in Stockholm and Gothenburg.

The Nordic service EasyGo currently includes the Nordic road tolls, except the congestion charging systems in Stockholm and Gothenburg which probably will be included in the future. The EasyGo service was introduced in 2007 and is a Toll Charger co-operation that offers a more convenient means of payment for road charges as well as some ferry lines.

Distance-based road charging for HGVs has been profoundly investigated in all Nordic countries during the last decade. The Swedish and Norwegian investigations (SIKA 2007 and SINTEF 2010) concluded that the socio-economic benefits are on pair with the approximate yearly cost of the systems. In Denmark the introduction of Kørselsafgift was interrupted in the beginning of 2013. Political reasons and unexpected high investment and operations cost were the reasons. Finland and Denmark have on-going investigations where distance-based charging for private cars is considered.

The common approach when European countries introduce distance-based charging is to look to their own country. Solutions are created that fit each country’s needs, fulfils the laws and minimizes the risk of time consuming activities. Avoiding the risk of postponed system introduction, which causes political problems, is perhaps one of the reasons why many countries tend to create “their own system”. This also means that the country doesn’t lose control to any other member state. This approach has led to system solutions and regulations that hamper the ambition of the European Union of technical and procedural interoperability of road charging.

Quotes from European Commission Mobility and Transport:

“Interoperability shall enable road users to circulate throughout the EU without having to be concerned by different charging procedures and without having to install equipment specific to the different charging zones, so that paying charges would be a seamless operation.”

The EU commission foresees a European Electronic Toll Service (EETS), but this service has however not yet come into sight. Several initiatives are on-going in Europe to realize the EETS, for example the formation of a regional EETS project and an EETS provider member co-operation.

The current co-operation on Eurovignette between Belgium, the Netherlands, Luxembourg, Sweden and Denmark will gradually be abandoned in the future as more countries introduce distance-based charging instead.

Therefore there are good reasons to investigate if Nordic distance-based road charging co-operation can bring benefits when looking at management, implementation and operational costs.
1.1 Aim, purpose and limitations

This study is performed on behalf of the research and innovation project ARENA. It aims to review the experience of EasyGo and analyse if a Nordic co-operation on distance-based road charging is possible. Is co-operation of road charging feasible and what are the opportunities and benefits? Which challenges exist and how could co-operation be performed?

Legal aspects of co-operation are not considered in this study. The study also has a European perspective.

The report could be used as a starting point and discussion material for further investigations and possible future projects. It does not aim to provide a complete and detailed set of measures that could be relevant for co-operation.
2 The EasyGo service

The EasyGo service is an additional service offered by Toll Chargers, which aims to offer a convenient means of payment for road charges and some ferry lines in Scandinavia. The service makes it possible for road users to sign a contract with a local Toll Service Provider and obtain its on-board equipment (OBE) and use it in all other toll domains connected to the service. For example: a customer who subscribes to an account with the Norwegian Fjellinjen might use the OBE for payment when passing the Øresund Bridge and vice versa.

EasyGo was an initiative of the Norwegian Public Roads Administration, the former Swedish National Road Administration, the Øresund Bridge Consortium and Sund & Bælt A/S. Practical co-operation started in 2004 when an agreement between the partners was signed. The involved actors already had road tolls systems in operation using different system suppliers, standards and routines. Different types of organizations (authorities, state owned companies and private companies) were involved. After a few years of preparations in a project called NorITS, the EasyGo service was made available in 2007.

The EasyGo Hub, were all TCs and TSPs connect, is central to the service.

![EasyGo architecture](www.easygo.com)

The OBEs of the EasyGo service uses DSRC (Dedicated Short Range Communication) technology, following the CEN TC278 DSRC standard. The service is prepared to meet the requirements and possibilities of the EFC Directive (EU Directive 2004/52/EC) and the EETS decision (2009/750/EC) for the European Electronic Toll Service.
2.1 A successful service

The EasyGo service has been successful from start; each year since the service was opened there has been an increased number of transactions. In 2012 more than 2 million OBEs were in use.

![Use of EasyGo Service](image)

**Figure 2 Number of transactions per month in EasyGo. Source: Arild Skadsheim, Vianova Transit.**

Approximately 50 Toll Chargers situated in Denmark, Sweden and Norway are today part of EasyGo. An extension to include OBEs from the Austrian HGV and bus toll system into EasyGo is currently going through final testing.

2.2 The experience of introduction

The experience from the introduction of the EasyGo Service is positive, both in terms of the implementation process and the following operation. The key success factors of the EasyGo introduction were that:

- **Committed parties, with the same ambition, were involved**
  - Key to any project is to have committed parties involved, especially when it’s a multinational project. The ambition was similar and there is also a tradition of cooperation between the Nordic countries.

- **Development didn’t start from scratch**
  - Before integration and negotiation in EasyGo, the technical and administrative foundation was already in place in Denmark and Norway. Norway did a similar process within the country creating the national AutoPASS system a few years earlier.

- **Technical standards were available**
  - Adopted and used standards of DSRC existed, making use of transponders easier.
• **Reduced costs**
  
  - A major cost driver for road charging is the handling of non-frequent users. The EasyGo co-operation reduces the cost of handling non-frequent users substantially. The cost is also reduced due to fewer manual transactions and easier enforcement.

The work of setting up EasyGo and integrate system solutions also had complicated elements. The following factors of the introduction were challenging:

  - Different currencies involved, problem with handling currency exchange rates.
  - Value Added Tax regulations differ between countries. In Sweden and Denmark the fees are subject to VAT, but not in Norway, so passages made in Norway are billed separately.
  - Mix of authorities and private partners involved, which made it more challenging to cooperate.
  - Integration and development of joint transactions hub.

### 2.3 Cost

The common costs of EasyGo include the interoperability management and development of the EasyGo Hub and other common information activities. These costs are shared between the Toll Chargers based on the volume of transactions and each partner pay an annual fee. For Sweden the fee is approximately 600 000 SEK annually.

Additionally, each Toll Charger pays a compensation fee to TSPs based on the collected amount to cover the cost of collection, credit risk and customer relations.
3  Co-operation on a Nordic platform for road charging

Co-operation between the Nordic countries regarding road charging could bring several benefits in terms of reduced risk, systems cost and operations cost. With available technology it’s possible to manage different types of road tolls which all have different purposes, using a common platform and equipment. The platform might handle different types of road tolls and purposes:

- Congestion charging
- Road tolls for bridges, tunnels and segments
- Distance-based charging

This chapter marks out the prerequisites, opportunities, benefits and challenges of co-operation on “next generation road charging” in the Nordic countries, when hypothetically using the same platform for managing and operating road tolls. The co-operation does not absolve each country’s sovereignty in introducing road tolls. Different countries have different purposes when introducing tolls and the requirements and legislation are diverse.

3.1 Prerequisites

The prerequisites of deploying co-operation include the framework set up by the European Union. The European Union encourages its members to use road user charges as a way to deploy the principle “the user and the polluter pays” as a means to internalize the external costs related to road transports. The framework aims at harmonizing the use of road user charges in the EU by defining maximum fees and technical standards. The following legislations are included in the framework:

- The Eurovignette directive (1999/62/EC, changed through directive 2006/38/EC and 2011/76/EC)
- The EFC directive (2004/52/EC)

The main purpose of EETS is to make it available on all electronically tolled infrastructures in the entire EU and, by limiting cash transactions at toll stations, to improve traffic flow and reduce congestion.

3.2 Opportunities and benefits

The opportunities of a co-operation are to create a common platform for road charging using different measures: congestion charging, road toll on bridges, tunnels and segments as well as distance-based charging. The platform can be used by any of the individual country, without reducing each country’s sovereignty to determine use and purpose. The platform should offer each country the possibility to set its specific tariffs. The platform should also be used for managing the road tolls already in operation.

The study shows the existence of key issues with high potential of reducing cost in case of co-operation. These areas could be:
• Privacy.
  o Protecting user privacy is essential in systems that handle private location-based information. Protected user privacy is also crucial for public acceptance either if private or business vehicles are in mind.

• Compliance and enforcement.
  o Compliance and enforcement is about preventing users from escaping to pay taxes and fees and is a common cost driver in road charging systems.

• Security.
  o The design of secure systems that are resistant against external threats is important.

• System complexity, precision requirements and business rules.
  o Definition of complexity of which types of road tolls that could be handled, congestion charging, distance-based charging, cordon charging, etc. Definition of joint precision requirements and establishment of business rules. Based on this countries can design their road tolling scheme.

• Roadside equipment.
  o If the Nordic countries share tendering of key equipment for road toll systems, this could reduce the cost of investments.

• Operation model.
  o A model for exchanging data, handle currencies and allocating costs should be developed.

• Charging area.
  o Defining the area (or areas) of charging zones is important for enforcement and system control.

• A “fall-back service provider.”
  o The introduction of EETS assumes that a market of Toll Service Providers will “occur”. If this market does not occur, the co-operation might include some sort of fall-back service provider.

There are substantial benefits of co-operation for the users and for the authorities and companies involved.

In the user perspective an extended Nordic road charging co-operation might lead to convenient payment fulfilling the EETS idea of one contract, one OBE and one invoice. The user shall not need to bother about how and when to pay the correct toll when driving. The EasyGo service also shows examples of for users of the co-operation.

For authorities and other Toll Chargers a co-operation could lead to reduced costs, lower risk and also a more flexible solution when each country considers road tolls in any form. A co-operation would probably reduce the cost of investments, operation and enforcement, due to economy of scale. In practice it means larger numbers of toll transactions, increased volumes of roadside equipment in case of joint tendering. Considerable savings regarding compliance and enforcement would be anticipated if a joint policy is developed. There’s always a risk of introducing tolls when performing large tenders and system development. Shared responsibility and development also lowers the risk of failure. Road tolls in the Nordic countries would be more flexible, because the authorities or Toll Chargers can apply the same system tools for different types of road tolls and purposes. The
handling of non-frequent users in each country would be less costly as they are handled within the same platform.

A major opportunity of making “next generation road charging” possible is the fact that the EasyGo service already exists, which provides a foundation.

### 3.3 Challenges

A co-operation on a common platform does not just “occur” and does not come without challenges. Agreements and co-operation between different countries are from the beginning difficult. This study has identified the following main challenges of a road charging co-operation:

- **Political and public acceptance**
  - Political and public acceptance is difficult due to the fact that road tolls and user charges have a history of being controversial and have difficulties to be accepted by the public.

- **Legal and institutional issues, fines and court processes**
  - The legal foundation differs between countries. There are differences regarding what is defined to be a tax and what is defined to be a fee. Value added tax also differs between countries. Definitions of fines when users violate the different charges could be challenging in a co-operation. Also the court process differs and has to be considered, as this might be a challenge for enforcement.

- **Time aspect**
  - As all agreements between countries are challenging, the time aspect should be specially considered. It would probably take several years to achieve implementation.

### 3.4 Next steps

This report describes an idea of a common platform for road charging in the Nordic countries. To further develop and start-up an actual co-operation it’s recommended to create a project, which explores the possibilities and creates a prototype for demonstration. The project should gather important stakeholders from authorities, EasyGo and other expertise from each of the Nordic countries. For demonstration at least a couple of system suppliers could be involved as well. It’s important to focus on legal, technical and procedural issues, challenging issues that yet have not been solved by the EFC-directive and the decision on EETS.

A joint project should include the following phases or packages:

- Definition on system complexity, precision requirements and business rules
- Definition on privacy, security, compliance and enforcement
- Create and perform pilots together with commercial TSPs
- Draw conclusions and design interoperability requirements, cost estimations
- Build a shared platform for interoperability

The experience of EasyGo and the process of EETS in Europe show that the development and negotiations between countries tend to take time. It could therefore be assumed that the time to implement a common platform is approximately 4-7 years.
## 4 Definitions and abbreviations

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CEN</td>
<td>Comité Européen de Normalisation (CEN)</td>
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<td>DSRC</td>
<td>Dedicated Short Range Communication, microwave communication on 5.8 GHz</td>
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<tr>
<td>EETS</td>
<td>European Electronic Toll Service</td>
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<td>Eurovignette</td>
<td>Time-based user charge co-operation in Denmark, Sweden, Belgium, the Netherlands and Luxembourg</td>
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<td>HGV</td>
<td>Heavy goods vehicle</td>
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<tr>
<td>OBE/OBU</td>
<td>On-Board Equipment/Unit, transponder or equivalent</td>
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<td>TC</td>
<td>Toll Charger</td>
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<td>TSP</td>
<td>Toll Service Provider</td>
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5 References

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- Per Skrumsager Hansen Transportministeriet Denmark
- Sören Rasmussen Sund & Bælt Denmark
- Trond Foss SINTEF Norway

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