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ENCLOSE Project

Cross-evaluation of energy efficient, sustainable urban logistics measures in the ENCLOSE towns

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Abstract

Transportation is one of the main contributors to global energy and environmental concerns. Transportation relies almost extensively on fossil fuels with Logistics being a large portion of transportation.

Freight contributed 31% of the final consumption of transport in the EU. Road freight traffic is projected to increase by about 55% between 2010 and 2050 (1.1% p.a.). (P. Capros, 2013) Urban freight and the urban portion of freight transportation is seen as the bottleneck of the freight transportation sector. Actions to try and alleviate these bottlenecks can contribute massively to reduced emissions. With this in mind, it is important given the urgent nature of the current environment crises that cities learn from each other to speed up implementation and lead times of such energy saving and environmentally advantageous measures.

This report aims to identify the most suitable measures to implement in the ENCLOSE cities. The comparison data is based on a standardised survey taken amongst the cities. The survey template is located in Annex 1 Cross Evaluation survey questions. This is to gather a representative picture of the characteristics of the cities and for Enclose' measures relevant features of each city. The goal for this cross-evaluation, is to get a good overview of the capability of a city to adopt other measures applied in other ENCLOSE cities.

1 Process vs Impact evaluation

1.1 Method 1

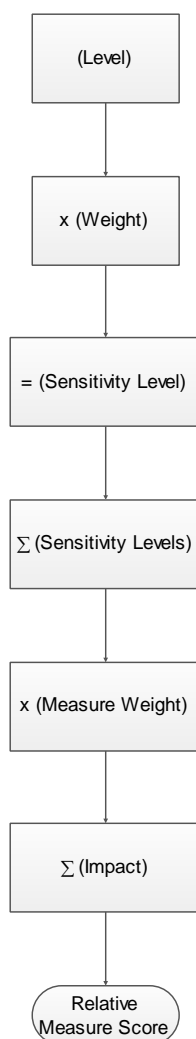


Figure 1. Method 1

There were two methodologies devised to try and cross-evaluate the measures of the ENCLOSE cities. This first methodology was concerned with evaluating the implementation of the measures and how successful would the measures be implemented, shown in Figure 1.

The “Level” section is related to the score from the partners’ survey for each criterion. This is a score of between 1 and 5, 1 typically meaning an underperformance and 5 being a good performance. There are six main criteria:

- A. Business
- B. Regulation
- C. Infrastructure
- D. Social Acceptance
- E. Area
- F. Strategy and Planning

Within those criteria there are a range of sub criteria, please refer to Annex 1 Cross Evaluation survey questions for the full list.

The “weight” is the level of significance for each of the criteria. The reasoning for each weight is explained in Annex 2 Weights Considerations. The product of the “level” and the “weight” is the “sensitivity level” for each city for those criteria.

The sub-criteria are then summed to find the total for those criteria, mentioned above. This will give the individual city context for each city.

All of the ENCLOSE measures fall into one of the following five types of measures:

1. Education and Awareness Raising Campaign
2. Restriction
3. Mode Change
4. Route Optimisation
5. Consolidation

Those five measure types above have specific weight factors applied to the six main criteria. This is an effort to put more an emphasis on the important elements to implement that measure. The

“sensitivity level “is then multiplied by this “measure factor”, this will then produce a relative score to each other for the measure types.

The main advantages of this method are:

- Its simplicity.
- Additionally due to the relativity nature of the scoring system inaccuracies are somewhat nullified.

The main disadvantage of this method is that:

- The local assessment evaluated in D3.5 for each city is not taken into account. It is only a process evaluation as the impact of the measure cannot be quantified.

1.2 Method 2

Method two is shown in Figure 2. This tries to bring in the local assessment results from D3.5 to try and forecast expected saving in the city that is looking to implement certain measures. In box 1 and 2 the measures are identified and group together under the measure types. i.e. Alba Iulia and Serres are the only two that completed Education/awareness raising campaigns (ARC).

In box 3, the cities that are proposing to introduce those type of measures are compared with those that have introduced the measure, for example if Dundee wishes to completed an ARC, their “level” results are subtracted from level results for Alba Iulia and Serres, in separate columns.

Box 4 and 5 is essentially the first methodology except, the difference between the level result of the cities are used. This will produce a factor which could be for example 0.8 or 1.2, which essentially means, that Dundee in this example would achieve 80% of the Alba Iulia result and 120% of the Serres result. In box 6 those factors that were found are then applied to the results of Alba Iulia and Serres. In box 7 the average is found this will then produce the proposed measure result for Dundee in this example. In Figure 3, the spreadsheet is shown to further the explanation of this method.

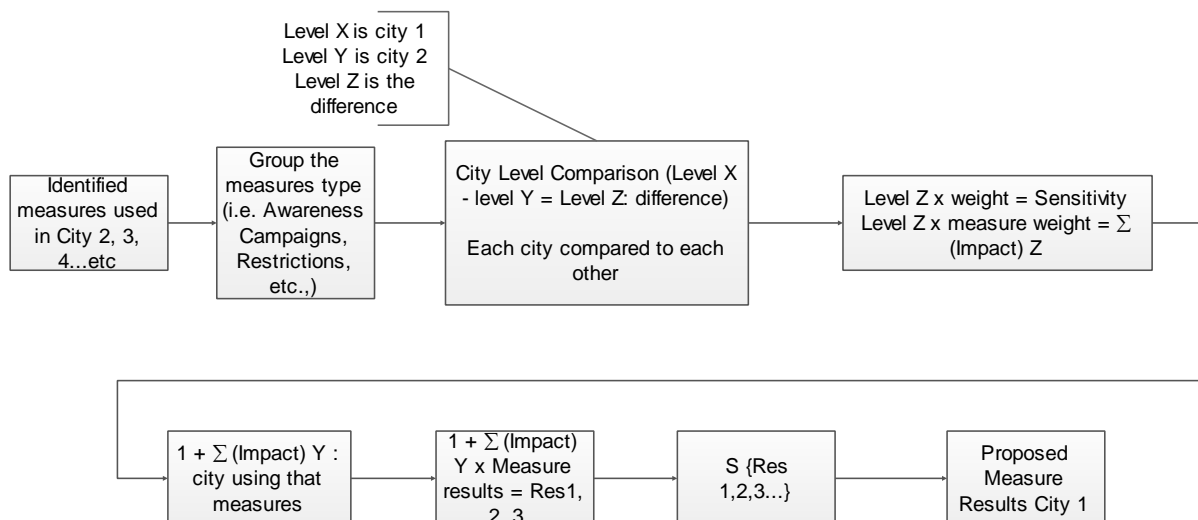


Figure 2 Method 2

| | A | B | C | D | E | F | G | H | I | J | K | L |
|----|--|--------|--------|------------|--------|------------|------------------------|-----------------|-------------------|--------------|--------|-----|
| 1 | | | | | | | | | | | | |
| 2 | | City 1 | City 2 | | City 3 | | Average of Differences | Criteria Weight | Sensitivity Level | Route Optim. | | |
| 3 | Criteria | Level | Level | Difference | Level | Difference | | | | Weight | Impact | |
| 4 | | | | B - C | | B - E | Avg(C,E) | | G*H | | SumI*J | |
| 5 | A. Business | | | | | | | | | | | |
| 6 | 1. Nr of B. in enclose area | 0.6 | 0.4 | 0.2 | 0.8 | -0.2 | 0 | 0.28 | 0 | | | |
| 7 | 2. Predominate business | 1 | 1 | 0 | 0.4 | 0.6 | 0.3 | 0.28 | 0.084 | | | |
| 8 | 3. Level of engagement | 0.4 | 0.2 | 0.2 | 0.6 | -0.2 | 0 | 0.28 | 0 | | | |
| 9 | 4. Level of ARC impact | 0.8 | 0.6 | 0.2 | 1 | -0.2 | 0 | 0.16 | 0 | | | |
| 10 | Business normalized sensitivity | | | | | | | 1.0 | 0.1 | 10% | 0.01 | |
| 11 | B. Regulation | | | | | | | | | | | |
| 12 | 5. Traffic regulation | 0.2 | 0.6 | -0.4 | 0.8 | -0.6 | -0.5 | 0.23 | -0.1125 | | | |
| 13 | 6. Daytime city restriction | 0.2 | 0.4 | -0.2 | 0.4 | -0.2 | -0.2 | 0.08 | -0.016 | | | |
| 14 | 7. Daytime hour restriction | 0.2 | 0.4 | -0.2 | 0.2 | 0 | -0.1 | 0.08 | -0.008 | | | |
| 15 | 8 Emission based regulation | 0.2 | 0.4 | -0.2 | 0.2 | 0 | -0.1 | 0.13 | -0.013 | | | |
| 16 | 9. Weight based emission | 0.2 | 0.6 | -0.4 | 0.4 | -0.2 | -0.3 | 0.10 | -0.03 | | | |
| 17 | 10. Loading bays/street | 0.2 | 0.4 | -0.2 | 0.6 | -0.4 | -0.3 | 0.08 | -0.024 | | | |
| 18 | 11. Enforcement types | 0.2 | 0.4 | -0.2 | 1 | -0.8 | -0.5 | 0.23 | -0.1125 | | | |
| 19 | 12. Incentives green vehicle | 0.2 | 1 | -0.8 | 0.4 | -0.2 | -0.5 | 0.08 | -0.04 | | | |
| 20 | Regulatory normalized sensitivity | | | | | | | 1.0 | -0.4 | 25% | -0.09 | |
| 21 | C. Infrastructure | | | | | | | | | | | |
| 22 | 13. Average speed | 0.2 | 0.4 | -0.2 | 0.8 | -0.6 | -0.4 | 0.2 | -0.08 | | | |
| 23 | 14. UCC market share | 0.2 | 0.4 | -0.2 | 0.2 | 0 | -0.1 | 0.4 | -0.04 | | | |
| 24 | 15. ITS running | 0.2 | 0.1 | 0.1 | 0.6 | -0.4 | -0.15 | 0.05 | -0.0075 | | | |
| 25 | 16. EURO tier | 0.6 | 0.5 | 0.1 | 1 | -0.4 | -0.15 | 0.35 | -0.0525 | | | |
| 26 | Infrastructure normalized sensitivity | | | | | | | 1.0 | -0.2 | 30% | -0.05 | |
| 27 | D. Social acceptance | | | | | | | | | | | |
| 28 | 17. Citizens acceptance | 0.4 | 0.4 | 0 | 0.2 | 0.2 | 0.1 | 0.4 | 0.04 | | | |
| 29 | 18. Logistic companies acceptance | 0.4 | 0.4 | 0 | 0.4 | 0 | 0 | 0.6 | 0 | | | |
| 30 | Social acceptance normalized sensitivity | | | | | | | 1.0 | 0.0 | 15% | 0.01 | |
| 31 | E. Area | | | | | | | | | | | |
| 32 | 19. City area | 1 | 0.8 | 0.2 | 0.8 | 0.2 | 0.2 | 0.6 | 0.12 | | | |
| 33 | 20. Population | 0.6 | 0.6 | 0 | 0.6 | 0 | 0 | 0.4 | 0 | | | |
| 34 | Area normalized sensitivity | | | | | | | 1.0 | 0.1 | 5% | 0.01 | |
| 35 | F. Strategy & Planning | | | | | | | | | | | |
| 36 | 21. Proactive commitment | 0.8 | 0.8 | 0 | 0.8 | 0 | 0 | 0.55 | 0 | | | |
| 37 | 22. Infrastructural plan | 1 | 1 | 0 | 1 | 0 | 0 | 0.45 | 0 | | | |
| 38 | Planning normalized sensitivity | | | | | | | 1.0 | 0.0 | 15% | 0.00 | |
| 39 | Impact (Energy, CO2, etc) | | 150 | | 200 | | 175 | | | | | |
| 40 | | | | | | | | | | 100% | -0.12 | 154 |

Figure 3. Spreadsheet - Method 2

Row 4 in the above figure gives a brief description of the working of each column. City 1 is the city implementing the measure (Route Optimisation in this example) and city 2, 3 are the comparison cities that have already implemented the measure. In column D and F the difference of the city surveys is found. Column G calculates the average of those differences. Column I obtains the sensitivity level with row 10 summing the sub-criteria of those main criteria to which the criteria weight of column J are applied to get the score for each of the main criteria. In row 39 we see the result of City 2 and 3 for that measure type, this could be emissions, energy, etc., again the average is found (175). The impact difference (-0.12) is applied to this average score (175) to get a figure of 154 in this example.

The main advantage of this methodology is that:

- It cross evaluates the impact of the proposed measure.
- It encompasses the enclose impact evaluation results.

The disadvantages include:

- Extremely inaccurate and might prove worthless.
- Some cities have evaluated two measures together therefore the inaccuracies are heightened.

- The City-to-City comparison is an opinion based qualitative survey and not based on quantitative surveys, therefore to compare on a mathematic basis like can't really stand up to scrutiny.
- Those opinion based surveys are also based on the opinion from each partner about their cities so they are biased and not evaluated by an independent evaluator.
- Geographical scope for ENCLOSE pilot and soft measures differ over a vast scale, from a whole city centre to a single street/promenade. The process of normalizing the energy and emissions benefits of ENCLOSE to get relevant data to compare between cities is not meaningful, due to the lack of relevant factors to normalize against.

1.3 Considerations

In communication with the Swedish national road and traffic research institute VTI it has become clear that cross-evaluating two different cities in terms of absolute value forecasting is very inaccurate and of no real benefit to the partners. There is also not much research completed in this field and there is no applicable best practise available. (Timms, 2014) Stated that:

"In general, care needs to be taken when examining any complex phenomenon from a partial perspective since there is likely to be a tendency to over-emphasise certain aspects whilst ignoring other aspects. In the context of policy formulation, such partiality can have a destabilising and mystifying effect, particularly if it is argued that a partial perspective is in fact 'comprehensive' and 'objective'." (Timms, 2014) Advocated a lighter form of cross-evaluation similar to that of used in method 1.

Another important point of consideration for cross-evaluation is the lack of a large sample size. If Enclose has a large number of cities that completed each measure the variability between individual cities might be overcome but it doesn't, which adds to the inaccuracy of using cross-evaluation for impact assessment.

Indeed even the CIVITAS project in which the above problem was lessened due to a larger number of cities involved still went for a lighter approach to transferability and cross-evaluation, focusing on the barrier and drivers for policy. In fact the main items to be transferred were the experiences not evaluating and estimating an absolute value. It also found that *"The importance of understanding the context surrounding such dependencies is therefore at the heart of the issue of "transferability", considering that the replication of measures and clusters of measures can only succeed if the context is correctly understood in order to be assessed and possibly replicated in the target city."* (Civitas Initiative, 2006)

Due to the above disadvantage of method 2, a high quality cross-evaluation of energy and emissions between the participating cities is not feasible, and therefore this cross evaluation is focused on measures implementation process, which utilises method 1.

2 Methodology

2.1 City Characteristics

Scientifically speaking, cross evaluation of cities features is a problematic task. It is inevitable that the characteristics of a distant city must be based on individual judgments and assessments. These judgments are consequently done by persons with their own individual set of references. In order to restrict the possible number of choices and get data from which conclusions can be derived in a fairly quantitative manner, only few choices were offered in the city context survey, at a maximum of 5. Sometimes an answer could have a numeric value while in other cases it was chosen between a number of given alternatives.

The characteristic of a city was divided into a number of criteria, each with a set of sub-criteria. Each rated criteria consists of 2- 8 sub-criteria. The (main) criteria were:

- A. Business
- B. Regulation
- C. Infrastructure
- D. Social acceptance
- E. Area
- F. Strategy and planning

It was considered that these six criteria were the best to represent the character of the cities with respect to the measures that were used within the ENCLOSE cities. In total 22 questions were answered, each corresponding to a sub-criteria. The answers were transformed to values between 0-5, to get a numeric representation of that sub-criterion, in relation to logistic measures.

Weights for City context

Each sub-criterion is not equally important. Therefore a weight must be applied for sub-criteria within each main criterion. An example illustrates this in Annex 2 Weights considerations. For example the main criterion D. Social acceptance consists of two sub-criteria No. 17 Citizens' acceptance and No. 18 Logistic companies' acceptance. The weights applied to these were 0.35 and 0.65 respectively, indicating that acceptance of logistics companies (for new measures) was rated almost twice as important as citizen's acceptance for implementation of the measures.

In general a sub-criteria that represents a "good " feature of a city has got a higher weight rating, as a well-developed feature is expected to be a positive prerequisite for measure implementation, though it might not give room for substantial energy improvements. Higher rating has been dedicated to sub-criteria that are more representative for the main criteria, regarding process evaluation.

As an example, we can have a look at criterion Regulation. A city area that is intensely regulated might, at a first glance, not have great success when implementing a measure which focuses on regulation improvements. On the other hand citizens and drivers are more likely to accept and adopt new regulations as their daily behaviour depends on existing regulations. This latter argument, being

how a measure can be successfully implemented, has become the principle for this part of the cross evaluation methodology.

The setting of weights is general, while it would have been more scientifically correct to apply different weights depending of what kind of measure that would be under test. However, this would have presented yet another dimension to the evaluation, without contributing more than marginally to the accuracy.

Next step is applying these weights to each sub-criterion, by multiplying the two numbers converted survey sub-criteria answer with corresponding weight. The weights within each criterion were summed up, thus getting the sensitivity of each city's feature when applying new measures.

2.2 *Measure type characteristics*

There are a large number of measures to handle. Instead of analysing measures directly, the task was reduced to a manageable level by analysing only five types of measures:

- Education/Awareness raising campaign
- Restriction
- Mode change
- Route optimisation
- Consolidation

2.3 *Weights for Measure types*

Measure types have different impacts on a city, depending on how well a certain measure matches different criteria of that city. Therefore it was necessary to assess the properties of the measures with respect to the cities features (criteria).

Measure types are given scores according to which extent they represent the core of each measure for each city criteria. For example, Education type measures, are not highly related to a city's Infrastructure, therefore the corresponding weight is low. Implementation of Educational type measures are related to social acceptance and corresponding weight is relatively high. Refer to Annex 2 Weights considerations, for more information.

3 Output

The polar (spider web) graphs indicate the relative likelihood of success for implementation of each measure type. The values are considered not to be anything but a relative measure score rather than a mathematically absolute indicator. The measure types, Education/Awareness Raising Campaigns (ARC), Restriction, Route Optimisation, Mode change and Consolidation are ordered from soft (inexpensive) to hard (demanding high investment budgets). By determining the location of the centre of the pentagon-shaped curve, relation to the pole of the graph, you get a quick overview of the type of measures that have the best likelihood of success.

Note that the cities' pentagon scales have different offsets at the pole. The pentagon scale below has 2.8 as polar offset.

It is important to realize that the graphs are not comparable between cities. Cultural and physical circumstances differ vastly and in order not to invite the reader to compare between cities the original scale have been remained untouched.

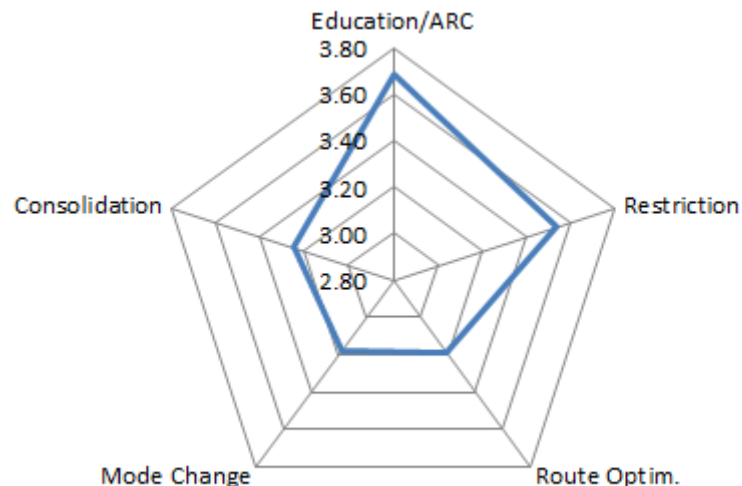


Figure 4. Spider Web Cross Evaluation Output Graph

The measure types are ordered from “softer” (Education) clockwise to “harder” (Consolidation). The centre of the curve often is displaced from the origin of the polar graph and well indicates the type(s) of measures that have the best probability of success if implemented.

4 Classification of Soft and Pilot measures

The number of classes is limited and consequently the classification of measures is not possible to do in a straightforward manner. In uncertain cases comments are given.

| City/Measure | Education/ ARC | Restriction | Route Optimisation | Mode change | Consolidation | Alternate classification |
|---|----------------|-------------|--------------------|-------------|---------------|--------------------------|
| Alba Iulia | | | | | | |
| Awareness raising campaign, ARC | X | | | | | |
| Regulation and time windows | | X | | | | |
| Almada | | | | | | |
| Creating loading and unloading regulation | | X | | | | |
| Loading and unloading redefinition. | | X | | | | |
| Balchik | | | | | | |
| Access time limitation | | X | | | | |
| Space limitation | | X | | | | |
| Burgos | | | | | | |
| Historical centre access regulation | | X | | | | |
| Card system | | X | | | | |
| Den Bosch | | | | | | |
| Biogas/CNG vehicle partnership | | | | X | | |
| Electric busses for people with bulky purchases | | | | X | | |
| Delivery services with biogas vehicles | | | | X | | Consolidation |
| Dundee | | | | | | |
| Increased enforcement of loading bays | | X | | | | |
| Viability of electric vehicles | | | | X | | |
| Lucca | | | | | | |
| B2B services with FEV | | | | | X | Mode change |
| B2B logistic reverse services with FEV | | | | | X | Mode change |
| FEV freight for leisure mobility | | | | X | | Consolidation |
| Serres | | | | | | |
| Local campaign | X | | | | | |
| Improvement of loading areas visibility | | X | | | | |
| Trondheim | | | | | | |
| Mail distribution using FEV | | | | X | | |
| Parcel distribution using electric and hybrid vehicles | | | | X | | |
| Pallets distribution using electric and hybrid vehicles | | | | X | | |

Table 1. Classification of Measures

5 Results for Feasibility study and Sustainable Urban Logistics Plan (SULP) measures

5.1 Introduction

All the considerations below are based on personal judgements, by local persons having assessed the city context and the weights for cities and measures criteria are based on the judgments of the authors.

The Feasibility Plans and SULPs measures for each city are classified amongst the five measure types. This makes the assessment of the implementation process an easier task at local level, as individual measures are not transferable between cities. Some short comments are given for such measures under each city's headline.

There are instances where the measures introduced in the cities could only be introduced with the accompaniment of another type of measure. Therefore in some cases such a measure does not fit exactly with the type to which it is located, and therefore might be subject for re-allocation.

Each city chapter starts with the contextual background of the cities' freight logistics, with conclusions made from the Cross Evaluation Survey. In addition areas and matters of concern for the measure type are identified. In the next section the Feasibility Study/SULP measures are declared and allocated to one of the five measure types. The purpose is to offer contribution and guidance to the city's decision basis for the implementation of FS/SULP and other future logistic measures. Therefore this is up to respective local partner to decide.

5.2 Alba Iulia

5.2.1 City Context

ENCLOSE study area is one street, Transilvania Avenue. Businesses are a mix of services and other commercial types, mainly associated around tourism sector. The avenue is poorly regulated, time restrictions of any kind for logistic vehicles. Consequently there are no enforcements. Most logistic vehicles are diesel fuelled, private cars. Generally speaking, the acceptance for new measures is expected to be high. In summary, the awareness of environmental and energy issues seems low in most respects, on the other hand there is political backing as there is a municipal infrastructural plan for the realisation of a Sustainable Urban Mobility Plan (SUMP).

5.2.2 Results

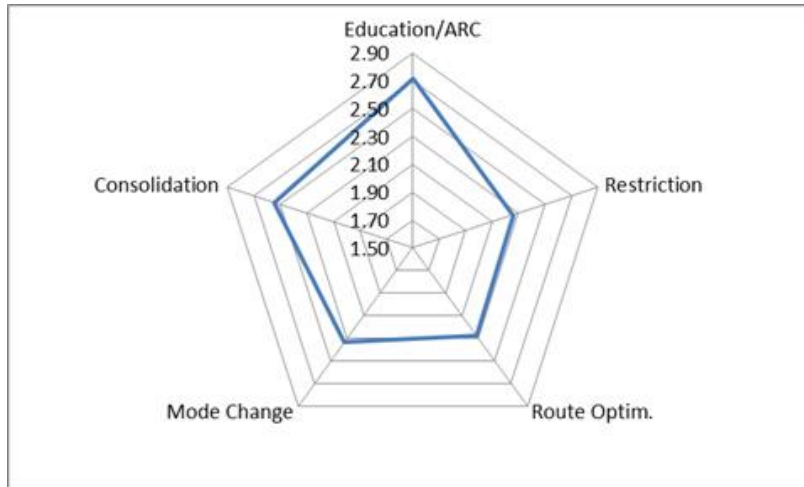


Figure 5 - Alba Iulia Results

| Measure Type Rating | | |
|---------------------|---------------|------|
| 1 | Education/ARC | 2.71 |
| 2 | Consolidation | 2.55 |
| 3 | Mode Change | 2.34 |
| 4 | Route Optim. | 2.28 |
| 5 | Restriction | 2.26 |

Table 2. Alba Iulia Results

In Alba Iulia, acceptance for new measures is expected to be high as well as municipal commitment for reducing negative logistic effects. Consolidation type of measures is likely to have successful implementation, mostly depending on municipal commitment and the existence of an infrastructural improvement plan. Not very logistically restricted Enclose area does not invite to restriction type of measures. The graph well displays this situation.

Table 3, shows that the measure types scoring are not widely spread, and therefore the measure types prioritizing table is a bit uncertain.

5.2.2.1 FEASIBILITY STUDY

| | Name | Measure Type |
|---|---|--------------------|
| 1 | Improve road traffic conditions | Route Optimisation |
| 2 | Setting up local freight distribution centres | Consolidation |
| 3 | Night deliveries | Restriction |
| 4 | Modernization of logistic fleet IT systems | Route Optimisation |

Table 3. Measure Categorisation

1. This measure might have a different implementation success than indicated, as it is not clear what kind of activities it is aiming at.
2. Measure complies well with its measure type. Success factor predominantly depending on the criteria, "Municipal Strategy" and "Planning" and "Social Acceptance" which are at a high level.
3. The measure will face one major negative element: noise for residents. This factor has no corresponding criteria in the survey and therefore the implementation success factor might be overrated.
4. Route optimisation type of measures does not have very high score, due to the low levels of regulation and city infrastructure, therefore it is expected to be difficult to implement.

5.3 Almada

5.3.1 City Context

The city of Almada is located on the south bank of the Tejo River, across from Lisbon with 174,030 residents living in 70 km² including urban, suburban and rural areas with and 35 km of water front Almada local economy is primarily based on Tourism, Services and Public Administration.

ENCLOSE study area in Almada is the historic centre comprising of three districts within 2 km², Cacilhas, Almada Velha and Almada Centre. Almada City Council is proactive and receptive to sustainable projects. It has a strong track record of implementing plans and policies and implementing measures that approved, although, had dwindling resources.

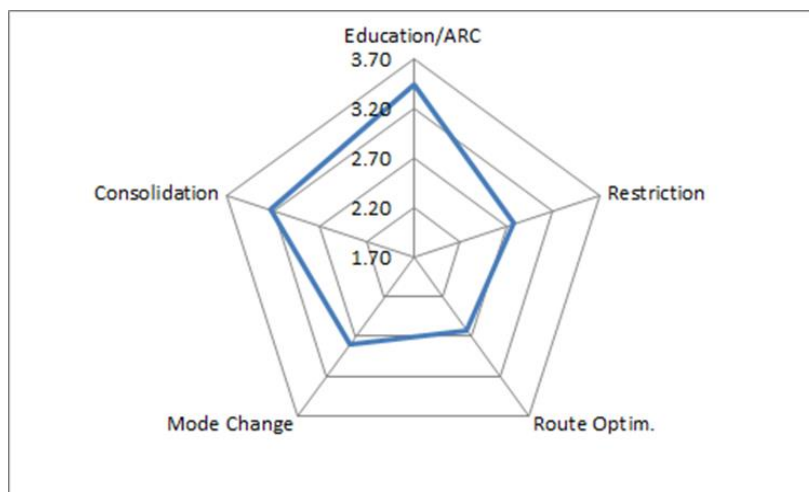
Nearly 50% of the trips made in Almada refer to “crossing traffic”, since Almada is the southern gateway to Lisbon. The contribution of transport to the GHG emissions is about 33% of the total CO₂ emission in the Almada urban area.

The significant presence of shops in the study area implies a large amount of delivered goods, estimated in an average of more than 60 tons/day, excluding self-supply with an average of 512 freight vehicles/day circulating in the reference area (peaks of 240 heavy commercial vehicles during the time window 08:00-10:00). To these, also the vehicles (private small vans/cars) of shopkeepers in self-supply must be added.

The logistical problems have been identified as the following:

- Lack of loading/unloading areas
- Poor signalling and control of reserved lots
- Lack of knowledge of freight regulation by operators
- Minimarkets – Management of deliveries
- Self –Supply

5.3.2 Results



| Measure Type Rating | |
|---------------------|------|
| 1 Education/ARC | 3.44 |
| 2 Consolidation | 3.24 |
| 3 Mode Change | 2.79 |
| 4 Restriction | 2.79 |
| 5 Route Optim. | 2.63 |

Table 4. Almada Results

Figure 6. Almada Results

Business structure and the social acceptance for new measures make Education/ARC likely to have good implementation success. These factors are also important for the success of consolidation related measures. The graph illustrates the measure types sensitivity to these circumstances. Route optimisation measures have the lowest scores, as the regulation and infrastructure context is at a low level, which is important for these measures types

5.3.2.1 FEASIBILITY STUDY

| | Name | Measure type |
|---|---------------------------------|---------------|
| 1 | Urban consolidation Centre, UCC | Consolidation |
| 2 | Pick up point, PuP | Consolidation |
| 3 | Market area service | Mode change |
| 4 | Extension of parking regulation | Restriction |

Table 5. Measure Categorisation

Notes:

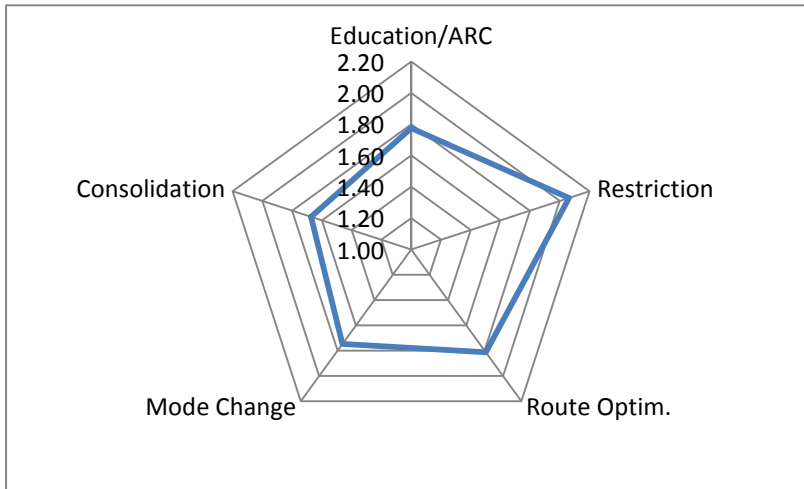
1. Social acceptance and municipal strategy and planning are high, being keys to successful implementation of consolidation type of measures.
2. Social acceptance and municipal strategy and planning are high, being keys to successful implementation of consolidation type of measures.
3. Mode change is average rated measure types, and in Almada infrastructure criteria are not well developed which otherwise would have rated this measure higher.
4. Regulation type of measures are average rated, and in Almada regulation criteria are not well developed which otherwise would have rated this measure higher.

5.4 Balchik

5.4.1 City Context

The ENCLOSE study area is located around the coastal area, Balchik Promenade, where the main hotels, restaurants, shops and entertainment facilities are located. There are some limited specific regulations for commercial and freight vehicle flows, entrance and parking. There are no specific regulations governing commercial and freight vehicle circulation in the study area. These vehicles are subject to time restrictions that apply to all vehicles except buses. There are a number of loading/unloading bays Enforcement of the loading intervals is provided by the private security firm. All the four big hotels have their rear access areas where heavy vehicles can temporarily, just for loading and unloading purposes stop. Other bars, discothèque, restaurants and shops (more than 20) use the logistic services according the time and space restrictions for loading/unloading. There is a known schedule by the drivers which mean that there are no traffic delays. The parking places are limited due to the topography restriction from the hilly and landslides activity. The restrictions are valid during the tourist season. Other time, there is no any traffic in this area, because most of the tourist facilities are closed.

5.4.2 Result



| Measure Type Rating | | |
|---------------------|---------------|------|
| 1 | Restriction | 2.06 |
| 2 | Route Optim. | 1.81 |
| 3 | Education/ARC | 1.77 |
| 4 | Mode Change | 1.75 |
| 5 | Consolidation | 1.67 |

Table 6. Balchik Results

Figure 7. Balchik Results

Table 6 and Figure 7. Balchik Results Figure 7, show the results of the cross-evaluation for Balchik. This shows that restriction would be the easiest to implement. This is more likely due to the size of the ENCLOSE study area. The area to which restrictions are to be applied is quite small therefore easy to control. Therefore restrictions would be the easiest to implement. There is also a regulation process and producers currently in place making further restriction easier to implement. There is also political and administrative willingness to implement restriction logistical measures as the city council regulate the traffic by Traffic Regulations Orders, (usually issued by the Mayor of the town and accepted as rule by the Municipality Council), which are under the auspices of national legislation.

Similarly route optimisation, would also be quite easy to implement again related to the size of the Enclose study area. Consolidation suffer for this as the proposed area of consolidation is small, also as most of the delivery of good is performed by the business owners themselves consolidation would be difficult to implement as it would mean engagement of many small supplier and a few big logistic companies.

5.4.2.1 FEASIBILITY STUDY

| | Name | Measure type |
|---|-------------------|--------------|
| 1 | Time Limitations | Restrictions |
| 2 | Space Limitations | Restrictions |

Table 7. Measure Categorisation

1. Given that restrictions have a highest rating of all the measures, it would indicate that this measure would have a high chance of implementation and success.
2. Given that restrictions have a highest rating of all the measures, it would indicate that this measure would have a high chance of implementation and success.

5.5 *Burgos*

5.5.1 City Context

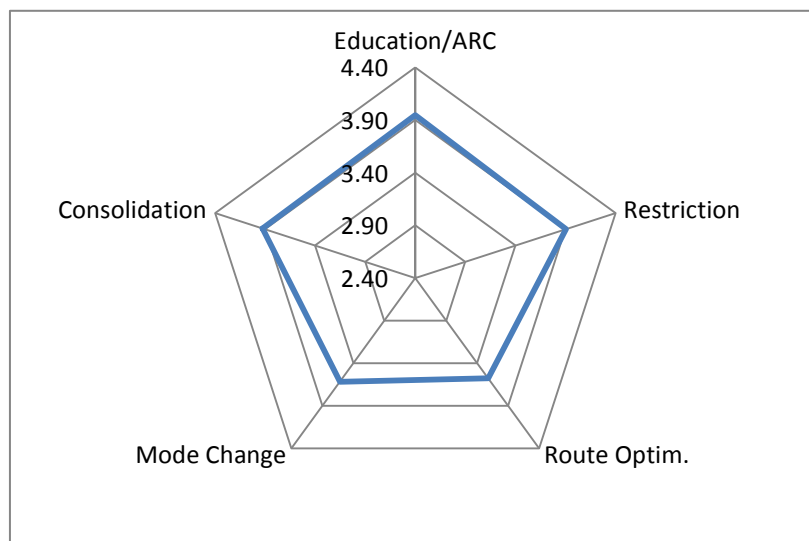
Burgos is a medium-sized city with 180,000 inhabitants. The movement of people in the historical centre is very high, due to the number of tourists visiting the area, which has increased by 20% over the last 5 years. Added to which there are numerous small businesses and administrative offices located in its streets, as well as a large number of hotels, restaurants and bars surrounding each tourist attraction. The layout of Burgos is determined by its 3 levels. The funnel effect of the river, the Castle hillside, the vast historic heritage, different narrow roadways and streets lead to a complicated mobility and logistics systems in the historic centre.

This high volume of traffic is principally due to the position of the city that lies at a crossroads between the North and South of Europe, for traffic passing through Madrid. In addition, is it also located along the main route for East to the West of Spain. The high volume of heavy vehicles obstructs the flow of traffic and considerably increases air pollution in specific areas of the city.

Moreover, their parking in the city is a contentious issue as there are no specific parking zones for heavy vehicles, which are left with little or no choice other than to park in the main roads and streets of the city. Traffic in the historic centre is dense and continuous, resulting in frequent traffic jams during rush hours. In short, demand within the historic centre has increased considerably in recent years while the area has yet to adapt to its changing circumstances.

Since 2006 the Municipality established clean areas in the historic city centre, covering 2.5 km, by controlling the pedestrian areas with bollards, phones and cameras surveillance 24 hours a day. In the same year in the historical centre freight urban transport (loading and unloading areas and routes) is regulated with an access control system. Within the artistic section of the city air pollution due to unclean vehicles has been reduced by the means of mechanical controls to restrict access and 30% of its surface area was limited to pedestrian traffic. A policy on information and management was developed (i.e. electronic access systems, identification cards) with residents in the area, which allowed them access to their homes. The system is monitored from a control centre. A pilot management system for loading/unloading was launched in 2012 and has proven to be successful. There is also a positive administrative commitment from the city council for urban freight measures.

5.5.2 Results



| Measure Type Rating | |
|---------------------|--------------------|
| 1 | Education/ARC 3.95 |
| 2 | Consolidation 3.93 |
| 3 | Restriction 3.91 |
| 4 | Mode Change 3.62 |
| 5 | Route Optim. 3.58 |

Table 8. Burgos Results

Figure 8. Burgos Results

Figure 8 and Table 8 show the results for the cross-evaluation analysis for Burgos. This indicates that Education/ARC would be the easiest to implement. This mainly arises from the results of the social acceptance of both citizens and especially logistical companies, which is quite high. ARC for Businesses, in the estimation of the partner, would achieve high levels of success. This would seem to indicate a high level of engagement within those three cohorts, which is very positive for future traffic measures being introduced.

Consolidation and restriction are second and third but in reality all of the first three have similar scores. Consolidation receives a high score again due to acceptancy of those three cohorts which is an important aspect of consolidation to get buy in from businesses and the frights companies. The other criterion which scored high and translates positively towards consolidation is political and administrative commitment from the city council. Restrictions achieve a high score due to the culture of regulation that already exists in Burgos. Therefore implementation of regulations would be relatively easy. Engagement and acceptance of the three main cohorts is also an important aspect to the positive implementation of restrictions in Burgos.

Route optimisations and Mode change receive the lowest scores. Mode change due to the lack of infrastructure for mode change opportunities is not quite there yet. Therefore implementation of this would be more difficult than others. Route optimisation is considered difficult due the restrictive nature of the city layout.

5.5.2.1 FEASIBILITY STUDY

| | Name | Measure type |
|---|-----------------------|---------------|
| 1 | UCC | Consolidation |
| 2 | Optimisation of UCC | Consolidation |
| 3 | Eco-Van Sharing | Mode Change |
| 4 | Web Management System | Restriction |
| 5 | Last Mile Service | Consolidation |

Table 9 - Measure Categorisation

Table 9 shows the chosen measures as part of the socio-economic analysis undertaken by the partner. Given that Burgos is further down the line in terms of implementation of urban freight measures and has already established a culture of sustainable urban freight analysis and measures being implemented, they have decided upon measures that address the harder issues as it is felt that education and awareness are quite high. While Education/ARC might be easier to implement the socio-economic analysis shows that the above options might have a greater impact.

1. Given the reasoning above and the score of consolidation it would estimate that this measure will have comparatively successful to implement.
2. As this measure is a continuation for the previous again, the cross-evaluation would indicate it to be successful.
3. This measure is heavily related to the previous two, and while be might be categorised differently is seen as the next step for those two steps, therefore while the category of measure is one of the lowest. It would be estimated to be successful based on those reasons.
4. Restrictions score quite high and as mentioned previously given the culture of regulations that already exists for this measure, it would be projected to be successful.
5. Again a consolidation based measure therefore it would be assessed to have a successful implementation.

5.6 Den Bosch

5.6.1 City Context

's-Hertogenbosch is a city in the southern part of Netherlands. The city has 140,000 inhabitants, about 100,000 of them working in various sectors in 9,890 companies, with a particular focus on food, healthcare, pharmaceuticals, business service and ICT. A considerable activity is also tourism, with the presence of 5million annual visits.

In Den Bosch transport in 2020 is estimated to accounting for 30% of the CO₂ emissions in the city and is the main cause of air quality problems, mainly around the historic inner city. The city is working towards zero CO₂ emissions by 2050. For the municipal institutions, that goal is set for 2020. There is high level of political and administrative support with multiple goals, targets and policy relating to clean transportation be implemented.

The access to the city centre is facilitated by a number of car parking adjacent to the centre and several Park & Ride facilities in areas adjacent to the city connecting the city by shuttle busses. Den Bosch Municipality is promoting a sustainable approach to transportation with:

- Access to the environmental zone in the city centre is only allowed to clean trucks such as clean diesel, electric and (green) gas vehicles.
- Regulations seek to reduce the number of freight vehicles and optimize delivery schemes.
- Load/unload spaces for freight.

The main regulatory instrument is the time window. This is being reinforced by the use of physical barriers and reinforcement officers. The time windows apply both for residents and freight. The city has a relatively large pedestrian area. A low emission zone around the inner city reduces the emissions of delivery trucks entering the city centre. A length limitation is in place to avoid big trucks to enter the small streets. A parking management system indicates the amount and location of free parking spaces including the P&R facilities.

About 1/3 of the deliveries is completed by the shopkeepers themselves and about 2/3 by third parties such as logistic companies or direct suppliers. Approximately 3,700 of the deliveries are done by truck or van.

5.6.2 Results

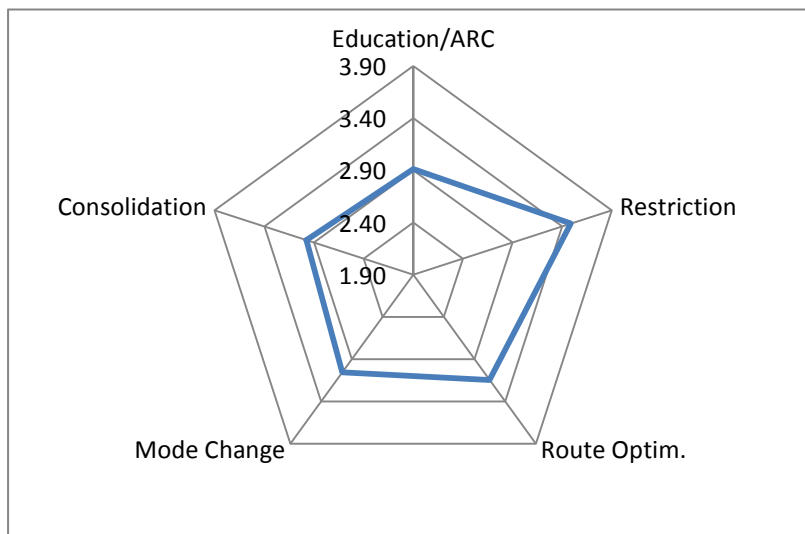


Figure 9. Den Bosch Results

| Measure Type Rating | |
|---------------------|--------------------|
| 1 | Restriction 3.49 |
| 2 | Route Optim. 3.15 |
| 3 | Mode Change 3.06 |
| 4 | Consolidation 2.98 |
| 5 | Education/ARC 2.91 |

Table 10 Den Bosch

Table 10 and Figure 9 show the results of the cross–evaluation for Den Bosch. It can be seen that restrictions would be the easier to implement. This seems to be related to the fact that there is a great deal of restrictions currently in place at the moment, therefore implementation of more would not be a difficult task. This would also indicate a political and administrative willingness for regulations, given that there are many regulations in place. Consolidation and Educations/ARC score the least in the evaluation. This is mainly due to a very low scoring in the logistical company acceptancy and engagement. With this low, it is quite difficult to implement these measures.

5.6.2.1 Sulp Measures

| | Name | Measure type |
|---|---|---------------|
| 1 | Wireless charging electric P&R shuttle busses | Mode Change |
| 2 | Biogas garbage trucks | Mode Change |
| 3 | Commercially operated distribution centre | Consolidation |

Table 11 - Measure Categorisation

Table 11, shows the results from the partner analysis for their Sulp.

1. While mode change scores, mid-range, given that modal change is actually regulated for in Den Bosch, it would be the estimation within this context that it would be implemented successfully.
2. Again similar to the opinion given for measure 1 is would also be implemented that is could be comparatively successful in implementation.

5.7 Dundee

5.7.1 City Context

Dundee is the fourth largest city in Scotland with a population of 147,800 inhabitants. The city is almost entirely urban and suburban in character and is a hub for major routes in the east of Scotland. A line of hills bisects Dundee; consequently there are gradients on many of the major roads linking the city centre with the outer suburbs. Road congestion occurs in the peak periods, particularly at key road junctions across the city. Dundee is located on the main east coast railway line connecting Edinburgh with Aberdeen and has a modern deep-water port and large harbour area downstream from the city centre.

Air quality is a significant issue in Dundee with EU Limit Values being exceeded for both nitrogen dioxide (NO) and particulates (PM10). The main source of air pollution is from road traffic emissions, with additional emissions from industrial sources. An Air Quality Management Area (AQMA), covering the entire city, was declared in 2006 following a review and assessment of air quality. An Air Quality Action Plan (AQAP) has been developed to set out the measures that the City Council intends to introduce to minimise the effects of air pollution on human health. A Regional Transport Strategy (RTS) has been developed which sets out a Vision and Objectives over a 10-15 year period for meeting the transport needs of people and businesses throughout the region. One of the RTS objectives is to improve the efficiency, reliability and integration of the movement of goods and people. Dundee also established a Freight Quality Partnership (FQP) in 2008. This brings together at a regional level stakeholders with an interest in freight movements, comprising both public and private sector organisations. A key role for the FQP is to contribute to the development and delivery of freight initiatives.

The study area comprises the city centre within the 1960’s constructed Inner Ring Road. This includes the Dundee Central Conservation Area which contains the historic heart of the city and provides protection for an area of significant historic and architectural interest. The study area includes the main retail and commercial centre for Dundee. The shops are divided between two purpose-built shopping centres developed from the 1970s, the Overgate and Wellgate Centres, and those occupying older properties in Murraygate, Seagate, High Street, Nethergate, Commercial Street and Reform Street. There are approximately 400 retailers in the study area. A number of streets are pedestrianized particularly those in the main shopping streets of Murraygate, High Street, Commercial Street and Reform Street.

There are no specific regulations governing commercial and freight vehicle circulation in the study area. These vehicles are subject to the small regulations outlined above that apply to all vehicles except buses. They do however, benefit from designated loading bays. These are lengths of kerbside space that are available only for vehicles loading and unloading, and are defined in TROs. Enforcement of the loading bays is provided by Dundee City Council employed Parking Attendants who issue Penalty Charge Notices (PCN) to vehicles contravening the regulations.

The total number of commercial vehicles entering and leaving the study area is 2,007. 83% of these vehicles are light vans (LGV). The peak time of movements is 08.30-10.30 when 449 vehicles entered the study area. From surveys of retailers it is apparent that 92% of deliveries involve deliveries to more than one shop. Responsibility for organisation of deliveries is generally through company head offices, in the case of 76% of shops, while 15% are arranged by the retailers themselves or through an employee. The majority of retailers (77%) indicated that deliveries are made to a regular schedule, while 13% receive deliveries on an ad hoc basis and 10% on a mixture of regular and ad hoc. The main delivery areas used are split between through the customer entrance (26%), on street (24%) and delivery bays within the premises (33%).

5.7.2 Results

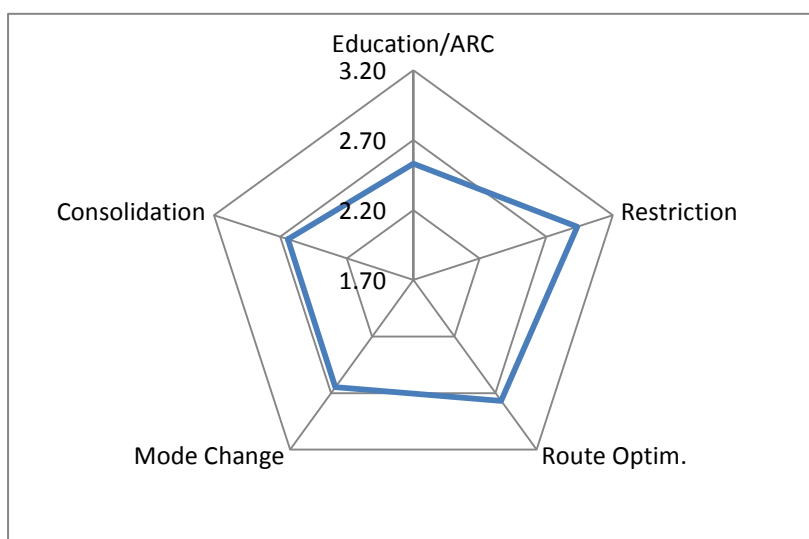


Figure 10. Dundee Results

| Measure Type Rating | |
|---------------------|--------------------|
| 1 | Restriction 2.93 |
| 2 | Route Optim. 2.77 |
| 3 | Mode Change 2.65 |
| 4 | Consolidation 2.64 |
| 5 | Education/ARC 2.53 |

Table 12. Dundee Results

In Table 12 and Figure 10, presents the results of the cross-evaluation for Dundee. Restrictive measures have a somewhat clear scoring margin on the rest. This stems from two reasons. Firstly, that there are several restrictive measures already in place, therefore implementing more should not have many barriers. Secondly, there is also a deep commitment politically and administratively, as there are many policies and targets in place from the city council. Route Optimisation is seen favourably due again to regulations needed for its implementation but also given that there is the IT infrastructure present in Dundee to implement those measures. Mode change and consolidation, more or less the same score. Education /ARC scores the lowest, this originates from what is estimated to be a poor acceptance and engagement of both citizens and logistical companies.

5.7.2.1 FEASIBILITY STUDY

Table 13 shows the proposed/implemented measures in Dundee.

| | Name | Measure type |
|---|--|--------------------|
| 1 | Enhanced enforcement of loading bays | Restrictions |
| 2 | Increased use of electric powered Dundee City Council vehicles | Mode Change |
| 3 | Consolidation Centre | Consolidation |
| 4 | Carriage of customer purchases on Park & Ride buses | Consolidation |
| 5 | Further development of web / app / Sat Nav based information for freight/logistics operators in Dundee | Route Optimisation |

Table 13 Dundee Measures

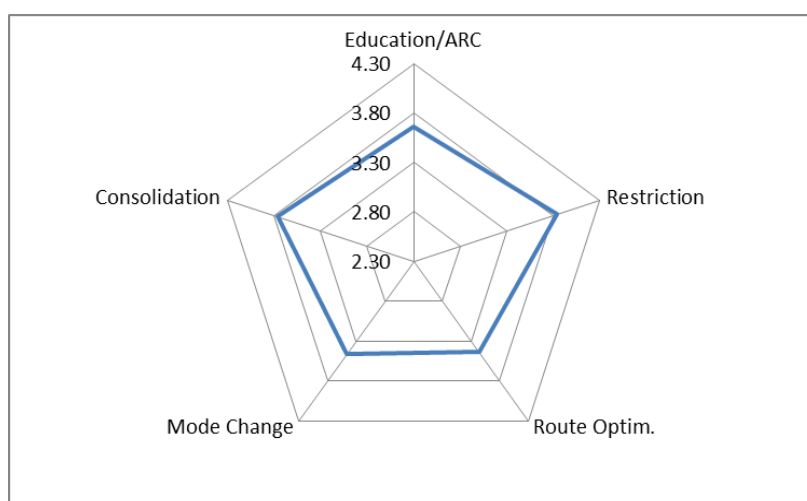
1. Given the rating of restrictive measures would seem to indicate it to be implemented successfully.
2. Given that the mode change is actually related to the city council themselves, implementation should be successful.
3. Consolidation has received a relatively poor rating given that the acceptance and engagement of freight companies is quite low, caution should be extended to these measures or further analysis.
4. Similarly to 3, the acceptance of citizens to freight measure received a very low score. Again it is the opinion of the author that caution is used for these measure or further in-depth analysis.
5. Given that the IT infrastructure is in place, this measure would seem to have a favourable implementation success. Another key point is that the regulations are in place for route optimisations again leading to easier implementation. Table 13 Dundee Measures

5.8 Lucca

5.8.1 City Context

ENCLOSE study area is quite large, comprising more than 1900 businesses which focuses on retail and other commercial services. There is a high level of political and administrative commitment to handle logistic issues and Lucca also has an infrastructural plan in place. Lucca has a high standard of regulations, thus being sensitive to Restriction and Route optimisation measure types. The existing consolidation centre is a prerequisite for offering new services to the logistic companies as well as to the businesses in the area. In general the city is well suited for a wide range of measures.

5.8.2 Results



| Measure Type Rating | |
|---------------------|--------------------|
| 1 | Restriction 3.84 |
| 2 | Consolidation 3.77 |
| 3 | Education/ARC 3.66 |
| 4 | Mode Change 3.46 |
| 5 | Route Optim. 3.44 |

Table 14. Lucca Results

Figure 11. Lucca Results

It is not surprising that Consolidation and Restriction type of measures have high ratings. The existing UCC offers new possibilities and the city is highly restricted. In general the measures' rating is quite close to each other and therefore the priority table should be read conservatively.

5.8.2.1 Sulp Measures

| | Name | Measure type |
|---|---|--------------|
| 1 | Load and Unload bays | Restriction |
| 2 | Agreement with operators | Restriction |
| 3 | Reinforcing delimited traffic zone (DTZ) regulation | Restriction |
| 4 | Reinforcing DTZ access control technology | Restriction |
| 5 | Fleet | Mode change |
| 6 | Reinforcing Luccaport services | Mode change |

Table 15. Measure Categorisation

1. Regulations are well developed in the city and creation of new loading bays will, with high probability have good success.
2. Agreement with main courier operators to access the DTZ only with low polluting vehicles, such as natural gas vehicles. Acceptance level is medium but restriction level high so this measure is subject to has successful implementation.
3. This measure is reported not to face other major problems. Regulations are well developed in the city and creation of new loading bays will most likely have good success.
4. Restriction type measured predominantly depends on the Regulation context level of the city. As the sensitivity for corresponding measures is high, implementation of this measure will most likely have good success.
5. Additional vehicles, including cargo bikes, to increase the market share of the UCC. Mode change measure types have more moderate rating but as this measure is an extended service it has very high likelihood of success.
6. Being an extended UCC service this measure has very high likelihood of success.

5.9 Serres

5.9.1 City Context

The Serres' ENCLSOSE study area is Ermou Street. There are many businesses including commercial, food services and retailing. Traffic is low regulated by signs and traffic lights, and enforcement is also at a low level. City of Serres' best criterion for new measures is Strategy and Planning having as high rating. Social acceptance is assessed not to be high. Most logistic vehicles are private cars. There are some restrictions but also infrastructure in the Enclose study area. Social acceptance has not been judged to be very high. As a result the spread between the measure types rating is very low.

5.9.2 Measure Type Comments

Social acceptance is assessed not to be high and as several measure types are closely connected with that criteria, corresponding measure types are not rated high (Education, Mode change, Consolidation). Consolidation measure types are the leading measure type, which originates from depending on the high assessment level of Strategy and Planning. It is also worth noting that the scores are remarkably similar to each other, on quite a low level and therefore a ranking is questionable.

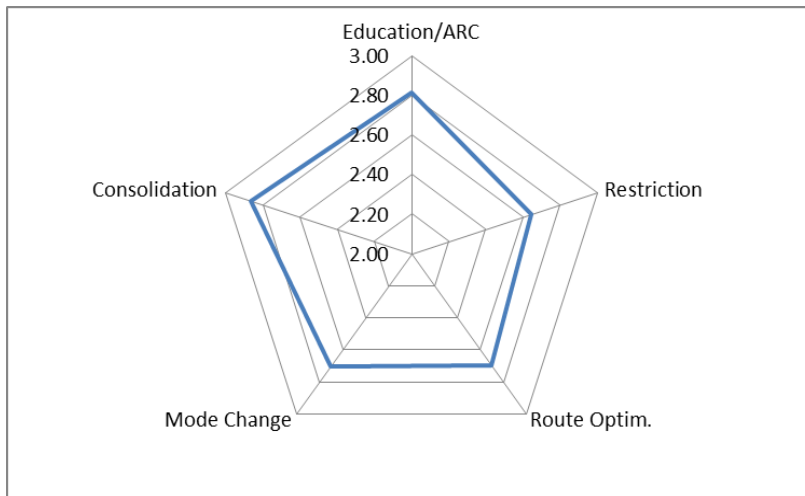


Table 16. Serres Results

| Measure Type Rating | |
|---------------------|------|
| 1 Consolidation | 2.86 |
| 2 Education/ARC | 2.81 |
| 3 Mode Change | 2.71 |
| 4 Route Optim. | 2.70 |
| 5 Restriction | 2.64 |

Table 17. Serres Results

5.9.3 Feasibility Study

| | Name | Measure type |
|---|---|--------------------|
| 1 | Awareness Raising and Information | Education/ARS |
| 2 | Spatial and temporal restrictions | Restriction |
| 3 | ICT E-platforms and collaboration between stakeholders in urban freight transport | Route optimisation |
| 4 | Routes’ optimisation through the provision of real time traffic system | Route optimisation |
| 5 | Urban logistic centre | Consolidation |

Table 18. Measure Categorisation

Notes:

1. The measure aims at alternative modes of transportation. Municipal commitment is important for implementation success which is on a fairly high level.
2. Restriction type measures have lower scoring, as regulations in Serres’ Enclose study area are not fully implemented.
3. The result of this measure is depending on acceptance level as well as technology. Acceptance is expected to be at medium level.
4. As there is an IT system running and also an Infrastructural plan, this measure is close to having good chance of success.
5. Social acceptance and municipal strategy and planning are the two most important criteria for successful implementation. These are relatively high rated and good prerequisite for success.

5.10 Trondheim

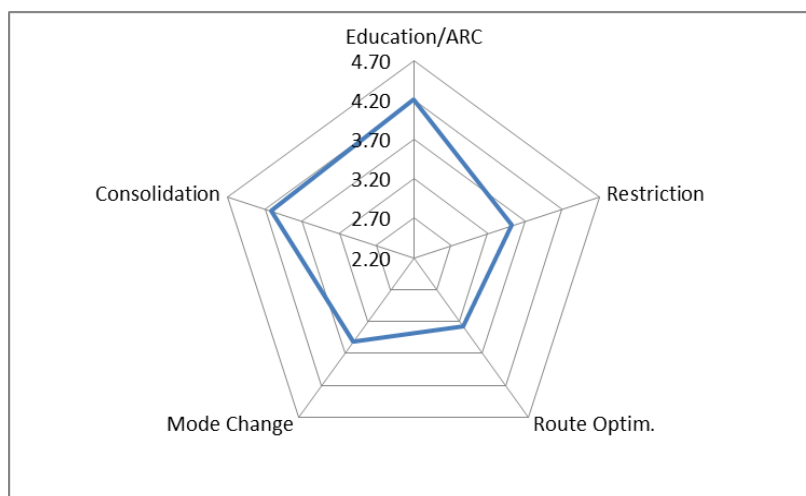


Figure 12. Trondheim Results

| Measure Type Rating | | |
|---------------------|---------------|------|
| 1 | Education/ARC | 4.21 |
| 2 | Consolidation | 4.12 |
| 3 | Restriction | 3.53 |
| 4 | Mode Change | 3.52 |
| 5 | Route Optim. | 3.27 |

Table 19. Trondheim Results

5.10.1 City Context

Trondheim is the third biggest city in Norway with 180, 000 inhabitants. Trondheim is located in the middle of Norway by the Trondheim fjord, and is the regional capital of Trøndelag region. Many tourists visit Trondheim each year by Hurtigruten, a cruise line from Bergen to Kirkenes with daily arrivals to Trondheim. Trondheim Municipality covers an area of 342 m². The inner city center of Trondheim is surrounded by the river Nidelva and the Trondheim fjord. This area has been the study area for Posten Trondheim in the ENCLOSE project - to make the postal distribution services CO₂-free. Trondheim Municipality have established an organization, “Miljøpakken”, to take actions on several areas in Trondheim to support the overall environmental work. “Miljøpakken” (“Greener Trondheim”) is a political agreement between local, regional and national political levels with specific goals, a finance plan and defined areas for actions. From Norway Post, Trondheim’s point of view is the overall impression of the report that Trondheim Municipality are in a good progress to reach several goals in “Miljøpakken”. However, the results of CO₂-emissions from Trondheim Municipality’s own businesses are not good enough. Norway Post have ambitious goals for CO₂-reductions. From 2012 till 2020 the goal is to reduce CO₂-emissions with 40 %. Reduction are planned in many areas, and transport related actions are the most important area where the plan is to reduce about 400 000 t/CO₂.

Trondheim partner, being a private company, does not represent the city itself, but merely its own infrastructure and clients (households and businesses). Acceptance for new measures is high among businesses, logistic companies and citizens. Also Strategy and Planning criterion is rated high.

5.10.2 Measure Type Comments

There is a significant spread of measure type ratings towards the extremes “hard” as Consolidation and “soft” as Education/ARC, explained by the fact that social acceptance and Strategy and planning

are on a high level in Trondheim, as well as business structures. In this case, business structure equals concentration of households. But in general, the scores are at a high level.

5.10.3 Sulp Measures

| | Name | Measure type |
|---|---|---------------|
| 1 | Infrastructure of filling stations for biogas | Mode change |
| 2 | Hydrogen to fill in natural gas and establishing a hydrogen filling station | Mode change |
| 3 | Joint distribution to kindergartens, schools, health institutions and other offices | Consolidation |
| 4 | 75% of vehicles for letter distribution shall be electric | Mode change |
| 5 | Fulfilling ENCLOSE pilot measures | Mode change |

Table 20. Measure Categorisation

1. Thought technically not having the highest rating, mode change measures will most likely have very good implementation success, since the rating still is high and due to all local experience in the field. There is also a large portion of this measure could be classified as Education/ARC as the driver and operators have to be educated and engaged in order to implement it successfully.
2. Similar to Point 1.
3. Though being at the top of the list, there are some threats: making the measure profitable, uncertain city support and challenge for people involved.
4. Similar to Point 3
5. Similar to Point 3

6 Conclusions

Rating complex actions, by mathematical methods, is a difficult process and typically one that has a high degree of inaccuracy and leave it open for debate. The methodology chosen for this cross-evaluation does have limitations, depends on the quality of the data supplied. The cities do have different contexts, different sizes of study areas, different policy environments and acceptancy amongst the different cohorts. This is to name but just a few of the many complex issues involved in logistics and freight. Consequently no comparisons between cities was been made.

A measure type that has been rated low still can have a successful implementation, depending on circumstances that does not appear in a limited survey. On the contrary there is no guarantee that a measure type that is highly rated can be easily implemented. There is also massive overlapping and dependency on different measures types for other measures.

In general Education/ARC and Consolidation type of measures are getting the best rating, i.e. having best chance of successful implementation. These two measure types have some opposite qualities. Education/ARS in general is directed towards citizens and does not demand investment, while Consolidation measures addresses professionals and often, when a UCC does not exist, implies heavy investments. Concerning physical results of pilot and soft measures refer to deliverable D3.3.

An analysis of computation accuracy for measures' rating would have been desirable. For reasons already mentioned this is not meaningful to do. The fact that source of base data originates from a number of individual assessments makes the accuracy analysis negligible. Nevertheless, the cross evaluation offers a contribution to decisions relating to implementation of new measures.

Annex 1

Cross Evaluation survey questions

A. Business

1. How many businesses (addressees) are there within your Enclose study area?

| |
|-----------|
| Comment : |
|-----------|

| | | |
|-------------|--|--|
| 5 - 20 | | |
| 20 - 50 | | |
| 50 - 250 | | |
| 250 - 500 | | |
| 500 - 1000 | | |
| 1000 - 2000 | | |
| 2000 - 5000 | | |
| >5000 | | |

2. Which are the predominate business types in your Enclose study area?

In order, 1 being the most important.

| |
|-----------|
| Comment : |
|-----------|

| | | |
|-------------------------------|--|--|
| Food services | | |
| Accommodation | | |
| Commercial and other services | | |
| Industrial | | |
| Retail | | |
| Other (please specify) | | |

3. What level of engagement could be expected from businesses for new logistic measures?

Comment :

| | | |
|--------------------------|--|--|
| Low (0 - 5% positive) | | |
| (5 – 10% positive) | | |
| Med (10-25% positive) | | |
| (25 – 50% positive) | | |
| High (50 - 75% positive) | | |

4. What level of impact would an awareness raising campaign have, in your estimation?

Comment :

| | | |
|--------------------------|--|--|
| Low (0 - 5% positive) | | |
| (5 – 10% positive) | | |
| Med (10-25% positive) | | |
| (25 – 50% positive) | | |
| High (50 - 75% positive) | | |

B. Regulation

5. To what extent is the traffic regulated?

Comment :

| | | |
|--------|--|--|
| Low | | |
| | | |
| Medium | | |
| | | |
| High | | |

6. What % of the city is restricted during day time (08:00-18:00) for logistics vehicles?

Comment :

| | | |
|------------|--|--|
| 0 – 5 % | | |
| 6 – 10 % | | |
| 11 – 25 % | | |
| 26 – 50 % | | |
| 51 – 100 % | | |

7. How many hours are restricted during the day (08:00-18:00) for logistics vehicles (in general)?

Comment :

| | | |
|----------|--|--|
| 1 h | | |
| 2 – 3 h | | |
| 4 – 6 h | | |
| 7 – 10 h | | |
| All time | | |

8. Is access regulation based on emission standard?

Comment :

| | | |
|-----|--|--|
| Yes | | |
| No | | |

9. Is access regulation based on vehicle weight/size?

Comment :

| | | |
|-----|--|--|
| Yes | | |
| No | | |

10. How many official, logistic, loading bays per street within your Enclose study area?

Comment :

| | | |
|-----------------|--|--|
| None | | |
| 1-2 per street | | |
| 3-5 per street | | |
| 6-10 per street | | |
| > 10 per street | | |

11. What kind of enforcement exists in the area?

Comment :

Check appropriate alternatives

| | | |
|--|--|--|
| High - Automatic enforcement by IT tools and Manually by Police and Traffic Warden | | |
| Medium – Manually by Police and traffic warden | | |
| Low – Manually Part time Police and Traffic Warden | | |
| None – No Enforcement Exists | | |
| Other (please specify) | | |

12. Incentives for electric fleet vehicles & environmental friendly vehicles

Comment :

| | Yes | No |
|---------------------------------|-----|----|
| Tax deduction | | |
| Car purchase benefits | | |
| Fee reduction | | |
| Other (Specify) | | |
| Battery switching stations | | |
| Electric vehicle charging poles | | |
| Other infrastructure | | |

C. Infrastructure

13. What is the average speed for vehicles in the main street in your Enclose study area at peak and off-peak time?

Comment :

| | |
|-------------------------|--|
| At peak time [km/h] | |
| At off-peak time [km/h] | |

14. If there is an Urban Consolidation Centre, UCC, what percentage of the total deliveries does the UCC handle?

Comment :

| | |
|------------------|--|
| No UCC on stream | |
| 1-5 % | |
| 10-25% | |
| 25-50% | |
| >50% | |

15. Is there an Intelligent Transport Systems (e.g. real time information by variable message signs) up and running?

Comment :

| | Yes | No | If Yes please comment |
|-----------------------|-----|----|-----------------------|
| We have a working ITS | | | |

16. Typical Logistical vehicle type – Euro Class of the most predominate types in the city

Comment :

| Vehicle type (bicycle, private car/van/light truck/heavy truck/FEV/Hybrid/...) Most popular first | EUR Class | |
|---|-----------|--|
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |

D. Social acceptance

17. How do you rate the level of citizens' acceptance for new measures?

Comment :

| | | | |
|--------|---------------------|--|--|
| Low | (0 - 5% positive) | | |
| | (5 – 10% positive) | | |
| Medium | (10-25% positive) | | |
| | (25 – 50% positive) | | |
| High | (50 - 75% positive) | | |

18. How do you rate the level of logistic companies' acceptance for new measures?

Comment :

| | | | |
|------|---------------------|--|--|
| Low | (0 - 5% positive) | | |
| | (5 – 10% positive) | | |
| Med | (10-25% positive) | | |
| | (25 – 50% positive) | | |
| High | (50 - 75% positive) | | |

E. Area

19. Area of your City?

Comment :

| | | | |
|-------|---------------------------|--|--|
| Small | (< 1 km ²) | | |
| | (1 - 2 km ²) | | |
| Med | (2 - 5 km ²) | | |
| | (5 - 10 km ²) | | |
| Large | (> 10 km ²) | | |

20. Population of the City?

Comment :

| | | |
|-------------------|--|--|
| < 25.000 | | |
| 25.000 - 50.000 | | |
| 50.000 – 100.000 | | |
| 100.000 - 200.000 | | |
| > 200.000 | | |

F. Politics and strategy

21. What level of municipal proactive commitment is there to reduce negative logistics side effects?

Comment :

| | Yes | No | Please comment |
|--|-----|----|----------------|
| Low – No commitment | | | |
| Low/Med - Political Consensus and commitment or equivalent | | | |
| Med - Strategic Plan or equivalent | | | |
| Med/High - Spatial Planning , Operational Plan and action list or equivalent | | | |
| High - Implementation of plans and actions | | | |

G. Planning

22. Has your city an infrastructural improvement plan in place or being acted upon?

Comment :

| | Yes | No | If Yes please comment |
|---------------------------------|-----|----|-----------------------|
| We have an infrastructural plan | | | |

Annex 2 Weights considerations

This table below shows the weights that were applied to the corresponding sensitivity level for each criterion. The weights have being thoroughly discussed, based on the experiences that were formed during the project.

City context weights

Only a few remarks will be brought up here. It is obvious that there are many ways of determining the weights so we will not go into much detail. In general, highest score has been dedicated to that or the sub-criteria (i.e. Number of businesses & Predominate business types) that is/are supposed to best represent the corresponding main criterion (i.e. Business, regulation, etc.). Depending on the number of sub-criteria, they are given a values between 0.35 to 0.65. Likewise sub-criteria that are similar to other sub-criteria may have a low value, as their total is will give relevant influence on the final result.

Measure type weights

In general for the measure (types) we are dealing with, Regulation, Social acceptance and Strategy & Planning measures are rated most important, while Area is not expected to be of great importance. Business structure is somewhere in between.

Education/ARC measures

For natural reasons, social acceptance is the most important (25%) prerequisite for a good result, followed by Business structure and Strategy & Planning. Business criteria are rather important (20%) as businesses structure and acceptance is essential for development of logistic processes.

Restriction measures

Regulation criteria are also for natural reasons most important, therefore having a 40% weight. Strategy and Planning are also is important, though at a lower level, 20%.

Mode change measures

Mode change refers to change of goods carrier type. Obviously Infrastructure must be essential factor here, thus having the highest rating (30%) followed by Social acceptance and Strategy and planning, both with 20%.

Route Optimisation measures

Route optimisation measures are likely to depend most on the infrastructure context of a city , therefore the corresponding weight is high (35%). A bit less important is the regulation situation (25%).

Consolidation measures

Keys for achieving consolidation of goods transportation is willingness of the logistical companies to engage in the process. Therefore Social acceptance and Strategy & Planning is rated almost equally high.

Most important criteria weights are marked yellow in the table below. Subcriterion 14. UCC market share has been disregarded from, as few cities have or are planning.

| A | B | C | D | E | F | G |
|-----------------------------------|--------|----------------------|-------------|-------------|--------------|---------------|
| City context | | Measure type weights | | | | |
| Criteria | Weight | Educational/ARC | Restriction | Mode Change | Route Optim. | Consolidation |
| A. Business | | | | | | |
| 1. Nr of B. in enclose area | 0.35 | | | | | |
| 2. Predominate business | 0.35 | | | | | |
| 3. Level of engagement | 0.20 | | | | | |
| 4. Level of ARC impact | 0.10 | | | | | |
| | 1.0 | 20% | 10% | 5% | 5% | 5% |
| B. Regulation | | | | | | |
| 5. Traffic regulation | 0.30 | | | | | |
| 6. Daytime city restriction | 0.08 | | | | | |
| 7. Daytime hour restriction | 0.08 | | | | | |
| 8. Emission based regulati | 0.08 | | | | | |
| 9. Weight based emission | 0.08 | | | | | |
| 10. Loading bays/street | 0.08 | | | | | |
| 11. Enforcement types | 0.30 | | | | | |
| 12. Incentives green vehicl | 0.04 | | | | | |
| | 1.0 | 10% | 40% | 20% | 25% | 15% |
| C. Infrastructure | | | | | | |
| 13. Average speed | 0.45 | | | | | |
| 14. UCC market share | | | | | | |
| 15. ITS running | 0.05 | | | | | |
| 16. EURO type | 0.45 | | | | | |
| | 1.0 | 10% | 15% | 30% | 35% | 15% |
| D. Social acceptance | | | | | | |
| 17. Citizens acceptance | 0.35 | | | | | |
| 18. Logistic companies acc | 0.65 | | | | | |
| | 1.0 | 35% | 10% | 20% | 10% | 32% |
| E. Area | | | | | | |
| 19. City area | 0.6 | | | | | |
| 20. Population | 0.4 | | | | | |
| | 1.0 | 5% | 5% | 5% | 5% | 3% |
| F. Strategy & Planning | | | | | | |
| 21. Proactive comitment | 0.45 | | | | | |
| 22. Infrastructural plan | 0.55 | | | | | |
| | 1.0 | 20% | 20% | 20% | 20% | 30% |

Figure 13: City context and Measure Type weigh

8 Annex 2 Cross Evaluation Survey Results

| Alba Iulia context | | | Measures Impact | | | | |
|---------------------------------------|----------|-------------------|-------------------|----------|-------------|---------------|-------------|
| Criteria | L. level | Sensitivity based | Evaluation Metric | Emission | Mode Change | Flower System | Contractual |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 3 | 1.05 | | | | | |
| 2. Predominate business | 5 | 1.75 | | | | | |
| 3. Level of engagement | 2 | 0.4 | | | | | |
| 4. Level of ARC impact | 4 | 0.4 | | | | | |
| Business normalized sensitivity | 3.6 | | 0.72 | 0.36 | 0.18 | 0.18 | 0.18 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 1 | 0.3 | | | | | |
| 6. Daytime city restriction | 1 | 0.08 | | | | | |
| 7. Daytime hour restriction | 1 | 0.08 | | | | | |
| 8. Emission based regulation | 1 | 0.08 | | | | | |
| 9. Weight based emission | 1 | 0.08 | | | | | |
| 10. Loading bays/street | 1 | 0.08 | | | | | |
| 11. Enforcement types | 1 | 0.3 | | | | | |
| 12. Incentives green vehicle | 1 | 0.04 | | | | | |
| Regulatory normalized sensitivity | 1.04 | | 0.10 | 0.42 | 0.21 | 0.26 | 0.16 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 1 | 0.45 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 0 | 0 | | | | | |
| 16. EURO tier | 3 | 1.35 | | | | | |
| Infrastructure normalized sensitivity | 1.8 | | 0.18 | 0.27 | 0.54 | 0.63 | 0.27 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 2 | 0.7 | | | | | |
| 18. Logistic companies acc | 2 | 1.3 | | | | | |
| Acceptance normalized sensitivity | 2 | | 0.70 | 0.20 | 0.40 | 0.20 | 0.64 |
| E. Area | | | | | | | |
| 19. City area | 5 | 3 | | | | | |
| 20. Population | 3 | 1.2 | | | | | |
| Area normalized sensitivity | 4.2 | | 0.21 | 0.21 | 0.21 | 0.21 | 0.11 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 4 | 1.8 | | | | | |
| 22. Infrastructural plan | 4 | 2.2 | | | | | |
| Planning normalized sensitivity | 4 | | 0.80 | 0.80 | 0.80 | 0.80 | 1.20 |
| | | | 2.71 | 2.26 | 2.34 | 2.28 | 2.55 |

| Almada context | | | Measures Impact | | | | |
|---------------------------------------|----------|-------------------|-------------------|----------|-------------|---------------|-------------|
| Criteria | L. level | Sensitivity based | Evaluation Metric | Emission | Mode Change | Flower System | Contractual |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 5 | 1.75 | | | | | |
| 2. Predominate business | 5 | 1.75 | | | | | |
| 3. Level of engagement | 2 | 0.4 | | | | | |
| 4. Level of ARC impact | 4 | 0.4 | | | | | |
| Business normalized sensitivity | 4.3 | | 0.86 | 0.43 | 0.22 | 0.22 | 0.22 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 2 | 0.6 | | | | | |
| 6. Daytime city restriction | 1 | 0.08 | | | | | |
| 7. Daytime hour restriction | 1 | 0.08 | | | | | |
| 8. Emission based regulation | 1 | 0.08 | | | | | |
| 9. Weight based emission | 1 | 0.08 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 2 | 0.6 | | | | | |
| 12. Incentives green vehicle | 3 | 0.12 | | | | | |
| Regulatory normalized sensitivity | 1.80 | | 0.18 | 0.72 | 0.36 | 0.45 | 0.27 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 1.5 | 0.675 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 1 | 0.05 | | | | | |
| 16. EURO tier | 2 | 0.9 | | | | | |
| Infrastructure normalized sensitivity | 1.6 | | 0.16 | 0.24 | 0.49 | 0.57 | 0.24 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 4 | 1.4 | | | | | |
| 18. Logistic companies acc | 3 | 1.95 | | | | | |
| Acceptance normalized sensitivity | 3.35 | | 1.17 | 0.34 | 0.67 | 0.34 | 1.07 |
| E. Area | | | | | | | |
| 19. City area | 3 | 1.8 | | | | | |
| 20. Population | 3 | 1.2 | | | | | |
| Area normalized sensitivity | 3 | | 0.15 | 0.15 | 0.15 | 0.15 | 0.08 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 4 | 1.8 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | 4.55 | | 0.91 | 0.91 | 0.91 | 0.91 | 1.37 |
| | | | 3.44 | 2.79 | 2.79 | 2.63 | 3.24 |

| Balchik context | | | Measures Impact | | | | |
|---------------------------------------|----------|-------|-----------------|-------------|-------------|------------|-----------------|
| | Citizens | Level | Security Issue | | | | |
| | | | Education/ARC | Flexibility | Mode Change | Flow/Opim. | Contract/Adapt. |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 1 | 0.35 | | | | | |
| 2. Predominate business | 5 | 1.75 | | | | | |
| 3. Level of engagement | 1 | 0.2 | | | | | |
| 4. Level of ARC impact | 1 | 0.1 | | | | | |
| Business normalized sensitivity | 2.4 | | 0.48 | 0.24 | 0.12 | 0.12 | 0.12 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 5 | 1.5 | | | | | |
| 6. Daytime city restriction | 1 | 0.08 | | | | | |
| 7. Daytime hour restriction | 2 | 0.16 | | | | | |
| 8. Emission based regulation | 1 | 0.08 | | | | | |
| 9. Weight based emission | 1 | 0.08 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 2 | 0.6 | | | | | |
| 12. Incentives green vehicle | 0 | 0 | | | | | |
| Regulatory normalized sensitivity | 2.66 | | 0.27 | 1.06 | 0.53 | 0.67 | 0.40 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 3 | 1.35 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 0 | 0 | | | | | |
| 16. EURO tier | 0 | 0 | | | | | |
| Infrastructure normalized sensitivity | 1.4 | | 0.14 | 0.20 | 0.41 | 0.47 | 0.20 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 2 | 0.7 | | | | | |
| 18. Logistic companies acc | 1 | 0.65 | | | | | |
| Acceptance normalized sensitivity | 1.35 | | 0.47 | 0.14 | 0.27 | 0.14 | 0.43 |
| E. Area | | | | | | | |
| 19. City area | 3 | 1.8 | | | | | |
| 20. Population | 1 | 0.4 | | | | | |
| Area normalized sensitivity | 2.2 | | 0.11 | 0.11 | 0.11 | 0.11 | 0.06 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 1 | 0.45 | | | | | |
| 22. Infrastructural plan | 2 | 1.1 | | | | | |
| Planning normalized sensitivity | 1.55 | | 0.31 | 0.31 | 0.31 | 0.31 | 0.47 |
| | | | 1.77 | 2.06 | 1.75 | 1.81 | 1.67 |

| Burgos context | | | Measures Impact | | | | |
|---------------------------------------|----------|-------|-----------------|-------------|-------------|------------|-----------------|
| | Citizens | Level | Security Issue | | | | |
| | | | Education/ARC | Flexibility | Mode Change | Flow/Opim. | Contract/Adapt. |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 4 | 1.4 | | | | | |
| 2. Predominate business | 5 | 1.75 | | | | | |
| 3. Level of engagement | 5 | 1 | | | | | |
| 4. Level of ARC impact | 4 | 0.4 | | | | | |
| Business normalized sensitivity | 4.55 | | 0.91 | 0.46 | 0.23 | 0.23 | 0.23 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 5 | 1.5 | | | | | |
| 6. Daytime city restriction | 2 | 0.16 | | | | | |
| 7. Daytime hour restriction | 3 | 0.24 | | | | | |
| 8. Emission based regulation | 1 | 0.08 | | | | | |
| 9. Weight based emission | 4 | 0.32 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 5 | 1.5 | | | | | |
| 12. Incentives green vehicle | 1 | 0.04 | | | | | |
| Regulatory normalized sensitivity | 4.00 | | 0.40 | 1.60 | 0.80 | 1.00 | 0.60 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 2 | 0.9 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURO tier | 3 | 1.35 | | | | | |
| Infrastructure normalized sensitivity | 2.5 | | 0.25 | 0.38 | 0.75 | 0.88 | 0.38 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 3 | 1.05 | | | | | |
| 18. Logistic companies acc | 4 | 2.6 | | | | | |
| Acceptance normalized sensitivity | 3.65 | | 1.28 | 0.37 | 0.73 | 0.37 | 1.17 |
| E. Area | | | | | | | |
| 19. City area | 1 | 0.6 | | | | | |
| 20. Population | 4 | 1.6 | | | | | |
| Area normalized sensitivity | 2.2 | | 0.11 | 0.11 | 0.11 | 0.11 | 0.06 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 5 | 2.25 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | 5 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.50 |
| | | | 3.95 | 3.91 | 3.62 | 3.58 | 3.93 |

| Den Bosch context | | | Measures Impact | | | | |
|---------------------------------------|----------|--------|-----------------|-------------|-------------|---------------|-------------|
| | Citizens | Lawyer | Environment | Enforcement | Mode Change | Flower Design | Commodities |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 3 | 1.05 | | | | | |
| 2. Predominate business | 3 | 1.05 | | | | | |
| 3. Level of engagement | 3 | 0.6 | | | | | |
| 4. Level of ARC impact | 1 | 0.1 | | | | | |
| Business normalized sensitivity | 2.8 | | 0.56 | 0.28 | 0.14 | 0.14 | 0.14 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 5 | 1.5 | | | | | |
| 6. Daytime city restriction | 5 | 0.4 | | | | | |
| 7. Daytime hour restriction | 3 | 0.24 | | | | | |
| 8 Emission based regulation | 5 | 0.4 | | | | | |
| 9. Weight based emission | 5 | 0.4 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 5 | 1.5 | | | | | |
| 12. Incentives green vehicle | 2 | 0.08 | | | | | |
| Regulatory normalized sensitivity | 4.68 | | 0.47 | 1.87 | 0.94 | 1.17 | 0.70 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 2 | 0.9 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURO tier | 3 | 1.35 | | | | | |
| Infrastructure normalized sensitivity | 2.5 | | 0.25 | 0.38 | 0.75 | 0.88 | 0.38 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 4 | 1.4 | | | | | |
| 18. Logistic companies acc | 2 | 1.3 | | | | | |
| acceptance normalized sensitivity | 2.7 | | 0.95 | 0.27 | 0.54 | 0.27 | 0.86 |
| E. Area | | | | | | | |
| 19. City area | 2 | 1.2 | | | | | |
| 20. Population | 4 | 1.6 | | | | | |
| Area normalized sensitivity | 2.8 | | 0.14 | 0.14 | 0.14 | 0.14 | 0.07 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 0 | 0 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | 2.75 | | 0.55 | 0.55 | 0.55 | 0.55 | 0.83 |
| | | | 2.91 | 3.49 | 3.06 | 3.15 | 2.98 |

| Dundee context | | | Measures Impact | | | | |
|---------------------------------------|----------|--------|-----------------|-------------|-------------|---------------|-------------|
| | Citizens | Lawyer | Environment | Enforcement | Mode Change | Flower Design | Commodities |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 2.5 | 0.875 | | | | | |
| 2. Predominate business | 3 | 1.05 | | | | | |
| 3. Level of engagement | 2 | 0.4 | | | | | |
| 4. Level of ARC impact | 3 | 0.3 | | | | | |
| Business normalized sensitivity | 2.625 | | 0.53 | 0.26 | 0.13 | 0.13 | 0.13 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 5 | 1.5 | | | | | |
| 6. Daytime city restriction | 1 | 0.08 | | | | | |
| 7. Daytime hour restriction | 3 | 0.24 | | | | | |
| 8 Emission based regulation | 0 | 0 | | | | | |
| 9. Weight based emission | 0 | 0 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 3 | 0.9 | | | | | |
| 12. Incentives green vehicle | 2 | 0.08 | | | | | |
| Regulatory normalized sensitivity | 2.96 | | 0.30 | 1.18 | 0.59 | 0.74 | 0.44 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 3 | 1.35 | | | | | |
| 14. UCC market share | 0 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURO tier | 1 | 0.45 | | | | | |
| Infrastructure normalized sensitivity | 2.1 | | 0.21 | 0.31 | 0.62 | 0.72 | 0.31 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 0 | 0 | | | | | |
| 18. Logistic companies acc | 2 | 1.3 | | | | | |
| acceptance normalized sensitivity | 1.3 | | 0.46 | 0.13 | 0.26 | 0.13 | 0.42 |
| E. Area | | | | | | | |
| 19. City area | 5 | 3 | | | | | |
| 20. Population | 4 | 1.6 | | | | | |
| Area normalized sensitivity | 4.6 | | 0.23 | 0.23 | 0.23 | 0.23 | 0.12 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 3 | 1.35 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | 4.1 | | 0.82 | 0.82 | 0.82 | 0.82 | 1.23 |
| | | | 2.53 | 2.93 | 2.65 | 2.77 | 2.64 |

| Lucca context | | | Measures Impact | | | | |
|---------------------------------------|-------|-------------------|-------------------|-------------|-------------|--------------|--------------|
| Criteria | Level | Sensitivity Level | Evaluation Metric | Flexibility | Mode Change | Hours Optim. | Coordination |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 4 | 1.4 | | | | | |
| 2. Predominate business | 3 | 1.05 | | | | | |
| 3. Level of engagement | 4 | 0.8 | | | | | |
| 4. Level of ARC impact | 3 | 0.3 | | | | | |
| Business normalized sensitivity | | 3.55 | 0.71 | 0.36 | 0.18 | 0.18 | 0.18 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 4 | 1.2 | | | | | |
| 6. Daytime city restriction | 5 | 0.4 | | | | | |
| 7. Daytime hour restriction | 5 | 0.4 | | | | | |
| 8. Emission based regulation | 5 | 0.4 | | | | | |
| 9. Weight based emission | 5 | 0.4 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 4 | 1.2 | | | | | |
| 12. Incentives green vehicle | 2 | 0.08 | | | | | |
| Regulatory normalized sensitivity | | 4.24 | 0.42 | 1.70 | 0.85 | 1.06 | 0.64 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 2 | 0.9 | | | | | |
| 14. UCC market share | 3 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURD tier | 2 | 0.9 | | | | | |
| Infrastructure normalized sensitivity | | 2.1 | 0.21 | 0.31 | 0.62 | 0.72 | 0.31 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 4 | 1.4 | | | | | |
| 18. Logistic companies acc | 3 | 1.95 | | | | | |
| Acceptance normalized sensitivity | | 3.35 | 1.17 | 0.34 | 0.67 | 0.34 | 1.07 |
| E. Area | | | | | | | |
| 19. City area | 3 | 1.8 | | | | | |
| 20. Population | 3 | 1.2 | | | | | |
| Area normalized sensitivity | | 3 | 0.15 | 0.15 | 0.15 | 0.15 | 0.08 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 5 | 2.25 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | | 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.50 |
| | | | 3.66 | 3.84 | 3.46 | 3.44 | 3.77 |

| Serres context | | | Measures Impact | | | | |
|---------------------------------------|-------|-------------------|-------------------|-------------|-------------|--------------|--------------|
| Criteria | Level | Sensitivity Level | Evaluation Metric | Flexibility | Mode Change | Hours Optim. | Coordination |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 4 | 1.4 | | | | | |
| 2. Predominate business | 2 | 0.7 | | | | | |
| 3. Level of engagement | 3 | 0.6 | | | | | |
| 4. Level of ARC impact | 3 | 0.3 | | | | | |
| Business normalized sensitivity | | 3 | 0.60 | 0.30 | 0.15 | 0.15 | 0.15 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 1 | 0.3 | | | | | |
| 6. Daytime city restriction | 3 | 0.24 | | | | | |
| 7. Daytime hour restriction | 3 | 0.24 | | | | | |
| 8. Emission based regulation | 0 | 0 | | | | | |
| 9. Weight based emission | 5 | 0.4 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 2 | 0.6 | | | | | |
| 12. Incentives green vehicle | 1 | 0.04 | | | | | |
| Regulatory normalized sensitivity | | 1.98 | 0.20 | 0.79 | 0.40 | 0.50 | 0.30 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 4 | 1.8 | | | | | |
| 14. UCC market share | 2 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURD tier | 1 | 0.45 | | | | | |
| Infrastructure normalized sensitivity | | 2.5 | 0.25 | 0.38 | 0.75 | 0.88 | 0.38 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 3 | 1.05 | | | | | |
| 18. Logistic companies acc | 2 | 1.3 | | | | | |
| Acceptance normalized sensitivity | | 2.35 | 0.82 | 0.24 | 0.47 | 0.24 | 0.75 |
| E. Area | | | | | | | |
| 19. City area | 2 | 1.2 | | | | | |
| 20. Population | 3 | 1.2 | | | | | |
| Area normalized sensitivity | | 2.4 | 0.12 | 0.12 | 0.12 | 0.12 | 0.06 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 3 | 1.35 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | | 4.1 | 0.82 | 0.82 | 0.82 | 0.82 | 1.23 |
| | | | 2.81 | 2.64 | 2.71 | 2.70 | 2.86 |

| Trondheim context | | | Measures Impact | | | | |
|---------------------------------------|-------|-------------------|------------------|-------------|--------------|----------------|------------------|
| Criteria | Level | Sensitivity based | Evaluation Index | Flexibility | Model Change | Measure Custom | Cost/valid index |
| A. Business | | | | | | | |
| 1. Nr of B. in enclose area | 5 | 1.75 | | | | | |
| 2. Predominate business | 3 | 1.05 | | | | | |
| 3. Level of engagement | 5 | 1 | | | | | |
| 4. Level of ARC impact | 5 | 0.5 | | | | | |
| Business normalized sensitivity | | 4.3 | 0.86 | 0.43 | 0.22 | 0.22 | 0.22 |
| B. Regulation | | | | | | | |
| 5. Traffic regulation | 3 | 0.9 | | | | | |
| 6. Daytime city restriction | 4 | 0.32 | | | | | |
| 7. Daytime hour restriction | 2 | 0.16 | | | | | |
| 8. Emission based regulation | 5 | 0.4 | | | | | |
| 9. Weight based emission | 0 | 0 | | | | | |
| 10. Loading bays/street | 2 | 0.16 | | | | | |
| 11. Enforcement types | 3 | 0.9 | | | | | |
| 12. Incentives green vehicle | 4 | 0.16 | | | | | |
| Regulatory normalized sensitivity | | 3.00 | 0.30 | 1.20 | 0.60 | 0.75 | 0.45 |
| C. Infrastructure | | | | | | | |
| 13. Average speed | 2 | 0.9 | | | | | |
| 14. UCC market share | 1 | | | | | | |
| 15. ITS running | 5 | 0.25 | | | | | |
| 16. EURD tier | 2 | 0.9 | | | | | |
| Infrastructure normalized sensitivity | | 2.1 | 0.21 | 0.31 | 0.62 | 0.72 | 0.31 |
| D. Social acceptance | | | | | | | |
| 17. Citizens acceptance | 5 | 1.75 | | | | | |
| 18. Logistic companies acc | 5 | 3.25 | | | | | |
| Acceptance normalized sensitivity | | 5 | 1.75 | 0.50 | 1.00 | 0.50 | 1.60 |
| E. Area | | | | | | | |
| 19. City area | 1 | 0.6 | | | | | |
| 20. Population | 3 | 1.2 | | | | | |
| Area normalized sensitivity | | 1.8 | 0.09 | 0.09 | 0.09 | 0.09 | 0.05 |
| F. Strategy & Planning | | | | | | | |
| 21. Proactive comitment | 5 | 2.25 | | | | | |
| 22. Infrastructural plan | 5 | 2.75 | | | | | |
| Planning normalized sensitivity | | 5 | 1.00 | 1.00 | 1.00 | 1.00 | 1.50 |
| | | | 4.21 | 3.53 | 3.52 | 3.27 | 4.12 |