

Innovative Approaches in City Logistics

Inner-city Night Delivery



Policy notes

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SIXTH FRAMEWORK PROGRAMME

What is it about?

Characteristics

Inner-city Night Delivery is the delivery to retailers and shops in the inner city area during the night hours when the city is usually quiet and inactive. Typical times are between 10.00 p.m. and 7.00 a.m.

In several cities such as Barcelona or Dublin, successful experiences with trials on night delivery are made replacing a (higher) number of vehicles operating during day time by a (fewer) number of vehicles operating during night time.

The Concept Inner-city Night Delivery addresses the following aspects:

- The delivery during night time with specially equipped low noise vehicles (low noise equipment, CNG etc);
- Allowance for larger trucks to enter the city centre which are restricted during the day time.

The PIEK program in the Netherlands is an important example related to night delivery solutions (see page 8).

Key benefits

The implementation of Inner-city Night Delivery...

- reduces delays for the logistics service providers by using the free road capacities at night;
- reduces emissions and energy consumption (less congestion during night time, direct access to the shops);
- increases logistics efficiencies in terms of the deployment of HGVs and manpower;
- enhances road safety.



Early morning rush hour



Conventional night time delivery

Photos: PTV Planung Transport Verkehr AG

Example: Barcelona night delivery scheme, Spain

Goods traffic continues to grow in Barcelona, and the Municipality has been active in finding solutions to manage on-street deliveries (the majority of premises have only limited stock-holding capability, and no off-street loading facilities, etc.) in ways that minimise congestion. In Barcelona in about 20 locations in the city and across the metropolitan area goods are delivered during night time and the solution has been extended within a short period of time to about 140 supermarket outlets all over Spain. The good experiences and especially the economic benefits led to this quick extension.

Is this something for us?

Inner-city Night Delivery is suitable for a wide range of cities. The following requirements are desirable in order to implement the Concept:

- **Political will:** The set up of a night delivery scheme depends on political will and support;
- **Key stakeholder:** In addition to the political will it is necessary to have a key stakeholder on the commercial side which has a strong interest in the solution and works as a driving force;
- **Local legal framework:** A framework which promotes active noise reduction in the city and which controls the access to the city during night time is very helpful. The legal framework has to contain also a realistic enforcement strategy.

Example: Dublin night delivery scheme

A detailed analysis of the delivery patterns and processes and the vehicle configurations in the inner city area of Dublin was made. The survey aimed to identify a logistics regime and configuration that justifies the use of urban delivery centres and more eco-friendly vehicles offering a more sustainable solution for managing freight deliveries in the historic city centre. The planning of the programme in Dublin has close relation with the experience of the PIEK programme in the Netherlands, which includes a consideration of 10 single issues to be taken into account in order to reduce noise emissions during loading and unloading at retail stores. The research in Dublin is designed to complement the PIEK experience because "no one size fits all".



Noise map of the city centre (Dublin)

Check list

City size	Not relevant.
Costs	<ul style="list-style-type: none"> ● Possible higher costs for quiet vehicles and quiet equipment and higher personal costs due to having to receive deliveries at night when the shops are normally closed; ● Lower logistics costs because of a faster and more efficient delivery process.
Implementation time	<i>Short term (< 3 years).</i>
Stakeholders involved	<ul style="list-style-type: none"> ● Public & planning authorities; ● Transport operators; ● Shops/companies; ● Residents; ● Chambers of Commerce.
Undesirable secondary effects	<ul style="list-style-type: none"> ● More noise during the night because of the delivery; ● May reduce consolidation work in freight villages and freight centres outside the city.

Sustainability, Benefits & Costs

Benefits

Inner-city Night Delivery includes a range of potential benefits:

- Reduction of the congestion by using the road network during night hours;
- Faster travel times for all vehicles;
- Optimisation of vehicle and manpower utilisation;
- Reduced emissions;
- Consolidation and clustering of shipments;
- Positive contribution to road safety.

For the **transport operators** the main benefits derive from the use of bigger vehicles and from a reduction of travel times during night time.

The benefits for the **society**, i.e. for the citizens, are a reduction of travel times for all vehicles (reduction of the time losses due to congestion) during day time and a reduction of the number of delivery vehicles operating in the city centre. Note: The benefits of less urban congestion overall would not be significant unless a high number of HGVs move to the night (source: IVECO).

The **shop owners** can benefit from a better organisation of the receiving of the goods and less disturbance for the customers (delivery outside shop opening hours).

Furthermore, the reduction of travel times leads to **less pollution and energy consumption.**

The introduction of night delivery leads to an increase of the delivery activities during the night and can therefore lead to more noise and more disturbances of the residents. The use of low noise equipment and additional noise reduction measures can mitigate or even overcome these negative side effects of night delivery.



Barrier for an access restriction during night time (from 8 p.m. to 6 a.m.)

Photo: PTV Planung Transport Verkehr AG

Barcelona night delivery

Within Barcelona, a night delivery trial was carried out concentrating the delivery processes between 23.00h and 24.00h in the night and between 5.00h and 6.00h in the morning.

40t trucks were delivering to grocery stores directly during the night instead of going to a regional distribution centre. The equipment used was noise adapted, both for the truck as well as the loading and unloading utilities.

As a result the trial was successful in terms of noise intrusion and from the commercial point of view. About 7 trucks could be replaced during day time allowing 2 large trucks to enter the city during the night time.

Costs and cost savings

An estimation of the additional cost for low noise equipment per vehicle must await the completion of the research being carried out in The Netherlands, Ireland and Spain. It is a challenge for the equipment suppliers to reduce the extra costs as much as possible.

For Barcelona the scheme investment is recovered within 2 to 3 years (for the 7 points delivered at the moment a cost saving of about 6,000 € per month can be seen).

Users & Stakeholders

Users and target groups

The affected parties involved in night delivery are the **drivers**, including the local **shop owners** but also the **residents** living nearby.

Key stakeholders for implementation

Night delivery concepts work well with close cooperation of the public side and the private sector. The key stakeholders are listed below:

- The **city administration** is a main stakeholder being responsible for the necessary framework in the city as basis for a night delivery scheme. The city administration is responsible for the necessary access restrictions to the area concerned and noise levels and - if necessary - can improve the acoustic properties of the existing loading ramps.
- The **transport operators** are responsible for negotiations with the own system suppliers for an adaptation of the equipment used and with the receivers in order to guarantee the receiving of the goods during night time. I.e. for the operation still the private companies are responsible.
If no changes of existing regulations are needed or if no existing legislation is concerned, Inner-city Night Delivery can also be implemented by a private company without any involvement of public entities.
- The **shop owners** need to find arrangements with regard to the receiving of the goods during night time. Either dedicated staff has to be on site if an attended delivery is planned or a technical solution has to be found if an unattended delivery shall take place.



Receiving goods during night time



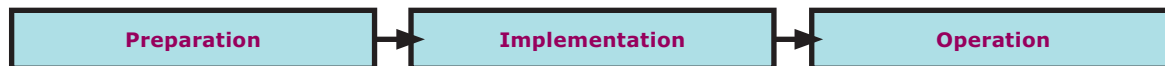
Noisy road surface

Photo: PTV Planung Transport Verkehr AG

“It is a challenge to persuade the major automotive manufacturers to bring low noise engines and ancillaries to market at a reasonable cost. They are awaiting the implementation of Europe-wide and commonly agreed acoustic limits for residential areas before they are prepared to make the necessary investments in research and production facilities for exploiting the mass market that, they believe, has yet to develop. An unfavourable comparison can be made with how commonly agreed EU- wide limits on tail pipe emissions stimulated the vehicle manufacturers to develop cleaner technology in relatively quick time. It is desirable that the action plans currently in preparation under the EC Noise Directive strives to achieve commonly agreed acoustic limits for night deliveries while still allowing a degree of flexibility to the local municipal authorities”

Hugh Finlay, Dublin Institute of Technology, Ireland

From concept to reality



Preparation and implementation

Before the implementation of the Inner-city Night Delivery Concept the following key aspects should be considered:

- The **acceptance** of night delivery can differ from country to country (for example southern cities are seen as more noisy than northern cities);
- **Technical solutions** for low noise equipment are available;
- **Public financial supports/subsidies** can encourage buyers/users to make use of the low noise equipment;
- **Existing noise limits** have to be respected (on the local, national and international level);
- **Local access regulations** (for example no access for trucks during night time) have to be considered and adopted;
- **Urban space** for deliveries has to be available (competition with parking vehicles of the inhabitants);
- **Infrastructure** (for example paving) around the ramps may cause additional noise and has to be mitigated;
- **Organisation** (and/or technical solutions) of the receiving of the goods during night times or in the morning at the receiver's side is needed.

The initiatives should come from the logistics operators and retailers which are subject to complaints by residents because of night deliveries. The authorities should then respond positively to the operators' initiatives and promote the development of innovative solutions by means of special permitting arrangements and privileges.

Combination of low noise equipment with alternatively fuelled vehicles, Barcelona

The trials with small trucks show that the combination is possible but in this case only biodiesel was used and no hybrid, fuel cell or CNG technology.

The discussion with the involved car manufacturer was fruitful and no problems occurred but this is due to the possibility to make use of biodiesel in most of the conventional vehicles.

The combination of low noise equipment and alternatively driven vehicles is seen as very important in the future, but at the moment the availability of alternatively fuelled vehicles is not given especially for long distance trucks.

Immediate actions to be taken by cities:

- Take a few simple measures, such as extending the time limit for morning deliveries or integrating afternoon and evening delivery time windows;
- Anticipate future needs for logistic areas (for example delivery «relay» centres) and reserve such areas in the land-use plans;
- Make the fit out of new urban logistics sites with low noise acoustic solutions a condition of planning permission;
- Night-time use of roadway infrastructures when the progress of equipment technology makes it possible to achieve a drastic reduction in noise levels.

The noise issue

Before the implementation of the Inner-city Night Delivery Concept the following key aspects should be considered:

- The existence of the EU-Directive (2002/49/EC) on noise as an European framework leads to a development of first national frameworks and awareness and relevant initiatives at local level;
- Night-time deliveries pose a problem of noise, articulated by local politicians echoing the complaints of the people;
- High noise levels are mainly due to factors independent of vehicle operations, such as goods handling, the opening and closing of store doors.

A Mac Donald's in Lyon has installed a power socket above the pavement in the delivery area so that the van's refrigerating set can be turned on without having to keep the engine running.

Success factors of night delivery:

- Quality label indicating that quiet equipment is used;
- Openness of city authorities concerning alternative delivery schemes;
- Research to develop low noise equipment and improve organisation;
- The shops are able to receive the goods during night time (the situation for the different shops can differ depending on the size and therefore different technical and/or organisational aspects are important);
- Infrastructure around the ramps, quiet loading and unloading locations (retailers and municipality), quiet paving (asphalt vs. bricks);
- Training of drivers and ramp personnel;
- Contracts between retailer/receivers and shippers ensuring that goods are transported with quiet equipment;
- Co-operation between shippers and transporters ensuring that the transporters use quiet equipment (responsibility goes from the shipper to the transport operator).

Potential solutions

Technology:

- LNG/CNG/hybrid/fuel cell;
- Silent trailers;
- Radio switches;
- Load restraints;
- New vehicle development;
- Treatment of the lorry floor with a noise-insulating material (Sikaflor).

Organisation:

- Briefing drivers & Training courses;
- Additional staff at the shops for loading/unloading.

The PIEK programme

PIEK programme, The Netherlands

At the end of 1998 the renewed "Decree Retail Trade Environmental Protection" came into effect. This Dutch decree sets down that the noise emission level must remain within noise emission standards set. It stipulates that the noise emission generated when loading and unloading goods, in particular from trucks, between 19.00 and 7.00 hours must comply with strict peak noise standards: 19.00 – 23.00 hours 65 dB(A) and 23.00 – 7.00 hours 60 dB(A).

Research has shown that many loading and unloading actions exceed the 60 and 65 dB(A) noise standards.

The Ministry of Housing, Spatial Planning and Environment, the Ministry for Economic Affairs and the Ministry for Transport, Public Works and Water Management introduced a long-term PIEK (peak noise) program in 1999 in order to bring about the necessary technical adjustments, by tackling the source, to the means of transport, the materials used when loading and unloading goods and the loading/unloading locations. The long-term PIEK program comprises 10 main projects. With the exception of the truck and the shopping trolley all solutions meet the 60 dB(A) requirement.

10 measures:

- Transfer of knowledge to the companies involved on a general level;
- Stimulate quiet behavior;
- Create the optimal loading and unloading bay;
- Low noise trucks (up to 7,5 tons);
- Low noise trucks (over 7,5 tons);
- Low noise transport refrigeration system;
- Low noise take along forklift truck;
- Reduce noise of roll containers, pallet-trucks and handpallet-trucks;
- Quiet shopping trolleys;
- Electric drive or electric hybrid drive.



Fuel cell technology

Photo: Transman

Conclusion

The PIEK MAP has resulted in many innovations. Solutions that can meet the PIEK standard of 60 dB(A) have been found for all components that were too noisy. Exceptions are the shopping trolley and heavy truck. These can meet 65 dB(A).

Additional requirements (not indispensable but that may facilitate implementation):

- **European/national standards:** An overall European and/or national approach with regard to standards which foresee noise reduction of the (delivery) vehicles would give a good framework and stimulation for manufacturers of the low noise equipment and vehicles and lead to lower prices. This framework should be comparable to the one in the field of particle emissions.
- **Local legal framework:** A local legal framework (based on a European/national framework) which aims at noise reduction in the city is very helpful. The legal framework has to contain also an enforcement strategy.
- **Bundle of measures:** It can be difficult to implement Inner-city Night Delivery as a stand-alone solution. It is then recommendable to implement this solution together with additional measures related to city logistics (e.g. a zone access control scheme which foresees no or only limited access for delivery vehicles during daytime) and to consider public subsidies which make the solution more attractive for the transport operators.



Photo: PTV Planung Transport Verkehr AG

The PIEK programme

Key aspects at this stage

An important issue during operation of night delivery is that the residents can complain about noise directly to the service centres. A permanent monitoring of the noise levels should guarantee that the noise levels do not increase by the used transport vehicles and drivers.



Photo: City of Barcelona

Night delivery of Mercadona supermarket, Barcelona

With an investment return of 3 years, Mercadona's night time delivery scheme is now a validated approach for more flexible delivery to larger outlets.

The trial took place during the closing hour of the shops, however, beside the driver also staff from the retailer was present to accept the delivery.

Mercadona supermarkets are larger than the average store, and there is scope to organise staff to receive the lorry night arrivals. There is an additional labour cost (night-working bonus).

The operator Mercadona has demonstrated that quiet delivery is possible with a 30T lorry serving supermarkets with a rather large capacity and with substantial refrigeration facilities. The result is quantified in terms of noise measures compared to ambient noise levels on nights when the delivery was not being made; the average of the minimum values recorded during unloading inside buildings (23.5 dB(A)) was 0.3 dB(A) greater than those recorded before loading started; for maximum values no difference was recorded for measurements inside buildings (33.4 dB(A)), and the maximum values recorded in the street varied by only 0.1 dB(A) average with unloading of 52.2 dB(A).

It is important to know that in Spain the supermarkets (shop owners) are responsible for the organisation of the goods transports. They even rent trucks and decide directly about the logistics process. I.e. they are also the driving force for the implementation of night delivery. The main arguments in favour of night time delivery from the shop owners' point of view are: reduction of cost by use of bigger vehicles during night time (consolidation); reduction of cost due to faster driving times during night time (night time driving takes only 1/3 of the time necessary during day time); and reduction of complaints from inhabitants.

In Barcelona noise measurements were realised at the Valencia St. night un/loading site by the municipal police during the months of April - July of 2003. The measurements were realised outdoors as well as indoors (at 6 occupied residences close to the supermarket). The measurements were realised at different time periods (23.00, 03.00 and 05.00 hours, with measurements at residences recording minimum and maximum values in dB(A) between 23.00 and 23.30 hours (total of 22 sets of measurements).

The reactions of the residents nearby the shops which are delivered during night time are very positive – no complaints were registered. They were asked directly after the delivery took place.

Further information & contacts

Further information

PIEK programme, The Netherlands
www.piek.org (English and Dutch)

Barcelona MIRACLES project

MIRACLES is an EU project funded within the CIVITAS programme.
www.eltis.org/study_sheet.phtml?study_id=663
(English)

BESTUFS workshops

BESTUFS is a thematic network on urban freight transport funded by the European Commission.
www.bestufs.net (English)

NICHES - further documents with more details

Reports on the state of the art, analysis of success factors and barriers for implementation, transferability potential and integrated strategies are available on the NICHES websites (English):
www.niches-transport.org
www.osmose-os.org

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The mission of NICHES is:

to stimulate a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and disciplines across Europe.

NICHES promotes the most promising new concepts, initiatives and projects, to move them from their current 'niche' position to a 'mainstream' urban transport policy application.

NICHES team

The NICHES consortium is composed of a variety of experts in the field of urban transport, ensuring the knowledge of the academic sector (Warsaw University of Technology), the experience of cities (Stockholm), the expertise of consultants (Rupprecht Consult, PTV Planung Transport Verkehr AG) and the multiplier effect of the networks (POLIS, EUROCITIES, CEMR).



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