LL #22 BEASt- ELSA

FACTSHEET

10 MARCH 2022

A. GENERAL (BUSINESS CASE)

1. Objectives

- Sustainability monitoring as a basis for emission reduction, starting with climate gasses from fuel consumption,
- Transport tracking (of excavation masses),
- Establishing routines for automatic reporting of environmental data of construction and maintenance works,
- Application of the building industry electronic business standard by developers, contractors, subcontractors and suppliers,
- Data exchange between platforms, in several stages along the supply chain, by routines as automated as possible,
- The desired data is to be sent in the standardised format from the contractor to the client or developer, e.g. the Transport Administration assigned digital mailbox.
- Each delivery note will refer to the activity of one contracted vehicle or machine on a daily basis. The contractor in turn will obtain the needed data from the subcontractor or supplier, preferably in the same format.

2. Main emphasis

The emphasis is to establish a common future path for the applicable semantics and data exchange mechanism regarding environmental data for construction and maintenance works for road and rail infrastructure. Many initiatives exist which may create a rather fragmented situation. Conversely, an electronic message standard for construction, rental and building business information exchange, BEAst, (https://BEAst.se) was identified as the most appropriate standard to be used for data exchange between various data platforms. An international translation of the name BEAst would be Konstru-Industria Normo De Elektronika Negoco (KINDEN).

The digital system ELSA, which is being developed by the Swedish Transport Administration (Trafikverket, STA) for internal use, aims to monitor operational energy and materials flows, due to contract works, starting with (1) fuel climate gas emissions and (2) transports of excavated soil masses. The intention is to reduce environmental impact by utilising the information quality available through the digital message standard. (The standard also has a paramount potential for reducing administration costs and improving communication on project progress and economy).

The standard message, containing environmental (and commercial) data, is automatically communicated in the supply chain from subcontractors and material suppliers to contractor and developer. The data is communicated between their different IT-platforms, close to real time and with actual outcome rather than estimates. The way of working is thereby eliminating administration and need for analogue reporting by means of manual paper forms and Excel sheets and increasing data quality and traceability. The way of working is in operation today and, after proof of concept in a number of projects, ready to require in procurements and move from pilots to scale up.

BEAst and ELSA will make an expeditious and cost-efficient digitalisation possible. If this is not conducted in the very near future, the prospective cost for converting to a standardised way will be heavy, as many actors are currently starting to develop their own ways of working and building disparate information and communication (ICT) systems for capturing and communicating climate and transport data.

The national road and rail infrastructure agency Trafikverket will lead the way. The involvement of municipalities large and small is also cogent, as is a start of the roll-out on a European scale soon, given that the building industry electronic business standard will comply to the Pan-European Public Procurement On Line (PEPPOL) standard as from second half of 2022 A.D.

3. Challenges

- Enable learning and improvement for fulfilment of environmental goals, by using industry standard in requiring and automatically following up actual outcome,
- Stakeholder commitment, also making clear commitment to reaching the Paris Agreement is a long-term commitment with great impact on the construction and transport sectors, representing 38% of CO_2 emissions,
- From numbers on paper to digital numbers by using the BEAst-standard,
- Integration with FEDeRATED semantic modelling,
- Change Management Process, including intensive communication with stakeholders operating in a fragmented market,
- Time needed to achieve fully operative digital system versus time for developing other, non-standardised (and therefore non desired) solutions.

4. Transport mode

Road, Sea and Rail

5. EU Map Focus

ScanMed corridor

6. Geographical coverage

Entire Sweden, possibly later followed by Norway and Finland.

7. Actors

The Transport Administration (Trafikverket - TSA)), both division of Maintenance and division of investment,

Contractors, until now:

- Nordstjernan Construction Company (NCC),
- SVEVIA,
- GRK Infra,

Sub-contractors, until now:

- VSM Entreprenad,
- Wikströms Schaktmaskiner AB,

Computer system providers, until now:

- Kubicom,
- Pipechain,
- BM System,
- Hogia,

Academic:

- Högskolan i Dalarna (www.du.se),
- Lindholmen Science Park (LSP),
- University of Linköping (www.liu.se)

Municipal administrations:

- Stockholms kommun
- 2-4 other municipalities not yet agreed on

8. Forecast scaling outside the Living Laboratory (LL)

After the pilot project and testing stage, the next phase will include the roll-out in Sweden including first trials in immediately neighbouring countries, followed by the

general acceptance and dissipation of the digital standard and algorithm throughout the European Union.

B. TECHNICAL SETTING

9. ICT vs physical

The electronic message standard for construction, rental and building business information exchange is BEAst (KINDEN). TSA (Trafikverket) is working with the standardisation community to enhance the message exchange with environment impact information.

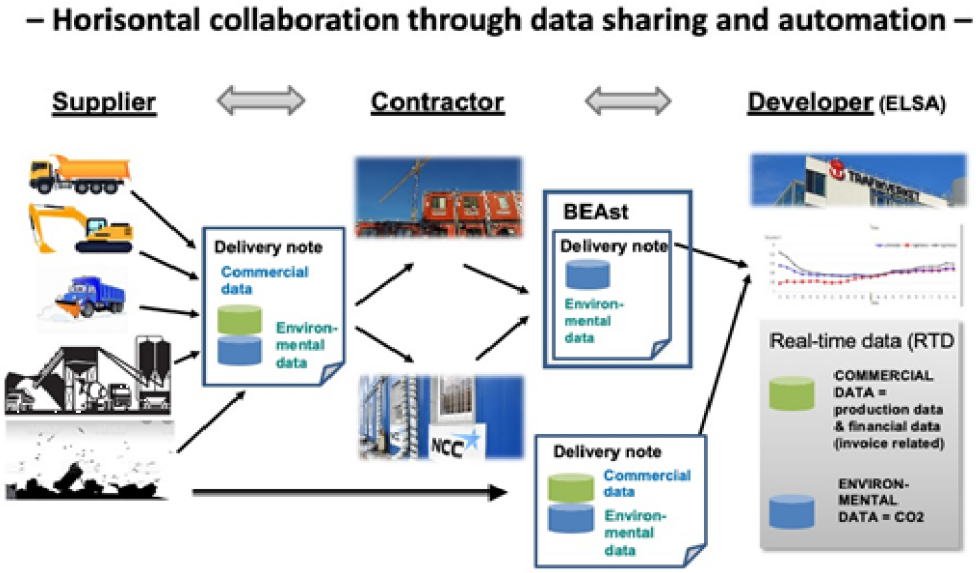
The standard is moving to be European PEPPOL compliant. PEPPOL also provides a message delivery platform as well as the message format specifications. TSA is developing IT-systems for receiving and analyzing data on energy usage and climate gasses.

TSA is providing a webservice for early pilot tests together with a main contractor, although the long-term delivery platform will be through PEPPOL message exchange brokers and network.

The main benefit of using the electronic business standard is to tap environmental and climate data off an already existing information flow with a high level of automation.

The project aim is a transition of information flows, data sharing and cyclonomic analysis through ICT using a common standard and the Single Face To Industry (SFTI) principle. This will be a tool for approaching physical sustainability on a large scale.

The parties involved in sending or receiving messages to ELSA – or to another computer system on the municipal side – should all have contracts with one another requiring the standard (KINDEN). The conveyed information should be handled by the involved parties only, according to required security and other precautions. For each party in the message chain, from haulier to contractor to final client and developer, competing systems are already offered by the market and providers are developing their products in concordance with ELSA project progress.



Scope: Uniform digital BEAst-delivery note communicated between the stakeholders

- Language
- Access.

10. DTLF implementation option

The solution may be described as focussing on

A = Peer to Peer,

All four options A, B, C, D can be utilised within this solution, as the common message format standard can be applied using any one of a number of different computer systems/platforms.

C. ORGANISATIONAL ISSUES

11. Success factors

- Total fossil carbon dioxide emissions of a contract, expressed as annual or daily tons per million (money), per kilometre of managed road, per ton of excavated masses, per ton kilometre of transported excavation masses, etc.
- Total energy turnover of a contract, expressed as annual terajoules (TJ) per same as previous.
- Portion of total project contracts of a client (million money) which require the digital standard,
- Portion of project transports (kilometres or ton kilometres) and works (machine hours) reported according to the standard,

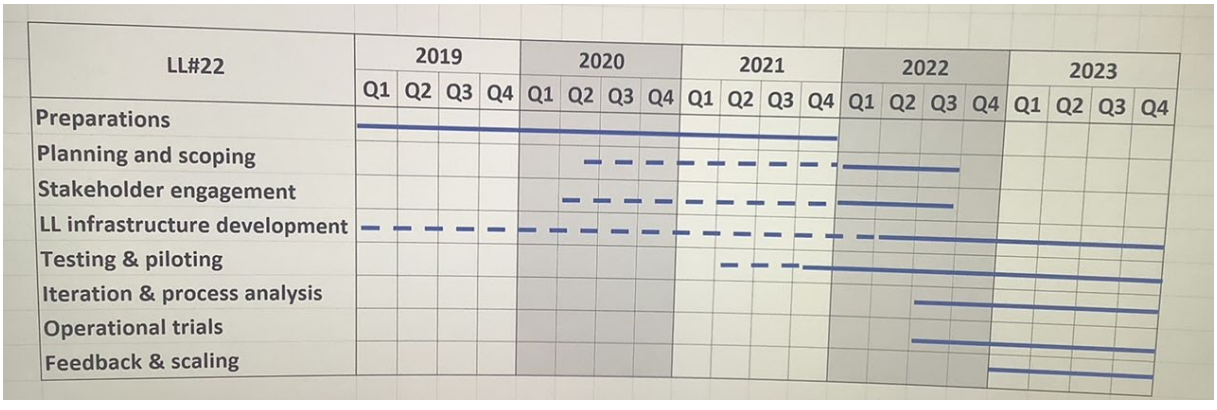
- Portion of project transports (kilometres or ton kilometres) and works (machine hours) thus automatically reported using machine data such as Controller Area Network (CANBUS) or On Board Diagnostics (OBD2).
- Rate of acceptance of the standard, in terms of total sum of budgets of clients using it.

12. Risks

Starting with major concerns and ending with very minor risk:

- Stakeholders – industry as well as clients – do not fully understand the mutual advantages of utilising the common standard instead of promoting non-aligned company-specific digital solutions.
- Smaller companies are unable to attain – by modifications andor new introduction – a sufficiently comprehensive computer system within reasonable time.
- Municipalities, especially small ones, are too slow to introduce the standard.
- Interested municipalities have too little works contracts to bring any significant contribution to the project.
- An important part of the industry chooses another path than the common standard, e.g. internet portals for reporting.
- The computer programming runs into an insoluble software problem.
- An alternative is discovered which may be better than the common standard.

13. Timing



14. Contact

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