



thinkstep



Intermodal Terminal Efficiency Calculator (ITEC)

Introduction

Intermodal terminals and providers of intermodal services are challenged by the increasing cost of energy and the need to contribute to sustainable, efficient transport chains. Terminals are depending on their layout, technologies and processes agreed upon with transport operators, which in total make the efficiency of the terminal.

Functionality

The Intermodal Terminal Eco-Efficiency Calculator (ITEC) is a tool developed to the maturity of a prototype which

- calculates the energy use and greenhouse gas (GHG) performance of intermodal terminals including all relevant operations;
- identifies the terminal's "hot spots", i.e. the main energy consumers and processes;
- points out the impact of "greening measures" already implemented and anticipates effects of planned measures.

Benefits for the terminals

Terminal owners and operators benefits are:

- ITEC can be used ad hoc (no data interfaces needed, no requirements concerning dedicated IT terminal systems or data exchange formats);
- Very detailed capturing of all energy relevant processes possible (~800 ITEC parameters might be modified on demand), see figure 1;

- In case of missing terminal specific parameters, experience figures and model calculations are available
 - Missing terminal specific data does not prevent ITEC applicability;
 - Quick, rough estimation with experience figures possible;

Alias	Terminal old	Terminal new
General Parameters		
Definition of locomotives		
Rail processes: General parameters		
Rail: Arrival process		
Operating schedule 1		
Operating schedule 2		
Line engine movement operation schedule 2		
Distance to parking position 2	0,49	0,49
Idle time line engine 2	0,25	0,25
Selection of engine types for line engine operating schedule 2		
Select line engine type 1	2	2
If type = 1: Annual number of diesel locomotives type 1	0	0
If type = 2: Annual number of electric locomotives type 1	260	260
Select line engine type 2	1	1
If type = 1: Annual number of diesel locomotives type 2	0	0
If type = 2: Annual number of electric locomotives type 2	0	0
Select line engine type 3	1	1
If type = 1: Annual number of diesel locomotives type 3	0	0
If type = 2: Annual number of electric locomotives type 3	0	0
Shunting operation schedule 2		
Distance of shunting engine approaching 2	1	1
Total idle time during shunting operation 2	0,467	0,333
Total shunting distance 2	2,44	2
Selection of engine types for operating schedule 2		
Select engine type 1	1	1
If type = 1: Annual number of diesel locomotives type 1	260	260
If type = 2: Annual number of electric locomotives type 1	0	0
Select engine type 2	1	1
If type = 1: Annual number of diesel locomotives type 2	0	0
If type = 2: Annual number of electric locomotives type 2	0	0
Select engine type 3	1	1
If type = 1: Annual number of diesel locomotives type 3	0	0
If type = 2: Annual number of electric locomotives type 3	0	0
Operating schedule 3		
Line engine movement operation schedule 3		
Shunting operation schedule 3		
Operating schedule 4		
Line engine movement operation schedule 4		
Shunting operation schedule 4		
Rail: Intermediate operations		
Rail: Departure process		
Truck operations		
Transshipment operations		
Terminal supply		
Additional Services		

Figure 1 – ITEC interface (parameters)

- Single "greening" measures can be implemented (e.g. replacement of transshipment facilities, modified rail/road infrastructure, new road check-in or wagon repair procedure);



Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013) Grant Agreement N° SCS2-GA-2012-314786 – EcoHubs



Status: April 2015



thinkstep



Traffic • Software • Service



BERATEN PLANEN UMSETZEN

- Not only total carbon footprint/"greening" effect, but detailed results:
 - Identification of "hot spots" (e.g. by processes or mode);
 - Explanation of different specific energy consumptions of terminals;
 - Evaluation of greening impact of (single) measures or measure bundles;

- Result documentation (Word/PDF) automatically generated (see figure 2);
- Visualisation of parameter modifications (scenarios) on the spot;
- Consideration of (country/terminal) specific energy mix;
- Desktop and web application available;
- Standardised template for data gathering (energy consumers and their specific consumption);
- Operational procedures can be clarified with terminal operator via video/telephone conference, using standardised check-list (small time needed);

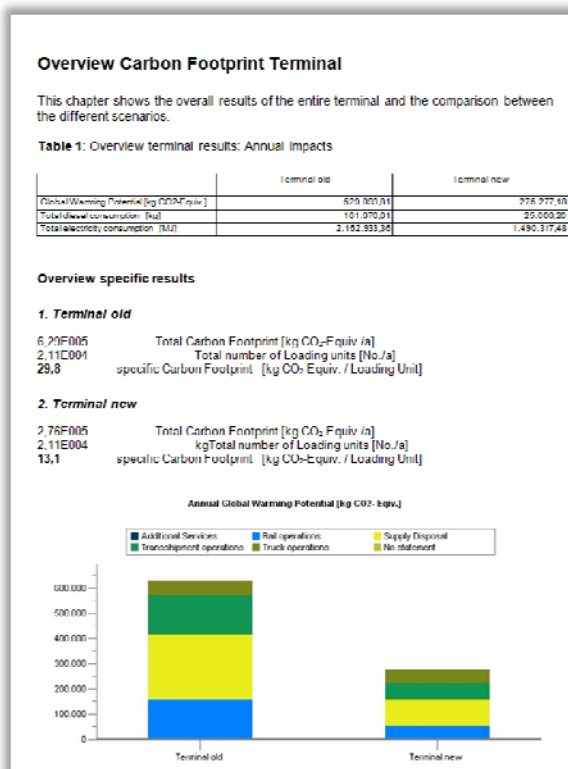


Figure 2 – ITEC Results

- Use of proven GaBi software in line with standards and respective methodical basics
 - 1st priority: use of exact, measured data,
 - next priority: use of average data or analogy methods

Benefits for the other actors

Users' of intermodal terminals benefits are:

- Functional terminal approach closes the knowledge gap to line oriented CO₂ calculators (e.g. EcoTransit) and standards (e.g. DIN EN 16258);
- Enhanced knowledge of the CO₂-footprint of intermodal terminals to improve the transport chain calculation;
- Reduction potential for rail and road operations within intermodal terminals.

Demonstrators

The following demonstration partners and use cases, all operational intermodal terminals of different size and type, are examined in the course of the EcoHubs project:

1. Interporto Bologna (IBI);
2. Stockholm Arsta (Jernhusen);
3. Ljubljana Moste (Adriakombi);
4. Antwerp Zomerweg (IFB);
5. Combinant Antwerp;
6. Neuss Trimodal.

Contacts

The product has been developed by the following companies:

thinkstep
 Leinfelden-Echterdingen
 Dr. Bärbel Hundt
 Baerbel.Hundt@thinkstep.com
 +49.711.341817425

HaCon Ingenieurgesellschaft
 mbH, Hannover
 Lars Deiterding
 lars.deiterding@hacon.de
 +49.511.33699132

KombiConsult GmbH
 Frankfurt am Main
 Klaus-Uwe Sondermann
 usondermann@kombiconsult.com
 +49.69.2443293172