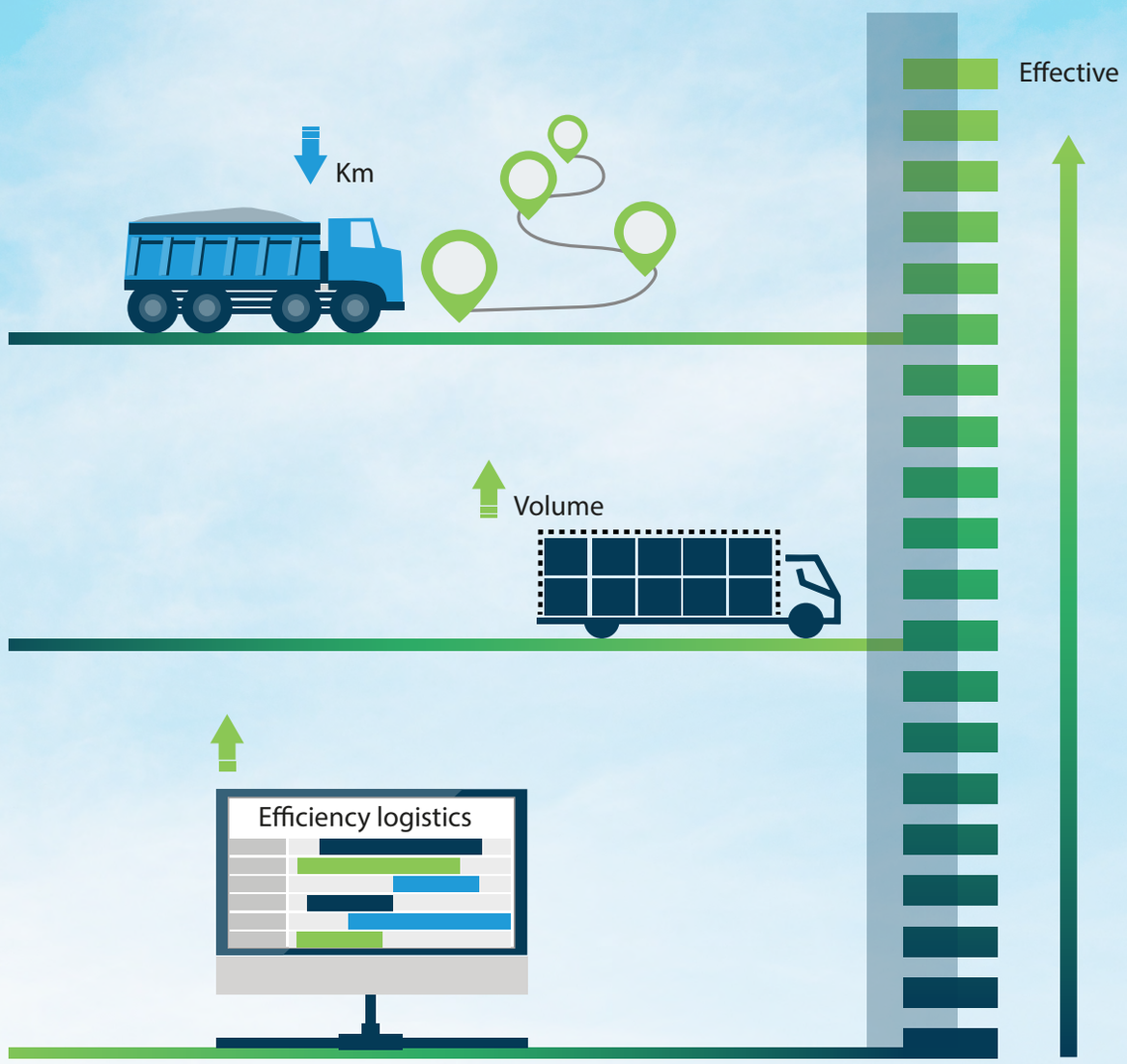
APPLICATION NOTES



LPI

Load Performance Indicator (LPI)

Maximise cargo capacity utilisation

Connekt

LEAN & GREEN EUROPE

Topsector Logistiek

Colophon

Load Performance Indicator (LPI)
Maximise cargo capacity utilisation

Application notes

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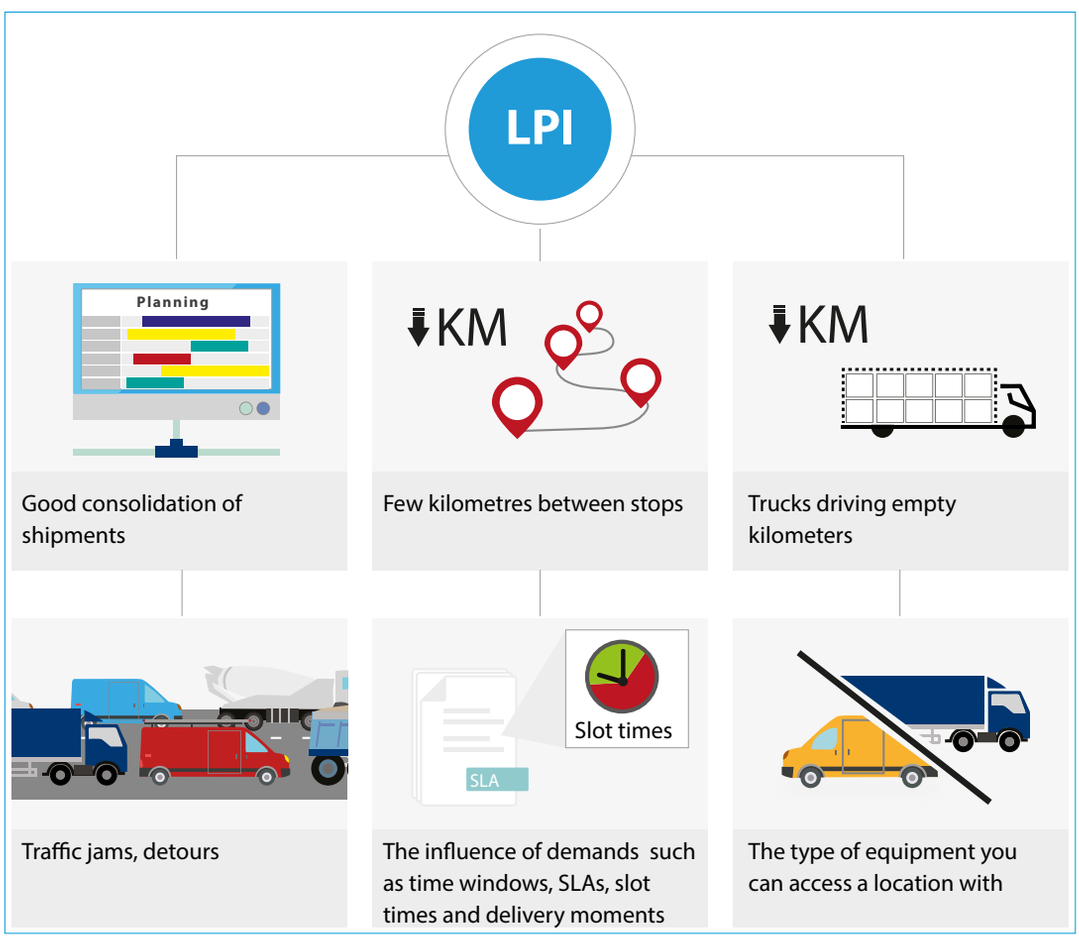
Connekt/Topsector Logistiek
Ezelsveldlaan 59
2611 RV Delft
+31 15 251 65 65
info@connekt.nl
www.connekt.nl

Load Performance Indicator

Maximise cargo capacity utilisation

LPI is an indicator that shows how efficiently cargo capacity is deployed on routes. The better the planning and the bigger the type of equipment, the greater the efficiency. This is influenced by different factors:

- good consolidation of shipments;
- few kilometres between stops;
- trucks driving empty kilometers;
- traffic jams, detours;
- time windows, SLAs, slot times and delivery moments;
- the type of equipment you can access a location with.

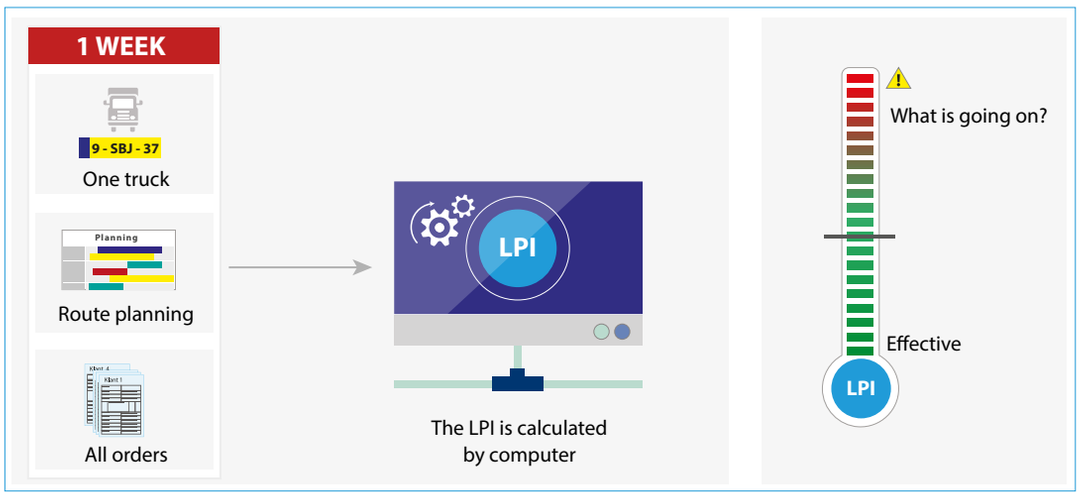


The higher the LPI, the fuller the vehicles and the fewer vehicles are therefore needed. This saves vehicle kilometres. In this way, we are making maximum use of scarce resources such as available transport capacity and the available infrastructure. By striving for the highest possible LPI, we also reduce the impact on the environment and climate.

The LPI is calculated by computer by analysing the planning. The LPI can be calculated per journey, but also for a particular period, for example a week. The higher the LPI, the more effectively the cargo capacity is being deployed.

A lower LPI is a signal to identify the reason for that lower figure:

- Has a small type of equipment been used?
- Is the planning not as good as it could be?
- Or are the framework conditions to enable good planning not in place?



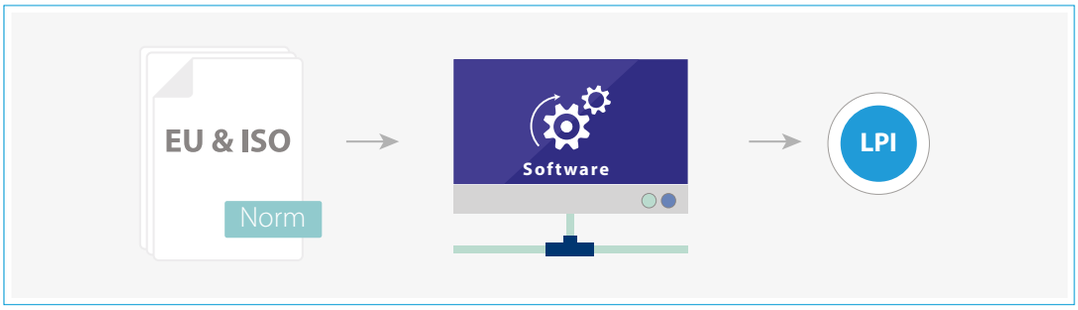
The LPI is a weighted average load. The LPI is normally expressed in weight or volume. These are actual limiting factors because you are not permitted to load beyond the maximum cargo capacity and you cannot load beyond the maximum volume of a vehicle. The maximum LPI therefore depends on the maximum cargo capacity of the vehicle.

In order to align with the units used in planning, the LPI can also be converted into units such as:

- weight;
- volume;
- load metres;
- Euro pallets;
- block pallets;
- rolling containers;
- packages;
- TEU.

LPI automation

An LPI calculation is a more in-depth CPI calculation. A CPI calculation is concerned with CO_2 emissions per ton.km based on existing EU standards and forthcoming ISO standards. The calculation can easily be automated. If the loading/unloading locations, the cargo and the capacity of the vehicle used are known, IT vendors will easily be able to calculate the LPI with the route map. A method is being worked out with IT vendors for the logistics and transport sector to integrate this into FMS and TMS systems, and into planning systems.



Brief explanation of LPI calculation

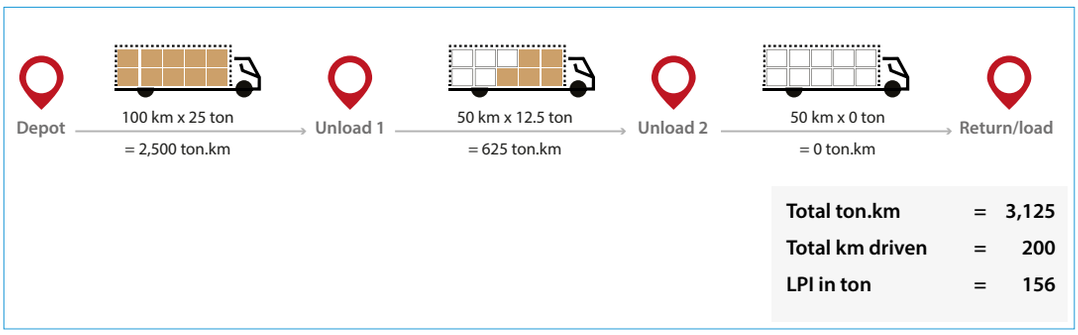
When calculating the LPI, we look at the average load of a journey expressed in tons (or volume, i.e. m^3). The amount carried is considered per leg of the journey. For this reason, it is important to know the route and to know how much is loaded or unloaded at each loading/unloading location.

In the example below, a truck departs from its own depot fully loaded, carrying 25 tons of cargo.
After 100 kilometres, the vehicle reaches its first stop.
By that point, it has covered 100 km with 25 tons of cargo, 100 km x 25 tons = 2,500 ton.km.

At the first stop, the driver unloads 12.5 tons and continues the journey with 12.5 tons remaining on board.
After 50 km, he unloads the remaining cargo, 50 km x 12.5 tons = 625 ton.km.

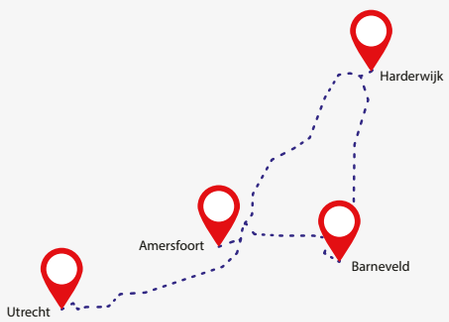
Now empty, the truck drives another 50 km to the address where the driver will load the truck for the return journey, 50 km x 0 ton = 0 ton.km.

Adding it all up, the driver has carried 3,125 ton.km by the time he reaches the return address.
The driver has driven 200 km.
The average ton is therefore 3,125 / 200 = 15.6 ton.
Up to this point, the journey therefore scores an LPI of 15.6 ton.



Examples

Below, the LPI (in average tons) and the average load factors have been worked out for two fictitious groupage journeys. For both variants, an example with more and less cargo has been worked out. These examples could be worked out in exactly the same way with cubic metres.



Example 1a:

The LPI of the journey is 2,960 / 156 = **19.0 tons** - the average load factor is **75.9%**.

Location	Loading/ unloading	Cargo (tons)	Load factor (%)		Km	Ton.km
Utrecht	+25					
Utrecht - Amersfoort		25	100%		41	1,025
Amersfoort	-10					
Amersfoort - Harderwijk		15	60%		29	435
Harderwijk	-15					
Harderwijk - Barneveld		0	0%		26	0
Barneveld	+25					
Barneveld - Utrecht		25	100%		60	1,500
Utrecht	-25					
Total			**75.9%**		**156**	**2,960**

Example 1b:

The LPI of the journey is 2,405 / 156 = **15.4 tons** - the average load factor is **61.7%**.

Location	Loading/ unloading	Cargo (tons)	Load factor (%)		Km	Ton.km
Utrecht	+15					
Amersfoort - Amersfoort		15	60%		41	615
Amersfoort	-5					
Amersfoort - Harderwijk		10	40%		29	290
Harderwijk	-10					
Harderwijk - Barneveld		0	0%		26	0
Barneveld	+25					
Barneveld - Utrecht		25	100%		60	1,500
Utrecht	-25					
Total			**61.7%**		**156**	**2,405**

Examples of trucks with a maximum capacity of 25 tons.

Example 2a:

The LPI of the journey is 54 / 74 = **0.7 tons** - the average load factor is **48.6%**.

Location	Loading/ unloading	Cargo (tons)	Load factor (%)		Km	Ton.km
Utrecht	+1.5					
Utrecht - Amsterdam		1.5	100%		33	49.5
Amsterdam	-0.5					
Amsterdam - Amsterdam		1	75%		2	2
Amsterdam	-0.5					
Amsterdam - Amsterdam		0.5	33%		5	2.5
Amsterdam	-0.5					
Amsterdam - Utrecht		0	0%		34	0
Utrecht	-0					
Total			**48.6%**		**74**	**54**

Example 2b:

The LPI of the journey is 27 / 74 = **0.4 tons** - the average load factor is **36.5%**.

Location	Loading/ unloading	Cargo (tons)	Load factor (%)		Km	Ton.km
Utrecht	+0.75					
Utrecht - Amsterdam		0.75	100%		33	24.75
Amsterdam	-0.25					
Amsterdam - Amsterdam		0.5	33%		2	1
Amsterdam	-0.25					
Amsterdam - Amsterdam		0.25	16%		5	1.25
Amsterdam	-0.25					
Amsterdam - Utrecht		0	0%		34	0
Utrecht	-0					
Total			**36.5%**		**74**	**27**

Examples of trucks with a maximum capacity of 1.5 tons.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