

# THORN

LIGHTING PEOPLE

## Case Study

Toven Tunnel, Norway



Photographer: Jan Fredrik Eliassen, Norwegian Public Roads Administration

# Toven Tunnel - the world's longest tunnel equipped with LED lighting



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## Background

At 10,7 km long, the new Toven Tunnel in Nordland, Norway, has become the world's longest tunnel equipped with a complete LED lighting solution. Technical Manager at Thorn Lighting, Hans Øien, explains: "Toven tunnel is a new tunnel subject to a relatively low amount of traffic. This means a traditional lighting scheme would have resulted in a vast amount of wasted energy. The developer therefore wanted to employ modern LED technology to achieve optimal energy efficiency and a high standard of road safety."

## Lighting objectives

Senior Engineer, Per Ole Wanvik of the Norwegian Public Roads Administration, said: "We already had good experiences of working with Thorn and going by what we had experienced from other suppliers, we knew Thorn's road lanterns offer good uniformity and superior performance."

Above all, the top priority was to provide light which would meet or exceed the safety requirements for the tunnel. Low energy consumption however was another key objective. A holistic approach was crucial in achieving these objectives so Thorn collaborated with Scanmatic, a company specialising in electrical infrastructure design and construction.

## Product



GTLED



### Lighting solution

Thorn's GTLED luminaire offered the ideal solution for Toven tunnel. GTLED is an advanced LED tunnel luminaire delivering energy savings and outstanding lighting comfort. Its clear white light with good uniformity gives the driver an optimal view of the road and oncoming traffic while preventing glare.

To further increase energy savings, presence detection and daylight sensors have been employed. The presence sensors automatically and instantly turn the lights on and off according to the traffic travelling through the tunnel while the daylight sensors adjust the light output according to the light outside.

### Results and benefits

The lighting solution has either met or exceeded all lighting requirements, with a luminance level in the inner zone of  $0.7\text{cd/m}^2$ , which exceeds the requirement of  $0.5\text{cd/m}^2$ .

GTLED's efficient LED lamps typically use 21% less energy compared to conventional alternatives. When combined with the intelligent lighting controls employed at Toven tunnel, this figure increases to 70% to secure substantially lower energy costs.

As well as ensuring low energy consumption, the LED lamps provide a long, low maintenance lifetime. This is particularly beneficial for tunnel lighting where maintenance is often difficult and expensive. GTLED offers a lifetime of 100 000 hours or the equivalent of 11 years – as much as 84% longer than traditional luminaires.

Hans Øien adds: "Toven tunnel is a good example of a secure tunnel in which we have met or exceeded all the safety standards while ensuring it does not use more energy than necessary. A win-win situation!"



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**eControl** From Thorn's 15 ways to save energy, the following are key to minimising energy consumption at in Toven tunnel:



#### Light distribution

Good control of cut-off angles not only means energy is used efficiently but also ensures very low glare for the highest standard of road safety.



#### System efficacy

The overall efficiency is optimised using advanced LED technology and precision lenses.



#### Maintenance schedule

LED lighting with a long life requires minimal maintenance. A stable operating temperature and motion control will further reduce the need for maintenance.



#### Presence/absence detection

Presence detectors automatically turn lights on and off according to the traffic in the tunnel. This prevents energy being wasted lighting an empty space.



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