

Billions to be saved with energy-saving roads

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Traffic is the second-biggest source of CO₂ emissions to the atmosphere. While new legislation and a variety of different initiatives have succeeded in breaking the pollution curve for industry and other sectors, traffic pollution is still increasing. The continued growth in vehicle traffic is the main culprit, and car and tyre manufacturers face a challenge to produce cars that cause less pollution. The road sector, however, can also make a contribution towards reducing CO₂ emissions by developing and using new energy-saving pavement types that cause less rolling resistance between the vehicle tyres and the road and thereby reduce fuel consumption.

New report on rolling resistance reduction

Denmark and Danish drivers will be able to save more than DKK 300 million a year in petrol and diesel costs by using new energy-saving asphalt surfaces on the State road network. Such is the conclusion of a new development project and report prepared by staff at the Danish Road Directorate, Dynatest, NIRAS and NCC Roads. The necessary investment would be recouped in the form of fuel savings and a reduction in CO₂ and nitrogen emissions, thus benefiting not only society and drivers, but also the environment and the climate.

Roads allow vehicles to travel further per litre

New energy-saving asphalt surfaces will provide lower rolling resistance. This means the road surface is smooth and less “rough” so vehicles require less fuel when travelling. The report shows that vehicles consume 3.3% less fuel when travelling on energy-saving roads. This applies to all types of vehicles – cars as well as lorries and buses. The energy-saving asphalt surfaces are just as safe as the asphalt surfaces we use today. At the same time they are quieter and therefore more pleasant for drivers and for the people who live and work next to the roads.



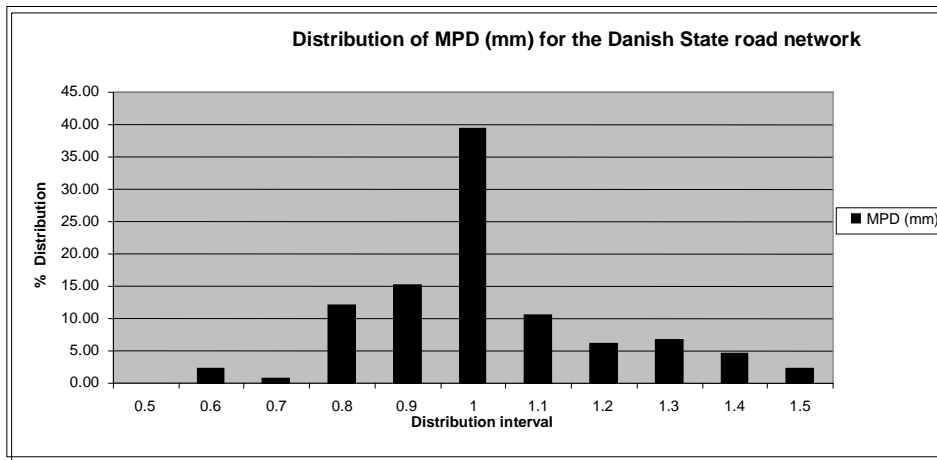
Rolling resistance measurement using measuring trailer from TU Gdansk

Road roughness

Tests carried out in connection with the development of the report show that road roughness is the greatest determining factor in terms of rolling resistance. The level of smoothness is also of significance, while the rigidity of the wearing surface only has a minor effect on rolling resistance.

The roughness of a road is specified by the mean profile depth or MPD. The higher the MPD figure the rougher the texture, and the lower the MPD figure the finer the texture. Experience shows that an MPD of 0.6 provides a sufficient degree of roughness to allow vehicles to steer and brake without any problem.

The following table provides a summary of the MPD figures for the Danish State road network for 2008. As may be seen, the MPD figure for most sections is higher than 0.6.



Distribution of MPD (mm) for the Danish State road network based on measurements taken in 2008

Renovating the State road network at no cost

If we opt to use energy-saving road surfaces – i.e. road surfaces with a low rolling resistance – on the State road network instead of the standard road surfaces in use today, we stand to save at least DKK 300 million a year. This corresponds largely to the DKK 330 million budgeted annually on average for maintenance of the State road network over the coming years. If we set aside the money for new energy-saving roads, we can renovate and maintain the entire State road network at virtually no cost to the country. The investment will, quite simply, be recouped by society through fuel savings and a reduction in CO₂ and nitrogen emissions.

The principles that apply to the State road network apply equally to the busiest municipal roads, meaning the social gain could be even greater than DKK 300 million a year. It goes without saying that the roads in question must be heavily trafficked in order to achieve fuel savings as a result of lower rolling resistance.

45,000 tonne reduction in CO₂

Around a third of Denmark’s total CO₂ emissions originate from the transport sector. Vehicle traffic is one of the greatest sinners in terms of CO₂, and there are therefore huge potential gains to be made in terms of the climate and the environment by reducing the amount of petrol and diesel consumed on our roads. Using energy-saving surfaces on the State road network would allow us to reduce fuel consumption by 3.3%, and that would make quite a difference. We would be in a position to save 48 million litres of fuel, thereby reducing Denmark’s CO₂ emissions by 45,000 tonnes and sparing the environment from 76 tonnes of nitrogen. “And that’s every year, mind!”

Denmark as an environmental pioneer

The energy-saving asphalt road surfaces will save drivers several hundred Danish kroner every year in fuel costs. Ultimately, however, the social implications of energy-saving road surfaces are far greater. We, as a society, would be able to save as much on the State road network as we invest in it annually. Another advantage of energy-saving roads is that they would contribute considerably towards Denmark’s efforts to achieve both global and EU climate and environmental goals.

We have the basics for energy-saving asphalt surfaces

Both NCC Roads and the rest of the Danish asphalt sector have been working intensely on the development of thin noise-reducing asphalt wearing surfaces for the past five to ten years. This work has

put Denmark on the world map as regards expertise in this field. Many noise-reducing surfaces have already been produced using this technology in Denmark, and some of these have been shown, uniquely, to meet the prerequisites for energy-saving asphalt surfaces. In the future, noise reduction and energy savings are two factors that can be made to go hand in hand.

From vision to reality

There is still some development work to be done before we can turn our vision of “*The energy-saving asphalt surfaces*” into reality, but in Denmark in particular we have a unique basis for this development. The perspectives for driver experience and the reduction in environmental impact are hugely promising, and since society also stands to save a great deal of money, we must secure the funding necessary to undertake this development work as soon as possible – the sooner the better.

The report, which is available in both Danish and English, is split into a technical section and a socio-economic section.

The reports may be downloaded from www.ncc.dk/greenroad

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Authors of the socio-economic report:

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The presentation will be given in ‘Scandinavian’.