

Maintain or replace?

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Yesterday was in the news that in the coming years billions will be invested in expanding rail capacity because of the growing number of travelers in the Netherlands¹. In any case, a solid growth of 30% was already foreseen in the next ten years, but due to increasing traffic congestion, another 15% is added. This therefore amounts to a growth of almost 5% per year. From a sustainability standpoint this is extremely good news. There is little doubt that the environmental burden of a passenger kilometer in public transport is much lower than in a car, especially if you are alone. Moreover, CO₂ emissions from public transport are largely centralized (blast furnaces and factory for the production of the transportation equipment, power station for electricity supply), while the car is largely distributed. CO₂ is relatively easy and cheap to capture centrally, in contrast to the CO₂ that has once been released into the atmosphere². The message also showed that a lot more money is needed, because local public transport solutions also have to come as light rail. We wholeheartedly agree with that. After all, we have positioned our head office near a light rail station for a reason. The only problem is that no trains will stop there for the moment³, a solution is not yet in sight⁴. Our mouth was indeed open from surprise when it turned out that the solutions are hindered by a train with a fixed speed of 80, 100 or 140 km per hour. Winning time by driving 120 (which may just be possible on that soil) is therefore impossible because it is not built into the security system as an option. That is what happens to us as if you had to go from Groningen to Leeuwarden via Heereveen, Irnsum, Joure and Koudum because that is the order of the alphabet. The route from Car to NS or from railway manager Prorail to Station will then have a lot of stops. From the amazement we draw our conclusion: we still have to apply the car for a while.

An annoying side effect is that in our Strategic Asset Management Plan we had counted on the availability of public transport. As we predicted in 2014⁵, from an economic point of view you better continue to drive in your current car than to buy a new one, even if the new one is much more efficient and there are higher maintenance costs for your current car. After all, you can pay a lot of extra costs from the extra depreciation of a new car. The fact that these additional costs are higher than the actual value of your car is not a limitation. After all, it's about the marginal value: what do you get back for the euro you spend. Although the relationship between age and failure of a complex system such as a car is not very clear, in general costs increase and reliability decreases, so at a given moment replacement will be more attractive. We had hoped to postpone this moment (our cars now have very respectable odometer readings) by travelling more by train, but unfortunately, we will have to make a new recital. That in itself is good, because until now we had not included sustainability and that can now be taken into account.

Back to the equation. Imagine you have a well-run car with a consumption of 8 liters of diesel at 100 km (at € 1,40 per liter), a yearly mileage of 30.000 km and maintenance costs of 1.000 euros per year. Due to the mileage, larger repairs can occur: automatic transmission revision, replacement of turbo, surfaces of the cylinder head, exhaust and catalytic converter, drive shafts and the like. All these repairs are on the order of at most several thousand euros, let's say a maximum of 5.000 euros per repair. In total, an additional repair post of 15.000 euros is expected over the next 5 years, more than the current value of the car (around 10.000 euros). A new comparable car costs 50.000 euros. This car is slightly more economical (factory specification 6 liters at 100 km) and will not provide additional maintenance costs in the next five years. A second alternative is a fully electric car. This consumes 20 kWh per 100 km (at € 0,20 per kWh). Purchase is unfortunately a lot more expensive, about 80.000 euros. In the table below

¹ <https://www.nu.nl/binnenland/5291477/prorail-steekt-miljarden-in-vernieuwen-spoor.html>

² <http://www.assetresolutions.nl/en/column/circular-co2>

³ <https://www.destentor.nl/kampen/live-station-stadshagen-in-zwolle-gaat-voorlopig-niet-open-aa7ca5e9/>

⁴ In <https://www.ad.nl/zwolle/sneller-overstappen-in-zwolle-oplossing-voor-kamperlijntje-a5f60e84/>, a reasonable alternative is mentioned.

⁵ <http://www.assetresolutions.nl/en/column/replace-or-maintain>

we have put the options side by side for the 5-year period. First we compare the costs, then we also take the CO₂ into account⁶. All amounts have been converted to cost per year for comparability.

Aspect	Current car (8 l/100km)	New car (6l/100km)	Electric car (20 kWh/ 100km)
Fuel cost (30.000 km/jr, €1,40/l)	2400*€1,40=€ 3.360	1.800*1,40=€ 2.520	6.000*€0,2=€ 1.200
Extra maintenance per year	€ 3.000	-	-
Depreciation (16% per year)	€ 1.600	€ 8.000	€ 12.800
Total economic cost per year	€ 7.960	€ 10.520	€ 14.000
CO₂ impact fuel (2,5kg/l)	2.400*2,5= 6.000 kg	1.800*2,5=4.500 kg	0 (sustainable electricity)
Value including CO₂ fuel (1€/kg CO₂)	€ 13.960	€ 15.020	€ 14.000
Production weight (car or parts)	300 kg	1.500 kg	2.000 kg
CO₂ impact production⁷ (20kg/kg) per year	1.200 kg	6.000 kg	8.000 kg
Cost CO₂ (1€/kg) per year	€ 7.200	€ 10.500	€ 8.000
Total value (1€/kg CO₂)	€ 15.160	€ 21.020	€ 22.000
Total value (CO₂ production 0,1 €/kg)	€ 14.080	€ 15.620	€ 14.800

Looking purely at the economic costs, the maintenance of the current car clearly wins by about 8.000 euros per year. A new car is about 2.500 euros more expensive per year, an electric car (without tax benefit) a further 2.500 euros. If the CO₂ effects of the fuel are taken into account, the alternatives will creep very close together. The current car and EV score then almost the same and the new car is less than 10% more expensive. In asset management terms all equally good. This changes again if the (hidden) production costs of the car are also taken into account. The repairs also require material, but that is a fraction of a new car. An electric car is much heavier because of the battery pack. In total, it means that for a new car there is not a lot of difference between an electric or fossil fuel powered car, but the current car here performs 30% better. Now one can say that the CO₂ of the production is not distributed and therefore easier to capture. But even if you calculate here with a different value, the current car remains the best.

Does this now give you a license to keep racing old cars? The answer to that of course is no. If a car is used a lot then the variable costs play a bigger role and it will be more attractive to buy a more efficient one. But with low usage, production costs will dominate and continuing with the current asset will be better. Maintaining the old car and travelling more by train is than the optimal combination. If the train however would cooperate once. Until that time, we just keep moving. In the context of sustainability, we will try to limit the usage of our existing cars. We will keep you informed.

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⁶ Excluding regular maintenance, road tax and insurance, these are the same for a new car and therefore do not play a role in the comparison

⁷ This number is uncertain. Estimates amount to about 30 kg of CO₂ per kg of complex product, but are recycled on cars. The value of the raw materials is about 10 kg CO₂ per kg. For the calculation, therefore, a value of 20 kg of CO₂ per kg of product has been used