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## “Pay As You Drive“ – An innovative car insurance concept

PAYD will give motorists greater control, choice and flexibility over their car insurance premium. Customers who drive less will pay less. And drivers, who avoid peak hours and dangerous roads, can save even more. Find out more about PAYD, that links auto insurance policies to mileage, and the technology behind this new concept.

**Tailored motor insurance premiums could be the future for car insurance. Customers will pay a usage-based insurance premium and will receive an itemized bill, similar to utility bills. PAYD allows premiums to be calculated on when, where, how far and how fast customers drive their vehicle. Using GPS technology (Global Positioning System), the driving habits are monitored and the trip data is used for the calculation of the insurance.**

### **Drive less, pay less**

Less time on the road equals fewer accidents. This is advantageous for both drivers and insurance companies. Usage-based insurance concepts like Pay-As-You-Drive reward low-mileage drivers for minimizing the accident risk by offering lower insurance premiums. In addition to the vehicle mileage there are also other risk factors which have to be incorporated into the fee. Insurance companies have statistics about when and where the risk of being involved in an accident is very high. The majority of road accidents occur in the morning rush hour, the worst accidents happen at night, especially during the weekend. Often times young drivers are involved in crashes. Country roads are more dangerous than motorways with separate lanes. Drivers who avoid these dangerous times and routes will save even more with PAYD insurance.

Low-risk drivers, who are currently overcharged, will particularly benefit from personalised insurance pricing. Senior citizens, for example, tend to drive less frequently and to avoid hazardous situations like rush-hour traffic. Pay As you Drive is therefore of particular interest to this growing target group.

Additionally, young drivers will benefit from PAYD pricing. Normally, they must pay much higher premiums than older people as traditional insurance concepts allocate them to the group of high-risk drivers. However, PAYD allows drivers to take an active role in reducing the cost of their insurance by driving sensibly.

## Who can save with Pay As You Drive car insurance?

- ▶ Low-mileage drivers
- ▶ Young drivers who drive sensibly
- ▶ Drivers who avoid rush hours and frequently use their cars on the weekend
- ▶ Drivers who adhere to speed limits

## The technology: Telematics box records vehicle usage

Drivers, who choose PAYD, receive a telematics box that is fitted into the customer's vehicle. It consists of a GPS module and records the GPS signals during the journey. Data about the current position, direction and speed of the vehicle as well as the date and time are collected and transmitted on a regular basis to the data centre of the insurance company or its system provider for map matching. This means that the GPS data is matched to the road network of a digital map in order to provide information about the route that was taken. The route data is then analysed on the basis of the relevant parameters, such as distance, type of road, time categories (e.g. rush hour, during the week, on the weekend) or speed, and used for billing purposes.

## Who is offering PAYD?

Norwich Union, the largest insurance services provider in the UK, was the first car insurer to introduce Pay As You Drive insurance. It is a trademark of Norwich Union in England. Norwich Union insurance premiums are calculated on a per mile rate. Customers only pay one penny for a mile on the motorway during off-peak hours - but seven pennies for each mile on country roads at night.

Young drivers tested a system in Denmark over a period of three years which recorded the trip data and warned of speeding. The system warned the driver as soon as he or she exceeded the local speed limit. Three hundred test drivers reduced their speed by six to seven kilometres per hour and the accident risk decreased by 25 per cent.

Other European countries, such as Italy, Austria, Switzerland, the Netherlands and Germany, are also testing or using this model. In Germany, the WGV insurance company has started a PAYD pilot study with 1,500 young drivers road-testing this technology. The Swiss Zurich insurance company is also pilot-testing the usage-based insurance concept.

## Integrating telematics and assistance services

Telematics devices allow insurance companies to combine PAYD with additional services, such as

- ▶ Automatic emergency call after an accident
- ▶ Fast roadside assistance
- ▶ Travel assistance

- ▶ Anti-theft devices
- ▶ Car locator to track stolen vehicles

These telematics and assistance services are based on GPS vehicle tracking technology. In the event of a vehicle breakdown, the in-vehicle telematics box transmits the vehicle's current GPS coordinates to a call centre or emergency centre through a single button push. The agent locates the vehicles via GPS tracking and contacts the appropriate breakdown service. The telematics service sector has become a multi-billion dollar market in North America. Motorists in the US subscribe to these advanced telematics and roadside services and spend about twenty to thirty US dollars a month for greater safety and comfort.

### **Why is Pay As You Drive the future for car insurance?**

Telematics solutions are also increasingly being used in Europe. The technical requirements regarding GPS coverage and the functionality of communication systems have been fulfilled. And the political climate contributes to this trend. The European Union relies on telematics systems in order to increase road safety and reduce the number of people in emergency situations. eCall is a major EU-funded project. The European Commission's aim is to introduce the telematics-based emergency call system as a standard option for all new cars in 2010. Twelve EU member states, the European Automobile Manufacturers' Association (ACEA) and numerous organisations have signed the Memorandum of Understanding (MoU).

Pay As You Drive has also a positive impact on the environment. It is expected to reduce the number of private trips and people will be encouraged to use public transport which will result in less air pollution.

Additionally, road safety will be increased because the new incentive has a great impact on driving behaviour, especially on young drivers. During a two-year test period, Norwich Union found out that the accident rate of young drivers aged 18 to 23 decreased by 20 per cent. The study in Denmark showed similar results: young drivers reduced the average speed by four to seven kilometres per hour. The accident risk also decreased by 25 per cent.

### **Does the driver become too "transparent"?**

But Pay As You Drive and its effect on data protection is also a hotly debated topic. Customers may find "big brother" privacy aspects of a satellite-based tracking system unappealing. Peter Schaar, Germany's Federal Commissioner for Data Protection and Freedom of Information is concerned about the potential danger that the collected data might also be used for other purposes, such as law enforcement.

However, he does not see any general risk appertaining to the use of the data because customers have freedom of choice - whether or not they sign up and have the in-car device installed is a purely voluntary act. Insurance companies provide usage-based insurance premiums as an option, which means that only

customers, who can cut premium costs, will choose this personalised type of insurance. Traditional insurance concepts are still available.

Insurance firms also seek to protect PAYD customers' personal information. Insurance companies have always had access to sensitive customer data and must adhere to strict guidelines on how they collect, use, disclose and finally destroy any personal data. However, no driver wants the insurance company to collect detailed information about all his or her trips and driving behaviour. This problem can be solved by strictly separating data collection and evaluation from billing processes. The information is therefore collected and evaluated anonymously by a service provider. The insurance company receives only aggregate data, which means general time categories and road kilometres for each street/road category. No information about the exact route or date and journey time is transmitted. Only the customer gets an itemised bill which contains a breakdown of all journeys so that he or she can easily check his or her bill.

It is also possible to evaluate the journey data with the help of the telematics box. Only the evaluated, aggregate data will then be transmitted from the vehicle to the data centre. The GPS data will be deleted from the box after data evaluation.

## **PTV technology for matching GPS data to the map**

PTV is involved in several pilot studies on Pay As You Drive. The company's geo-software solutions are used for these projects to reconstruct and evaluate the journeys. The software matches the GPS data to a digital map, and thus reconstructs the route travelled and evaluates the appropriate parameters. They vary according to the insurance company's pricing model. Basic models just count road kilometres whereas more complex pricing models take peak/off-peak structures and street/road categories into account. Additional parameters, such as street/road and time categories must be included for this type of insurance policy.

Map matching, which means matching GPS data to the road network of a digital map, is central to the evaluation process. Under good reception conditions, a GPS device can pinpoint a vehicle's position down to the nearest metre. However, poor satellite geometry can lead to inaccurate data so that a vehicle's position might deviate up to 20 metres from the actual location (e.g. next to the road or between two parallel roads).

Therefore, map matching is a decisive factor. The software matches each GPS coordinate to a road network of a digital map and allocates the GPS coordinate to the road actually taken. Different parameters, such as direction, speed and direction history, are included in the process. If a motorway runs closely parallel to a country lane and the GPS coordinate between the motorway and the country lane is inaccurate due to bad satellite reception, matching problems might occur. However, the software considers the vehicle speed of 140 kilometres per hour and allocates the coordinate to the motorway and not to the country lane.

## Other technical features for Pay As You Drive

Map matching is not the only solution for evaluating the driven route. PTV technology allows users to divide maps into different areas of any size and to allocate certain risk categories. The evaluation is then based on the total amount of road kilometres that a vehicle travelled per area category. The GPS data must only be matched to the correct area. No map matching down to one metre is required.

The PTV RoadRunner software components also allow data to be evaluated in the telematics box. Only the evaluated, aggregate data will then be transmitted from the vehicle to the data centre. This is an interesting option, especially with regard to the protection of personal data. A speed alert system can also be integrated because map matching is instantly performed in the vehicle and not at a data centre.