

## Bachelor or Master projects within the ASPARi research unit

Company and Location	The student will initially be based in the ASPARi research unit at the University of Twente
Type of project	B.Sc and M.Sc project depending upon needs and time available
Title of topic	<b>Sustainability assessment of Asphalt pavement product to reduce energy usage and CO2 emission</b>
Project background / context	<p>The Transportation Sector has significant and complex impacts both in their construction, use, maintenance phase and end of life phase. A considerable amount of energy and materials that include bitumen and aggregates, are required to build and maintain the roads (Butt et al. 2014) and generates potentially harmful emission in the environment as well as higher costs. In addition to the technical objectives, environmental impact and sustainability are increasingly being considered in the design of the roadway and other infrastructure projects (Zapata and Gambatese 2005).</p> <p>In the Netherlands, the Dutch Roads Agency (RWS) is following a sustainability approach in all its activities and has officially decided to apply sustainable procurement for all tenders on projects from 2010. In this way, RWS will have a strong impact on the development of a sustainable operating market in the civil sector through their procurement policy (Ven et al. 2012). This will encourages industries to develop advanced and innovative technologies to reduce the use of non-renewable fossil fuels, in order to reduce emissions and exposure. The introduction of low temperature asphalt mixtures is an important development/initiation made by the road industry for new solutions for sustainable production (Doh et al. 2010).</p> <p>Approximately 10 million tons of asphalt mixtures are produced annually in the Netherlands (Ven et al. 2012), in which the ASPARi network contractors are collectively responsible for more than 80% of the asphalt turnover in the country i.e. in excess of 8 million tonnes each year. With such a huge production of asphalt, it is important to study how this can be produced in a sustainable way. Therefore, the theme for the student project: Developing and implementing models to reduce Energy usage and CO2 emissions at asphalt plants and on construction sites, will add the value for the sustainable production of asphalt.</p>
Research method	To assess the sustainability of asphalt, it is important to consider their entire life cycle and to evaluate the environmental and economic impacts associated with the raw material extraction, the production, transportation, recycling, disposal etc. of the materials. For this project, the student will be trained and required to use the software tools Ecochain or GaBi for assessing the sustainability of part of the asphalt

supply chain. The actual scope of the project will be defined in discussion with the supervisors whose names are given below.



(Aggregate Industries, 2015)

Fig 1: The life cycle of asphalt Pavement

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