Solar Highways - a sustainable solution

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1. Rijkswaterstaat - mission

- Rijkswaterstaat is the executive organisation of the Dutch Ministry of Infrastructure and the Environment.
- Maintenance and development of national roads, waterways and open waters, and support a sustainable environment
- Rijkswaterstaat ensures the Dutch
  - dry feet
  - sufficient and clean water
  - a smooth and safe transport on the national highways and the main waterways
  - reliable and useful information
Rijkswaterstaat in a nutshell

- around 8,800 employees in 2013
- annual budget: 4.8 billion euro in 2013
Daily tasks

- supervision of public works and water management
- construction, maintenance and improving of infrastructure and water works
- regional consultations about traffic- and transportation issues with other organisations that maintain roads and waterways
Rijkswaterstaat’s area of management

Rijkswaterstaat is in charge of three national infrastructure networks
Main Highways Network

- > 3,000 kilometres of main highways,
- Including
  - Viaducts
  - Tunnels
  - Bridges
  - Ecoducts
  - Noise barriers
2. Solar Highways
Winning energy with a noise barrier

CONTEXT
- Dutch noise legislation Rijkswaterstaat – measures, noise barriers
- Policy of Rijkswaterstaat - more sustainability and innovation

OBJECTIVES
- Demonstrate the technical integration of bifacial PV cells in noise barriers
- Show the environmental, social and financial benefits
- Cooperate with stakeholders
Solar Highways - facts

Budget information: € 3.740.724
% Life+ 2013 co-financing: 37,56%
Other budget: Dutch regulation, innovation and sustainability

Time span: start: 01/06/2014 - End: 30/06/2020

Aimed project location: Dordrecht

Coordinating beneficiary: Rijkswaterstaat
Associated beneficiary: ECN en SEAC

ECN - Energy research Centre of the Netherlands
SEAC - Solar Energy Application Centre
Project activities

1. Location research (soil quality, inform stakeholders)
2. Benchmark study (overview of known initiatives, reviews)
3. Developing a technical financial model (economic feasibility)
4. Creating and testing a prototype – PV integration design
5. Procurement strategy (innovative tender procedure)
6. Communication and dissemination
7. Realization of the integrated noise barrier
8. Monitoring of energy performance and effects on noise and air quality
Bi-facial noise barrier, Münsingen, CH

Source: TNC Consulting AG
http://www.tnc.ch
Trento Italy monofacial
Planning

June 2014

Jan 2017

Jan 2018

Preparation
- Benchmark
- Development prototype
- (Preparation of) tender

Construction
- Testing, production
- Construction elements
- Groundwork
- Construction

Demonstration until 2021
- Monitoring energy performance

Exploitation
- Communication, conferences, expert meetings
Expected results

1. Design of a bifacial integrated module, fitting in a barrier
2. Prototype of an integrated barrier:
   o In North-South direction
   o Measures 450 x 6 m
   o Height of PV cells 4 m
   o Energy yield 275 MWh a year (80 households)
3. 356 ton CO₂ reduction
4. Business case financial and technical feasibility
5. International conference
6. Technical publications
Supported by

NL: ProRail, Province of Zuid Holland
UK: Birmingham City Council
Belgium: Accoustic Technologies (A-tech)
Italy: Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)
EU: Working Group Noise Eurocities
     European Union Road Federation (ERF)
     Forum of European National Highway Research Laboratories (FEHRL)
     European cities and regions networking for innovative transport solutions (POLIS)