# SC5-4-2015: Energy independent EVs and EV Battery Charging + Battery Exchange + H2 supply Stations, powered by WWT-Wind + PV + Fuel Cells

Urban Transport Means (UTM), road Vehicles AND waterborne Vessels (with high pollution) are a primary source of air pollution in ALL cities. Innovative concepts-technologies can make UTM Energy Independent-Electric Powered with batteries charging ONLY from CLEAN Energies, in this Proposal using WWT-Wind + Solar PV + (cost effective) Fuel Cells (FC) for all clean energy Electric Vehicles (aceEVehicles), NO need to charge from c.a. 80% UNCLEAN Grid Electricity

This is the basic idea...........

.... and PV panel on the roof..........

..and other locations........

WWT
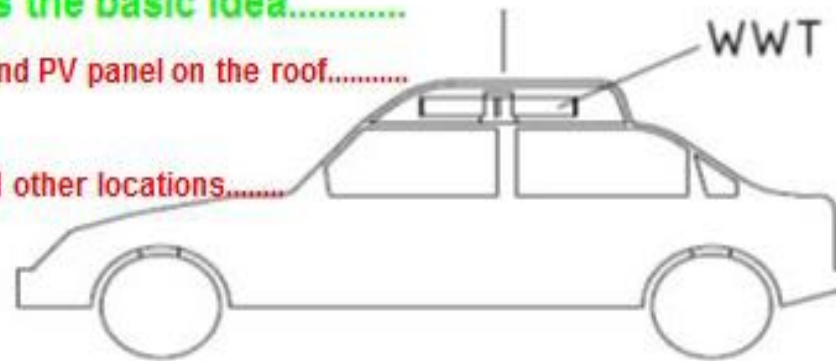
For such concept UTM must be Very Light-Weight (VLW), contrary to existing UTM that use (..waste) much higher proportion of energy to propel the heavy-weight of the EMPTY UTM, related to the energy needed to transport the payload-weight. This can be REVERCED with VLW-aceEVehicles from this action, but results could also apply to waterborne VLW-aceEVessels (UNFLOP-SHIP)

UNFLOP-SHIP: Truss members can have HYDROFOIL and TORPEDO shapes and suitable orientation in the truss to match the motion, and they can form orthogonal and triangular shape basic truss elements. Waves affect EACH TORPEDO and HYDROFOIL with myriads of micro-forces in myriad directions separately and at different times, resulting to all micro-forces cancelling each other. TORPEDO members on the surface are also not affected from waves and provide stability and LARGE reserve buoyancy

UNFLOP-SHIP concept: MG.4.1-2014: Towards the energy efficient and very-low emission vessel

WWT-PWT Wing Wheel Turbines & Paddle Wheel Turbines
Wind-River-Wave-Tidal-Current

WWT-Wind fully engineered special Wind Tunnel Test Prototype in operation at NTUA-Lavrio Technology Park, GREECE... Video>>>>

WWT-PWT comprise two or more Frames-Wings/Paddles on a Shaft that have one or more airfoils-hydrofoils (S) on their own axles fixed parallel to the Shaft. S are free to turn between two stops utilizing the apparent wind-water flow each experiences every moment, to absorb fluid kinetic energy by exploiting continuously BOTH Drag AND Lift forces.

https://www.youtube.com/watch?v=2YSetMwCbpw

Preliminary **CFD** analysis with **LES** and **RANS** turbulence modelling by: **Dr. Carles Oliet + research team at UPC-Universitat Politechnica de Catalunya, Barcelona , Spain.** Fixed blade-angle of attack, fluid velocity and rotational speed used, so that results can be compared to features observed by other authors. Good agreement with experimental and numerical results (Fujisawa and Shibuya 2001 - Simao et. al. 2007-Nobile et. al. 2011) http://youtu.be/jZNAYBsNNQg
Themistoklis Andrikopoulos the Inventor