Clean Electro-mobility Solutions Only Using Green Energy Input

Kaldellis J.K., Spyropoulos G.

Soft Energy Applications and Environmental Protection Laboratory
Dept. of Mechanical Engineering, University of West Attica

e-mail: jkald@uniwa.gr, www.sealab.gr

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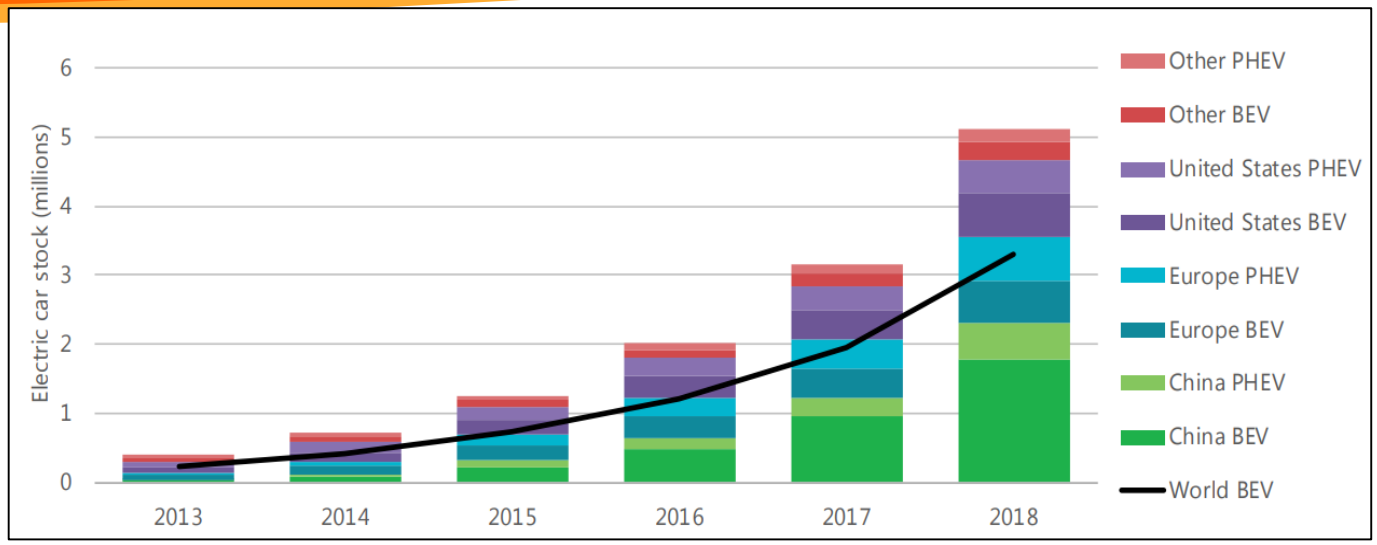
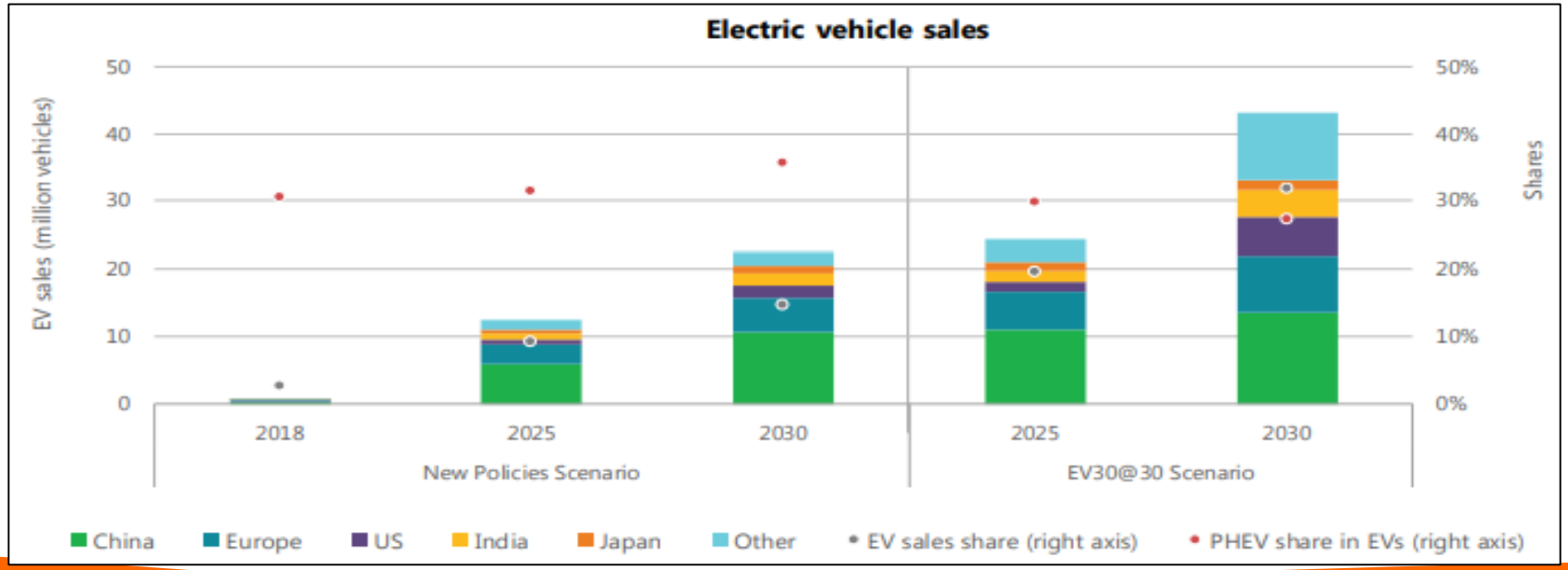
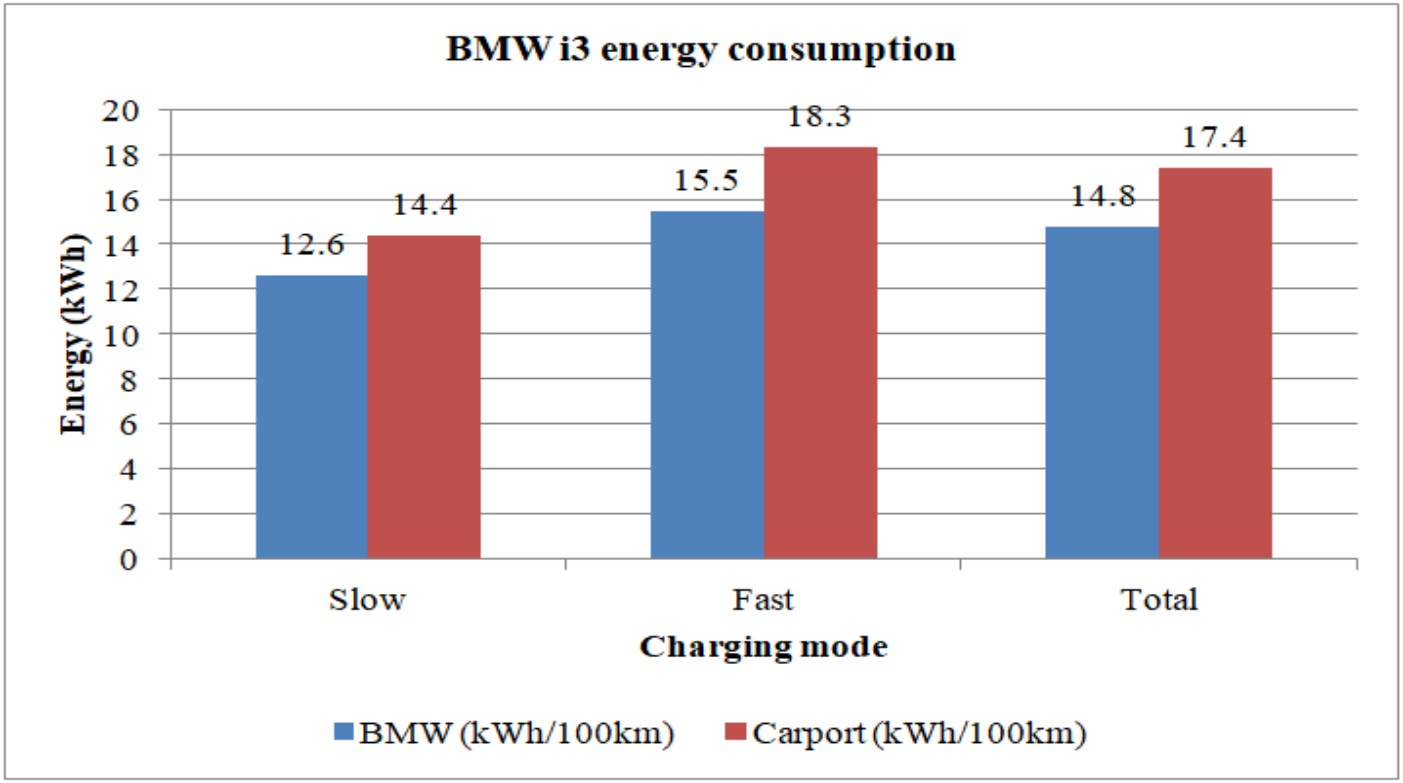
ELECTROMOBILITY MARKET



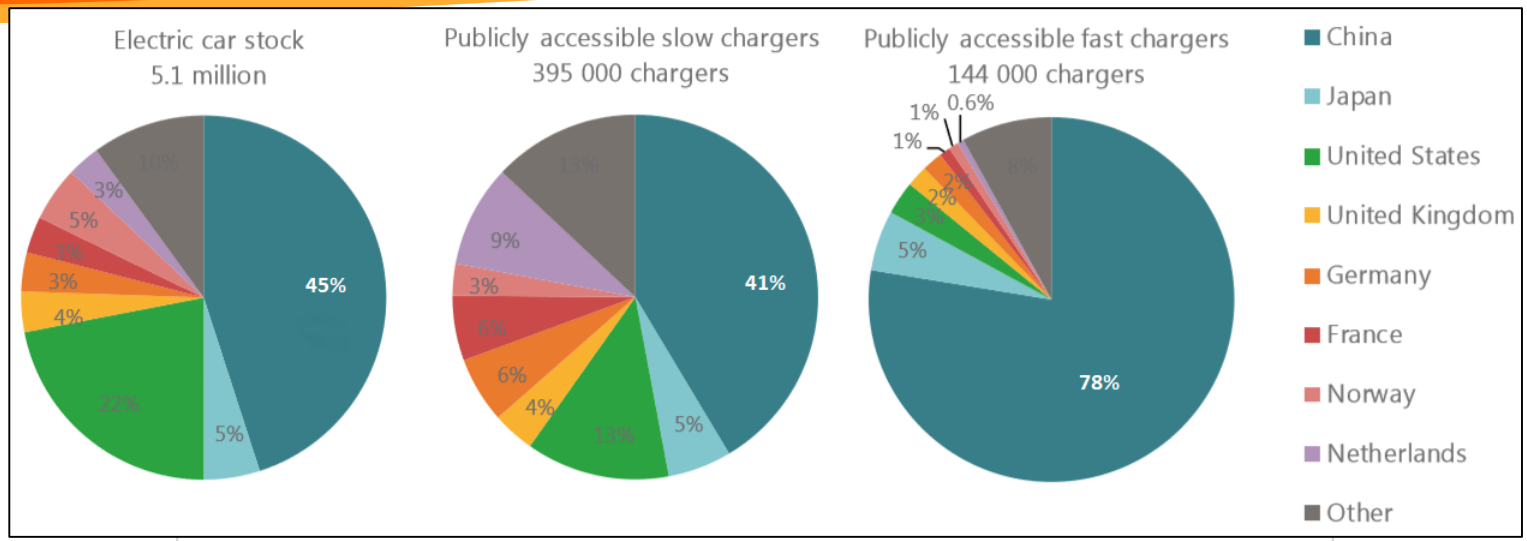


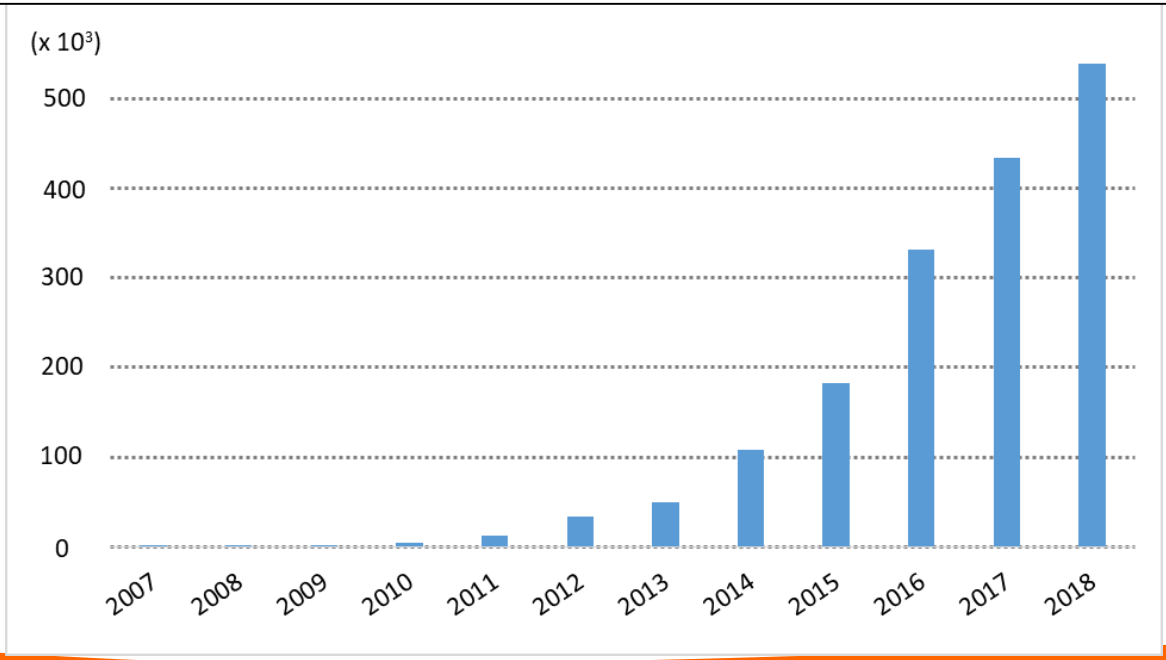
ENERGY REQUIREMENTS (EVs)

- According to real world measurements of our Lab for the BMW i3, the total energy consumption using an experimental solar charger is almost 17.5kWh$_e$ per 100km, although the EV consumption is only 14.8kWh$_e$.



PRESENT CHARGERS' STATUS





UNIWA PROPOSED SOLUTION
(Urban Case)

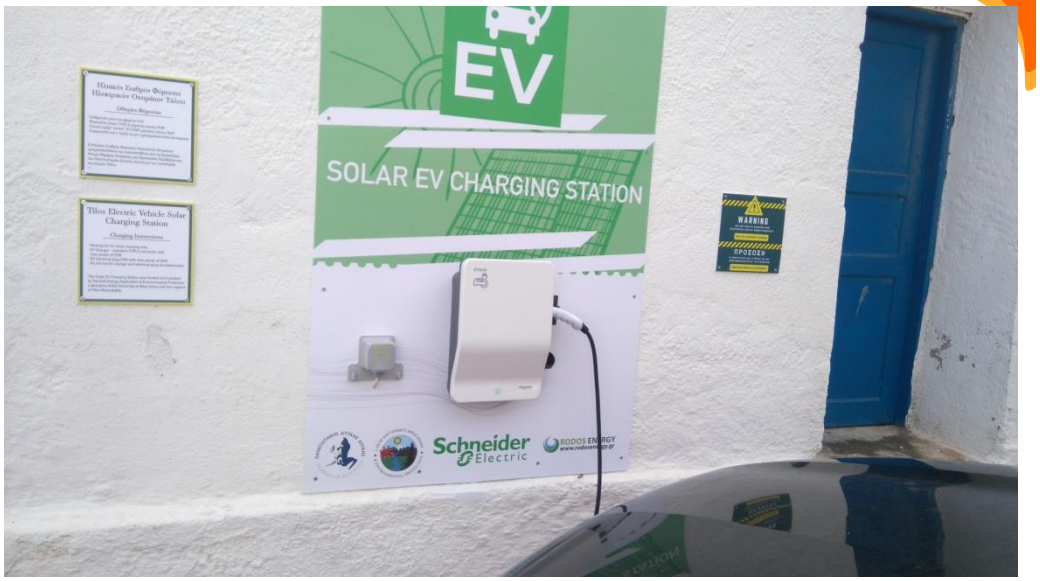
Soft Energy Application & Environmental Protection Lab of UNIWA RES-based EVs Charging Station, since October 2014

To build the first autonomous solar powered EVCS in Greece

UNIWA PROPOSED SOLUTION
(Urban Case)

UNIWA recently (end 2019) has acquired its first electrical mini bus in order to support R&D efforts and cover the personnel transfer needs between its two Campuses.

PROPOSED SOLUTION (Island Case)



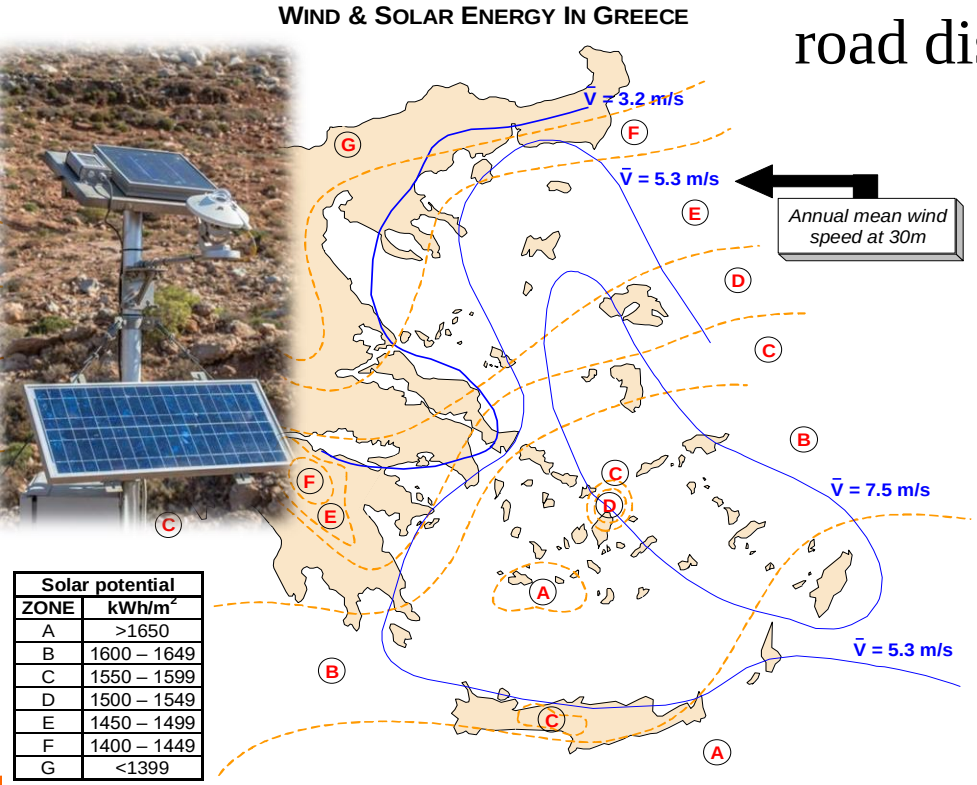
Febr. 2019

5kW$_p$ PV Generator

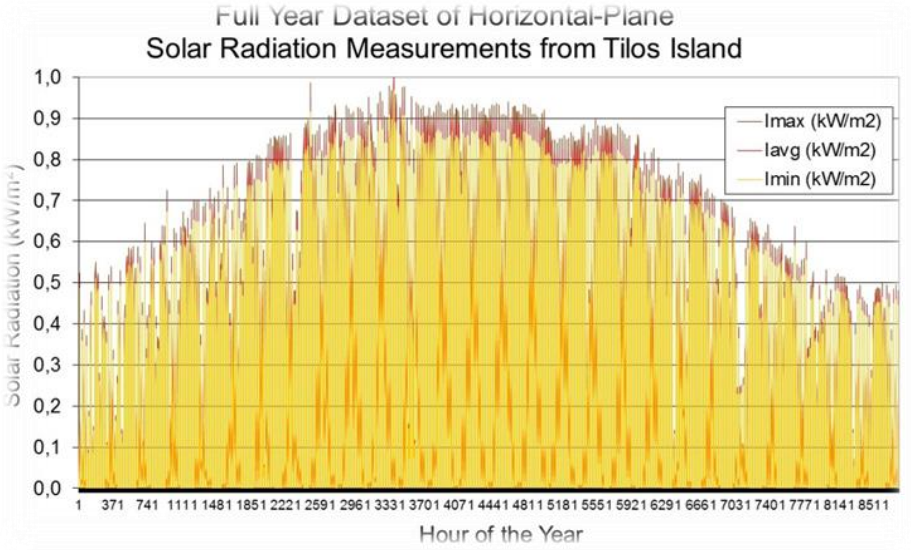
EVs charge of 7.5kW and 40A.

TILOS ISLAND CASE STUDY

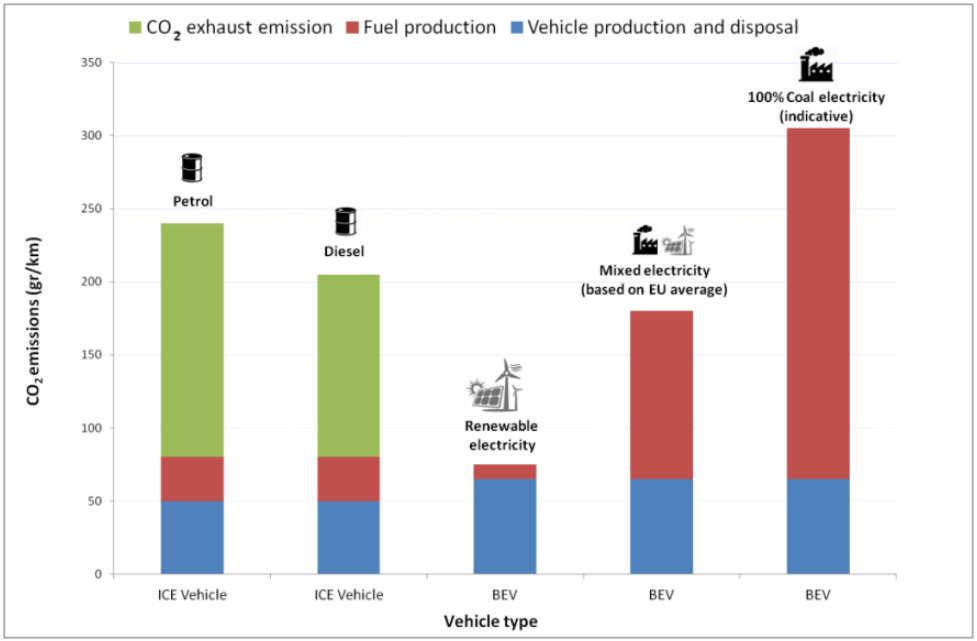
- On the basis of the available solar irradiance the expected annual electricity generation is approximately 8000kWh, able to cover the electricity requirements of 40000-50000km per year. The longest road distance of the island is 15km!!!



Solar potential	
ZONE	kWh/m^2
A	>1650
B	1600 – 1649
C	1550 – 1599
D	1500 – 1549
E	1450 – 1499
F	1400 – 1449
G	<1399



HOW ENVIRONMENTAL FRIENDLY IS ELECTROMOBILITY?



The statistical weighed CO_2 emission specific factor is s_{CO2}=750-800kgr/MWh_e for oil-based TPS and s_{CO2}=50kgr/MWh_e for RES-based generation.

Air Pollutant (gr/km)	ICEV	Mainland Grid	Island Grid	Solar EVCSs(*)
CO_2	100-200	80-200	120-160	**5-10**
NO_x	0.06-0.15	0.15-0.25	0.04-0.10	**0.00001**
HC	0.1-0.2	0	0.05-0.08	**0.00002**
SO_2	0	0.2-0.35	n/a	**0**
PM	0.005-0.015	0.001-0.003	0.005-0.01	**0**

PROSPECTS & PROPOSALS

- The current electrical sector fuel mix and the battery losses minimize the environmental benefits of EVs. Only extensive RES exploitation may improve the situation.
- Greece possesses excellent RES potential, especially wind and solar, able to support clean-green electromobility.
- Clean Electromobility offers to Greece and to EU a lot of advantages (oil imports decrease, air pollution and other environmental problems minimization, etc.).
- Greek State should definitely support clean-green electromobility for national, financial and environmental reasons.

Thank You
for Your Attention