### <u>GREEN ISLAND</u> AGIOS EFSTRATIOS

### **Prof. Nikitas Nikitakos University of the Aegean**

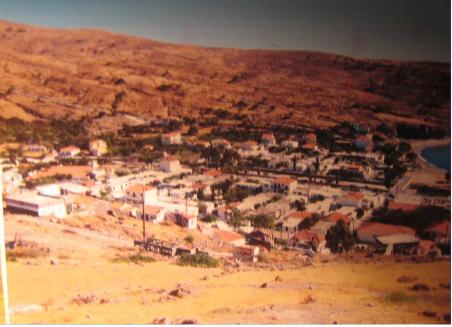
# THE ISLAND after the 1968 earthquake



Άγιος Ευστράτιος 1971



# The island today (not much development)



### **REGIONAL DEVELOPMENT**

Traditional approach (REDUCE» DISTANCE (more and faster boats)

2. NEW APPROACH SUSTAINABLE ECOLOGICAL DEVELOPMENT = SELF CONTAINED with local resources

**3. Economy of needs vs Economy of profit** 



### • ENERGY

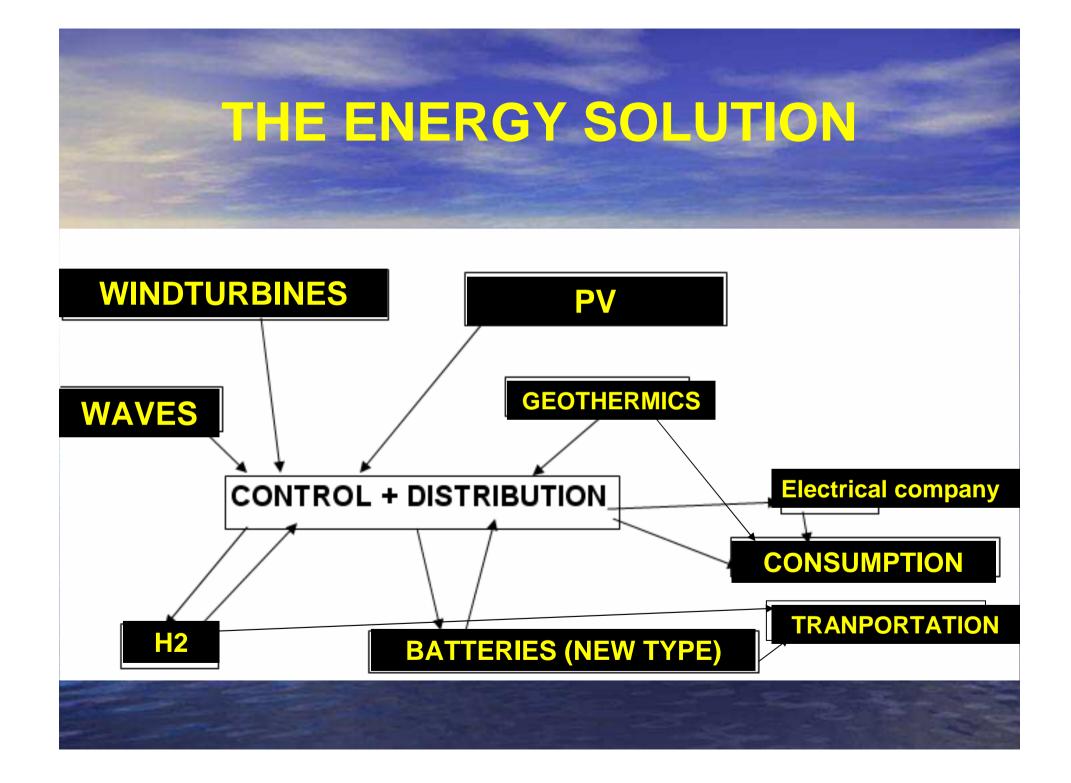
Renewable Energy Sources REDUCE ENERGY CONSUMPTION SAVING ENERGY BIOMASS - HEAT (WASTE) • GEOTHERMIC • FOOD WASTE – WASTE WATER TREATMENT AGRICULTURE, FISHING

# TARGET

POWER 100% from RES

### INNOVATION: NOT CONNECTED TO MAIN GRID

INTEGRATED APPROACH FROM THE BEGINNING



# WIND ENERGY

#### 1<sup>st</sup> Small windturbine in Agios Efstratios

# **PHOTOVOLTAICS**





Some in the roofs to provide better design + a PV park

#### Some in the roofs to provide better design + a PV park



### WAVE ENERGY(waves in Ag. Efstratios)







# NEW SOLUTIONS

# **Building Wave energy solutions**

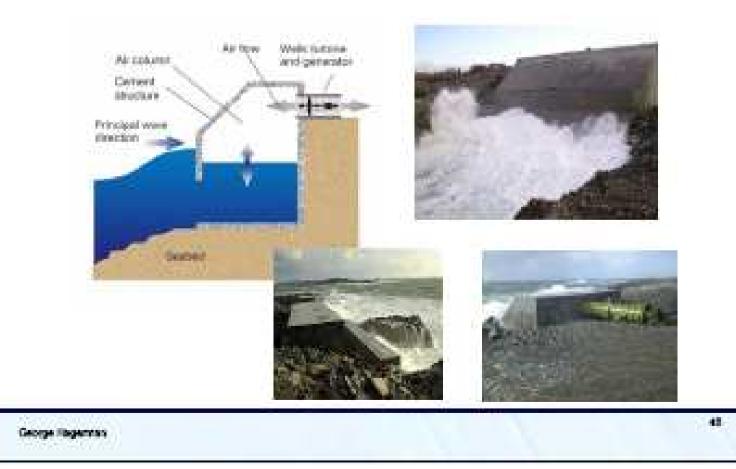


# A LOT OF ENERGY

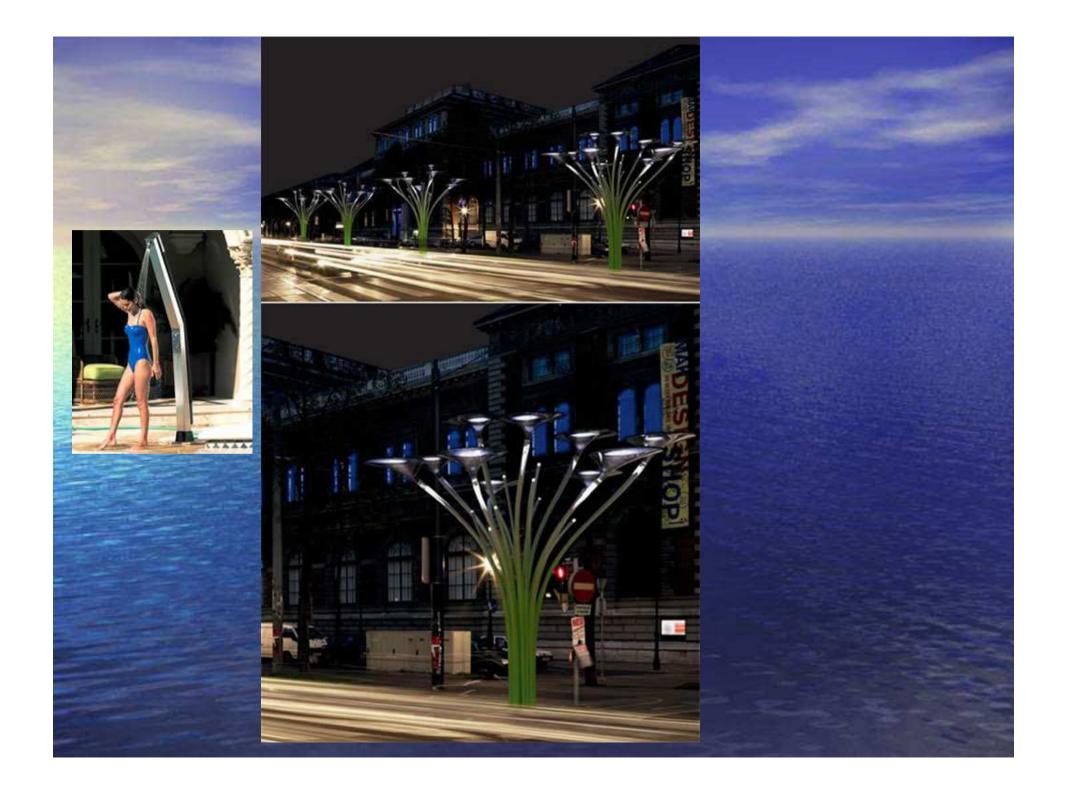


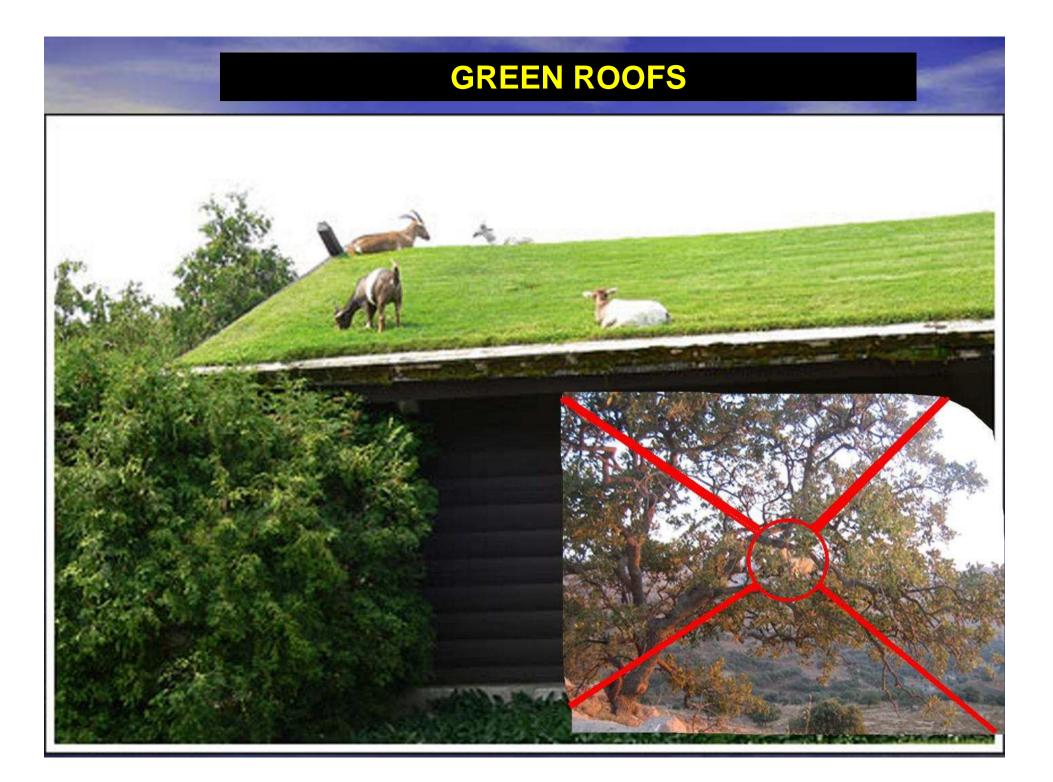
# Using wave devices in the future in the NEW PORT of the island

Oscillating Water Column (OWC): Wavegen's Onshore LIMPET









# CENTRAL HEATING COOLING (GEOTHERMIC)





#### POWER GENERATOR H2 5Kw

#### PRODUCTION OF H2 HYDROLYSIS

>

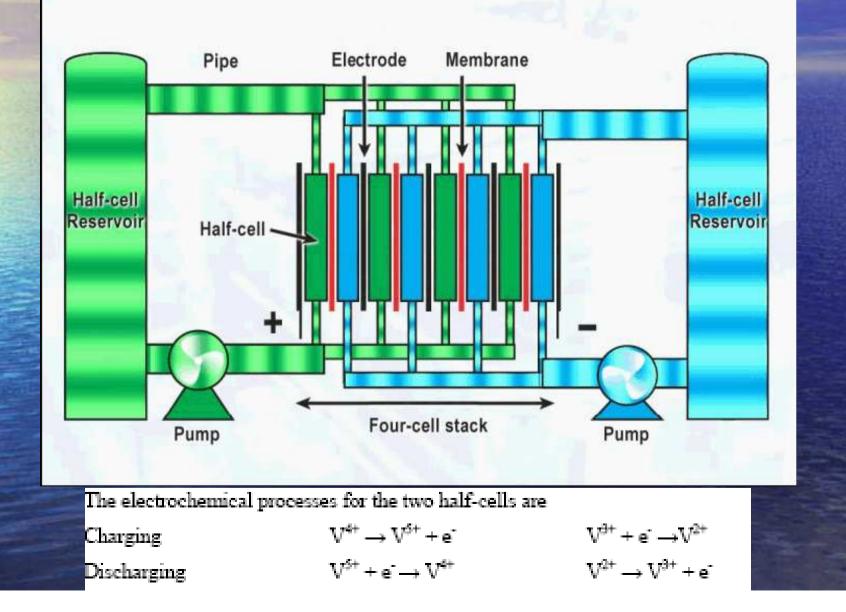
**H2** 







## NEW BATTERIES (FLOW, LITHIUM,...



# 2. TRANSPORTATION

# • BOATS HYBRIDIC

• CARS





Figure 6: UNSW Vanadium Fuel Cell Powered Electric Golf Cart



#### THE «CITYCAR» Hydrogen Fuel Cells Citycar.

4 θέσεων)

#### **ELECTRIC BICYCLES**





## **TECHNOLOGIES** to be used

#### WINDTURBINES

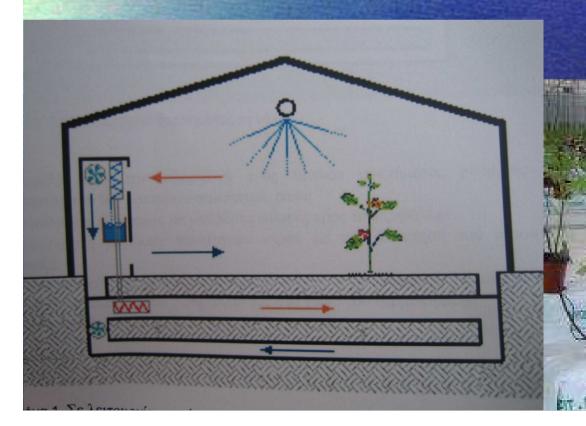
• PV

WAVE
GEOTHERMIC
H2
NEW BATTERIES
SAVINGS
CLEAN CARS + BOATS

# 3. FOOD AUTONOMY

HIDROFT WYCODET . HICEOT

# NEW TYPE CLOSED HYDROPONIC GREENHOUSES



# ANCIENT TECHNOLOGY HYDROPONICS

 Hanging Gardens of Babylon King Nebuchadnezzar 600 BCE
 Aztec Empire Floating gardens in Mexico
 Egyptians, Inca, Indian
 tribes ....



#### China Floating Gardens





#### **PROHIBITION OF PLASTIC BAGS**





• WASTE WATER TREATMENT (throwing nothing to the sea)

# **PLASTIC BAGS**

 8.000.000 tonnes of plastic bags from ships to the sea per year 5.000.000 tonnes from waste disposal areas through the wind to the sea Are 15% of the total garbagies that cust up on shore. Kill a lot of fishes and sea animals 10-20 years for decomposition in the sea. • 2.000 plastic bags / km2 in the Mediteranean

#### Waste disposal near the sea in many areas



#### They are transferred everywhere from the wind



# **5. DEMONSTRATION TRAINING**

#### ENERGY ACADEMY



#### WATER+ENERGY SOLUTION (we have it) in FLOATING AUTONOMOUS ECOLOGICAL DESSALINATION UNIT



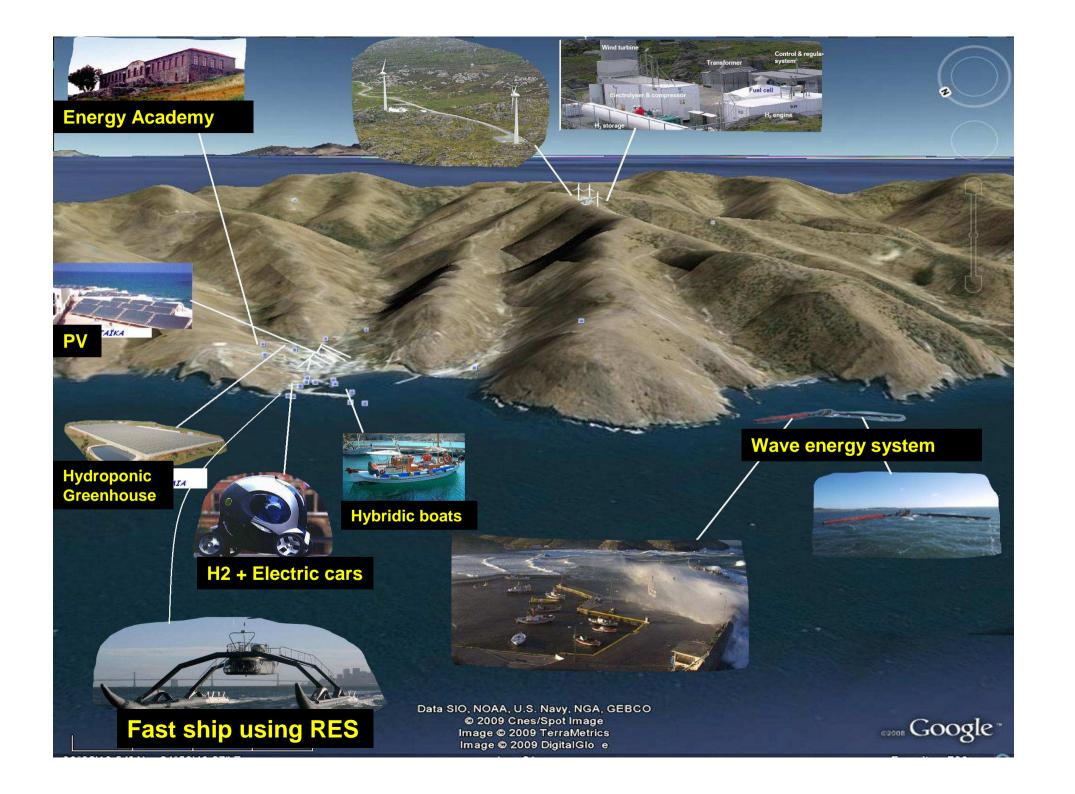
# **RESULTS - OPORTUNITIES**

- 1. Sustainable Regional Development (+development of local economies)
- 2. Environmental Benefits
- **BUSINESS OPORTUNITIES for Investors**
- 1. Increasing the use of RES (>>20%)
- 2. Transfer this model to big islands, will create major oportunities
- 'New' Business Green Business e.g. FED for islands – real estate projects – golfs – hotels – big Greenhouses .....

# SCHEMATICALLY THE EXPECTED RESULT

• The journey of a thousand miles starts with a single step.

#### Confucius







UNIVERSITY OF THE REGEAN Department of Shipping

Trade and Transport

# Thank you for your attention

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