

# Panama Key - An Off-Grid Island Renewable Energy Marine Laboratory

Safe, Green, Renewable Energy



Environmental Science Forum Meeting  
Weedon Island Preserve Cultural/Natural History Center  
Thursday, 2 December Beginning at 4pm



Presenters:

**Clifford R. Merz, PhD, PE – University of South Florida/College of Marine Science**  
**Joseph Lettelleir, AMIkids-Pinellas**

# Agenda

- **Panama Key - Recent Past and Present**
- **Proposed New Use for Panama Key**
- **Technology Opportunity**
- **Community Value**
- **Existing Interest and Immediate Project Needs**
- **Background – The Researcher**
- **Conclusion**



# Panama Key – Recent Past and Present

## ■ Panama Key – Present

- Panama Key is a 2.5 acre (M.O.L.) barrier island off the Gulf of Mexico in Boca Ciega Bay, southernmost Pinellas County.
- Currently on the island there exists a 2,000 square-foot stilt house built in 1992 with a dock.
- AMIkids, Inc (formally Pinellas Marine Institute [PMI]) is the current lessee and Pinellas County is the property owner.
- Originally established as a lab to measure the effectiveness of a program where troubled kids were taken out of court and introduced to a 30 to 60 day island stay.
- The lab worked and over the years has been able to turn kids around after having moved them from their home influences.
- However, over the years, funding for this program has disappeared and the facility condition has degraded and is in need of much repair.



# Proposed New Use for Panama Key

## ■ Panama Key – Proposed Future

- The USF College of Marine Science (USF/CMS) proposes to collaborate with AMIkids, Inc., Pinellas County, and supporting partners to perform needed infrastructure and building (LEED Certified) repair/renovation and convert the Island into a self-contained off-grid renewable energy and water quality/drinking water production research, outreach and education center.
- Ultimately the self-contained, renewable energy/water quality research facility would consist of (among others):
  - A high energy efficient – LEED Certified building with rain water capture and hold with backup diesel generator capable of running on Biodiesel;
  - An high efficiency roof mounted solar array/or a stand alone solar tracker;
  - A small farm sized wind energy component on tilt up tower – presuming suitable units are available to operate efficiently in the low/intermittent wind climate;
  - Establishment of an island micro-grid with battery back-up for power supply;
  - Investigative research into battery and other energy storage technologies;
  - Investigative research of locally available ocean energy technologies (including novel ideas such as Salinity Gradient/Tidal inlet power) with micro-grid intertie;
  - Investigative research of water quality, purification, and seawater desalination technologies;
  - An electrolyzer for H<sub>2</sub> production, storage, energy generation via a fuel cell.

# Technology Opportunity

- This ambitious project offers a unique opportunity to conduct research at a convenient location and apply it directly to real world conditions and needs.
- This remote facility would provide unique opportunities for students and faculty at USF/CMS to conduct research in a local environment where research results would enhance the technical knowledge and application of renewable energy and water quality/purification techniques.
- These techniques would be demonstrated “on the ground” and interested partners could experience the practical applications without the expense and difficulties of travel to remote rural or island-based communities.
- At the same time, it is possible that governmental, commercial, and volunteer organizations could be trained to export our findings.

*“If at first, the  
idea is not  
absurd, then  
there is no hope  
for it”*

**Albert Einstein**

# Community Value

- To the extent feasible, USF/CMS would involve students and staff at AMIkids in installation activities as adjuncts to classroom education. AMIkids will also assist in local environmental studies, island to mainland transportation needs, and provide a night time resident/caretaker.
- Exposure to possible Renewable Energy and Water Quality related career opportunities is an added benefit, not only to AMIkids and/or USF/CMS participants but also to members of the general community.

***RENEWABLE ENERGY WILL HELP FILL THE SUPPLY GAP TO MEET MARKET DEMANDS***

# Existing Interest and Immediate Project Needs

- Existing and Interested Project Supporters include:
  - University of South Florida/College of Marine Science
  - AMIkids, Inc.
  - Progress Energy
  - Southwest Florida Water Management District
  - Pinellas Science Center
  - Tampa Bay Water
  - Dialytics, Inc.
  
- **ESF and County Project Review, Approval, and Permitting is Required**
  
- Although significant project supporters exist, no existing funding is available. Once county approval has been obtained, efforts will continue to locate and secure the necessary funding.

# Background – The Researcher

## ■ Experience

- Extensive private and academic sector experience in the application of advanced engineering and program management to the design, development, closeout and transition to operation of ocean and hydrologic systems. Last 12 years as USF/CMS Coastal Ocean Monitoring and Prediction System (**COMPS**) Program Director.
- **COMPS** (<http://comps.marine.usf.edu/>), is a coastal ocean hydrologic and meteorological monitoring observing network along the West Florida coast, consisting of 4 offshore surface buoys, 8 National Ocean Service (NOS) compliant tidal and meteorological stations, and 5 High Frequency (HF) Radar surface current monitoring sites.
- Some of these sites are here in Pinellas County with active license agreements in place with the county at: Fred Howard Park (Tarpon Springs), Redington Shores, Ft De Soto and the City of St. Petersburg.
- Registered Professional Engineer, State of Florida, USA. Status: Active.

## ■ Education

- **PhD, Engineering Science, MS and BS in Ocean Engineering.**
  - Researched and identified a novel approach to generate electricity via the use of salinity concentration gradient differences while doing research during my PhD dissertation. Filed for a Patent on the **Dialytic Power Generator Using Diffusion Gradient** back in 2004 and was finally awarded the U.S Patent US 7,736,791 B1 on June 15 2010.
- **U. of South Florida College of Marine Science (USF/CMS) & School of Global Sustainability NT Faculty**
- **Certificate in Renewable Energy Technology, NSF's Consortium for Education in Renewable Energy Technology (CERET) Program.** Program consists of direct hands-on Solar, Wind, and Biomass workshops at remote in-field locations coupled with related sustainability based distance-learning course work.
- **Desalination Technology and Engineering Graduate Certificate, USF, Dr. Robert P. Carnahan, Program Coordinator.** Selected courses include: Membrane Theory and Practice; Pilot Plant Design and Operation; Design of Membrane Desalination Systems.

# Conclusion

- Thank you for your time and attention.
- Questions:
- Contact info:

**Clifford R. Merz, PhD, PE**  
**Coastal Ocean Monitoring and Prediction System (COMPS) Program Director**  
**University of South Florida/College of Marine Science**  
**140 Seventh Avenue South, MSL Room 136-M**  
**St. Petersburg, FL 33701**  
**(727) 553-3729 (Office)**  
**(727) 553-1189 (Fax)**  
**(727) 409-0770 (Mobile)**

[cmerz@seas.marine.usf.edu](mailto:cmerz@seas.marine.usf.edu)