

3<sup>rd</sup> World Congress and Expo on

# GREEN ENERGY

September 28-29, 2017 Berlin, Germany

## The Kuroshio power plant for deep oceans

**Falin Chen**

National Taiwan University, Taiwan

The Kuroshio, a branch of the North Pacific Gyre, flows strongly and stably along the eastern coast of Taiwan and then pass the Ryukyu Islands and Japan. From the perspective of energy development, the Kuroshio is a high-quality ocean current, able to provide a steady and high-volume power output needed to achieve economies of scale and commercial value. In this presentation, we shall initiate a novel design called the Kuroshio Power Plant and discuss the design in details. The deployment of hundreds of turbines in deep waters and their anchorage in a stable formation to the seabed hundreds of meters below is an unprecedented engineering feat. This design is also entailing new approaches to turbine design, anchorage system planning, deep sea marine engineering, and power plant operations and maintenance. The design consists two major portions: the single-cable anchored turbine and the multi-cable anchored relay platform, both are designed to protect power plant from earthquake damage and high-frequency fatigue. These technologies can also be applied to generate power in other waters, such as the Gulf Stream east of Florida, the East Australian Current, the Humboldt Current west of South America, the East Africa Coastal Current, and so on. All these waters feature strong currents and deep waters, similar to those found in the Kuroshio. Finally, since the proposed Kuroshio Power Plant is a new design and requires deep sea construction, it may entail high research costs and construction risks during the development stage, which will be elucidated as well.

falin@iam.ntu.edu.tw