

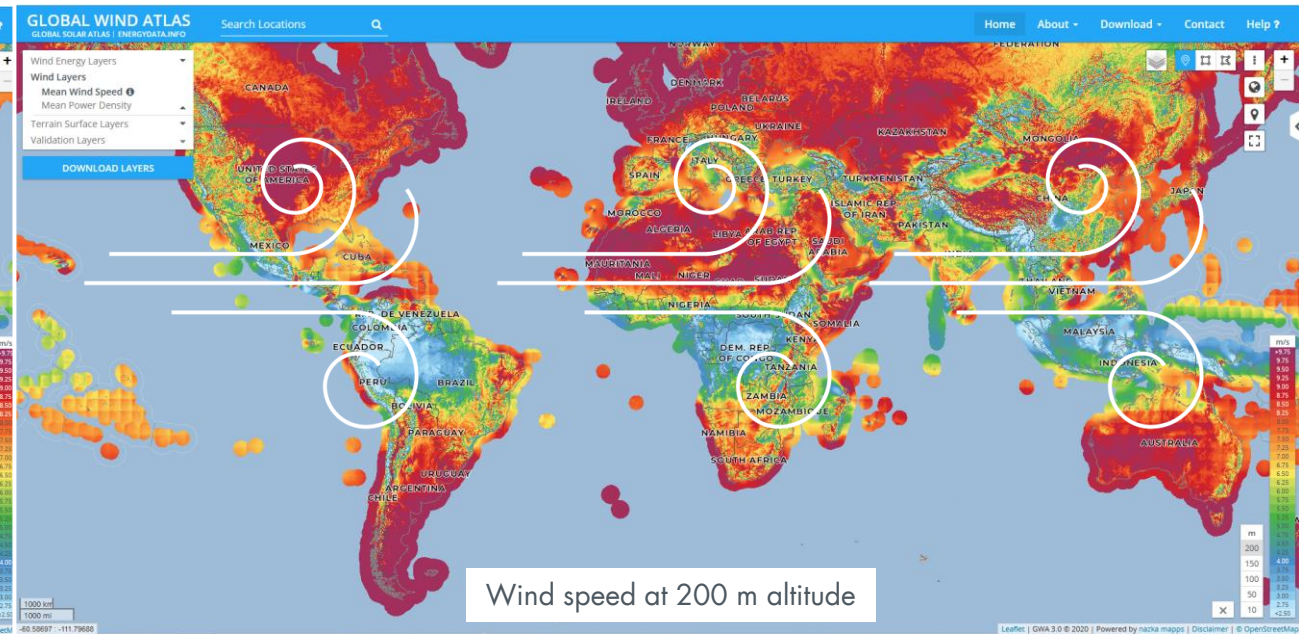
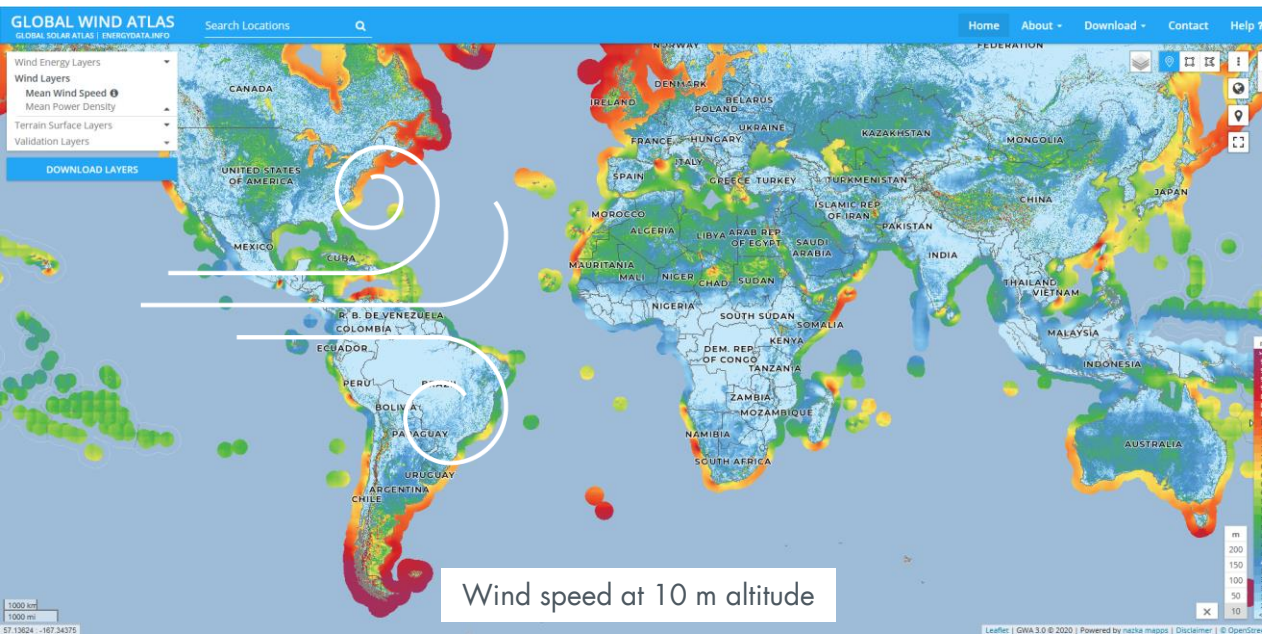


# REMOTE ISLANDS AS A MARKET FOR AIRBORNE WIND ENERGY

November 6, 2023 | Alexandra Hamel | Windenergietage Potsdam 2023

# AIRBORNE WIND ENERGY - LARGEST GLOBAL RENEWABLE ENERGY POTENTIAL THAT IS YET UNTAPPED

“We are the only ones who can harvest this enormous energy potential with 90% less material input through the use of software.”



# UNIQUE SKYSAILS KNOW-HOW - LEADING COMMERCIALIZATION OF AIRBORNE WIND ENERGY SYSTEMS



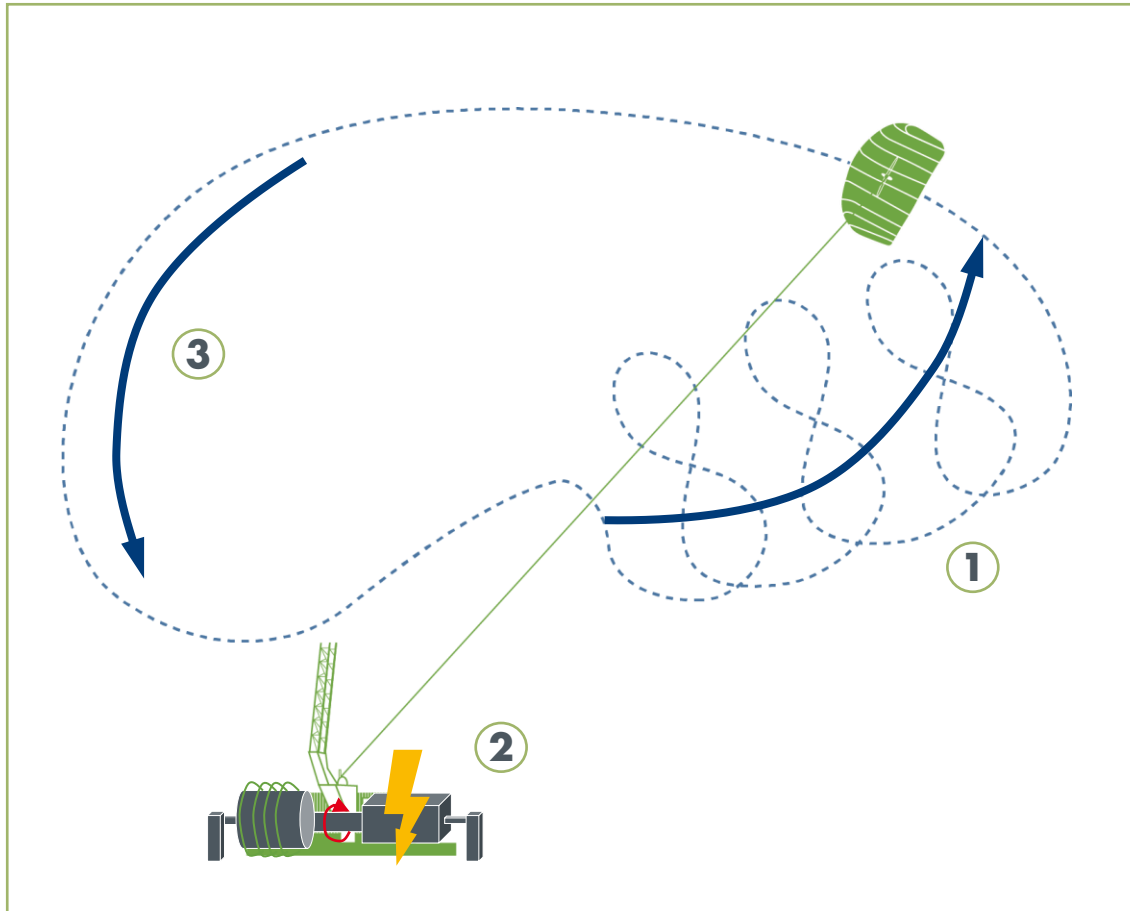
## THE 7 KEY COMPONENTS

- ① Kite
- ② Control pod, autopilot
- ③ Tether
- ④ Tether guide
- ⑤ Launch and landing mast
- ⑥ Winch with generator and gearbox
- ⑦ Ground station & grid connection\*

\* Optional energy storage to supply return phase; required in remote areas



# HARVESTING WIND IN 3 DIMENSIONS - THE WAY WE PRODUCE ENERGY



## OUR POWER CYCLE

### Power phase

- ① The kite unwinds a tether of 800 m length from a winch.
- ② A generator inside the winch converts the rotational movement into electricity.

### Return phase

- ③ The generator now acts as a motor and reels-in the tether, consuming only a fraction of the energy generated during the power phase.

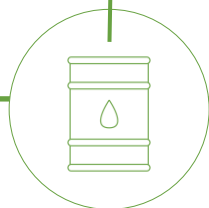
## SKYSAILS IN NORTHERN GERMANY



[https://www.youtube.com/watch?v=UZ82rK\\_RS4U&ab\\_channel=SkySailsGroup](https://www.youtube.com/watch?v=UZ82rK_RS4U&ab_channel=SkySailsGroup)

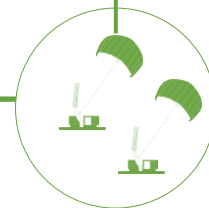
# MARKET ENTRY WITH SMALL SYSTEMS – NEXT UP, MULTI-MW SYSTEMS AND WIND FARMS IN THE GIGAWATT RANGE

DIESEL GENERATOR HYBRIDIZATION



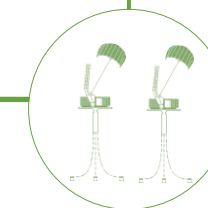
**Market entry**  
Existing PN-14 system  
LCOE >20 ct/kWh

ONSHORE WINDPARK



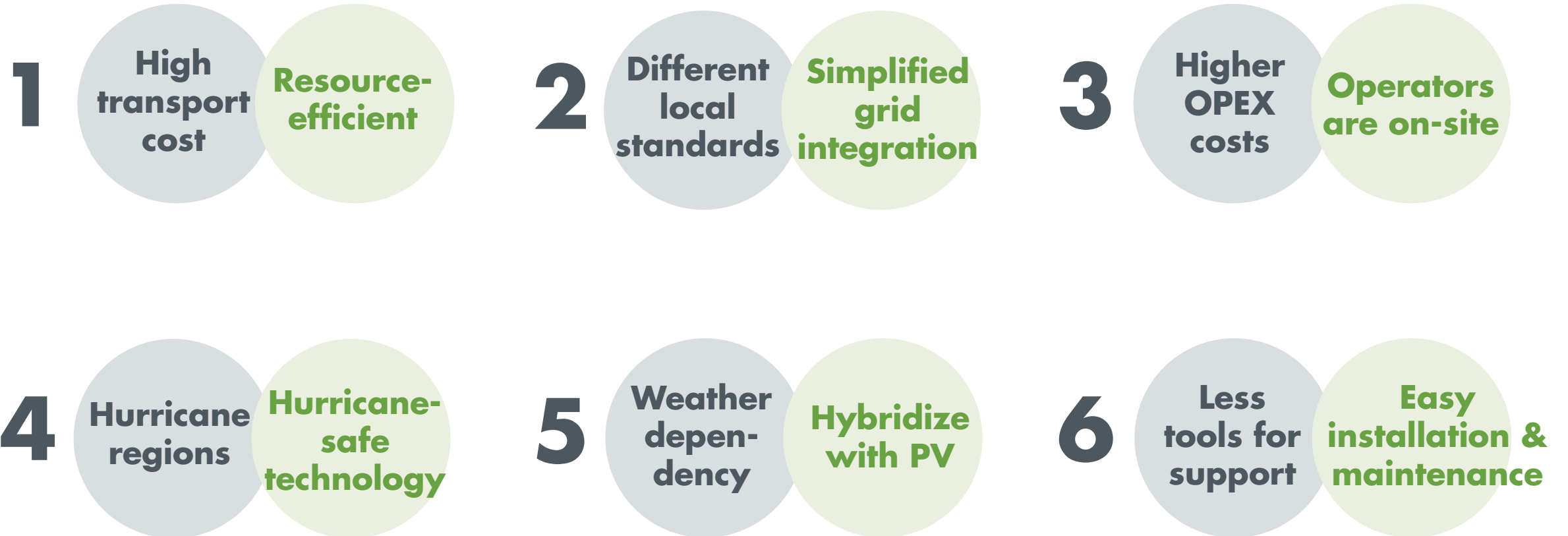
**Growth phase 1**  
Next generation product (1)  
LCOE >10 ct/kWh

FLOATING OFFSHORE WINDFARM



**Growth phase 2**  
Next generation product (2)  
LCOE <5 ct/kWh

# ADVANTAGES AND DISADVANTAGES OF INSTALLATIONS IN REMOTE AREAS

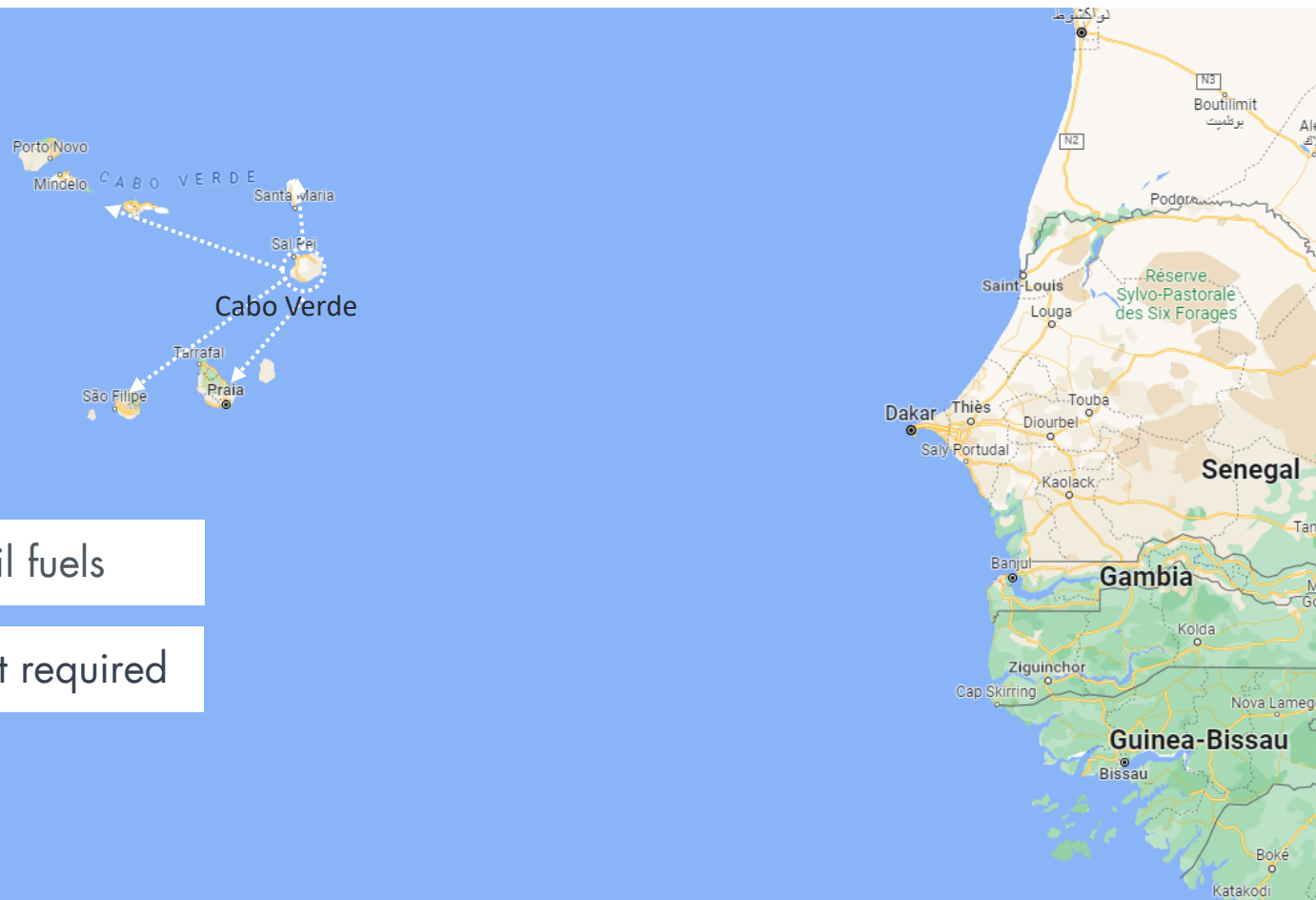


# CABO VERDE IS LOOKING TO BECOME ENERGY INDEPENDENT WHILE AN INCREASING ENERGY NEED FOR DESALINATION AND TOURISM MUST BE MET

## Market situation

LCOE Diesel Generator >250€/MWh

Total Market (Units) 1,000



High energy needs

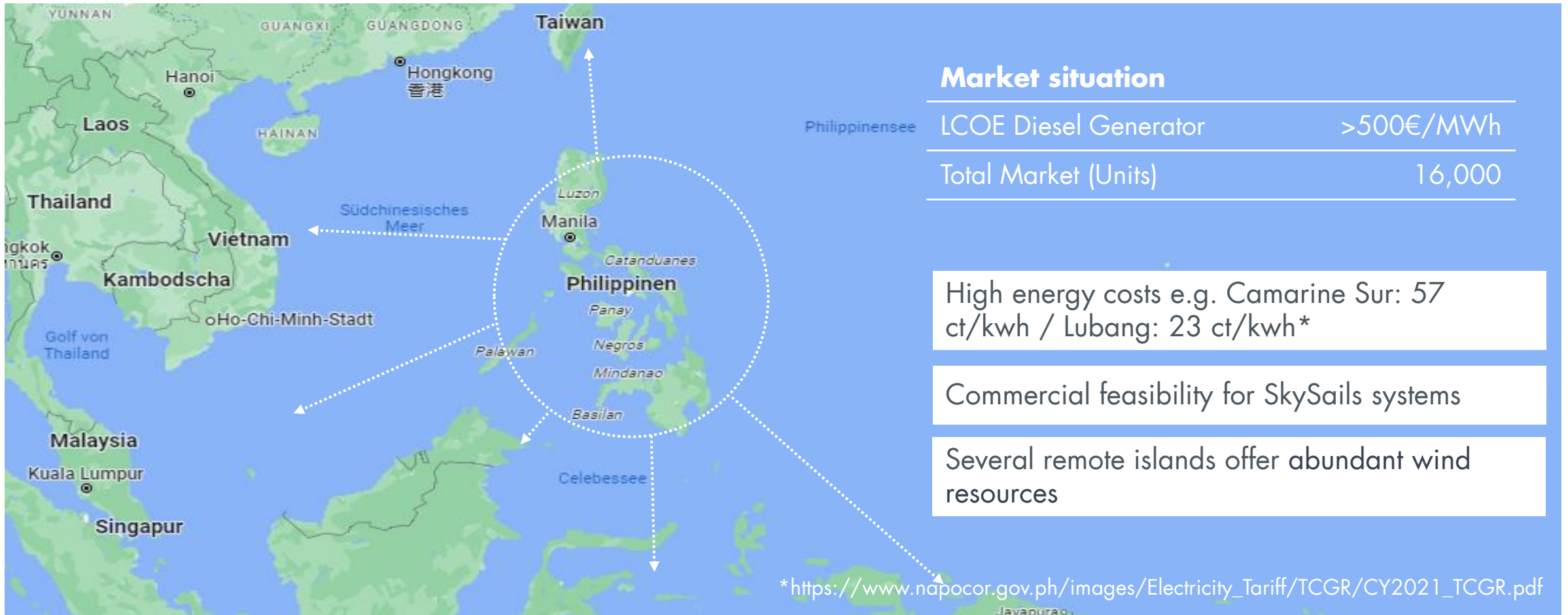
Strong reliance from fossil fuels

Green energy for tourism

No logistical support required



# HIGH PRESSURE TO ACT; SUPPLY ENERGY ALSO IN REMOTE AREAS SUSTAINABLY AND AFFORDABLY COMBINING PV WITH AIRBORNE WIND ENERGY



## REMOTE ISLAND ACHIEVING 100% RENEWABLE ENERGY WITH AIRBORNE WIND ENERGY



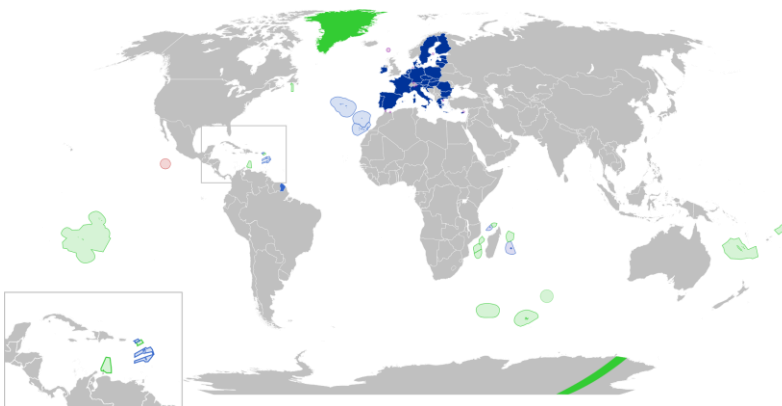
### Pilot site for 100% renewable

- 10 000 inhabitants
- PV farms of > 1 MW
- 6-15 MWh battery
- Wind turbine 300kW

### Remote areas, overseas territories

ENGIE sees a potential viable commercial market in the region of up to 2GW.

Region with a rapidly growing demand, over 6 millions residents.



### Needs:

- Clean energy
- Price stability
- Reliability to weather conditions incl. hurricanes
- Easily installable

### Reason:

- Make 100% renewable overseas territories
- Conventional multi-MW project impossible
- Provide reliable, affordable energy access
- Implement large hybrid project

# CONCLUSION

**1**

**Highly valuable technology addition for hybrid energy.**

**2**

**Non-typical, smaller projects and minimal competition.**

**3**

**International funding available supporting remote locations, e.g. French AFD, ADB, EIB, KFW ...**

**4**

**High pressure to act – high interest in renewable energy.**

**5**

**Lighthouse islands supporting local tourism.**

Thank you for your interest.  
**LET'S TALK!**



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