Unanchored Floating Wind Turbines

An invention for deep water wind farms

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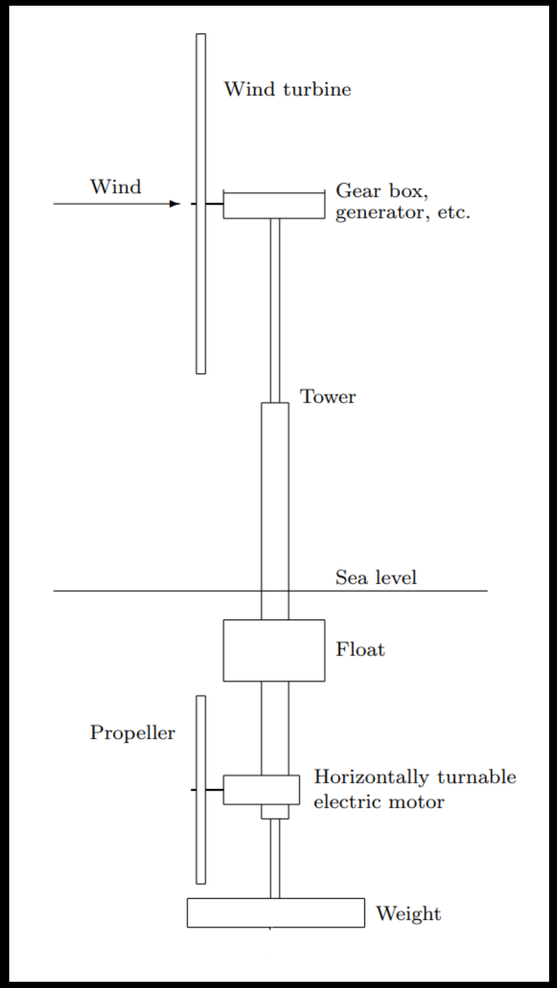
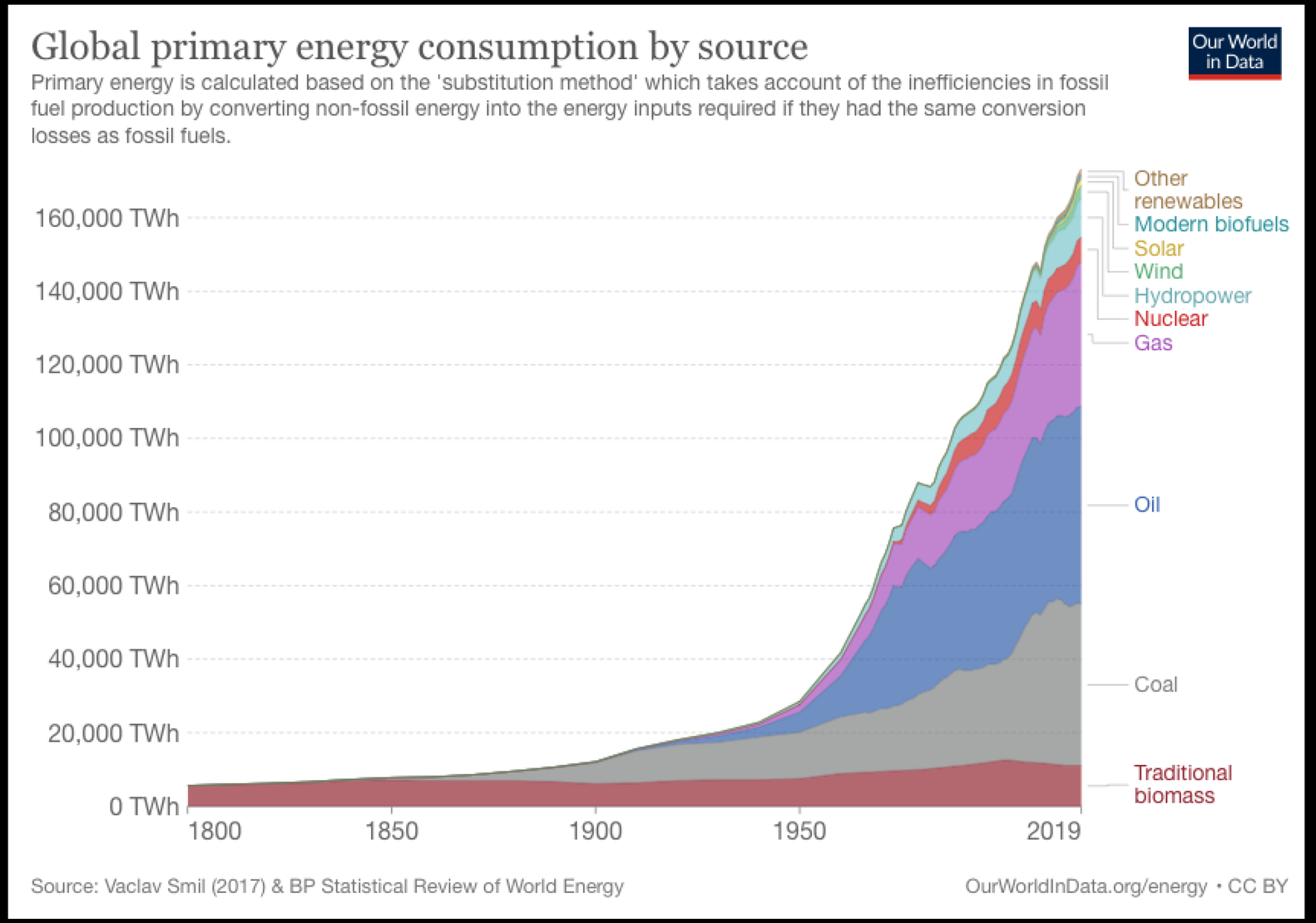
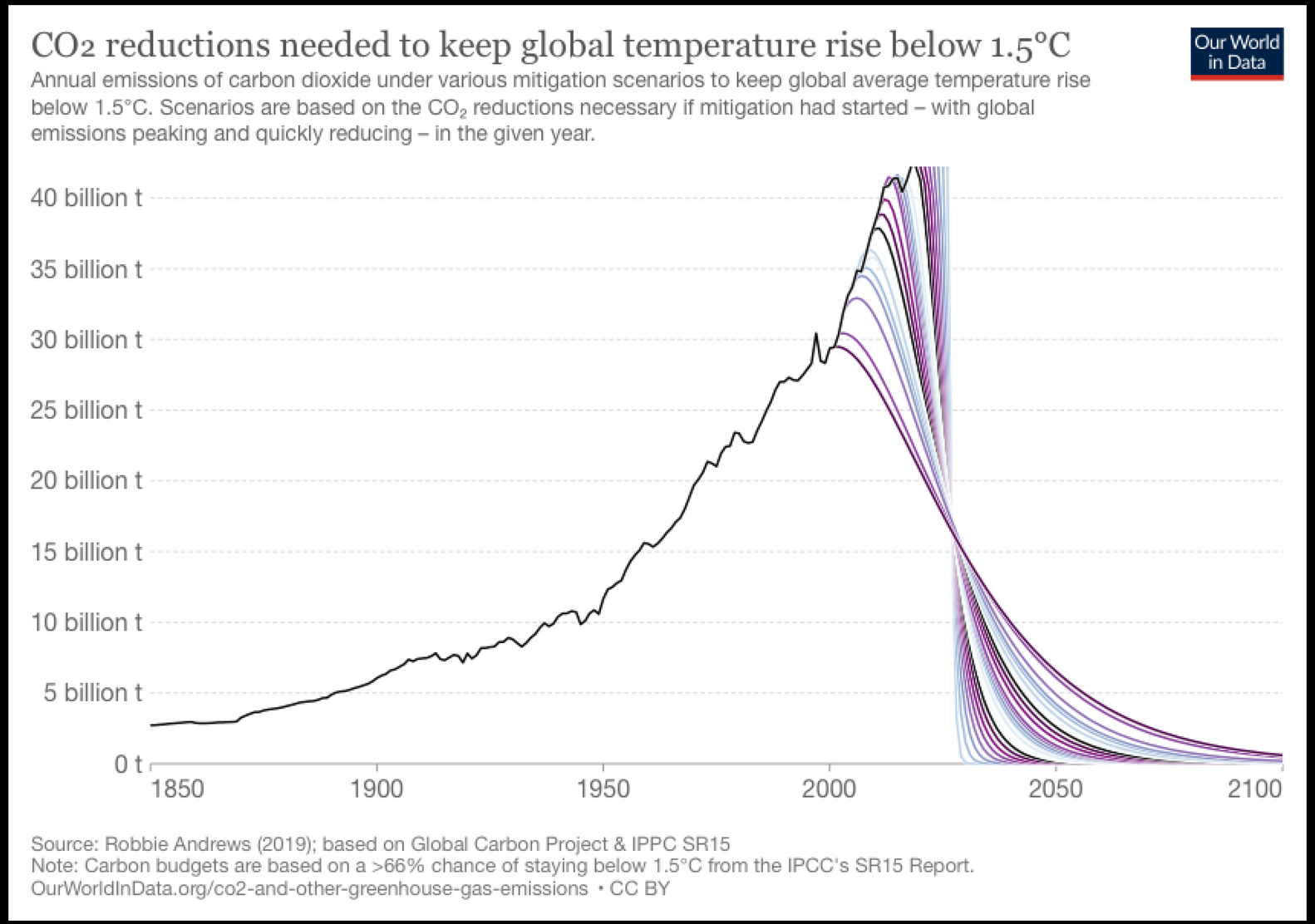


2019: 170,000 terawatt-hours, >80% fossil



Immediate energy shift needed for 1.5°C



Can we deploy renewables quick enough?

NASA Blue Marble
by NASA Goddard Space Flight Center

71%

covered by oceans

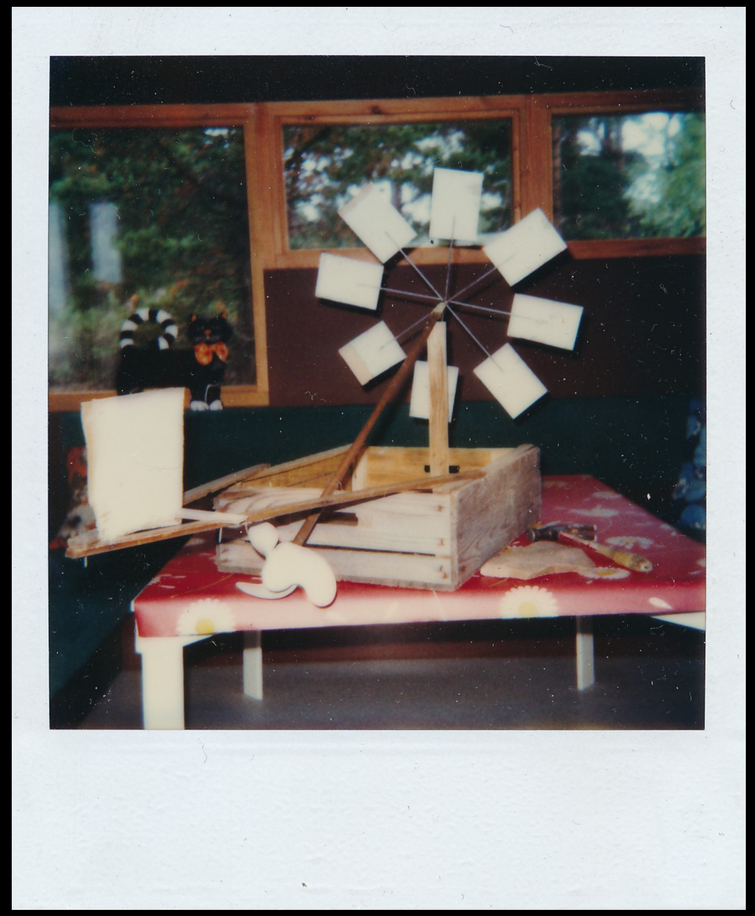
“wind power generation over some ocean areas can exceed power generation on land by a factor of three or more”

Possner, A. & K. Caldeira. (2017). Geophysical potential for wind energy over the open oceans. *PNAS.*

Sundman:

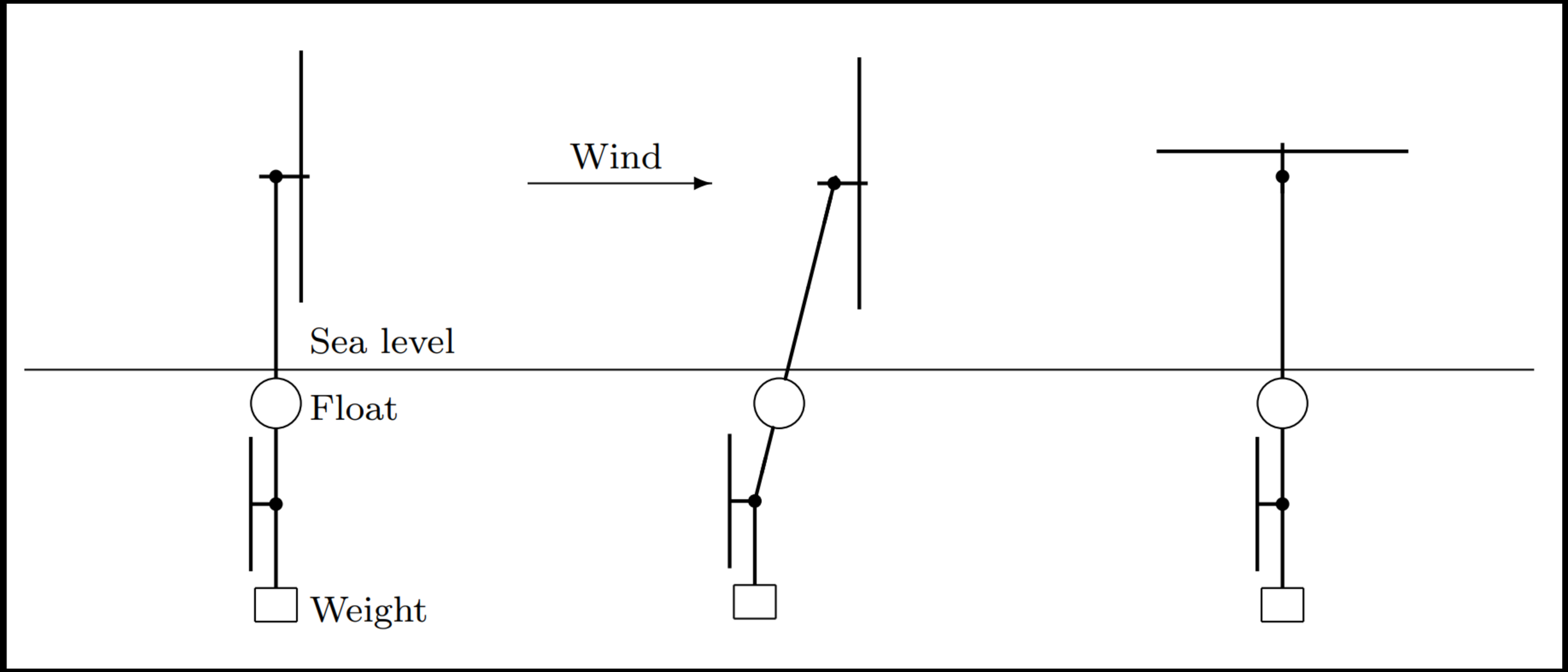
Deep water wind farms made of unanchored, free floating turbines

Early Testing & Prototyping in 1980s



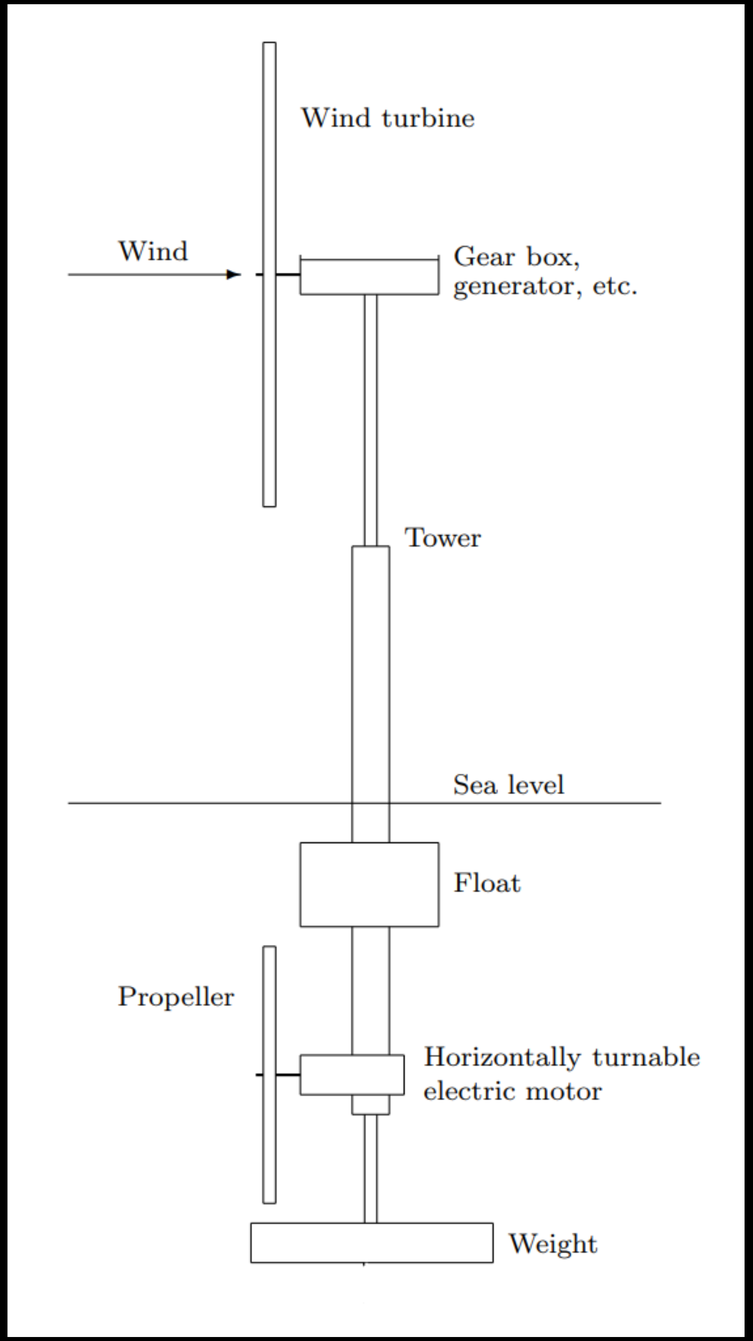
US, EU & FI Patents Granted, Released to Public in 1994

2010s: Invention Refined

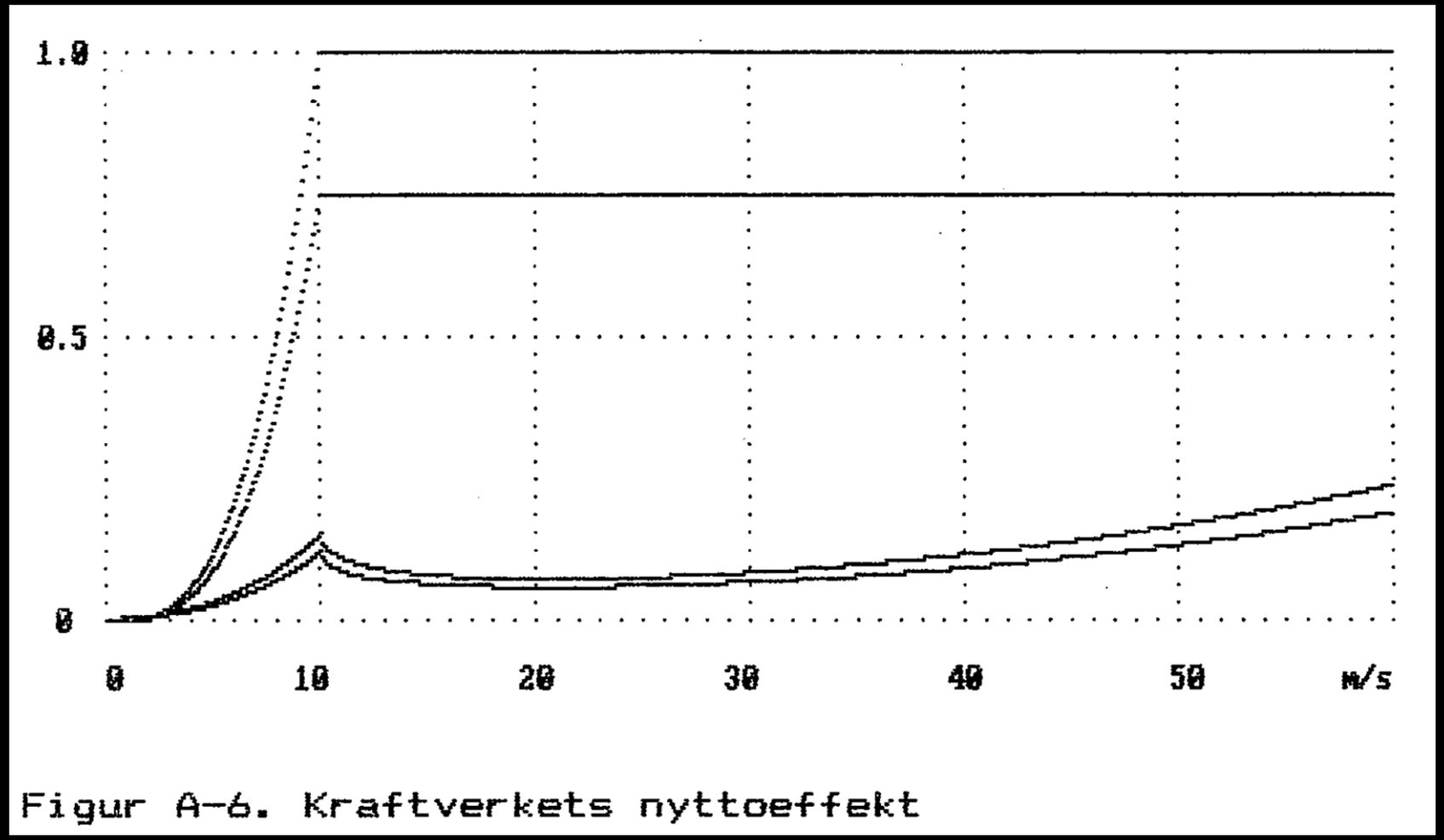


2010s
Invention Refined

- Unanchored, floating unit
- Slender & needle-shaped
- Not rigid — flexes under wind
- Relatively small material footprint
- Turbine and propeller: two-bladed fast runners
- Propeller holds unit in place, can float out of position under storm conditions and then return



Turbine’s Theoretical Net Energy Production



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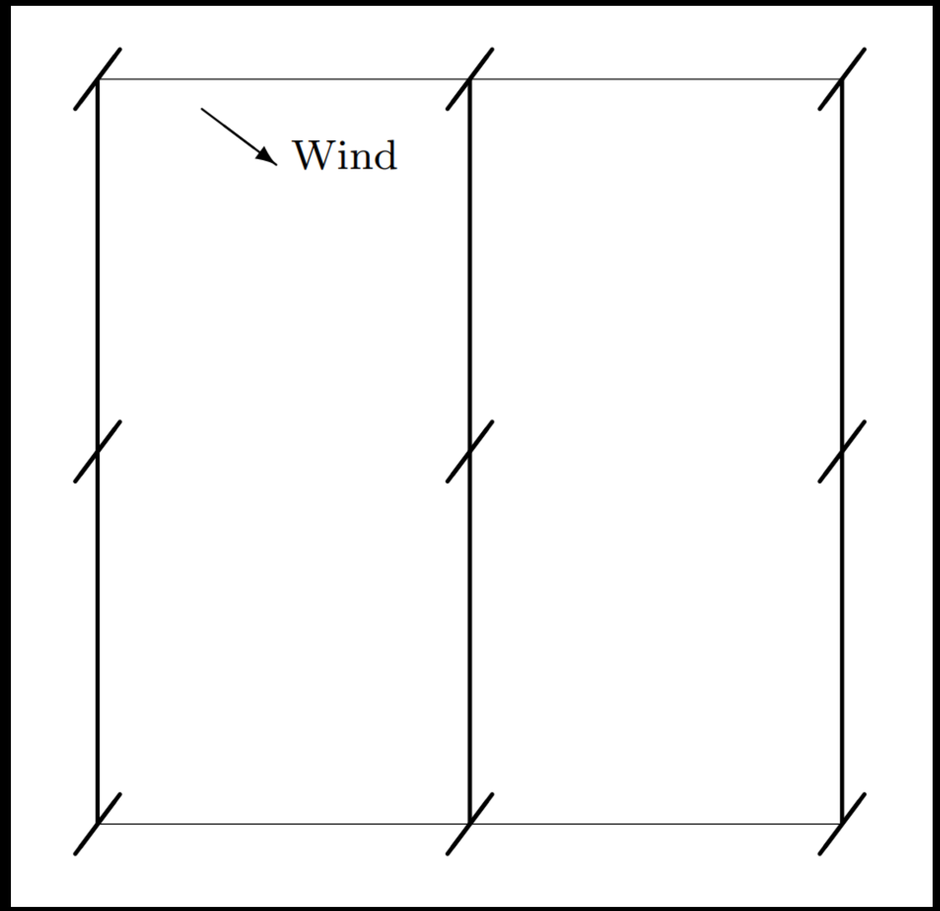
Wind Farm

Turbines Joined Together at Sea

- Green hydrogen via electrolysis of water
- —> climate-neutral hydrocarbons
- May be used in existing air, sea, and land transportation fleets



Stig Sundman, MSc

Call for construction and real-world testing of a prototype at scale

Bokna Fjord, Stavanger, and surrounding areas
© Open Street Map

Norway, Northern Europe, and surrounding region
© Open Street Map

Who would like to take it further?

Thank you!

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