

Real Events !



- Glacier of Forni, Italian Alps (Valtellina)

- Mogens North in South Greenland



Where are we and where we will need to go ?

Targets:

- Long-term temperature goal keeping the rise in mean global temperature to **well below 2 °C** (3.6 °F) above pre-industrial levels, and **preferably** limit the increase to **+1.5 °C** (2.7 °F).
- Emissions should be reduced as soon as possible and **reach net-zero by 2050**.
- CO₂ and Other greenhouse gases Emissions: **30 Gtons/a 2020** → **21.1 Gtons/a 2030 (?)** → **0.0 NetZero Gtons/a 2050 (?)**
- Total generation: **26,800 TWh** (approx. 22% renewable) (2021)
- Hydrogen: **70 Mton/a** (practically all gray)

What does this mean to sustain Net-zero (EIA data):

| | 2030 | 2050 |
|--|--------------------|--------------------|
| ➤ Renewable: yearly additional Capacity (Wind / Solar) | ≈ 15,000 TWh (50%) | ≈ 45,000 TWh (90%) |
| ➤ Investment: | ≈ 260.- BUSD/a | ≈ 800.- BUSD/a |
| ➤ Green Hydrogen: | ≈ 150 Mtons/a | ≈ 470 Mtons/a |
| ➤ New electrolyzers capacity | ≈ 850 GW | ≈ 2,600 GW |
| ➤ Investment: | ≈ 165 BUSD/a | ≈ 800 BUSD/a |
| ➤ H2 Co-firing in Power (% capacity): | up to 6% (2035) | (?) |
| ➤ Low carbon shipping (% of capacity): | up to 50% (2035) | 100% (?) |
| ➤ Low carbon aviation (% of capacity): | up to 50% (2040) | (?) |
| ➤ <i>Forestation</i> | | |
| ➤ <i>EV transportation</i> | | |
| ➤ <i>others means</i> | | |