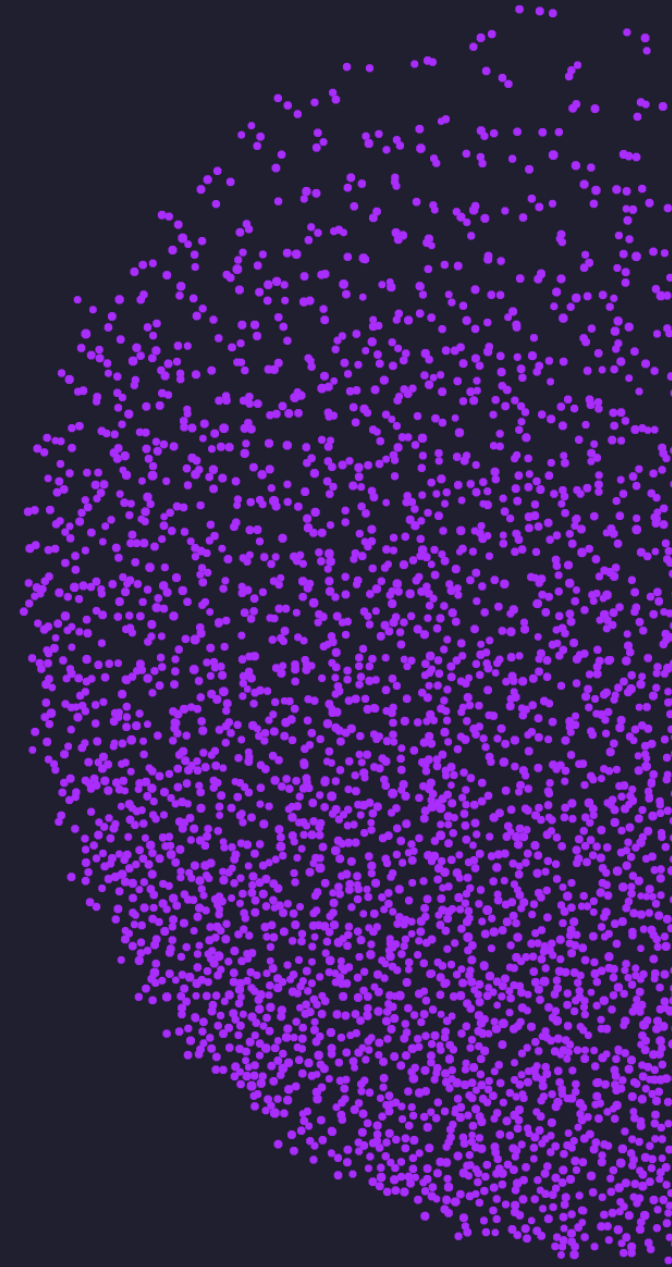


# RENEWABLE HYDROGEN OUTCOMPEETING FOSSIL ALTERNATIVES

JON ANDRE LØKKE

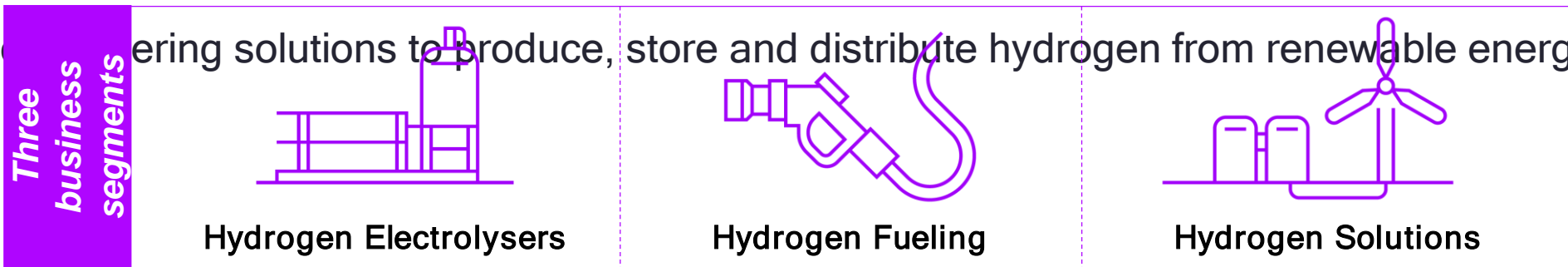
CEO Nel Hydrogen



# Nel in brief

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- Global, listed pure-play hydrogen company - facilities in Norway, Denmark and the U.S., ~16,000 shareholders
- Significant foothold in fast-growing markets with several breakthrough contracts
- World-leading on hydrogen electrolyzers and fueling equipment - unrivalled performance and track-record
  - >3,500 hydrogen solutions delivered in ~80 countries world wide since 1927
  - ~40 hydrogen fueling stations delivered to 9 countries, and delivering to South Korea in 2019
- Capable of offering solutions to produce, store and distribute hydrogen from renewable energy





A large industrial refinery or chemical plant at sunset. The sky is filled with colorful clouds in shades of blue, orange, and pink. Several tall, cylindrical distillation columns are visible, some with red and white bands. The entire facility is illuminated by numerous bright lights, creating a complex network of pipes, walkways, and structural elements.

55 million tons of hydrogen





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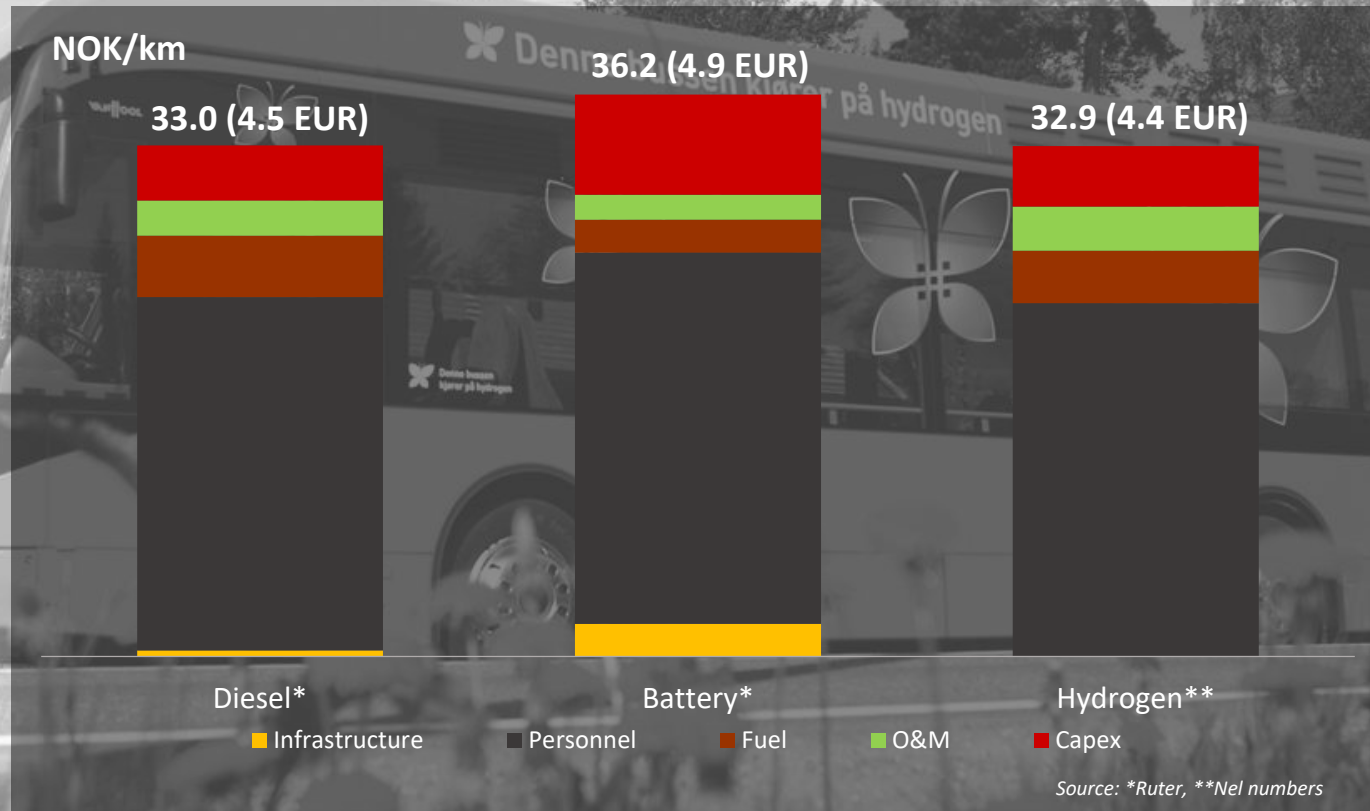
# HYDROGEN BUSES

COMPETITIVE WITH DIESEL AND BATTERY





# HYDROGEN BUSES COMPETITIVE WITH DIESEL AND BATTERY



## HYDROGEN TRAINS

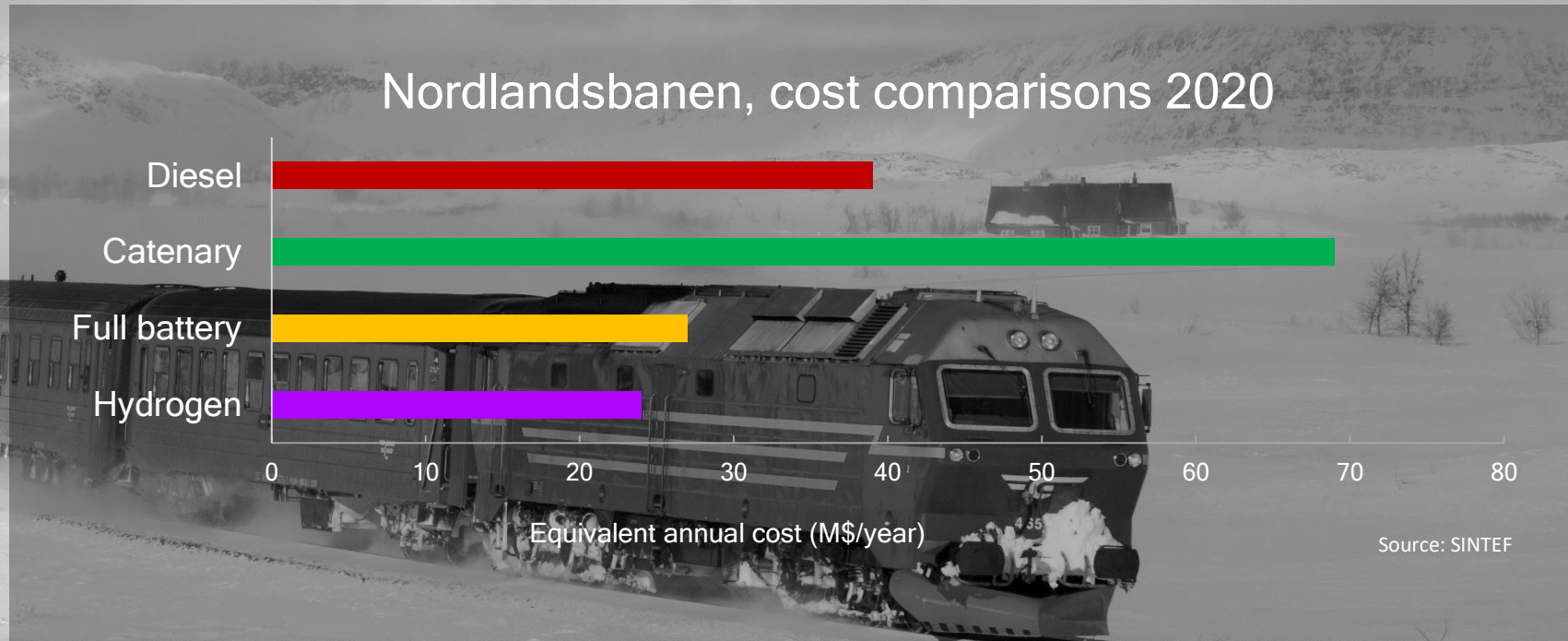
CURRENTLY 40% OF EU & 1550 KM OF NORWEGIAN RAILROAD IS DIESEL  
COST OF ELECTRIFYING WITH WIRES: ~15 MNOK/KM (2 MEUR/KM)





## HYDROGEN TRAINS ARE COMPETITIVE WITH DIESEL

CURRENTLY 40% OF EU & 1550 KM OF NORWEGIAN RAILROAD IS DIESEL  
COST OF ELECTRIFYING WITH WIRES: ~15 MNOK/KM (2 MEUR/KM)





Across USA, 2020-2028

700





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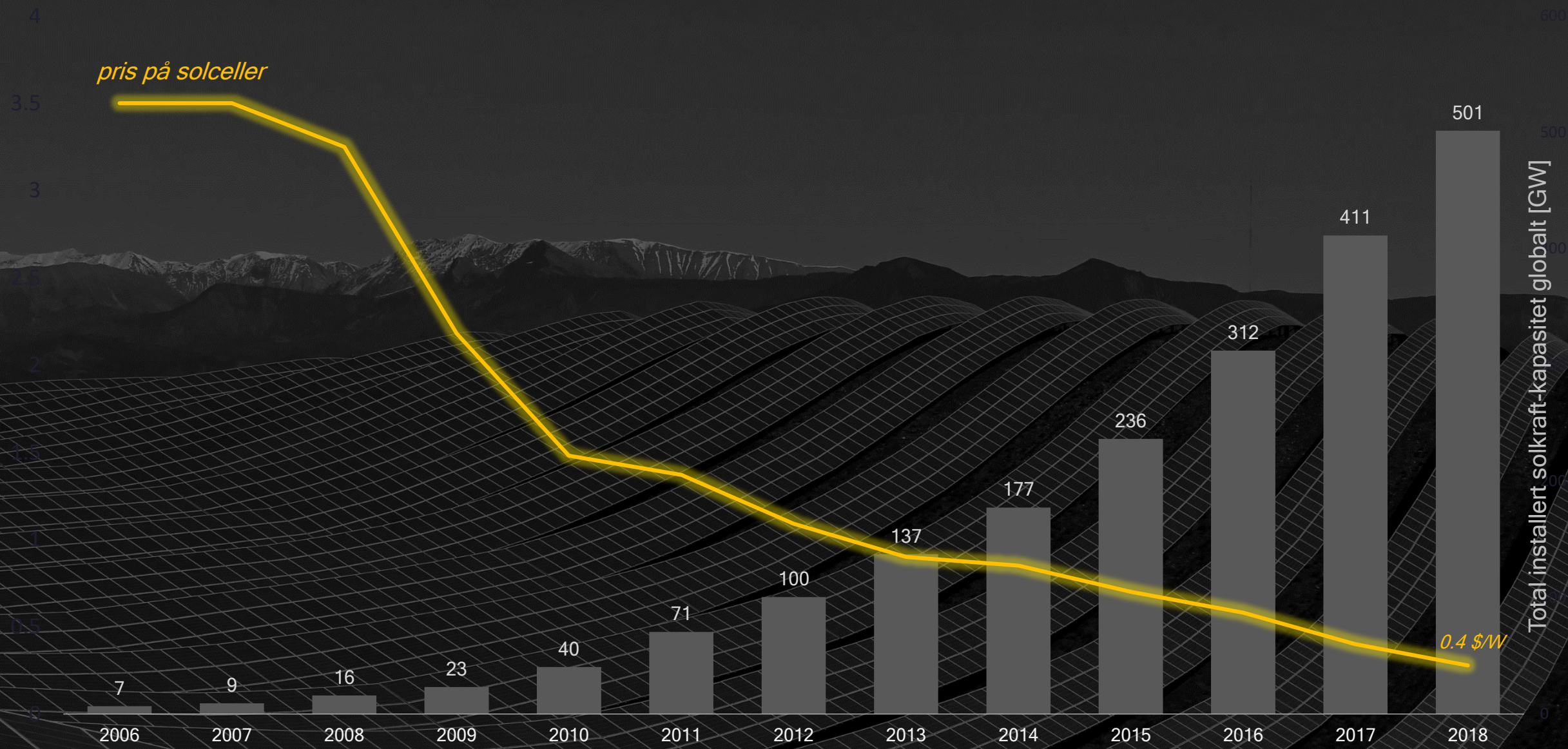


NIKOLA TRE™



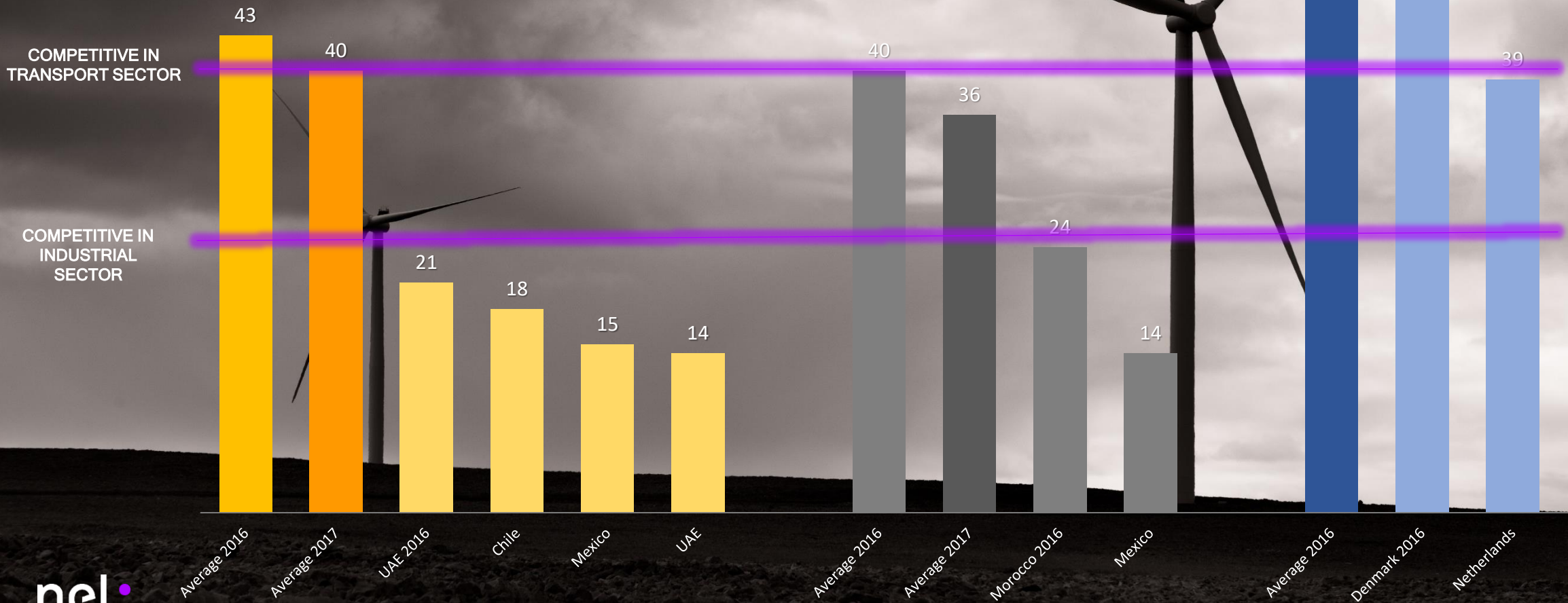








# How competitive is renewable hydrogen

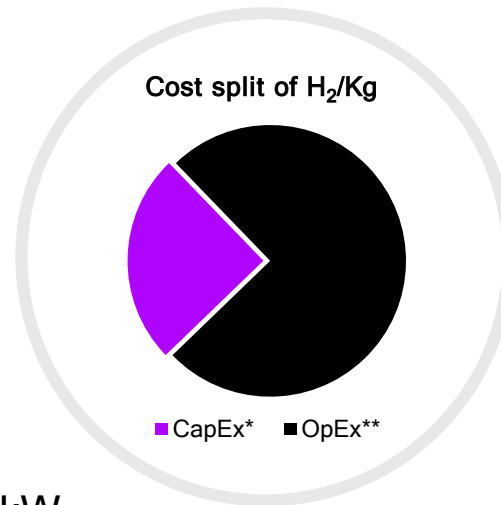
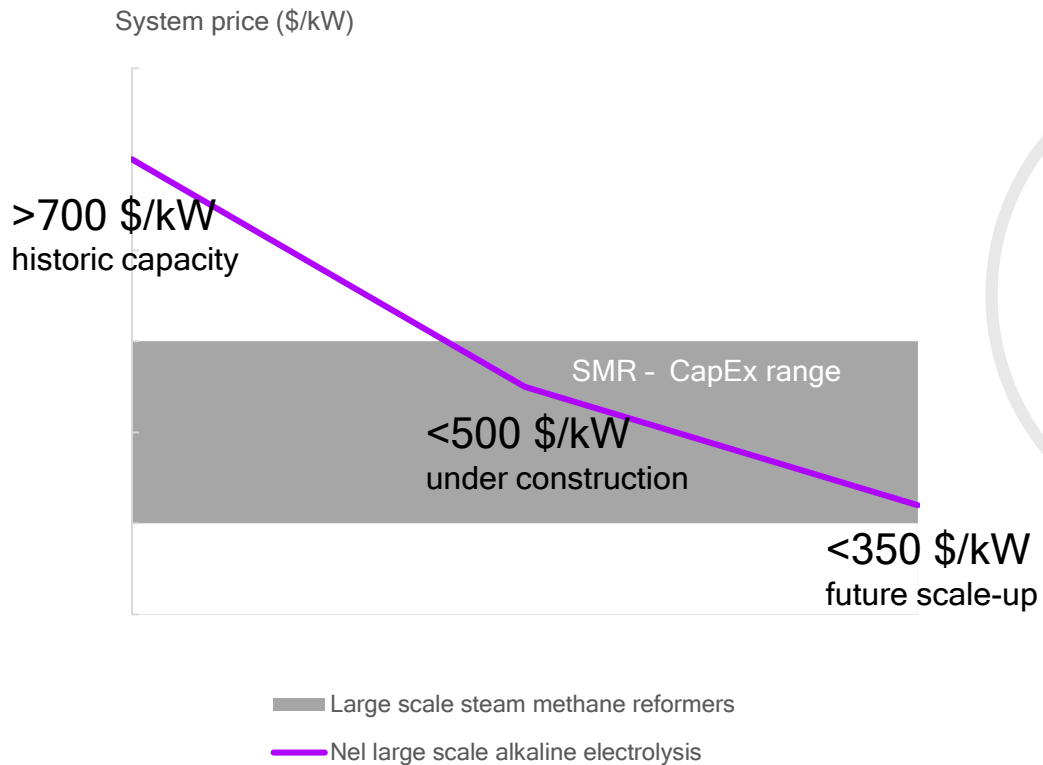




# Renewable hydrogen from electrolysis becoming more and more competitive

General market update

## CapEx: Electrolyzers from Nel - becoming competitive with SMR



- Lower cost of renewable impacts  $\frac{3}{4}$  of total cost of renewable hydrogen
- $\frac{1}{3}$  relates to CapEx and other operating cost like maintenance, etc.
- By aggressively driving this down, renewable hydrogen is in the process of outcompeting fossil hydrogen
- Produced from coal, oil and natural gas



# Constructing world's largest electrolyzer manufacturing plant

Nel ASA Q3 2018

Nel in brief & segment updates

## Name plate capacity of 360 MW per year, more than 10x current annual production

- Highly automated and designed according to lean manufacturing principles
- Industrial scale production, the most efficient electrolyzers in the market at a game changing cost
- Manufacturing plant will be constructed as an extension of the current facility at Notodden, Norway
- Operational in 2020 with ramp-up aligned to customer requirements



A high degree of automation is planned for the new facility



# Making renewable hydrogen mainstream – changing industries

Nel ASA Q3 2018

Nel in brief & segment updates

## Aiming at system cost reduction of more than 40%

- Electrolysis has for several decades been a niche solution, will now become competitive with steam methane reforming of natural gas (SMR)
- The largest hydrogen consumers globally are already evaluating switching to electrolysis and away from SMR
  - Replacement market alone represents a potential market opportunity of ~20 BUSD/year
- Expansion will support ambitions of Nikola as well as other customers who want to make a significant change to their business model



8-cluster electrolyzer solution, produce 8 tons of hydrogen per day



# Officially opened large-scale H2Station production facility in Denmark

Nel ASA Q3 2018

Nel in brief & segment updates

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## Annual nameplate production capacity of up to 300 H2Stations

- First production line in the world for hydrogen stations
- Serial production according to lean principles represents significant improvements in existing production efficiency
  - Hydrogen compression, cooling and gas control assembled onto one skid
  - Allows both CE- and UL-certified stations off the line
- H2Stations for Europe, US and Asia running on same production line (70MPa and 35MPa fueling option)





Hyundai's new FCEV NEXO just launched in Norway – looking forward to next gen. Toyota

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Thanks for the ride dinosaurs,  
we'll take it from here!

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