

■ KOHTI FOSSIILIVAPAATA PROSESSITEOLLISUUTTA - TYÖPAJA

HAVAINTOJA EUROOPAN JA KIINAN PTX HANKKEISTA

- Arvioita tulevasta kehityksestä

Arto Nikkanen



- »» Kiina etenee päättäväisesti vihreän siirtymän eri osa-alueilla
 - »» Aiempia aluevaltauksia mm. aurinkovoima, tuulivoima, sähköautot, muut sähköiset ajoneuvot (bussit jne)
 - »» Nyt Kiina on alkanut toteuttamaan myös Power-to-Methanol ja Power-to-Ammonia hankkeita. Asennettua kapasiteettia jo useissa tehdaskokoluokan hankkeissa
 - »» Useita esimerkkejä integroiduista arvoketjuista ja teollisen kokoluokan toteutuksista (uusiutuva sähkö, vedyn tuotanto, Metanolisynteesi, vihreä kemianteollisuus ja meriliikenne
 - »» Esimerkki Kiinan etenemisestä seuraavilla kalvoilla

- »» Euroopassa markkina käynnistyy hitaammin
 - »» Hankkeita on paljon valmisteilla, mutta teollisia käyviä laitoksia on vähemmän
 - »» Ensimmäisiä käyviä Power-to-Methanol laitoksia mm. George Olah (4000t) Islannissa ja Kassø (40000 t) Tanskassa

» Carbon Recycling International (CRI) on Islantilaislähtöinen Power-to-Methanol teknologiaa kehittävä yritys

» <https://carbonrecycling.com/about>

From demonstration to global deployment

CRI demonstrated the commercial production of renewable methanol with the commissioning of the George Olah Renewable Methanol Plant in Iceland, the world's first facility producing renewable methanol from captured CO₂ and renewable hydrogen.

Today, CRI focuses on licensing its technology and supporting partners developing methanol plants worldwide. Through collaboration with project developers, industrial companies and engineering partners, the company continues to expand the deployment of CO₂-to-methanol projects globally.



2006

Company founded in Reykjavik Iceland. Equity raised from angel investors, Icelandic VC and family funds.



2007-2009

ETL Technology and IP development. Proof-of-Principle in a lab scale pilot-plant.



2010-2011

Engineering, design and construction of the first-of-its kind demonstration plant, The George Olah Renewable Methanol plant in Svartsengi, Iceland.



2012

The GO plant is commissioned and CRI becomes the first company to produce and market e-methanol under the brand name Vulcanol.



2012-2015

Methanex and Geely become strategic investors in CRI.



2014

CRI receives its first large EU grant for development and demonstration of its ETL technology in the MefCO₂ project.

- CRI on tehnyt muutamia demohankkeita Euroopassa ja kaksi teollisen kokoluokan tehdasta Kiinaan, kolmas tehdas Kiinan rakenteilla

Our Projects



George Olah

More

The world's first commercial plant producing renewable methanol from captured CO₂ and renewable hydrogen.



MefCO₂

More

Industrial demonstration converting captured CO₂ from steel production into methanol.



FresME

More

EU demonstration project exploring the production of renewable methanol for maritime transport.



Shunli

More

Large-scale deployment of CRI's ETL technology, demonstrating industrial production of low-carbon methanol.



Sailboat

More

Commercial project deploying CRI's technology to convert captured CO₂ into renewable methanol.



Tianying

More

Expected to become the world's largest CO₂-to-methanol plant once operational, producing e-methanol at industrial scale.



Key facts

- Second commercial scale Emissions-to-Liquids (ETL) plant
- Commissioned in 2023
- 100,000 tons low-carbon intensity methanol from 150,000 tons CO₂
- CO₂ sourced from ethylene oxide production facility
- H₂ by-product stream valorized



Aerial overview photograph of the CO₂ to Methanol plant operating with CR's ETL technology™ - located at the Shenghong Petrochemical Industrial Park in Jiangsu, China.

The plant has the capacity to produce 100,000 tonnes of sustainable methanol annually – the second-largest CO₂-to-methanol plant in the world. Used primarily to supply their olefins facility, this methanol will be used to produce chemical derivatives, including sustainable plastics and EVA coatings for solar panels. This will reduce the reliance on fossil-based methanol to drive more sustainable value chains and carbon footprint reduction initiatives across various sectors, such as industrial manufacturing and renewable energy.

» Hankkeita rakenteilla tai tuotannossa useita. Euroopassa olemme jo jäljessä. Tutkikaa itse lisää ja seuraava viisivuotissuunnitelma kiihdyttänee kehitystä

Project	Location (City,	Developer(s) /	Product(s)	Capacity	Status
Green H2 + e-Methanol	Shuangyashan (Jixian County),	Local government-backed project	Green hydrogen + e-methanol	119,000 t/y e-methanol	Under construction
SPIC Jilin “Full-chain” Green Methanol Industrial	Siping (Lishu / Siping area), Jilin	Jilin Electric Power (SPIC) with COSCO Shipping & SIPG	Green methanol (renewables + H2 + biomass coupling)	197,200 t/y green methanol (reported)	Construction / implementation phase (construction
China Tianying × CRI e-Methanol	Liaoyuan, Jilin	China Tianying + Carbon Recycling	e-methanol (CO ₂ + green H ₂)	170,000 t/y e-methanol (phase	Development / expected start-up
Shanghai Electric Taonan Wind+Biomass	Taonan, Jilin	Shanghai Electric (and partners)	Green methanol (wind + biomass; green H ₂ derived)	Initial ≈50,000 t in 2025; expected ≈250,000 t/y at full	Operational (initial phase) / scaling
Songyuan Green Hydrogen–Ammonia–Methanol	Songyuan, Jilin	China Energy Engineering Group (CEEC) (reported)	Green hydrogen + synthetic ammonia + methanol	Up to 3 GW renewables; combined 800,000	Operations began (phase 1 reported)
Shunli CO ₂ -to-Methanol (Anyang) – CRI ETL	Anyang, Henan	Shunli (Henan Shuncheng Group majority ownership)	Recycled / low-carbon intensity methanol	110,000 t/y methanol	Operational (commissioned Oct 2022)
Jiangsu Sailboat CO ₂ -to-Methanol	Shenghong Petrochemical	Jiangsu Sailboat Petrochemicals	Recycled methanol (CO ₂ + residual H ₂)	100,000 t/y methanol	Operational (start-up 2023)
SPIC Jilin Da’an Wind+Solar → H ₂ →	Da’an, Jilin	Jilin Electric Power (SPIC)	Green hydrogen + green ammonia	32,000 t/y green H ₂ + 180,000 t/y green	Operational (put into operation July



PELI ON JO KÄYNNISSÄ, MUTTA EI VIELÄ HÄVITTY

- Vihreä siirtymä etenee ja valtiolliset toimijat panostavat huomattavasti siirtymän edistämiseen ja fossiilisista riippumattomuuteen
- Siirtymä kiihtyy ja kyydissä kannattaa pysyä
- Vieressä esimerkki Kiinasta sähköautoista...

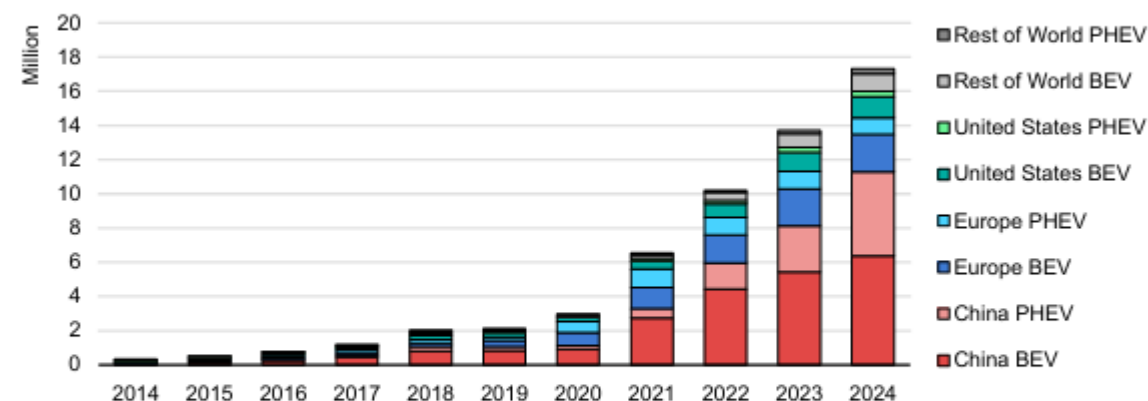
Electric car sales

Global electric car sales exceeded 17 million in 2024

More than 20% of new cars sold worldwide were electric

Electric car sales topped 17 million worldwide in 2024, rising by more than 25%.¹ Just the additional 3.5 million cars sold in 2024 compared to 2023 outnumber total electric car sales in the whole of 2020. China maintained its lead among major markets, with electric car sales exceeding 11 million – more than were sold worldwide just 2 years earlier. Global sales were slightly tempered by stagnating growth in Europe, as subsidies were phased out or reduced in several major markets, and as the EU CO₂ targets for cars remained the same between 2023 and 2024. Electric car sales continued to increase in the United States although growth was about one-quarter that of the previous year. Significantly, outside of these three major markets, there was a record increase in sales of nearly 40% to reach 1.3 million, closing in on the United States' sales of 1.6 million electric cars.

Global electric car sales, 2014-2024



IEA. CC BY 4.0.

Notes: BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle. Includes new passenger cars only.
Sources: IEA analysis based on country submissions and data from the European Automobile Manufacturers Association (ACEA), European Alternative Fuels Observatory (EAFO), EV Volumes and Marklines.