

ShARE

GROWING
CHANGE
MAKERS



October 2022

Consulting Project

Benchmarking Net zero strategies of Denso vs Valeo

Junior Member Presentation

Harsheet Singh
Junior Member
LU – Mobility
IIT Bombay

DO WELL DO GOOD



Executive Summary

- **Need for Net Zero Strategies:** Measures taken by global leaders like European Union, USA and China towards net zero and the environmental need of reduction of GHG emissions.
- **General Information of Valeo and Denso** regarding their mobility products, missions, locations and origin.
- **Energy Usage by both companies and measures taken** to optimize and reduce dependence on non-renewables.
- **CO2 Emissions data and measures taken** by each company for reduction.
- **Operations(Plant, Production and Equipment) related developments:** New technologies and reuse of materials like steel,copper,etc.
- **Economics and Future Projections related to investments in R&D and electrification technologies:** Improvement in fully - electric mobility products and measures taken for it.

Need for Net Zero Strategies

Global Developments related to Carbon Neutrality



European Union

- Introduce a carbon border tax (taxes on emissions of imported goods)
- Expand renewable energy sources, reduce costs, and terminate coal-fired thermal power generation (U.K., France, Netherlands, etc.: by 2030)



USA

- Invest \$2 trillion in clean energy (four years) to significantly escalate its use in transportation, electricity and building sectors.
- Capture CO2 on a large scale and demonstrate reuse
Example: Capture CO2 in the atmosphere and turn it into fuel.



CHINA

- Strengthen the EV industry by giving subsidy on purchases and increasing number of charging stations
- Increase nuclear power generation five to six times.

Environmental Impact



- UN has created a goal of keeping the temperature rise below 1.5 degrees.
- Visible effects of incremental warming, including erratic weather patterns – such as heatwaves, floods, and severe storms – loss of polar ice, acidification of our oceans, and rising sea levels.

General Information about Valeo and Denso



Origin

- Founded as SAFF in 1923 near Paris by distributing brake linings and clutch facings and renamed to Valeo in 1980.

- Founded as Nippon Denso Co. Ltd in 1949 after becoming independent from Toyota Motor

Mission

- Aims to design innovative solutions for smart mobility by keeping CO2 emissions into account.

- By 2025, DENSO intends to standardize microcomputers, close the gap between the automotive and semiconductor industries, and make the supply chain more robust

Locations

- In 31 countries across the globe, including France, Japan, Mexico, and USA.

- DENSO Corporation consisted of 200 consolidated subsidiaries (64 in Japan, 23 in North America, 32 in Europe, 74 in Asia, and seven in Oceania and other regions).

Products

- Thermal Systems
- Visibility Systems
- Powertrain Systems

- AC & Engine Cooling
- Diesel Components
- Engine Management Systems

Source: Valeo website, Denso website

Energy Usage and measures taken to reduce it

Scope 1 emissions are direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles).

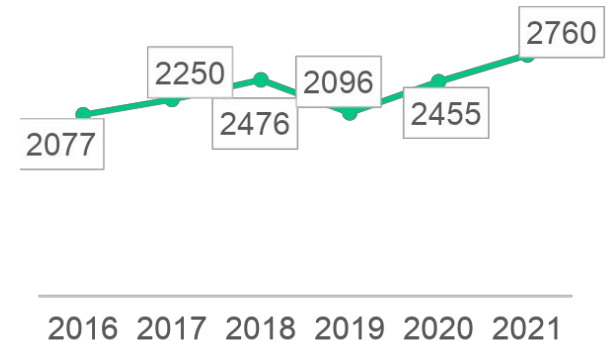
Valeo:

- Plans to considerably increase the share of low-carbon energy purchased to power its sites, from 5% today to 80% in 2030.
- Eco-chiller buildings, 100% LED lighting, heat recovery compressors are some short-term operational investments to reduce energy usage
- Flagship Wind Power Purchasing Agreement in Chennai covering up to 90% energy,
- Self-production on-site with Solar panel projects, eg. Bad Rodach(20% energy coverage),Sanand(30% Energy Coverage)

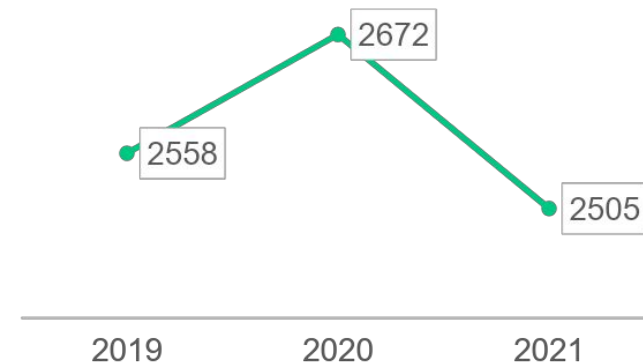
Denso:

- Developing new technologies like artificial photosynthesis and CO2 Cycle at factories to capture CO2 and use it as renewable energy and material.
- Participating in solar projects to help power operations.
- Aims to achieve revenue of 300 billion yen by 2035 from the commercialization of renewable energy.

Energy Usage of Valeo(GWh)



Energy Usage of Denso(GWh)



Source: Valeo carbon neutral strategy, 2021 Denso green energy report

CO2 Emissions data and measures taken for neutrality

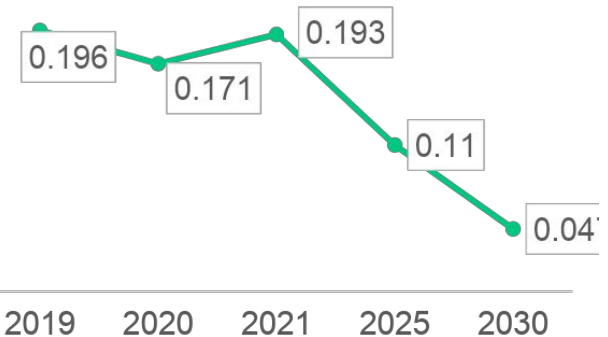
Valeo aims to reduce CO2 emissions by 45% by 2030 and 100% by 2050.

- By 2030, Valeo will have allocated more than 400 million euros to reducing emissions relating to its operating activities to upgrade the Group's sites to enable the current 100 most carbon-intensive facilities to become high-energy efficiency sites by 2030.
- Developed a Predictive Cruise Control system that automatically adapts distances and driving profiles to traffic conditions to minimize CO2 emissions.

Denso aims to achieve carbon neutrality for electricity by 2025 and achieve full carbon neutrality by 2030.

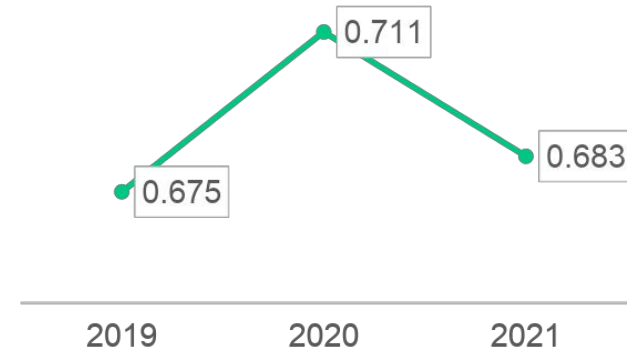
- Established a 1,500-kW solar power generation facility and a 560-kW solar power generation facility at the Zenmyo Plant and Anjo Plant, respectively, thereby helping to achieve an emissions reduction of 330t-CO2.
- Working to establish a system for the utilization and supply of just the right amount of energy at the necessary time through energy JIT(Just in Time) activities.
- Focuses on developing several technologies and BEV, PHEVs, HEVs, and FCEVs are all viable routes towards achieving CO2 neutral mobility.

Net emissions of Valeo in MtCO2 eq.



(Considering only Scope 1 emissions)

Net Emissions of Denso in MtCO2 eq.



(Considering only Scope 1 emissions)



Operations (PP&E) related measures towards Net Zero strategies

Valeo

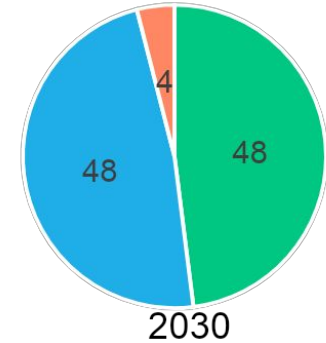
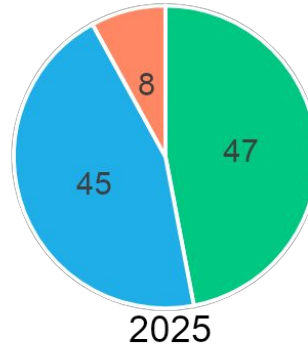
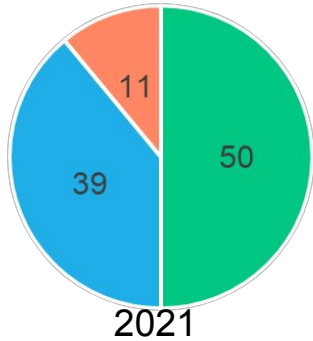
- At the Bursa site (Turkey), the hydraulic system was automated in 2021, allowing 685 metric tons of CO2 equivalent emissions to be avoided each year.
- The Group reuses 96% copper, 100% aluminum, and 87% steel, representing 92% reused materials overall. In terms of plastic parts, Valeo already incorporates 10% to 20% recycled polymers.
- The goal for 2024 is to be able to supply parts made of 100% recycled polypropylene.
- Since 2019, the furnaces at the Jinzhou site in China have been equipped with a heat recovery unit. This investment of several thousand euros generates annual savings of 428 metric tons of CO2 equivalent. Given Jinzhou's hot climate, this upgrade has generated significant savings, with 1,955 metric tons of CO2 equivalent avoided each year

Denso

- New technologies like Molecular bonding and Factory IoT eliminate loss and waste in production operations.
- DENSO leverages world-class micro processing, paying attention to detail down to the 1/1000mm, and an assembly line that improves production efficiency and quality.
- Excellent factory (EF) activities that realize growth for both plants and people
- Development of super eco-friendly equipment like production control platform and modularize heating.
- Denso's Maryville plant has reduced 99.7 percent of all waste since 2000. In 2017, it diverted nearly 30 million pounds to landfill and replicated this by reducing 27.5 million pounds in 2018.

Source: Denso 2021 green report, Valeo 2021 climate report

Economics, Future Projections and R&D



■ Non-Electric ■ Fully-Electric ■ Hybrid

■ Non-Electric ■ Fully-Electric ■ Hybrid

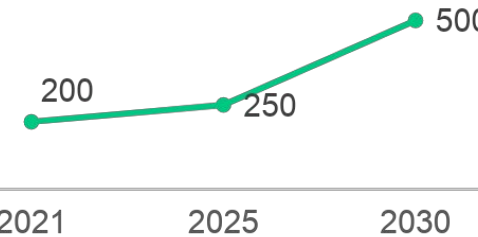
■ Non-Electric ■ Fully-Electric ■ Hybrid

Net increase in Fully Electric Products by Valeo

- Valeo has invested more than 1510 million euros in Rnd.
- 45% of order intake by Valeo is made up of new innovations.
- 1 in 3 new vehicles worldwide is fitted with one of Valeo's electrical systems that help in CO2 reduction.
- 60% of total sales are derived from electrification technologies.

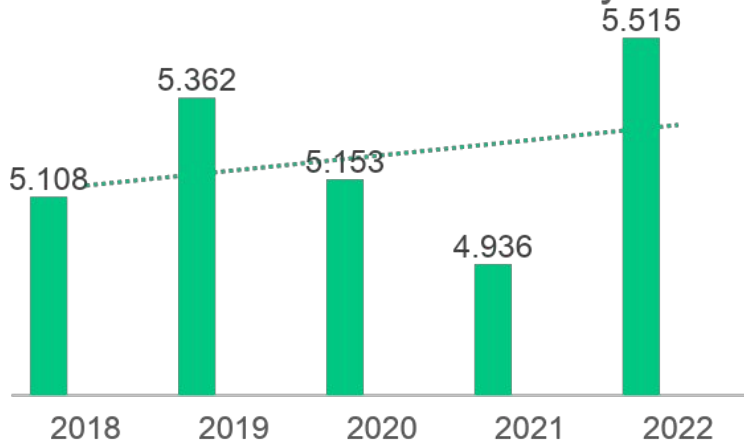
- Between 2009 and 2021, Valeo's sales of electrification solutions increased 26-fold.
- All forms of mobility, from bikes and scooters to driverless taxis require 48V technology, in which, Valeo is a market leader. Currently, Valeo has booked more than 200 million euros of sales and is expected to increase.

48V Mobility Product Sales in Million Euros



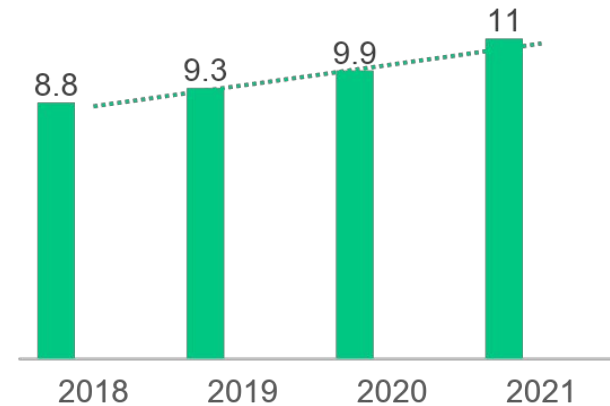
Source: Valeo 2021 financial outlook

Denso revenue in trillion yen



- Even though there was a contraction in revenue during covid times, Denso still continued to allocate approx. 9% of the total revenue for R&D purposes.
- Denso has recently introduced new technologies like wire bonding connection system, high-speed assembly line for engine control module ECUs, electromagnetic field simulation and lead-free soldering apparatus in its attempts towards its net zero goals.

Ratio of Denso's RnD expenditure to Revenue



- Ratio of R&D expenditure to revenue is approx. 9% from 2011 to 2021 for Denso.
- Denso allocates at least 500 million yen every year even if there is growing uncertainty in the current business environment.
- Recently, Denso opened a new office in Tokyo to conduct R&D on advanced driver assistance, automated driving, and connected vehicles.
- 41500 patents held by Denso

Source: Denso 2021 financial statement, Denso Ten website