Review of Automotive in 2021 and near-term outlook

Pete Kelly, Managing Director, LMC Automotive
1 February 2022
GlobalData has acquired LMC Automotive

Watch this space – more coming soon!
Outline

- 2021 review and industry volume forecasts
- Electrification update
Economic growth extends into 2022

2022 GDP level compared with 2019:

- Global: +6.3%
- US: +6.2%
- Eurozone: +2.2%
- China: +16%

Source: Oxford Economics
Global Light Vehicle sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Millions</th>
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<tbody>
<tr>
<td>2018</td>
<td>73.5 mn</td>
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<tr>
<td>2019</td>
<td>81.9 mn</td>
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<tr>
<td>2020</td>
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<tr>
<td>2021</td>
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Source: LMC Automotive
2021 – Lack of inventory constrains sales rebound
World LV sales – 81 mn, up 5% from 2020

<table>
<thead>
<tr>
<th>Region</th>
<th>Units: millions</th>
<th>2020</th>
<th>2021</th>
<th>Change</th>
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<tbody>
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<td>17.0</td>
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<td>+3%</td>
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<td>3.0</td>
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<td>16.6</td>
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<tr>
<td>China</td>
<td></td>
<td>24.4</td>
<td>25.5</td>
<td>+4%</td>
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<tr>
<td>Rest of Asia</td>
<td></td>
<td>13.3</td>
<td>14.4</td>
<td>+8%</td>
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</tbody>
</table>

Source: LMC Automotive
2022 – Marginal improvement with upward revisions

World LV sales – 86 mn, up 6% from 2021

<table>
<thead>
<tr>
<th>Region</th>
<th>Units: millions</th>
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<th>2022</th>
<th>Change</th>
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<td>Europe</td>
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<td>16.7</td>
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<td>14.4</td>
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</table>

Units: millions

Source: LMC Automotive
Global truck market (GVW>6t)

- Global SAAR uptick from October after three consecutive falls
- Global semiconductor shortage likely bottomed out during Sep/Oct period
- Full-year sales 2021 estimated at +4% YoY (3.2 mn units)
- Sales constrained by pandemic and supply chain disruption
- NB: China continues to distort profile of the overall global topline.

Source: LMC Automotive
Segment trends (SAAR index)

- **HD**: Strong initial rebound, outperforming other sectors – but now hit by shortages (plus China impact)
- **MD**: Tracking LV sales recovery with slight initial lag – but have lost momentum
- **Bus**: Sales remain in the doldrums – low public transport demand due to ongoing pandemic

**Segment Recoveries (2019=100, s.a.)**

Source: LMC Automotive
Global LV production 2021 and 2022 growth vs 2019 base

2021: Indexed against 2019

Q1: -10%
Q2: -15%
Q3: -21%
Q4: -7%

2021: 76.9mn

2021 Forecast cut by 10.7mn

2022: Indexed against 2019

Q1: -12%
Q2: -5%
Q3: 0%
Q4: +4%

2022: 85.8mn

2022 Forecast cut by 6.5mn

Source: LMC Automotive
Disruption in 2021 totalled 9.6mn units from planned volume, with 95% of lost volume due to semiconductor shortage. NA made up 24% of shortage total 2.3mn units.

Ford’s impact was early and most severe throughout year. GM’s impact levelled off and Toyota’s was late.

2022 showing improvement but does not escape lost volume and risk – impact still at 4.8mn units

Source: LMC Automotive
Inventory situation stabilizing/improving across markets

- **US** days’ supply has improved marginally in last three months, but still well below normal levels and below the pace of demand. December was 59% below December 2020. Market will not likely see significant improvement until late 2022.

- **China**’s change in stock was negative in 8 of 11 months in 2021. November’s production increase has improved vehicle availability. Chips and covid-19 remain a risk in the short-term.

- **Europe** saw a similar low as US in 3Q and expecting to improve at a slightly better pace through 2Q 2022. Demand will continue to be constrained as availability priority remains premium market.

Source: LMC Automotive
Current regional LV production metrics

<table>
<thead>
<tr>
<th>Region</th>
<th>‘21 Δ from ‘18–’19 Ave.</th>
<th>‘22 Δ from October 2021 forecast</th>
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<td>-17%</td>
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<tr>
<td>Europe</td>
<td>-26%</td>
<td>0%</td>
</tr>
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</table>

Source: LMC Automotive
Key markets medium-term recovery path

**CAGR Global LV Sales ‘21-’25**

- **Brazil**: 9.7%
- **Eastern Europe**: 8.9%
- **India**: 8.4%
- **ROW**: 8.3%
- **Western Europe**: 7.9%
- **Global LV Sales**: 6.1%
- **China**: 5.2%
- **US**: 3.8%
- **Japan**: 3.4%
- **S. Korea**: 3.1%

- Global CAGR at 6.1 2021-2025, with most emerging markets outperforming mature.
- Strong recovery in Europe after lagging in 2021.
- Japan and South Korea both upgraded recently.
- US growth flattening out post-recovery.

Source: LMC Automotive
Global LV production gains traction after short-term chaos

- Forecast risk is highest in 2022 but signalling does suggest improvement. Risks include: Covid-19 variants, parts shortages, logistic issues, labour shortages and inflation.

- CAGR 21-25 of 8% slightly outpaces demand as inventory rebuild pushes volume past 100mn units.

Source: LMC Automotive
OEM group medium-term ‘scorecard’

Global LV Production: 2019=100

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</table>
Outline

- 2021 review and industry volume forecasts
- Electrification update
Global BEV model onslaught

Number of mainstream BEV models on sale

Models > 1,000 units per year

Source: LMC Automotive
When can I get the vehicle I want as a BEV?

Global BEV models on sale by bodystyle

- Aside from total cost of ownership and utility, a critical factor is the basket of choices available to consumers.
- We analyse the strategies and model pipeline of all OEMs, hence deriving a view on how the xEV showroom will develop.

Source: LMC Automotive
OEM response: a raft of pledges to move away from ICE

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<th>What?</th>
<th>Where?</th>
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</tbody>
</table>

Source: LMC Automotive
Every forecast needs a solid base: where are we now?

BEV share of PV sales (LV sales for USA), %

France

Germany

Italy

UK

Norway

Netherlands

China

USA

Canada

Brazil

Japan

Korea

… plus all other significant markets
ESG policy & xEV mandates: accelerating change

130 countries have signed up

China: 2060

EUROPE

EU proposal for new car fleet CO₂ target at 95g/km less 55%
EU new car fleet CO₂ target at 95g/km less 15%
EU proposal for new car fleet CO₂ target at 95g/km less 100%
EU to be climate neutral

EUROPE

CHINA

China Dual Credit Policy
• Only Positive NEV Credits can balance Negative CAFC Credits

China: Technical Roadmap 2.0

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Affordability vs ICE depends on battery costs

- The curves represent market average – in reality, the BEV-ICE comparison depends on segment, vehicle, OEM, market and chemistry!
- Current view is that long-term Li, Mn, & Ni supplies will be sufficient to keep up with demand, but prices will be spiky – 2022 could see a rise
- We aren’t assuming a commercial-level battery breakthrough such as solid state before 2028
- The outlook from here is to remain with Li-ion, with price trending down as benefits from scale, optimisation and learning curve are realised.

*Price representative of mass market BEV model with NMC battery pack. Actual date of parity or higher BEV profitability is market dependent.
World: xEV demand – positive in all major markets

BEV, PHEV & FHEV markets

Europe PV*

USA LV

China PV**

Europe BEV 2021: +64%

USA BEV 2021: +81%

China BEV 2021: +169%

Source: LMC Automotive Global Hybrid & EV Bulletin
*pan-Europe; **wholesales
World: xEV over-performs, record month in December

BEV, PHEV & FHEV markets

BEV annual view

World BEV 2021: +116%, World PV* 2021: +4%
World: BEV & gasoline hybrid are the winners

- Non-hybrid gasoline and all diesel falling away as gasoline hybrid and BEV grow
- But >70% of production is pure gasoline and almost 85% has a gasoline engine
- Diesel share has fallen from 13% to 8% in the last 3 years and will fall further

Source: LMC Automotive
The changing political landscape & environmental pressure necessitated a forecast change from 2020

The proliferation of ICE & hybrid end of sale targets plus OEM ZEV statements of intent really point toward BEV being the favoured technology in most markets

FCEV remains a marginal player until at least 2030 with slow growth until 2035

Total BEV LV in 2033: 47mn

Source: LMC Automotive Global Hybrid & EV Forecast
*including N. America LV

Source: LMC Automotive
Concluding …

- No quick fix for shortages, but demand is strong and likely to stay that way as vehicle delivery continues to improve.
- Risks from further pandemic disruption (not least a new variant wave) are non-trivial and future supply shocks could still stall recovery.
- Electrification going faster than many expected – even if easy wins in terms of use case are being ‘used up’ other factors are more positive.
- Other disruptive change, e.g. from Autonomous Driving, are still in the pipeline, but the reset to unrealistic expectations of fast and transformative change that came in advance of the pandemic still stands – development interrupted/slowed, but not sidelined.
- Development for Autonomous technology still on two tracks: owned/OEM and shared transportation.
For experts by experts

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Thank you