

Scenaria,

**Case Study Summaries
Light-Duty OEMs**

Situation:

- Global OEM required significant investment in engine portfolio to meet multiple regional and customer requirements. Client needed to evaluate architecture and technology alternatives and determine the best opportunity.
- Decision was critical to expanding market position and required optimizing key regulatory, customer, competitive and internal business objectives.
- The selected engine architecture and technology path needed to be robust against future regulatory and market uncertainties

Approach:

- Combine Scenaria's attribute optimization modeling capabilities with AVL powertrain development expertise.
- Evaluate technology alternatives based on capability to meet prioritized attributes while maximizing cost-effectiveness.
- Analyze sensitivity of technology selection to discover tipping points, and robustness to changes in competitive pressures and market factors (e.g. competitive targets, vehicle taxation policies, emissions and fuel economy legislation and market volume risks).

Results:

- Recommended engine architecture met or exceeded prioritized attribute targets and delivered a total cost per unit savings of \$450.
- Sensitivity analysis confirmed that the recommended architecture path was robust to the range of regulatory and market risks identified.
- Client changed the proposed engine portfolio based on analysis and new data from AVL/Scenaria.

Situation:

- Client required insights into the technology plans needed by competitors to comply with future fuel economy legislation in the United States
- Client's future technology choices influenced by vehicle performance requirements, technology availability, and current level of fuel economy

Approach:

- Provide an overview of the US market for light duty vehicles
- Identify competitor vehicle nameplates, research technologies of interest, and baseline performance characteristics
- Model all potential technology combinations used to achieve regulatory compliance on a per vehicle basis
- Conduct sensitivity analysis to test the 'robustness' of the technology options to uncertainty in future market factors
- Estimate potential impact of performance metrics (0-60mph, power to weight ratio) on technology trends

Results:

- Leveraging technology credits and vehicle refresh/redesign timing will be a key part competitor compliance plans, but will not overcome the need for new powertrain technologies.
- Without substantial increases in consumer adoption, diesel vehicles will have minimal impact on competitor CAFE calculations.
- Gasoline powertrains are the "rational" choice (based on cost-effectiveness or "payback") as long as diesel prices are equal to or greater than petrol prices.
- The current downtrend in annual vehicle miles traveled negatively affects "payback" for both diesel and electrified powertrains.

Situation:

- Client needed to prioritize Engineering R&D resource allocation decisions for future powertrain product programs, due to a shortage of trained and experienced calibration and controls staff
- Engineering resource decisions need to be balanced against other considerations, based on impact to future profitability and GHG/ Fuel Economy compliance
- Client required scenario exploration and 'what-if' analysis to identify the highest value investments from a compliance and financial standpoint

Approach:

- Map the "current state" process used to prioritize engineering resources and identify gaps in data and process flow
- Develop tool requirements from process mapping exercise and stakeholder interviews
- Structure a database of resource availability and requirements, based on financial and regulatory impacts of each powertrain application
- Create and demonstrate a prototype decision dashboard that enables client to quickly evaluate the impact of resource allocation and prioritization decisions.

Results:

- Delivered detailed recommendations and plan to address issues discovered during process mapping, as well as an implementation plan to imbed dashboard within clients IT system
- Executive steering committee approved recommendations and requested project scope expansion to cover overall powertrain portfolio planning