



INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM & EXHIBITION



Silencing the Future – A System Level Approach to NVH Reduction

Michael Furness



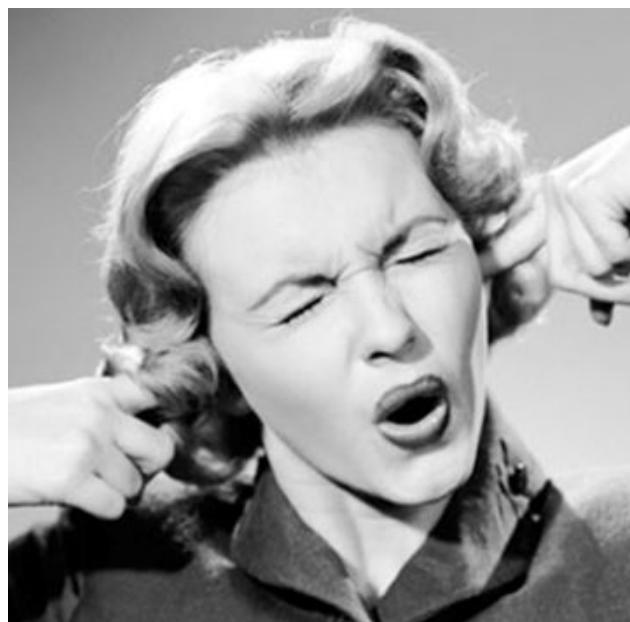
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Drive System Design, Leamington Spa, UK



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[Source: https://www.assemblymag.com](https://www.assemblymag.com)

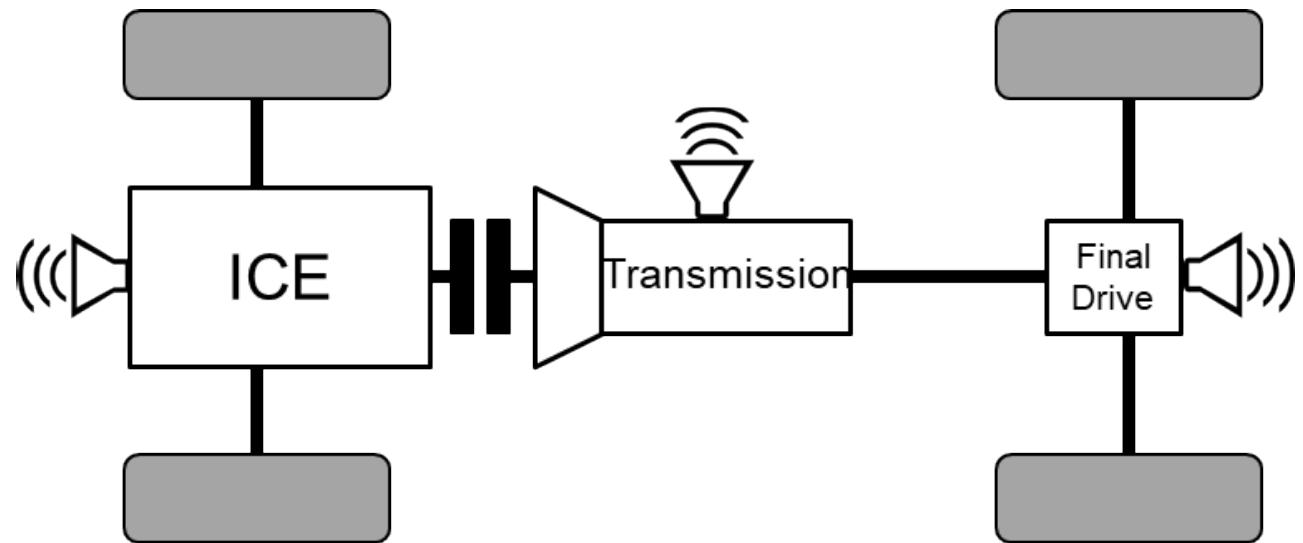


[Source: https://opentemple.org](https://opentemple.org)

**EXPECT
DELAYS**



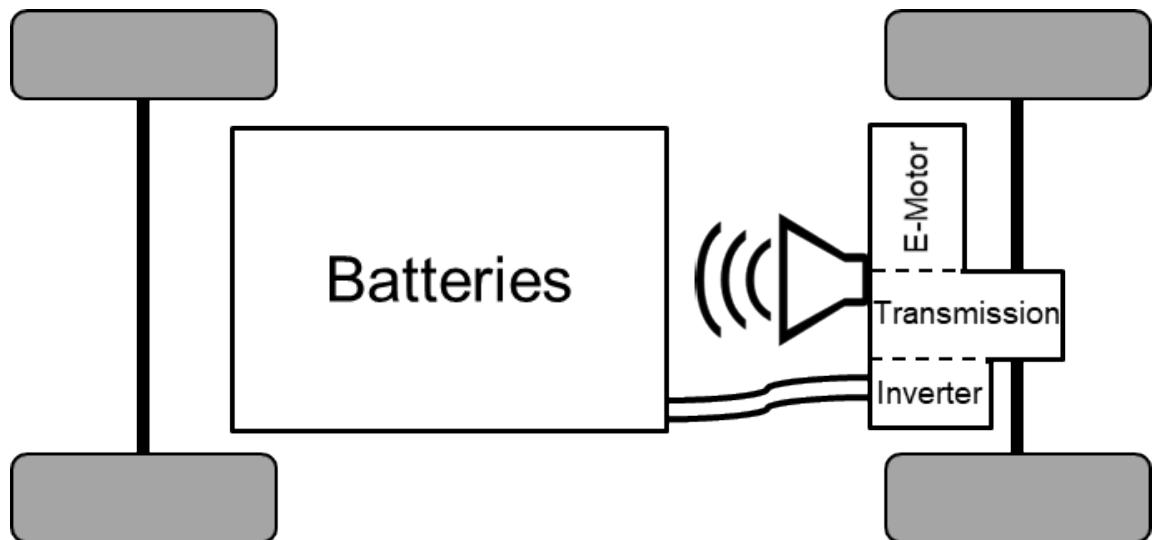
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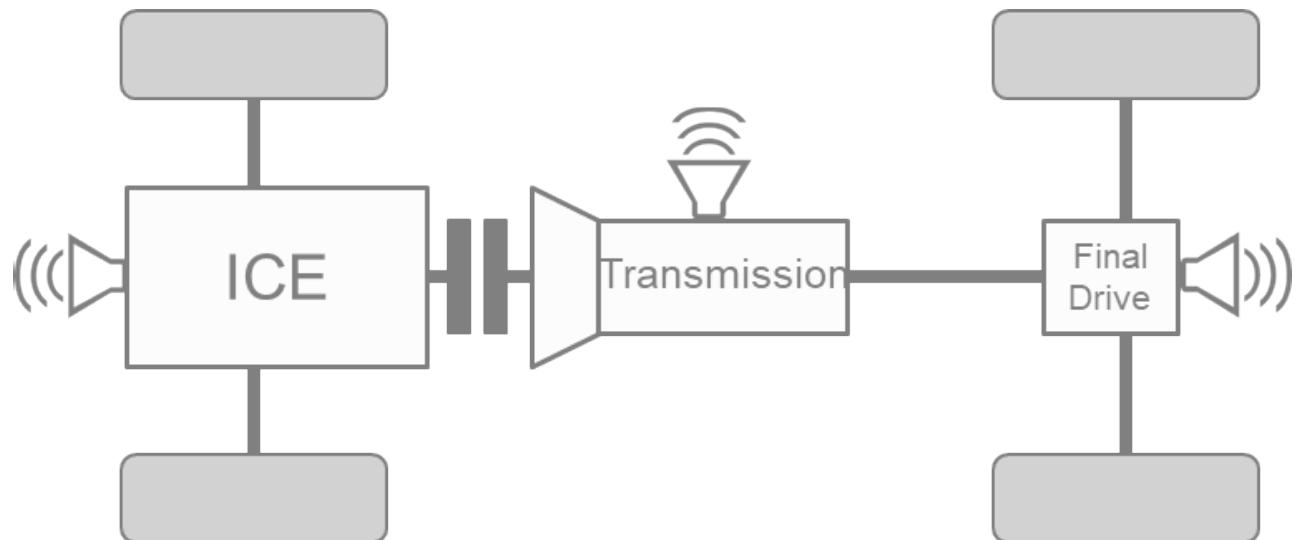
Typical ICE Powertrain



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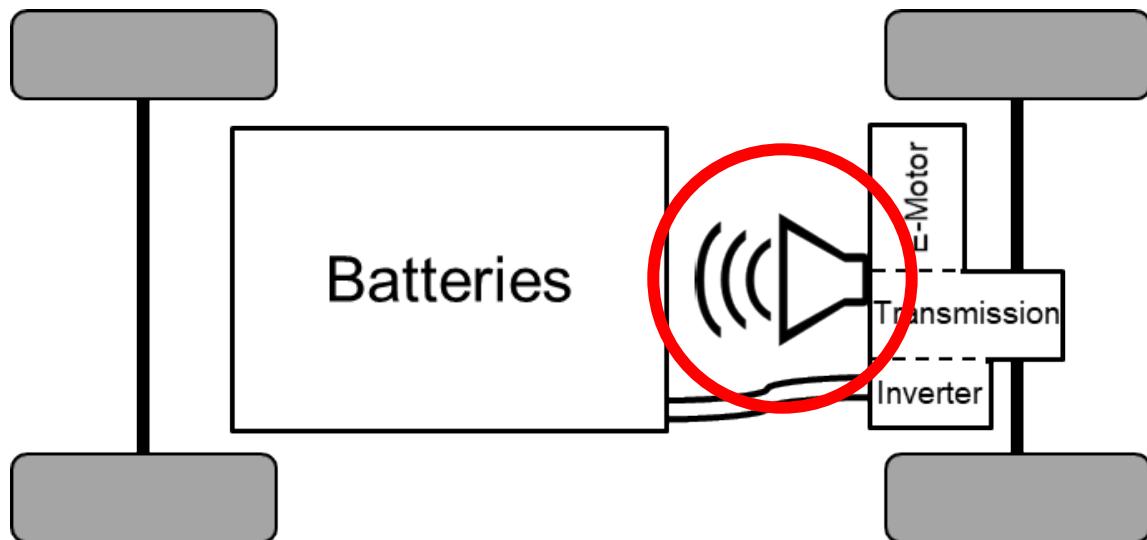
Typical EV Powertrain



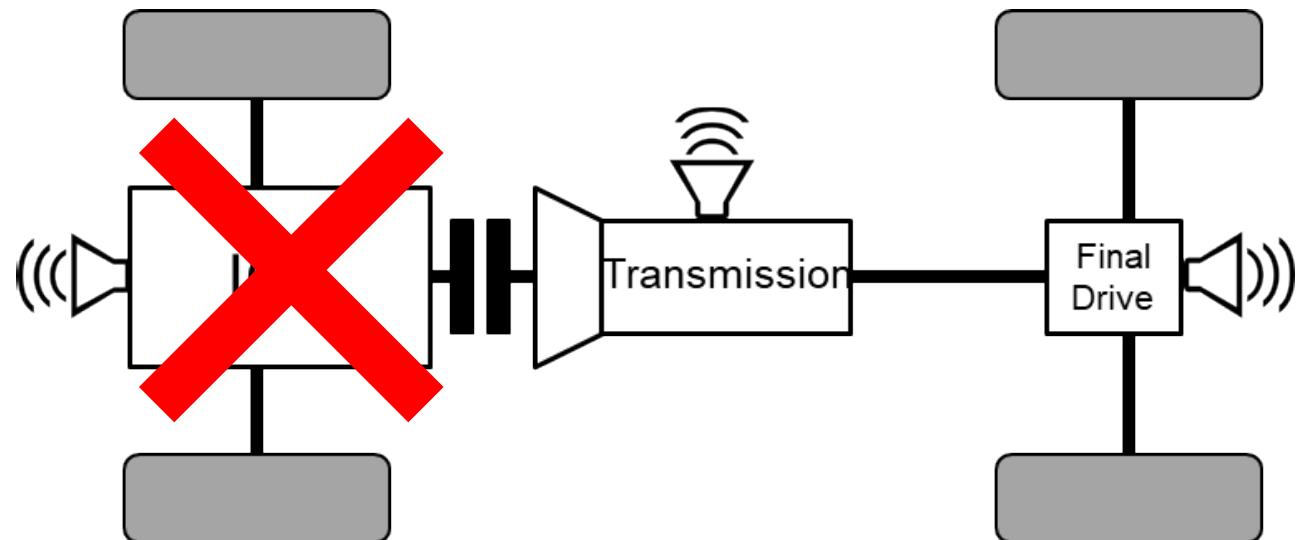
Typical ICE Powertrain



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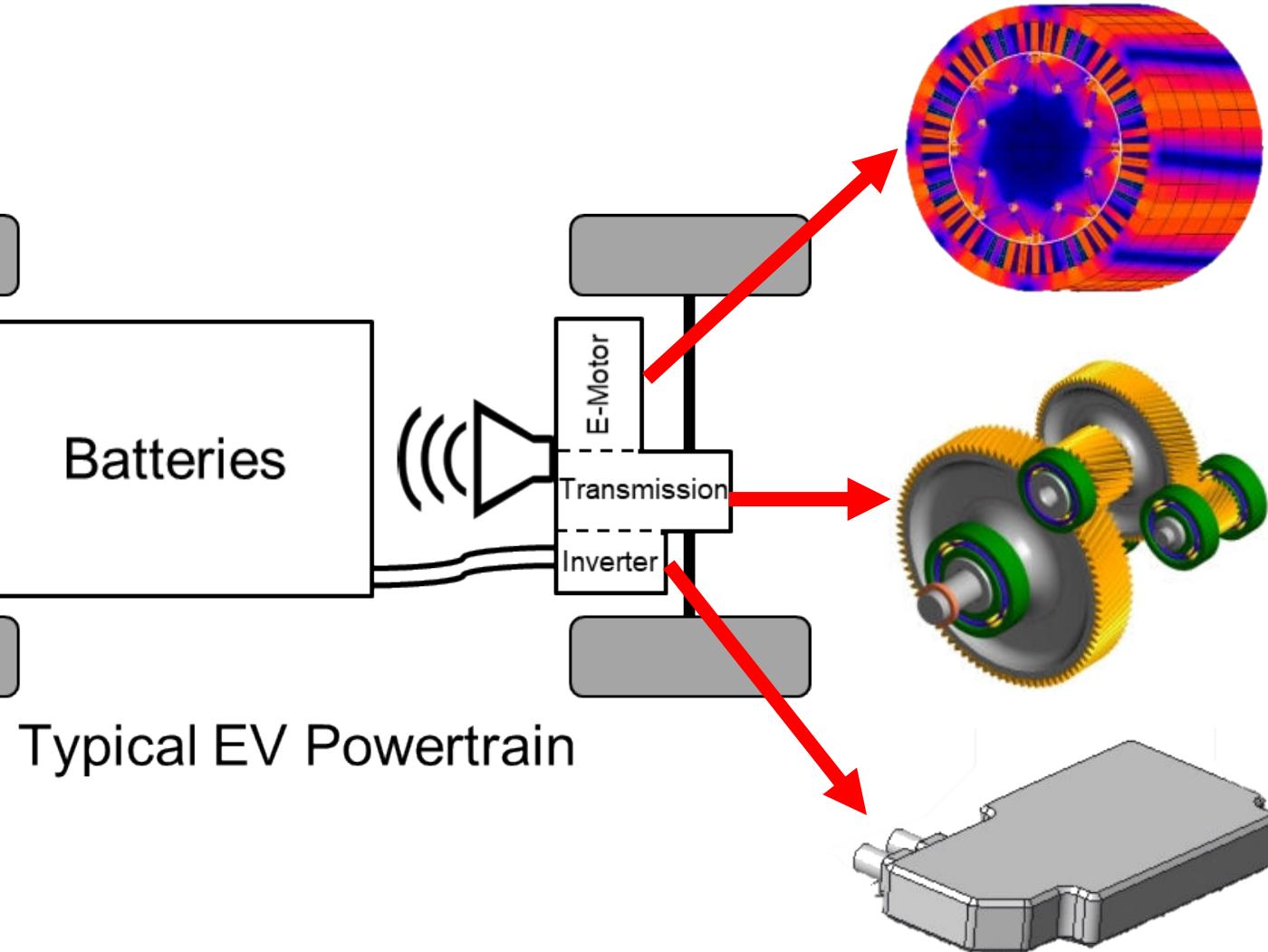
Typical EV Powertrain



Typical ICE Powertrain

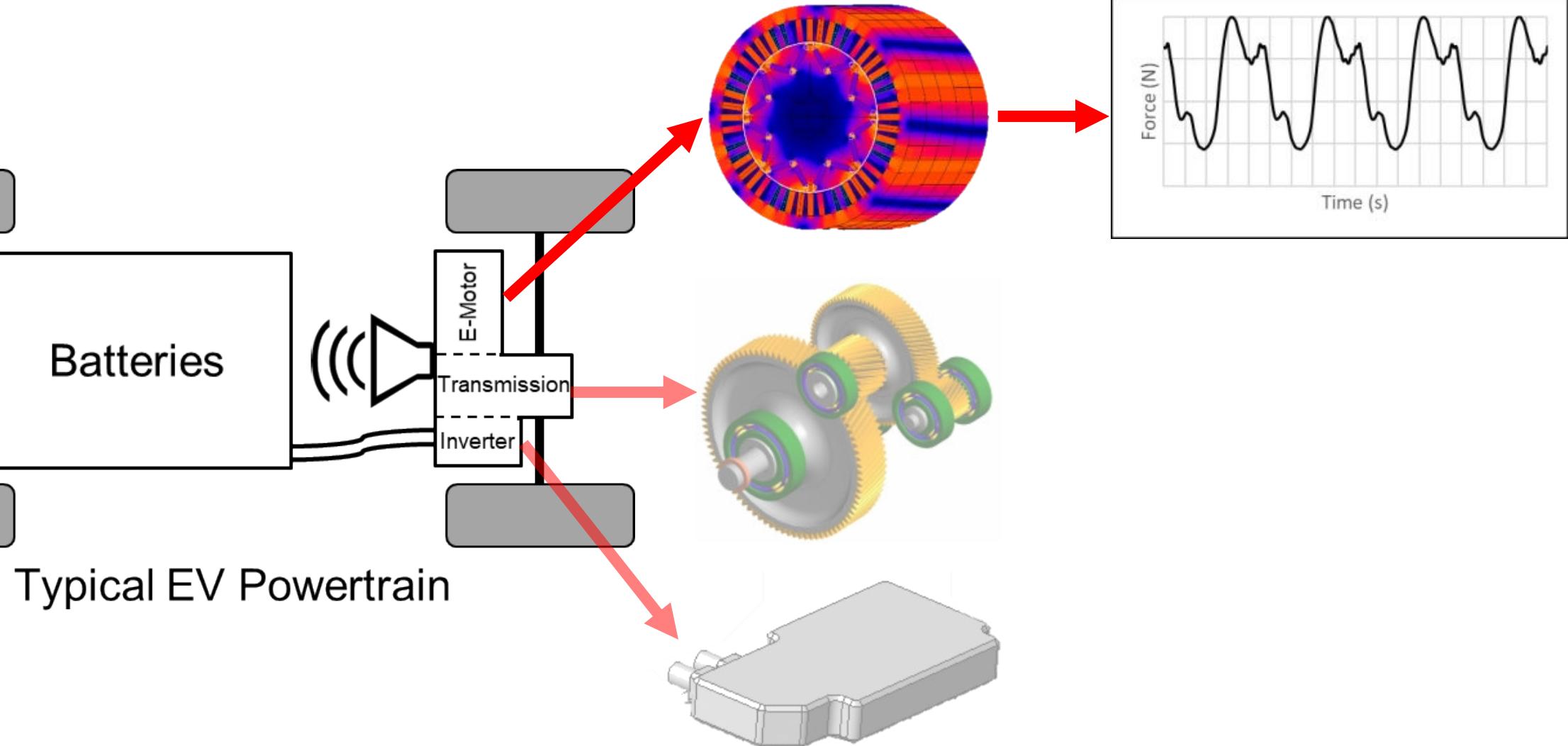


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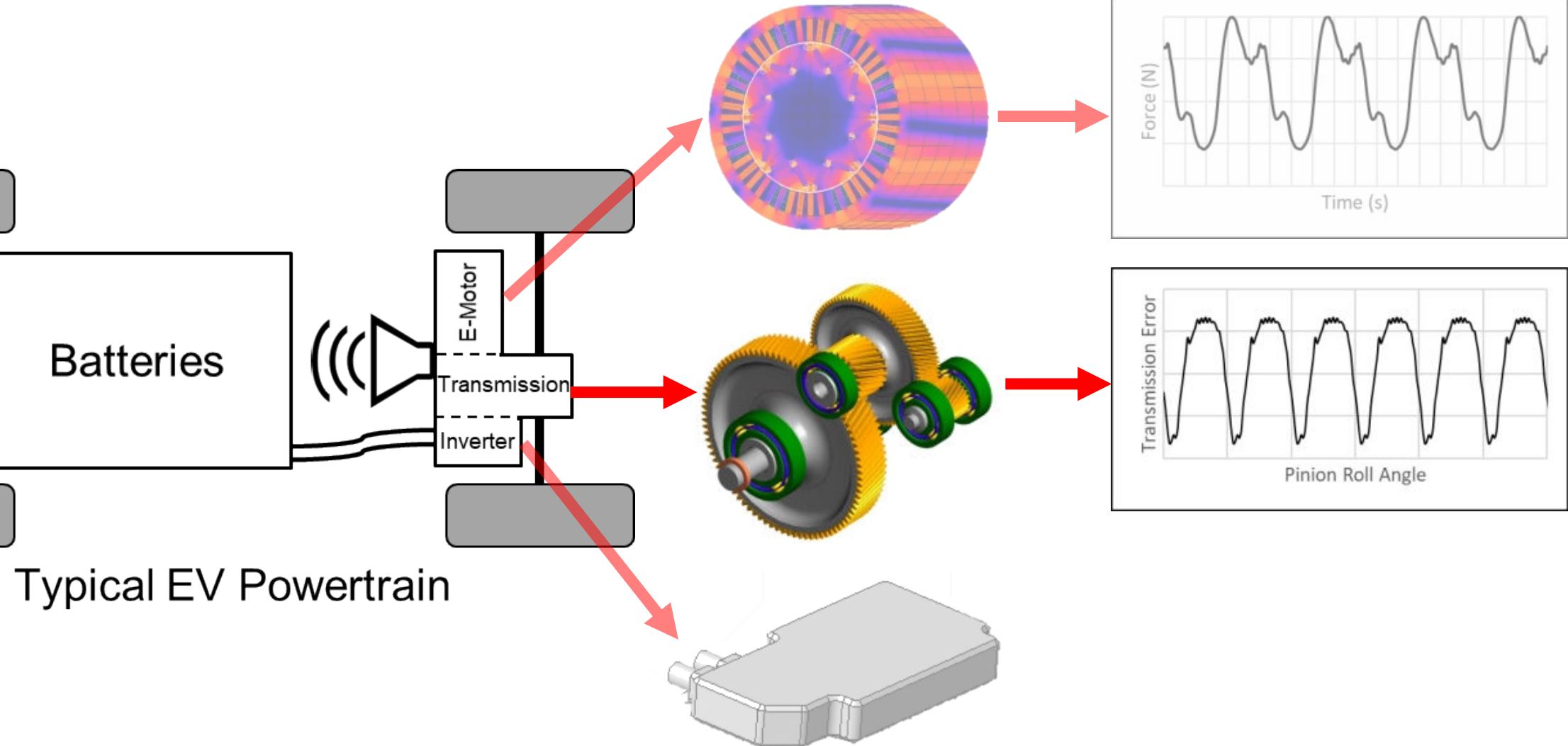


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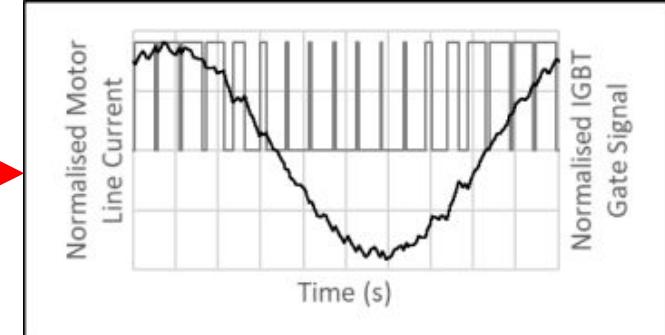
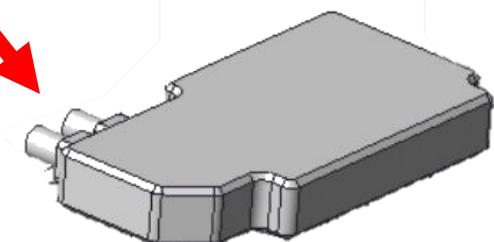
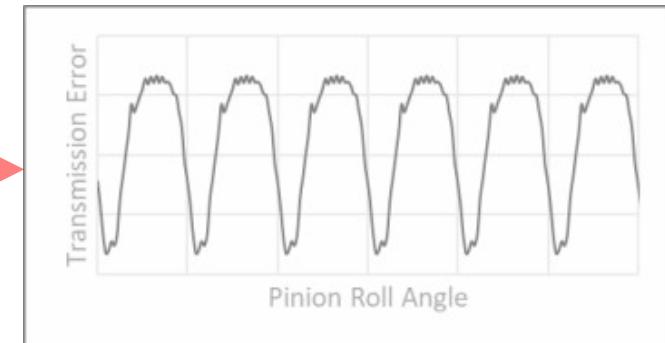
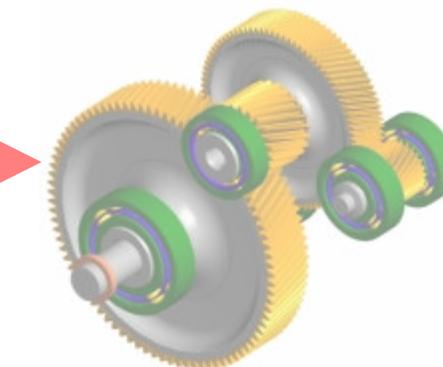
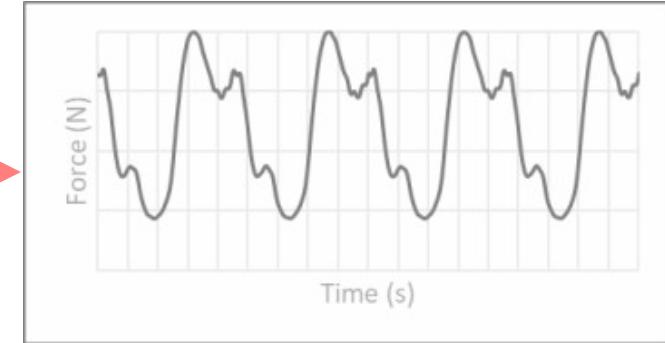
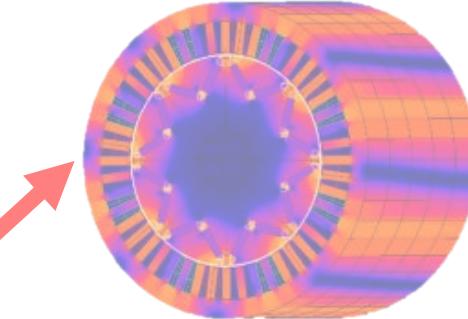
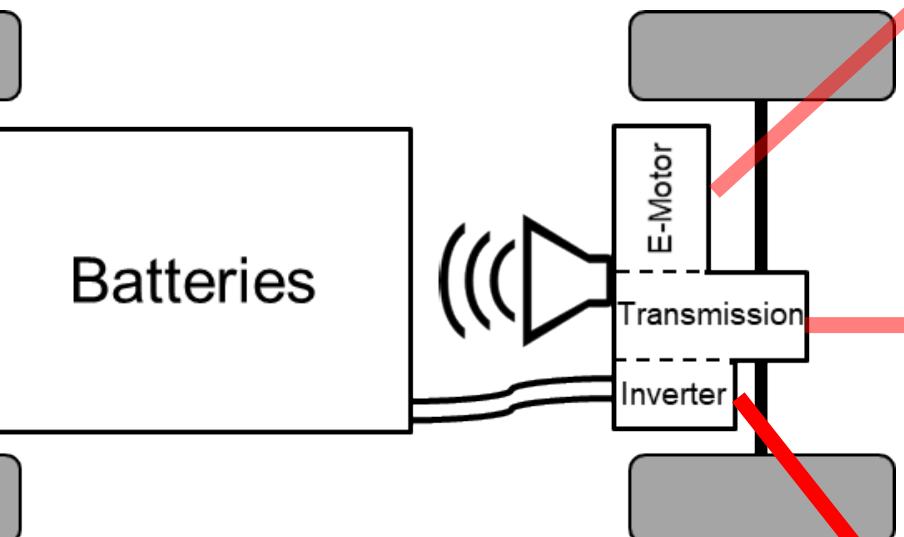


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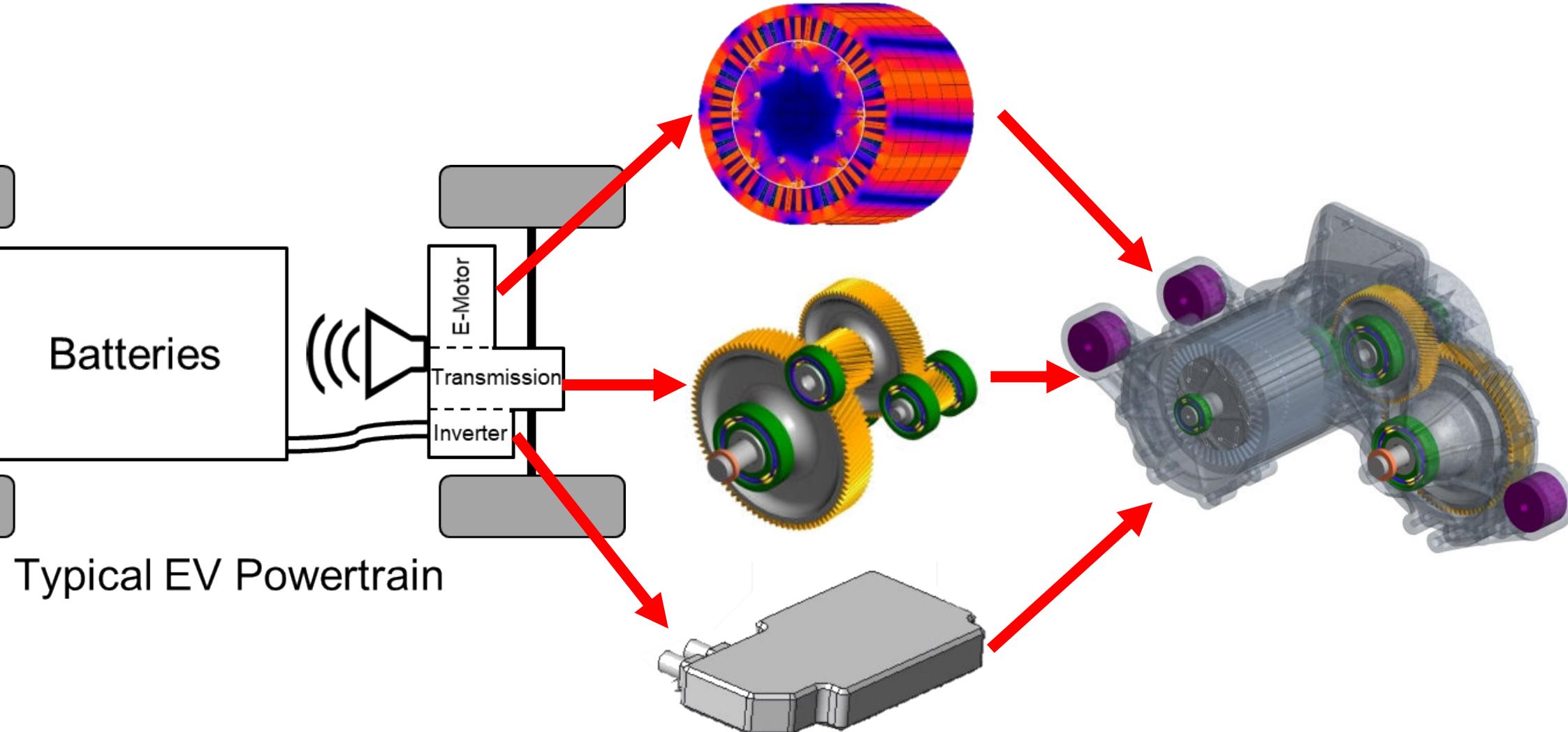


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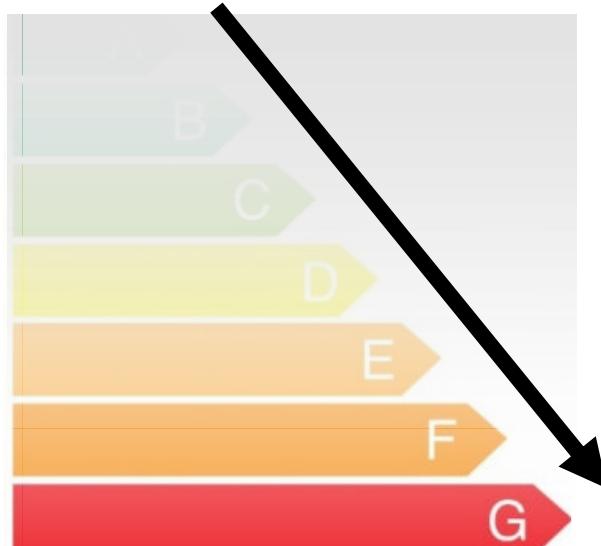




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Reduced Efficiency

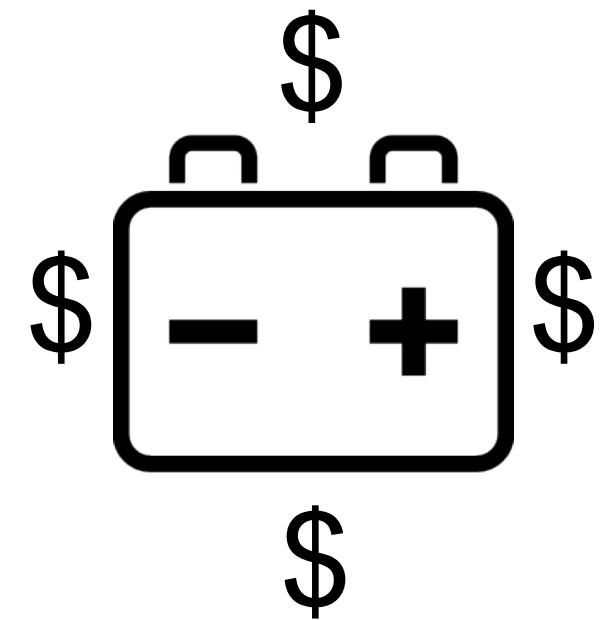


Reduced Range

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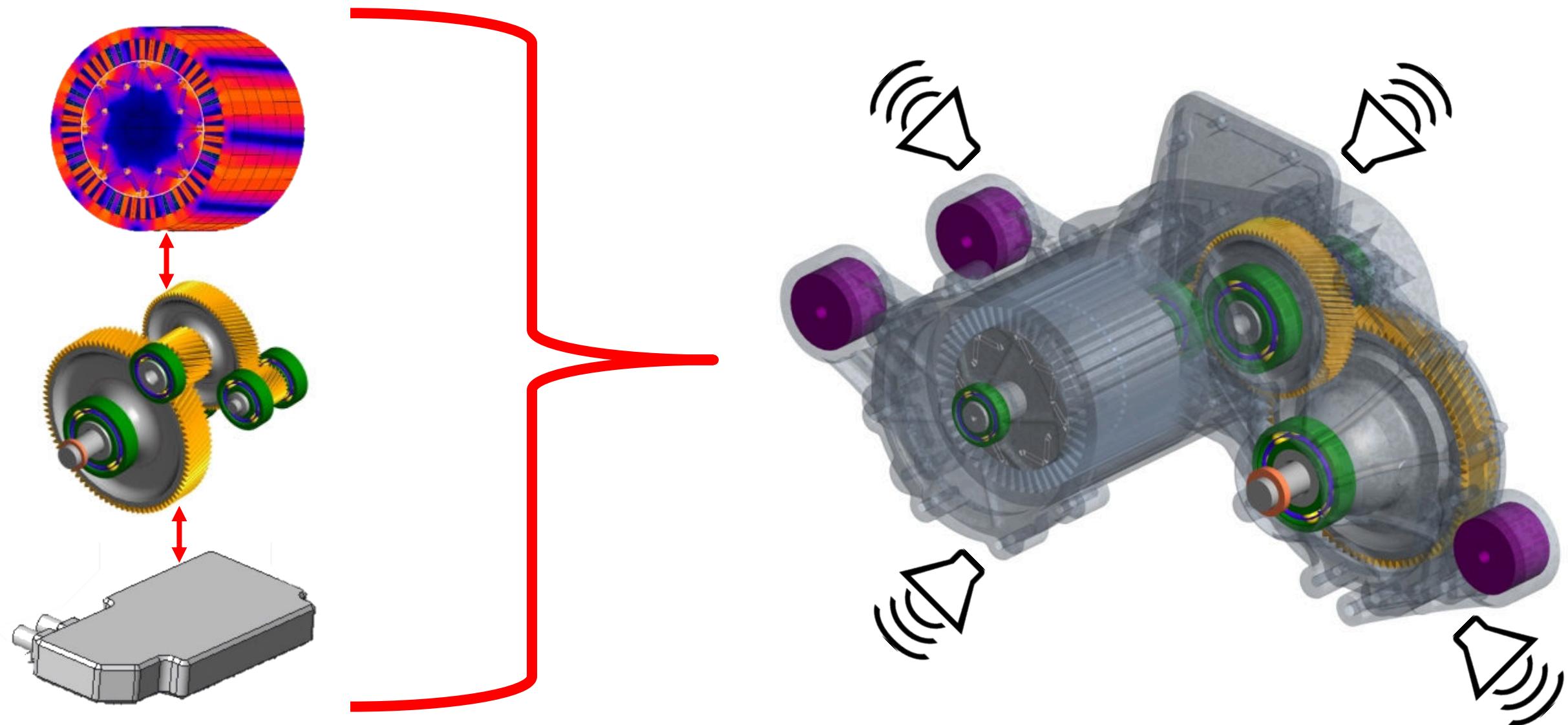
OR



**Increased
Battery cost**

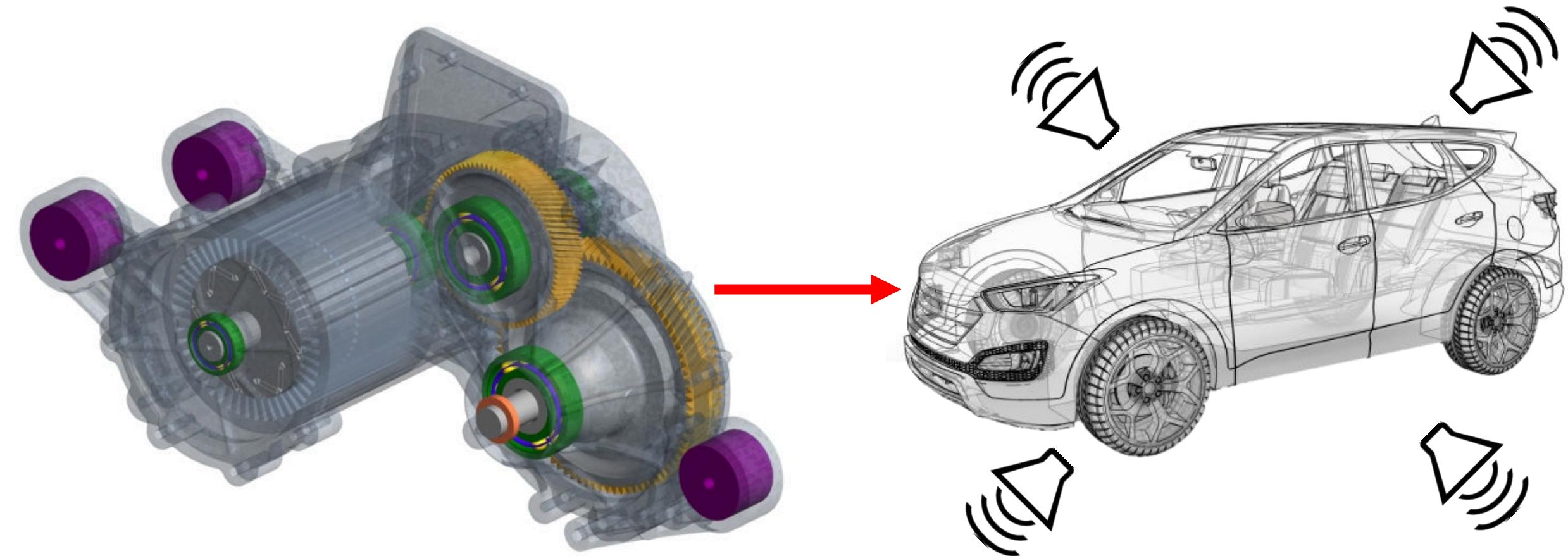


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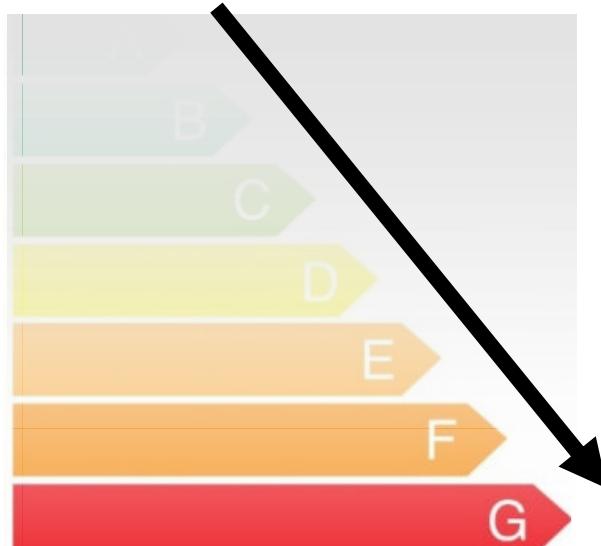




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Reduced Efficiency

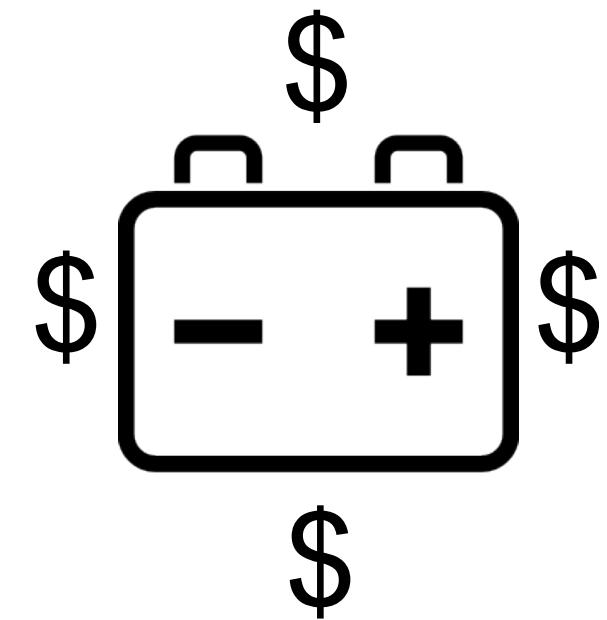


Reduced Range

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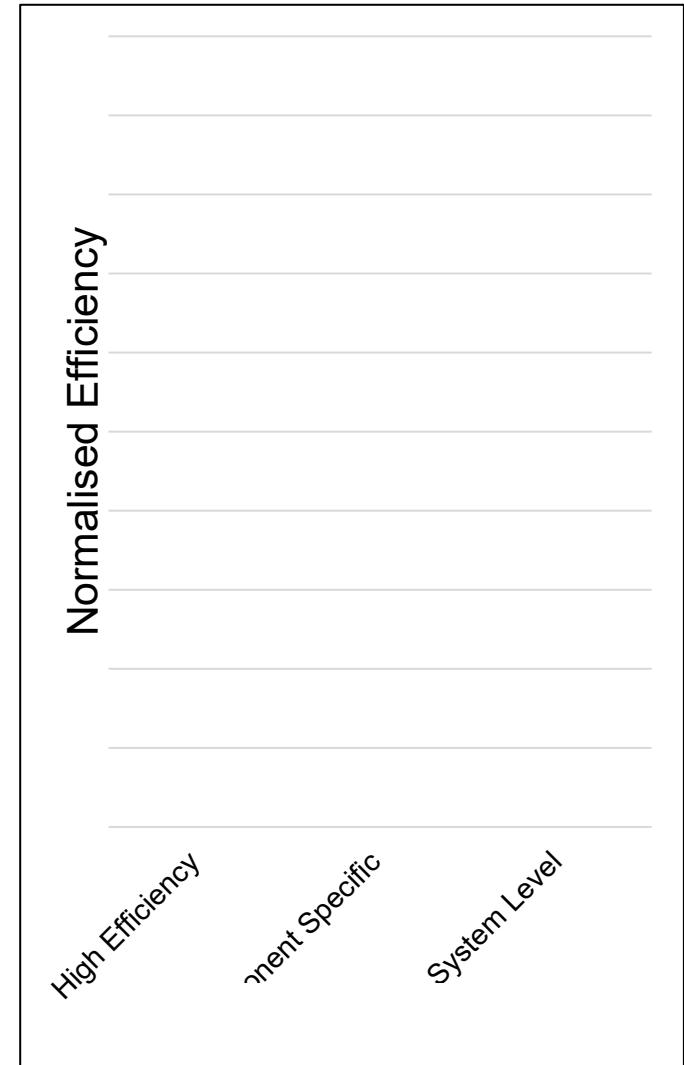
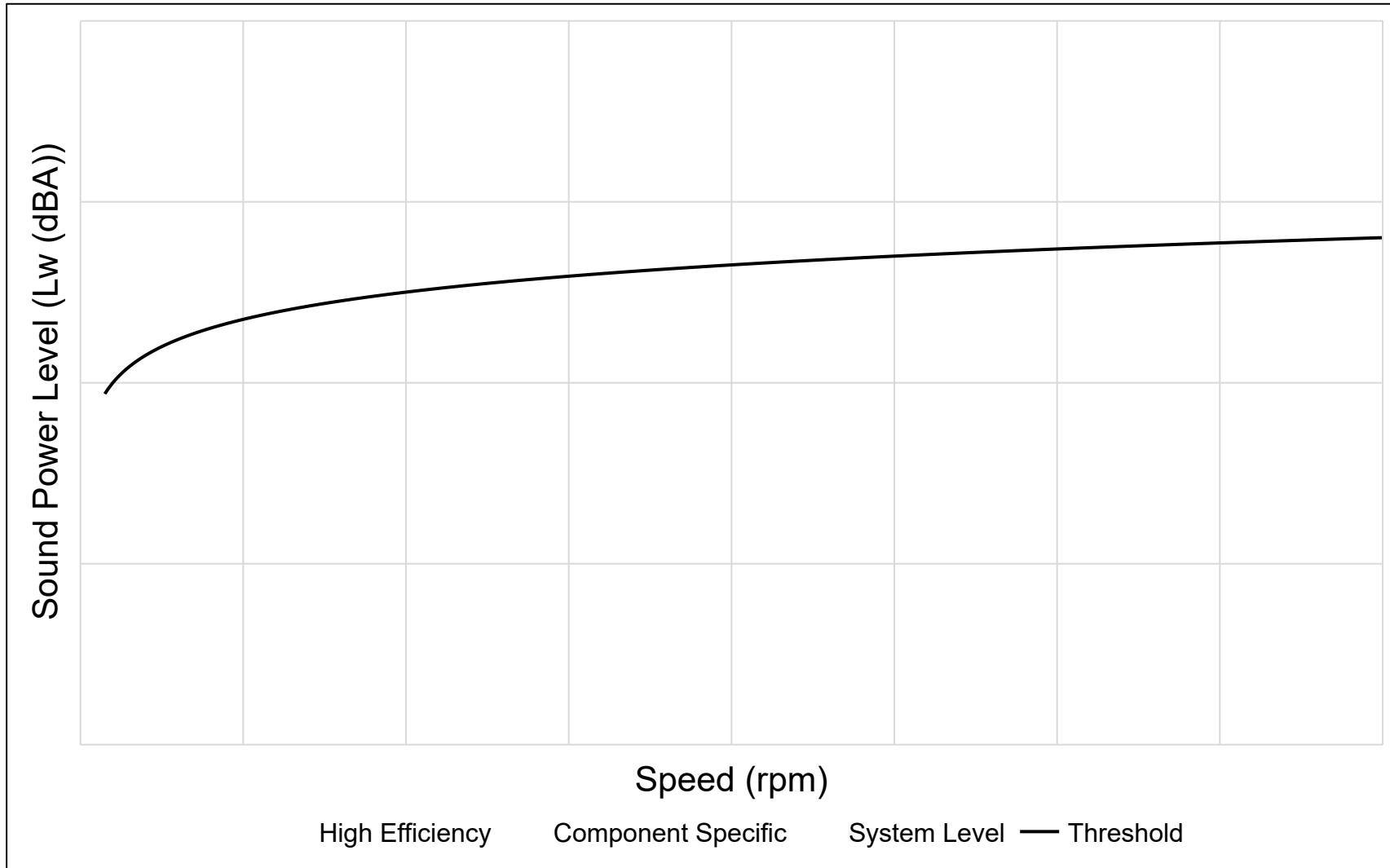
OR



**Increased
Battery cost**

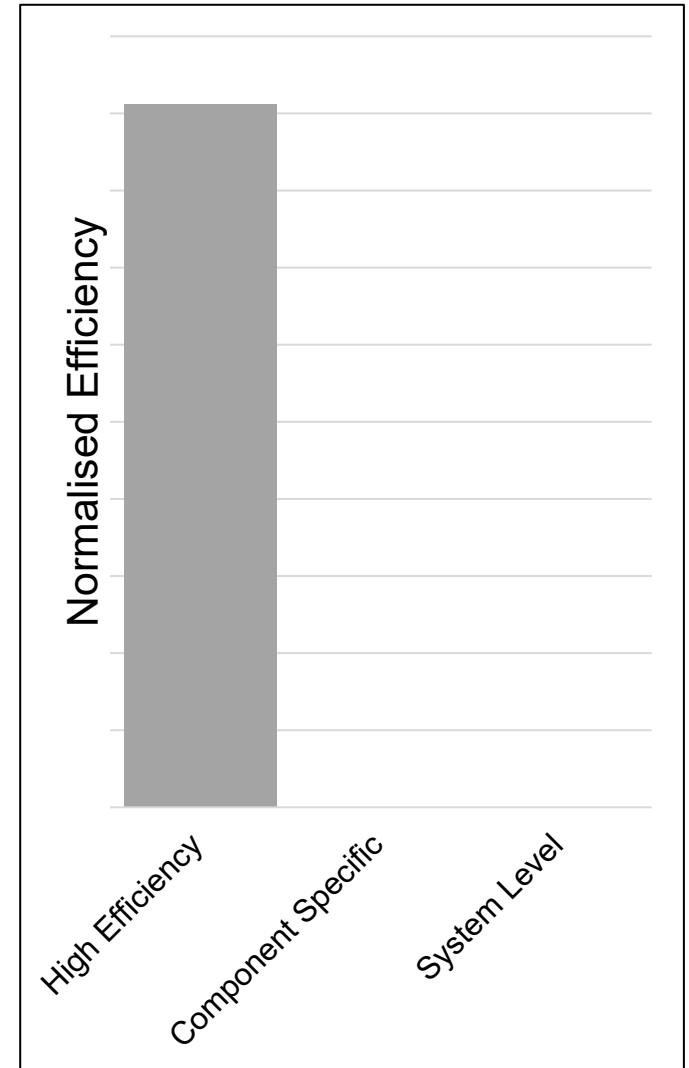
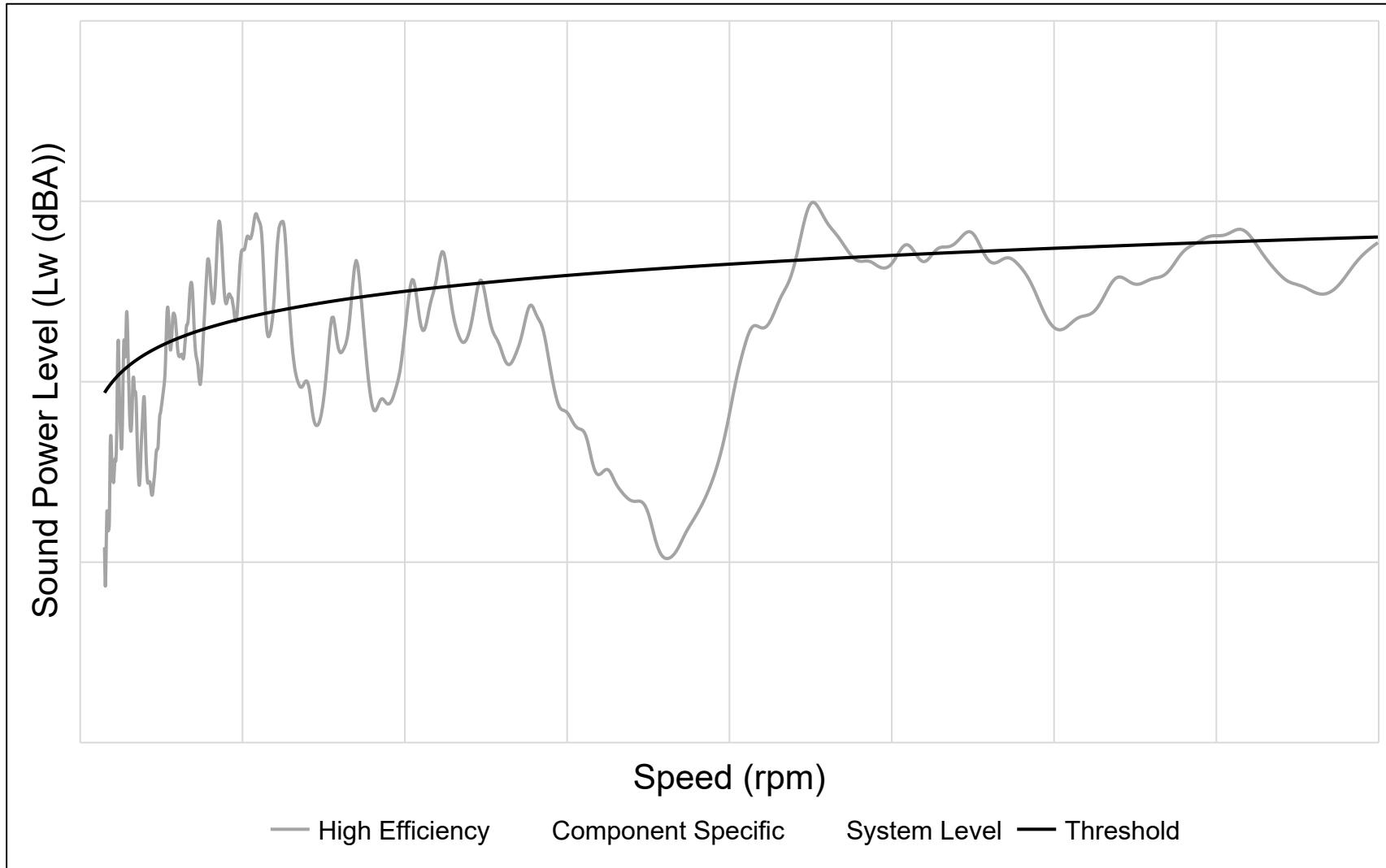


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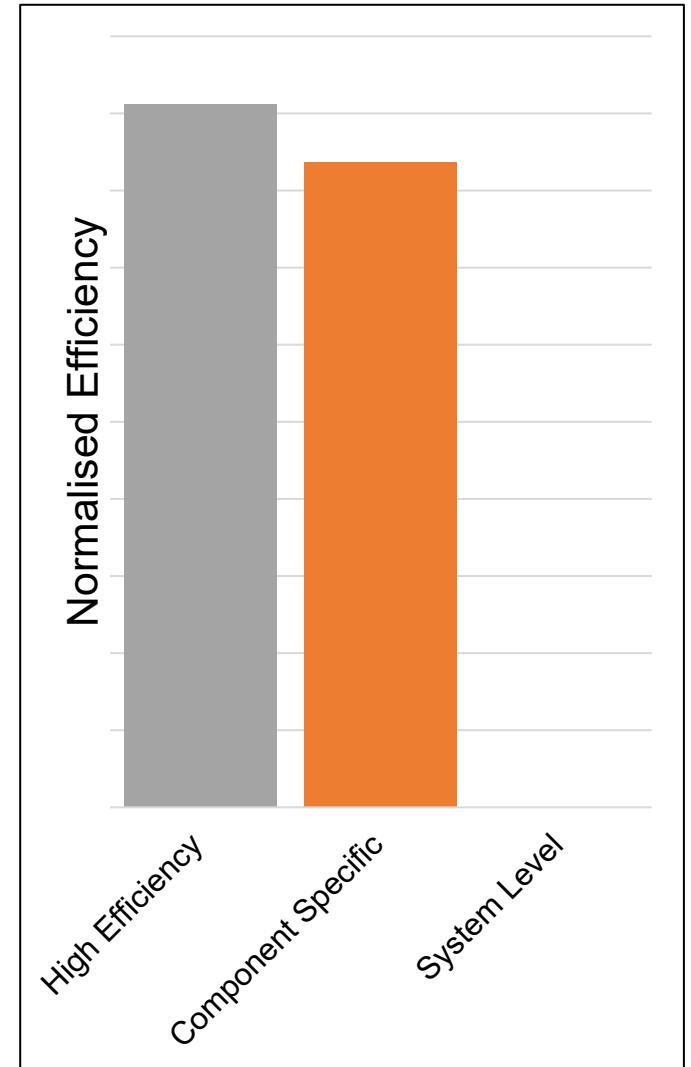
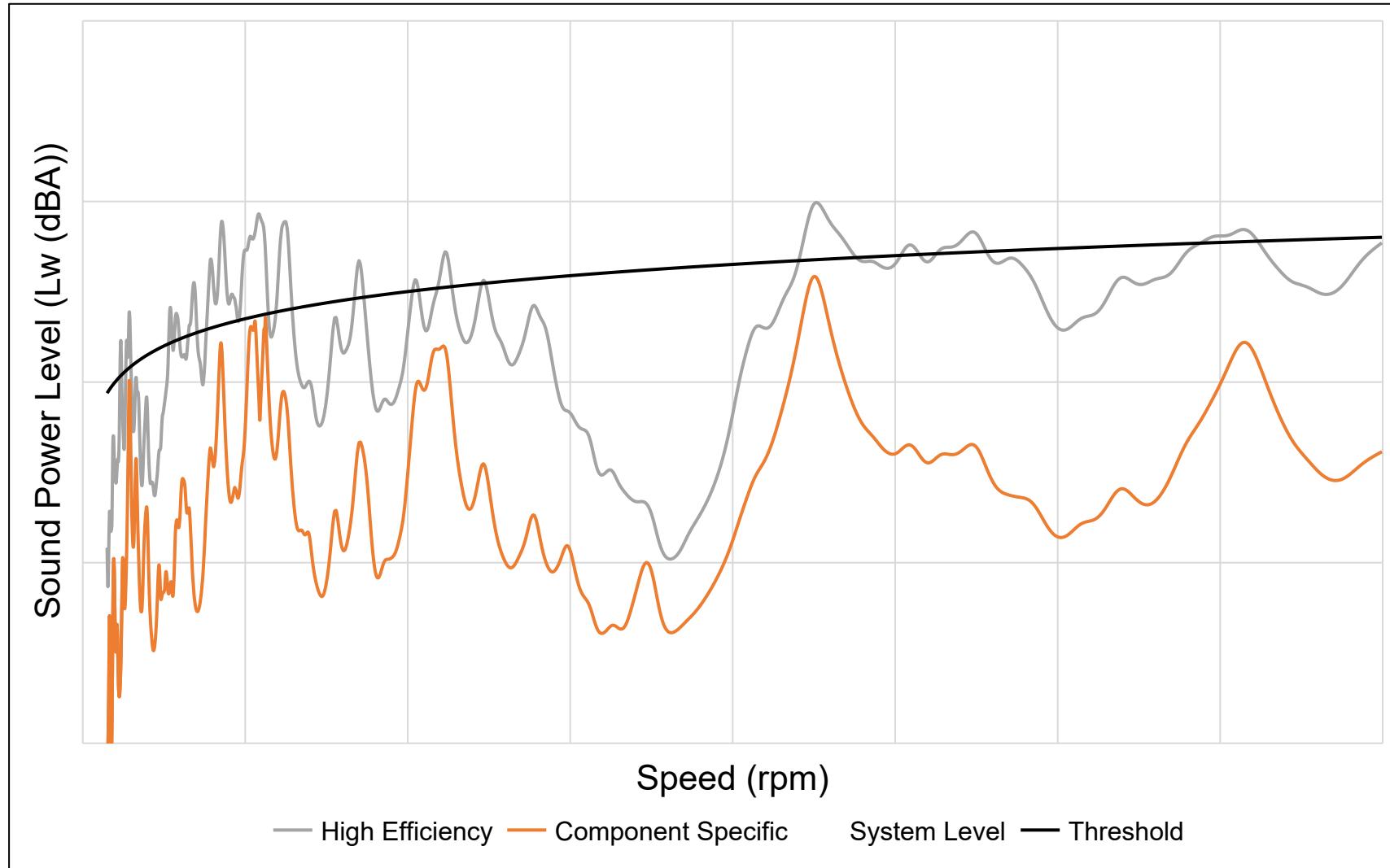


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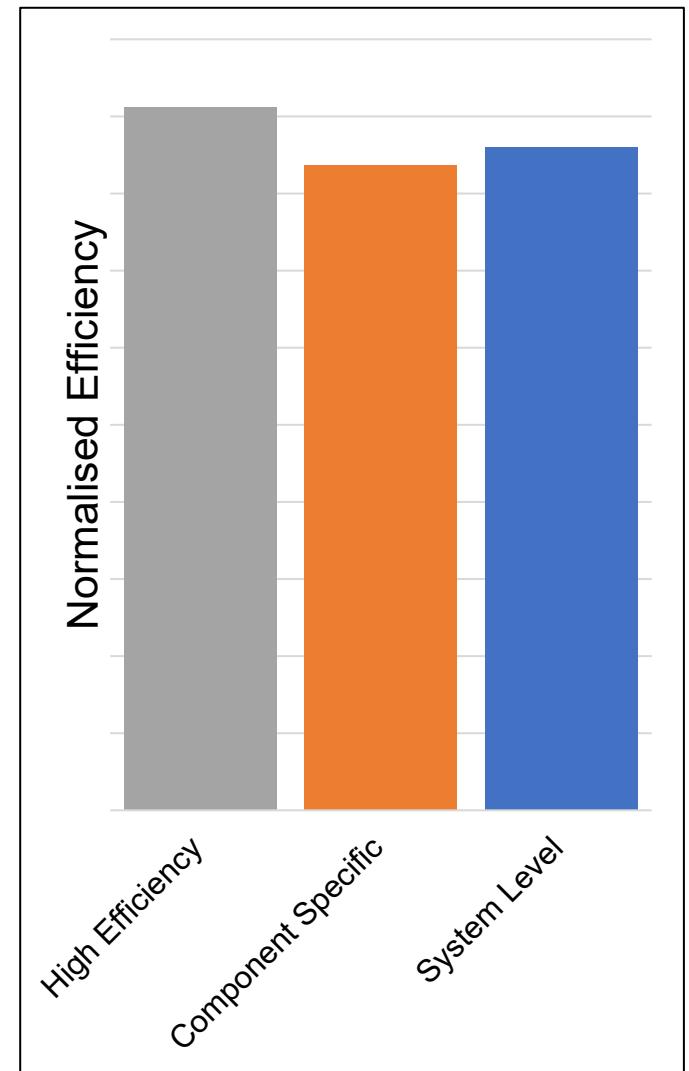
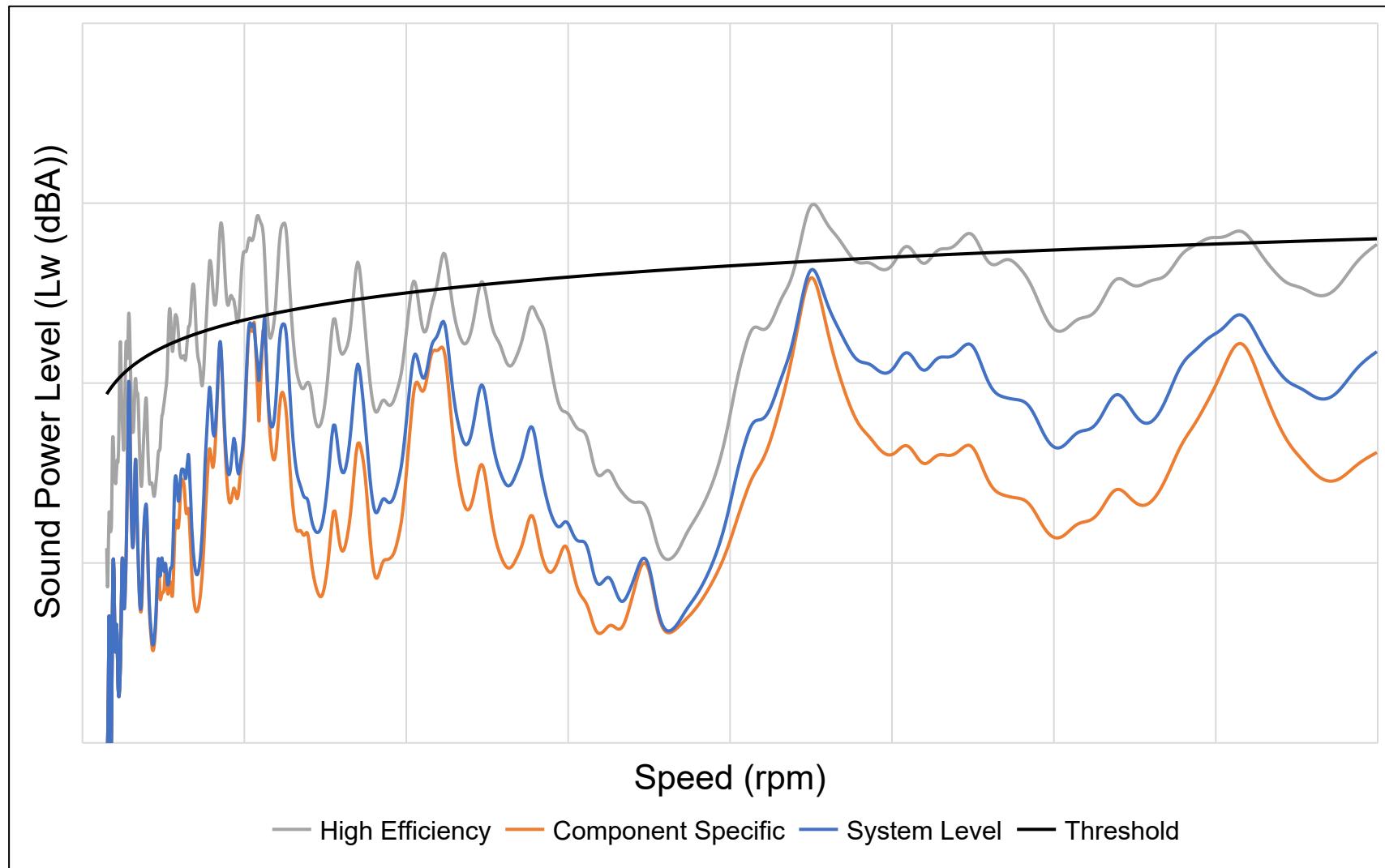


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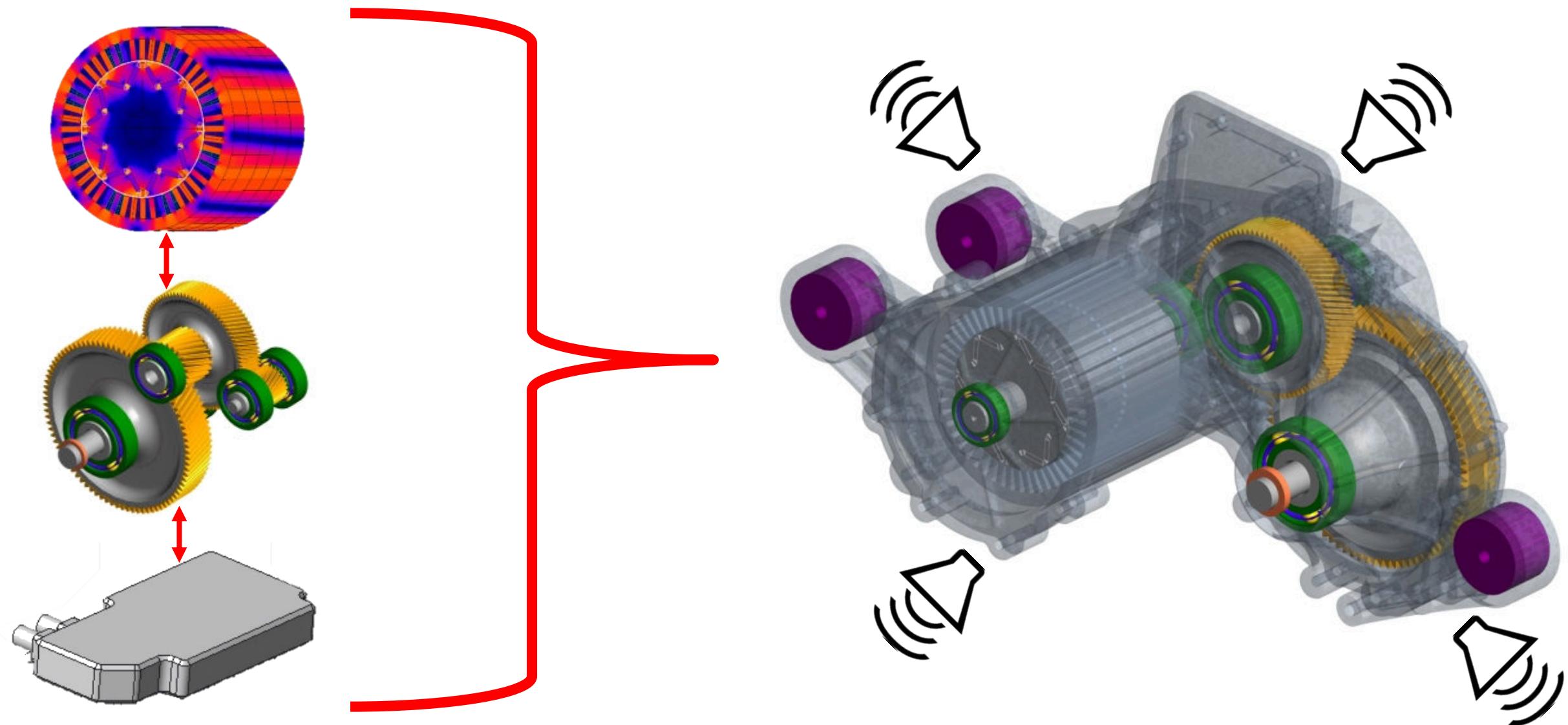


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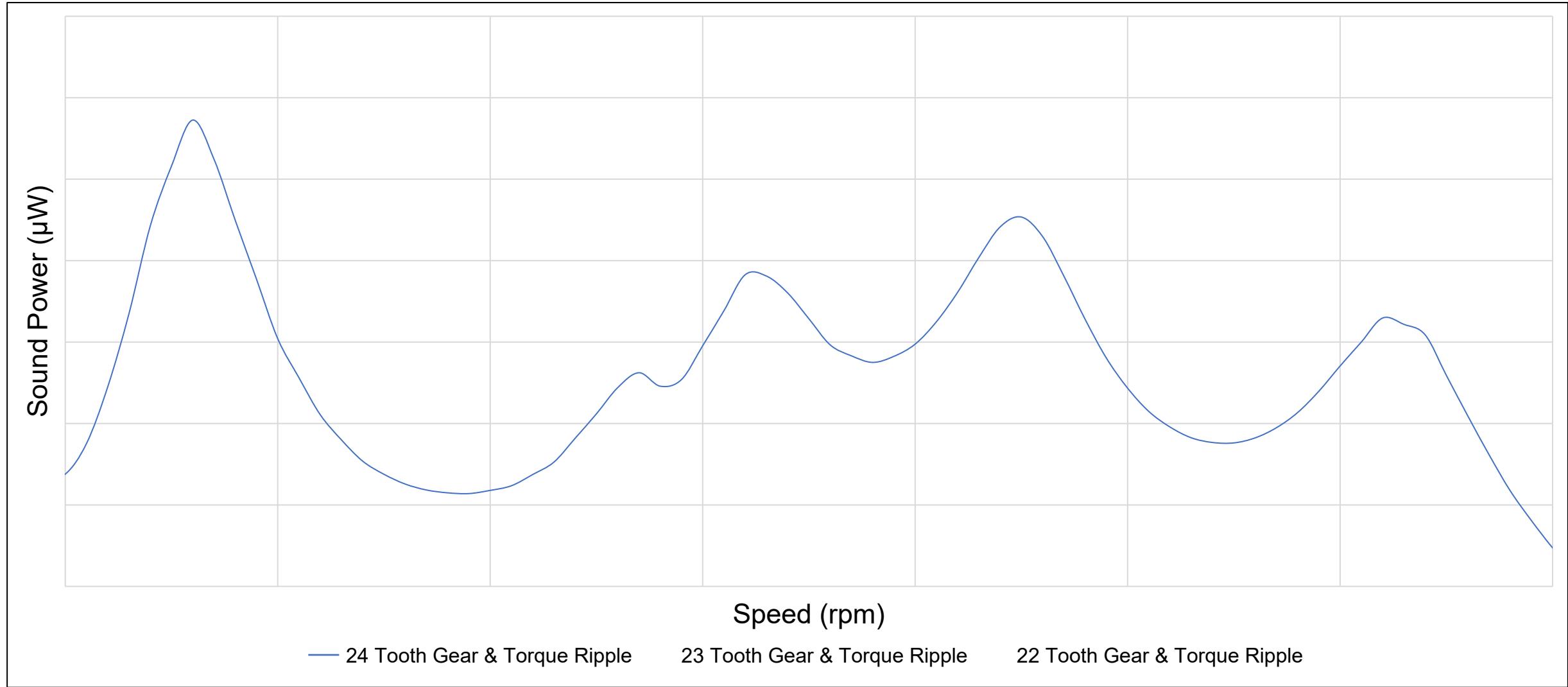


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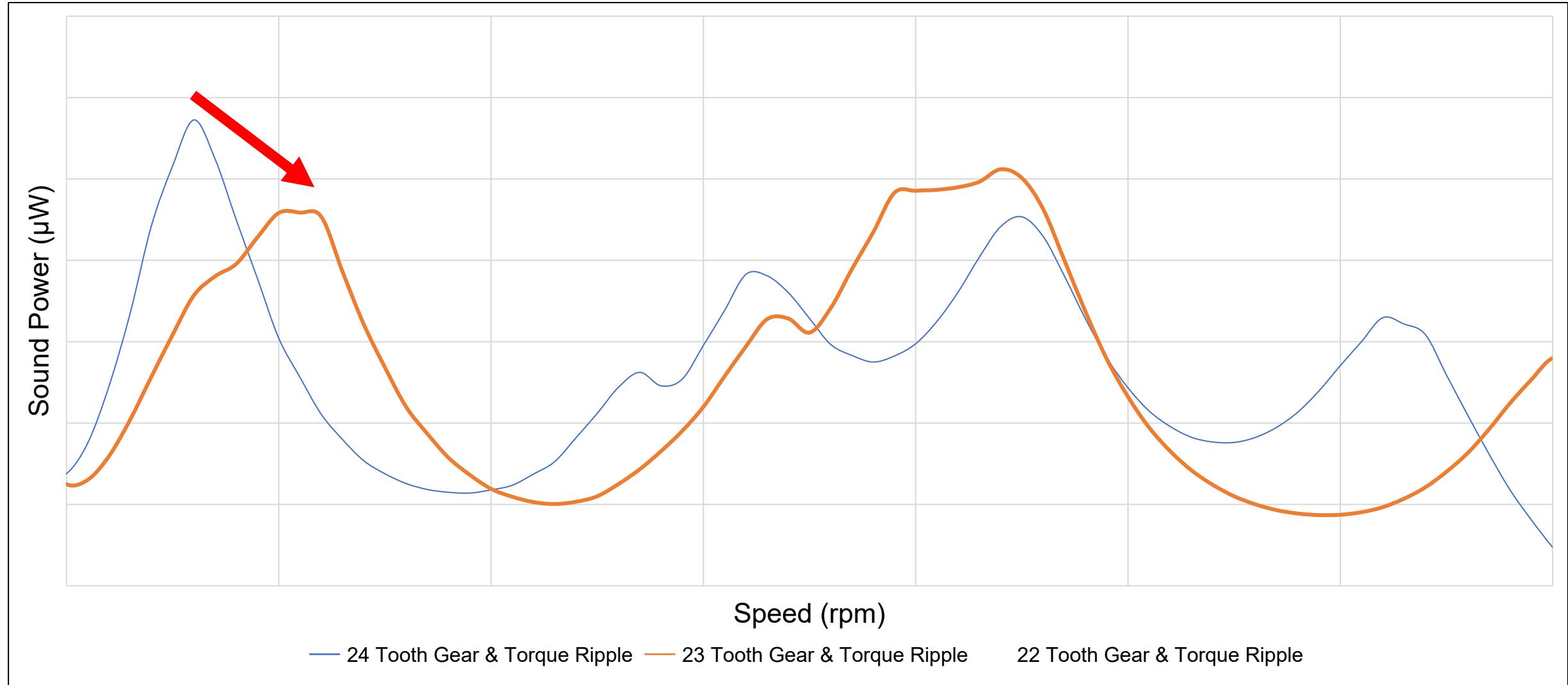


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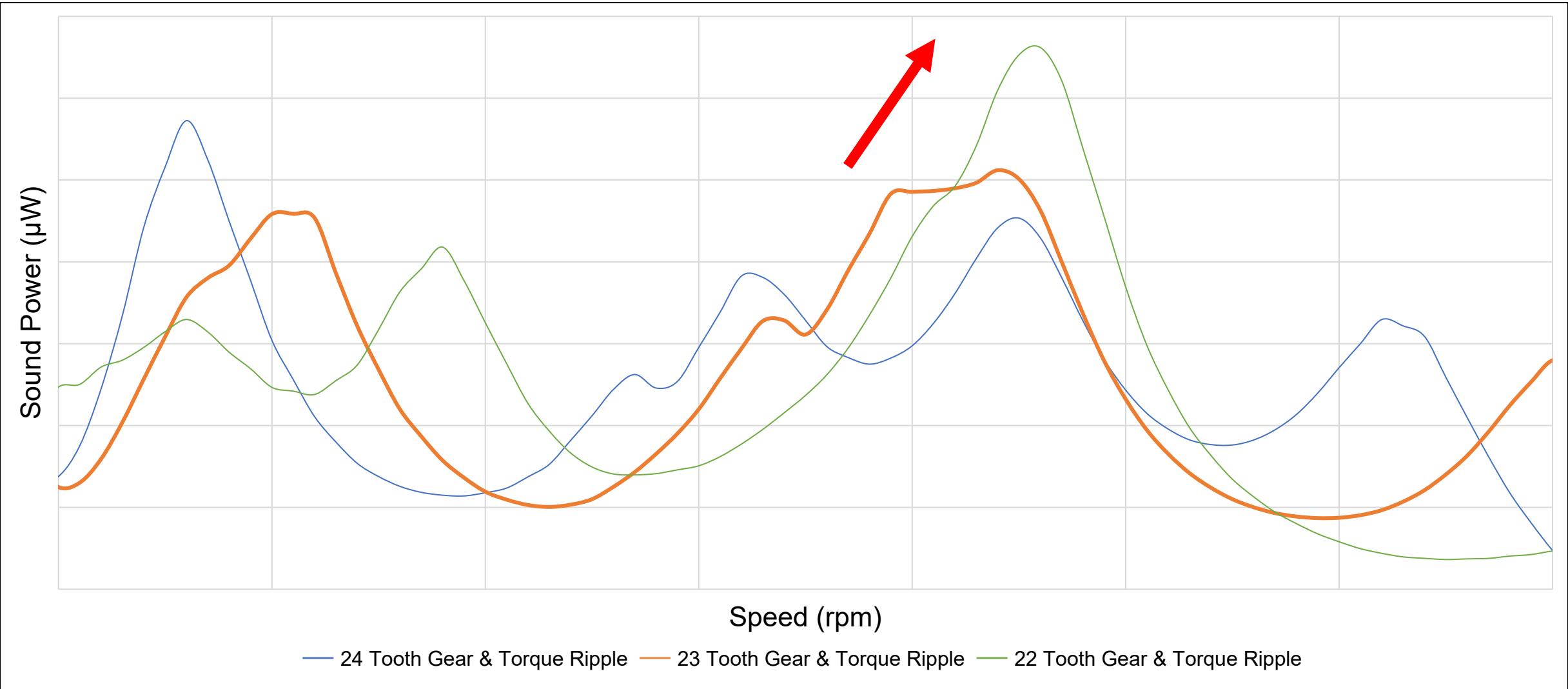


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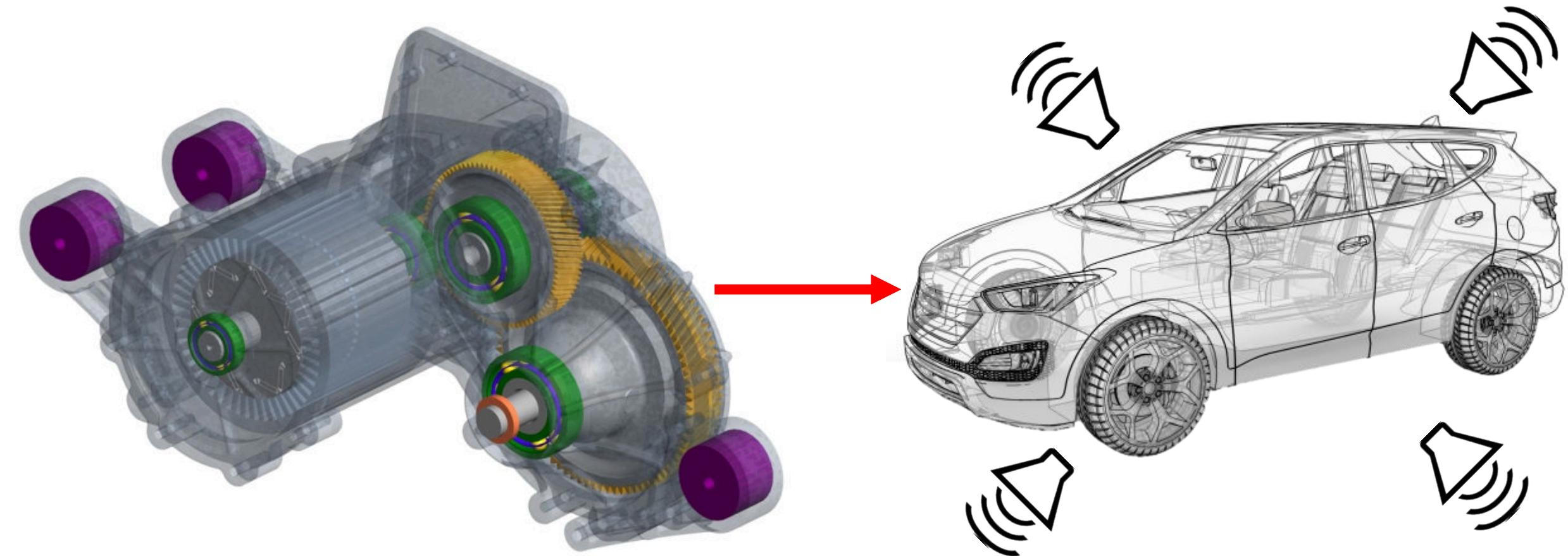


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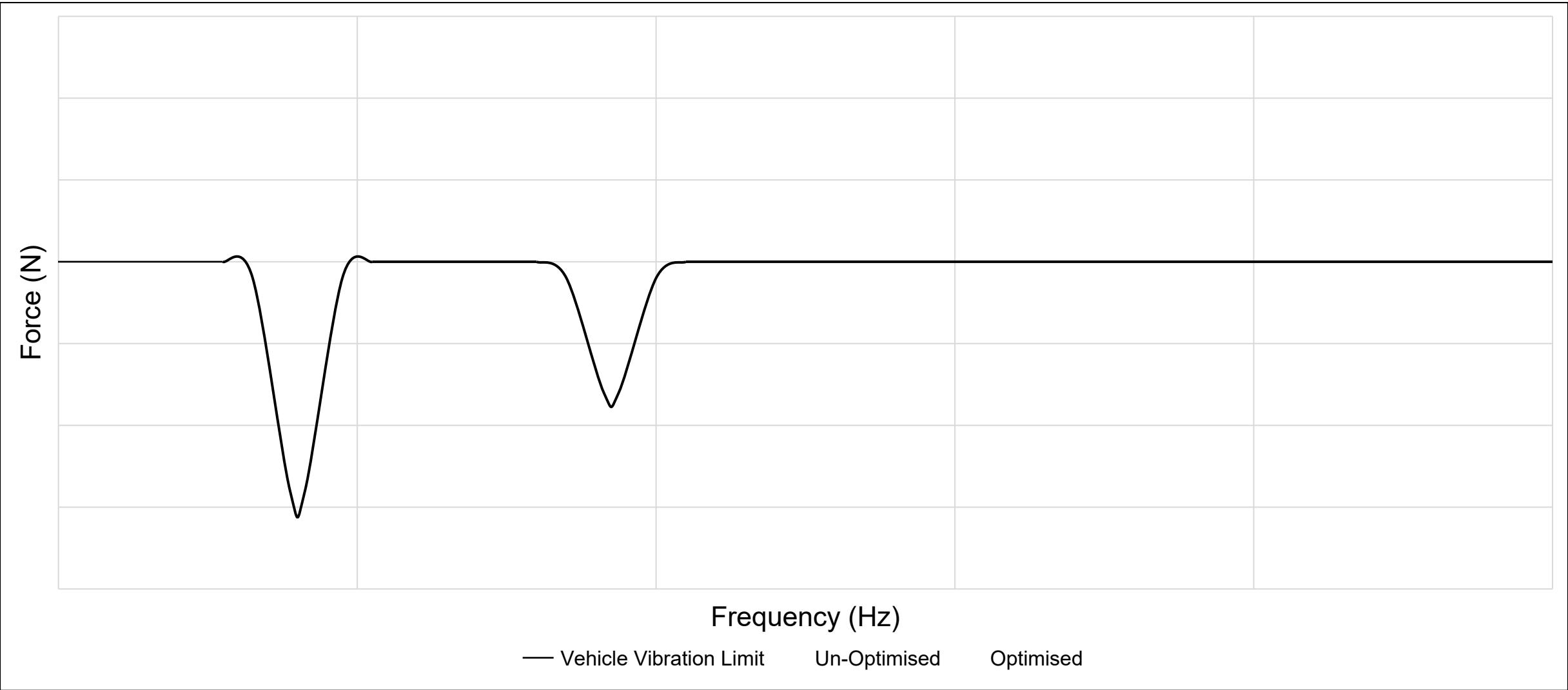


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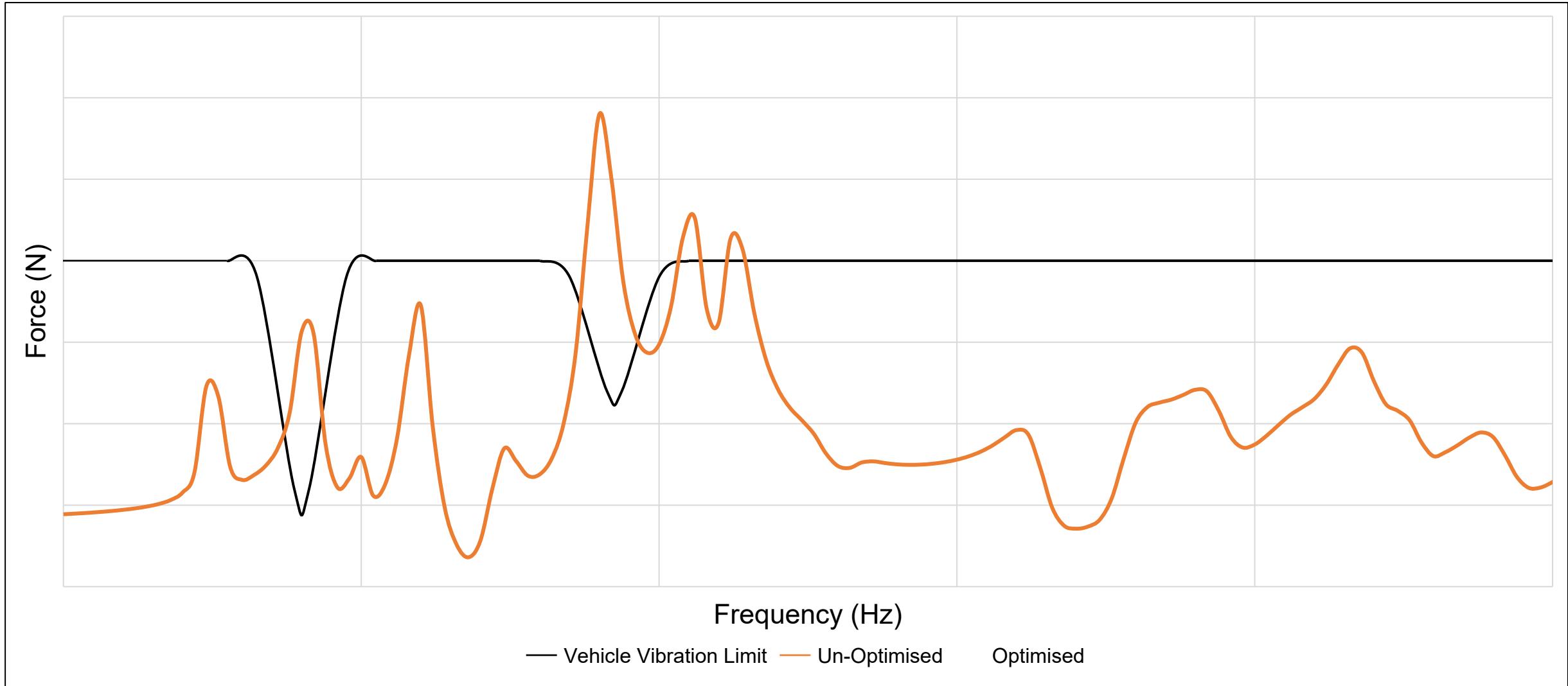


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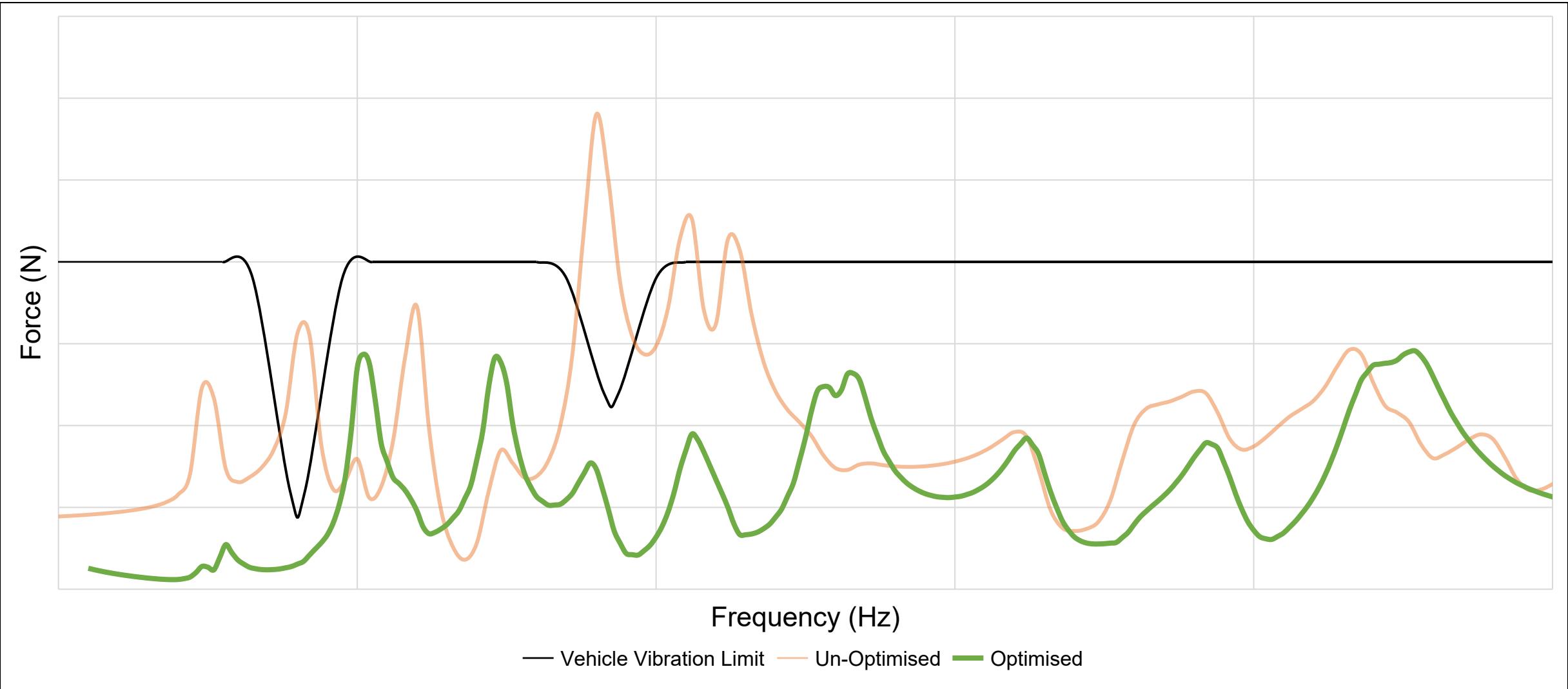


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System Level NVH Analysis Approach

- Realise efficiency benefits
 - Increase vehicle range or reduce battery costs
- Understand component and vehicle interactions
 - Avoid late emerging NVH issues
 - Avoid inefficient and costly compromises
 - Avoid costly delays to vehicle programs



Michael Furness



**DRIVE
SYSTEM
DESIGN**

Come see us at
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**NO
DELAYS**