Project Description

- Maintaining desired aftertreatment temperatures (A/T) is a challenge during low load operation.
- Conventional thermal management operation at low loads incurs fuel penalty.
- VVA strategies maintain desired A/T temperatures, with significant fuel savings.
- Improved system level performance: NVH performance, and hardware cost reduction via elimination of external EGR loop.

Approach

Strategies Compared:
- Fuel Economy mode
- Warm-up mode (focused on increasing the temperature of A/T)
- Dynamic Cylinder Activation (DCA): Uses varying firing patterns for NVH and performance
- Fixed CDA: Deactivating half the number of cylinders
- Reverse breathing: Uses Internal EGR for NOx control, without requiring external EGR loop

Results At Loaded Idle

**Desired TOT can be reached, with lower fuel consumption**

- More control with DCA over desired frequency content implies NVH concerns can be greatly resolved

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VVA is capable of resulting in fuel efficient thermal management, with additional system level improvements.