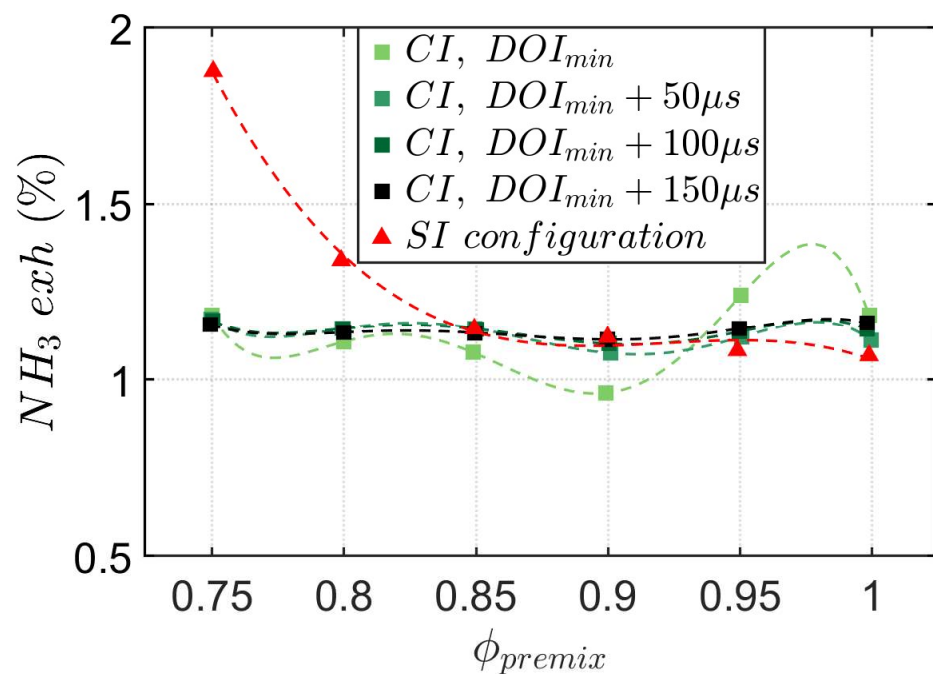
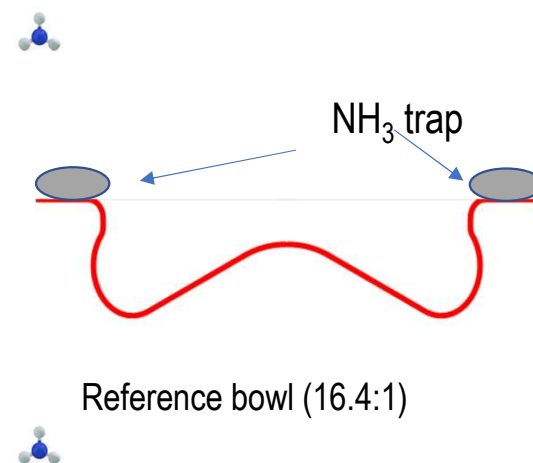


Pollutants for SI / RCCI in CI ammonia engine

I. Unburnt NH₃

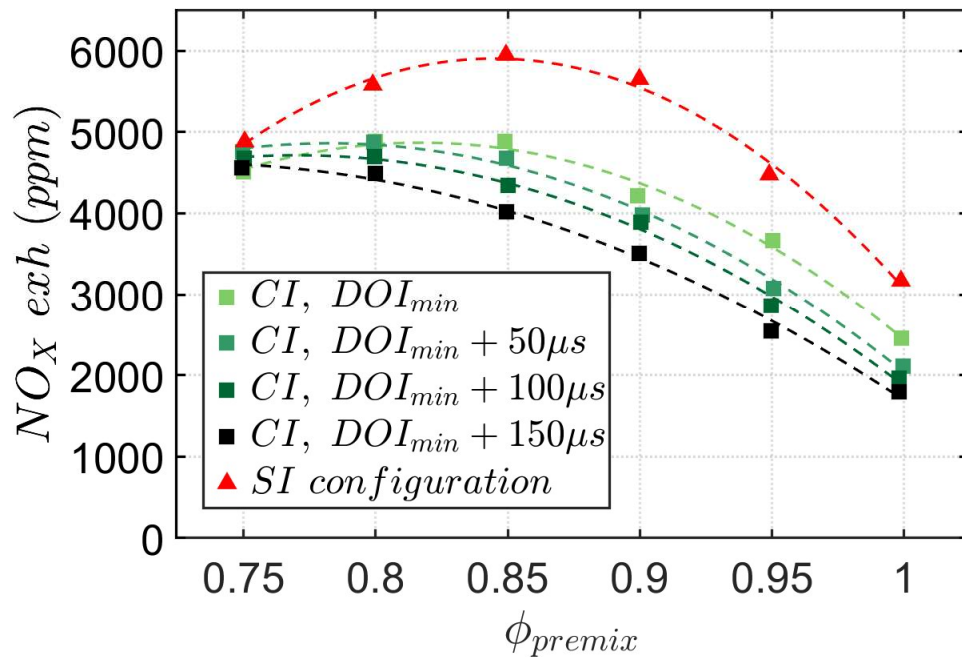


- Constant NH₃ level
 - Minimum = high
 - Due to piston design !



Pollutants for SI / RCCI in CI ammonia engine

II. NO_x (NO₂ < 30 ppm)



- Constant NH₃ level
 - Minimum = high
 - Due to piston design !

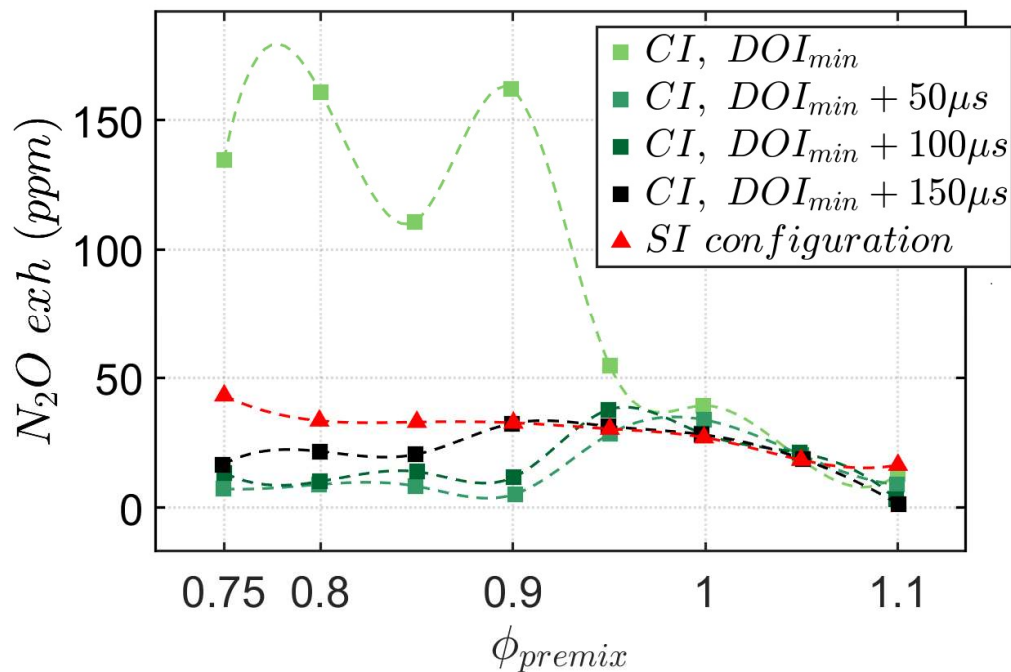
• Nox

- Higher with Spark Ignition
 - Higher T
- Lower with DOI increase
- Max around 0.85



Pollutants for SI / RCCI in CI ammonia engine

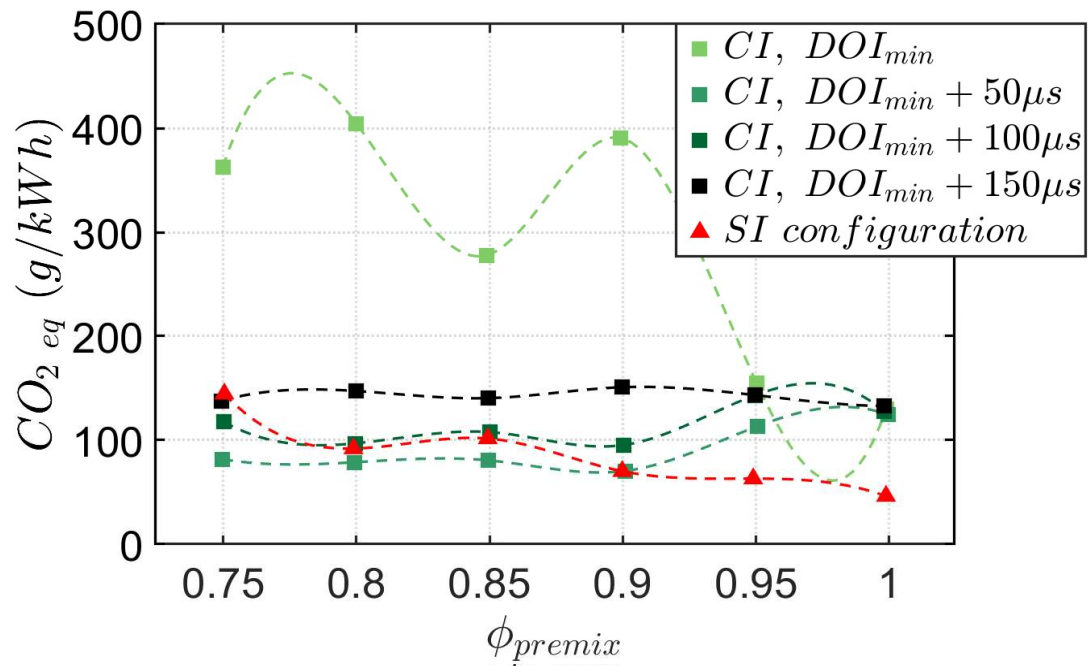
III. N_2O = 265 x CO_2 impact on GW



- Constant NH_3 level
 - Minimum = high
 - Due to piston design !
- Nox
 - Higher with Spark Ignition
 - Higher T
 - Lower with DOI increase
 - Max around 0.85
- N_2O
 - similar level < 50 ppm
 - SI : constant with ER_{premix}
 - RCCI : small peak around stoich.

Pollutants for SI / RCCI in CI ammonia engine

IV. Global Warming Impact



N_2O

- similar level < 50 ppm
- SI : constant with ER_{premix}
- RCCI : small peak around stoich.

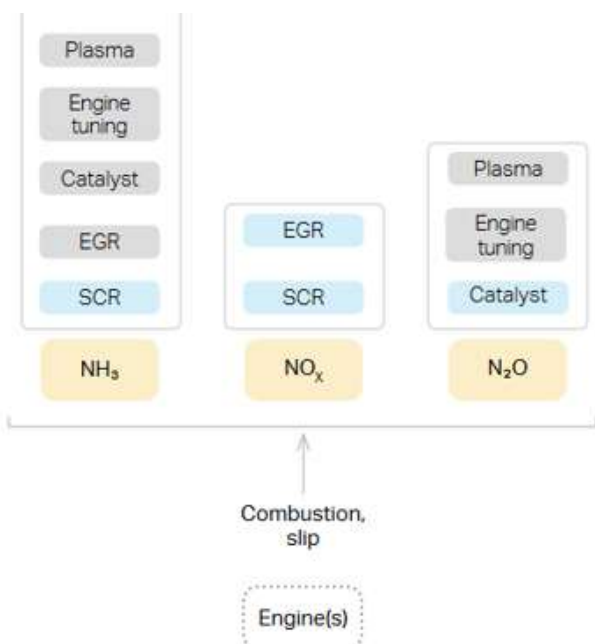
CO_2 equivalent

- CO_2 emissions between 0.5 and 1.25 % in RCCI, 0% in SI
- Same order of magnitude between RCCI and SI for lean mixture !
- Less around $ER = 1$ for SI

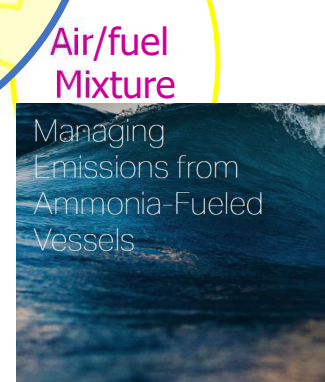
NH₃ as fuel for ICE

- ⚙ Fuel-bound nitrogen: NO_x, N₂O,
- ⚙ Unburnt NH₃, H₂
- ⚙ Mitigation strategy required for pollutants

- ⚙ SCR : not mature for NH₃ engine !
- ⚙ NO_x/NH₃ not constant
- ⚙ High H₂O : catalyst efficiency, life ?



- ⚙ Corrosion (copper, alloy, plastic, rubber, teflon...)
- ⚙ Lubricant
- ⚙ Effect of NH₃, H₂, NO_x ?
- ⚙ Aging ? Lubricity ? PM ?



An overview of regulatory drivers, emission types, sources, scenarios, reduction technologies, and solutions

COME to DISCUSS ABOUT CHALLENGES



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