PigStun
Developing non-aversive stunning methods for pigs

Argon Retrofit System

PigStun Webinars April 2025

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Background: Project TIGER

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Testing **I**nert **G**ases in order to **E**stablish **R**eplacements
for high concentration CO_2 stunning for pigs at the time of slaughter

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Project manager

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Ansgar Rinklake

Air Liquide

Veronika Weber

Vion FOOD GROUP

Hypothesis

Inert gases such as argon are known to be less aversive than high concentration CO_2.

But there are concerns regarding meat quality and stunning efficiency.

Hypothesis:

The Argon Retrofit System with low residual oxygen levels (<1%) may make argon a viable alternative to high concentration CO_2 when stunning pigs in commercial practice.

Standard CO_2 stunners

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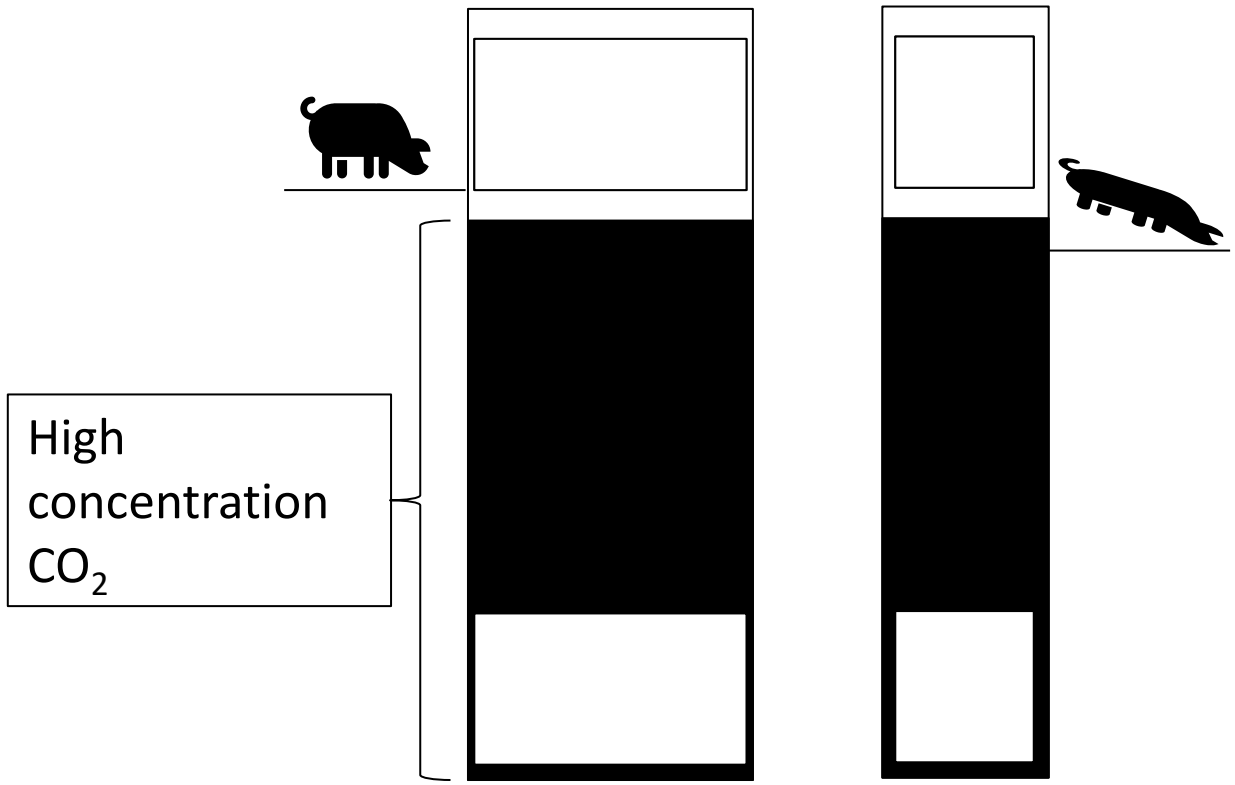
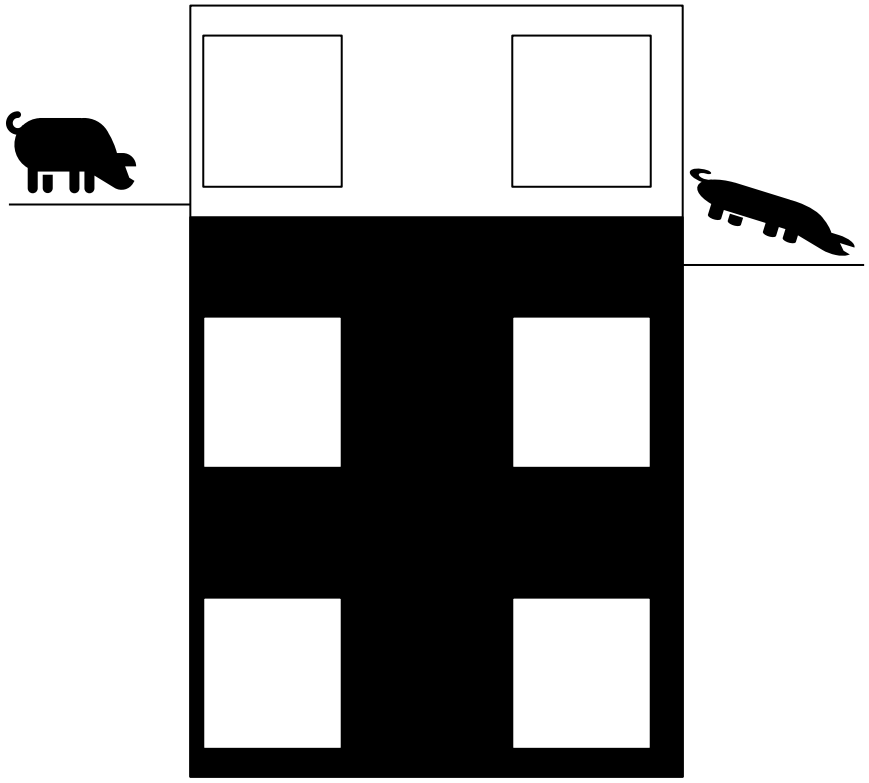
Dip-Lift



Paternoster



Argon Retrofit System

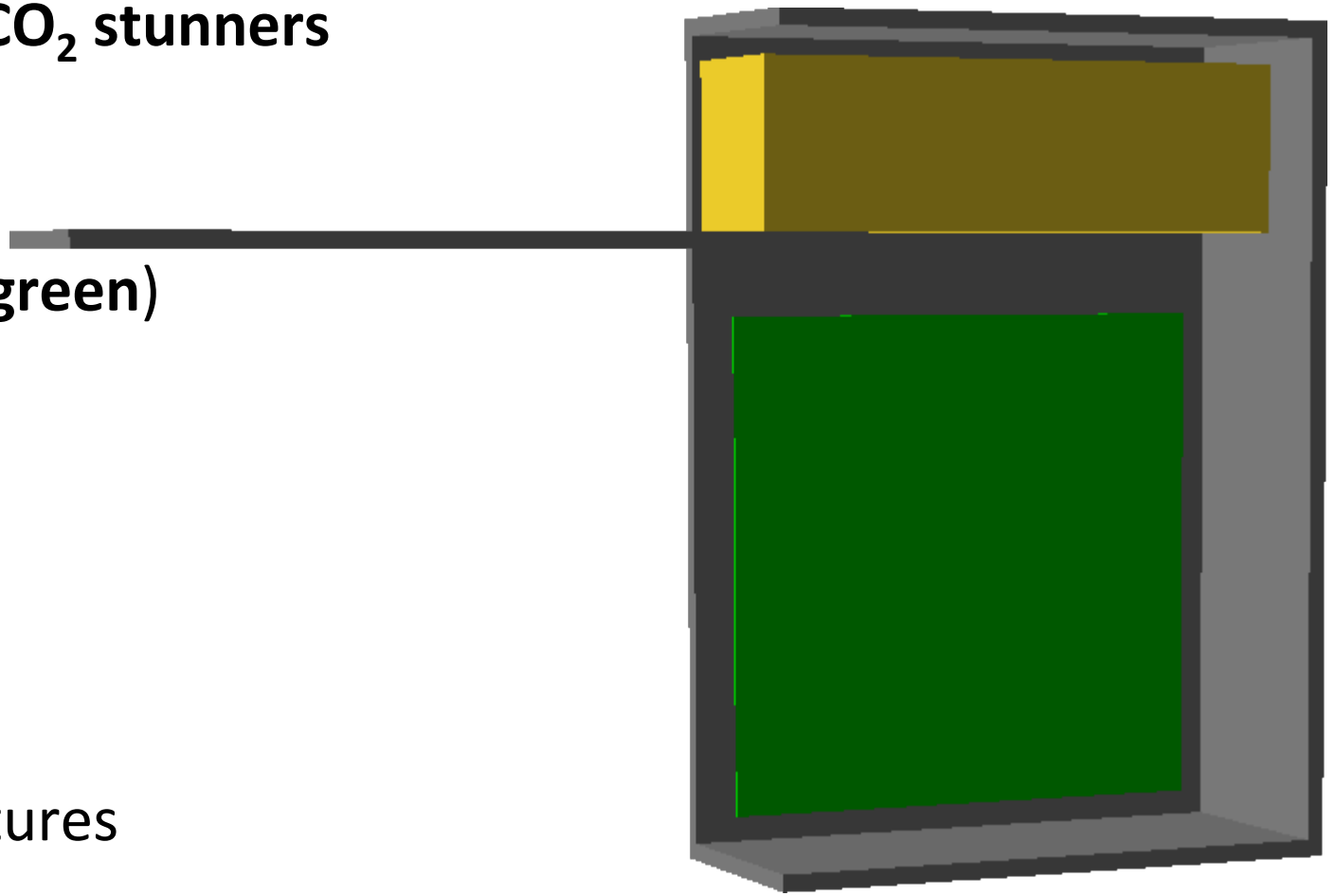
New (patented) **gassing system** from Air Liquide installed into existing commercial **CO_2 stunners**

Requires:

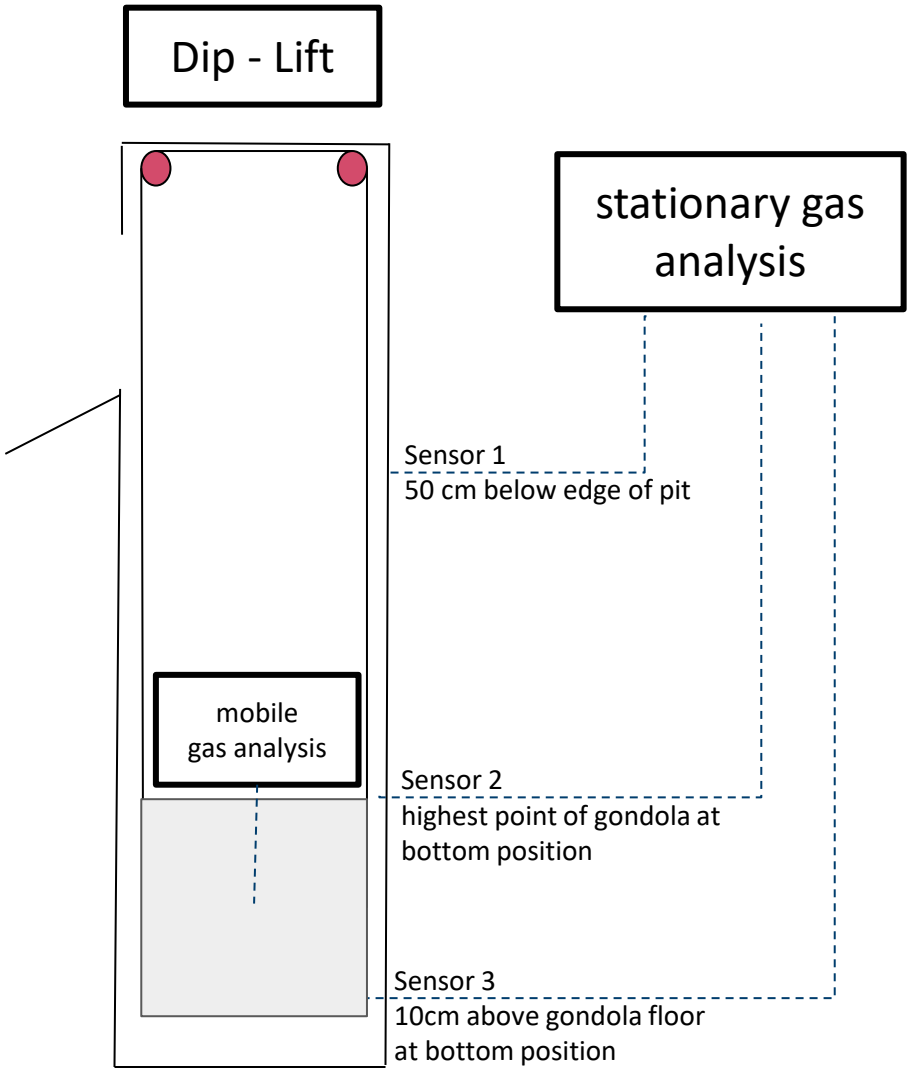
- new **gassing system** (shown in **green**)
- **oxygen sensors**
- **gas flow control** system and
- **gas tank**

No other (mechanical) changes

Suitable for different inert gas mixtures



Argon Retrofit System: Experimental Setup



Commercial **Dip-Lift System**

Gas analyzer to **measure (CO_2 and O_2) and control** the gas atmosphere

Three sensor locations and mobile gas analysis

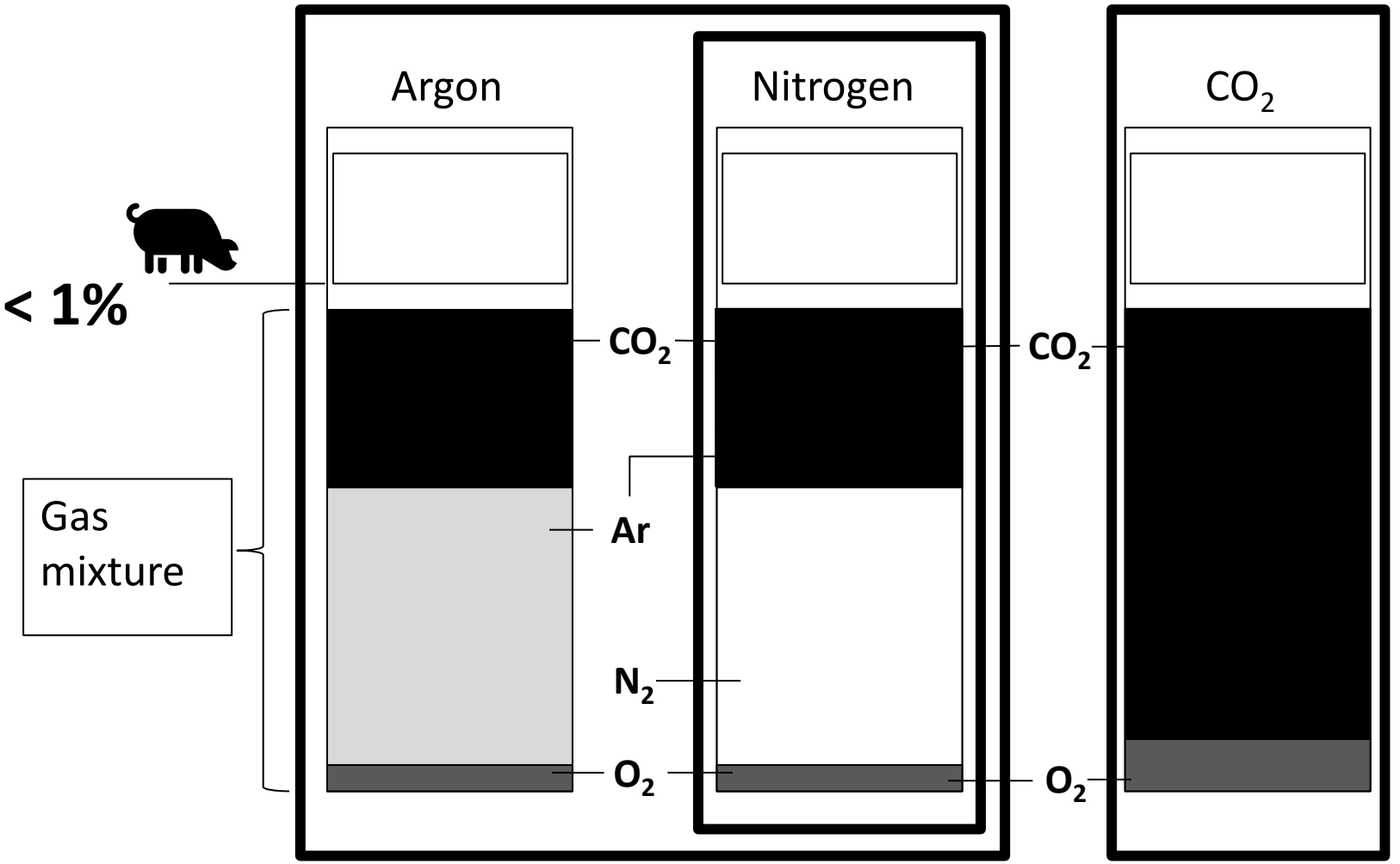
✓**Stable gas atmospheres**

✓**Residual O_2 well below 1% at sensor 2 and 3**

Argon Retrofit System: Pilot Tests

Screening gas mixtures:

- **Argon or nitrogen** as **primary gas**
- residual **oxygen** level: **< 1%**
- **CO_2** from **0 to 30%**
- **90 and 95% CO_2 control conditions**

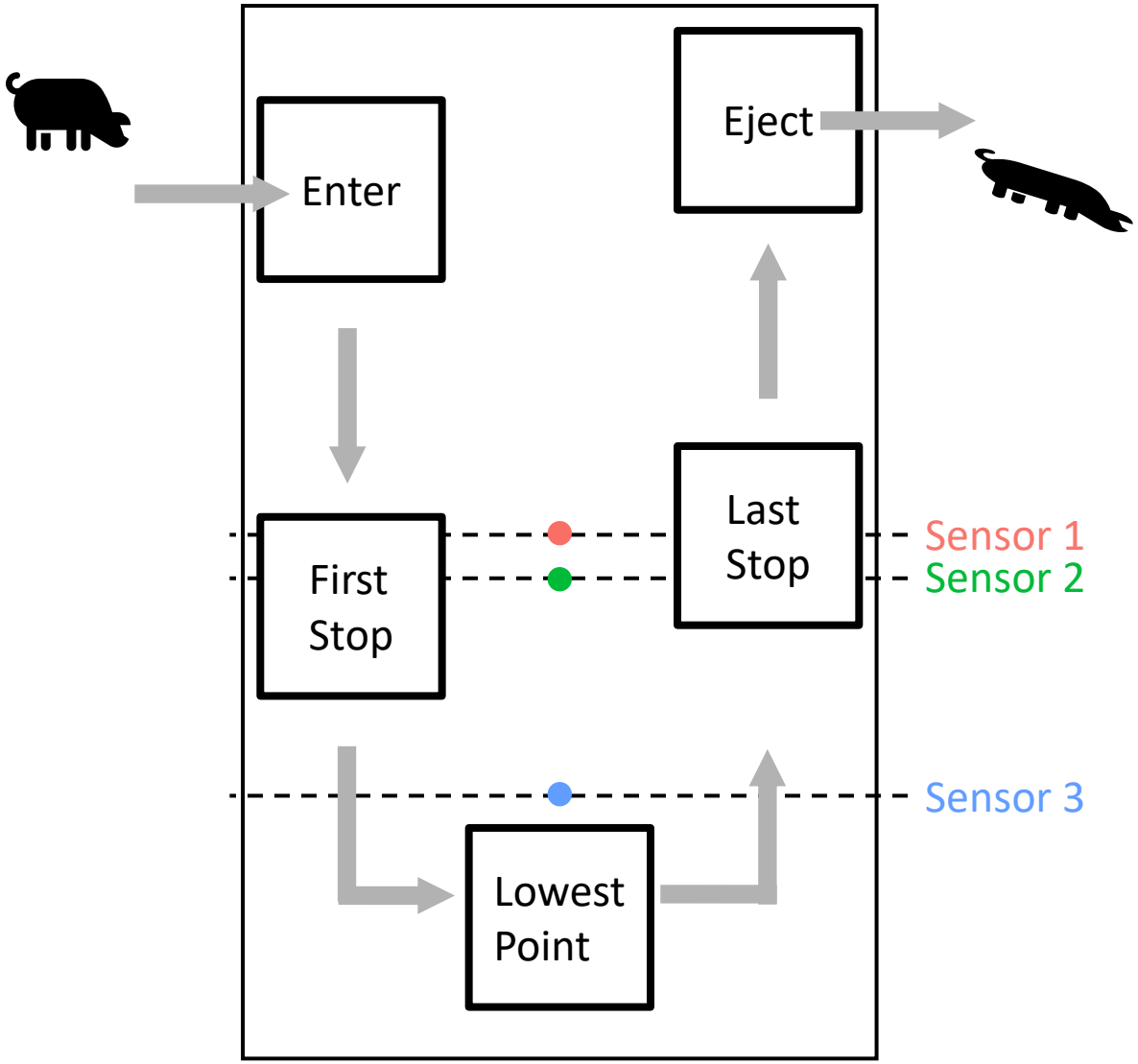


Argon Retrofit System: Main Test

- **Argon,** (Nitrogen-Argon) **and CO_2**
- **300 animals per condition**
- **Avoiding confounding effects:**
  - Each mixture was measured on each measurement day
  - Rotating order of conditions across measurement days
  - Balancing different breeds and farms across conditions

- **Variable Exposure time**
- **Handling of animals at lairage not assessed**

Argon Retrofit System: Scaling up - Successful Technical Tests



Argon Retrofit System: Scaling up - Summary

- **Functional at Dip-Lift scale**
- **Possibility to use in existing Paternoster systems**
  - Successful technical tests
  - Residual O_2 << 1% achievable
  - Lower O_2 levels at later stops may lower necessary exposure time, but this remains to be tested
- Scaling up to commercial capacity
  - 40% increase in necessary exposure time compared to CO_2
  - New system: Design stunner accordingly
  - Existing system: Identify individual technical or organizational solutions

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