



July 23, 2015

Anesthetic Gas Systems

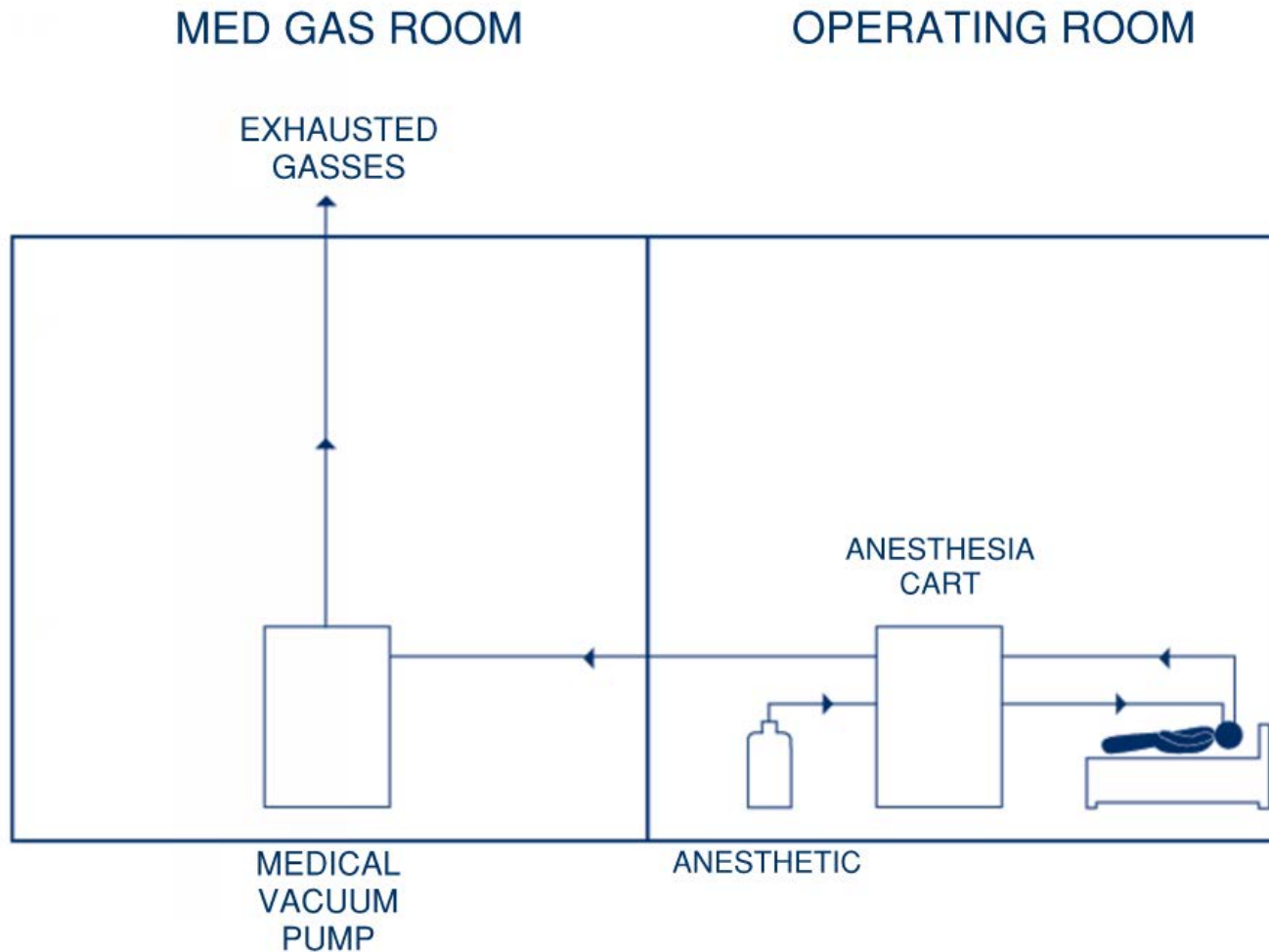
John Pappas, PE,
LEED AP



Anesthetic Gas Systems: Outline

- Overview of anesthetic gas systems
- Environmental impact
- Mitigation strategies
- Summary

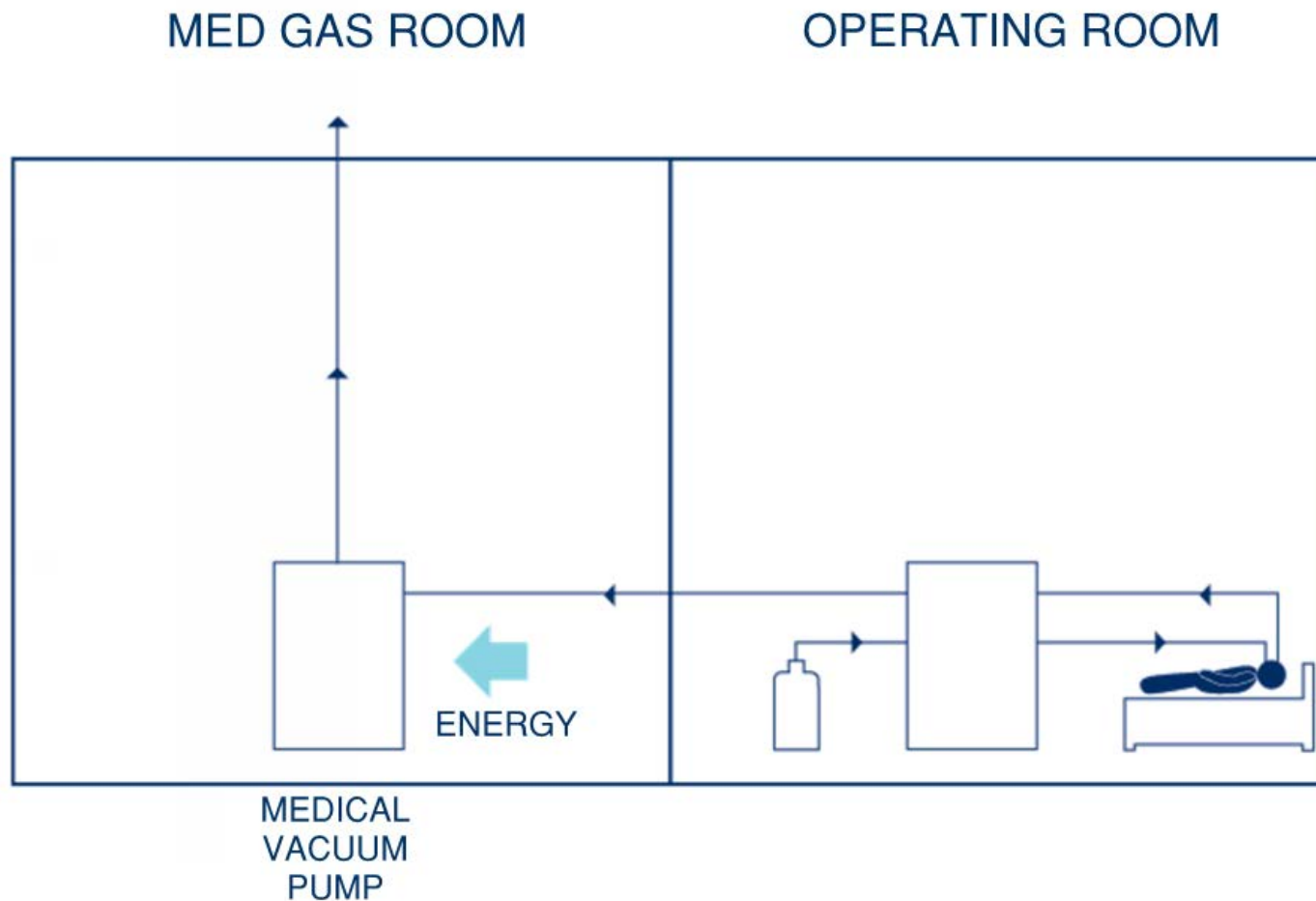
Anesthetic Gas Systems: Overview



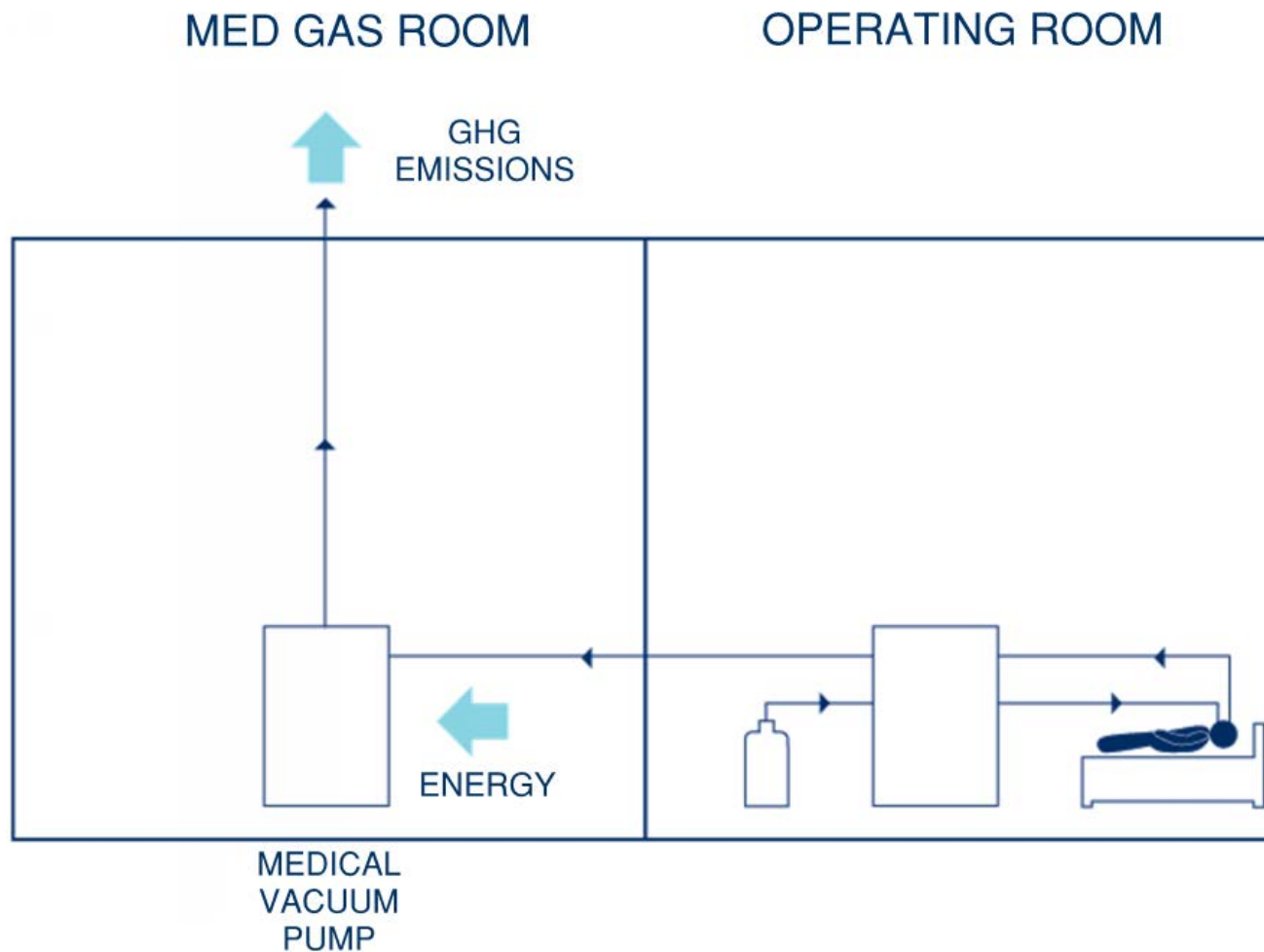
Environmental Impact

- Energy used for conveyance and management of waste anesthetic gasses
- Exhausted greenhouse gas emissions
- Embodied energy

Environmental Impact: Energy



Environmental Impact: Emissions



Primer on Greenhouse Gasses

- 3 types of GHG emissions
 - Scope 1 – direct (exhausted gasses)
 - Scope 2 – indirect (electricity consumption)
 - Scope 3 – other (supply chain embodied energy)

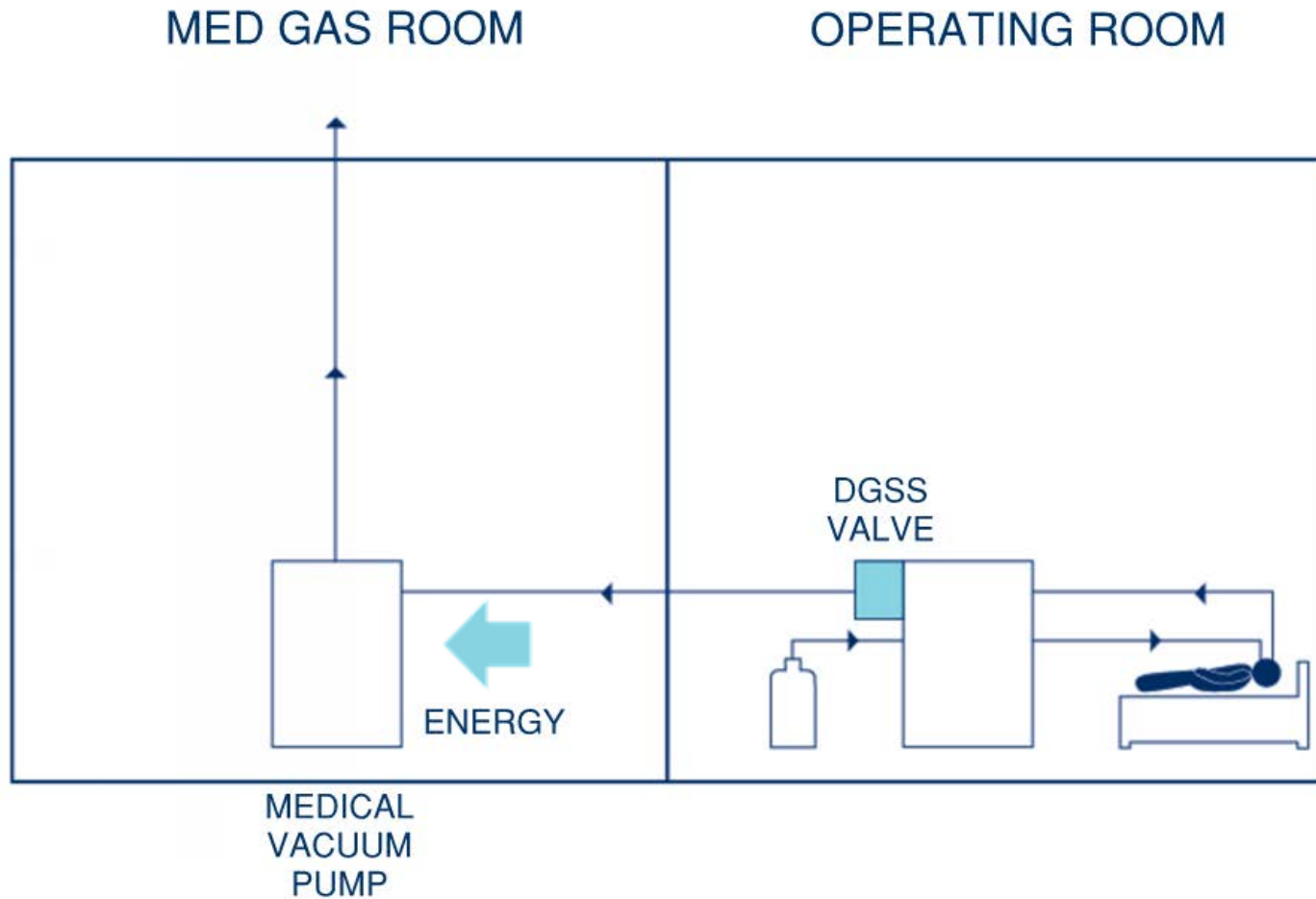
Primer on Greenhouse Gasses

- Global Warming Potential (GWP)
 - Measure of the impact of a gas on global warming by unit volume as compared with that of CO₂
- Anesthetic gasses can have a GWP of between 349 and 3714 depending on the gas used
 - GWP (Sevoflurane) = 349
 - GWP (Isoflurane) = 1401
 - GWP (Desflurane) = 3714
- Example: 1 MT of Desflurane = 3714 MT of CO₂

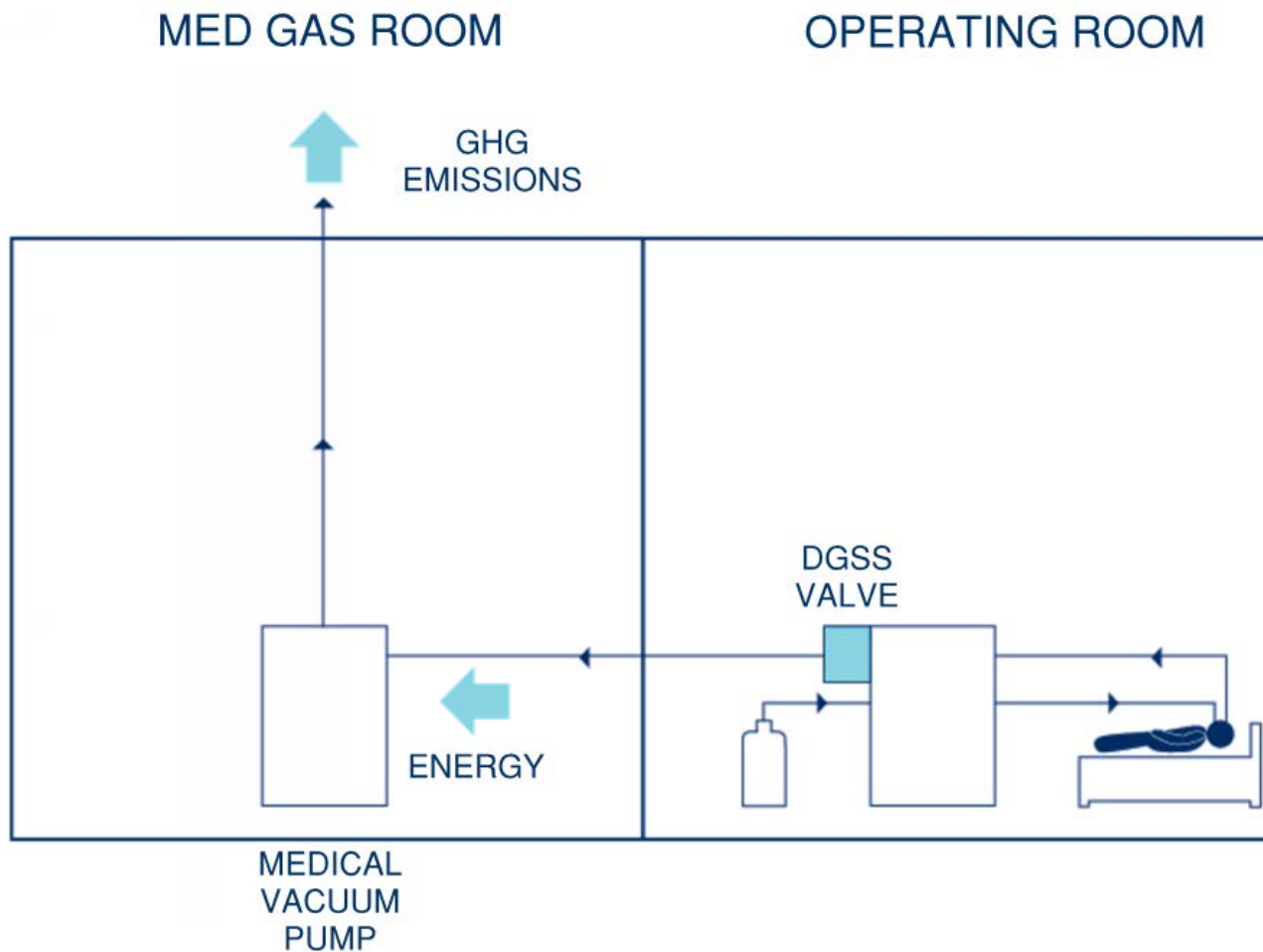
Mitigation Strategies

- Energy savings – Scavenging valves
- Emissions reductions – anesthetic gas recovery systems

Mitigation Strategies: Energy



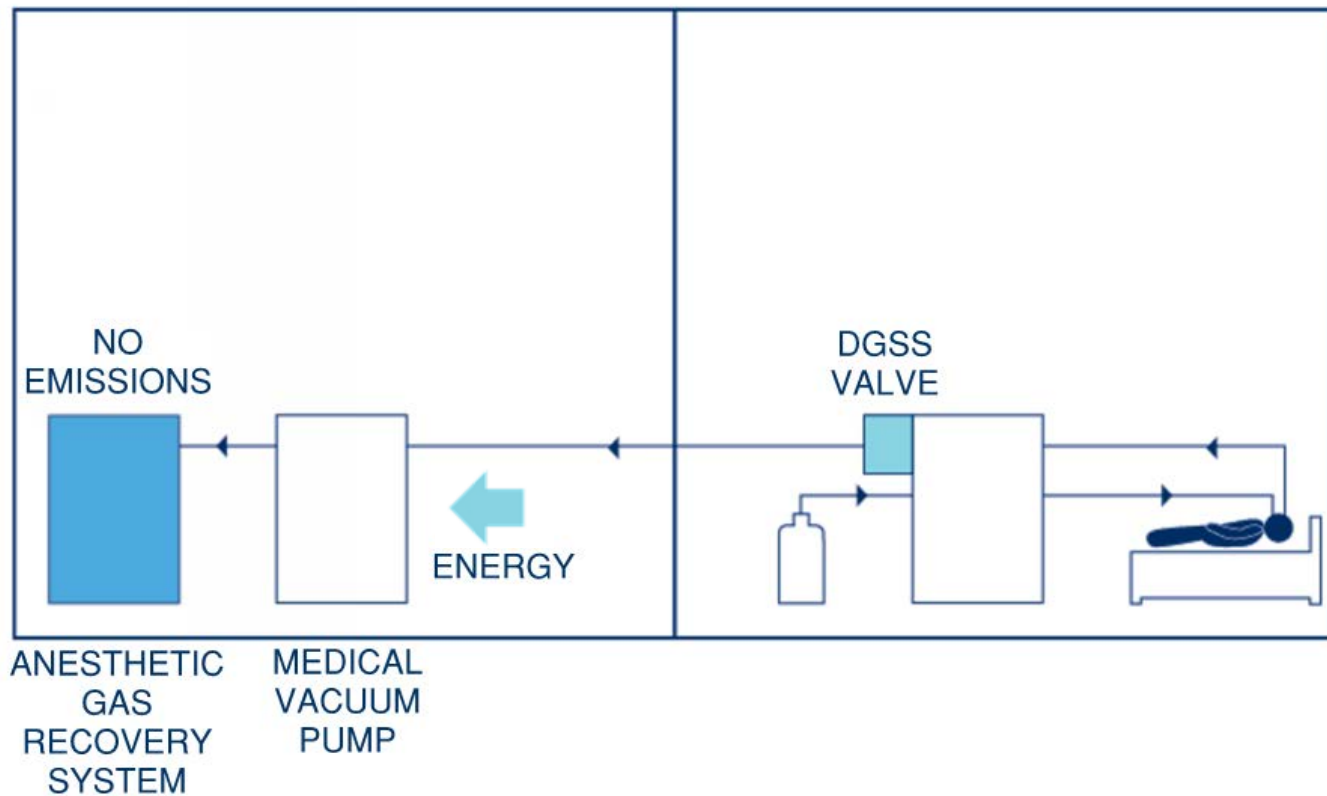
Mitigation Strategies: Emissions



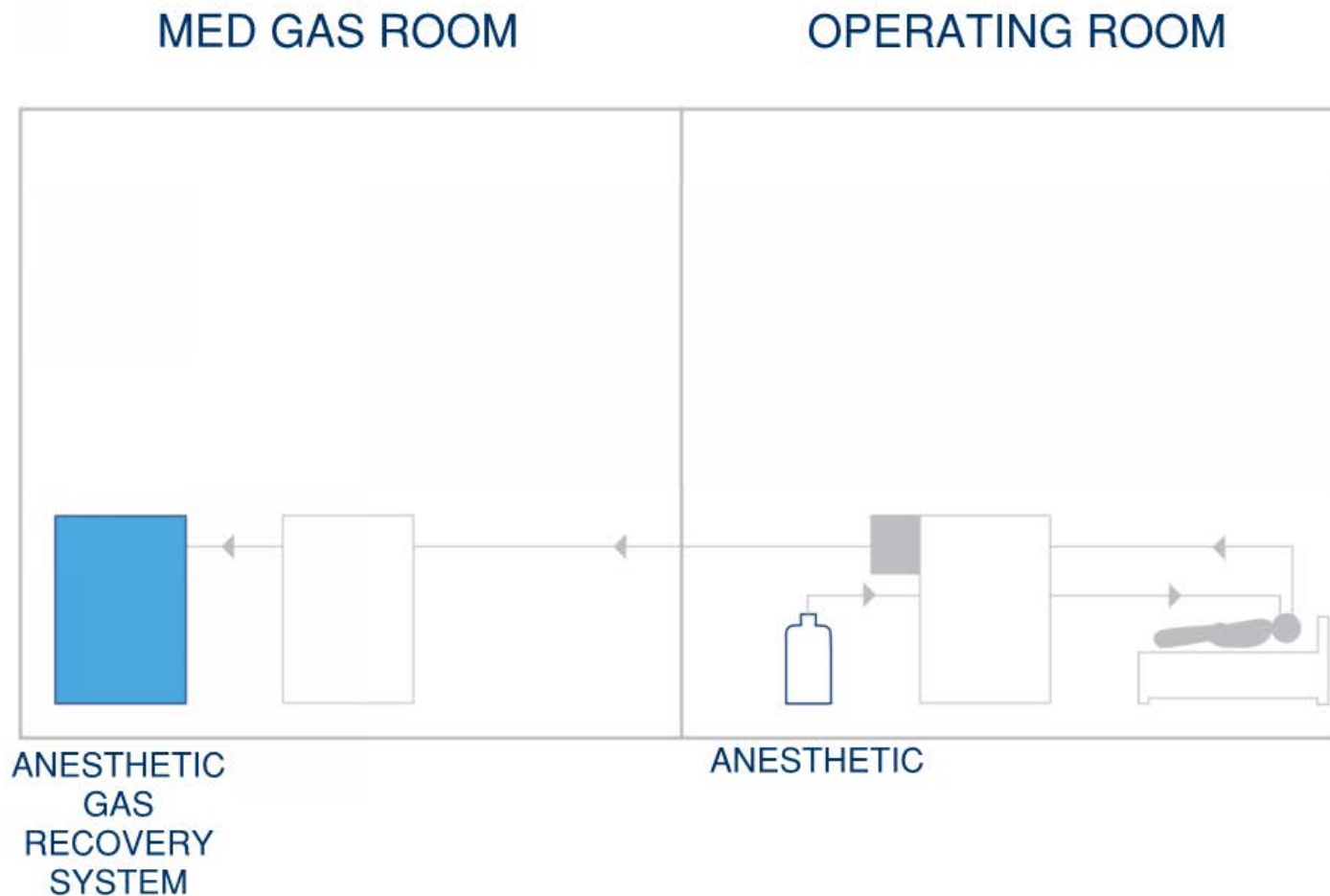
Mitigation Strategies: Emissions

MED GAS ROOM

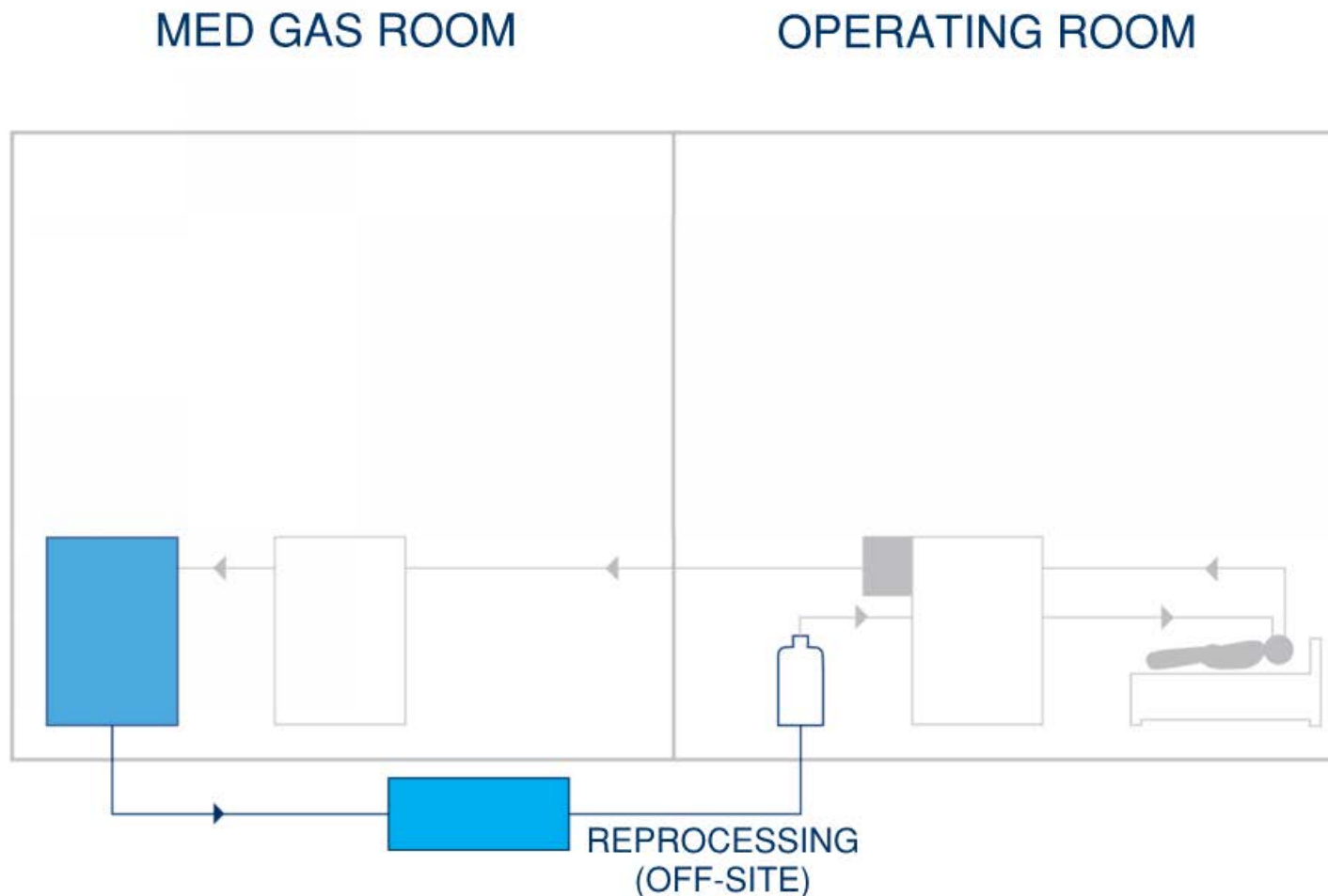
OPERATING ROOM



Mitigation Strategies: Supply Chain



Mitigation Strategies: Supply Chain



Summary

- Anesthetic gas systems are an essential part of OR procedures
- These systems have a significant environmental impact
- There are several available technologies to mitigate these impacts

John Pappas, P.E., LEED AP
Principal

johnp@mazzetti.com
415.652.4184



MAZZETTI

220 Montgomery Street, Suite 650
San Francisco, CA 94104
415.362.3266

www.mazzetti.com

An employee-owned Benefit Corporation