

Sustainable Practice and Energy Savings Through Setbacks of OR Heating, Ventilation and Air Cooling (HVAC)

Diane Gordon MD, Thomas Kinman BS-ME, MBA, PE, CHFM



Sustainability: The idea that the future of our planet depends on the way we live today

Introduction

Healthcare uses LOTS of energy and the operating room has the largest energy use per square foot in the hospital. This is largely due to the Heating, Ventilation and Air Cooling (HVAC) requirements of the OR:

Operating rooms are required to have 20 Air Changes per Hour (ACH) when in use.

Operating rooms are required to maintain positive pressure relative to adjoining spaces, which usually requires approximately 6 ACH.

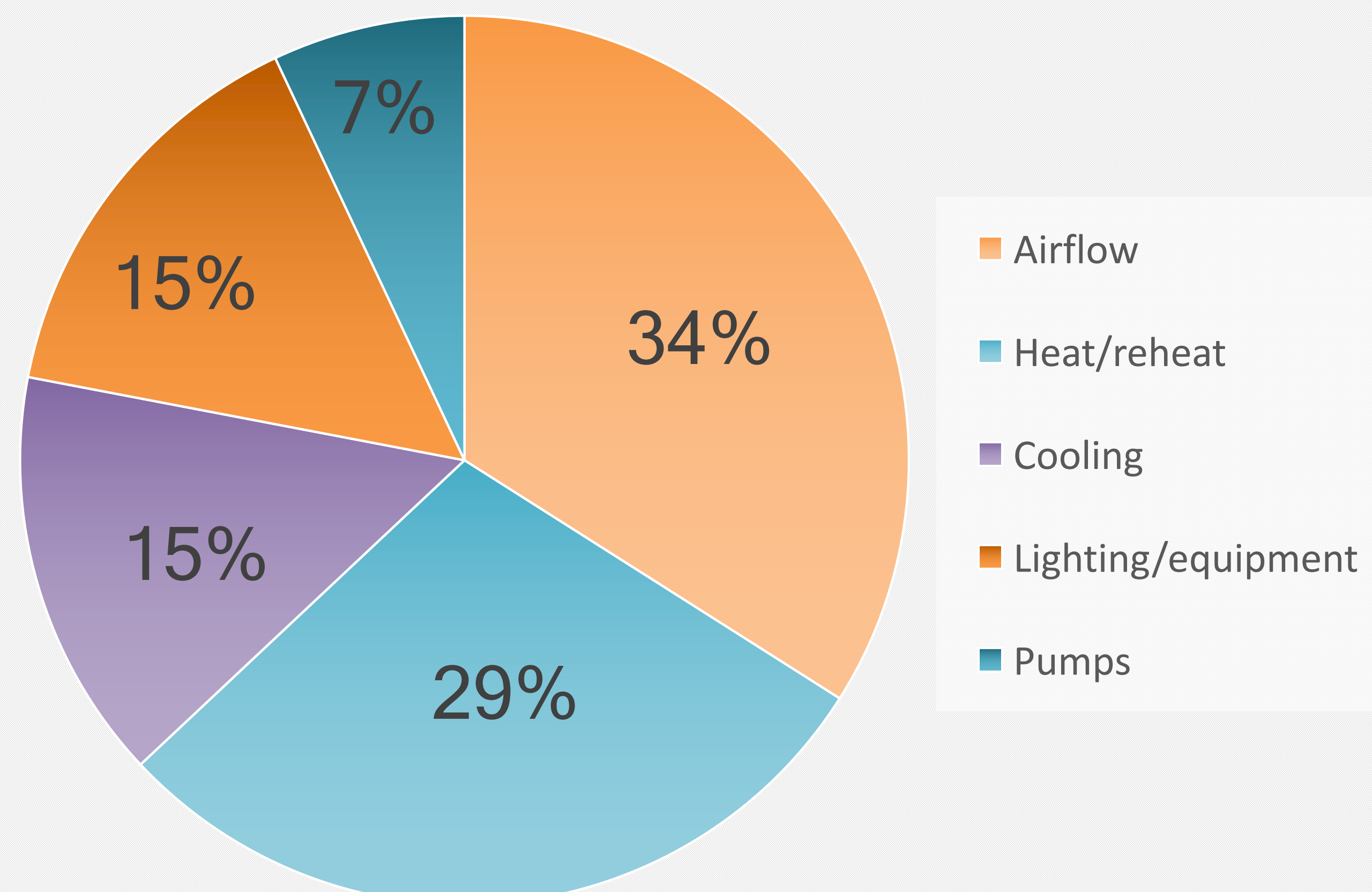
ACH are allowed to decrease when the OR isn't being used, as long as positive pressure status is maintained.

HVAC systems use both natural gas (heating, humidification, hot water) and electricity (fans, pumps, chillers/air conditioning).

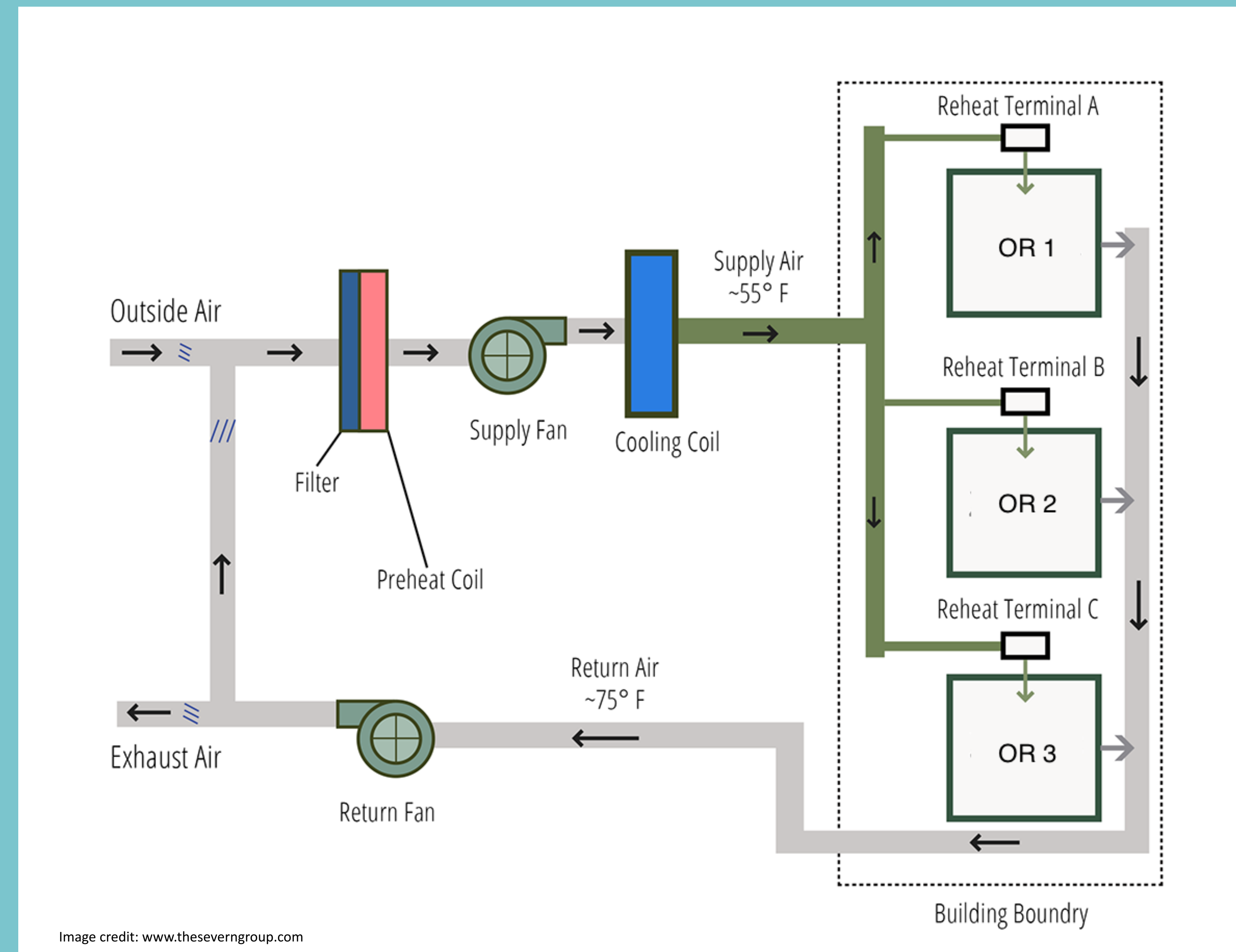
Electricity in the U.S. is generated mostly by burning fossil fuels. Coal-fired power plants contribute to respiratory disease and poor health.

Less energy use = cost savings and improved public health

Healthcare Energy Use



How does industrial HVAC work?



Methods

Ambulatory surgery center, 8 ORs. 2 rounds of setbacks (2014-2015 and 2016-2017)

ORs set back from 20 ACH to 6 during nighttime hours (8pm-5am)

OR used for nighttime cases was not changed. Staff educated on procedure to bring an OR back online if needed.

Energy requirements were tracked pre/post setbacks.

Results

- In one year of setbacks, natural gas use decreased by 5,196 MMBTU (10%), a direct cost savings \$23,000
- In one year of setbacks, electricity use decreased by 40,000 kWh, a modest but measurable savings of \$2,600
- During the 2nd round of setbacks, the natural gas savings were enough to offset the demand of heating a new building (Proton center)

Learning Points

- The OR has many opportunities to decrease waste, reduce costs and practice more sustainable healthcare.
- OR setbacks are a good starter project, as setbacks don't impact patient care, don't directly involve staff, and result in significant cost savings.

References

- 1) <https://practicegreenhealth.org/topics/energy-water-and-climate/energy>
- 2) <https://practicegreenhealth.org/topics/leaner-energy>
- 3) <https://www.eia.gov/tools/faqs/faq.php?id=427&t=3>
- 4) Gabbard, A. Coal Combustion: Nuclear Resource or Danger. Oak Ridge National Laboratory, UT for the US Department of Energy, February 2008. Available at: <http://www.ornl.gov/info/ornlreview/rev26-34/text/colmain.html>