

# VAV Systems

Design, Performance and Commissioning Issues

A Typical VAV System



**Instructor:**

David Sellers

Senior Engineer

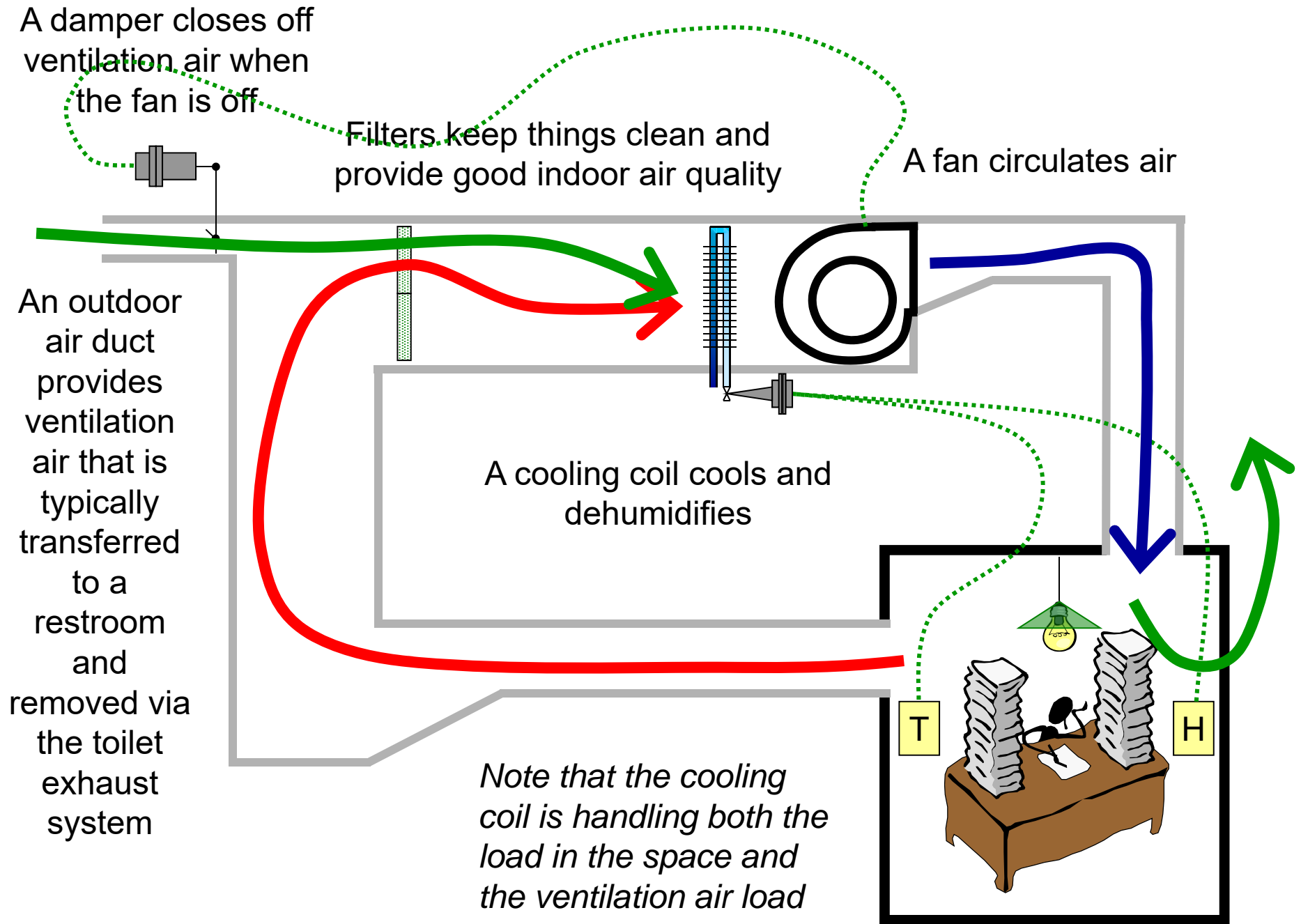
Facility Dynamics Engineering

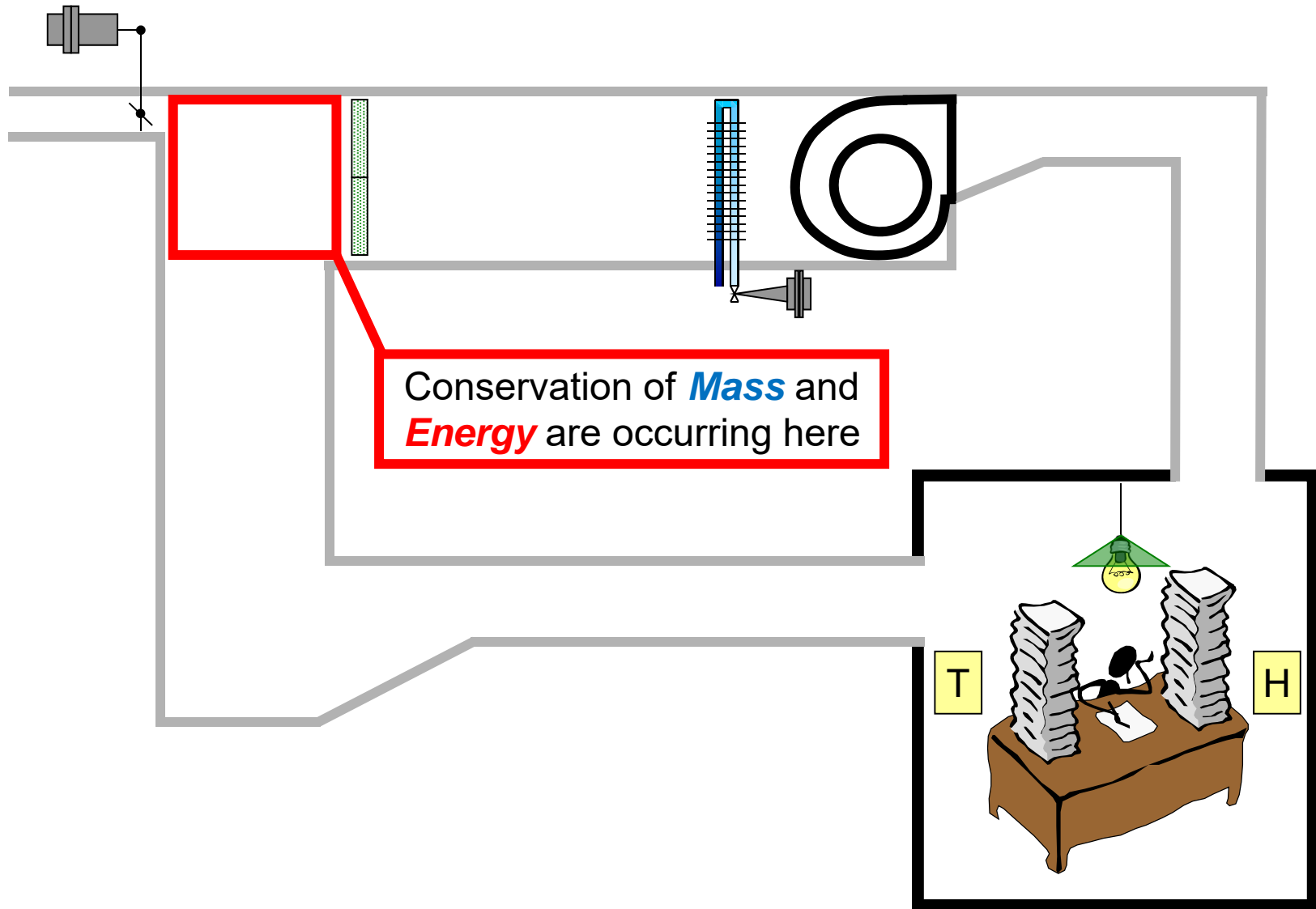
March 7, 2018



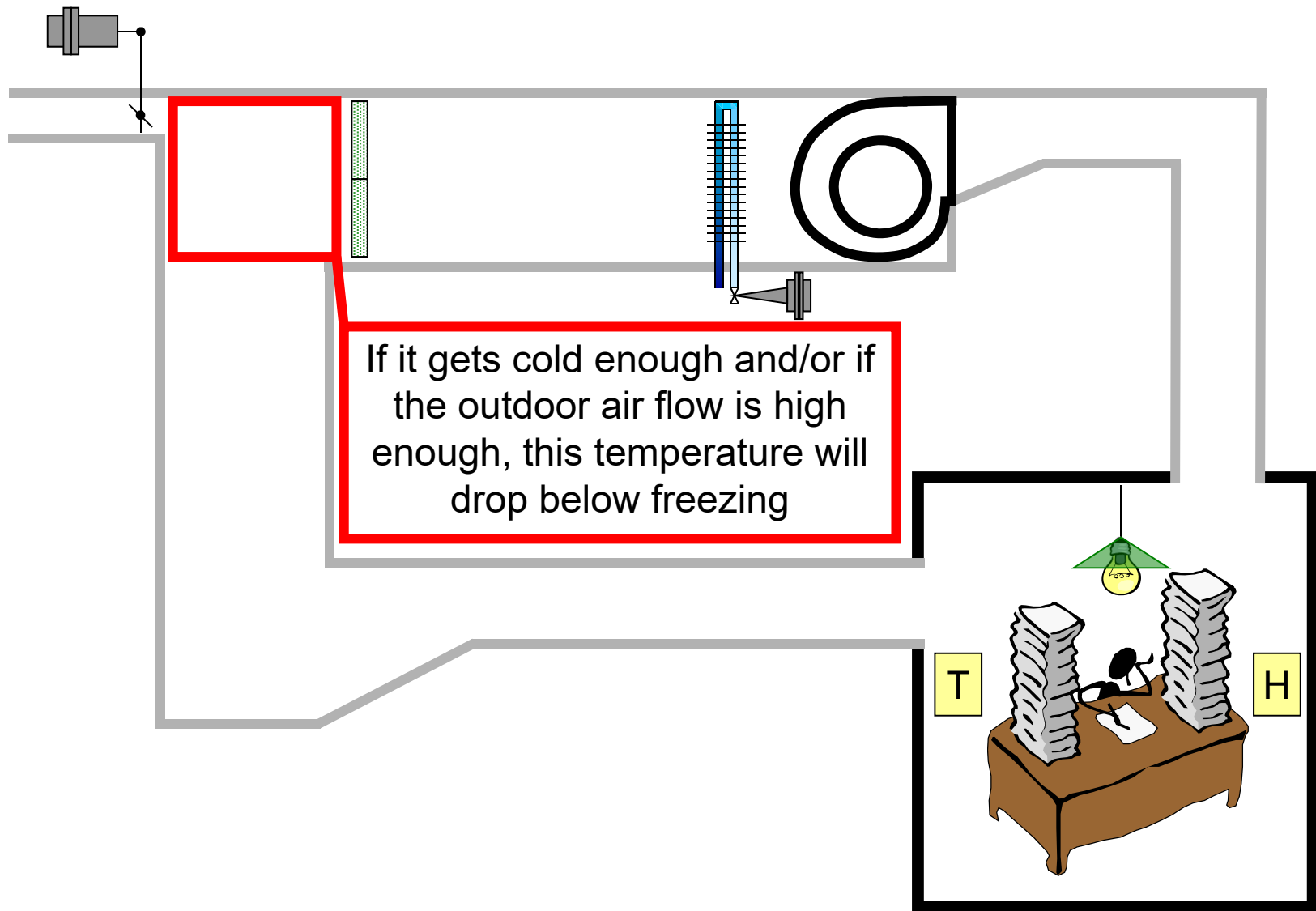
# Putting Together a VAV Air Handling System for Modern Building

A TYPICAL VAV SYSTEM

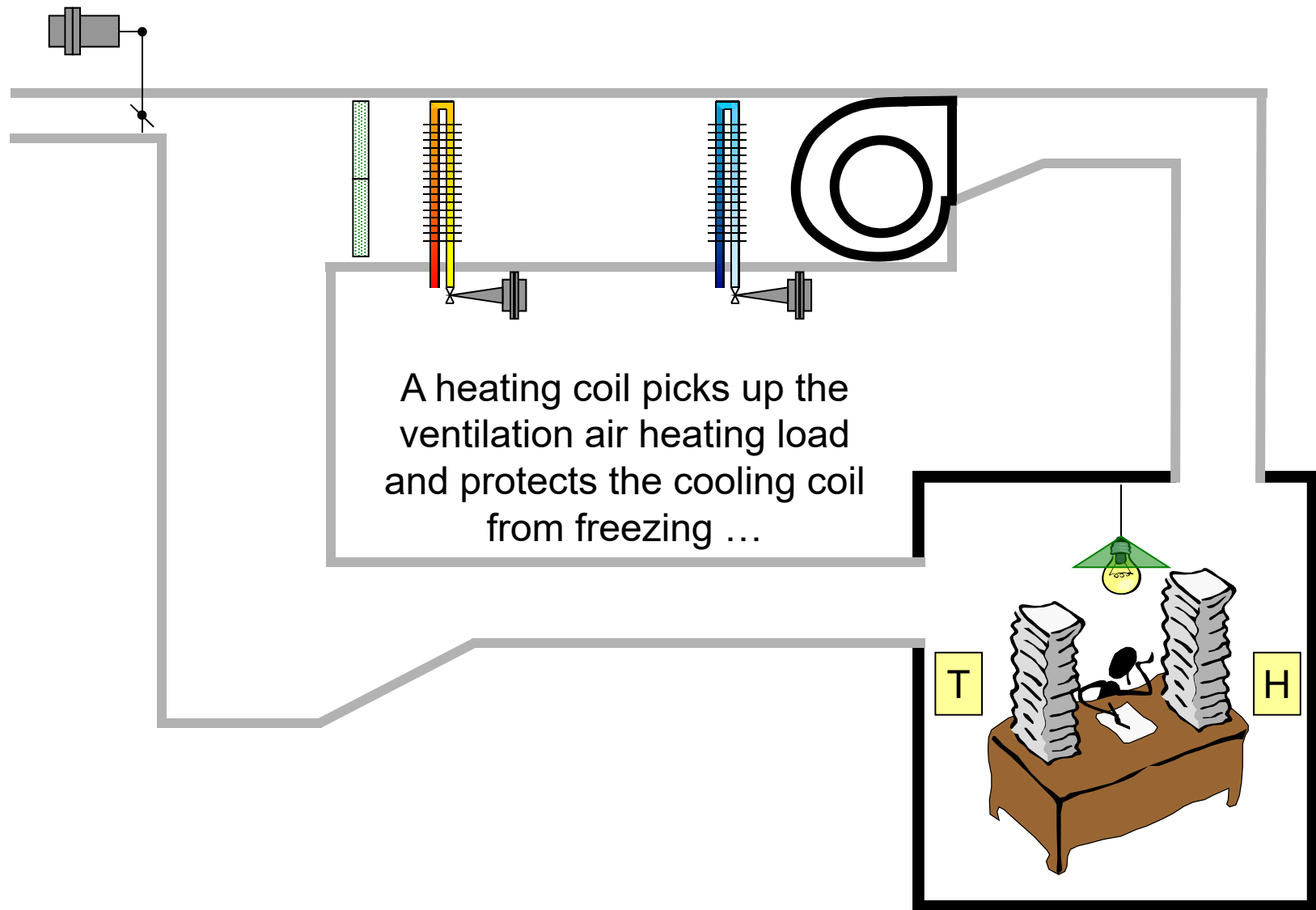




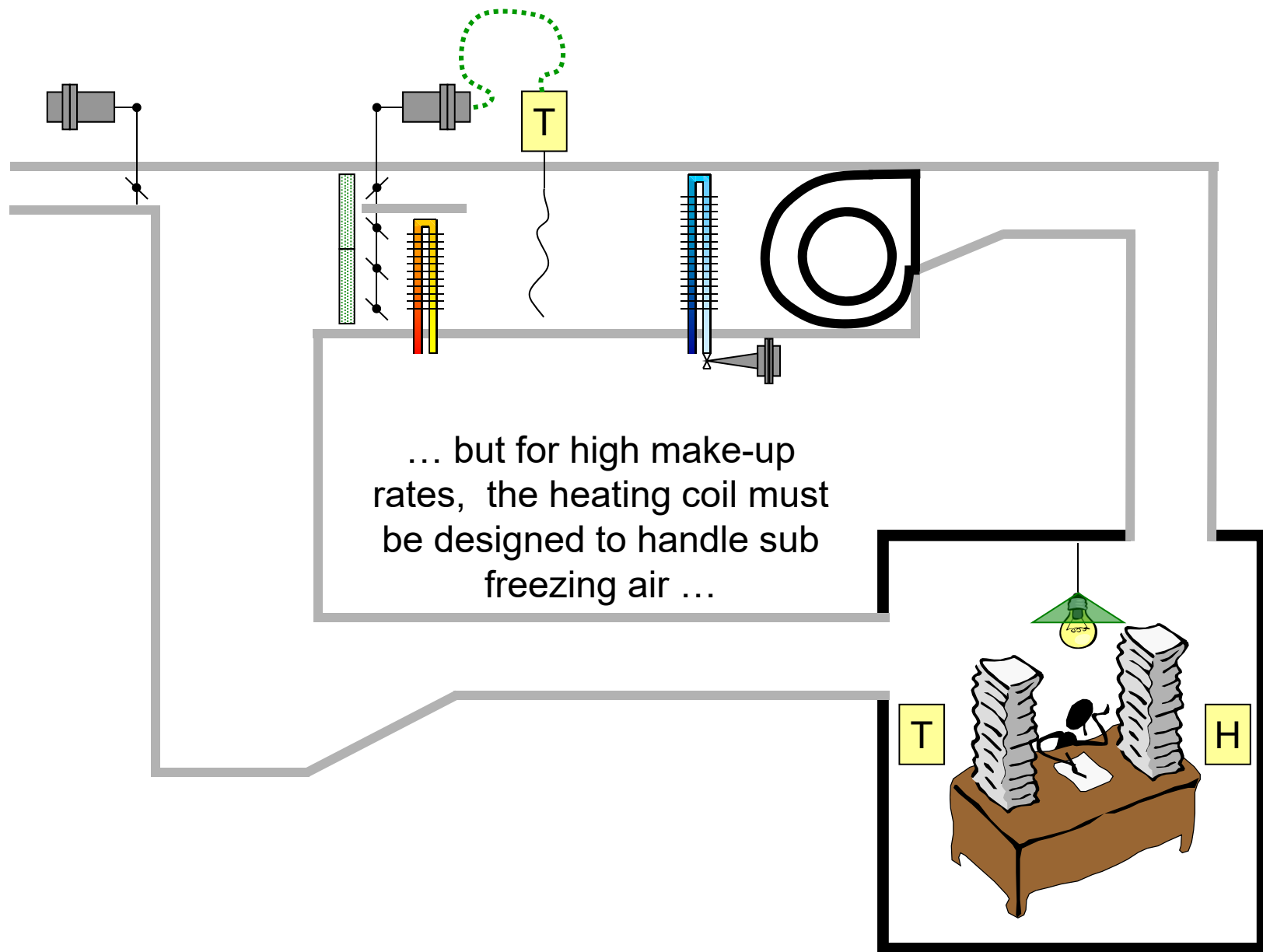
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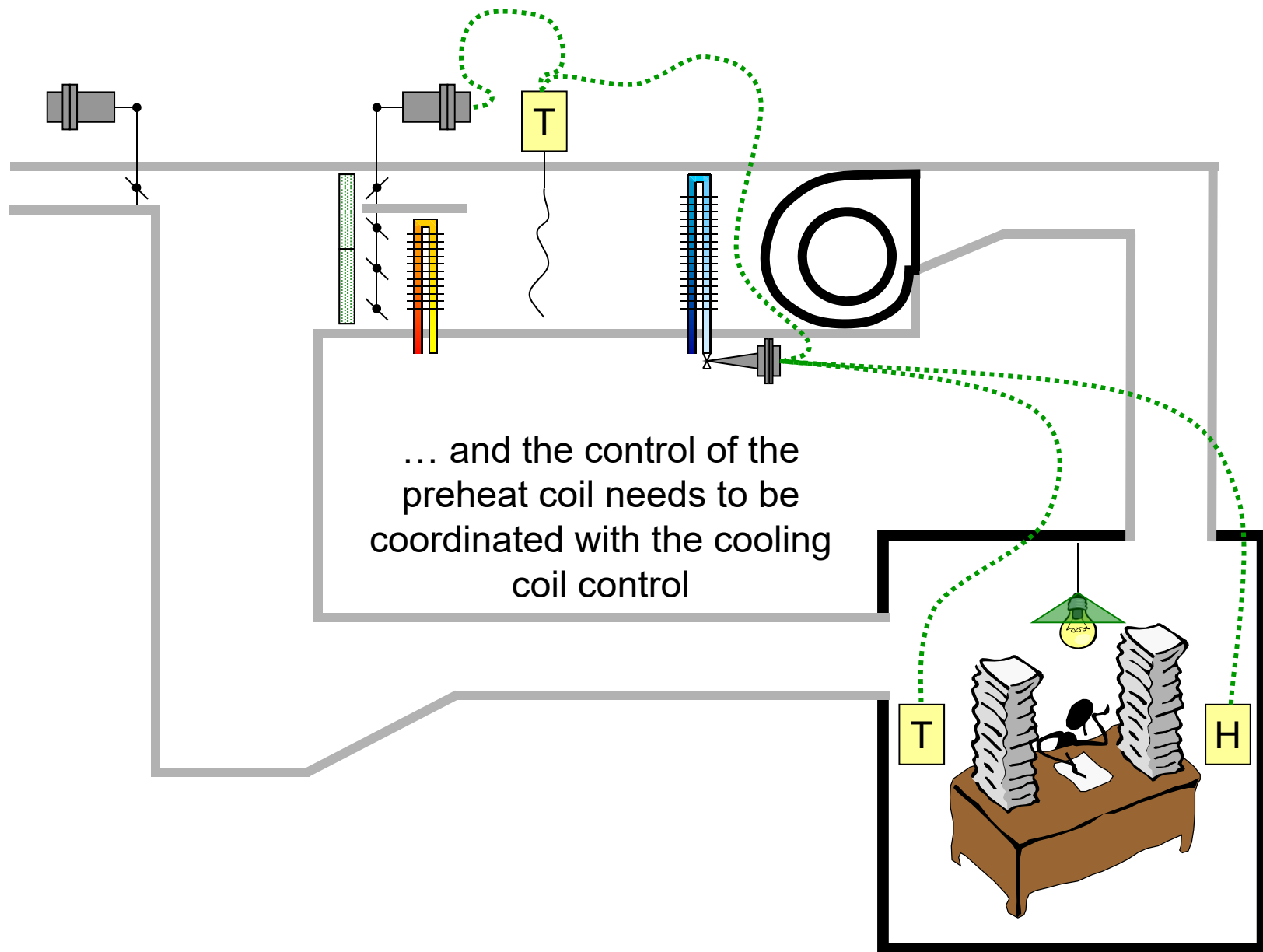
A TYPICAL VAV SYSTEM



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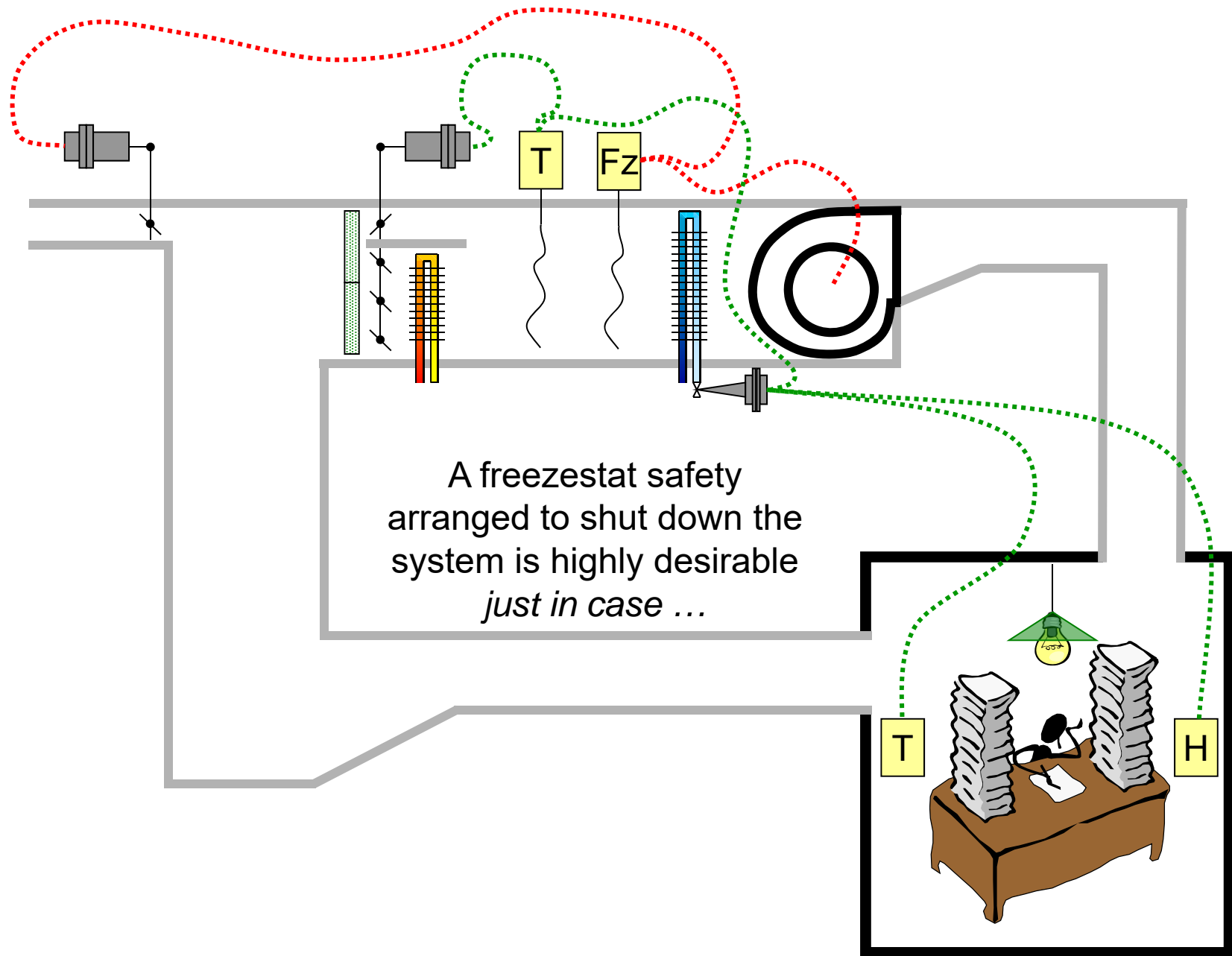


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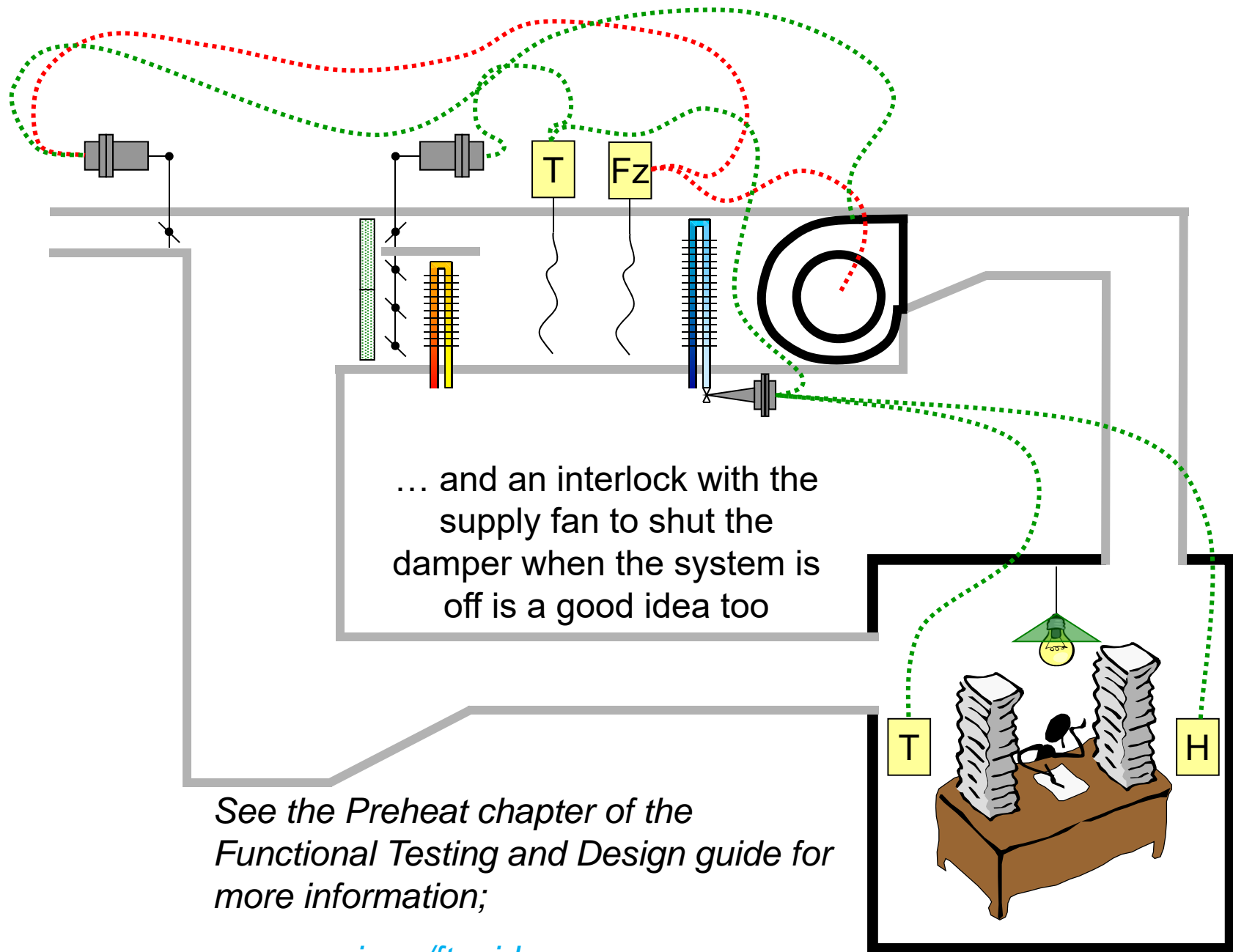


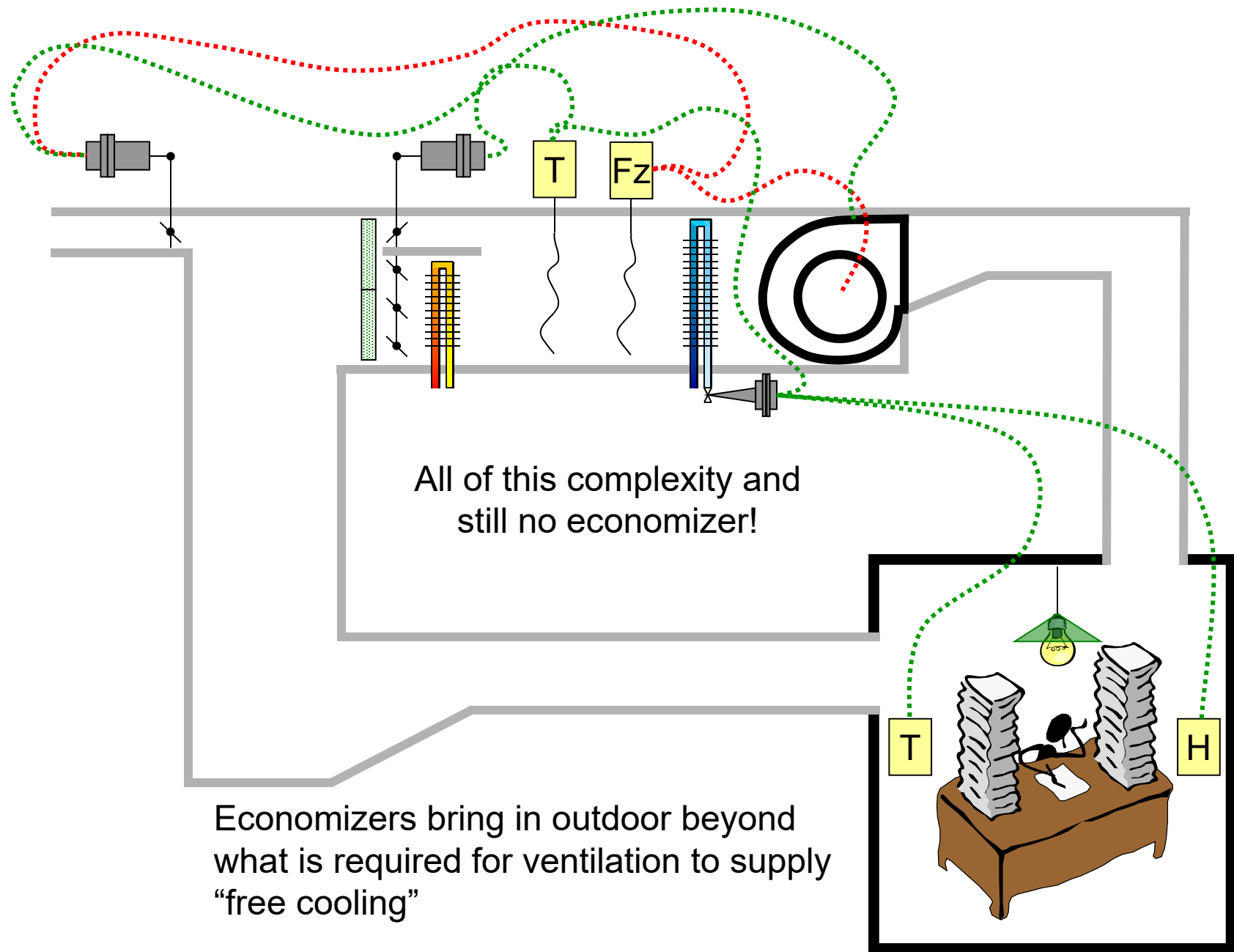
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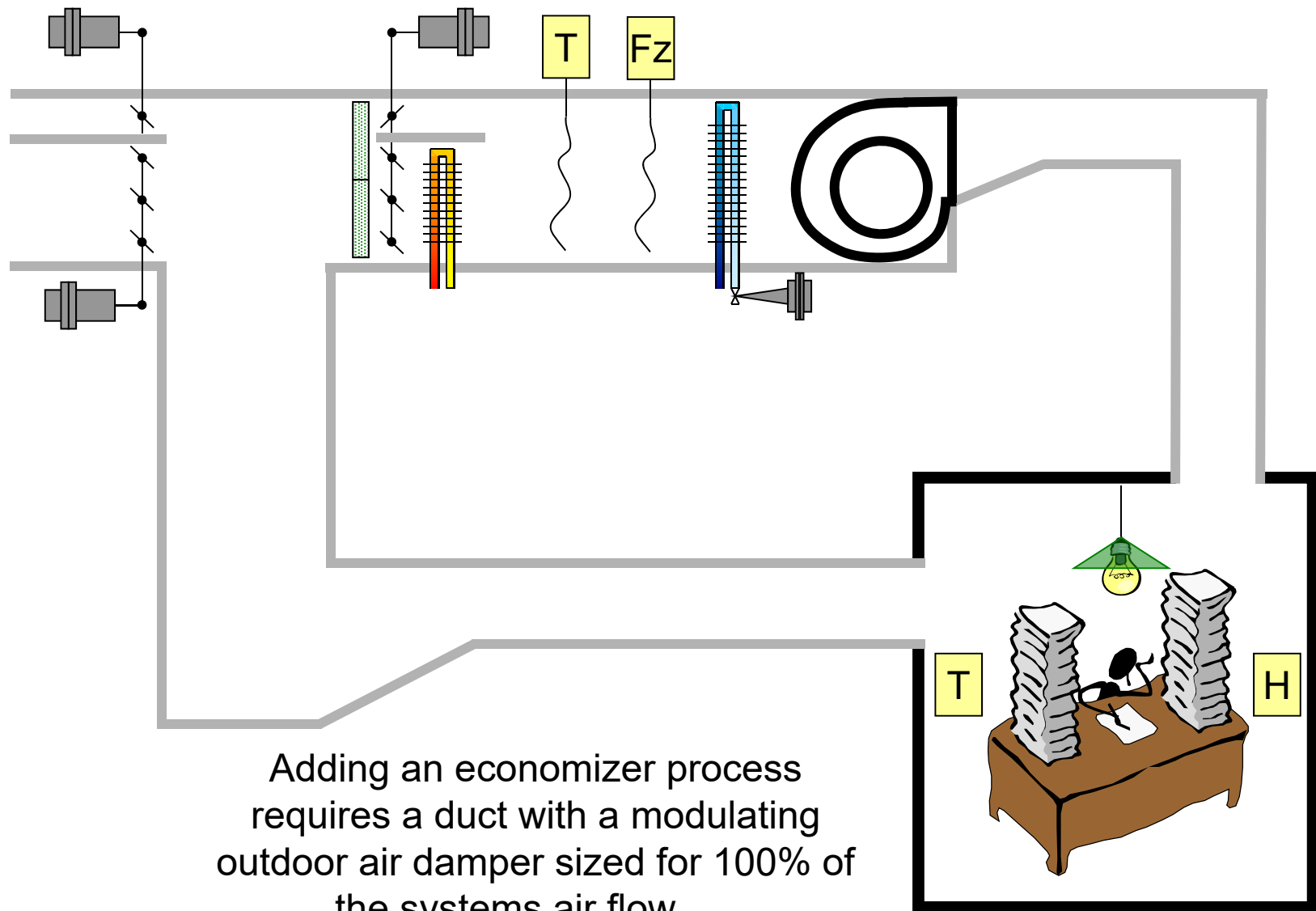


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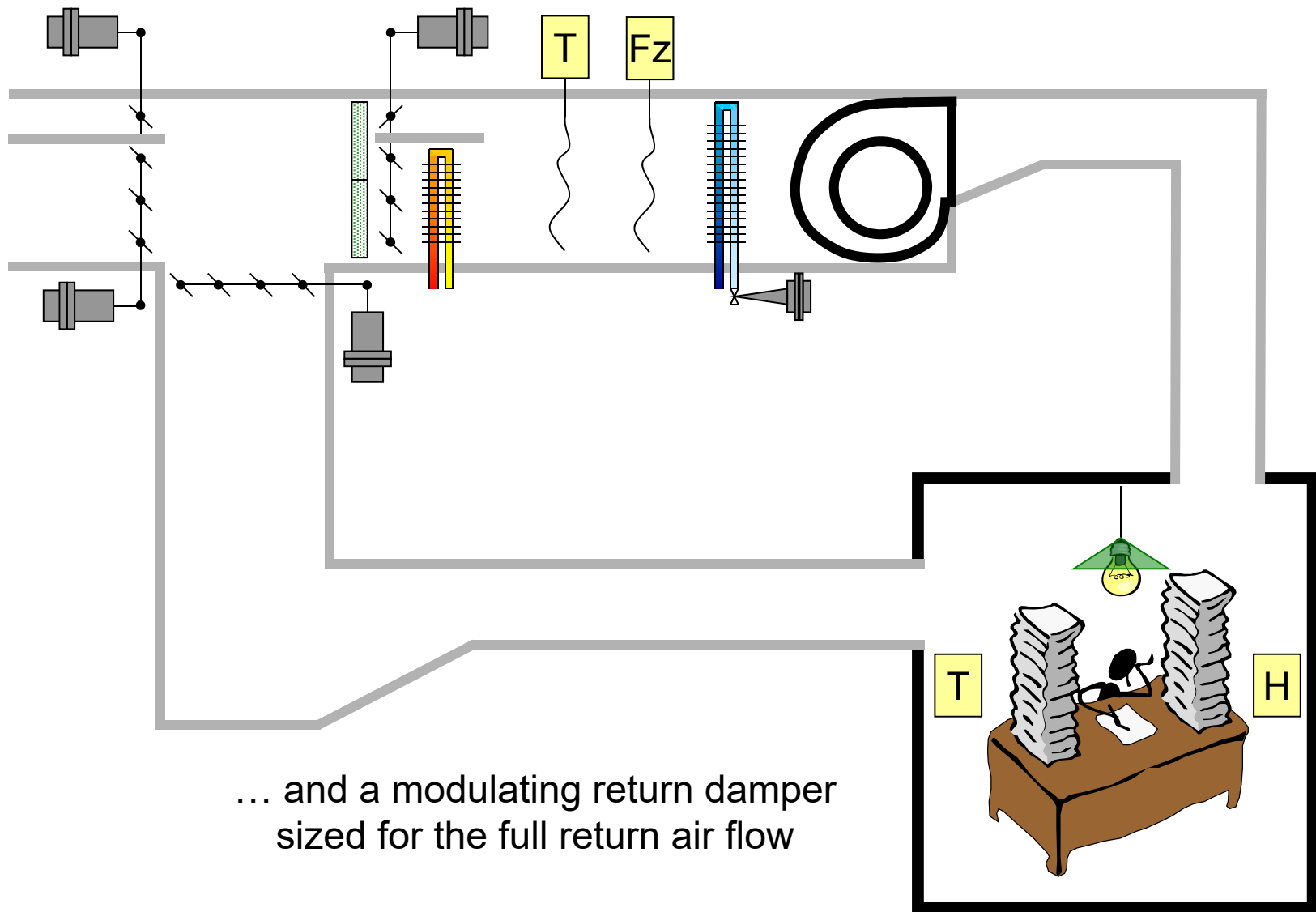




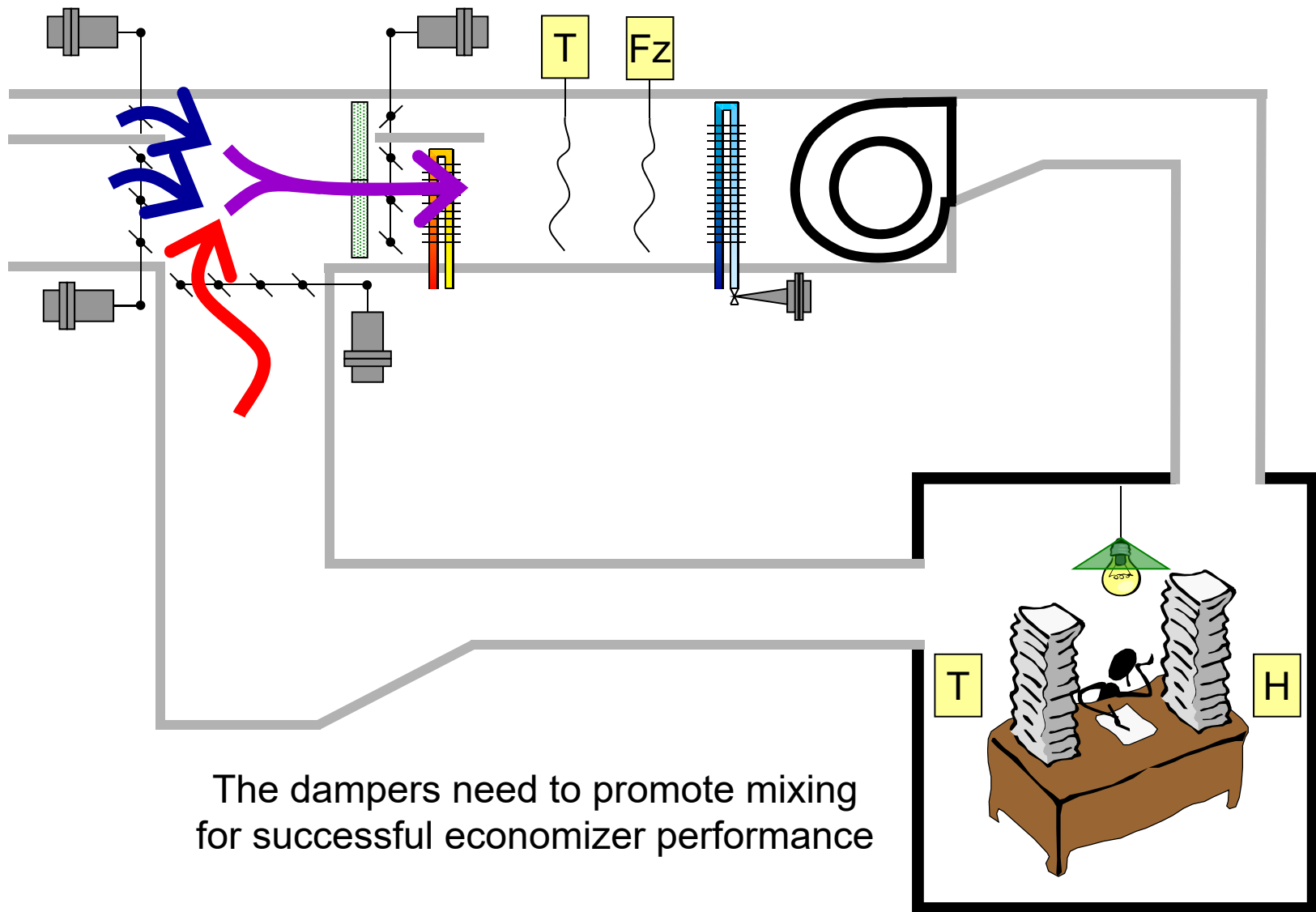
A TYPICAL VAV SYSTEM



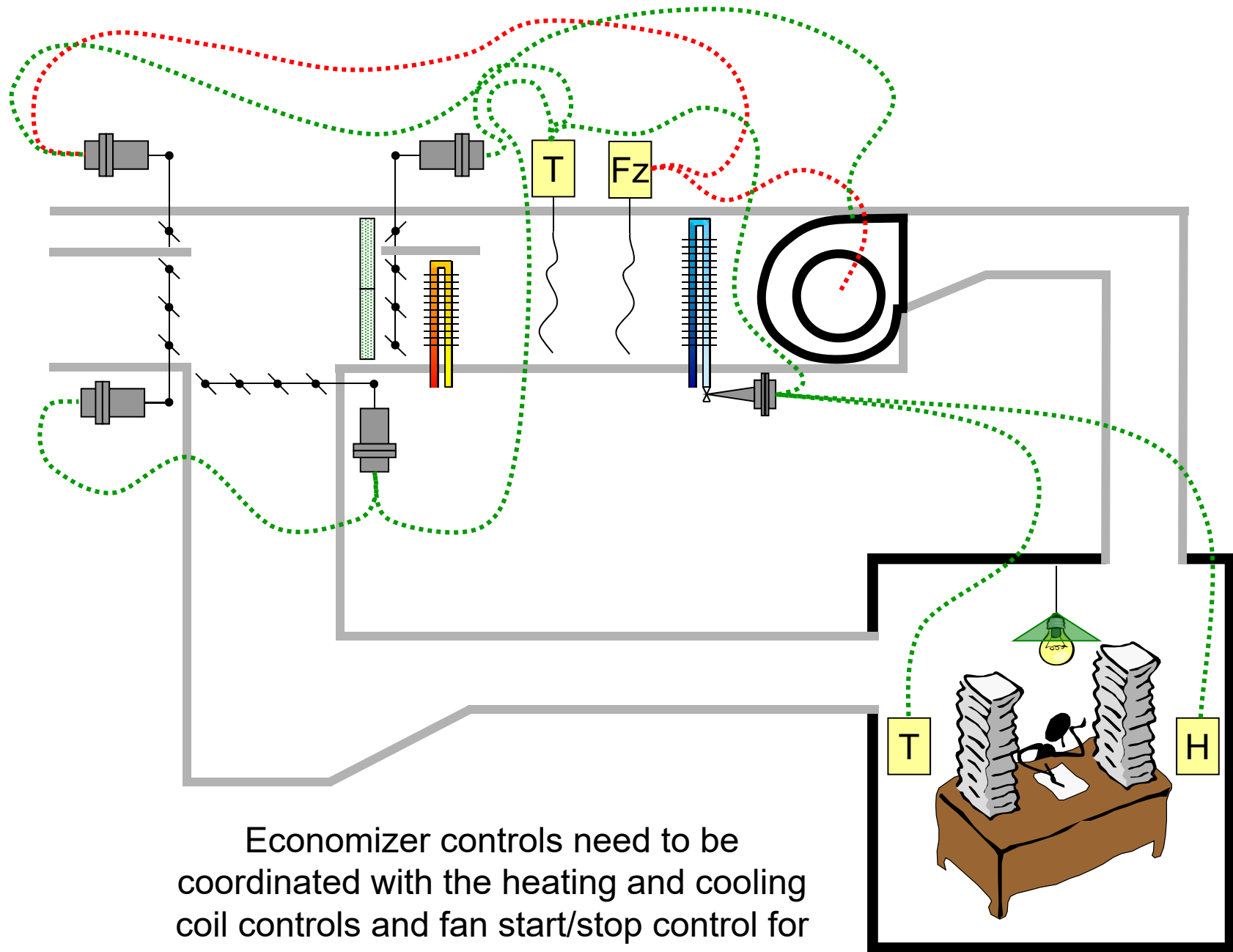
Adding an economizer process  
requires a duct with a modulating  
outdoor air damper sized for 100% of  
the systems air flow ...



... and a modulating return damper sized for the full return air flow

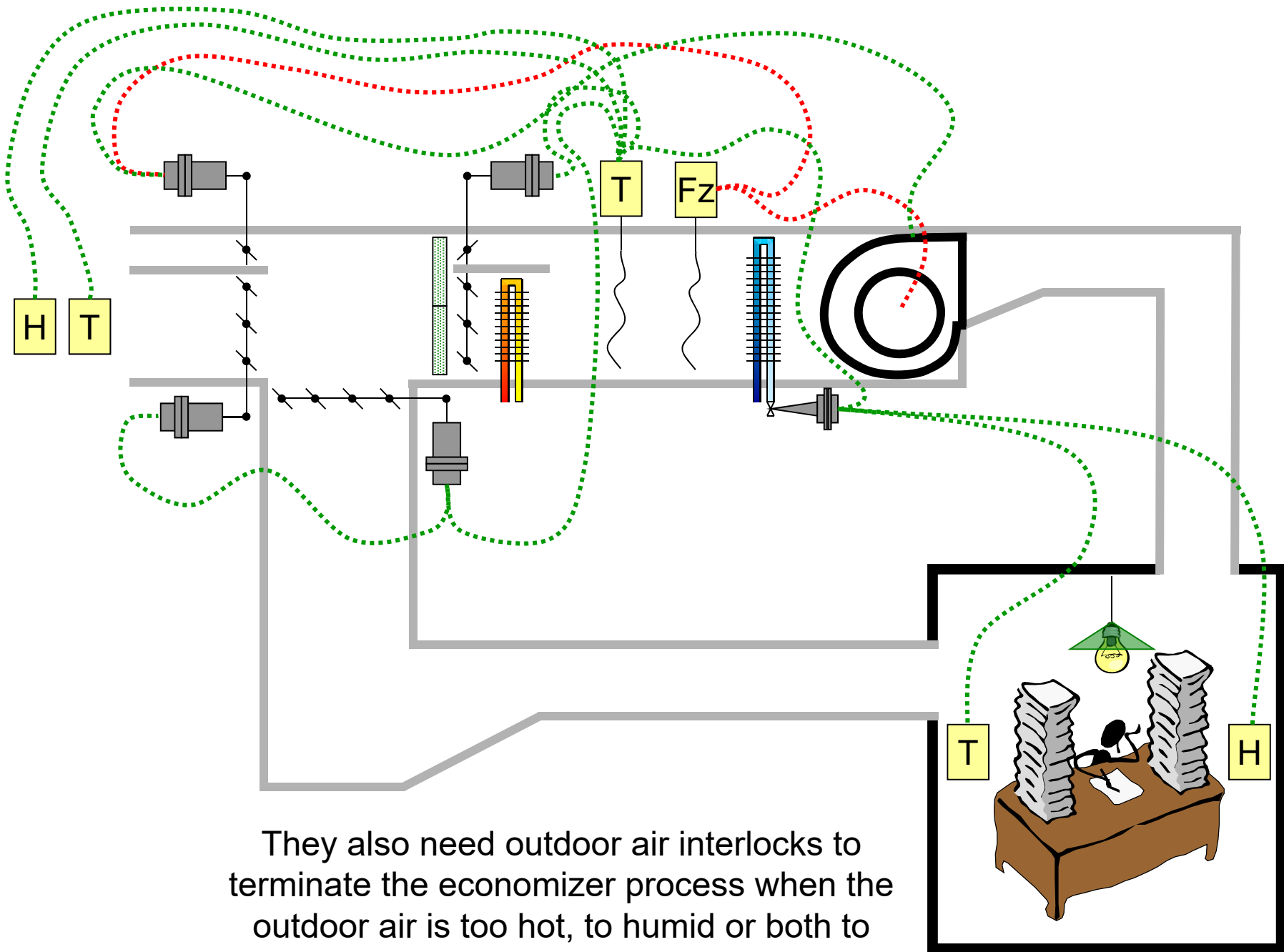


The dampers need to promote mixing for successful economizer performance



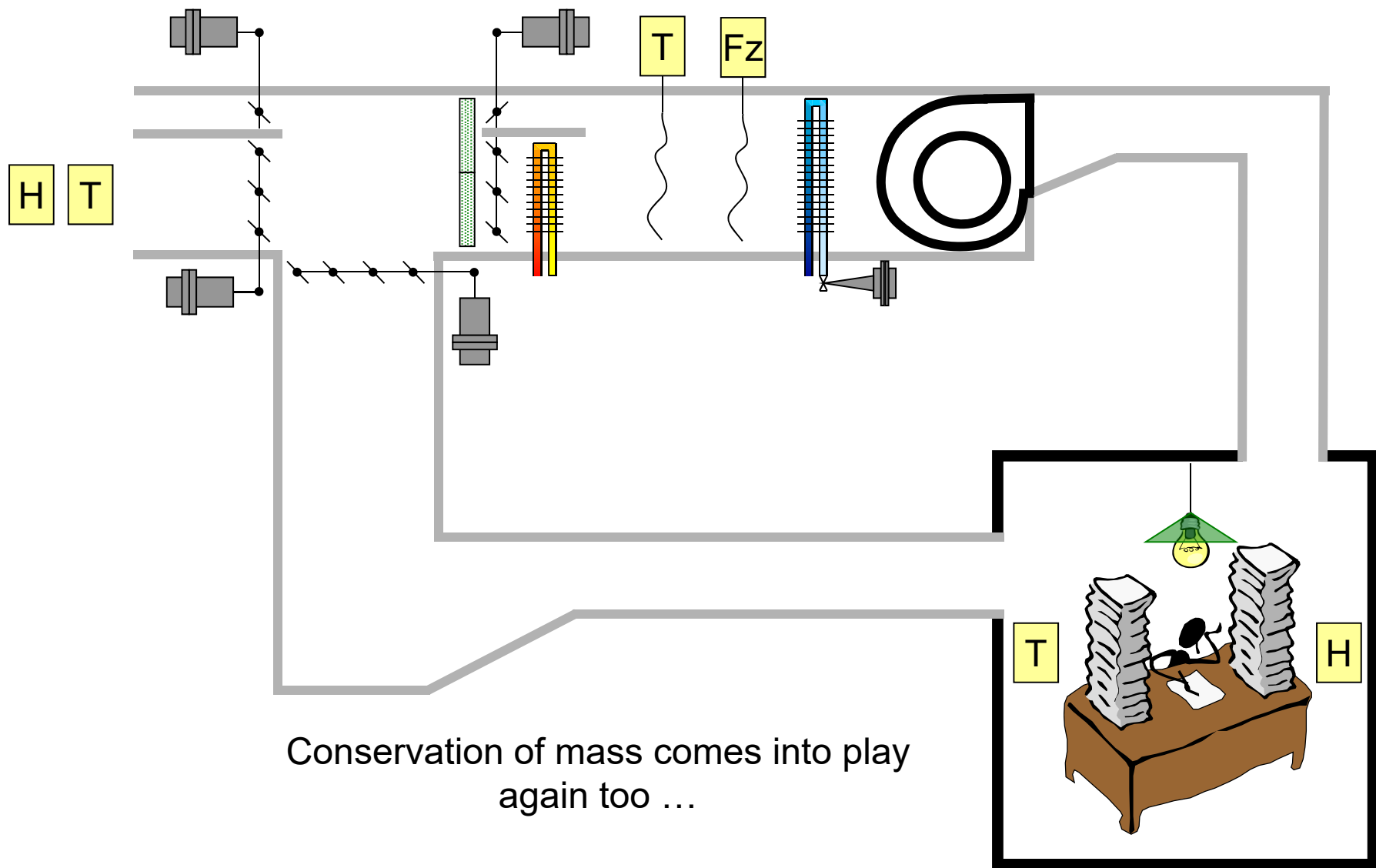
Economizer controls need to be coordinated with the heating and cooling coil controls and fan start/stop control for best efficiency and performance

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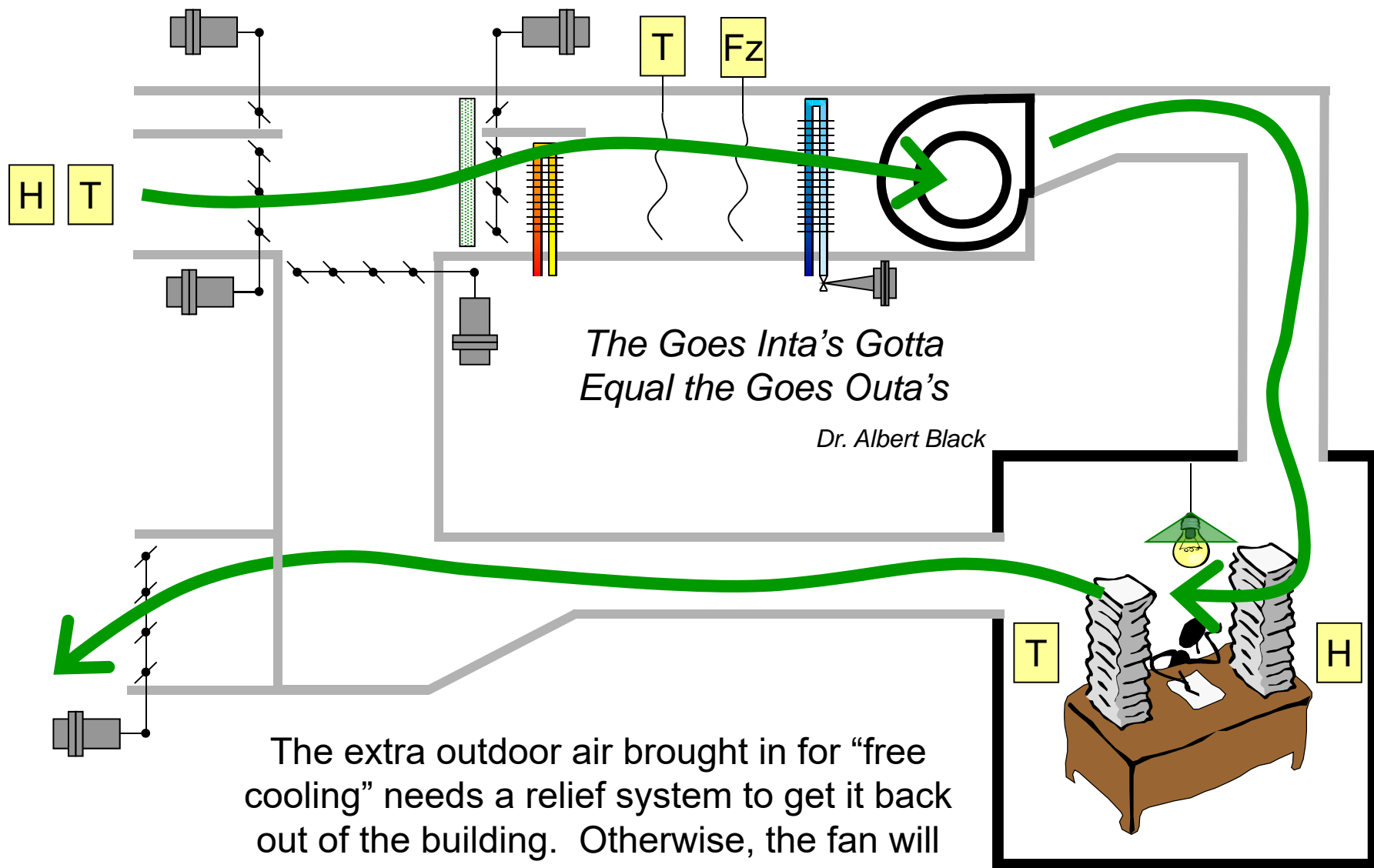


They also need outdoor air interlocks to terminate the economizer process when the outdoor air is too hot, too humid or both to save energy

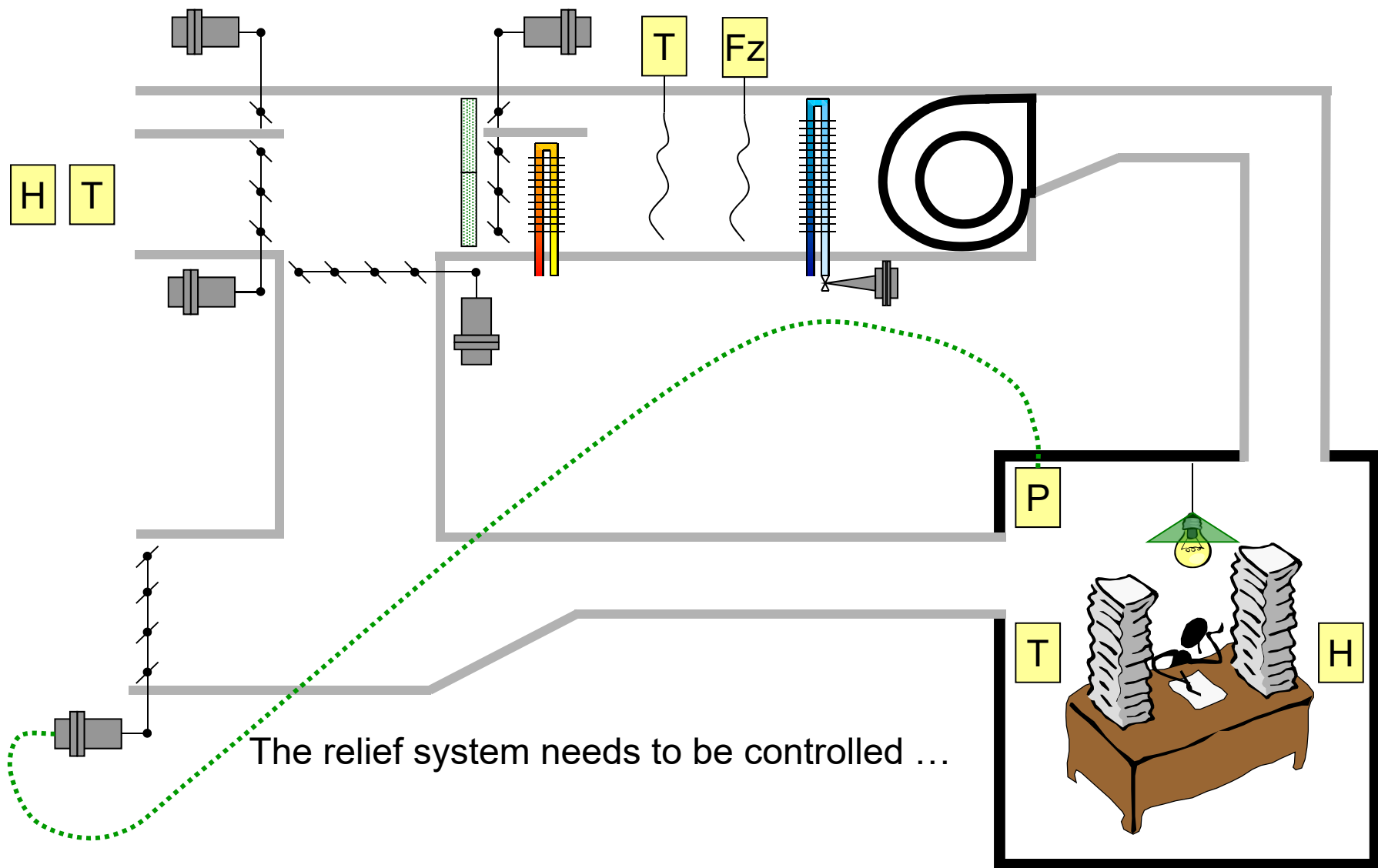




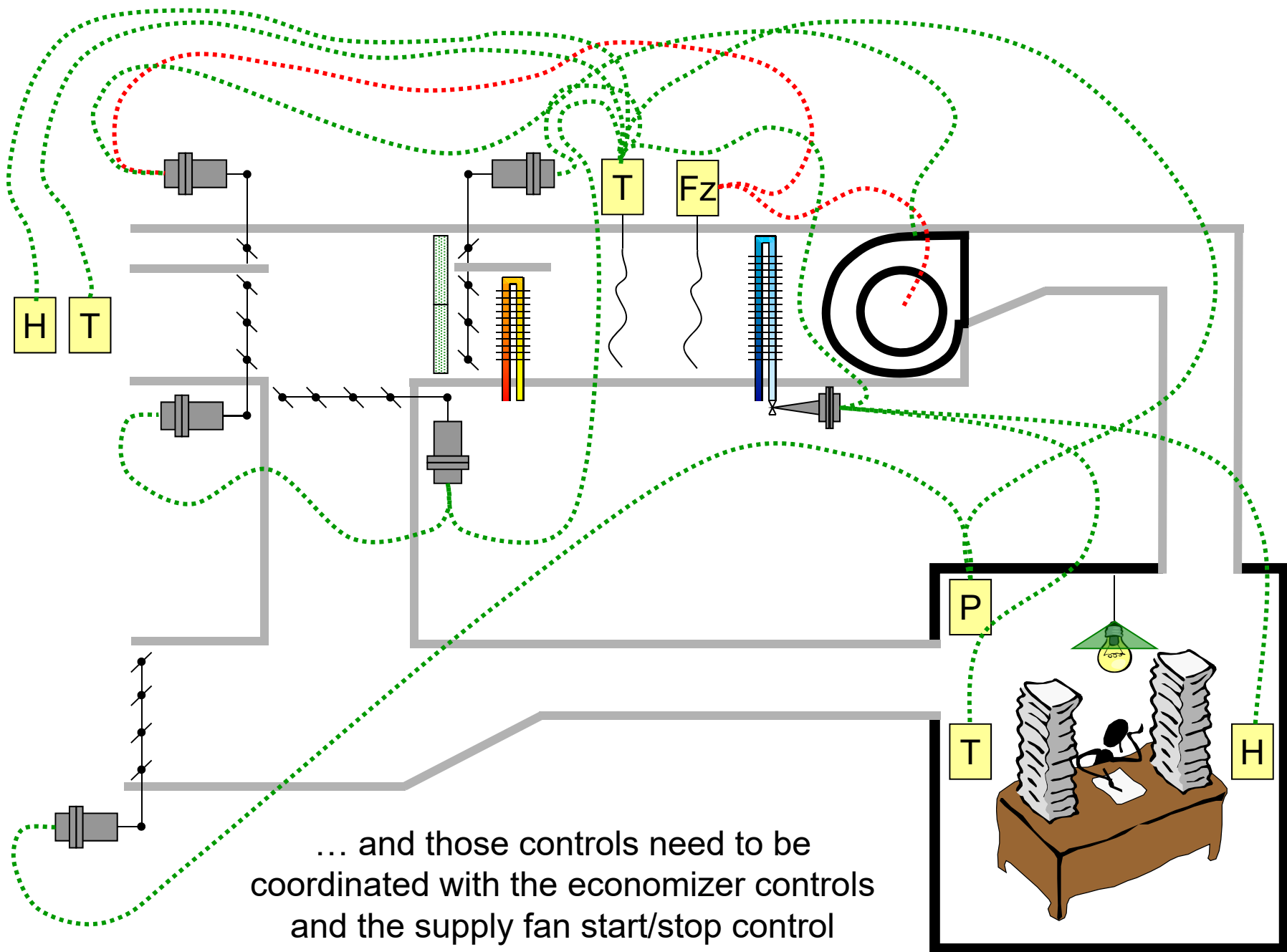
Conservation of mass comes into play  
again too ...



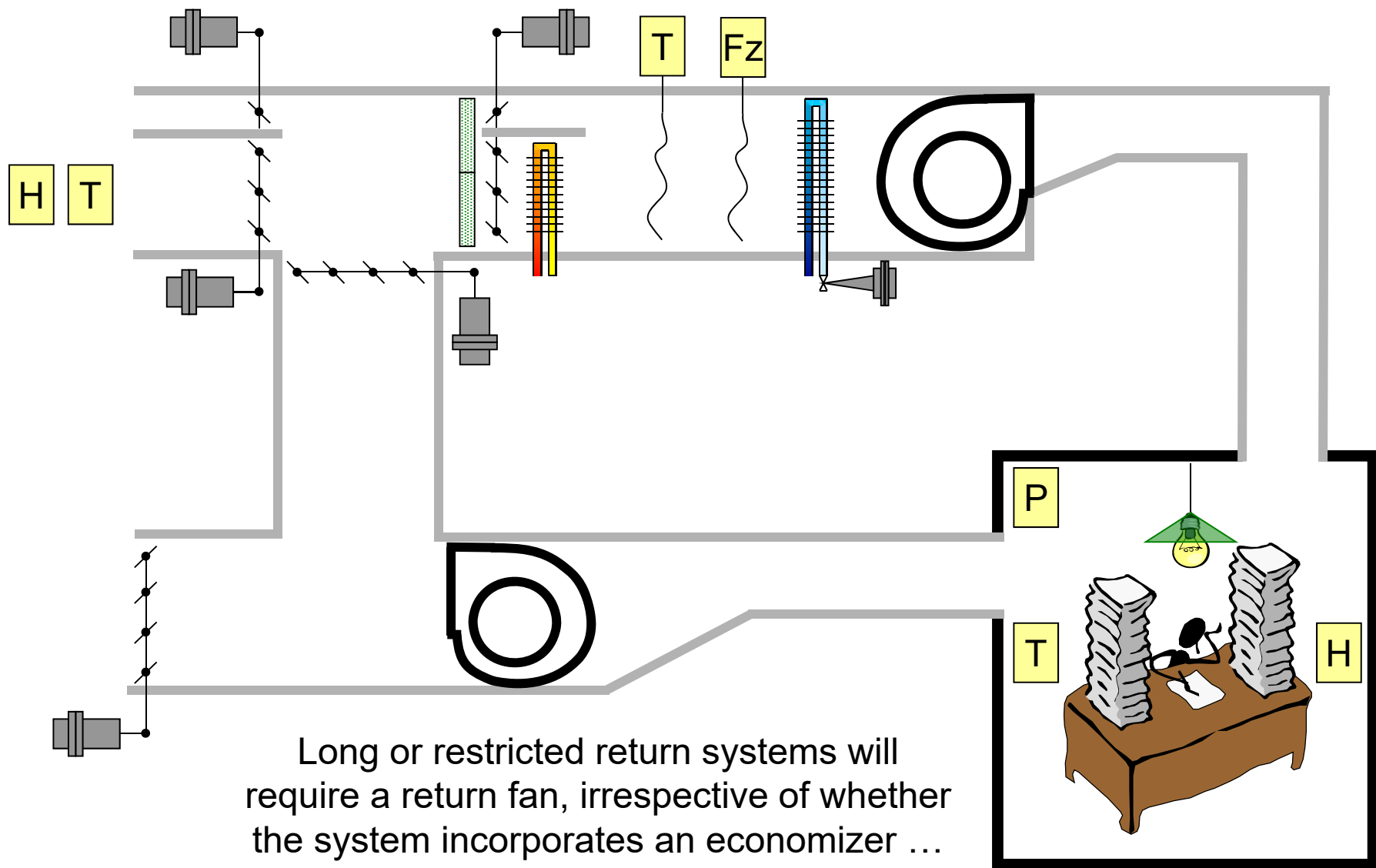
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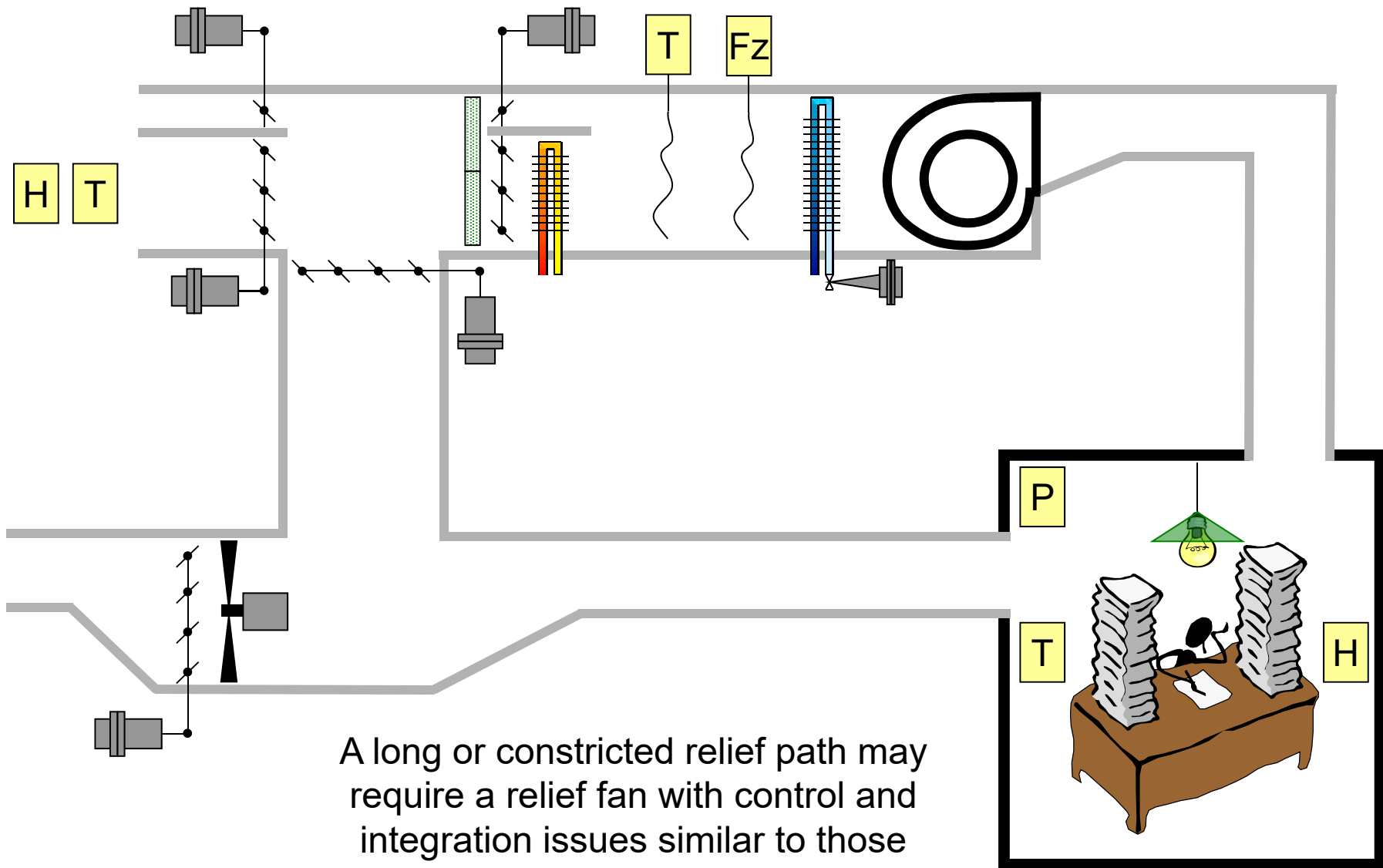


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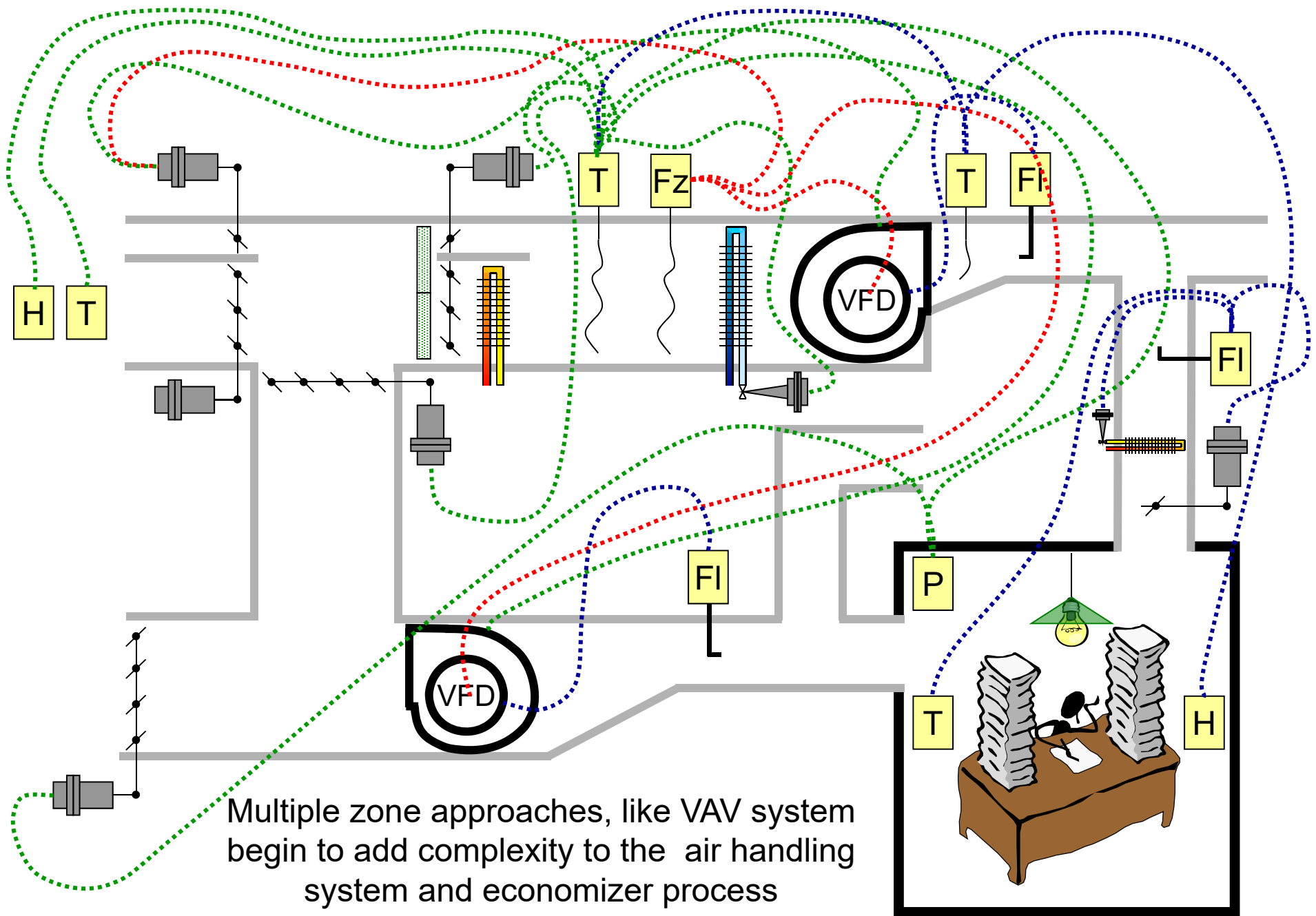


A TYPICAL VAV SYSTEM





A long or constricted relief path may require a relief fan with control and integration issues similar to those associated with the return fan





## Bottom Line

Varying flow to keep people comfortable can be a bit of a trick