

BUILDINGENERGY BOSTON

Refrigerants: Rethinking their Role in Electrification

Neil Donnelly, New Ecology

JS Rancourt, DXS

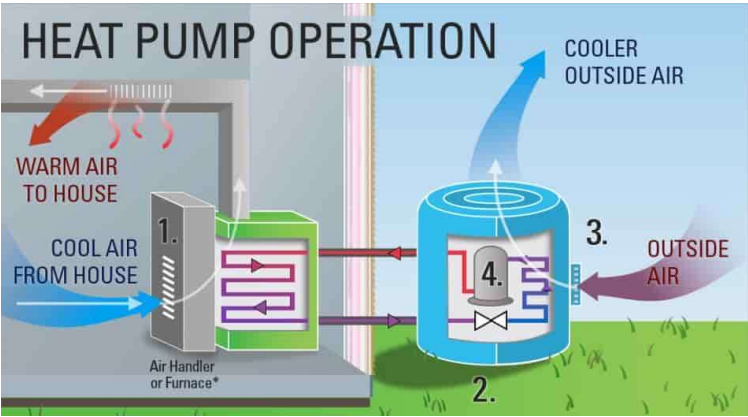
Tom Secondo, R.W. Sullivan

Developed by Ching-Wen Hsiao and Miary Rasoanaivo, New Ecology

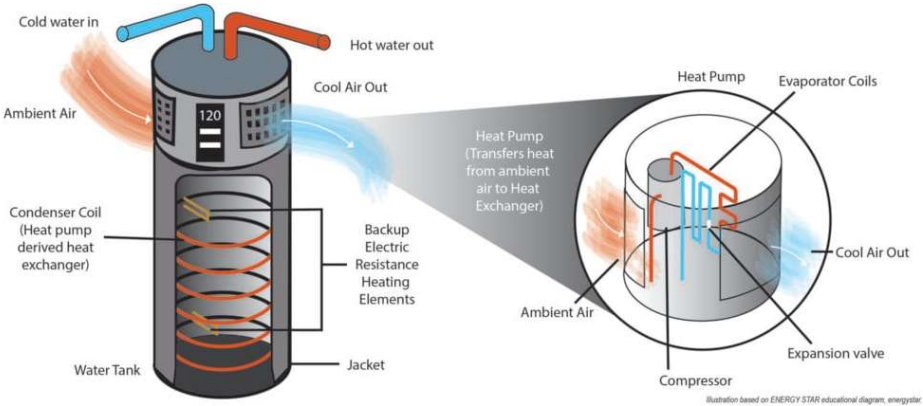
Curated by Brendan Kavanagh and Ashley Wisse

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To decarbonize buildings we must electrify...



... heating and cooling



... and domestic hot water

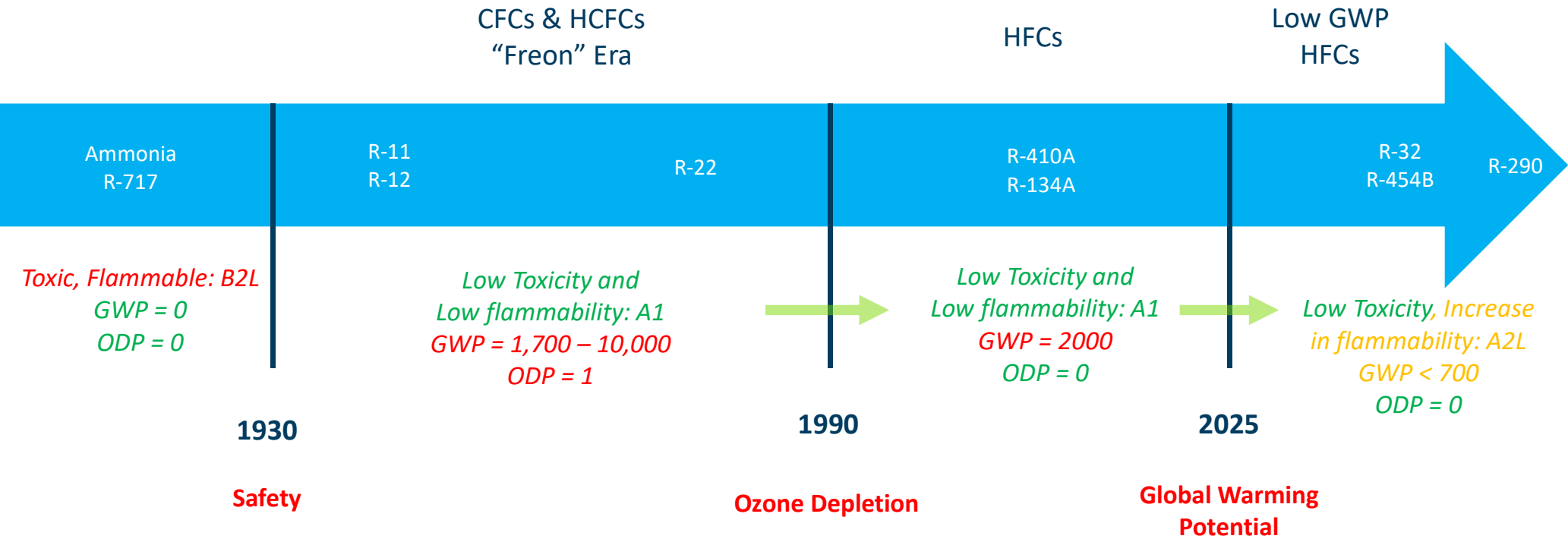
Source: <https://www.mechstudies.com/wp-content/uploads/2023/09/heat-pump-working-ingas-furnace-vs-heat-pump-difference.jpg>
<https://www.trccompanies.com/projects/heat-pump-water-heater-pilot-program/>

Which also means we need
refrigerants!



Source: MIT Science Policy Review.
<https://sciencepolicyreview.org/2020/08/institutions-and-governments-can-slow-climate-change-by-regulating-and-reducing-halocarbon-refrigerant-use/>

History of Refrigerants



Now what?

The Phase out is a success story:

- Implementation
- Alternative options



Panel Discussion

Part I

Regulatory Response and Design Impacts

20 mins

Part I: Q & A – 5 mins

Part II

Innovative HVAC Design Alternatives to Minimize Refrigerants

20 mins

Part II: Q & A – 5 mins

Panel Discussion

Panelists

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Panel Discussion

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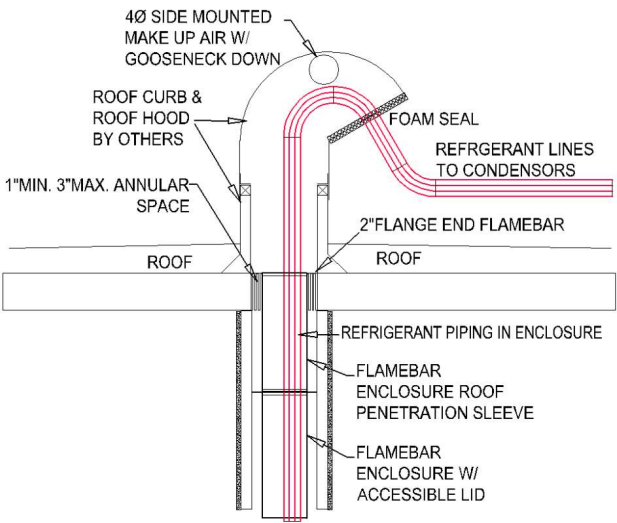


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Regulatory Response and Design Impacts

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- What are the impacts on the architectural design and HVAC design?
- Impacts on refrigerant leakage?



Ventilated Shafts



Retrofits



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Source: <https://www.conquest-firespray.com/wp-content/uploads/2024/05/A21-roof-1024x1024.png>

Regulatory Response and Design Impacts

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- What are the impacts on the architectural design and HVAC design?
- Impacts on refrigerant leakage?



Source: <https://drexel.edu/news/archive/2024/June/EPA-HFC-reduction-plasma>



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Regulatory Response and Design Impacts

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Q & A - 5
mins



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20 mins

Part I: Q &A – 5 mins

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Innovative HVAC Design Alternatives to Minimize Refrigerants

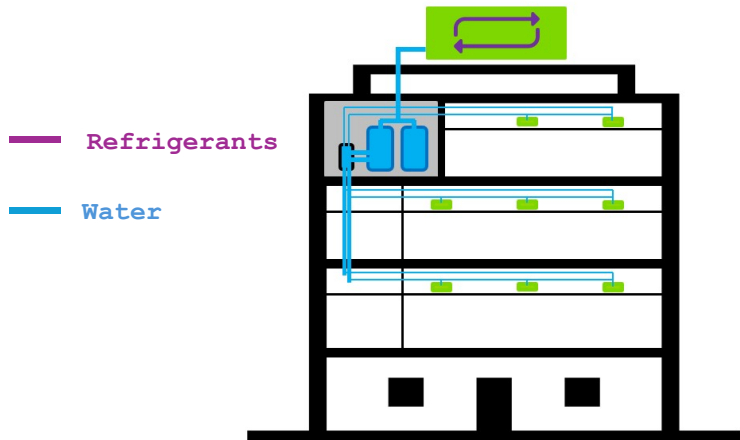
20 mins

Part II: Q & A – 5 mins

Innovative HVAC Design Alternatives to Minimize Refrigerants

Air to Water HP (future proof option)

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- Modular vs unitary
- 4 pipe system needed?
- Cost?
- ccHP chillers performance?

Source: DXS & HTS, JS Rancourt

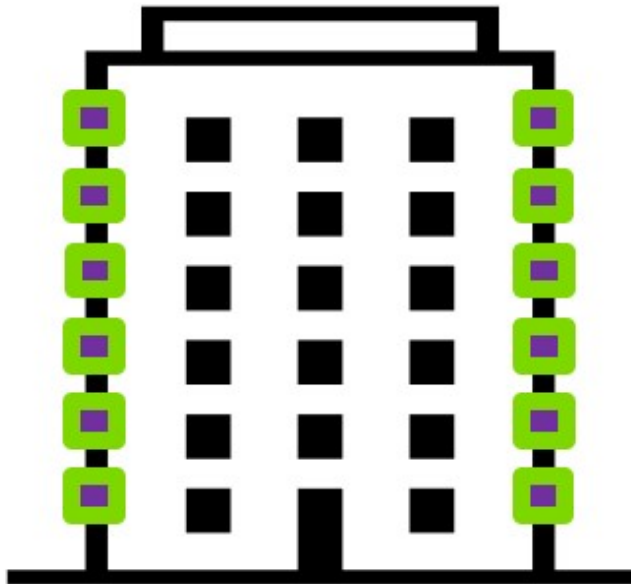


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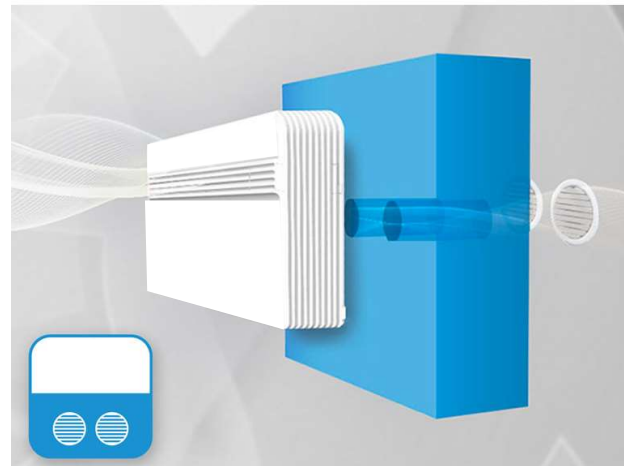
Innovative HVAC Design Alternatives to Minimize Refrigerants

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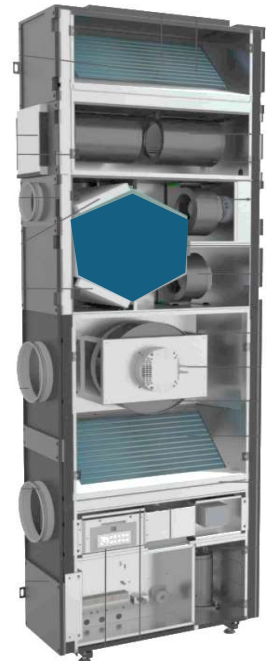
Package Terminal Heat Pump



Source: DXS & HTS, JS Rancourt



Source: manufacturer's website



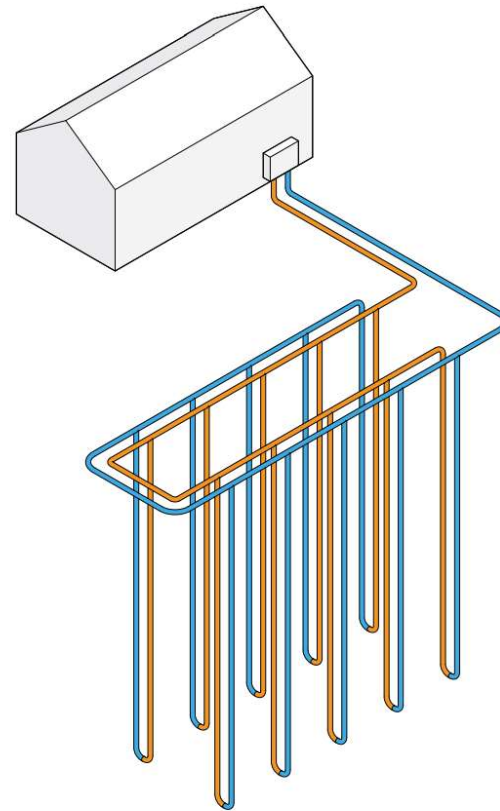
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What are other options?
Geothermal

- Eliminates refrigerant distribution
- Traditional system 'inside' the building
 - WSHP in apartments
- Longevity?
- With IRA lower first cost



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**Q & A - 5
mins**

Thank you!

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Glossary

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EPA: U.S. Environmental Protection Agency

GWP: global warming potential

ODP: Ozone depletion potential

HFCs: Hydrofluorocarbons

HCFCs: Hydrochlorofluorocarbons

CFCs: Chlorofluorocarbons

SNAP: Significant New Alternatives Policy
(SNAP) program

IMC: The International Mechanical Code