Where's ENERGY STAR metrics in the mix?
Hi - are you referring to the ENERGY STAR score? That can vary somewhat but we don't necessarily have ENERGY STAR scores for all the zero energy buildings in our database. But in general the scores we do have are quite high, often above 90.

Are there state and local policies to support the efforts for building electrification? 
Certainly. This policy is already in place in quite a few jurisdictions across the country and many more will be coming. Roughly a hundred cities and states have passed legislation, ordinances or codes banning fossil fuel combustion equipment in buildings, including Washington DC, New York City, Ithaca, New York; Brookline, Massachusetts; Chicago, Illinois, Berkeley, Los Angeles, Sacramento, San Francisco, Oakland and San Jose, California; and Washington State. Chicago is considering it as well: Chicago has passed electric-ready requirements. And Denver is considering similar measures. There are also federal energy efficiency tax incentives such as 179D and 45L that can help offset costs.

Do heat pumps work in very warm environments to provide air conditioning?
Yes - and in fact that is one driver for new heat pump installations happening now in several regions. For example in the Northwest, many older buildings don't have A/C, but as we see more extreme heat events there is MUCH more interest in A/C. It's significant enough that Seattle is no longer the least-air-conditioned big city in the US (rather, moving toward San Francisco).

What do they look like the water heaters heat pumps where to buy how much do they cost?
You can actually search for these on the web to see pictures, sizes, models available. It's a readily available product. Search the 120 gallon units for commercial, or for a centralized system try SandenCO2 or the Heat20 product. And as far as the cost, they usually cost more than a cheapo electric resistance water heater HOWEVER big rebates are often available and now big tax credits too via the IRA. When I installed a HPWH in my house the post-rebate cost for the water heater itself was about $400 (cheaper than any alternative, gas or electric!) and then the tax credit made it basically free. As you might expect, the question of "how much does it cost" is much harder to answer for built-up (custom engineered) large central water heating systems. The answer I gave above is for unitary HPWH.

GSHPs maintain higher efficiencies at lower OATs than ASHPs, and so have lower grid impacts than ASHPs. Are there efforts to further incentivize GSHPs over ASHPs, or encourage district level access to GSHPs? Or GS heat exchange utilities?
If I would have had more time to include 6-7 technologies, I would've included GSHPs. Glad you mentioned it. I really like this solution for larger commercial buildings, and with federal tax credits (which are SIGNIFICANT) are seeing cost-effective GSHPs in larger buildings. Incidentally, you can also tie a ground-source system to VRF; this is another good solution. The tax credit has been the primary effort to promote these, though several states have other incentives for GSHPs too. District Geo is the next obvious step; look at NYSERDA, Mass Save,
Building Decarb Coalition, and MWBDC who are all working on piloting and promoting district geo. These are the first systems of their kind in most places though; it's early going.

I analyzed using a DHW heat pump for my house. The heat pump takes about 12 hours to recover to the small heat pump compressor size. This somewhat matches building hot water usage, two large bursts per day. Electric resistance will kick in often unless set to heat pump mode only. Using off peak electric energy would further restrict the ability to recover. Without electric resistance for quicker recovery, there would be a shortage of hot water to meet our family's needs. Your thought?
@james - I have a family of 3 and a 50 gallon heat pump hot water heater in Massachusetts. We definitely have not run out of hot water, but I don't have teenagers yet... We'll ask Scott about recovery time, especially for the sizing for commercial systems.
Hi - these things are somewhat anecdotal. I have my own anecdote: family of 4, including 2 kids, and have a 65 gallon tank HPWH that I run in "heat pump only" mode (so, no electric resistance). Ran out of water 1x in 3 years, and it was on Thanksgiving with pretty unusual use due to high home occupancy.
Moving beyond the anecdotes, we are seeing that the HPWH do supply enough hot water (almost always in heat pump mode, rather than electric resistance) in nearly every case. Out of 32 studied homes I believe we have had folks run out of hot water maybe 2x, and it's mostly happening where the household probably should have been given a larger tank because their usage is higher than might be predicted by just "how many people live in your house."

Centralized Heat Pump systems - do they maintain 135 deg F within the storage? Can't remember what ASHRAE recommends for domestic water storage temps? Some energy savings by NOT storing, but circulating only 110 deg F water, right?
With these commercial HPWH systems you pretty much have to add storage. Or you won't be able to get the capacity needed. Glad you asked about temp. I ran out of time to point out the mixing valve in that diagram I showed at the end -- you definitely want to add a mixing valve to your system that allows you to have the hot water tank above the comfortable temperature (which is usually 125-130). That allows you to heat above 125 that in the tank, creating additional capacity.

How much do we need to rely on Hybrid VRF systems in cold climates when the building loads are heavily tilted toads heating?
The beauty of VRF systems is that they can optimize efficiency in cases where a building has simultaneous heating and cooling. This is very common in larger buildings: often the core zone requires cooling even when it's cold outside and the perimeter zones require heating. VRF systems are great at sharing heat (or cool) between those zones, which minimizes the need for the compressors and other equipment to run.
The biggest downside to VRF often has to do with refrigerants- there are lots of refrigerants and variable field installation practices can mean in some cases leakage rates can be pretty substantial. Hybrid VRF uses less refrigerant because it uses water loops in the building to distribute heating and cooling, requiring much less refrigerant and fewer field installed connections on the refrigerant lines.
Doesn't rebate based on size lead to oversizing?
We've been a little concerned with that on VRF, but we haven't seen strong evidence of it happening. The rebate isn't enough to afford to buy equipment you don't need. But it's something to keep an eye on in designing and operating rebate programs. It could, however within the NYS program the sizing ratio has to be within 90% to 120% of the peak load.

Most of the time, unitary HPWH are installed with larger tanks to maximize the amount of time the system spends in heat pump mode, rather than the much less-efficient resistance mode. For example, in my home, I had a 50 gallon electric resistance WH and installed a 65 gallon HPWH so I could use it in heat pump only mode.

Pasting in an answer of mine from another question:
Hi - these things are somewhat anecdotal. I have my own anecdote: family of 4, including 2 kids, and have a 65 gallon tank HPWH that I run in "heat pump only" mode (so, no electric resistance). Ran out of water 1x in 3 years, and it was on Thanksgiving with pretty unusual use due to high home occupancy.

BUT - we also have real-world results from our currently active field study on 120V HPWH water heaters. As you might imagine, 120V HPWH come with smaller electric supply - you can't run so many amps through the wire and plug at 120V as you can at 240V. So the electric resistance backup capability is much lower.

Moving beyond the anecdotes, we are seeing that the HPWH do supply enough hot water (almost always in heat pump mode, rather than electric resistance) in nearly every case. Out of 32 studied homes I believe we have had folks run out of hot water maybe 2x, and it's mostly happening where the household probably should have been given a larger tank because their usage is higher than might be predicted by just "how many people live in your house."

Heat recovery chillers are fantastic, but when operating at 42F chilled water and 130F hot water, the COP can be 3 or lower. A water cooled chiller can operate at a 6 COP and when combined with gas heating, it is often a lower cost than a heat recovery chiller.

Heat recovery chillers can be a game changer in buildings that have simultaneous heating and cooling - which happens ALL THE TIME in larger buildings like those that would have chiller plants! That can make their effective COP much, much higher than 3 because they are providing both heating and cooling