Recover Water from air using no electricity

Reducing Greenhouse emissions while increasing comfort.

XDOBS.COM LLC 1-800-658-8745

Reduce greenhouse emissions in California by over 4 billion pounds per year with less than a 10% market adoption.

We have invested several years working on solutions that reduce greenhouse emissions and have come up with some solutions that not only dramatically curtail greenhouse emissions but increase comfort and can create an economic boost in the process of deployment.

We specifically targeted areas where billions of pounds of carbon emissions can be rapidly eliminated without a corresponding reduction in comfort or quality of life. Large scale deployment of these systems could actually reverse the trend of increasing CO2 emissions in the USA.

This particular technology was invented for production of water from air without consuming any electricity and hence avoiding indirect emission of greenhouse gas during operation. We felt this is important because most water purification especially desalination which is rapidly growing lists electricity as the #1 or #2 operational expense and their electricity consumption indirectly releases millions of pounds of carbon every month.

There are several ways this technology can be used in green building concepts where it could reduce carbon emissions even further. The water based application of this technology is highly applicable in regions where global warming is likely to cause large scale disruption due to droughts and loss of fresh water such as Pacific and Caribbean islands but with an enriched humidity stream it can be successfully deployed into almost any climate and will work in all seasons.

The core system uses black body radiant cooling and optimized air flow to chill air up to 15F below ambient conditions and it does this with almost no moving parts and no external energy or fuel requirements. Radiant cooling has been used to cool space craft for decades and more recently has been funded by the DOE to for space cooling. Our proprietary design allows us to provide a higher degree of cooling in a broader range of conditions which allows our dew condensation system to operate in a broader range of conditions as well.

I am very interested in ideas about how we might deploy tests of these ideas in the micro scales while producing test data that could be widely published. . Visibility is a key element in the adoption of any and we rely on those who are passionate about the global warming issue.

Reduction of greenhouse gas emissions

Net carbon reduction water from air

Most water purification techniques especially desalination consume large amounts of electricity which indirectly produces large amounts of greenhouse gas. The approach shown here does the exact opposite. It does it not consume the electricity and also encourages installation of large amounts of greenhouse where the growing plants sequester carbon from the air and binds it to a solid form which in large volumes would help reverse greenhouse gas induced global warming.

Air conditioning with 90% less electricity

The waste product from the night radiant A2WH system is chilled air. In many seasons the chilled air is colder than the comfort level for air conditioning. This means that we can use the excess chilled air to cool buried tanks of water which can be used for cooling during the day. This is best used in construction where radiant cooling loops can be installed in the ceiling but can also be used with a water to air heat exchangers.

The chilled water can be used as a leg in a geothermal loop to reduce the energy required by the geothermal heat pump. Whenever the water is colder than the surrounding ground a simple redirection valve could be used which redirects the loop from it's standard ground loop through the chilled water. This would dramatically reduce the amount of energy needed for the heat pump system since the fluid returning from the loop would be much colder than the ambient ground loop.

The ground loop could be used to pre-cool the loop fluid prior to final chilling in the water which would increase the total efficiency of the system. This is similar to how some industrial users use off peak energy to chill a reservoirs that are used as a cold source during the day when energy prices are higher. Air conditioning consumes massive amounts of electricity and each KWh of electricity consumed releases between 0.4 to 0.6 pounds of carbon to the atmosphere. (State of California average).

Initial research indicates that we can eliminate up to 90% of the energy invested in cooling depending on climate which according to my calculations could reduce carbon emissions in California by over 4 billion pounds per year with only a 10% market adoption.

When used for large scale cooling this system would likely be roof mounted and would create a zone where sunlight strikes the collectors which are naturally cooled using convection and an air gap between them and the roof. This results in less heat energy reaching the outer roofing layer and hence less solar gain through the roofing insulation which further reduces the amount of net cooling energy needed. It would also extend the life of the roofing material since high summer heats is one of the key ingredients for roofing degradation.

Reduction of greenhouse gas emissions

Eliminate electricity demands for evening cooling of homes and small commercial buildings

Our primary waste product chilled air can be directly routed through buildings and since it is dehumidified higher temperatures can be comfortably tolerated which allows the thermostat set points to be raised.

Air from the warm air return would be ducted into our input and our output would be ducted back into the warm air return after it has been pre-chilled and dehumidified. In many instances the air conditioning compressor will not even need to activate since the air will be pre-chilled a sufficient amount before it returns to the HVAC system.

Even when the compressor does need to activate it will not need to provide as many BTU of cooling and since the air has been dehumidified the compressor will not need to work as hard to deliver the desired degree of chilling.

Our system produces maximum chilling at night when the cooling system is not working as hard anyway but in buildings such as homes which are predominantly occupied at night this would coincide with their desired usage pattern and there are multiple options for storing the cold energy such that it can be used the next day.

With reasonable amount of storage a well insulated home should be able to coast through the entire next day while commercial buildings with higher internal heat loads would coast for part of the day.

Eliminate demand related electricity grid failures

In commercial buildings a intelligent controller could be used which would allow electrical cooling to be used until the peak afternoon times when our stored cold could be activated which would dramatically reduce the buildings power demands during the 3:00 to 5:00 pm peak demand times. Such a strategy would be a cheap way to eliminate demand related grid failures while also reducing the buildings total energy consumption and indirect greenhouse gas emissions.

Eliminate carbon emissions from space heating

A minor modification of the moisture enriched greenhouse system would allow additional storage tanks of water which could easily be heated to over 100F on most sunny days. These tanks of heated water could be used for space heating especially with floor mounted radiant heat systems.

In addition the heated air which is exhausted from the greenhouse could be routed through the home to provide forced air ventilation prior to being routed into the condensation systems which would pretty much eliminate the need to burn fuel for heating during the day while the stored heat would eliminate the need to heat for a majority of the night.

Reduction of greenhouse gas emissions

When the heat is not needed the hot humid air can be directly routed to the condensation systems. It appears that cement septic tanks are almost ideal for this kind of storage provided they are insulated with at least 1" of polyurethane foam on all 6 sides before back fill.

Most heating in the USA is done with natural gas and while natural gas burns cleaner than many fuels it still produces substantial carbon during the burning process. I have not been able to find a validated number but have read numbers of 0.1 to 0.5 pounds of carbon per KWh of heat energy delivered.

By reducing the amount natural gas consumed for space heating we reduce carbon emission quite possibly by billions of pounds per year.

There is a special tweak available for our design which maximizes daytime heating inside the condensers which could which can be used to maximize heat production for use at night when it is most often needed for space heating. The use of the heat optimized units does not impair their night time efficiency but it does preclude shaded daytime use.

Recover Water from air anywhere in the world, In any climate and during any season.

Operations using an enhanced humidity stream

The XDOBS Night radiant condensation A2WH system can recover safe water even in the most hostile conditions when a enriched humidity stream is provided. This can easily be provided by a greenhouse, solar trench, industrial waste heat and many other sources. The source water for the humidity can be otherwise unusable such as saline ground water, salt water even water that is contaminated with arsenic and lead.

When not provided with humidity enriched air the system is limited to operating in conditions where the night time dew point is within 6F to 10F of the nighttime temperatures however the enriched humidity stream can raise the dew point quite often to above ambient which allows the system to operate in a much broader range of conditions.

Using a greenhouse enriched humidity stream would be an ideal deployment of for our night radiant Water from Air recovery system A2WH. An enriched humidity stream would allow it to be used anywhere in the in just about any climate and during any season. We are confident that the Night radiant system will work well in most climates when augmented with an enriched moisture stream. We always recommend local testing before planning a large installation. Enriched moisture steams can

allow minor modifications to the design and materials which may allow increased production at lower costs especially for large scale facilities. The major hurtle in this type of deployment is that greenhouses produce maximum evaporation during the day while our system is optimized for maximum operation during the night. There are several options as explained below that offset this mismatch and make the combination system nearly ideal

The XDOBS night radiant A2WH system depends on cooling air to the dew point. Any process which increases the air's humidity also raises the dew point increases the effectiveness of the system since it can operate with less cooling energy. More humid air contains more water per cubic foot which means we can produce more water while chilling less air which increases total system production.

We are willing to collaborate on articles which highlight various aspects of how this technology can be used to dramatically reduce greenhouse emissions.

Thanks, Joseph Ellsworth

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