



# ALBERT/CRCES<sup>TM</sup>

- Waste Heat Acquisition & Storage  
Technology Overview

[www.solutia-tech.com](http://www.solutia-tech.com)

# Technology – Industrial Heat Pump

## ALBERT (Acquisition Latent BTU Energy Retention Technology)

The ALBERT process is an improved industrial heat pump that yields the ability to utilize lower temperature waste heat sources. Most low temperature industrial waste heat is expelled requiring significant cost and infrastructure. Albert supports:

01

Standard heat pumps improve efficiency up to 500%

02

ALBERT IP improves efficiencies above competition

03

ALBERT is 100% US/local materials and labor

04

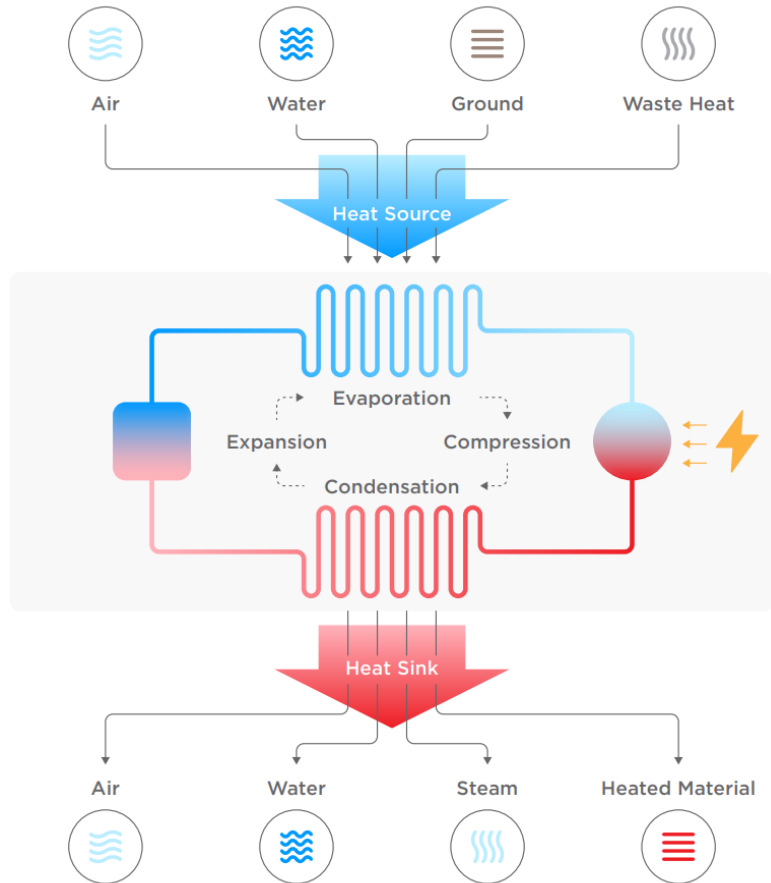
Tesla Master Plan 3 forecast supports heat pumps

05

Utilization of waste heat sources that require expense to expel the heat

06

ALBERT is made from common materials



# Technology

## Standard Heat Pumps

- Heat pumps move heat from source to another via the compression/expansion of an intermediate refrigerant.
- Air source heat pumps can deliver 2.8 units of heat per unit of energy consumed.
- An (HSPF) of 9.5 BTU/Wh is the typical efficiency rating for heat pumps today.
- Gas furnaces have an annual fuel utilization efficiency (AFUE) of ~90%.
- Heat pumps use ~3x less energy than gas furnaces (2.8/0.9).

# Technology – Thermal Energy Storage

## CRCES™ (Carbon Reduction Clean Energy Storage)

The second technology supported by SolutiaTech is CRCES™ (Carbon Reduction Clean Energy Storage). This is the battery of the overall system to store the energy that has been acquired from the heat source. Although, CRCES™ is thermal energy storage the real **efficiency** in the storage process occurs because of phase change in multi-refrigerant media. CRCES™ supports:

01

The first heat pump IP with a loop added for energy storage

02

Low-cost LDES (Long Duration Energy Storage)

03

Supports thermal storage under Tesla Master Plan 3

04

No cyclical limitations

05

Phase Change Storage, a type of thermal storage with high-energy density

06

100% US materials and labor

# Technology

CRCEST<sup>TM</sup> Greater Energy Density



**TES**

## Thermal Energy Storage

### Current Industry Technology

Thermal Energy Storage (TES) is a proven peaking energy storage system that has been deployed globally for decades.

By maintaining a stratified environment of warm and cold water, each can be drawn from the same system when needed for cooling stored energy.

TES Tanks can be optimized with more efficient exchangers or operations but remain a basic form of storing Sensible Heat.

1  
Tank

1,100,000 US gal | Sensible heat storage tank | **201** MMBTUs



**CRCEST<sup>TM</sup>**

## Carbon Reduction Clean Energy Storage

### New Industry Technology

Carbon Reduction Clean Energy Storage (CRCEST<sup>TM</sup>) performs in a similar manner to thermal energy storage systems by maintaining an environment of liquid-based energy storage.

The difference in these systems is that CRCEST<sup>TM</sup> works in conjunction with Latent Heat and stores :

**19 times the energy vs. a TES Tank.**

1  
Tank

1,100,000 US gal | Latent heat storage tank | **3,889** MMBTUs