

## Technical system specifications

Nostromo's IceBrick® is a clean, safe and cost-effective water-based Thermal Energy Storage system. Commercial cooling consumes up to 70% of the peak electric load of commercial and industrial buildings.

Nostromo's energy storage system lowers the building's carbon footprint, reduces energy costs, and enhances resilience. It's modular and compact, making it ideal for retrofit.

### THE ICEBRICK® SYSTEM IN A NUTSHELL



Patented water-based Thermal Energy Storage (TES) cells store energy during off-peak hours/surplus solar then use it for cooling during peak hours. The system is environmentally friendly and shows negligible degradation over 20 years.



Minimal Real Estate Footprint. The system's energy density per square foot is significantly higher than other TES technologies and can be installed on most rooftops in basements, or as integral elements of the architecture



Designed for both new builds and retrofits.



High performance. Nostromo's system uses a novel encapsulated ice technology with unprecedented round-trip efficiency (>85%). It can discharge 94% of the stored energy within 4 hours at a stable rate.



Cloud Based management & Optimization. Full transparency of techno-economical data.



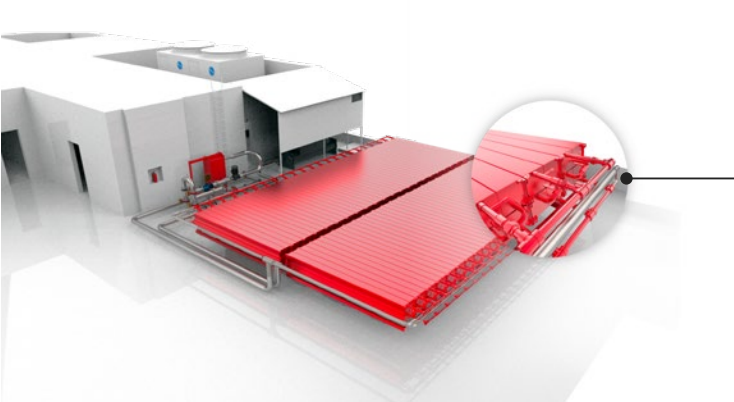
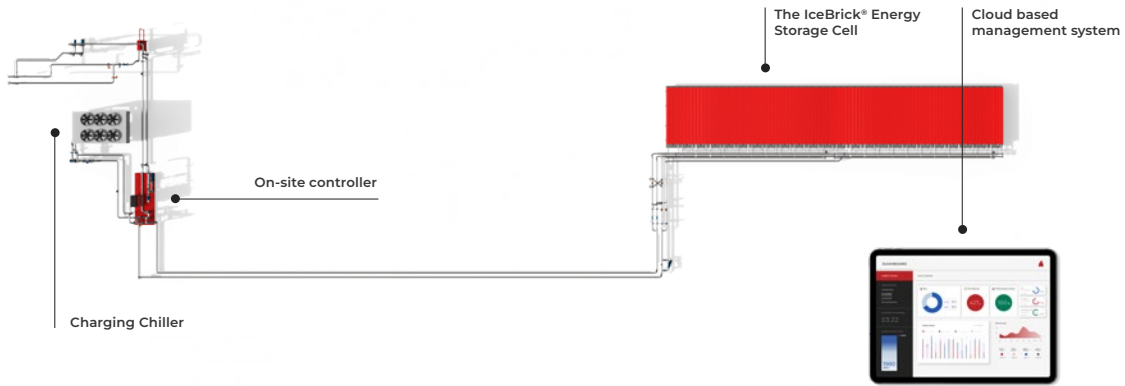
Superior Maintenance. Encapsulated ice technology minimizes the probability of failures.



Fully recyclable, non-toxic, non-flammable.



# SYSTEM OVERVIEW



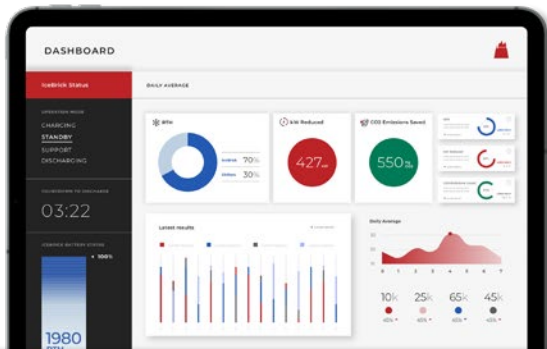
## The IceBrick® Energy Storage Cell

200 to 10,000 ton refrigeration hour of clean cooling energy, whenever you need it.

## On-site controller

Pre-fabricated skid that manages the system operation.

The heart of the IceBrick® is the local control system, responsible for the system's energy and flow management, communication, sensing and metering. It operates the charge and discharge cycles of the IceBrick® based on a plan provided by the cloud-based energy storage management platform and sends energy data back to the cloud-based management system.



## Cloud based management system

Advanced cloud-based energy storage management platform, for monitoring and optimizing performance, analytics and ESG reporting



# OPERATION MODES

All modes are preconfigured in Nostromo's control system. They are customizable.

## Charge

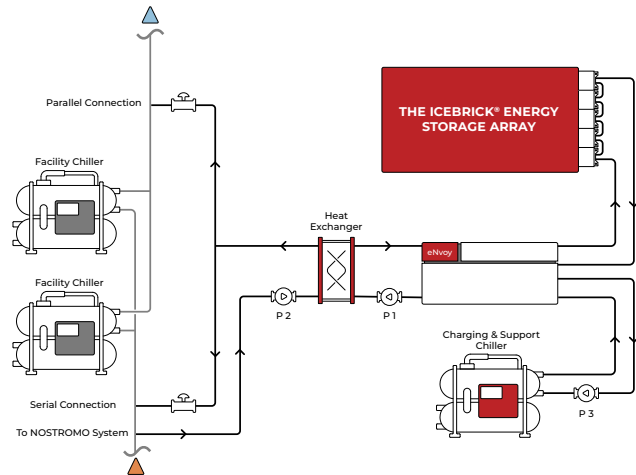
Nostromo's system is charged taking into account the optimal charging chiller design working conditions.

## Discharge

Nostromo's system can discharge at a configurable rate between 2.5 hours to 10 hours or more.

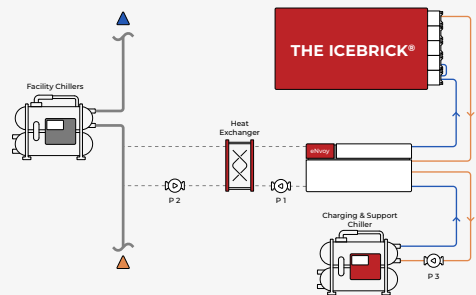
## Support

Nostromo's system enables using the charging chiller as a support in comfort cooling temperatures with or without the TES



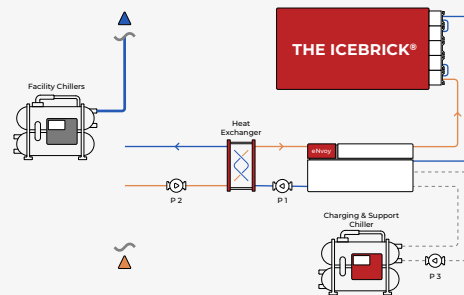
## Charge Mode

Pump P3 - Stable flow rate according to charging chiller design condition



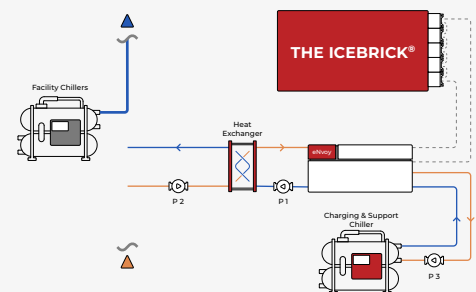
## Discharge Mode

Pump P1 & P2 - Stable flow rate according to discharge load while maintaining 9°F ΔT  
Valve V1 - Temp regulation to maintain desired supply temperatures



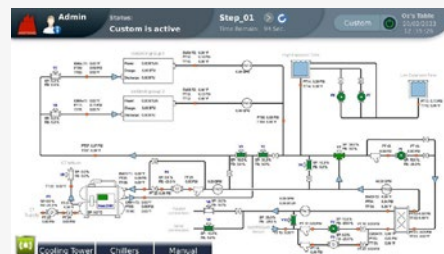
## Chiller support Mode

Pump P3 & P2 - Stable flow rate according to charging (support) chiller design condition



## On-site independent control panel

Allows operation of the system. It is fully programmable, Using MQTT cyber-security communication protocol.



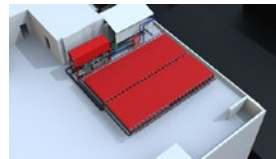
# A MODULAR SYSTEM

## Modular and Compact Design

Nostromo IceBrick™ is compact and can be positioned in a variety of configurations, utilizing unused spaces or becoming part of the landscape.

## Minimal Real Estate Footprint

Nostromo's system can be stacked and has unprecedented usable energy per sq ft.



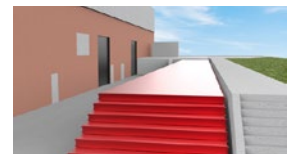
Rooftop



Surrounding a parking structure



Benches as part of the landscape



Bleachers

## Nostromo System Specifications

### Typical Configuration Measurements



Stack



Wall



Shallow (Roof)

	Stack	Wall	Shallow (Roof)
<b>Formation</b>	Up to 12 High	1 or 2 Wide along walls	2 High, Spread on Roof
<b>Area in example</b>	96 Bricks 13.8' x 13' = 178 sqft	24 Bricks 13.8' x 3.3' = 45 sqft	20 Bricks 13.8' x 16.4' = 224 sqft
<b>Energy Density</b>	50 ton-h / sqft	5.3 ton-h / sqft 17.4 ton-h / foot wall Length	0.9 ton-h / sqft
<b>Other Options</b>	Maximum 12 High according to room size	1 or 2 Brick Wide up to 12 high along walls	1-3 Brick High according to roof or support frame loading

## Measurements & Specifications of one IceBrick® unit

	Imperial	Metric
<b>Dimensions</b>	14' x 20" x 10"	(420 x 50 x 25cm)
<b>Capacity</b>	10 Ton-Hrs. (~8-12.5 kWh- equivalent)	
<b>Weight</b>	1720 lbs	780 kg
<b>Water volume (in capsules)</b>	1720 lbs	780 kg
<b>Number of capsules</b>	192 capsules per IceBrick	
<b>Inlet/Outlet connecting tubes</b>	1.5"	
<b>Solution</b>	25%-30% Ethylene / Propylene Glycol   70-75% water	

## Measurements & Specifications of one IceBrick® unit

<b>Min Floor Loading (1 High) - Roof</b>	75 lb / sq ft	375 kg / m <sup>2</sup>
<b>Max Floor Loading (12 high)-Ground</b>	900 lb / sq ft	4,500 kg / m <sup>2</sup>
<b>Min Energy Density (1 High)</b>	0.44 Ton / sq ft	5 Ton / m <sup>2</sup>
<b>Max Energy Density (12 High)</b>	5.3 Ton / sq ft	60 Ton / m <sup>2</sup>

## Operating Envelope

<b>Lowest charging temperature</b>	26-28 °F	-2 to -4 °C
<b>Discharge temperature</b>	32 - 41 °F	0 - 5 °C
<b>Max Flow Rate per IceBrick unit</b>	21.1 GPM	4.8m <sup>3</sup> /h
<b>Pressure drop</b>	7 psi	0.5 bar

## Performance

<b>Round trip efficiency</b>	85% - 100% Depends on a variety of factors
<b>Depth of discharge</b>	94% at 4 hour discharge
<b>Maximum Discharge Rate</b>	3 Tons of stable power rate at 50°F (10°C) inlet & max outlet temp. 41°F (5°C)
<b>Discharge Time</b>	2.5 hours - 10 hours. Short to Long Duration possible.

