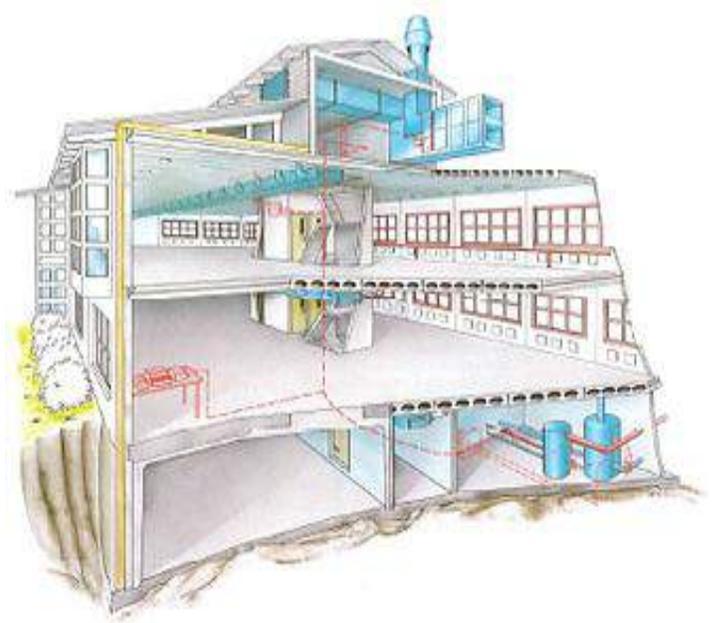


Innovation In HVAC + Design

ECO-STRUCTURES INTERNATIONAL



TermoDeck: Design Buildings Into Batteries

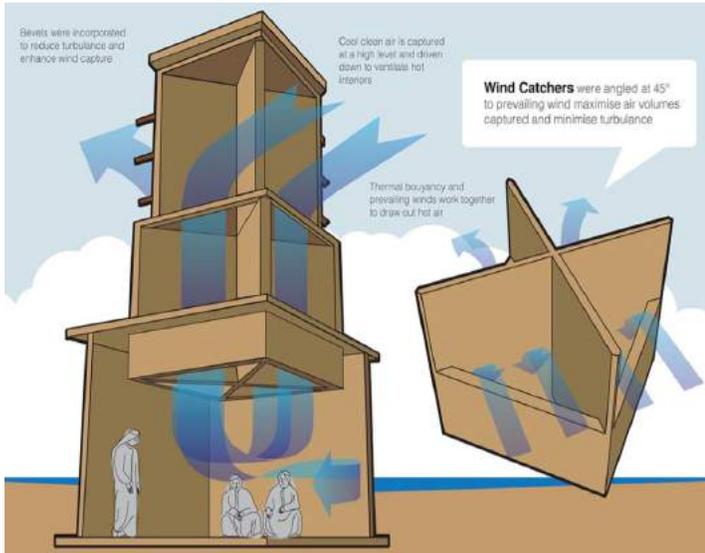
Technology for building structures capable of storing energy, radiating coolth and providing ventilation has arrived: A low-cost, low-energy, award-winning, superior indoor environment quality, and low carbon solution using local materials and labour, and proven in both extreme cold and hot environments.

TermoDeck cuts installed AC capacity by ~50%; cuts connected electrical load by 33%; cuts energy consumption and HVAC-O&M by 30-50+%.

Lower CapEx, Lower OpEx and Superior Indoor Environment.

Harness the inherent thermal properties of your buildings.

Wisdom from the past...



...to protect our future.



TermoDeck

Proven in 400+ projects

Thermal Energy Storage: Energy storage is easily integrated into voids within a structure's concrete slabs. System can use both precast hollowcore slabs and in-situ concrete slabs, and with standard products and methods of construction. This Swedish technological adaptation allows for an HVAC system with building-integrated radiant cooling, ventilation and individual room control.

Lowers Costs

- Cuts installed AC Capacity ~50% (lowers CapEx ~3-7%)
- Cuts electricity consumption ~25-35+% (lowers OpEx)
- Cuts HVAC-related O&M >50+%
- Less concrete, fewer false ceilings, less ductwork, lower height

Low Energy

- Can slash peak power consumption 90%
- Enables Net-Zero solar power off-grid structures (Optimized DSM)
- Energy stored offsets amount of energy used to make the concrete
- Meet sustainability targets, reduces CO₂ and GHGs ~80%

Future Proof

- Adapts to any new equipment technologies
- Makes Renewables more viable
- Improves profitability and ROI

Healthy Indoors

- Radiant cooling, stable temperatures, no drafts or cold blasts, quiet operation, superior ventilation
- No in-room air re-circulation, highest fresh air possible indoors.
- No risk of mold, bacteria or fungus.

Proven Technology.



Project:
**GEMS Dubai
American
Academy**

**TermoDeck
cut total
connected
load: 7.4 MW
→ 4.9 MW**

Project:
**24 North
Jeddah
Gate**

**>50%
reduction in
active energy
needed for
cooling**



Proven Savings.



Project: Botswana Innovation Hub



Structural system used both hollowcore slabs (produced by us on-site) and embedded metal ducts within in-situ concrete

Reduced heating and cooling load
>40%



Next Generation HVAC

Building in harmony with nature

Global energy needs are projected to rise 30% by 2040 – that’s adding another China and India to today’s global demand. Buildings are the largest energy consumers, and in the GCC approximately 70% of power is used purely for air-conditioning. As costs to supply photovoltaic (PV) and concentrated solar power (CSP) decrease, localized storage solutions help increase their viability, by overcoming the limitations of intermittent supply and efficiency plateaus.

Across the board, experts agree that thermal energy storage systems decrease the levelized cost of energy, increasing reliability of renewable energy (e.g. solar) and making it more economical. Lack of awareness of the availability and efficacy of storage technologies, and high perceived costs are the only barriers to the wide-scale application of air-based building integrated

thermal energy storage, known commercially as the TermoDeck system.

TermoDeck is the only thermal energy storage HVAC system that relies exclusively on materials that are inexpensive, available in large quantity, and thermally and chemically stable.

TermoDeck projects have achieved some of the highest LEED, BREAAAM and Passivehaus certifications, and the system claimed the WGBC 2018 MENA Indoor Air Quality Award for its outstanding indoor environment, as well as two of the prestigious 2018 Climate Control Awards for the both the building envelope/structure and air movement/ventilation/Indoor Environment.

Over 20 GCC projects have each achieved a reduction of 50+% in installed AC capacity, reducing the total connected electrical load 33% and resulting in a 25-50+% reduction in recurring HVAC-related costs.

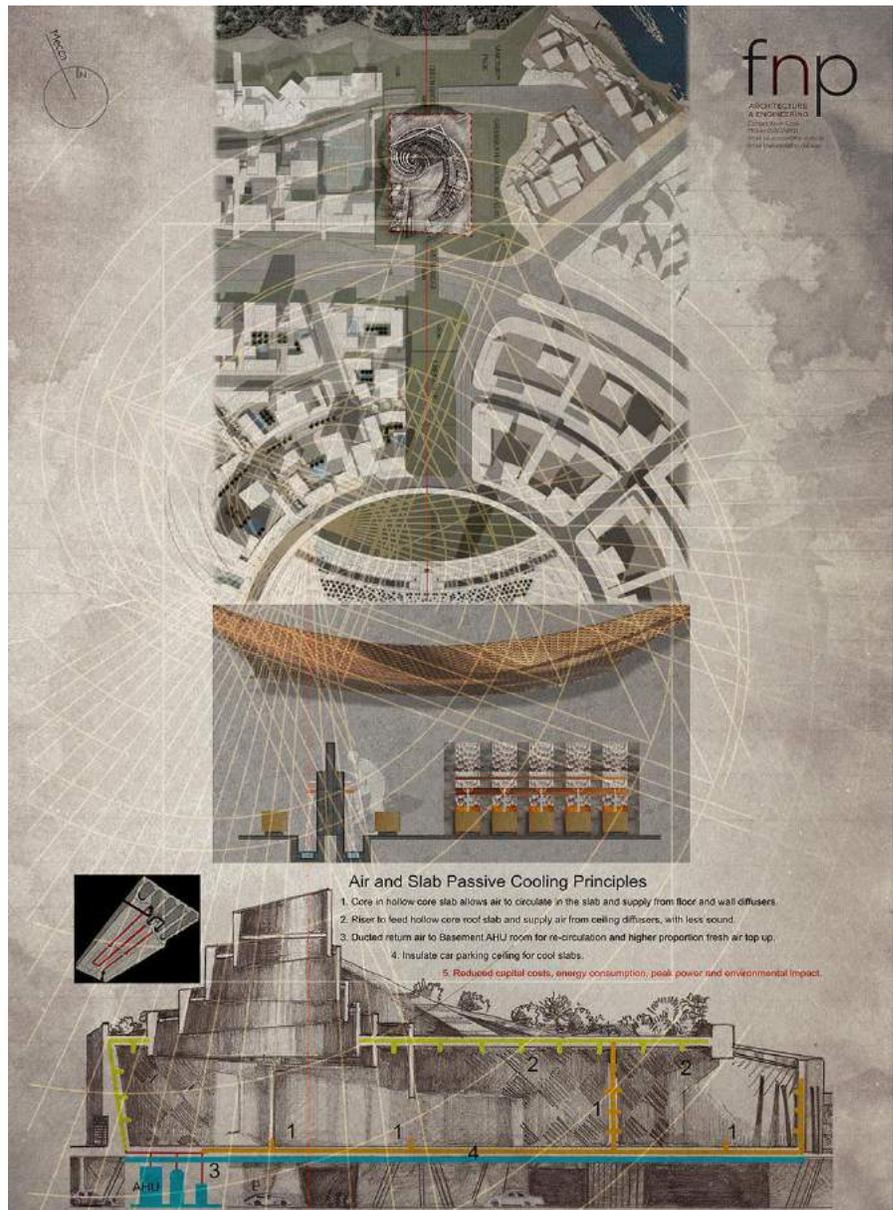
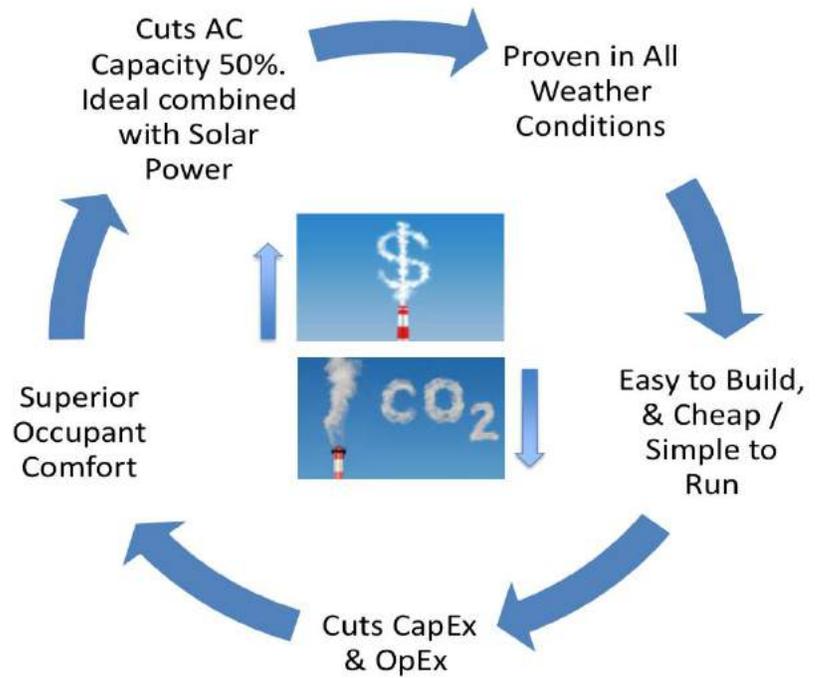
+ Flexible Design Technology

The TernoDeck system is different from conventional technologies because it integrates the HVAC system into the heavy concrete structure of a building. The traditional steel supply air ductwork is replaced by the voids within hollowcore or in-situ concrete slabs.

TernoDeck is an innovative design method that uses the building's structural mass to regulate internal temperatures for a wide spectrum of building types.

The effectiveness of a building's thermal mass is enhanced by passing supply-air through the slab, before it enters into the occupied spaces. The slabs work as heat exchangers between the supply-air and the rooms, so the difference in temperature between air entering spaces, and in the slabs that act as ducts, is minimal. This prevents cold blasts of air and all but eliminates the risk of condensation and other causes of sick building syndrome.

TernoDeck provides the most comfortable HVAC system at no extra cost to developers and tenants.



Globally Certified:



Superior Comfort. Low Cost. Low Carbon.



Elizabeth Fry Building

PROBE: “The Elizabeth Fry Building stands out in achieving exceptional conditions across a wide variety of key criteria. On overall comfort, winter and summer air quality and lighting, the **occupancy scores are the highest** in the Building Use Studies (BUS) dataset: high air quality scores and good summer freshness at EFry... the overall score for comfort is exceptional...”

“...DETR report no.106 on the Elizabeth Fry Building confirmed that the building was **20% cheaper to build** [with TermoDeck] than a [conventionally] air conditioned building.”



Innovate Green Building

Awarded the highest ever BREAAAM rating, only surpassed by one other building a two years ago.

Relying on TermoDeck + PV, Innovate produces just 22kg of CO₂/m² translating to roughly **80% less carbon** than a conventional model office building.



Circulated cooled supply air (or cold night air) cools slabs and dissipates surplus heat that was stored in the slab during the day.



Slabs cooled overnight absorb energy during hot days. Cooled supply air passes through slabs providing cooling and ventilation. Surplus energy is stored.



GCC Selected Projects

TermoDeck has completed residential, commercial, retail and mixed-use, hospitality, health and educational projects across the GCC.



Gulf Agency Company Headquarters (Jebel Ali, U.A.E.)

Original AC Design: 90 TR

TermoDeck Design: 40 TR

Client: "Very simple installation. Low Up Front Costs. Reduced Operating Cost. Speedy Construction. Silent HVAC. Even Temperatures & Fresh Air"



LuLu Hypermarket (Muscat, Oman)

Original AC Design: 1,020 TR (+340 standby)

TermoDeck Design: 510 TR (+170 standby)

Client: "Until now, we have not required the standby chiller to be started up, even for maintenance or additional capacity requirements... due to smaller AC plant, we are saving approx. 35% on the electric charges and reduced maintenance"



Gulf Centre (Jeddah, Saudi Arabia)

Original AC Design: 2, 200 TR (+550 standby)

TermoDeck Design: 750 TR (+500 standby)

>60% reduction in AC capacity. Standby chillers never used. Building initially designed to be 6 floors (26,400m²) was converted to 7 floors (30,700 m²) providing an extra floor with 16% more lettable space, within the same height limitation owing to the reduction in false ceilings.



Lotus Centre (Jeddah, Saudi Arabia)

Original AC Design: 180 TR

TermoDeck Design: 76 TR

The building achieved a peak load reduction of approximately 90%.

TermoDeck: HVAC With No Compromises

Lower Construction Cost

50% Reduced Installed AC Capacity
33% Reduced Electrical Load
Reduced Overall Building Height

Lower Operating Cost

50+% Reduced HVAC O&M
33% Reduced Electricity Consumption

Superior Indoor Environment

Stable Temperatures, Quiet, No Drafts
Higher Fresh Air Component (40-60+%)
No Bacteria, Mold or Fungus

A Healthier World for an Indoor Generation

IAQ Test: **97% Lower**
Bacteria Mold and Fungus

IAQ Test: **69% Lower**
Respirable Suspended Particulate Matter
(RSPM PM10)

Dubai Municipality Green Building Code 401.07



#TermoDeck

#FutureProof



**ECO-STRUCTURES
INTERNATIONAL**

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