BEYOND EFFICIENCY is a new paradigm for buildings in the tropics - based upon new technologies and integrative design. Radically rethinking / reassembling / redesigning buildings as systems offers new pathways of increased environmental performance and value creation at lower cost, while providing more comfort.

**Central Air Ducts**

In conventional air conditioning systems cooling is provided by pumping chilled air directly into the rooms. Because of the low heat capacity of air, huge volumes of air are needed, much more than is necessary for fresh air supply. Large ducts need to be installed above suspended ceilings to move huge volumes of air directly into the rooms. Because of the low heat capacity of air, chilled air is pushed out on the lee side, reducing needed fan power. Space cooling is supplied by very efficient high temperature cooling systems (higher COP). Central technical rooms and towers become obsolete as the systems are instead integrated into façade and floor.

**Spatially Demanding M&E Systems**

In conventional systems, M&E systems are not integrated into façade and floor. Instead they are integrated into façade and floor. Instead they are located in mechanical rooms, requiring substantial structural loads and consequently, all materials and construction costs associated with these elements.

**Energy Performance: 3 X Better**

The vertical and horizontal integration of the technical systems into the construction reduces the building volume by 33%, while providing the same useful floor space. This not only reduces the conditioned volume but also reduces the conditioned volume but also reduces the amount of equipment and space needed to move the conditioned air from the central air-handling units and chillers and back. The new pathways of new pathways of increased environmental performance and value creation at lower cost, while providing more comfort.

**Centralisation, Decentralisation, Miniatrurisation and System Integration**

Centralised systems require large ducts to move large volumes of air, which are expensive to install and maintain. Decentralised systems, on the other hand, use smaller ducts and can be integrated into façade and floor, reducing costs and improving performance. Miniatrurisation refers to the compact design of equipment and systems, reducing their size and improving their efficiency. System integration means that different systems are combined into a single, more efficient system. This results in lower costs, less material, and less volume, while providing better performance.

**Heat Rejection: More Sweat**

Chillers need less electricity to run if they can get rid of the heat at lower temperatures (higher COP). The standard way is with split type air conditioning units, commonly found in buildings. A much better solution is the use of large cooling towers, which are part of the cooling water evaporation - with the same effect that sweat has on our skin. We propose a plug-and-play Heat Bus that moves heat from the decentralised chillers to the central cooling tower. The cooling towers are shifted from the outside of the building and can be integrated into the façade.

**Performance: COP**

The efficiency of the cooling system is evaluated as COP - Coefficient of Performance. This measure expresses how many units of cooling are provided per unit of electricity input. COP values of 3 are commonly found in today’s buildings. Going Beyond Efficiency creates new pathways of increased environmental performance and value creation at lower cost, while providing more comfort.