

4C – RENEWABLE ENERGY AND MICROGRIDS

CHICAGO LAKESIDE DEVELOPMENT



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An aerial architectural rendering of the Chicago Lakeside Development project. The image shows a large, modern urban development situated along the Chicago Lakefront. The development features a mix of high-rise residential and commercial buildings, green spaces, and a large marina with numerous sailboats. A prominent bridge or walkway runs along the water's edge, and a large, curved green area is visible in the foreground. The background shows the city skyline and the lake.

Centered around a design for living differently. Lakeside's vision for the nearly 600-acre site includes plans for a connected and accessible community, next generation infrastructure, innovative architecture and lakefront access, all surrounded by a vibrant mix of residential, retail and commercial space, a new high school and a 1,500 slip marina.

An aerial architectural rendering of a coastal city. The city is built on a peninsula or coastal strip, with a dense grid of white, block-like buildings of varying heights. A prominent red line, likely representing a transit or rail system, runs diagonally through the city. The city is bordered by a body of water on the right and bottom. In the water, there are several offshore wind turbines. The background shows a vast, flat landscape, possibly agricultural or undeveloped land, under a clear sky.

INITIATIVE FOR INNOVATIVE LIVING AND NEXT GENERATION INFRASTRUCTURE

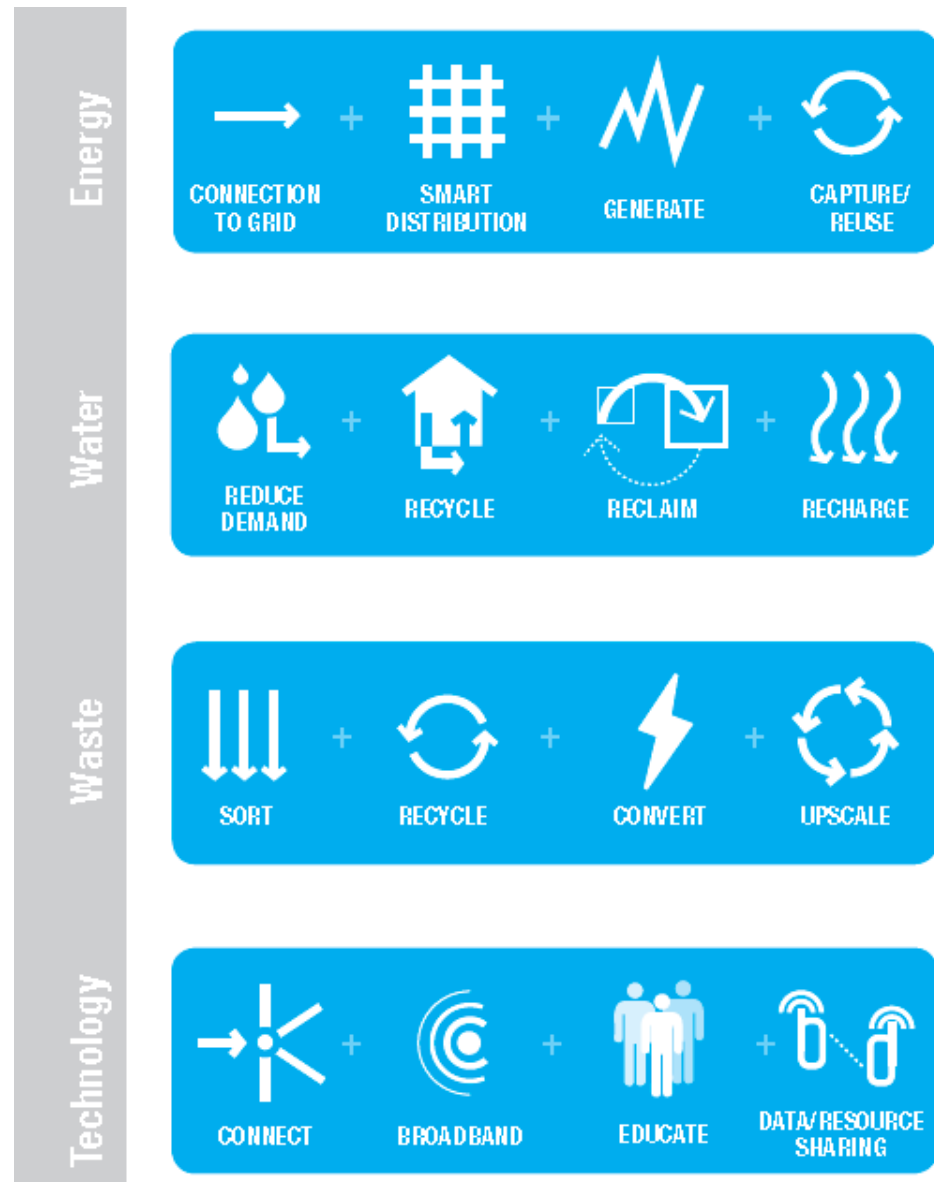
USS - US STEEL



NEXT GENERATION OF INFRASTRUCTURE

- Energy
 - Lakeside can build an innovative neighborhood utility approach to serve as a resource-efficient and cost-effective way to deliver clean energy for the community
- Waste
- Water
- Technology (IT etc)
- Transportation

RAMBOLL



MAIN ENERGY STRATEGY

Efficient use

- Green code
- Smart grid

Local renewable energy production

- Wind
- Biomass
- Solar
- Ground source cooling...

Future proof

- Adaptive to future technologies
- Flexibility to shift between fuel sources

THE SMART GRID STRATEGY – LIVEABLE CITY ENERGY CONCEPT

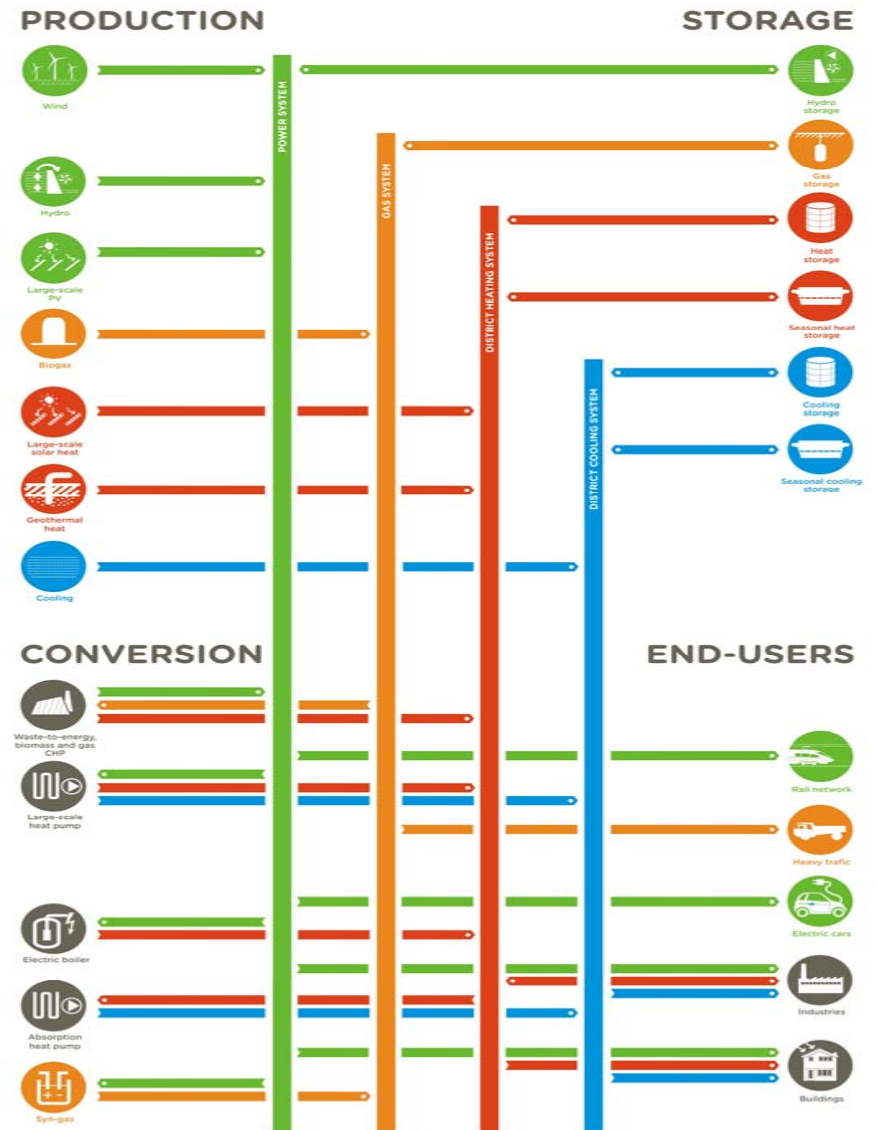
District Heating & Cooling is a vital part of the smart grid energy system

District energy offers the most affordable, clean, discrete and future proof energy supply.

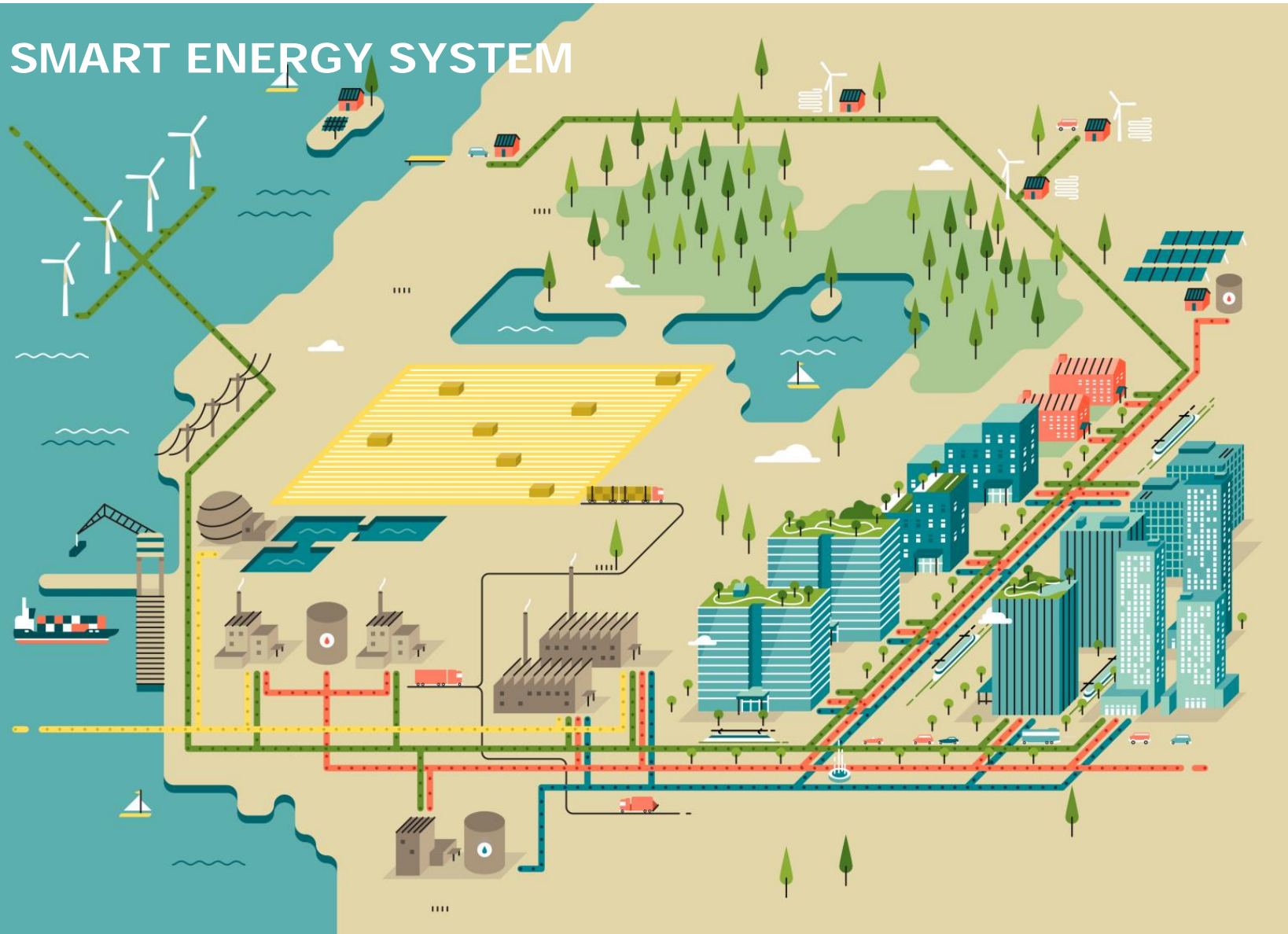
With thermal virtual electricity storage.


















As the hidden back bone of the livable city, the vision is to:

- Create district energy systems that provide Lakeside with heating, cooling, and power
- Create energy generation facilities that can be phased with the development
- Create a shared network for energy distribution
- Extend the energy network into the adjacent community



SMART ENERGY SYSTEM



-  Surplus biomass for CHP plant
-  Surplus straw for CHP plant
-  Offshore wind farm
-  Large building
-  Residential building
-  Harbour, unloading of biomass
-  Wastewater treatment and biogas plant
-  Solar heating plant and heat storage
-  Distant building w/solar PV
-  Outskirt building w/ heat pump, solar PV and wind turbine
-  CHP plant fuelled by gas, straw, wood, city waste + heat storage
-  District heating/cooling plant + cold water storage
-  Industry with process energy and surplus heat
-  Electricity
-  District heating
-  District cooling
-  Gas

EFFICIENT USE OF ENERGY: A LAKESIDE GREEN CODE

Facade Optimization



Mixed Mode Ventilation



Improved Building Insulation



High Performance Glazing & Shading

Lighting & Equipment Performance



Occupancy Sensors



Efficient Equipment

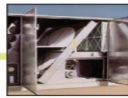


Reduced Lighting Power Density

HVAC Performance



Demand Control Ventilation



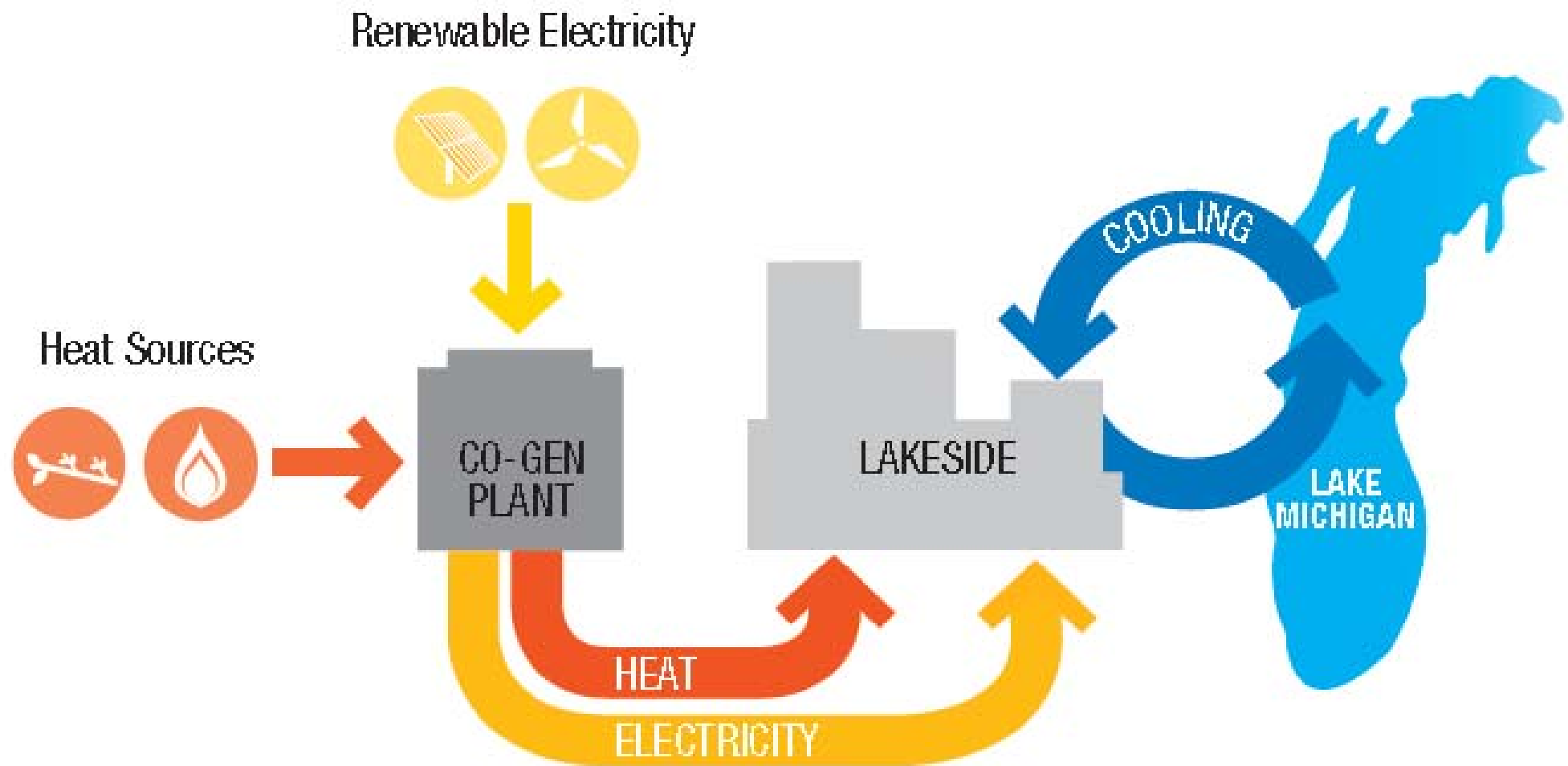
Energy Recovery



Underfloor Air & Radiant Cooling & Heating

- Minimum level of energy performance
- Life cycle screening of building materials
- Connect to district energy systems
- Smart and intelligent building design
- Reduce loads of cooling, heating and electricity

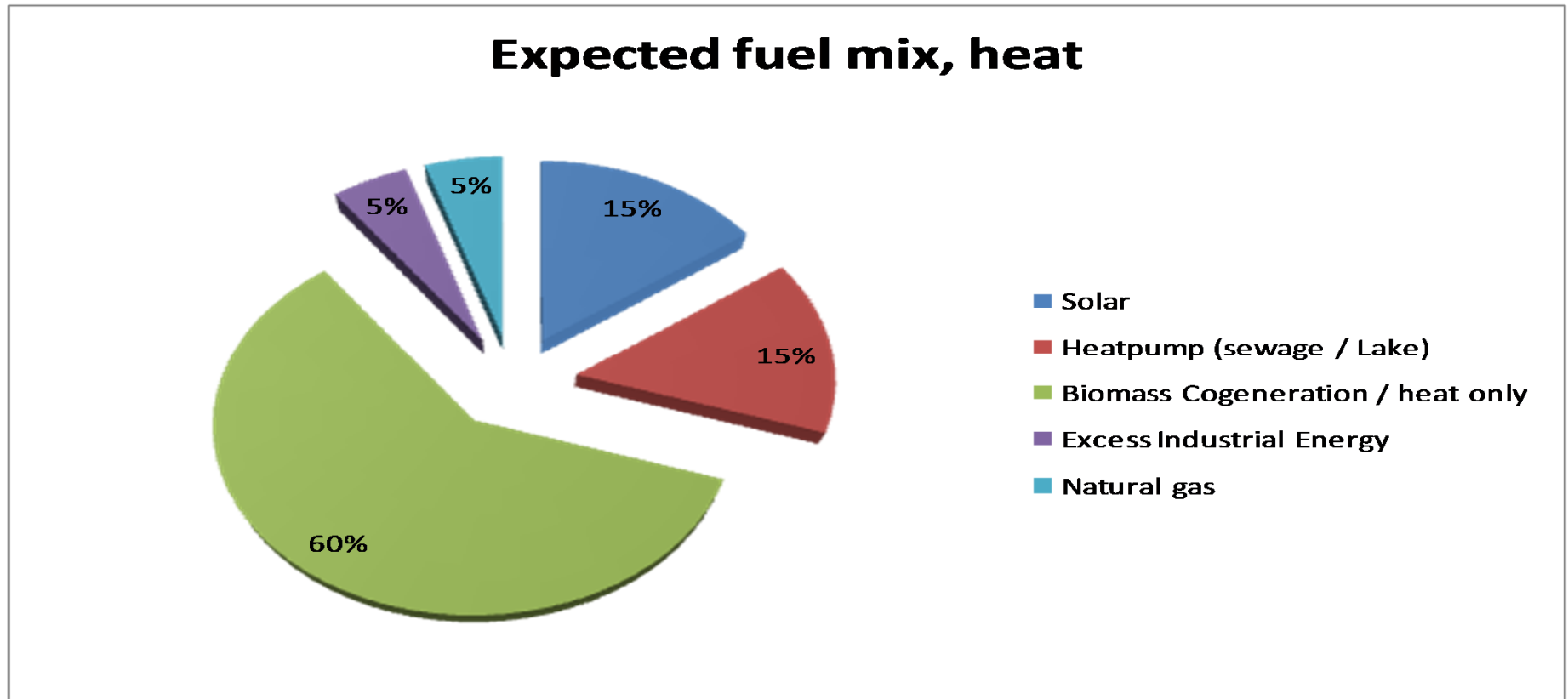
A DISTRICT ENERGY APPROACH



A DISTRICT ENERGY APPROACH



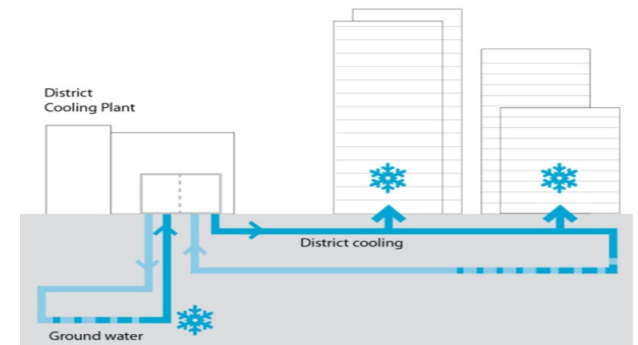
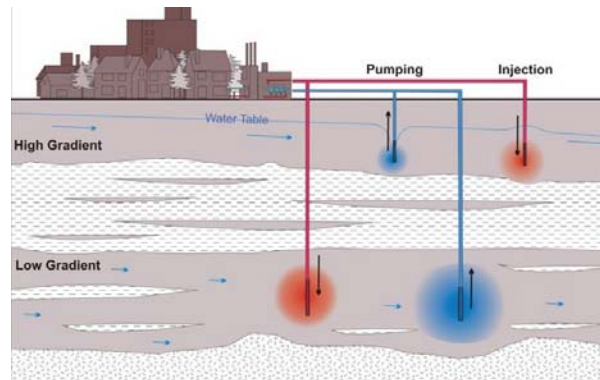
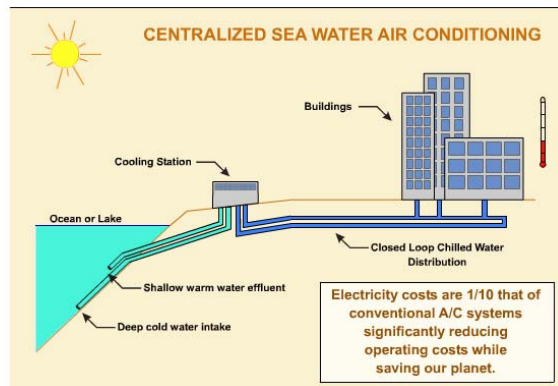
HEATING - EXPECTED FUEL MIX



DISTRICT COOLING

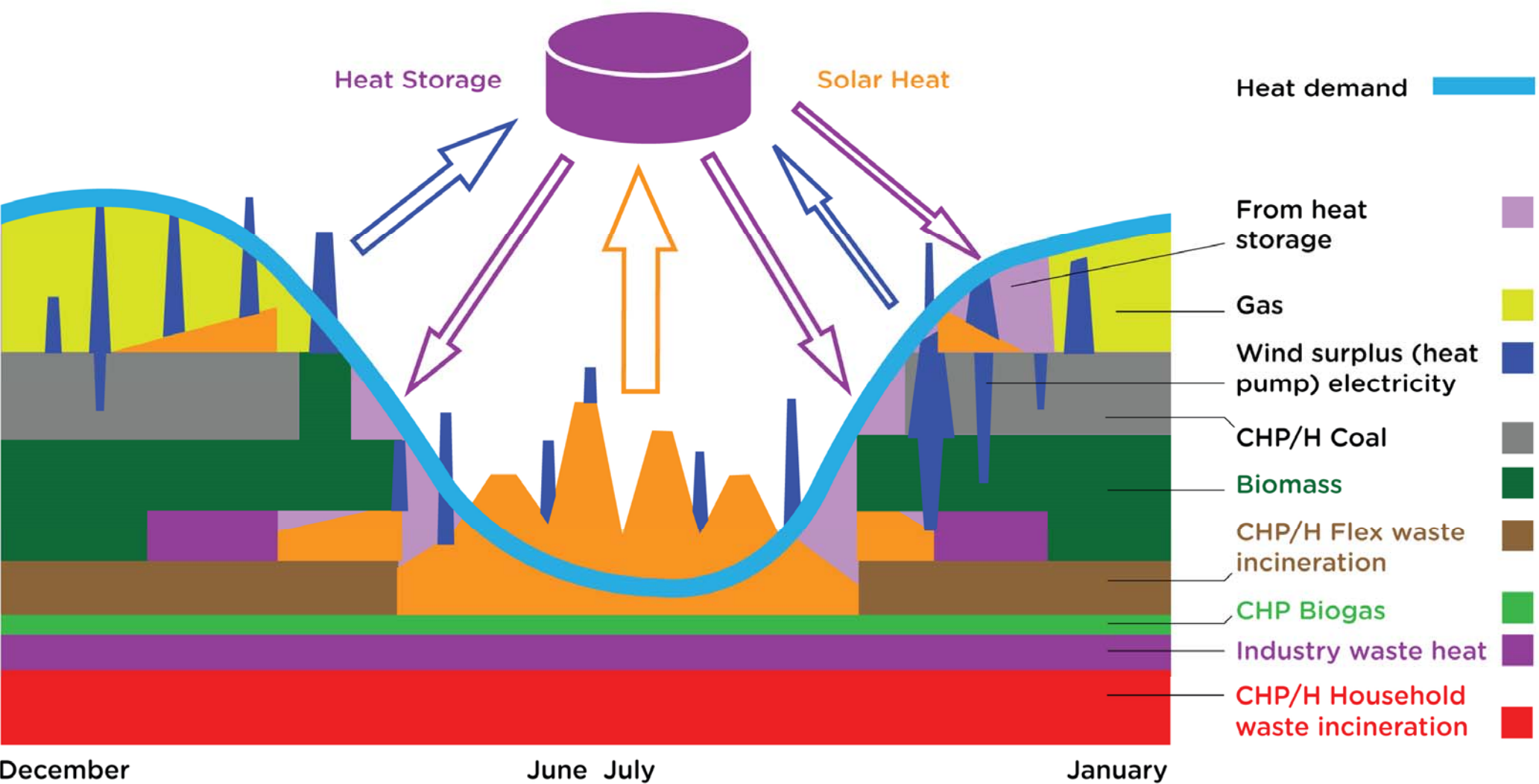
- **USE OF LAKEWATER FOR DISTRICT COOLING**

- Intake from Lake (approx. 6-9 ft. diameter)
- Distribution to buildings
- Storage tanks to reduce max. load production



POWER – PV & WIND ENERGY





PHASING



CHICAGO LAKESIDE – THE FUTURE OF URBAN DESIGN

An aerial photograph of the Chicago Lakeside development, showing a mix of modern high-rise buildings, green spaces, and a large body of water. The image is overlaid with three semi-transparent dark boxes containing text. The background shows a grid of streets and a large body of water with many sailboats. A bridge is visible in the foreground, and a city skyline is in the distance.

Challenge

Vision to breathe new life into South Chicago

How to create a liveable and sustainable city for future generations

What we did

Prepared design concept for sustainable energy, water management and waste management

Fossil fuel reduction of 90%, CHP & District Energy

Effect

New way of living

Urban design strategy is key differentiator

Winner of Sustainia Community Award



THANK YOU

FOR MORE INFORMATION

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