



ENGIE-District Heating & Cooling

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*Dr-Ing. Michael Schack
Director Networks & Cogenerations
ENGIE*



SUMMARY



CHAPTER 1

ENGIE and the Energy Revolution

CHAPTER 2

Heating & Cooling what is at stake ?
The role of District Heating & Cooling

CHAPTER 3

District Heating & Cooling



01



ENGIE AND THE ENERGY REVOLUTION

AN ENERGY REVOLUTION IS ONGOING



DECARBONIZATION

Worldwide renewable energies: annual additional capacity to grow by +70% in 2030 vs 2015



DIGITALIZATION

Digital disrupts energy systems and improves customer offers



DECENTRALIZATION

Decentralized solutions to more than double by 2030

WE HELP OUR CUSTOMERS TO IMPROVE THEIR USE OF ENERGY AND TO REDUCE CO₂ EMISSIONS



Low cO₂ power generation

We develop, build and operate power plants delivering low CO₂ energy based on renewables and ever greener natural gas.

- #1 in independent power production
- 103GW ⁽¹⁾ installed
- 90% low CO₂
- 23% renewables ⁽²⁾



Global networks

We develop, build and operate large gas and electricity infrastructures, ensuring energy supply

- #1 gas infrastructure operator in Europe
- 12 billion m³ gas storage capacity
- Global presence in power transmission and distribution



Customer solutions

We help our customers – individuals, businesses, cities and territories – with a wide range of energy, and beyond energy, solutions.

- 24 million contracts worldwide
- Global leader in energy solutions for cities
- 350+ District heating and cooling networks worldwide

PRESENT IN 70 COUNTRIES ACROSS 5 CONTINENTS



€65 billion
TOTAL REVENUE

2,4 billion
RECURRING PROFIT AFTER
TAX

150,000 EMPLOYEES

14,3 billion
DEDICATED TO THE 2016-2018
INVESTMENT PROGRAM

€3.9 billion
total revenue
North America ⁽¹⁾

€51.0 billion
total revenue
Europe ⁽²⁾

€0.9 billion
total revenue
Middle East

€2.8 billion
total revenue
Asia

€4.3 billion
total revenue
Latin America ⁽¹⁾

€0.4 billion
total revenue
Africa

€1.9 billion
total revenue
Oceania

(1) Including Mexico
(2) Including Turkey

AT THE HEART OF THE ENERGY TRANSITION IN A FAST CHANGING WORLD

IEA Scenario “Energy for all” 2030

B2T & B2B
Microgrids
36%



B2C
Off-grid Solutions
20%

**Centralized
power generation**
44% (80% today)



DECARBONIZATION



DECENTRALIZATION



DIGITALIZATION

AT THE HEART OF THE ENERGY TRANSITION IN A FAST CHANGING WORLD

Cities

2 % of World Area

50 % of World Population

75 % of World Energy Consumption

80 % of World GHG



DECARBONIZATION



DECENTRALIZATION



DIGITALIZATION

A PRESENCE ON ALL « VERTICALS » ANSWERING TO TRANSVERSAL CUSTOMERS NEEDS

Our customer's needs

To improve
SECURITY and **RESILIENCE**

To benefit from
FLUID and **GREEN MOBILITY**

To allow
REDUCE COSTS

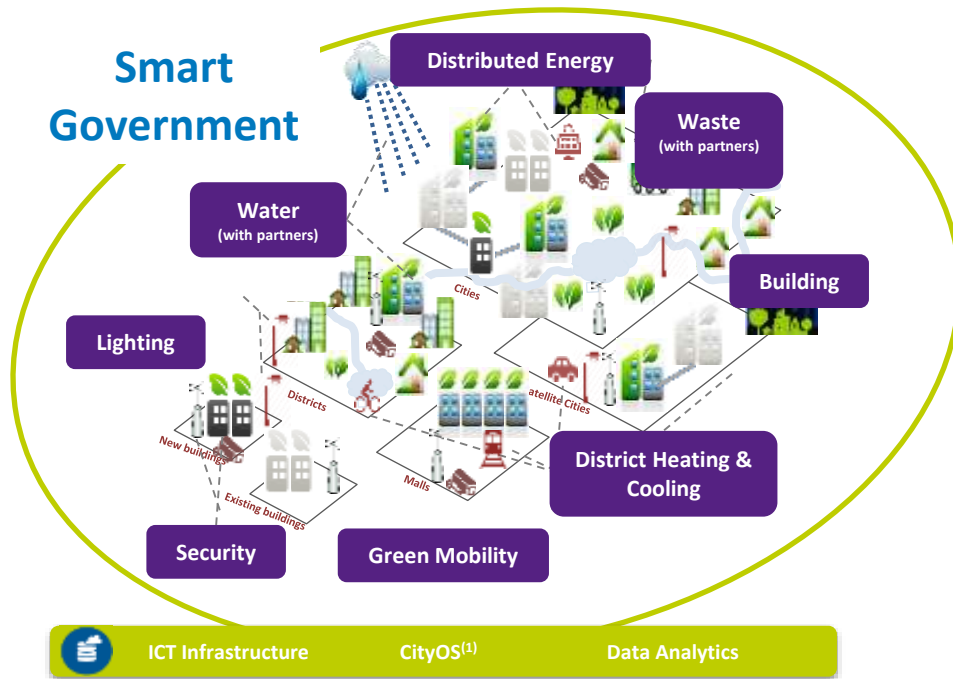
To ensure an
ENJOYABLE ENVIRONMENT

To develop the
LOCAL ATTRACTIVENESS



A PRESENCE ON ALL « VERTICALS » ANSWERING TO TRANSVERSAL CUSTOMERS NEEDS

BETTER CITIES
TODAY

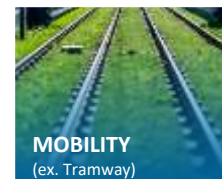
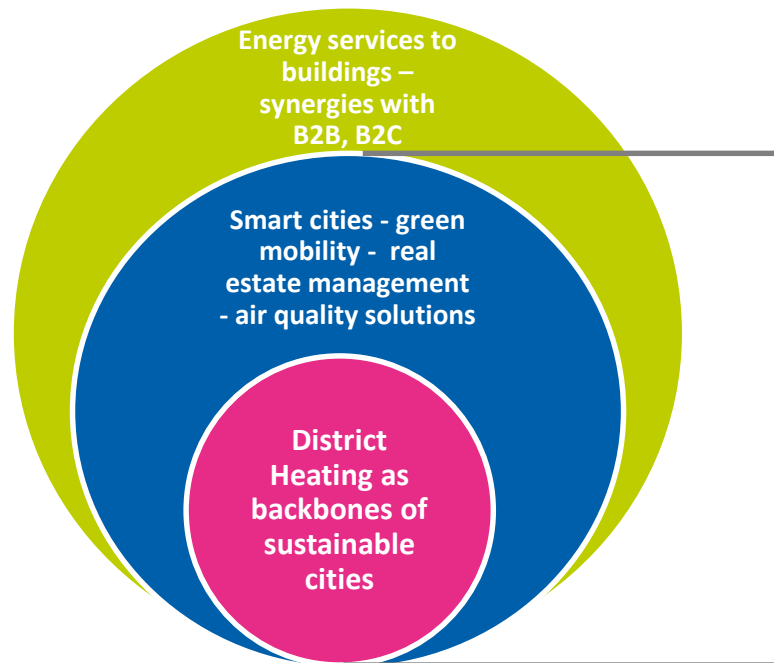


livin'

(1) Includes city management tools such as dashboards to enable city stakeholders to make informed decisions

A SYSTEMIC APPROACH TO LEAD CITIES TOWARDS THE TRANSITION

Digital tools & platforms



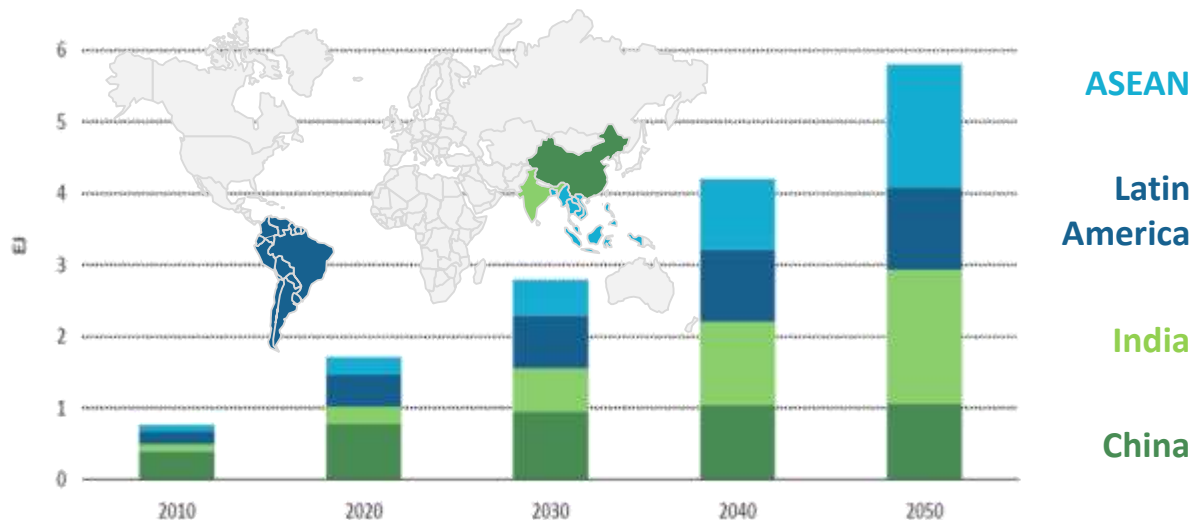


ENGIE

HEATING AND COOLING WHAT IS AT STAKE ?

The role of District Heating &
Cooling

Cooling is set to **expand 625%** by **2050** in selected regions of **Asia & Latin America**



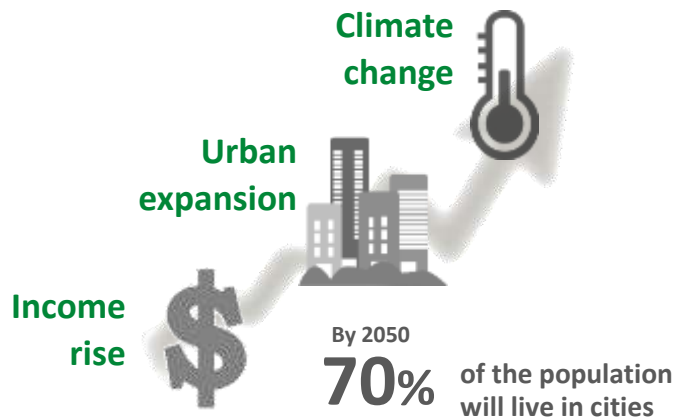
World final energy use for cooling in the IEA's 2°C scenario, 2010–2050 ¹

District Cooling A solution to answer cooling needs while respecting major energy and environmental issues

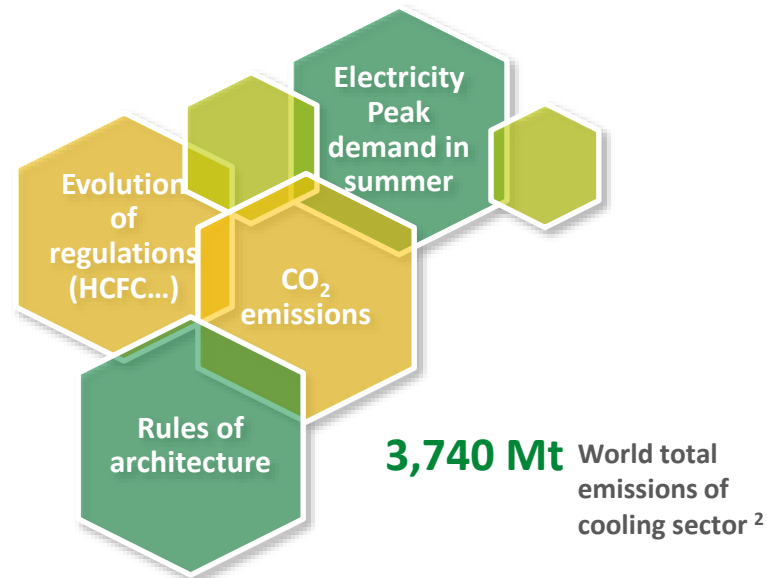
¹ Source : IEA (2014b)

DISTRICT COOLING : A solution for sustainable cities

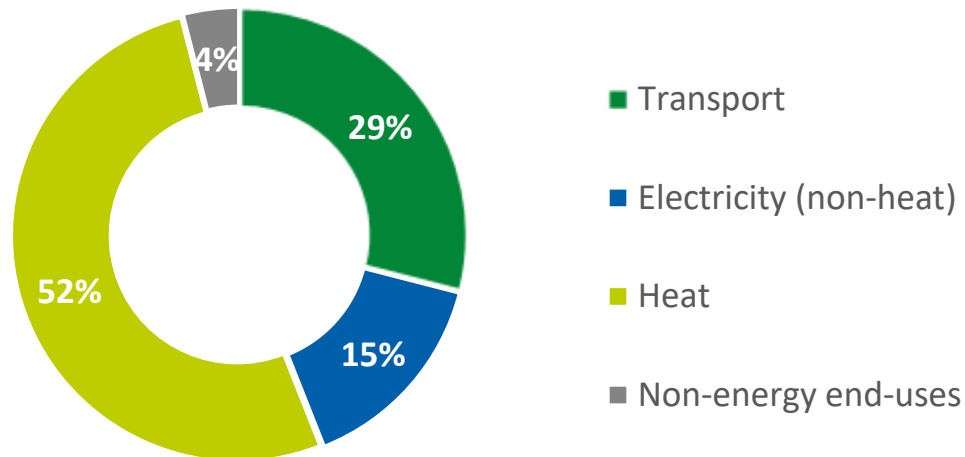
Cooling energy demand Growth factors



Constraints



HEATING IS 50% OF FINAL ENERGY CONSUMPTION



Heat dominates global energy consumption providing key services such as space heating, hot water and industrial process heat.

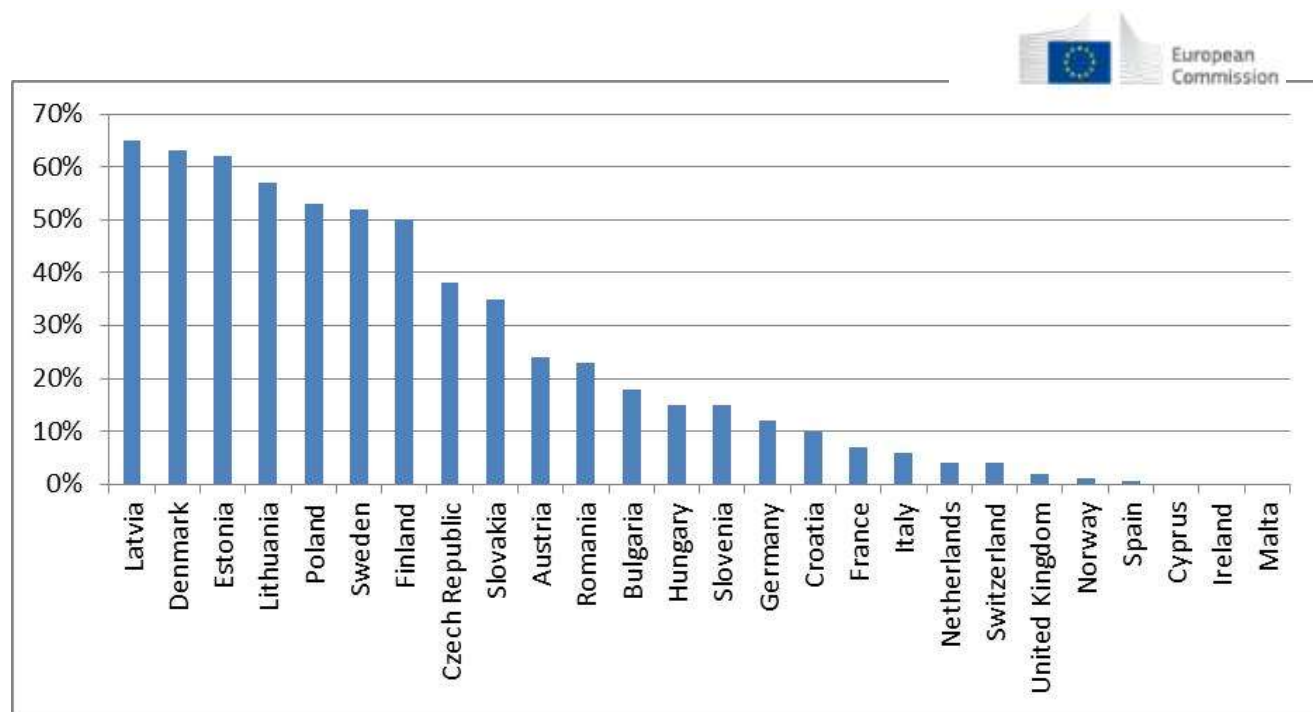
Sources: IEA (2017a) World Energy Statistics and Balances 2017 (database), www.iea.org/statistics/; IEA (2017b), World Energy Outlook 2017. Notes: Heat includes electricity used to produce heat which accounts for just over 6% of heat consumption.



THE ROLE OF DISTRICT HEATING AND COOLING SYSTEMS

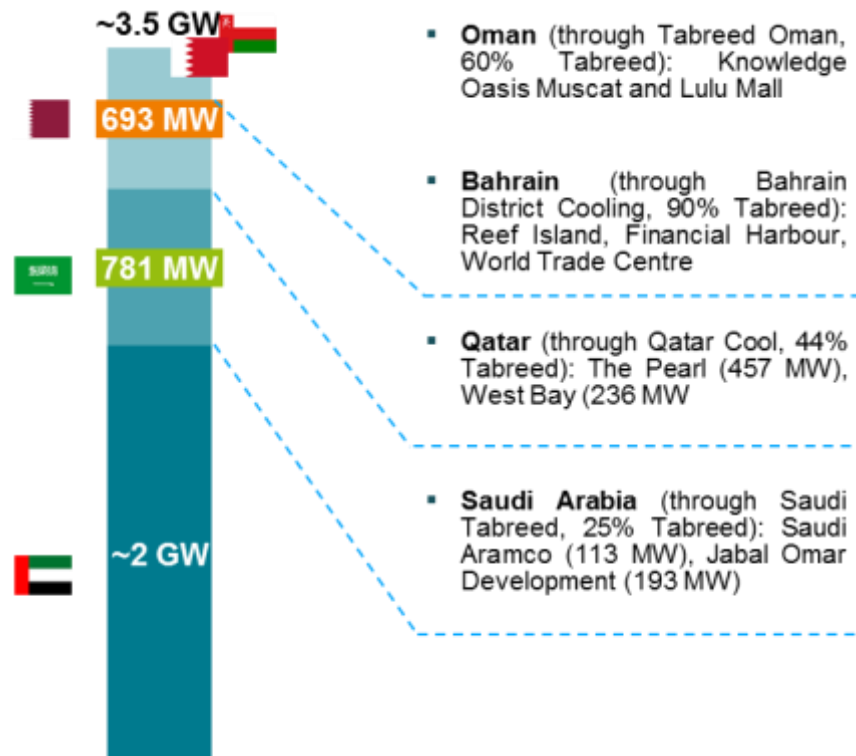
District Heating accounted for around **12%** of heating energy consumption

60 million EU citizens are served by DHS



Source : Commission services using data supplied by Euroheat and Power

TABREED, A LEADING OPERATOR OF DCS NETWORKS IN THE MIDDLE EAST



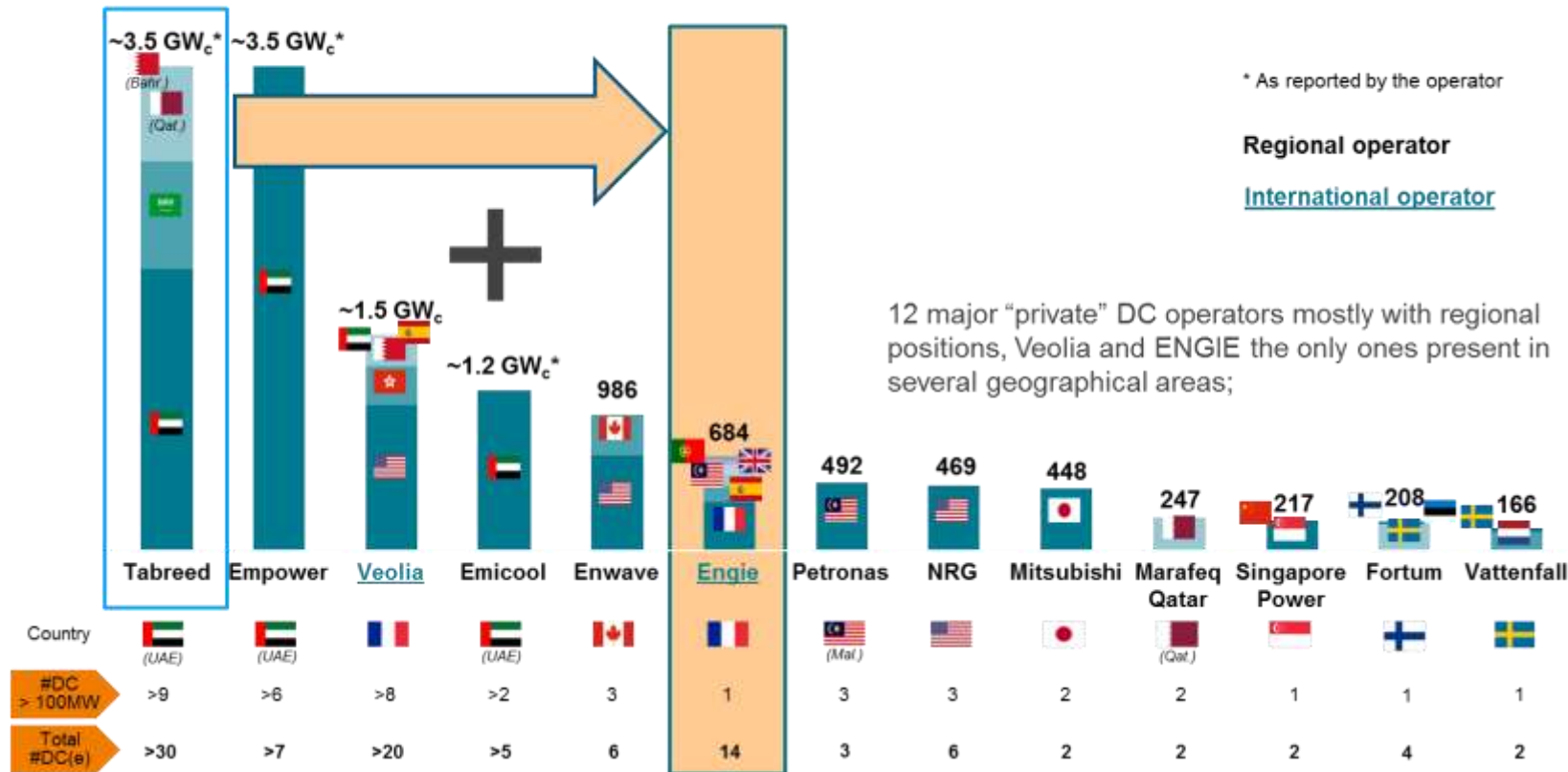
- Established in **1998** in UAE
- **2003** : launch of **Qatar Cool**, first expansion project in other GCC countries
- **2004** : expansion in **Bahrain**
- **2006** : expansion in **Saudi Arabia** and **Oman**
- **2010** : **recapitalization of the company** (due in particular to the slowdown of construction activity in Dubai); Mubadala injected ~800 k€

RECENT DEVELOPMENTS

- **100 M€ net profits** in **2016**
- Cooling capacity growing **~8% p.a. since 2012**
- Currently **building ~350 MW** (7 plants) of new cooling capacity in UAE, Qatar, Saudi Arabia, Oman
- Pipeline of **long term projects**: Doha metro (cooling for 7 stations), additional capacity for King Khalid International Airport in Riyadh, additional capacity in Maryah Island (Abu Dhabi)

WITH TABREED, ENGIE BECOMES WORLD LEADER IN DCS

Major DC operators (excluding municipalities) and corresponding DC operated capacity by country (MW_c) – 2016 (e)



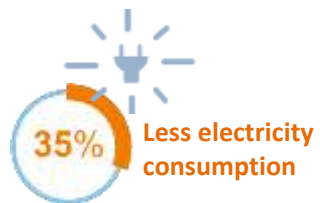
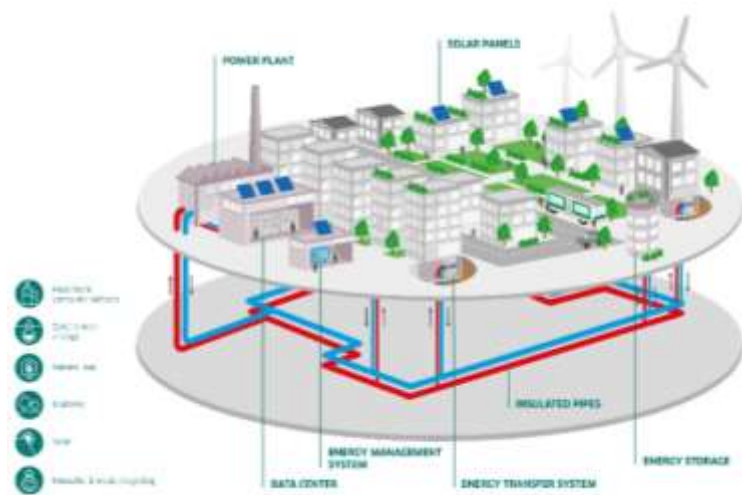
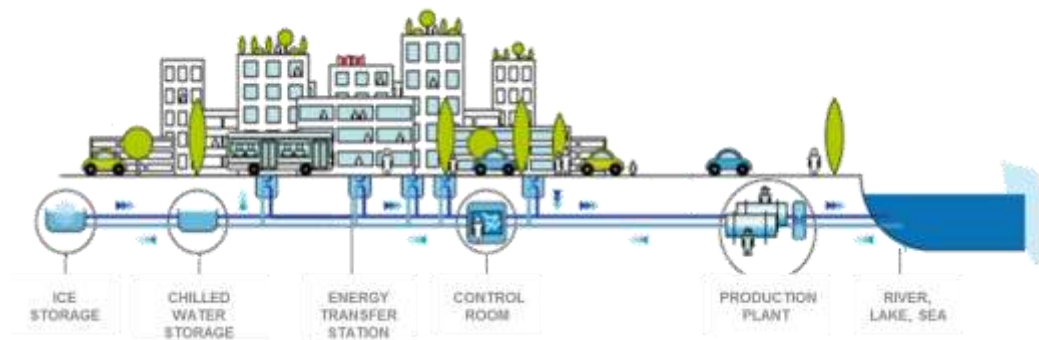


03

ENGIE

DISTRICT HEATING &
COOLING

DISTRICT HEATING & COOLING



DCS REFERENCES in ASIA PACIFIC



Malaysia

Megajana DCS :

14,000 RT & 48 Buildings

4,100 Tons of CO2

avoided since 2013



Philippines

Northgate DCS :

12,000 RT & 16 Buildings

1st Brownfield District Cooling project in Asean



New Zealand

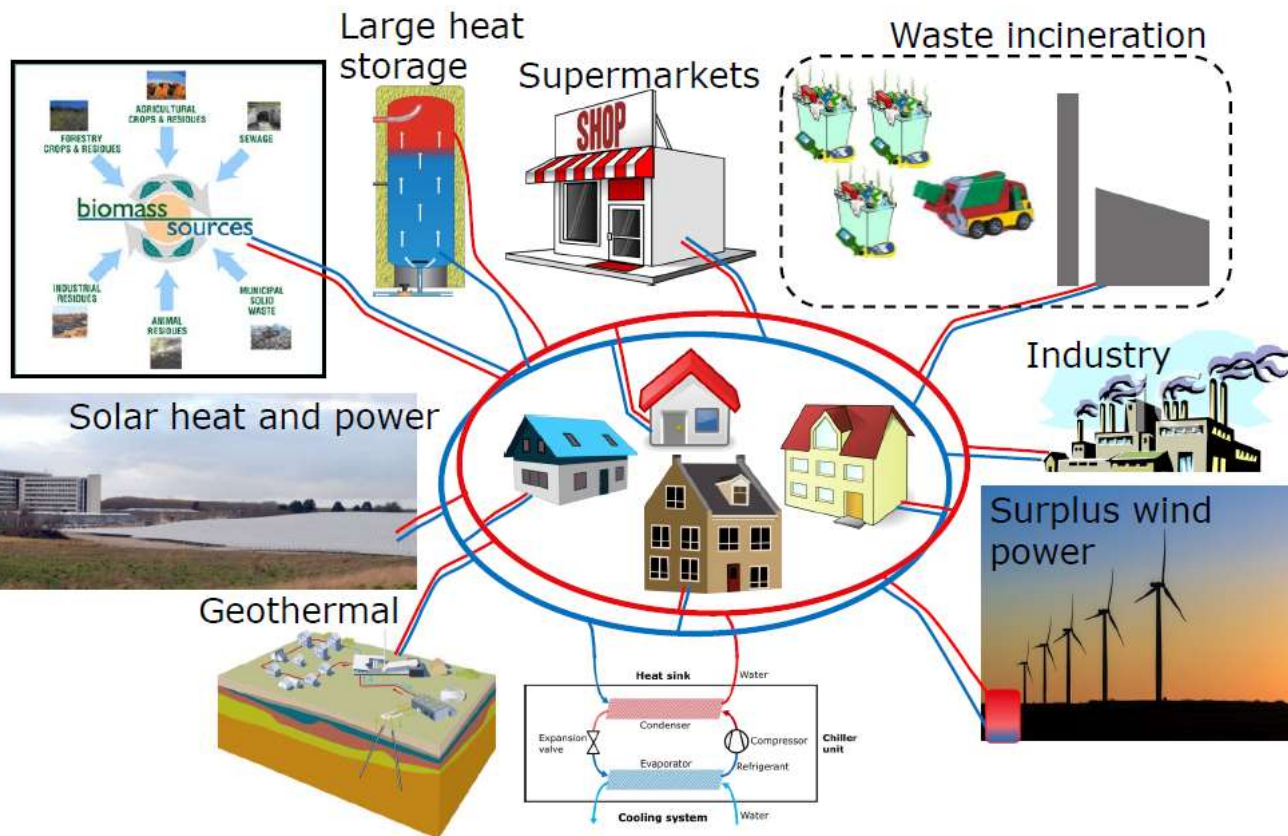
Christchurch DCS

14% estimated savings on energy bills



3 networks in operation in 2017 and the will to develop local expertise in DCS

4TH generation DISTRICT HEATING & COOLING as renewables energy integrator



4TH generation DHC :

- Decarbonize existing buildings
- Heat recovery of waste heat (fatal heat from industries, data centers, waste incineration...)
- Key enabler of RES integration as flexibility provider

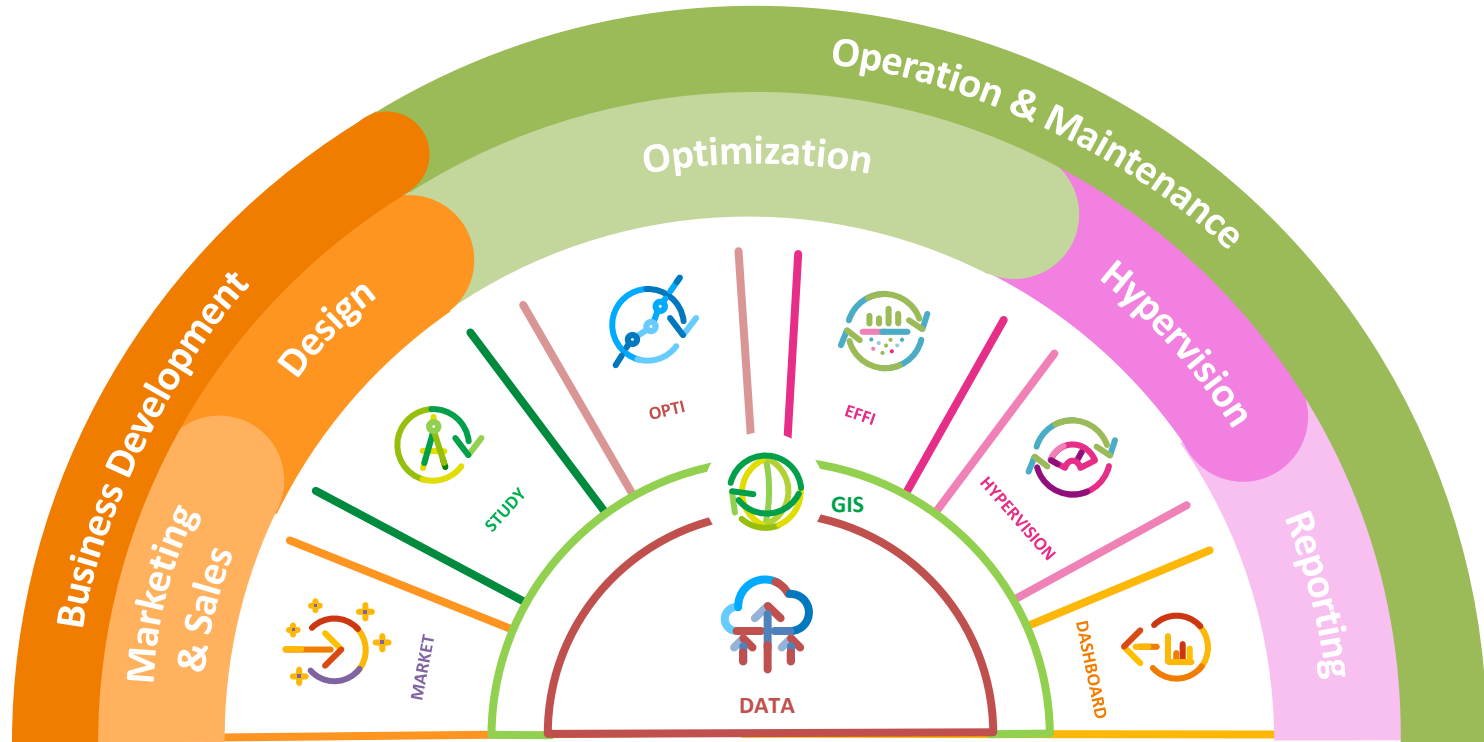
“Maximize created value for Business Development and existing operations”

**DIGITAL TOOLS
AS KEY ENABLERS**

PROCUREMENT

**BEST
OPERATIONAL
PRACTICES**





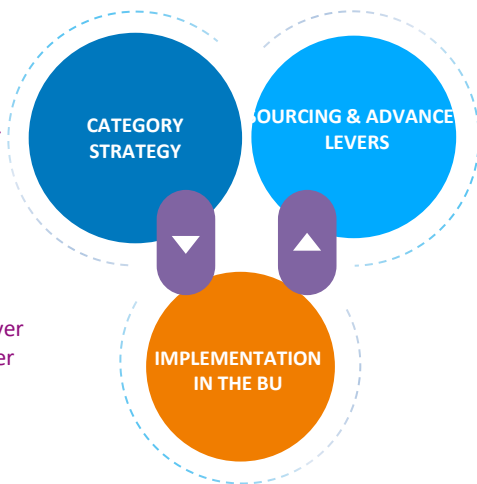
2 TRANSVERSAL PROCESSES TO LEVERAGE ENGIE SIZE & DIVERSITY

CATEGORY MANAGEMENT

AIM: to deliver the optimum conditions for recurrent & common purchases

LEADER
CM – Category Manager

ACTORS
CLB – Category Lead Buyer
CLU – Category Lead User



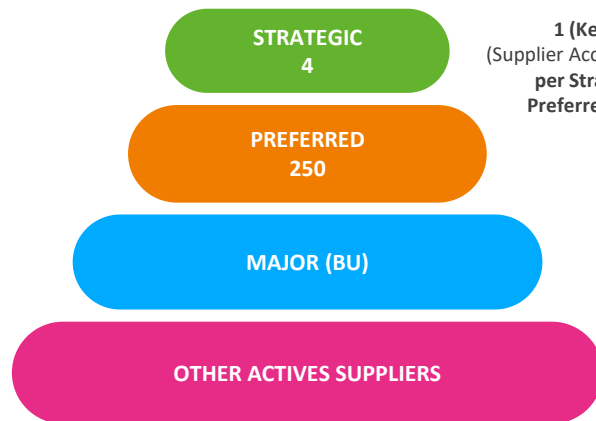
GROUP
LEVEL

BU
LEVEL

MANAGE THE SUPPLIER PANEL


AIM: to develop a panel of performing suppliers in accordance with the rules, the law, & the Group's CSR requirements

1 (Key) SAM
(Supplier Account Manager)
per Strategic and Preferred supplier



OPERATIONAL EXCELLENCE : DHC BEST PRACTICES SHARING







DHC Operational Best Practices

[Accueil](#) ▾ [Documents](#) [Contenu du site](#) [Pages](#)


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Retrofit Engineering




Distribution (network + ETS)



Administrative Operations



Production

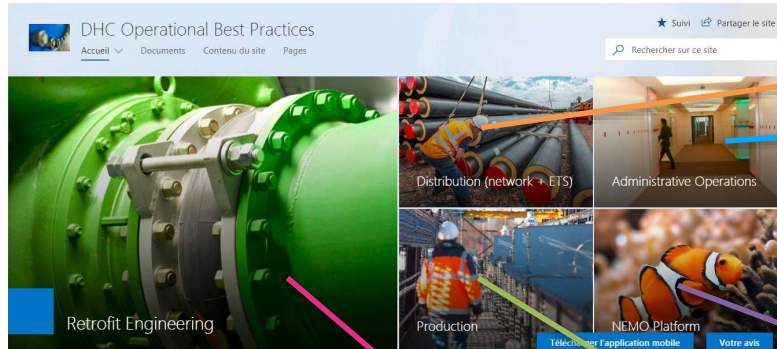


NEMO Platform

[Télécharger l'application mobile](#)

[Votre avis](#)

OPERATIONAL EXCELLENCE : DHC BEST PRACTICES SHARING



Ultrasound nondestructive thickness testing



Audits to Secondary Network (Client's)



Comissioning DHC networks



Chiller and Cooling Tower Optimization



NEMO.Market

The new energy world is characterized by **decarbonization, decentralization and digitalization** with **modern DHC at the heart of the energy revolution.**

3rd and 4th generation **DHC Systems are the most efficient way to decarbonize dense areas** like City Centers, or tertiary or industrial parks, and will be **the backbone of the sustainable City of Today and of Tomorrow.**

Engie together with its partners in different parts of the world, like Mubadala and Tabreed for the GCC region, the ministry of Finance in Malaysia... **believes that DHC will create tremendous value for customers and stakeholders** and has identified it as a privileged growth vector significantly contributing to Engie transformation.



THANK YOU !

