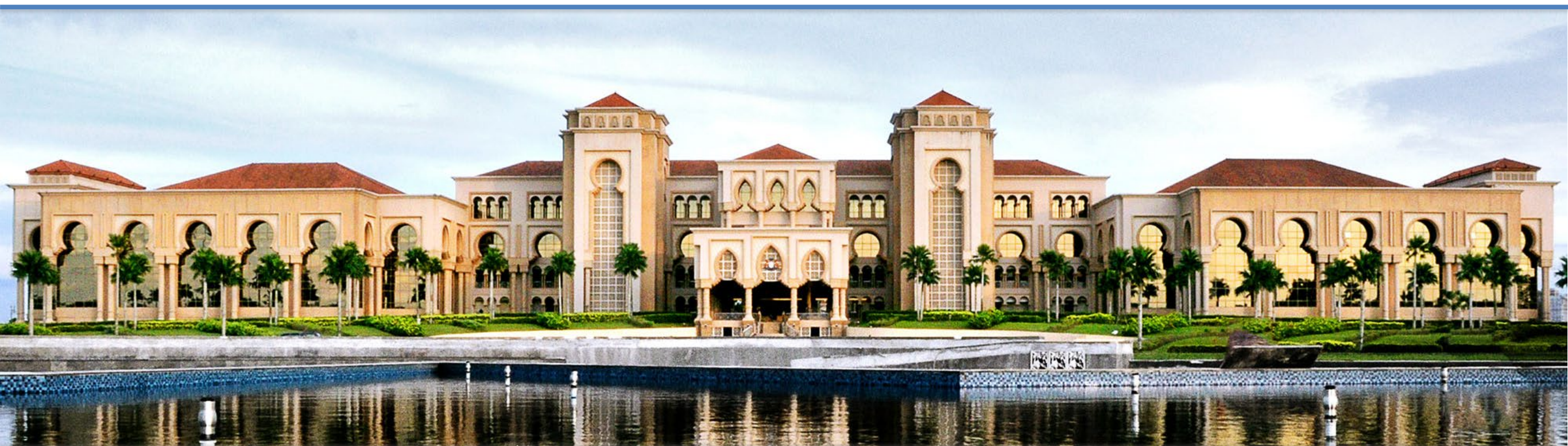
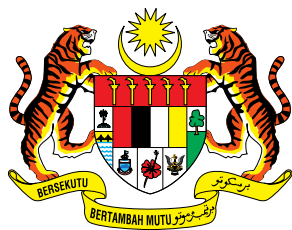


GOVERNMENT OF MALAYSIA



# **District Energy Systems Webinar Series 2020-2021: Policy Development: Integrating DES Into Urban Planning**

**BY: KAMISAH MOHD GHAZALI  
SENIOR VICE PRESIDENT, RESILIENT ENVIRONMENT**



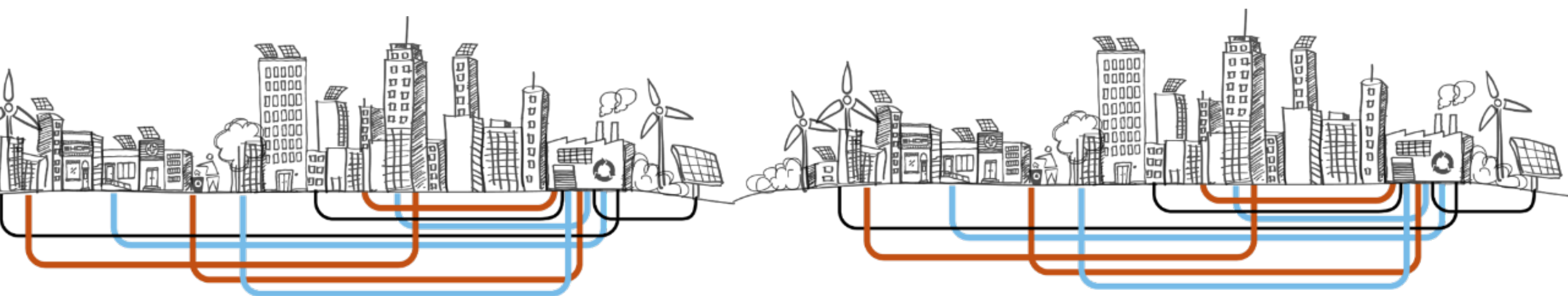
GOVERNMENT OF MALAYSIA



## OBJECTIVE

**This webinar presents the fundamentals of policy development in DES planning, including:**

- **The importance of integrating DES in urban planning process**
- **Key steps of policy development to integrate DES in urban planning**
- **Best case practices, strengths and limitations**
- **Lessons learned & recommendations**







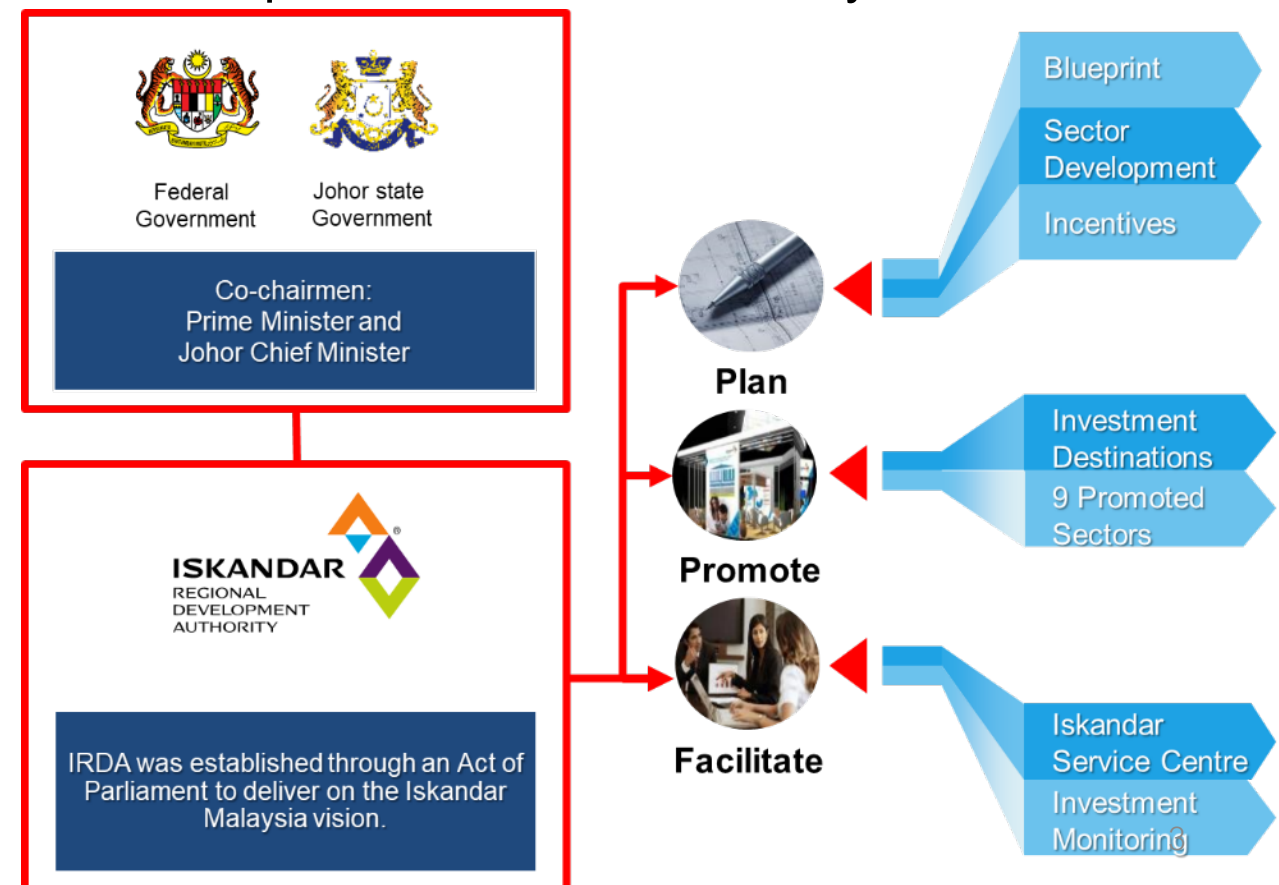
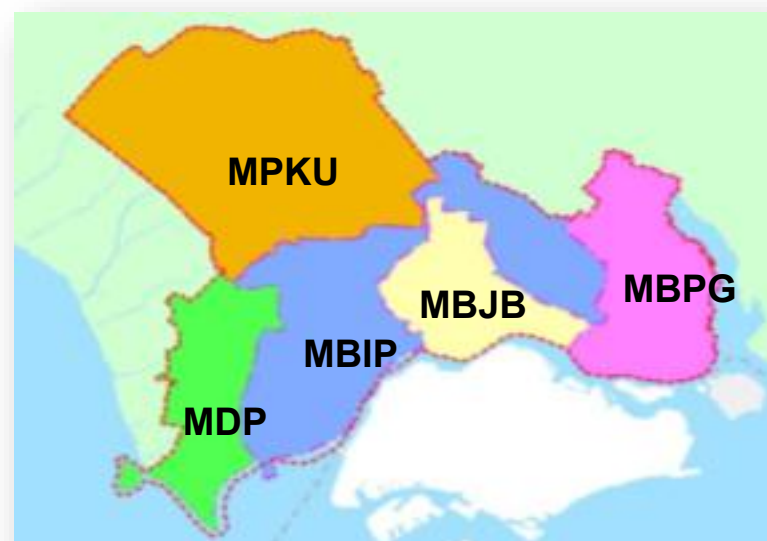
PRIME MINISTER'S DEPARTMENT

# ISKANDAR MALAYSIA



- Iskandar Malaysia is located in the main southern development corridor in Johor.
- Total area: 2,217 sq km (12% of Johor State); 3 times the size of Singapore.
- Iskandar Malaysia covers **FIVE Local Authorities**

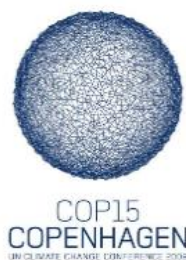
- Iskandar Regional Development Authority (IRDA) is a Malaysian Federal Government **statutory body** tasked with the objective of regulating and driving various stakeholders in both public and private sector towards realizing the vision of developing Iskandar Malaysia into a strong and sustainable metropolis of international standing.
- IRDA's statutory powers and functions are designed to achieve the above objective with core functions to **plan, promote and facilitate** developments in Iskandar Malaysia,





PRIME MINISTER'S DEPARTMENT

# LOW CARBON SOCIETY BLUEPRINT FOR ISKANDAR MALAYSIA 2025



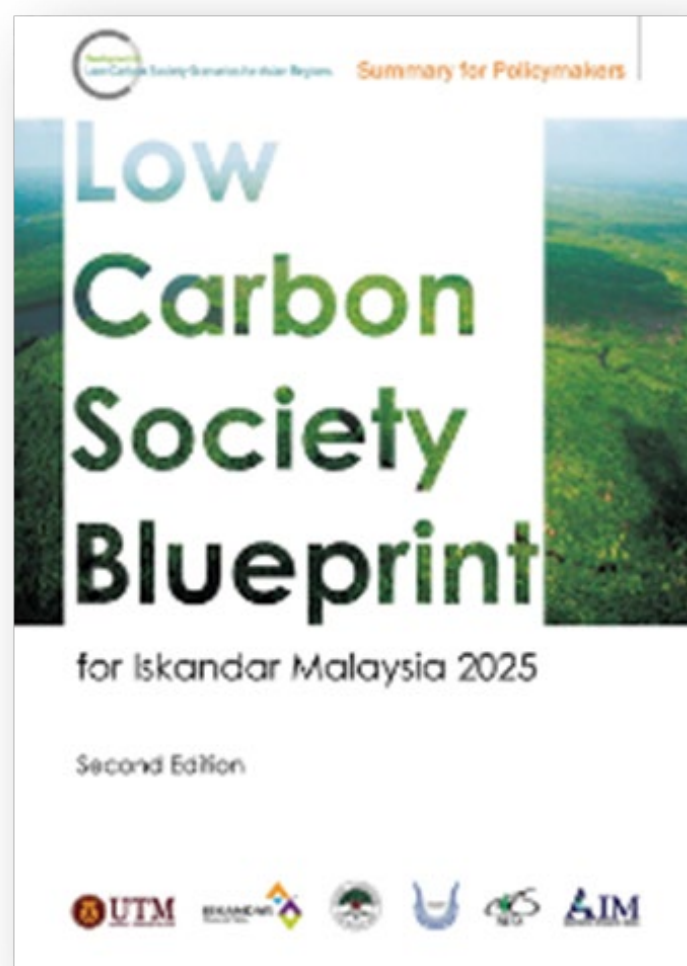
On 17 Dec 2009, Malaysian 6<sup>th</sup> Prime Minister committed to a voluntary reduction of up-to-40% in terms of emission intensity of GDP by the year 2020 compared to 2005 levels.



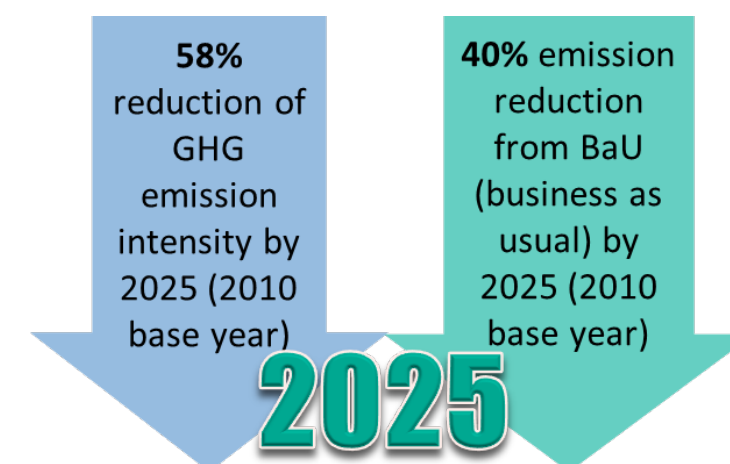
At COP 21 Paris – The commitment is renewed to a reduction of up to 45% in terms of emission intensity of GDP by 2030 compared to 2005 levels.



At COP 19 Doha – Iskandar Malaysia launched **Low Carbon Society Blueprint for Iskandar Malaysia 2025**. The Blueprint was subsequently endorsed by the Prime Minister of Malaysia in December 2012

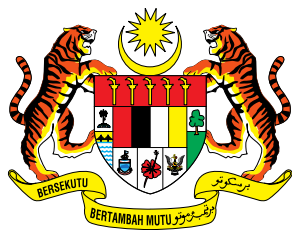


| Action Names  | Themes  |
|---|---|
| 1. Integrated Green Transportation                  | <br><b>GREEN ECONOMY</b>     |
| 2. Green Industry                                   |   |
| 3. Low Carbon Urban Governance                      |   |
| 4. Green Buildings & Construction                   |   |
| 5. Green Energy System & Renewable Energy           |   |
| 6. Low Carbon Lifestyle                             | <br><b>GREEN COMMUNITY</b>   |
| 7. Community Engagement & Consensus Building        |   |
| 8. Walkable, Safe, Livable City Design              | <br><b>GREEN ENVIRONMENT</b> |
| 9. Smart Growth                                     |   |
| 10. Green and Blue Infrastructure & Rural Resources |   |
| 11. Sustainable Waste Management                    |   |
| 12. Clean Air Environment                           |   |



- Low Carbon Society Blueprint for Iskandar Malaysia 2025 presents **comprehensive climate change mitigation policies and detailed strategies to guide development of Iskandar Malaysia**
- The LCSBPIM– a quick reference for all policy-makers in both public and private sectors as well as IRDA.





GOVERNMENT OF MALAYSIA

# DISTRICT ENERGY WORLDWIDE AND MALAYSIA

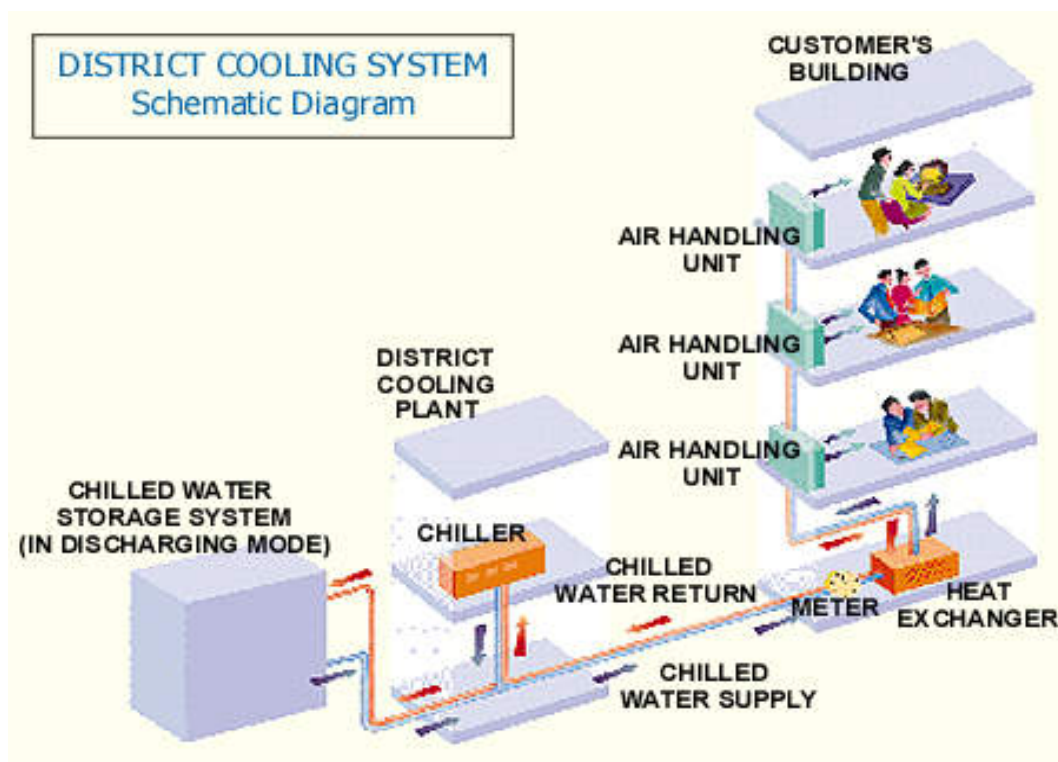
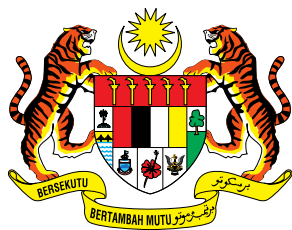


Figure: Simple diagram of District Cooling System

In Malaysia, district energy system is based on the market demand and supply, which currently, there is no regulation, standards, planning and coordination body is established to monitor development of this facility. **Malaysian district cooling market is more developed than other countries in South East Asia.**

However:

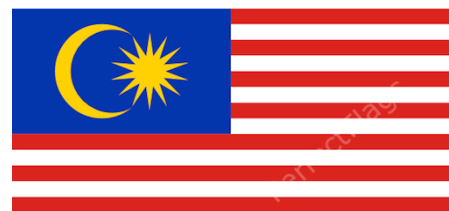
- i. DCS is not the standard cooling technology for dense urban areas
- ii. Most DC projects are greenfield and not much of the existing buildings consider to have retrofitting for this facilities.
- iii. Innovative technologies are not being piloted or promoted
- iv. Major customers groups are not being connected (residential, education, data centres)
- v. **DC being led privately and not by cities – limiting potential**



# Case for Action



PRIME MINISTER'S DEPARTMENT



**1** Malaysia's voluntary commitment to the Paris Agreement (2015) to reduce up to 45% emission intensity of GDP by 2030 compared to 2005 level.



**2** Demand for electricity in Peninsular Malaysia is expected to **increase by 50%** from 2018 to 2035



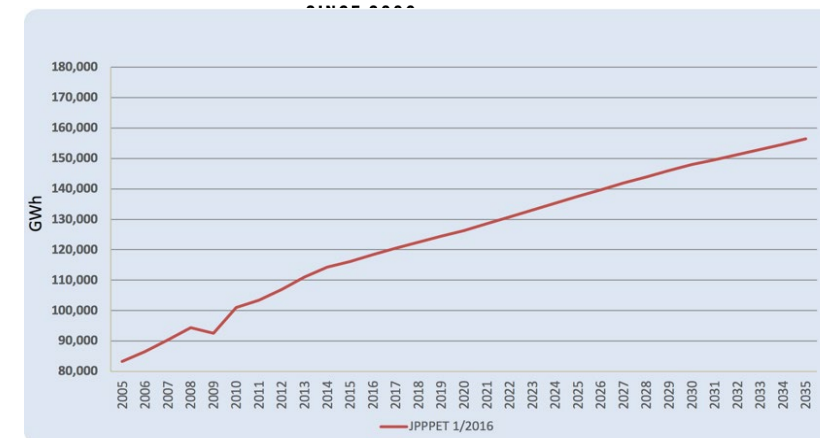
Power sector emissions (2015): 25% of total emissions or 88MtCO<sub>2</sub>



Current emissions from space cooling: 9% of total emissions or 22MtCO<sub>2</sub> (estimated)

**3** Iskandar Malaysia **targets 12% of its energy requirement from renewable energy** with **24% energy consumption reduced by 2025 through efficient energy management.**

**4**

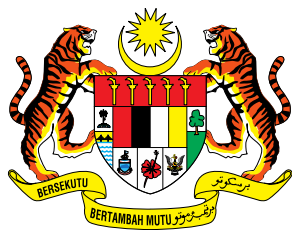


Cooling of buildings is estimated to consume 25% of total power demand in Malaysia.

**5**

|                         | Non-A5 (developed countries)   | A5 (developing countries) Group 1       | A5 (developing countries) Group 2   |
|-------------------------|--|---|---|
| Baseline HFC component  | 2011-2013 (average consumption)  | 2020-2022 (average consumption)         | 2024-2026 (average consumption)   |
| Baseline HCFC component | 15% of baseline  | 65% of baseline                         | 65% of baseline   |
| Freeze                  | -  | 2024                                    | 2028  |
| 1st step                | 2019 - 10%   | 2029 - 10%                              | 2032 - 10%  |
| 2nd step                | 2024 - 40%   | 2035 - 30%                              | 2037 - 20%  |
| 3rd step                | 2029 - 70%   | 2040 - 50%                              | 2042 - 30%  |
| 4th step                | 2034 - 80%   | -                                       | -   |
| Plateau                 | 2036 - 85%   | 2045 - 80%                              | 2047 - 85%  |
| Notes                   | Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan, 25% HCFC component and 1st two steps are later: 5% in 2020, 35% in 2025 | Article 5 countries not part of Group 2 | GCC (Saudi Arabia, Kuwait, United Arab Emirates, Qatar, Bahrain, Oman), India, Iran, Iraq, Pakistan |

**Montreal Protocol HCFC Phase-out Management Plans (HPMPs)22 – Stage 1** focus on compliance with the 2013 freeze and 2015 reduction targets. Subsequent stages, focus on HCFC phase-out in compliance to future reduction control targets.



# Benefits of District Cooling Implementation



PRIME MINISTER'S DEPARTMENT

## Economy of Scale

- Building owners - save investment and maintenance costs
- Utility operators, the initial capital cost can be spread over longer period

## Energy efficient and Lower Green House Gas (GHG) emission.

- DCS can operate with 20-40% less electricity consumption than conventional air conditioner systems. Energy and fuel are conserved which simultaneously reduce the carbon emission

## High system reliability

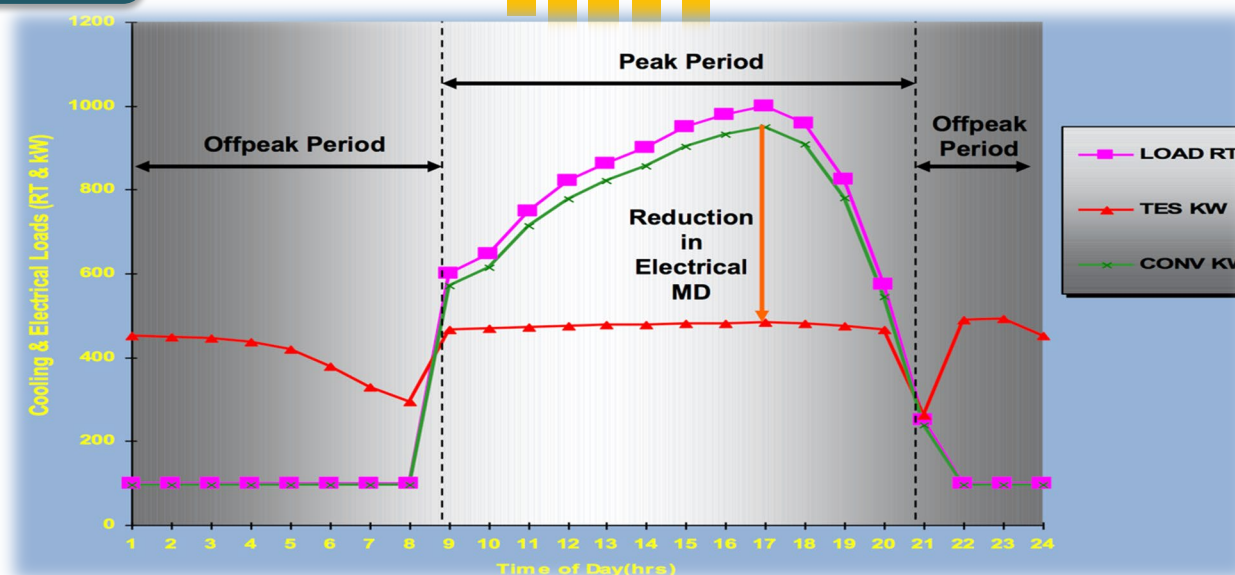
- In standard operation, the cooling equipment and backup chillers are installed in standby mode.
- Thus, when an emergency happens, operation is not interrupted and will still perform normally

## Minimal environmental impact

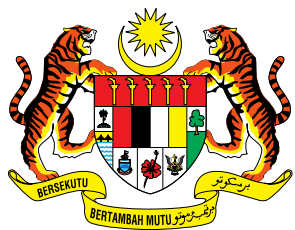
- The quantity of refrigerant used to serve a district is less than the total amount of refrigerant used for in-building AC system.

## Better utilization of building space

- The removal of individual cooling facilities from a building allows more space saving, and Green space can be designed on the building roof which was initially used to place the exterior mechanical parts of AC system (compressor etc.







# ENERGY VISION FOR ISKANDAR MALAYSIA



GOVERNMENT OF MALAYSIA

## VISION

*To provide its residents and industries with*

***energy choices that are affordable, reliable, diverse, safe and environmentally acceptable.***



## 5 THRUSTS

Strengthen the institutional framework

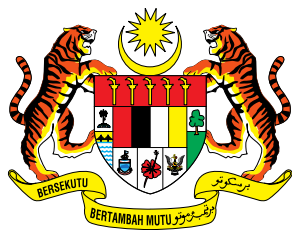
Provide conducive environment for RE, EE and Green Technology Development

Intensify Human Capital Development in RE, EE and Green Technology

Intensify RE, EE and Green Technology Research and Innovations

Promotion and public awareness



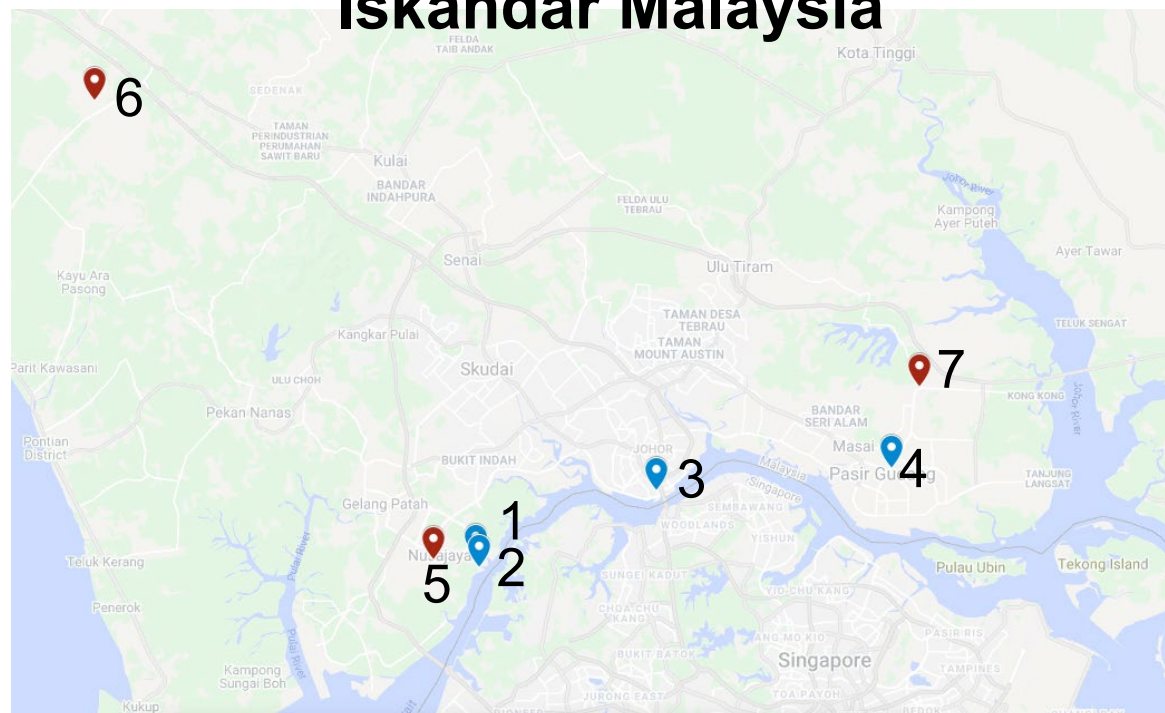


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# POTENTIAL DEVELOPMENT OF DISTRICT ENERGY IN ISKANDAR MALAYSIA AND AT NATIONAL LEVEL



## Existing and Potential DCS in Iskandar Malaysia



## Other established DCS in Malaysia



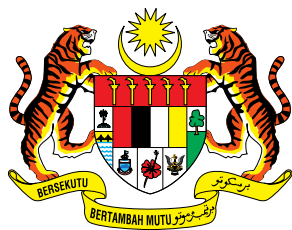
Gas District Cooling Kuala Lumpur International Airport (KLIA) Plant, Sepang, Selangor.

KLCC District Cooling in January 2014 with As Syakirin Mosque and Petronas Twin Towers to the left



| Category                              | No | Name/ Area                          |
|---------------------------------------|----|-------------------------------------|
| Existing                              | 1  | DCS Kota Iskandar- Jana DCS         |
|                                       | 2  | DCS Puteri Harbour- UEM             |
|                                       | 3  | Galleria@Kotaraya                   |
|                                       | 4  | Hotel Selesa Pasir Gudang- inactive |
| Potential (not limited to these area) | 5  | MedinI Township                     |
|                                       | 6  | Kulai Sedenak Data Exchange         |
|                                       | 7  | Iskandar Halal Park                 |

**And the potential to expand in other townships and Central Business Districts (CBD) in Malaysia are LIMITLESS!!**



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# THE IMPORTANCE OF INTEGRATING DISTRICT ENERGY SYSTEM IN URBAN PLANNING PROCESS



“WHY”



Planning authorities have the ability to implement planning policies that will encourage, or even mandate, new developments to incorporate district cooling where certain conditions are met.

## LEVEL OF PLAN

## DETAILS

National Level

- Shows **commitment to the development of the facility and provides certainty** for investors
- The **integration of district cooling considerations into national building codes** and specific green building codes, could also be used to encourage district cooling in new building developments.
- E.g. To prepare **Act at National level covering consumer and operator protection, fair and transparent tariffs, licensing of operators, and technical standards**, whilst also supporting and encouraging innovation and development

01

Regional Level

- **District cooling should be listed as a separate infrastructure in the Development Plans, similar to the approach taken with power, water, sanitation.**
- This could include an overview of the **potential role(s) of the city government**, in developing district cooling as an infrastructure. For example, the city may seek to play a role in being a promotor of district cooling and in facilitating private sector investment, or may choose to play a more active role as an investor / asset owner

02



# THE IMPORTANCE OF INTEGRATING DISTRICT ENERGY SYSTEM IN URBAN PLANNING PROCESS

## LEVEL OF PLAN

## DETAILS

### State/ City Level

- State or city level policy has an important role in enabling district cooling, since it sets out the guidance on specific city level planning.
- **Urban design guidelines** also set at city level could also be used for setting specific district cooling related requirements, such as:
  - a. **Requiring new developments to connect to district cooling networks**
  - b. **Setting minimum floor space requirements for connecting to district cooling**

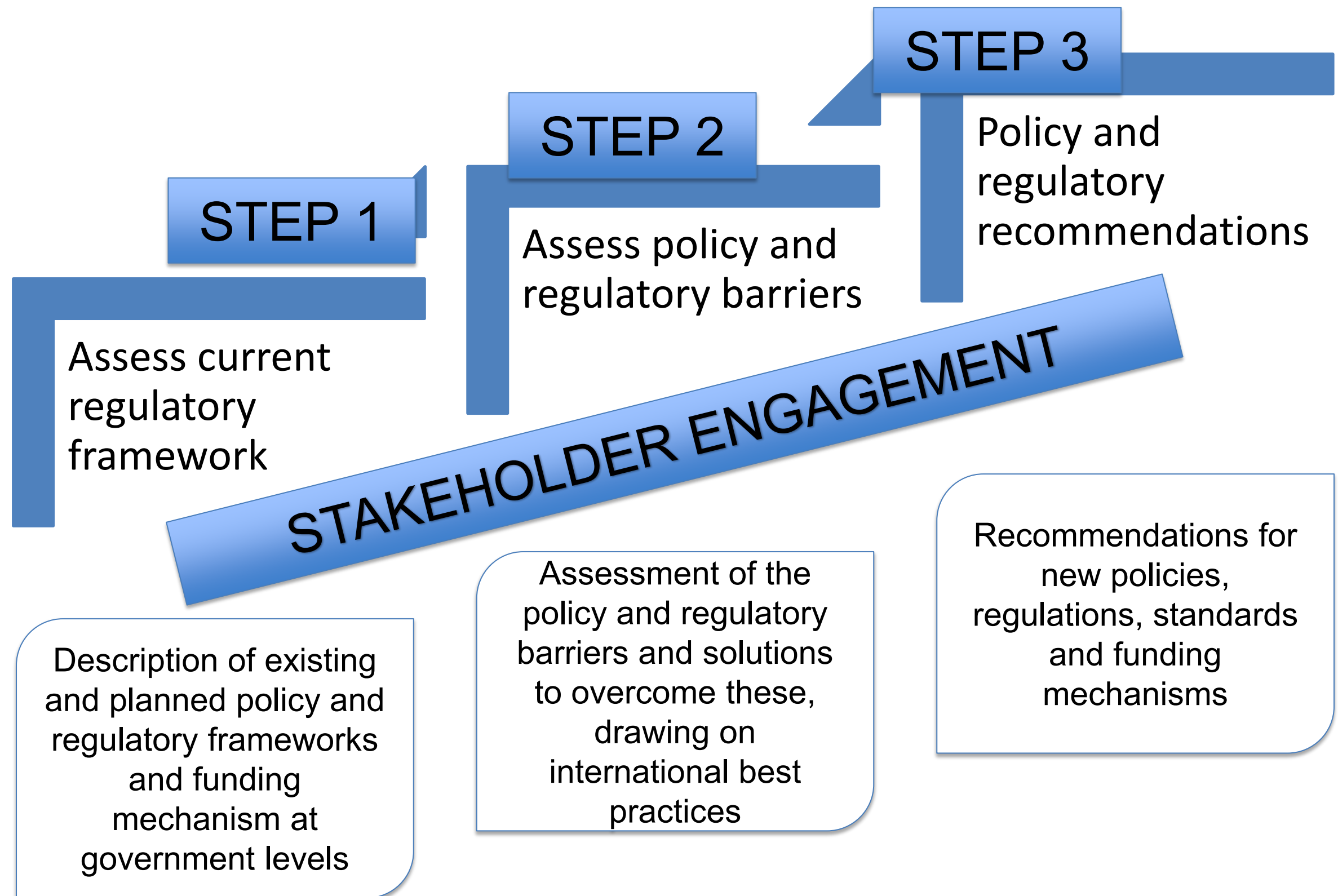
03

### Township Level

- **New development/ township can incorporate the requirement of connecting buildings to district cooling system.**
- For example: Certain township or new development in Iskandar Malaysia has its own masterplan for the whole township to ensure the township planned well throughout the whole development. E.g. Iskandar Sustainable Living

03

# KEY STEPS OF POLICY DEVELOPMENT TO INTEGRATE DES IN URBAN PLANNING

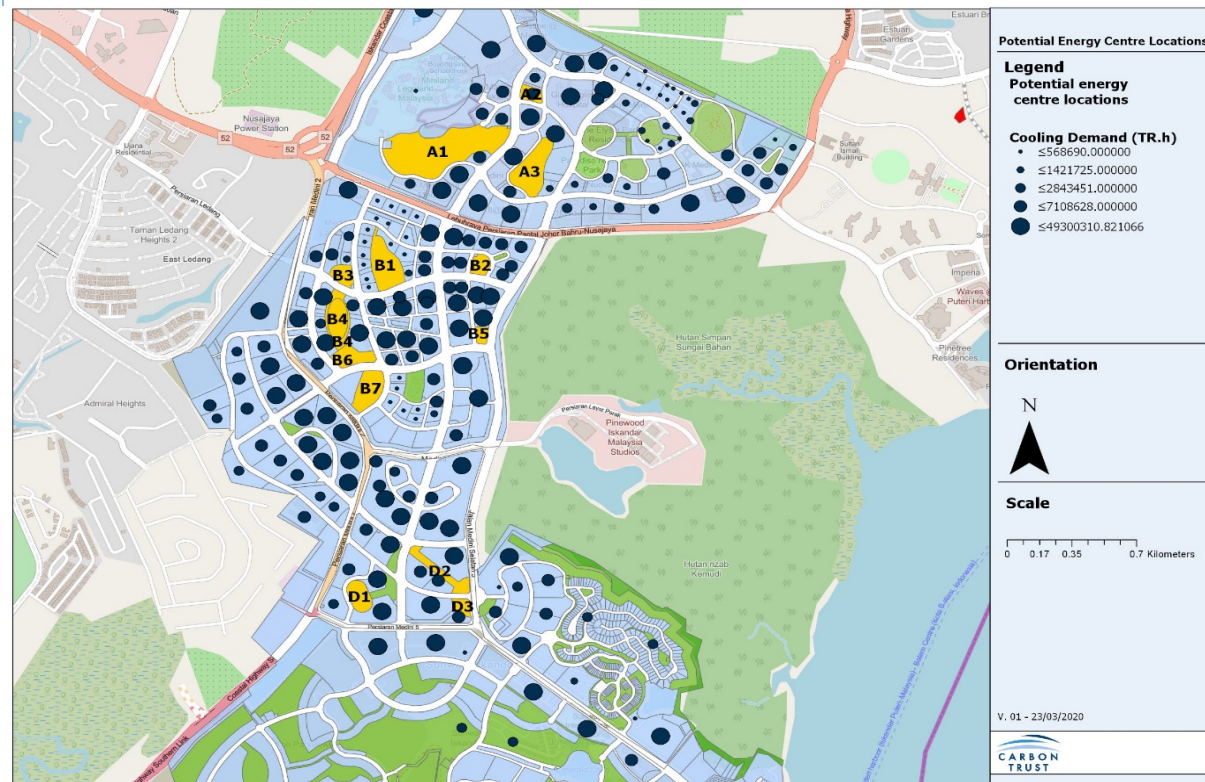




# PRE-FEASIBILITY STUDY OF DCS IN ISKANDAR MALAYSIA AREA

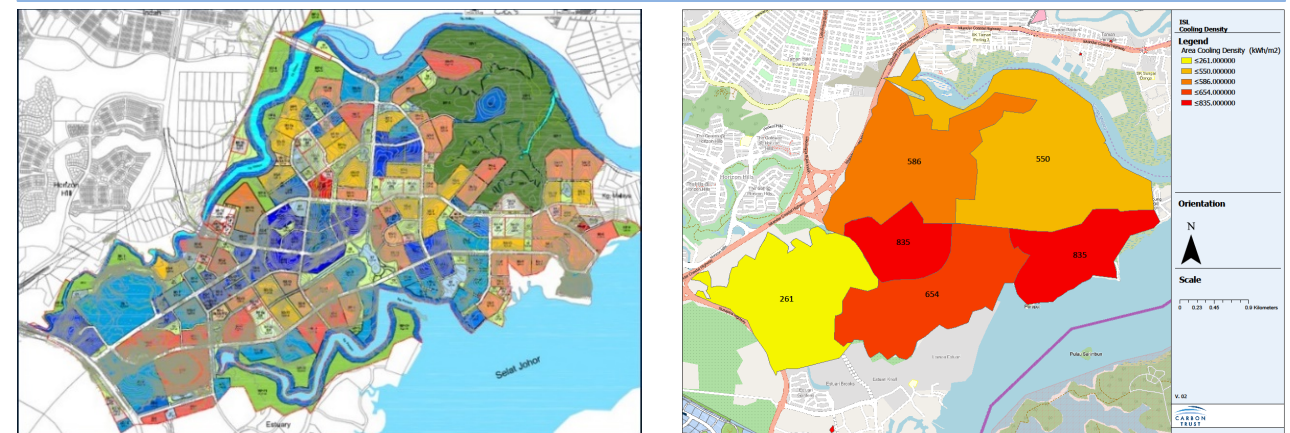
Among studies done on feasibility of DCS in Iskandar Malaysia

## Medini Township



The mapping exercise shows that **Medini has substantial potential for district cooling**. Multiple zones show potential for district cooling that should be explored, keeping in mind that the price of land there is at a premium and that energy centre locations are likely to be one of the largest constraints.

## Iskandar Sustainable Living



The ISL Masterplan Landuse

Mapping of Cooling density for ISL Development according to ISL Masterplan

Looking at the **area cooling demand density**, on the right, we can see that phase of Central Business District (CBD) **has both the highest levels of total cooling demand and area cooling demand density**.

\*studies done by UN Environment and Carbon Trust



# BEST CASE PRACTICES ISKANDAR MALAYSIA

## District Cooling System in Kota Iskandar, Nusajaya

Owner: Johor State Government  
Developer: Cahaya Jauhar Sdn Bhd  
DCS Operator: Jana DCA Sdn Bhd

### Coverage:

- Johor Administrative Centre in Kota Iskandar (3000RT); and
- Various private sector developments in Puteri Harbour (3000RT); Traders Hotel, The Little Red Cube, Jen Hotel, Marina Walk

### Strength

- The contractual agreement between JanaDCS and Johor Administrative Centre make this business could sustain since there are activities happened there everyday.
- Many retails/ commercial centre nearby need the cooling load for their business operation (strategic location).



### Limitation/ challenges

- Many retails./ commercial units has been downsizing or closed operation due to Covid pandemic- e.g. Hello kitty and hotels
- Pandemic situation - hard to move the projects and forecast future market
- Low occupancy rate of buildings (commercial) and the development happened by phases.



# BEST CASE PRACTICES ISKANDAR MALAYSIA

## - LESSON LEARNED

# LESSON LEARNED

Government intervention is crucial/ essential to speed up the development of DCS nation-wide by policies

Regulatory and standard is important to guide the investors, building owners and regulatory/ coordination body for DCS

There is need/ requirement to list the DCS as part of main enablers- as important as other enablers such as electricity, water etc to ensure this facility incorporated well in the masterplan at national, state and regional level.

A lot of awareness and matchmaking business potential between developers/ building owners with the district energy services providers need to be conducted to ensure more building owners understand the concept of DCS and how it works

# PROPOSED RECOMMENDATIONS AT NATIONAL LEVEL TO OVERCOME THE CAPACITY, FINANCING, AND POLICY BARRIERS

## Create a centralised coordination body

- A coordination body would play an important role in providing technical assistance and training, as well as supporting the development of projects. Such coordination is best placed at a national level, where it can provide a standard that will be applied across the country.

## Establish national district cooling policies

- Following the example of Singapore and its District Cooling Act, a comprehensive regulatory framework should deliver consumer and operator protection, fair and transparent tariffs, licensing of operators, and technical standards, while ensuring innovation and development is supported and encouraged.

## Developing national district cooling standards

- National standards can be used to set minimum standards for developers of district cooling networks and therefore ensure standards across the industry. Standards can cover all stages of the development of a district cooling network from feasibility through design, construction, commissioning, and operation.

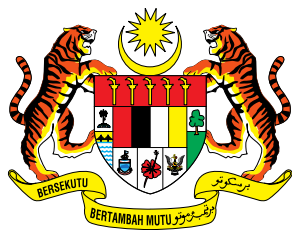
## Carry out energy master planning

- This can be done at regional, city or at a local level to help to develop a vision of the future of the energy system and specifically to investigate and develop the potential for a district cooling network.

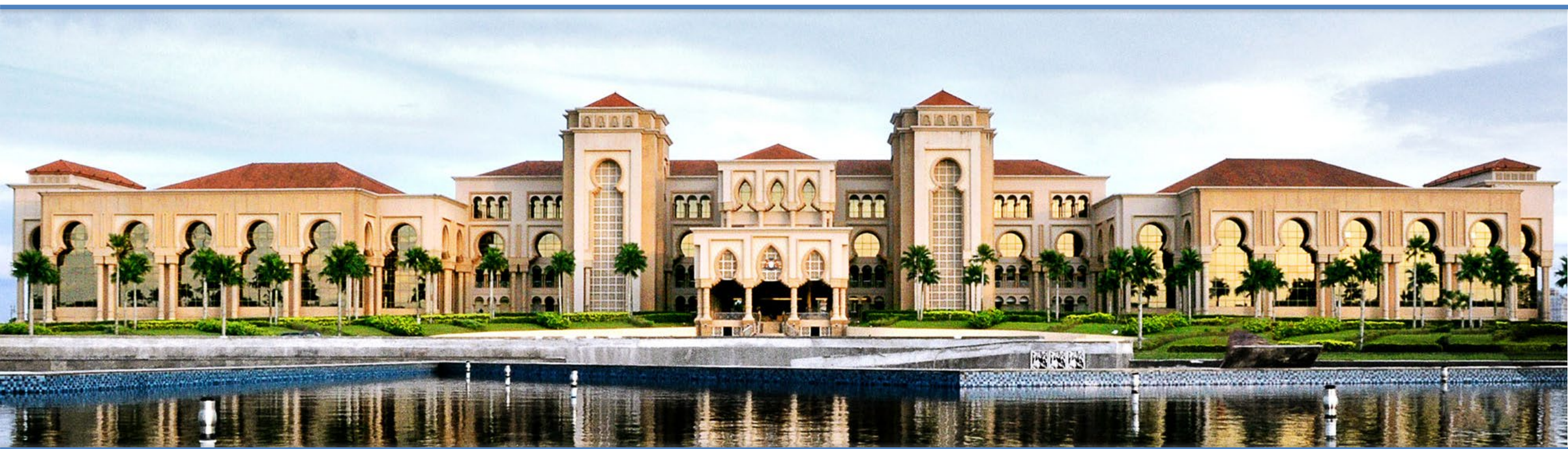
## Raise awareness of district cooling across all stakeholders

- The established coordination body need to developed training packages aimed at different stakeholder to build knowledge and understanding of district cooling.





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# THANK YOU



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