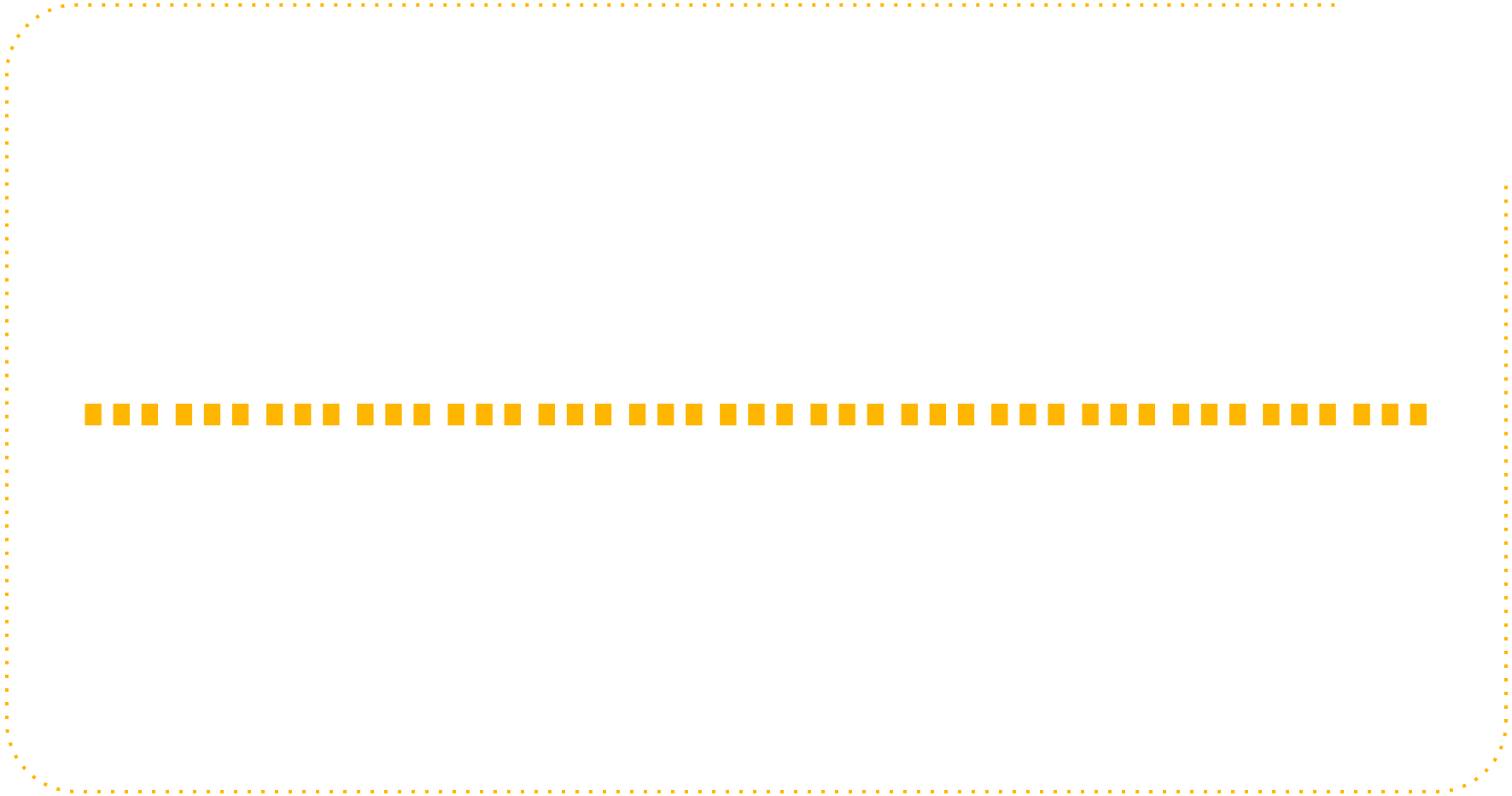
the climate is changing ...

... so MUST architects

farah abdul samad

cawangan alam sekitar & kecekapan tenaga
ibu pejabat jkr malaysia

31 july 2018



globally ...


WEATHER
GONE
IRAL


AVALANCHE
SLAMS INTO
CAR WHILE
DRIVING


A COUPLE IN
CRIMEA IS
SURPRISED BY
A ROGUE WAVE


HEAVY FLOODING
CAUSES BRIDGE
TO COLLAPSE IN
CHENNAI INDIA


VOLCANO ERUPTS
WITHOUT WARNING

GLOBAL WARMING

"...the warming effect on our climate due to greenhouse gases like carbon dioxide (CO_2) had increased by **34%** from 1990 to 2013..."

World Meteorological Organisation, Sept 2014

Malaysia's nationally determined contribution

COP 21

COP21·CMP11
PARIS2015
UN CLIMATE CHANGE CONFERENCE

Earth Summit, Paris, Sept. 2015

sustainable development goals

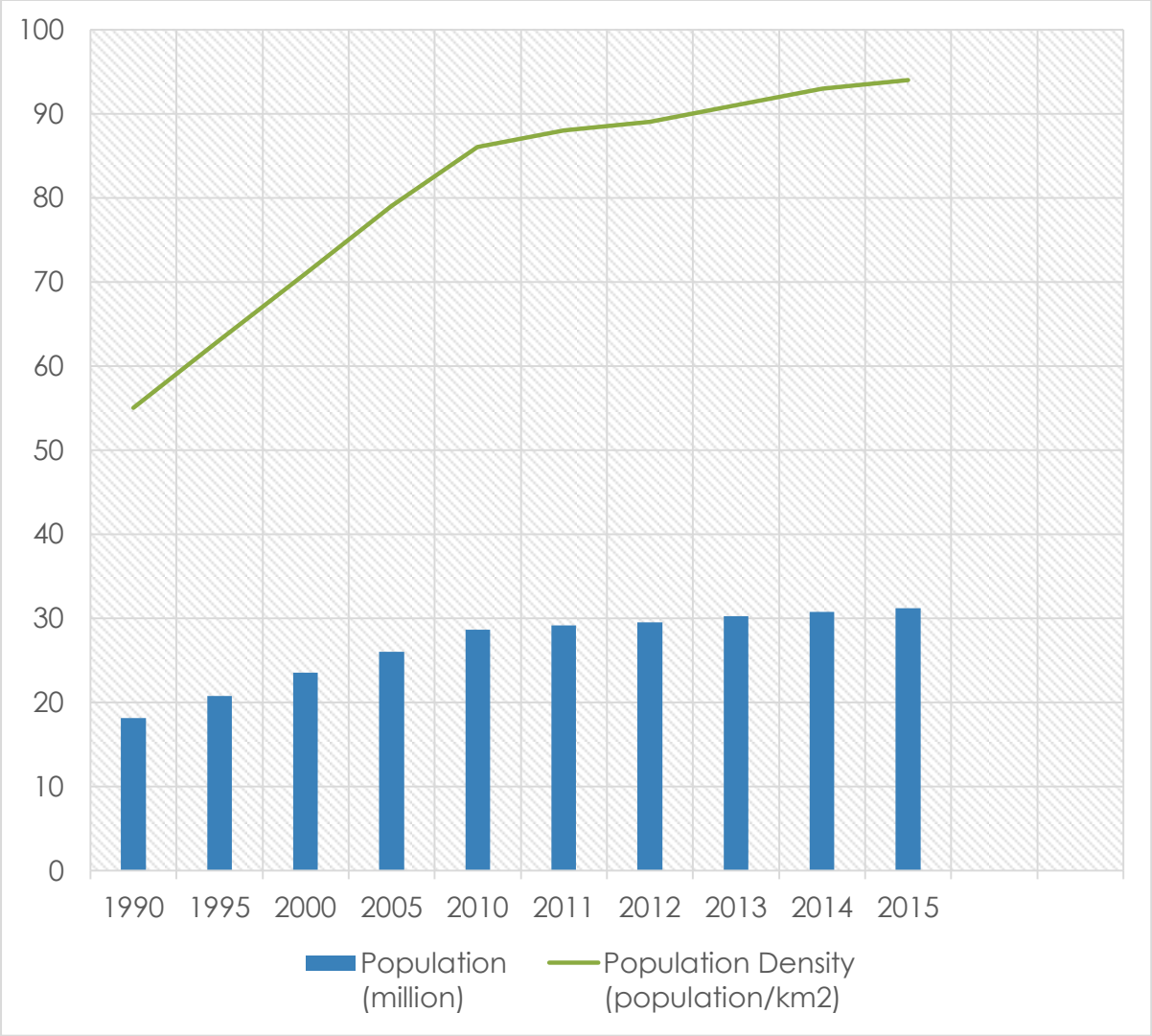
- On 25thSeptember 2015, countries adopted a set of goals to **end poverty**, **protect the planet**, and **ensure prosperity for all** as part of a new sustainable development agenda;
- Each goal has specific targets to be achieved by 2030;
- For the goals to be reached, everyone needs to do their part :
  - Governments;
  - private sectors;
  - civil society;
  - people like us.

national circumstances ...

Source :

Third National Communication (TNC) to the United Nations Framework Convention for Climate Change (UNFCCC)

population



1. The total population of Malaysia in 2015 was 31.2 million. Population increased approximately 32.8% over the period 2005-2015.

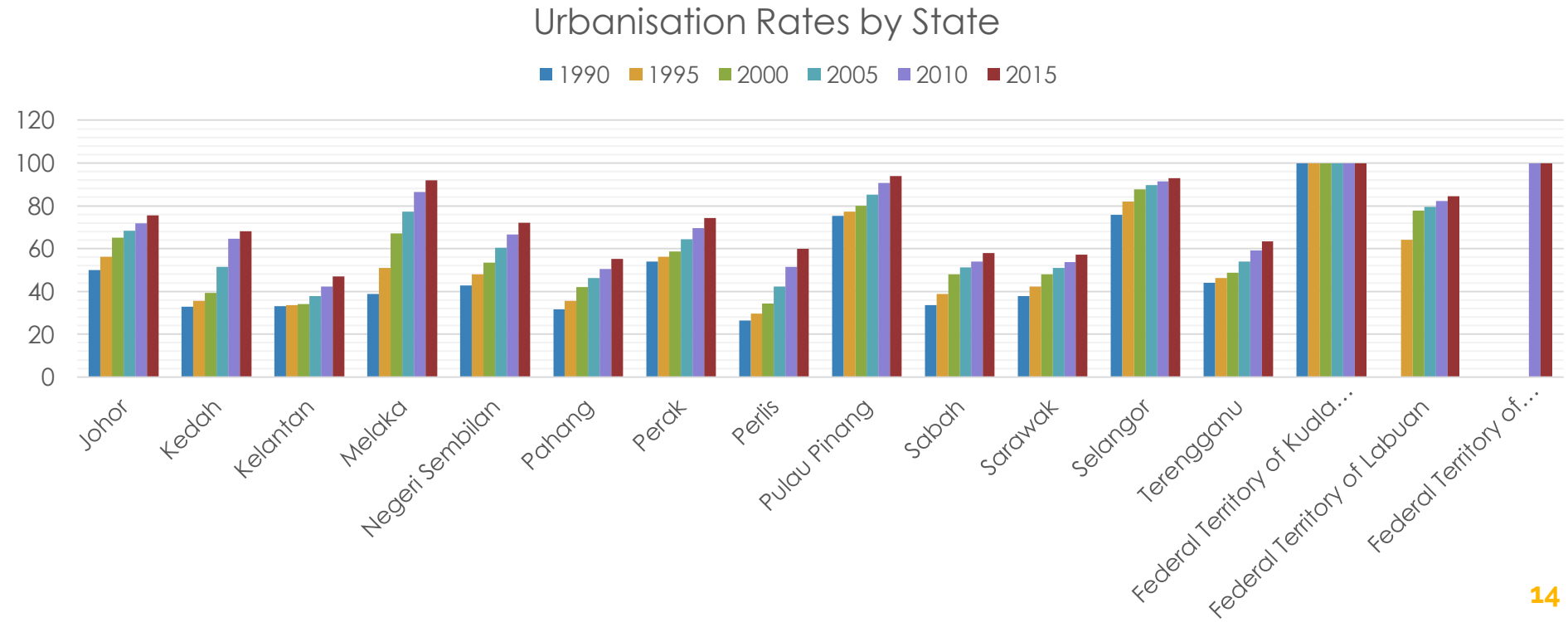
2. There is gradual increase of population density of Malaysia from 79/km^2 in year 2005 to 94/km^2 in 2015.

3. In 2015, approximately 25.0% of the population was under 15 years old, 69.1% was from between ages 15-64, and only 5.9% was over 65 years of age

4. Naturally, each and everyone of us contributes to the carbon emission

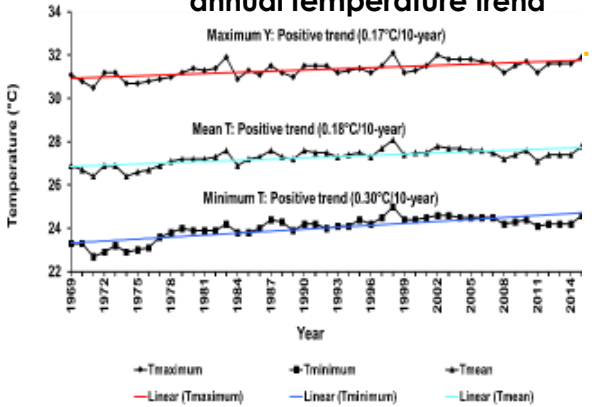
1 The urbanisation rate of Malaysia increased from 66.5% in 2005 to 74.3% in 2015.

2 Cities becomes bigger and carbon emissions of cities becomes higher.

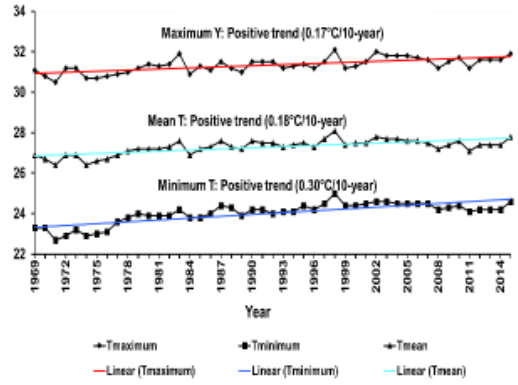


temperature and rainfall

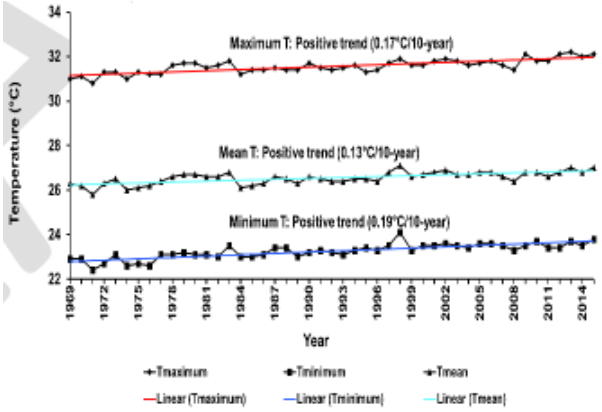
annual temperature trend



peninsular malaysia



sabah

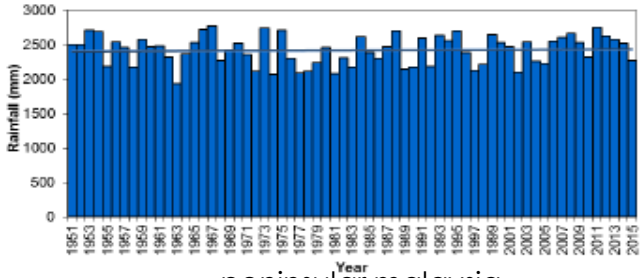


sarawak

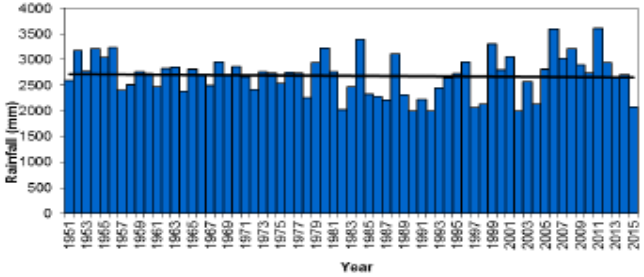
Over the past four decades, increasing temperature trends of 0.13°C to 0.24°C per decade have been observed. (Refer to Paris Agreement)

However the long term trends in rainfall is less pronounced.

annual rainfall trend



peninsular malaysia



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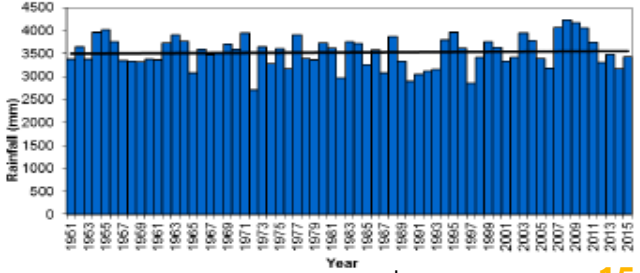
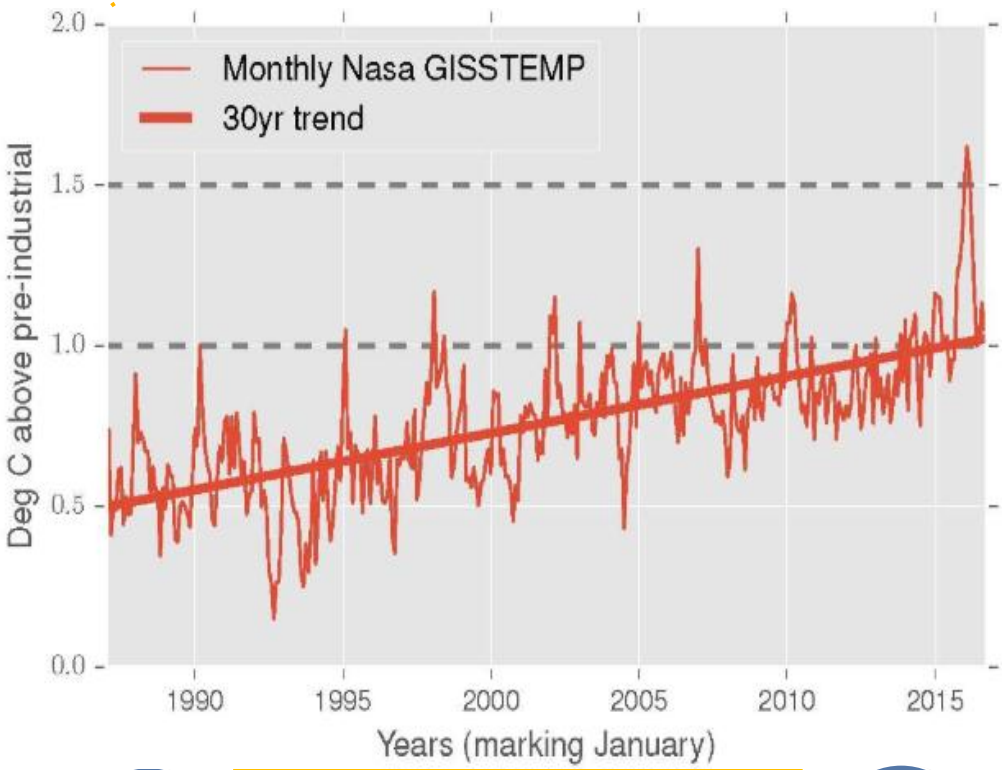


sarawak

paris agreement



1 The Paris Agreement aims to hold global temperatures well below 2°C above pre-industrial levels and

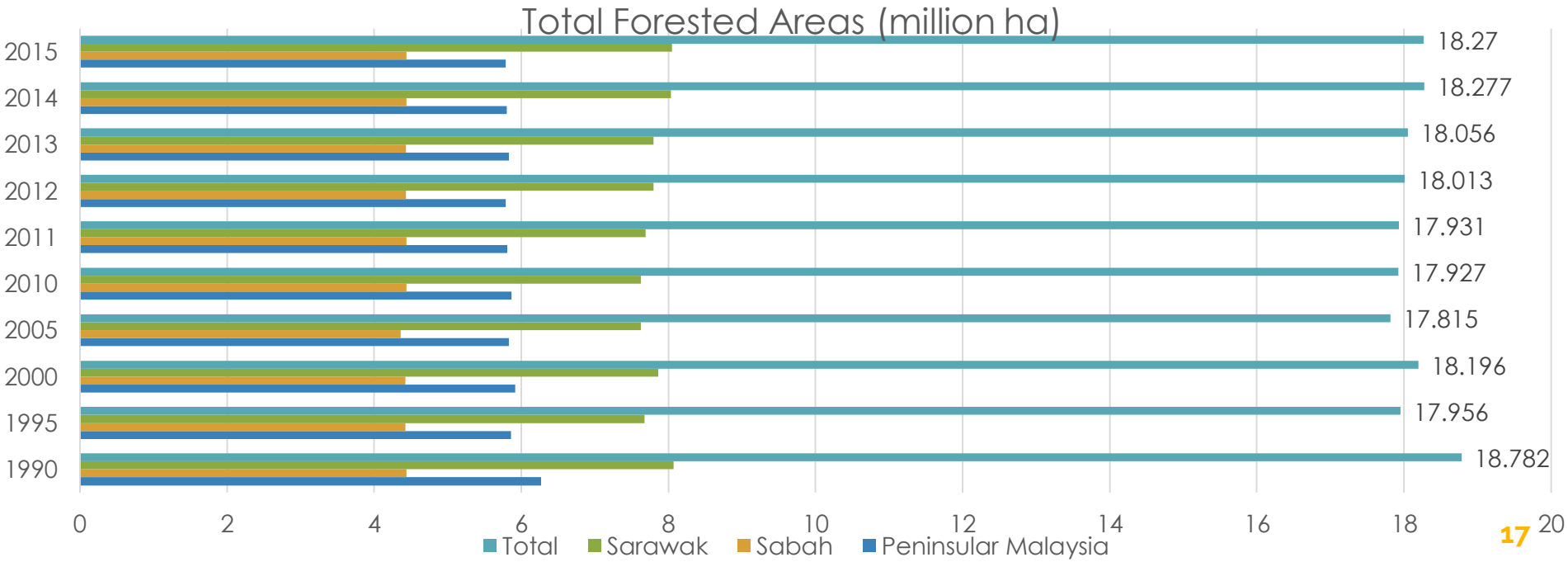
2 to pursue efforts to limit the temperature increase to 1.5°C.

3 This goes beyond what had been agreed in Copenhagen and confirmed in Cancún, namely to recognize the 'the scientific view that the increase in global temperature should be below 2°C

4 The 2015 temperature record of a 1°C increase in global mean surface air temperature above pre-industrial levels

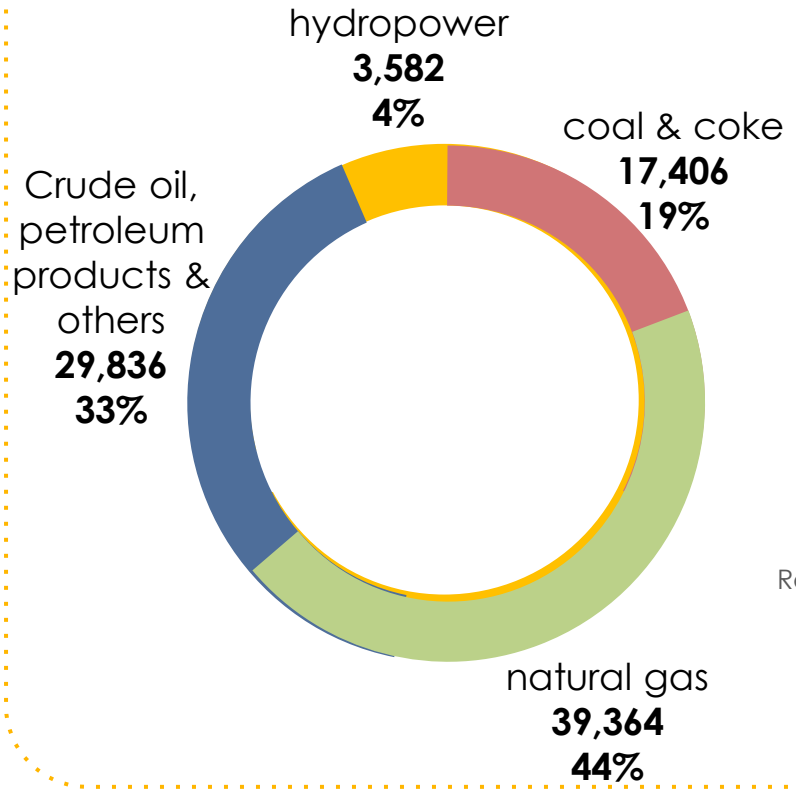
5 This has led to some speculation as to the feasibility of limiting warming to 1.5°C, in line with the long term temperature limit in the Paris Agreement.

1. Forest is an important heritage and ecosystem of the country
2. In 2015 approximately 55.23% of the land remained forested
3. Terrestrial biodiversity is concentrated within these forests and the country is considered as one of the world's mega-diverse countries

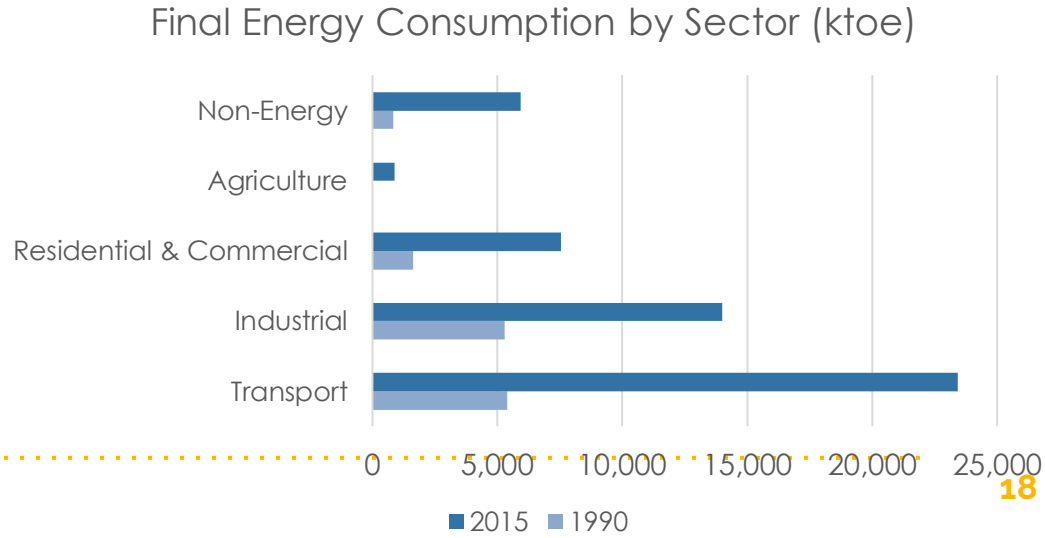


energy

- Malaysia's primary energy supply in 2005 was 66,211 ktoe



- This increased to 90,188 ktoe in 2015.
- The main source of primary energy supply of Malaysia comes from oil and gas.
- Residential & Commercial Sector consumption has risen by 21% (1990 to 2015)



renewable energy

1. Cumulative Installed Capacities of Grid-Connected FiT Renewable Energy Projects (MW)

2. The trend is increasing but not enough

Year	Biogas	Biomass	Small Hydro	Solar PV	Total
2012	5.16	36.9	11.7	31.58	**85.34**
2013	11.73	36.9	11.7	138.59	**198.92**
2014	12.83	49.4	11.7	203.65	**277.58**
2015	20.23	68.4	18.3	230.48	**337.41**

source : SEDA, 31 July 2017

renewable energy >>

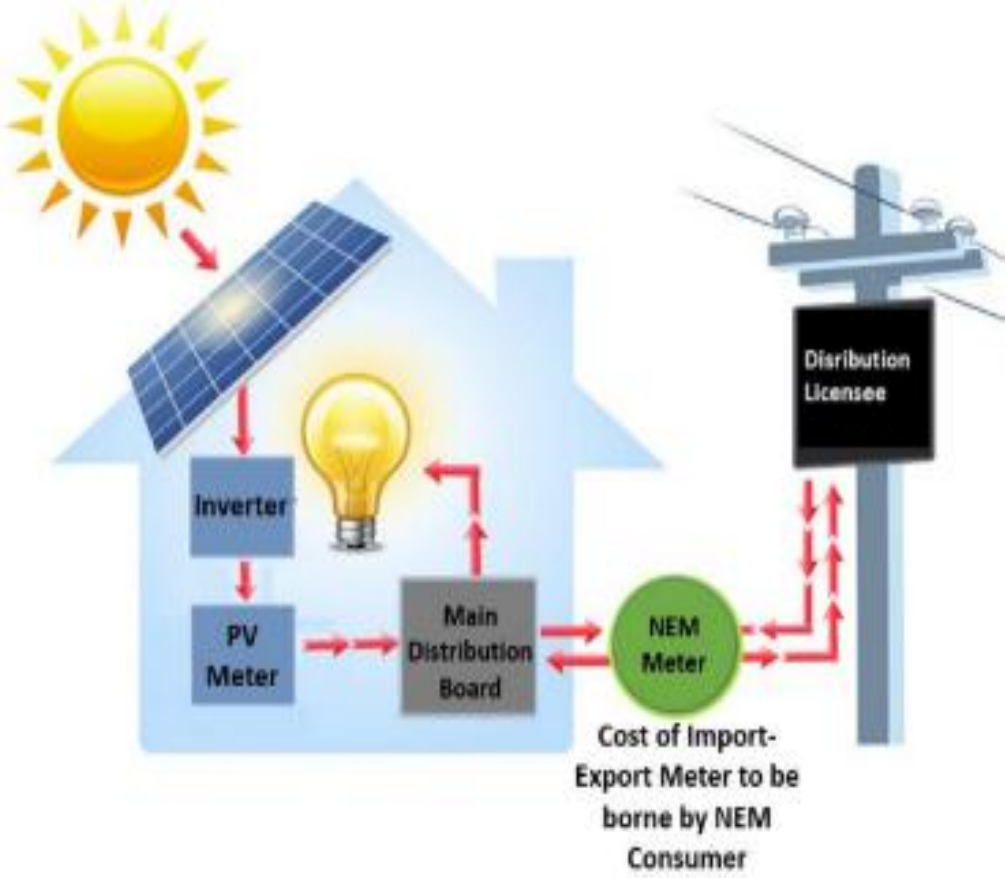
Net Energy Metering (NEM)

The concept of NEM is that the energy produced from the solar PV system installed will be consumed first and any excess to be exported and sold to the distribution licensee (such as TNB /SESB) at the prevailing Displaced Cost prescribed by the Energy Commission.

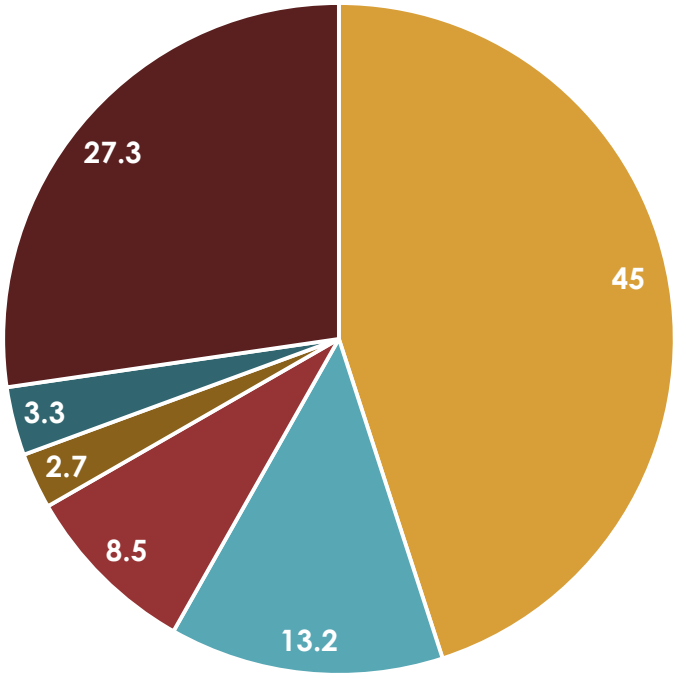
This scheme is applicable to all domestic, commercial and industrial sectors as long as they are the customers of TNB (Peninsular Malaysia) or SESB (Sabah and FT Labuan).

The energy generation by NEM consumer will be consumed first which implies less energy import from the utility.

By generating their own clean energy, consumer will contribute to the reduction of CO_2 emission, hence reducing the carbon foot print and mitigating climate change.



solid waste

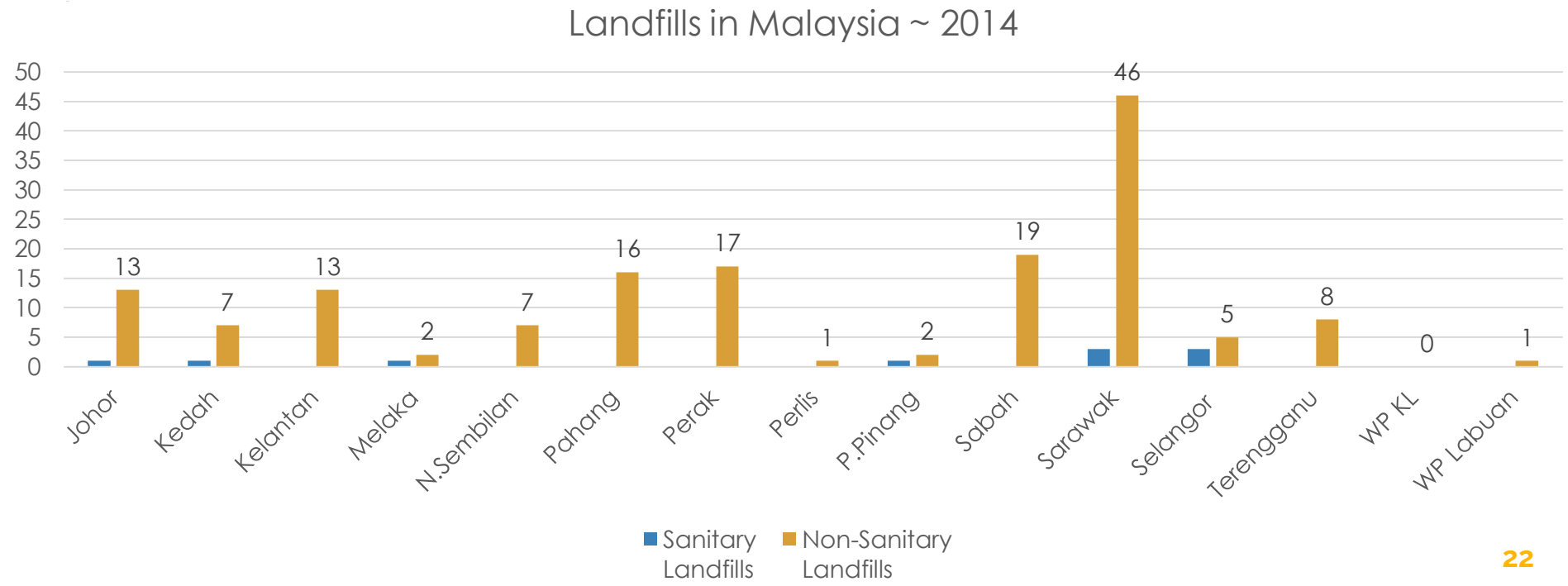


- The average per capita waste generation ranges from 1 to 1.33 kg per person per day across the strata and housing type
- Population distribution and the level of development dictate the distribution of waste disposal sites and waste characteristics in the country.
- More waste is generated in areas where developments are highest.

region/ year	2007*	2012**
peninsular Malaysia (tonnes/day)	20,500	27,802
sabah (tonnes/day)	1,210	2,984
sarawak (tonnes/day)	1,988	2,344

solid waste landfill

Sanitary landfills are sites where waste is isolated from the environment until it is safe. It is considered safe when it has completely degraded biologically, chemically and physically.



governance

1

majlis teknologi hijau & perubahan iklim (MTHPI)

- established in September 2009
- to formulate policies and identify strategic issues
- to implement in the National Green Technology Policy and the National Policy on Climate Change
- chaired by the Prime Minister and comprises a number of key Cabinet Ministers as members making it an ideal platform for high-level decision-making on climate change

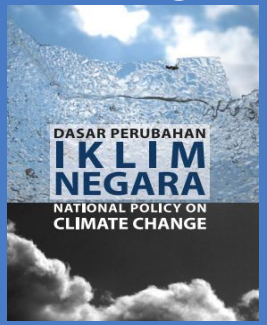
2

Rancangan Malaysia ke-11

- Coordinated by the Economics Affairs Ministry
- Carried out through the five year development plans and include the programmes for mitigation and adaptation of climate change.

3

Dasar Perubahan Iklim Negara

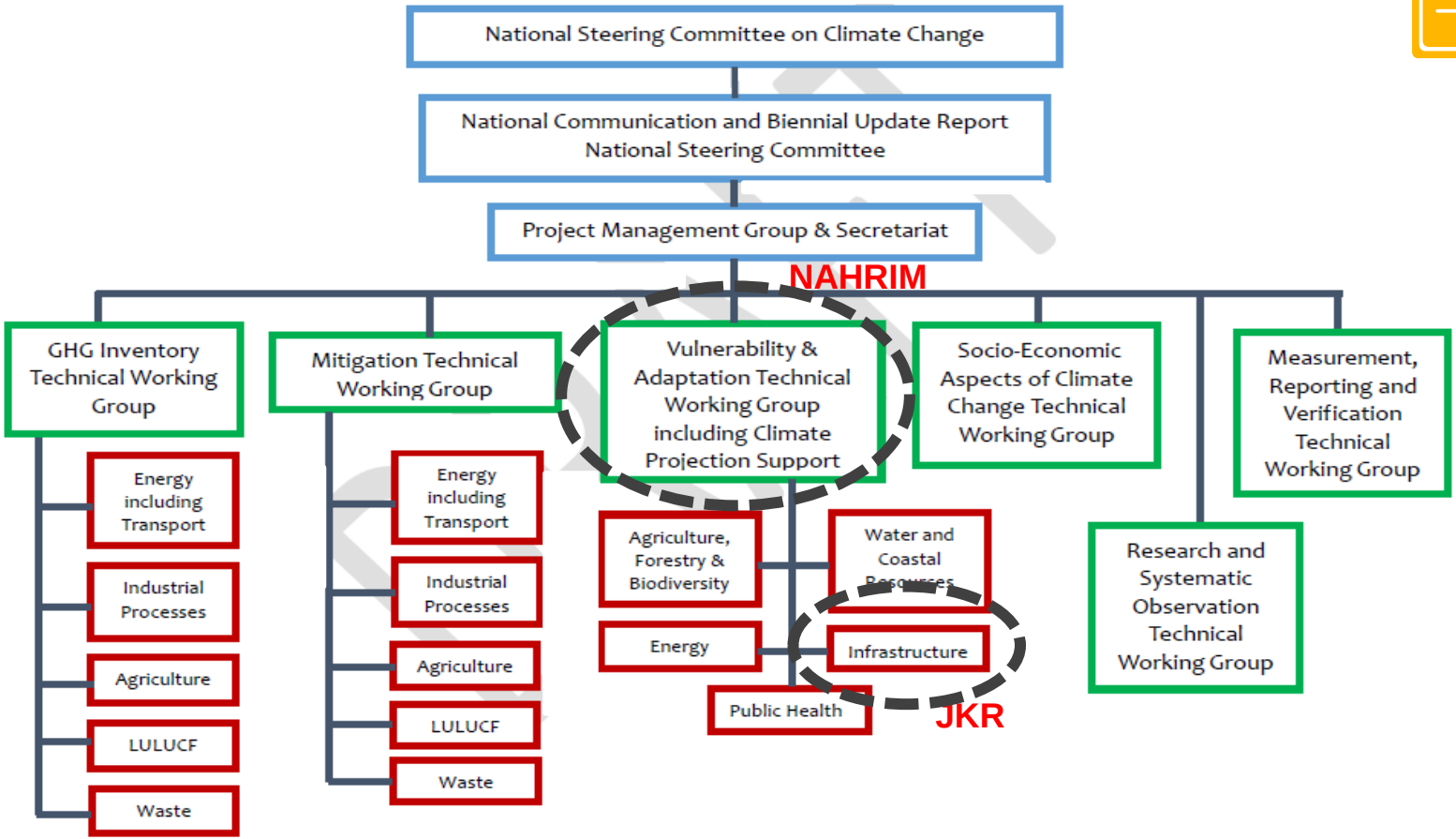


- Climate change matters used to be under the charge of the Minister of Natural Resources and Environment. Now,
- Coordinating Ministries and their implementing agencies for key sectors that are relevant sectors for climate change actions implementation.

Principles

- P1: Development on a Sustainable Path
  - Integrate climate change responses in national development plans to fulfil the country's aspiration for sustainable development.
- P2: Sustainability of Environment and Natural Resources
  - Initiate actions on climate change issues that contribute to environmental conservation and sustainable use of natural resources.
- P3: Integrated Planning and Implementation
  - Integrate climate change considerations into development planning and implementation.
- P4: Effective Participation
  - Improve participation of stakeholders and major groups for effective implementation of climate change responses.
- P5: Common but Differentiated Responsibility
  - International involvement on climate change will be based on the principle of common but differentiated responsibilities and respective capabilities.

institutional arrangement for climate change in Malaysia (NRE)



GHG inventory

comparison of greenhouse gas emissions >>

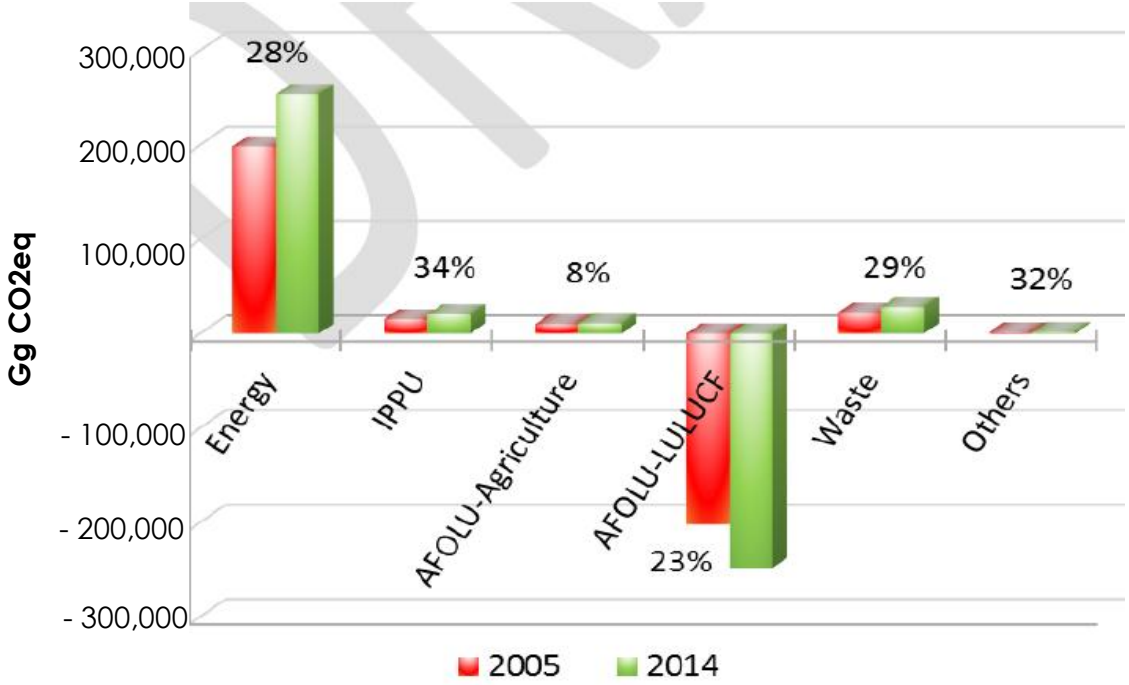
by sector between 2005 & 2014

Emissions in the **energy sector** increased by 28%

IPPU sector increased by 34%

AFOLU-Agriculture sector increased by 8%

Waste sector increased by 29%
AFOLU-LULUCF net removals increased by 23%



major sources of carbon dioxide emissions >>

in 2014

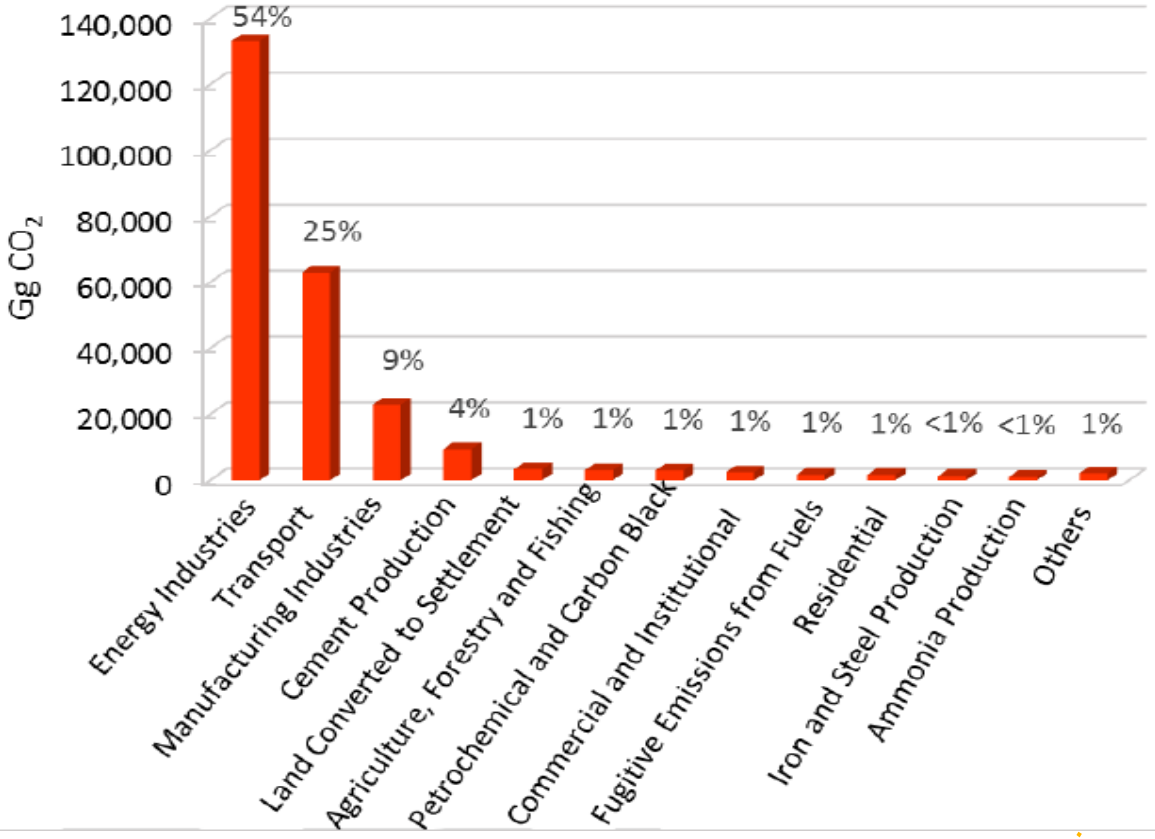
In 2014, a total of 248,195 Gg CO_2 was emitted.

The CO_2 emission from energy industries was the highest at 133,097 Gg CO2 (54%)

followed by emissions from transport at 63,020 Gg CO2 (25%)

Emissions from energy industries were due to the fuels used by the power and auto producers for producing electricity, petroleum refining and natural gas transformation.

Manufacturing industries and construction was the third largest contributor to CO_2 emissions at 22,906 Gg CO2 (9%).



greenhouse gas emissions

- In **2014**, the GHG emission intensity per unit of GDP, taking into account **Land Use, Land Use Change and Forestry (LULUCF) emissions only**, has **improved** by approximately **27%** compared with 2005 levels.

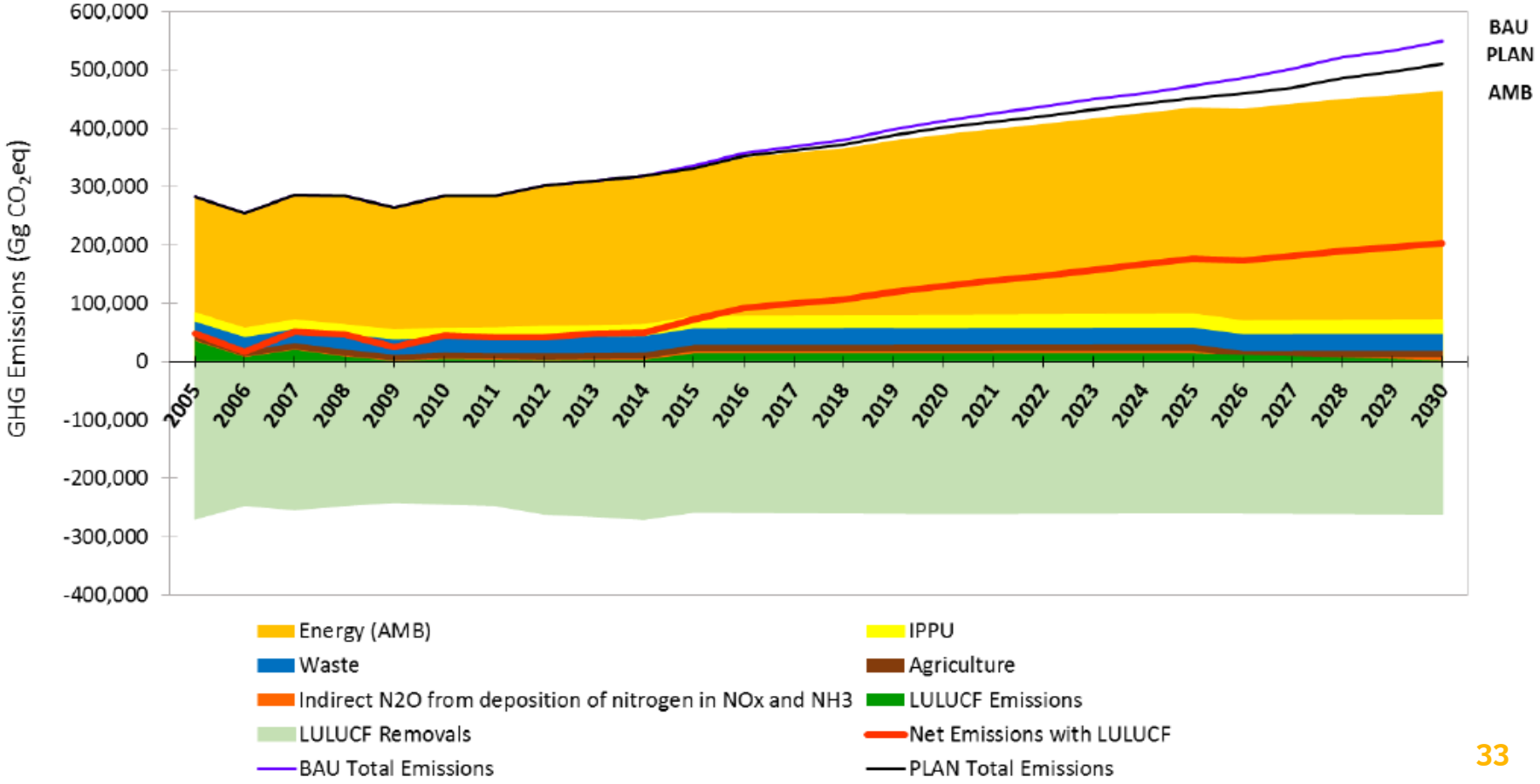
- With the inclusion of **removals by LULUCF**, the GHG emission intensity per unit GDP had **improved 33%** by 2014 compared with 2005 levels

- The **main contributions** to the GDP are from **services (54%), manufacturing (23%), agriculture, livestock, forestry and fishing (9%), mining and quarrying (9%) and construction (5%).**

mitigation actions

projected GHG Emission Time Series for >>

BAU, PLAN & AMB scenarios



vulnerabilities & adaptations

effect of climate change

>> temperature rise/drought <<

effect of climate change

>> temperature rise/drought <<

vulnerabilities

- **Thermal discomfort** or even fatal (young children/elderly)
- **Reduced material durability** thus building lifespan will be shorter
- Increased Urban Heat Island Effect
- Increased energy demand especially for air conditioning
- **Increased operational cost** of buildings **Increased GHG emission**
- **Haze/Air Pollution** will cause problems for mechanical services
- Fire hazard for buildings
- Depletion of aquifers cause serious ground settlement as a result the building will sink
- Water scarcity will cause **shortage of water supply**

adaptations

- **Improve EE** in buildings through **Passive Design** strategies and **Renewable Energy** to reduce dependency on electricity
- Use UV stabilized materials
- To increase thermal comfort
  - Better cross ventilation design
  - Shallow plans
  - Window openings of sensible size
- **Adaptive skins** (passive approaches i.e. shading device, louvers, double skin etc)
- Usage of **thermal mass**
  Efficient and supportive M & E systems
- To review water management and plan (**recycling water/ rain water harvesting**)
- Alternative material/ design
- Renewable Energy as alternative energy source
- If water is reduced below critical levels, new development has to be discouraged or banned.
- Potable water requires infrastructure and energy to purify and to pump and the resulting waste water requires further treatment. Both these factors indicate that **water efficiency** is imperative thus the need for water saving features/fittings.

effect of climate change

>> flood <<

vulnerabilities

- Structural and material **damage** to the building
- Condensation/Corrosion
  Acid Rain will cause negative impact on building materials

adaptations

- **Review building design standard** at vulnerable areas
- Flood Mitigation Plan
- New design approach for houses **in flooded prone areas.**
- Implementation of 'Manual Saliran Mesra Alam' (**MSMA**) that can absorb rainwater to prevent flash flood.
- Implementation of rainwater harvesting system
- Erosion and Sedimentation Control Plan (**ESCP**)
- More stringent enforcement on EIA control
- Suitable **design standards** to be enforced for infrastructure
- Control over **design** of houses **to withstand adverse weather**
- Systematic **Disaster Recovery Plan** for housing and infrastructure

effect of climate change

>> sea level rise <<

vulnerabilities

- **Coastal flooding and Coastal Erosion** will cause structural and material damage

adaptations

- **Protect coastal area** by placing gabion, constructing wave breaker
- Conserve & plant **mangrove** trees
- Suitable design to adapt

We cannot stop **natural disasters**

BUT

we can arm ourselves with **knowledge**;

so many lives wouldn't have to be lost

if we are **more prepared**

Thank You

Any questions?

You can find me at farahas.jkr@1govuc.gov.my