



FINLAND FUTURES
RESEARCH CENTRE



Erasmus+

FUTURE SUSTAINABLE ENERGY CHALLENGES – GLOBAL OUTLOOK

DEVELOPMENT OF ENERGY EDUCATION IN THE MEKONG REGION (DEEM) FIRST TRAINING

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OBJECTIVES

- ✓ PART I: REVIEW BASIC TERMINOLOGY ON SUSTAINABLE DEVELOPMENT, CLIMATE CHANGE AND SUSTAINABLE ENERGY
- ✓ PART II & III : THE STORY OF GLOBAL AND CAMBODIAN ENERGY OUTLOOK
- ✓ PART IV (HOMEWORK): UNDERSTAND THE BASICS OF DIFFERENT RENEWABLE ENERGY TECHNOLOGIES

PART I - REVIEW

”Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”- Our Common Future

CONCEPT OF NEEDS & LIMITATIONS

SUSTAINABLE DEVELOPMENT?

**SOCIAL, ENVIRONMENTAL AND ECONOMIC
SUSTAINABILITY**

MILLENNIUM DEVELOPMENT GOALS (MDGs)

**SUSTAINABLE DEVELOPMENT GOALS (SDGs),
AGENDA2030**

17 GLOBAL TARGETS

PEACE, JUSTICE & STRONG INSTITUTIONS

NO POVERTY

ZERO HUNGER

CLEAN WATER & SANITATION

QUALITY EDUCATION

GOOD HEALTH AND WELL-BEING

REDUCED INEQUALITIES

SUSTAINABLE CITIES & COMMUNITIES

SUSTAINABLE DEVELOPMENT

GOALS

CLIMATE ACTION

DECENT WORK & ECONOMIC GROWTH

GENDER EQUALITY

RESPONSIBLE CONSUMPTION & PRODUCTION

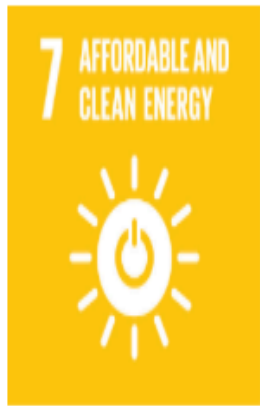
INDUSTRY, INNOVATION & INFRASTRUCTURE

LIFE ON LAND

LIFE BELOW WATER

PARTNERSHIPS FOR THE GOALS

AFFORDABLE & CLEAN ENERGY



CLIMATE VS. WEATHER?

– *“Climate is what you expect, weather is what you get”* - Heinlein, 1974

CLIMATE VARIABILITY?

- SEASONAL, ANNUAL, PERIODIC

CLIMATE CHANGE?

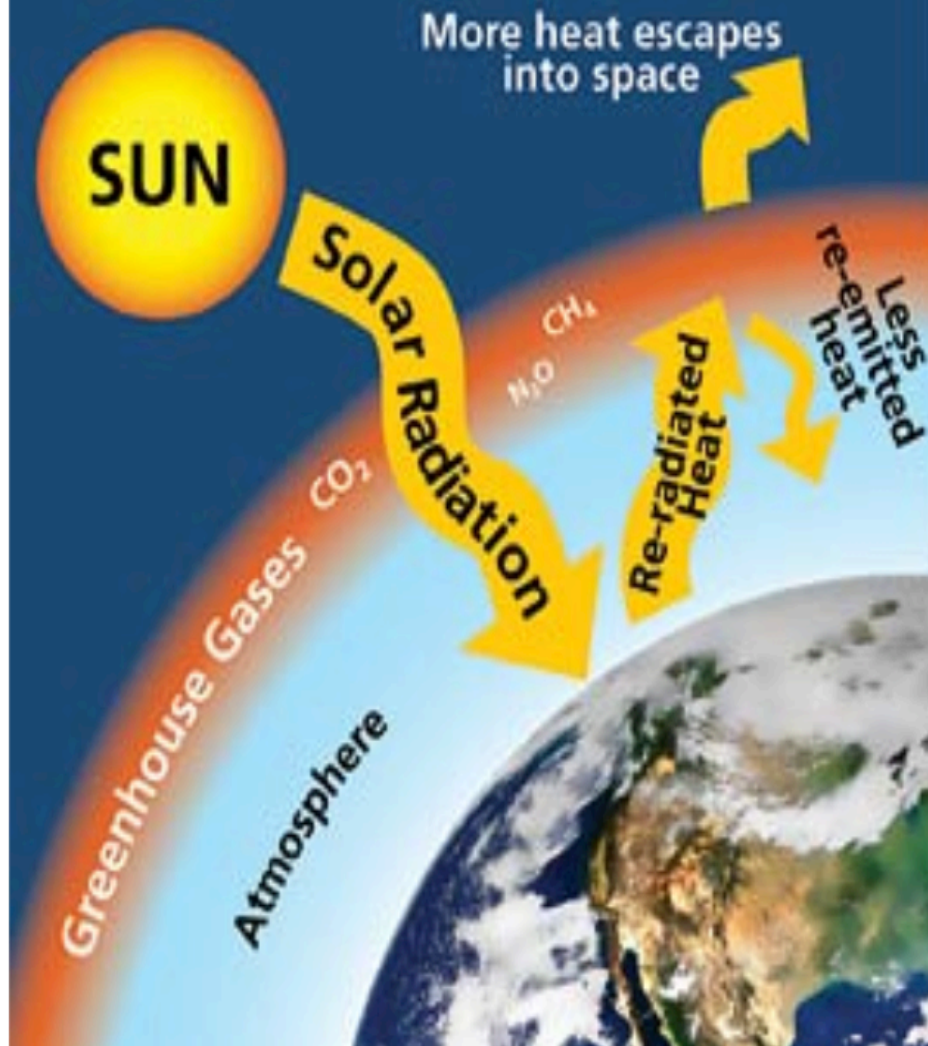
CLIMATE CHANGE

- NATURAL & UN-NATURAL

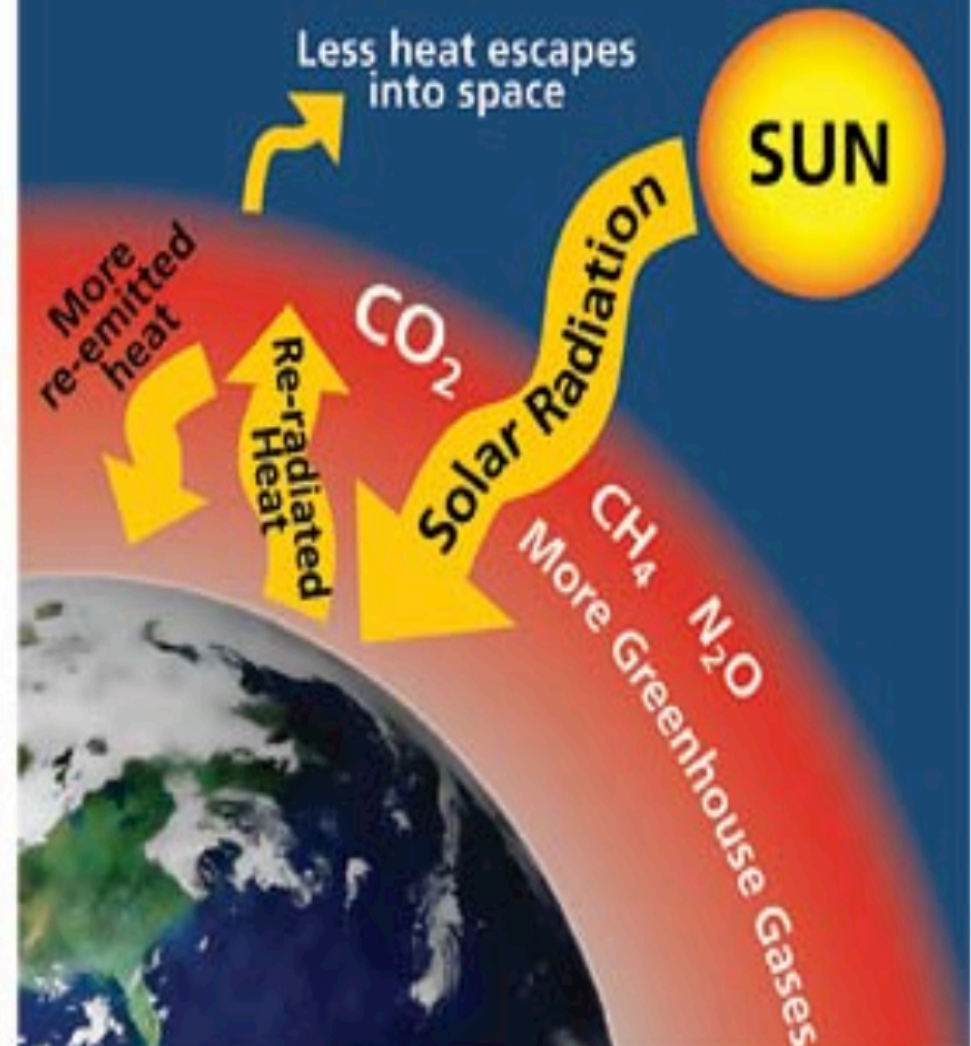
HUMAN INDUCED/ANTHROPOGENIC CLIMATE CHANGE?

- GHGs FROM HUMAN ACTIVITIES INCREASING EARTH'S AVERAGE TEMPERATURES

Natural Greenhouse Effect

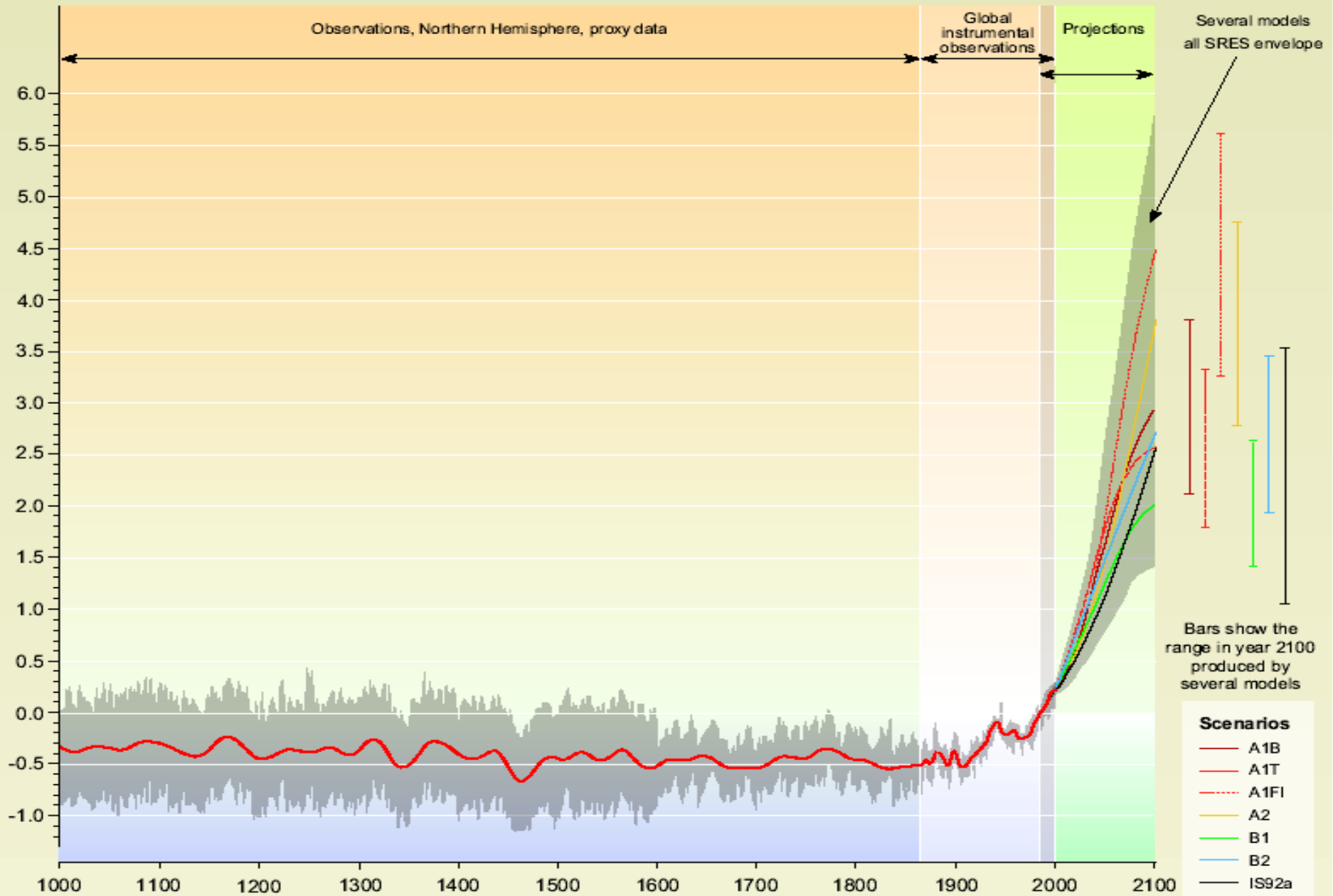


Human Enhanced Greenhouse Effect



Variations of the Earth's surface temperature: years 1000 to 2100

Departures in temperature in °C (from the 1990 value)



HUMAN ACTIVITIES AND DEVELOPMENT

INDUSTRY

AGRICULTURE,
FORESTRY, LAND
USE

TRANSPORT

GHGs EMISSIONS INCREASING IN THE ATMOSPHERE

ENHANCED GREENHOUSE EFFECT

GLOBAL WARMING

CLIMATE CHANGE

IMPACTS TO HUMANS AND ECOSYSTEMS

INTERGOVERNMENTAL (IPCC,
UNFCCC) & COUNTRY MECHANISMS

ADAPTATION TECHNICAL
FUNDING ASSISTANCE
KNOWLEDGE PLANNING

ADAPTIVE/COPING
CAPACITY
VULNERABILITY
RESILIENCE

IMPACTS TO HUMANS AND ECOSYSTEMS

ADAPTATION

AVERAGE TEMPERATURE RISING
DISASTERS
WEATHER EXTREMES
POLAR ICE MELTING
ARCTIC REGIONS
LOSING ICE/SNOW
COVER

DISEASES
CORAL BLEACHING
SPECIES EXTINCTION
SEA LEVEL RISE
SALT WATER INTRUSION
COMPLEX SYSTEM, WHO KNOWS?



**ADAPTATION=
RESPONDING TO THE
SYMPTOMS OF THE
CC DISEASE**

CLIMATE NEGOTIATIONS
(PARIS, COP 21)

CARBON MARKETS/CLEAN
DEVELOPMENT MECHANISMS
AGREEMENTS &
POLICIES

SUSTAINABLE ENERGY

AVOIDING IMPACTS?

MINIMISING EMISSION OF GHGS

TRANSITIONING FUELS FROM
FOSSIL TO OTHER FUELS

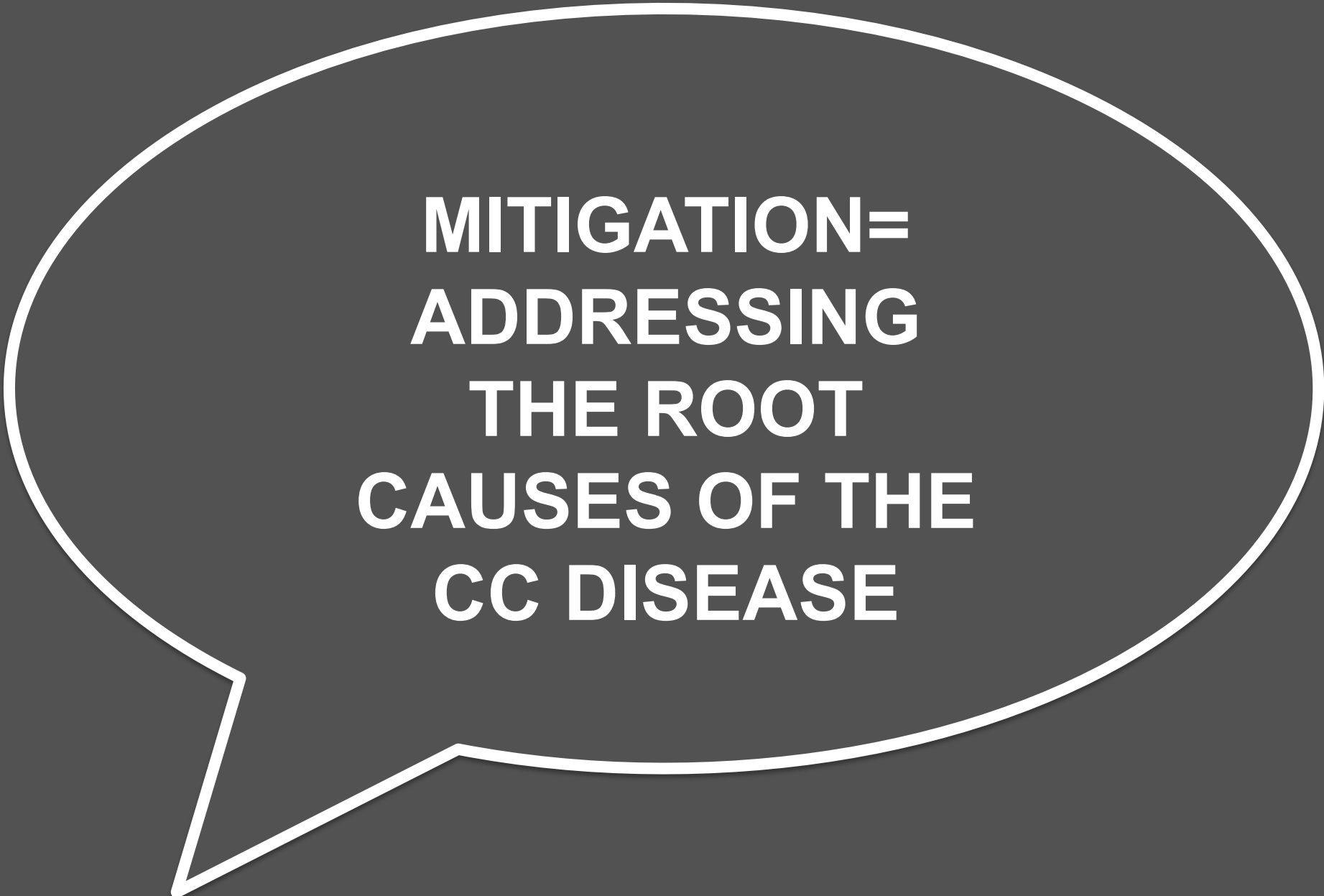
DECREASING ENERGY,
AGRICULTURAL & TRANSPORTATION
EMISSIONS

CARBON CAPTURE & SEQUESTRATION

MITIGATION

BEHAVIORAL &
CONSUMPTION
PATTERN CHANGES

RESOURCE/ ENERGY
EFFICIENCY



**MITIGATION=
ADDRESSING
THE ROOT
CAUSES OF THE
CC DISEASE**

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**MITIGATING THE GHG
EMISSIONS TO ATMOSPHERE**

CLIMATE CHANGE

**COPING WITH CHANGES/
IMPACTS TO HUMANS AND
ECOSYSTEMS**

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**FOSSIL VS. NON-FOSSIL
RENEWABLE VS. NON-RENEWABLE
INEXHAUSTIBLE VS. EXHAUSTIBLE
CONVENTIONAL VS. NON-CONVENTIONAL
CLEAN VS. DIRTY**

ENERGY

**FOCUS ON NON-FOSSIL, RENEWABLE,
INEXHAUSTIBLE, NON-CONVENTIONAL AND
CLEAN ENERGY**

RENEWABLE ENERGY SOURCES

HYDRO

SOLAR

OCEAN (TIDAL,
WAVE)

BIOMASS

WIND

GEOHERMAL

SUSTAINABLE ENERGY?

THE USE OF THE ENERGY SOURCE IS LIMITED
BASED ON AN EVALUATION OF ECOLOGICAL
AND SOCIO - ECONOMIC FACTORS.

**END OF PART I
-QUESTIONS
COMMENTS**