Adapting The Transport Sector: The Case of Cyprus

Dr Marios Valiantis

27-03-14

UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Centre for Green Development and Energy Policy

Weather vs Climate

- Weather is what we experience over a short period of time (e.g. over an hour or a day)

- Climate is the average weather and its variability over a long period of time (e.g. 30 years)

<u>It is important not to:</u>

- Confuse short-term weather events (e.g. snow in November and December 2010) with long-term trends in the climate (e.g. winters warming by over 2°C by the mid-century)

- Presume extreme cold spells will end. Despite a warming climate, cold spells will still occur but with reduced likelihood

Climate Change

Climate change refers to changes in global climate and in particular to changes in meteorological conditions spanning at a large time scale.

Natural Causes

- Changes in solar radiation
- Volcano eruptions
- Reflection of solar heat from the earth

Human Causes

- Increase of greenhouse gas emissions in the atmosphere
  - Transport
  - Industries
  - Households

Transport Sector

The transport sector is the driving force of the modern economy.

The needs in passenger and freight transportation are increasing at rates greater than the economy and population growth.

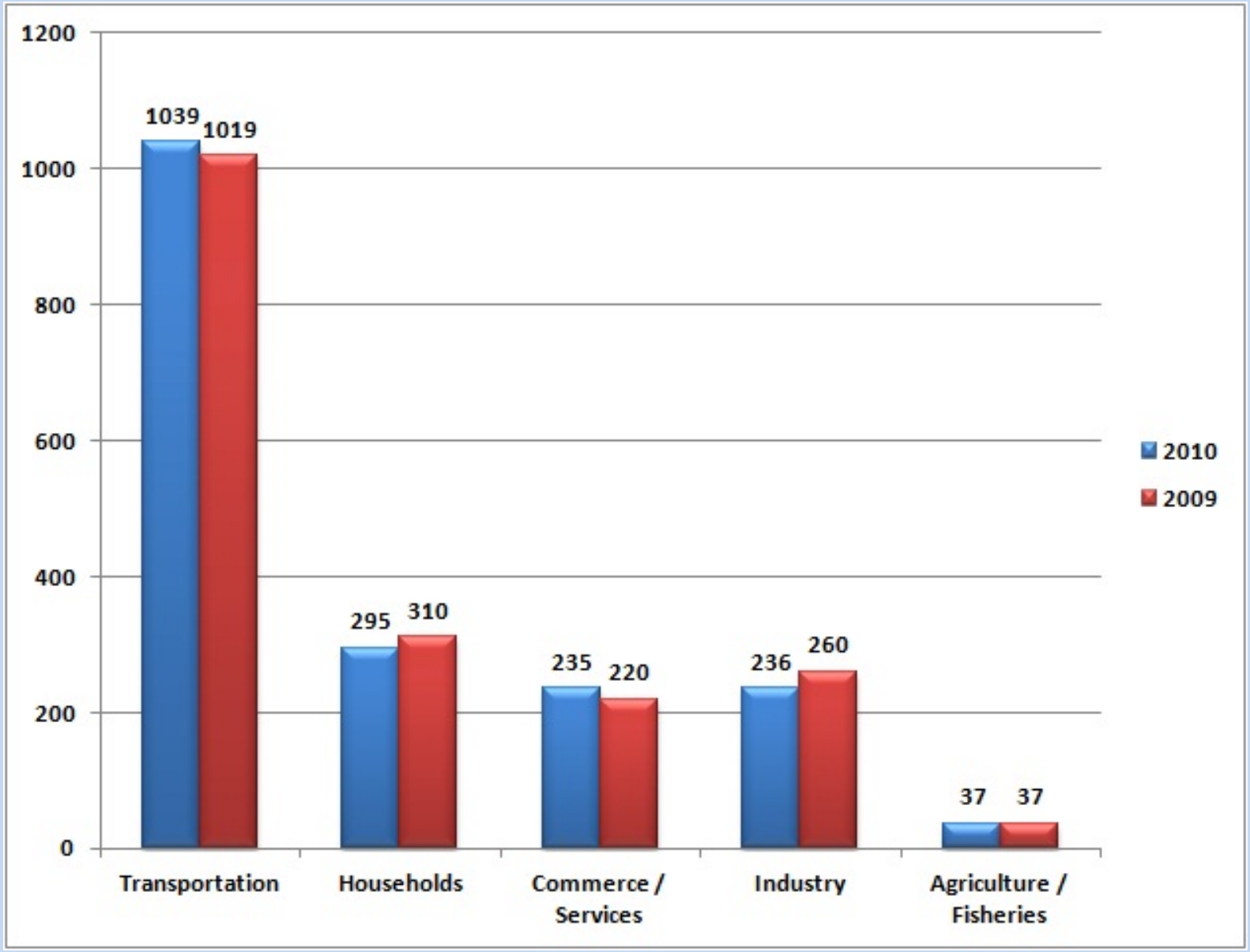
Existing transport systems cannot be characterized sustainable long term.

Transport Infrastructure in Cyprus

The transport infrastructure can be divided into three (4) categories:

- Roads;
- Rail;
- Seaports; and
- Airports.

Energy Consumption – Cyprus (ktoe)



Airports

- **International airports**
  - Larnaca
  - Paphos

- **Military airports**
  - RAF Akrotiri
  - Kingsfield Air Base
  - Lakatamia Air Base
  - Karter Air Base

Sea ports

- Limassol port: largest port of Cyprus;

- Larnaca port

Both ports serve the seaborne cargo and passenger traffic of the island.

Road Network
Current Situation - Private Cars

For years, urban transport policy has focused unilaterally in private cars.

Steady increase in passenger cars in 1980 till 2005.

Higher proportion of car ownership in the world (743 private cars per 1000 people).

Current Situation
Public Transport

Public Transport is degraded.

Dramatic reduction in the use of public transport in the last 20 years.

3% share of the movement of public transport in the metropolitan area of Nicosia in 2010. Currently increasing trend.

Current Situation
Road Network

Lack of implementation of planned major road arteries as described in the local projects for the urban road networks.

Lack of infrastructure for pedestrians and cyclists or for any other types of infrastructure such as priority lanes for buses or High Occupancy Vehicle (HOV) lanes.

Road Network

It must be noticed that there is no railway transportation in Cyprus, pointing out that motorways substitute the only significant infrastructure of the island.

The total length of motorways in 2009 totaled 257 km

it must be noticed that in Cyprus there are a number of small bridges in the road network.

Climate Change Effects - Infrastructure

According to the Intergovernmental Panel on Climate Change (IPPC) transportation is under the sector of Infrastructure

The climatic factors that are likely to cause impacts to the Infrastructure sector are the **extreme weather phenomena**.

Heavy rainfall and rising sea levels are the most important climatic factors of the extreme weather phenomena that should be considered to measure the impact on infrastructure.

Climate Change Effects – Infrastructure (2)

- damage to infrastructure that is probably associated with extreme weather and flooding

- disruption in the normal functioning of the community, such as interruption and obstruction of passengers or freight

- human safety

Climate Change Effects - Transportation

Climate factor	Impacts on transport infrastructure
Increase in temperature	Deformation of road and airport asphalt surfaces
	Passenger discomfort
Extreme events	
Heavy rain	Flood damage
	Increased demand for car use
	Flooding of underground networks
	Risk to passenger and workers' safety (reduced visibility, safety risk associated with floods etc.)
	Bridge collapse and associated implications (transport communication, safety risks etc.)
Sea Level Rise (SLR)	Permanent asset loss at coastal sites
	Periodic flooding of coastal infrastructure
	Limited access to ports
	Threat to port operation
	Risk to workers' safety
High winds	Transport disruption (caused by blown down trees etc.)
	Impede aircraft operation
Combined extreme events (drought & flash floods)	Asset failure due to long, hot, dry periods followed by intense rain causing flash floods.

Climate Change Effects – Road Transport

According to the records kept by the Water Development Department (WDD, August 2011) since 1859, **a number of floods have occurred with multiple implications in road infrastructure, such as:**

- **Transport disruption and road damage:** 1918 (11/12/1918 and 21/12/1918), 1936, 1984 (04/11/1984), 2005 (31/05 – 01/06/2005), 2010 (18/01/2010) etc.

Climate Change Effects – Road Transport (2)

➢**Collapse of bridges**:

•February 1901: Three bridges collapsed in the region between Nicosia and Idaliou;

•February 1901: Three bridges collapsed in the region between Nicosia and Idaliou;

•August 1906: The bridge of Plakos river collapsed;

•11 December 1918: Serious damages in roads and bridges in the whole area of Cyprus;

•11 December 1918: A number of small bridges collapsed (approximately 20), as also the largest part of Strovolos bridge.

Climate Change Effects – Road Transport (3)

➢**Collapse of bridges (cont)**:

- 1936: The bridges of South Amiantos, Pera Pedios and Limnati collapsed, while the bridge near Skouriotissa area was seriously damaged;

- 24 October 1967: The bridge in the road Avlonas-Filia collapsed;

- 25 December 1968: The bridge Ha-river collapsed. Two taxi-cars fell into the river posing the passengers (5) in high risk; and

- 12 February 2003: One bridge collapsed in the area of Dali.

Urban floods (mainly caused by failure of the drainage system) are likely to lead to flooding of underground networks. However, there is no underground transportation (metro) in Cyprus. Consequently, no such impact applies for the case of Cyprus at present.

Climate Change Effects – Rail

Severe damages have been recorded in rail transport as in 1906 (12/08/1906), 1918 (21/12/1918), 1921 (08/06/1921) etc.

However, rail transport operated from October 1905 to December 1951 and has never been used ever since.

Climate Change Effects – Ports

No significant impacts of have been recorded

Climate Change Effects – Airports

In Larnaca, on the 19th of December 2002, the corridor of the International Airport was flooded, hindering the landing of two civil aircrafts.

Vulnerability and Adaptation

Vulnerability is the degree to which a system is exposed and fails to address the negative effects of climate change, including climate variability and extreme weather (IPCC 2007).

Adaptation is the extended action and practical measures taken to adapt to the adverse impacts of climate change, including climate variability and extreme weather (IPCC 2007).

Given that Cyprus is an island characterized by coastal infrastructure development, it is considered to have greater vulnerability to flood events due to a) storm surge or sea level rise and b) heavy rainfall (affecting urban centres).

Adaptation

Adapting to climate change means adapting the way we do things - in all areas of our lives - to respond to the changing circumstances. It means not only protecting against impacts, but also making us better able to take advantage of any potential benefits.

For planning decisions with long lifetimes e.g. designing new infrastructure, it is important to plan adaptation strategies early to cope with higher temperatures, changing rainfall patterns and the other potential changes that will not occur for years to come.

That might mean ensuring services, buildings and transport links are robust against flooding, storm damage, heat waves and subsidence.

Because of the uncertainty inherent in projections of future climate, **adaptation strategies designed now should be able to cope with a range of possible future changes, and be flexible where possible to incorporate new knowledge and information in the future.**

Thank You

Dr Marios Valiantis

Director of Centre for Green Development and Energy Policy
P. Coordinator - BSc Environmental Management
P. Coordinator - MBA - Oil, Gas and Energy Management
P. Coordinator – BSc Energy, Oil and Gas Management

University of Nicosia
46 Makedonitissas Ave.
P.O. Box 24005, 1700
Nicosia

Tel: +357 22841689 Fax: +357 22355116
Email: valiantis.m@uni.ac.cy
Website: www.unic.ac.cy

UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

Centre for Green Development and Energy Policy