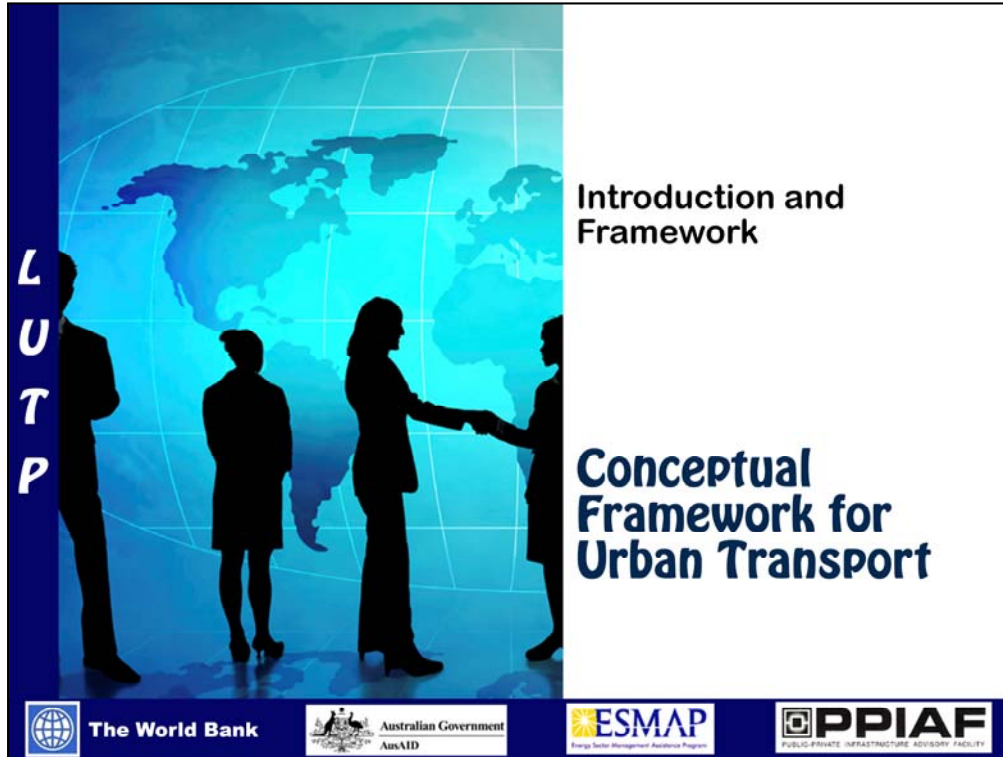




INTRODUCTION AND
OVERVIEW

CONCEPTUAL FRAMEWORK FOR URBAN TRANSPORT

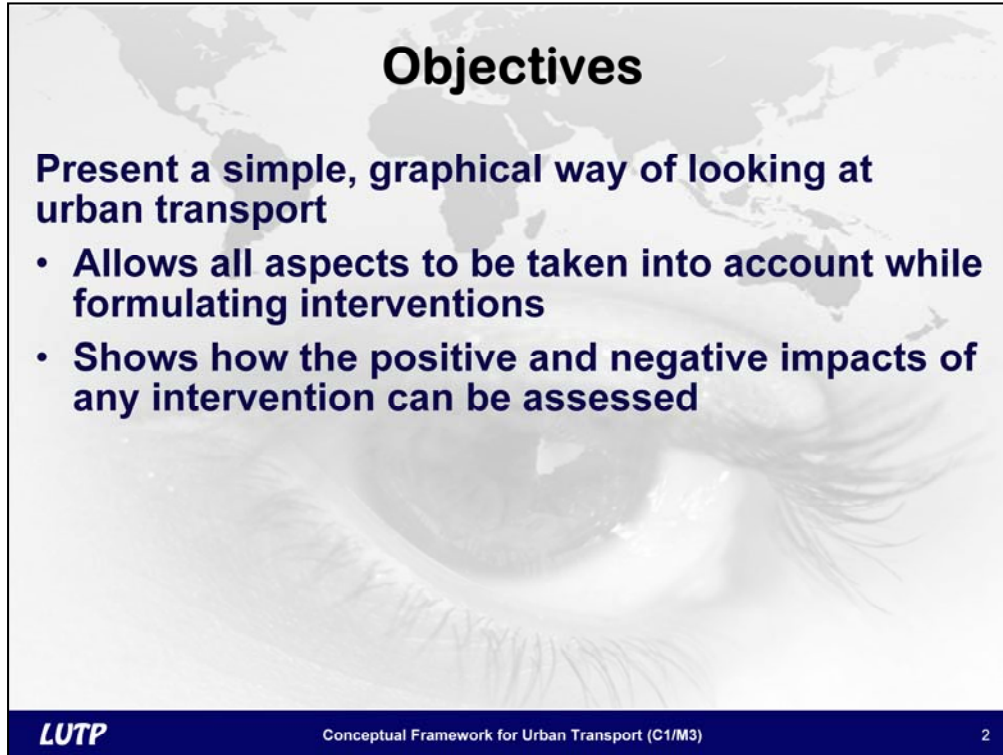


Cluster 1/Module 3 (C1/M3): Conceptual Framework for Urban Transport Key Messages.

This presentation is one of the support materials prepared for the capacity building program *Building Leaders in Urban Transport Planning (LUTP)*.

Support for LUTP was provided by:

- The World Bank
- Australian Agency for International Development Aid
- The Energy Sector Management Assistance Program (ESMAP), and
- Public-Private Infrastructure Advisory Facility (PPIAF).

The slide features a background with a faint world map at the top and a close-up of a human eye looking forward. The text is overlaid on this background.

Objectives

Present a simple, graphical way of looking at urban transport

- **Allows all aspects to be taken into account while formulating interventions**
- **Shows how the positive and negative impacts of any intervention can be assessed**

LUTP Conceptual Framework for Urban Transport (C1/M3) 2

Urban transport impacts, and is impacted by, several factors. Any intervention in dealing with the problems has a positive impact on some factors and a negative impact on others. Therefore, it is necessary to consider the totality of all these impacts so as to be able to decide what the overall effect of any intervention will be.

The purpose of this module is to present a simple and graphical way of looking of urban transport in a comprehensive manner. This framework will allow all aspects to be taken into account while formulating interventions. It also shows how the positive and negative impacts of any intervention can be assessed



Opening Exercise Road Widening Problem



- **Your city plans to widen 2 main trunk roads**
 - Expand from 4 lanes to 6 lanes
 - Each road is 18 km in length
- **Motivation is severe congestion**
 - Vehicles move at near-walking speed
 - Excessive emissions from slow-moving, idling vehicles
- **Analysis questions**
 - What do you think will be the positive impacts of this initiative?
 - What will be its negative impacts?
 - Would you think this widening plan is desirable?

Our opening exercise is designed to get you to start thinking about the complexities involved in urban transport.

Your city is planning to widen the two main trunk roads in the city from their current 4 lanes to 6 lanes. The roads are each of about 18 km in length.

The motivation for the road improvement is the severe congestion that is being faced with vehicles moving at near walking speed. This has also produced excessive emissions from vehicles that are idling for a large part of the time.

What do you think will be the positive impacts of this initiative? What will be its negative impacts? Would you think this widening plan is desirable?

Take about 5 minutes to do this exercise.



Comprehensive Planning Framework

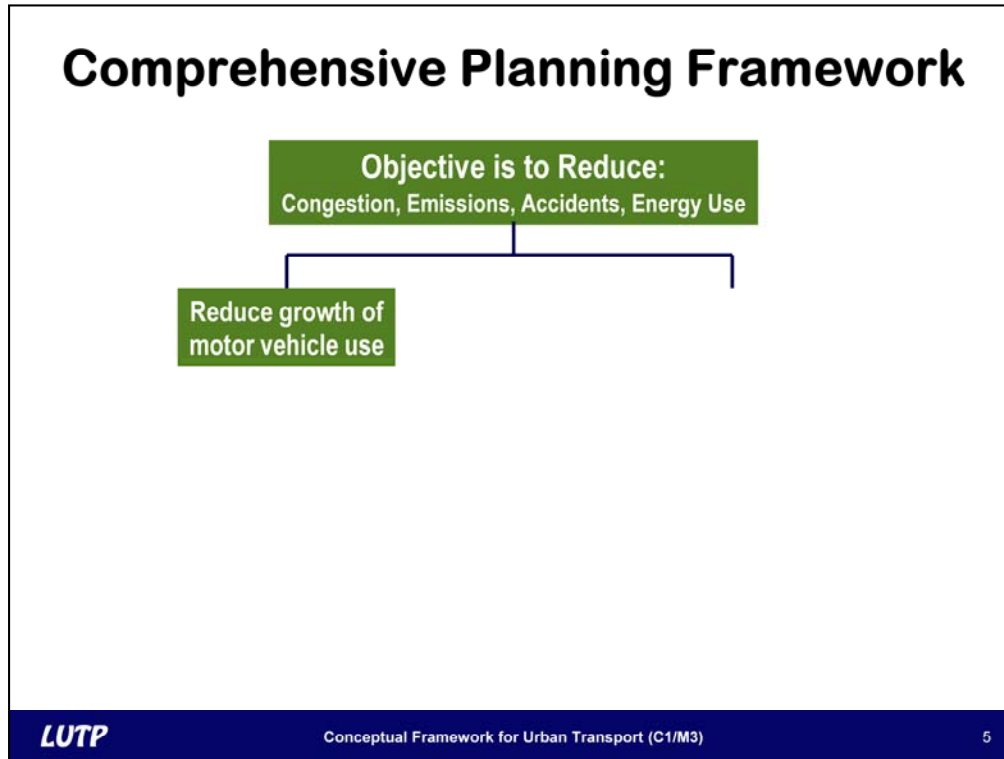
Objective is to Reduce:
Congestion, Emissions, Accidents, Energy Use

A comprehensive framework for urban transport planning has been presented in the last module. This framework seeks to establish a holistic and systematic way of looking at urban transport interventions.

In this module, you will see a simple framework. The framework is presented in a graphical manner to make it easy to understand and appreciate.

Let's start with what we want to achieve in a transport intervention in a city. In simple terms, our interest is to reduce:

1. Congestion – so people can move around faster and with greater ease
2. Emissions – so that the air we breathe is less polluted and our throats and lungs don't get damaged
3. Accidents – so that fewer people are injured or killed while travelling, and
4. Energy use – so that we can save on costs and a non-renewable fuels.

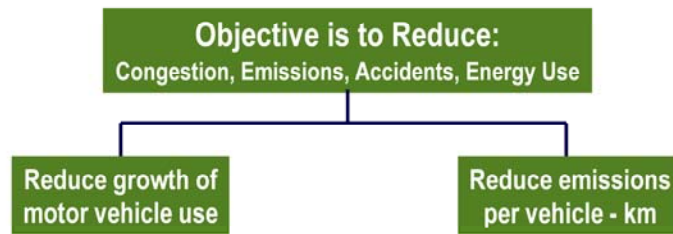


There are two ways of achieving these objectives.

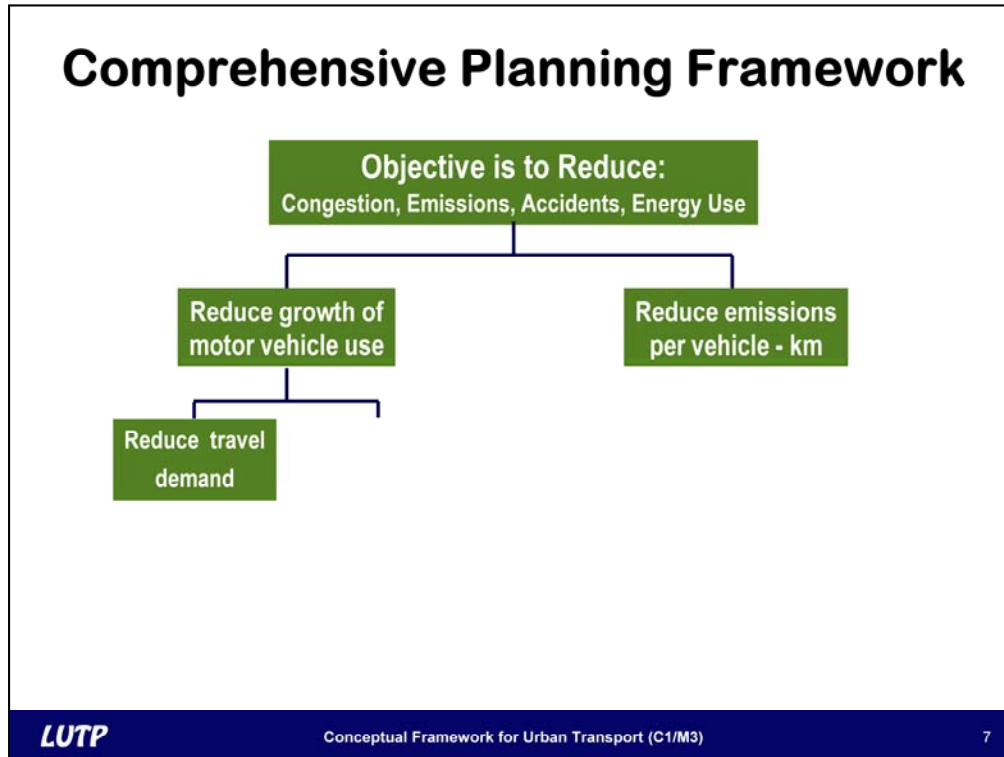
1. We need to reduce the growth in motor vehicle use, and



Comprehensive Planning Framework



2. We need to reduce the emissions per vehicle per kilometer of travel. In other words, we need to reduce the emissions from a motor vehicle for every kilometer it moves.

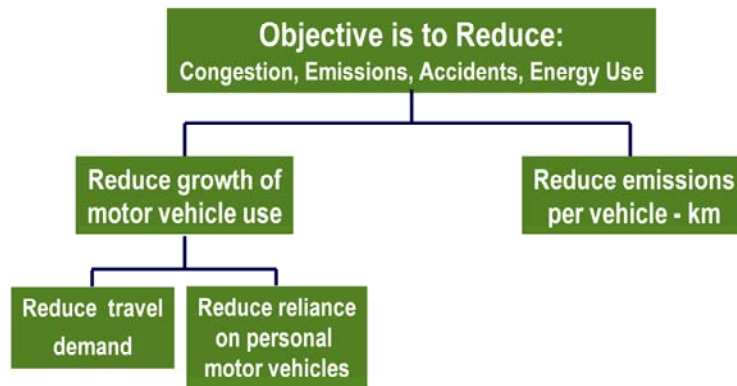


So far, it is simple. Now let's go a little deeper. How do we reduce the growth of motor vehicle use?

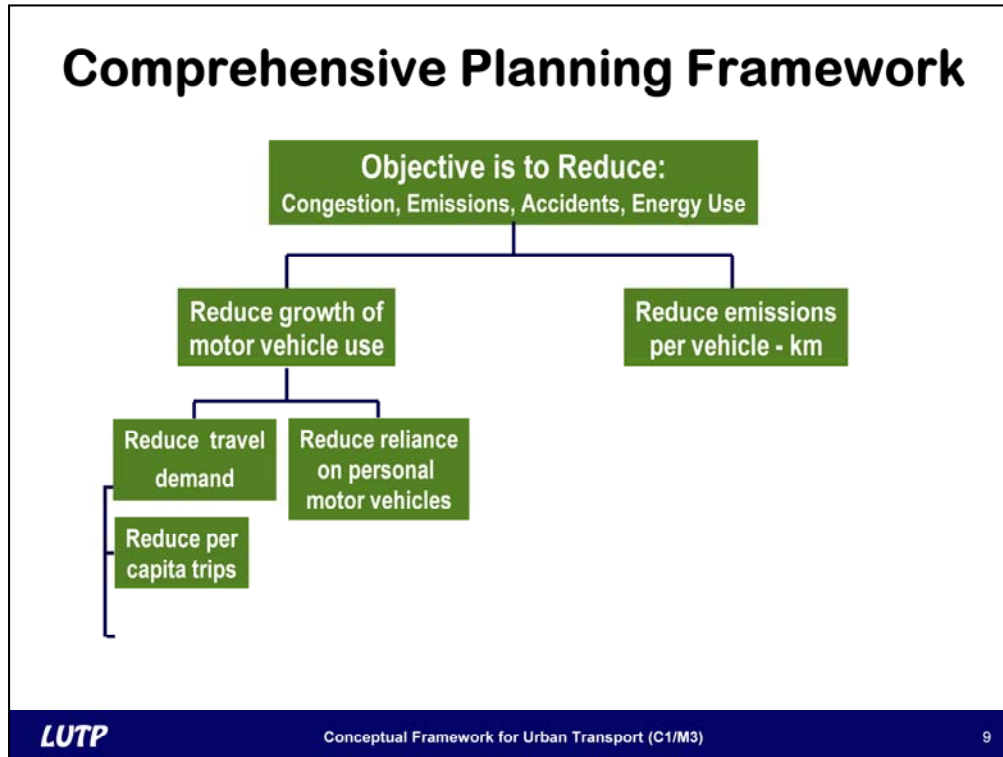
Again, two methods come to mind:

1. Reduce the amount that people need to travel – or, in more technical terms, the travel demand, and

Comprehensive Planning Framework



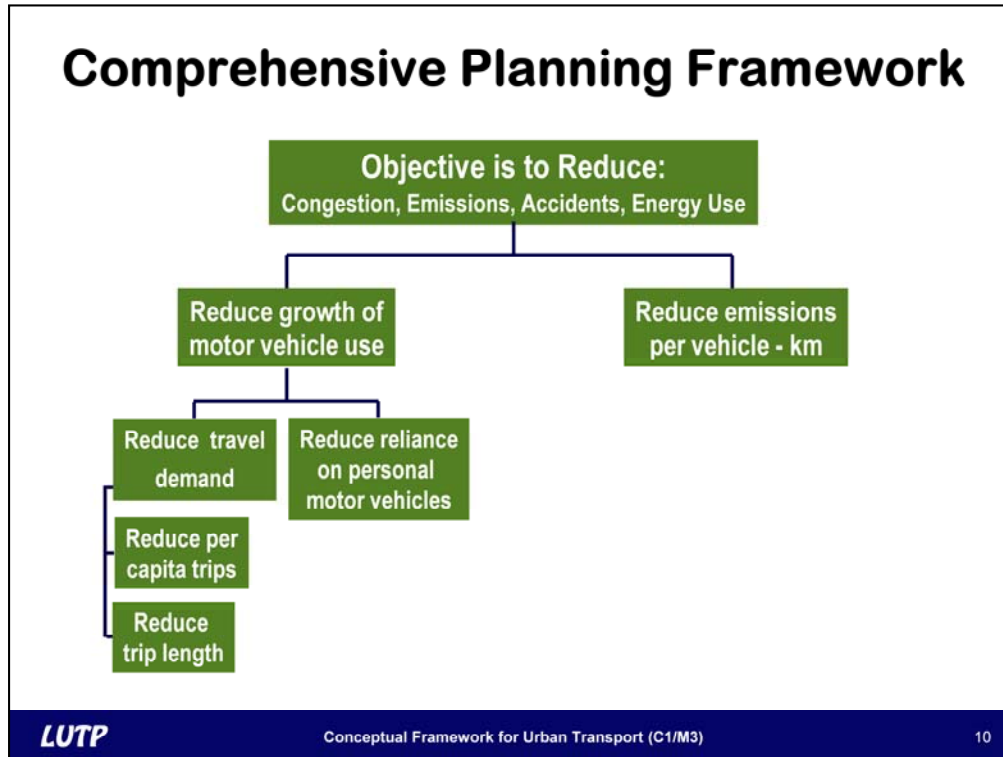
2. Reduce the extent of personal motor vehicle use – or the reliance on personal motor vehicles.



But how do you reduce travel demand? Well, remember that travel demand is not just a function of **how many** people travel and **how many times** they travel, but also the **distance** they travel each time. Therefore, one method of reducing the travel demand is to reduce the number of trips that an individual needs to make – also known as the per capita trip rate.

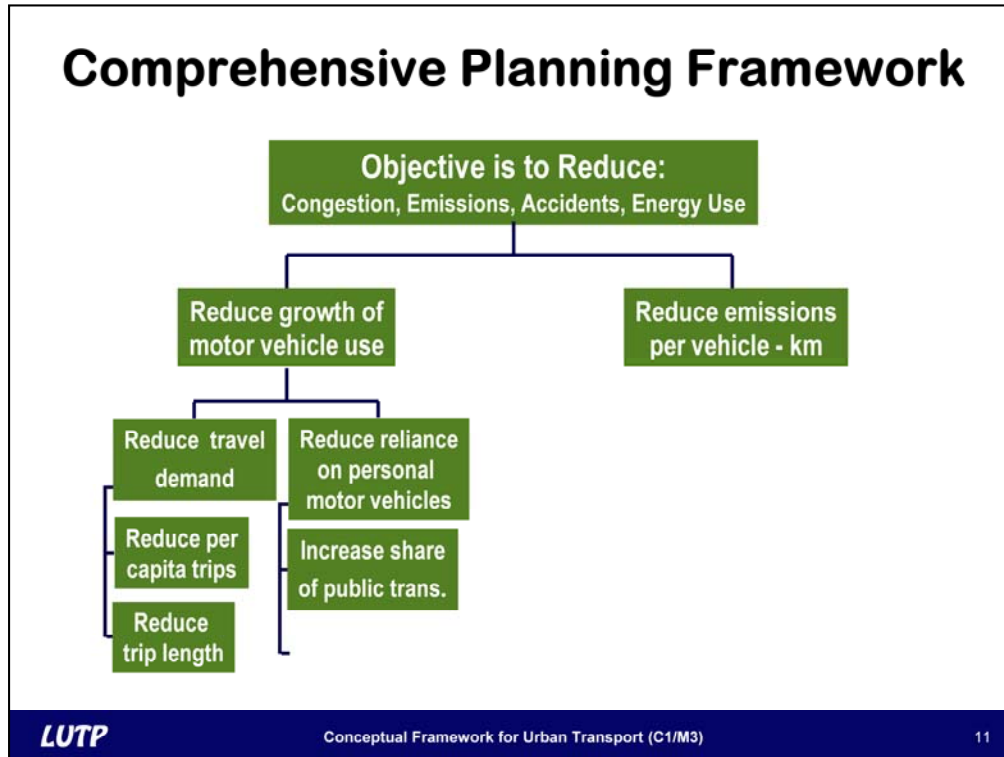
This can be done by actions such as:

- Increasing the number of holidays (which we would all like for ourselves)
- Increasing telecommuting, so we can work some days from home
- Improving e-Commerce, so we can meet our shopping needs without having to go to the market



A second way of reducing the travel demand is to reduce the distance that one needs to travel during each trip (known to transport planners as the “trip length”). This is done through integrated land use and transport planning. Briefly, this involves ideas like having living and work places close to each other or schools that are well interspersed with residential areas. This is known to urban planners as “mixed land use planning”. You will learn more about these concepts in the module on integrated land use and transport planning.

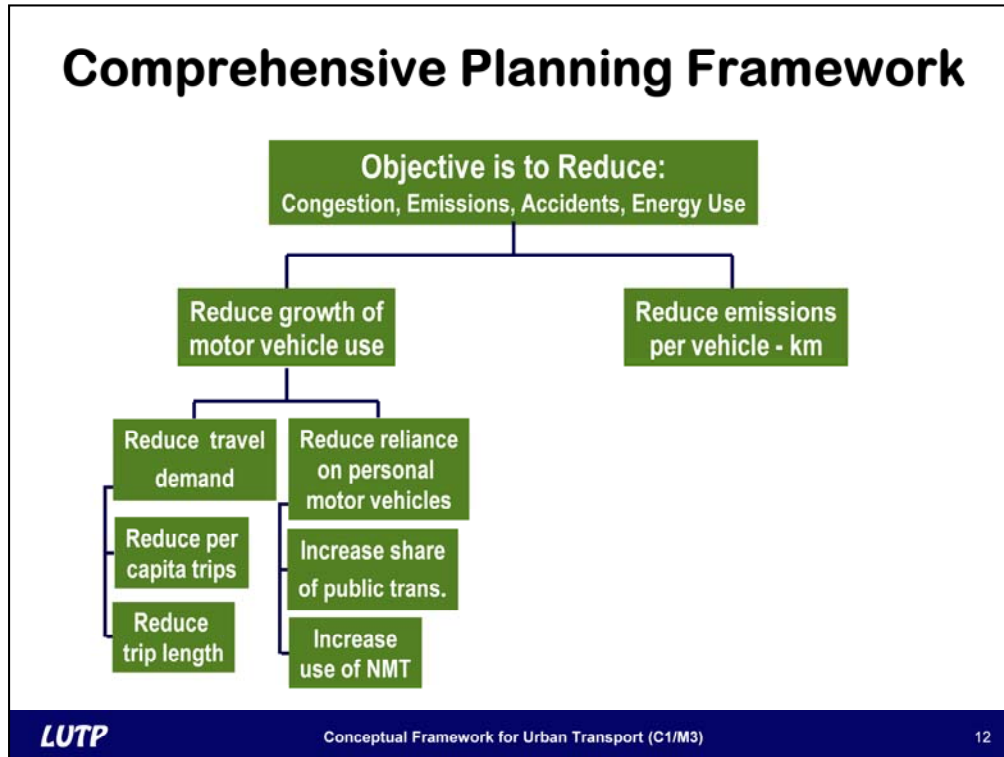
So, reducing the number of trips that people make each day and the length of each such trip is the way to go for reducing travel demand.



Now, how do we reduce the reliance on personal motor vehicles?

This is done by making other forms of travel more attractive.

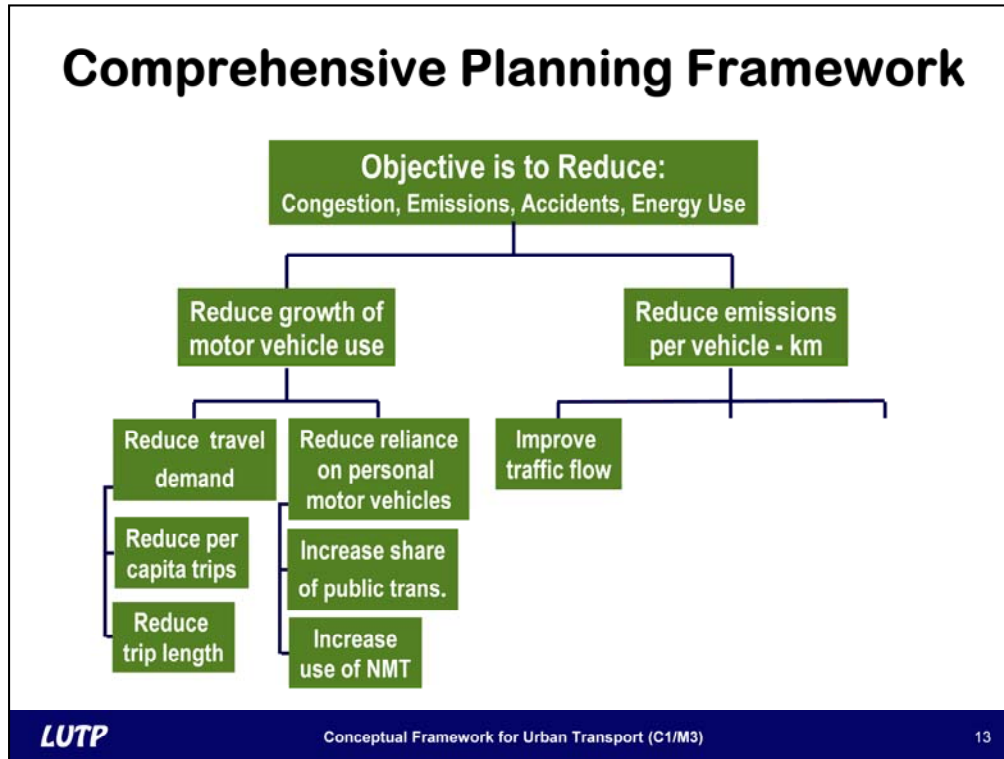
The two main alternative modes of travel for most people cities are public transport and...



... non-motorized modes of travel, such as walking and cycling.

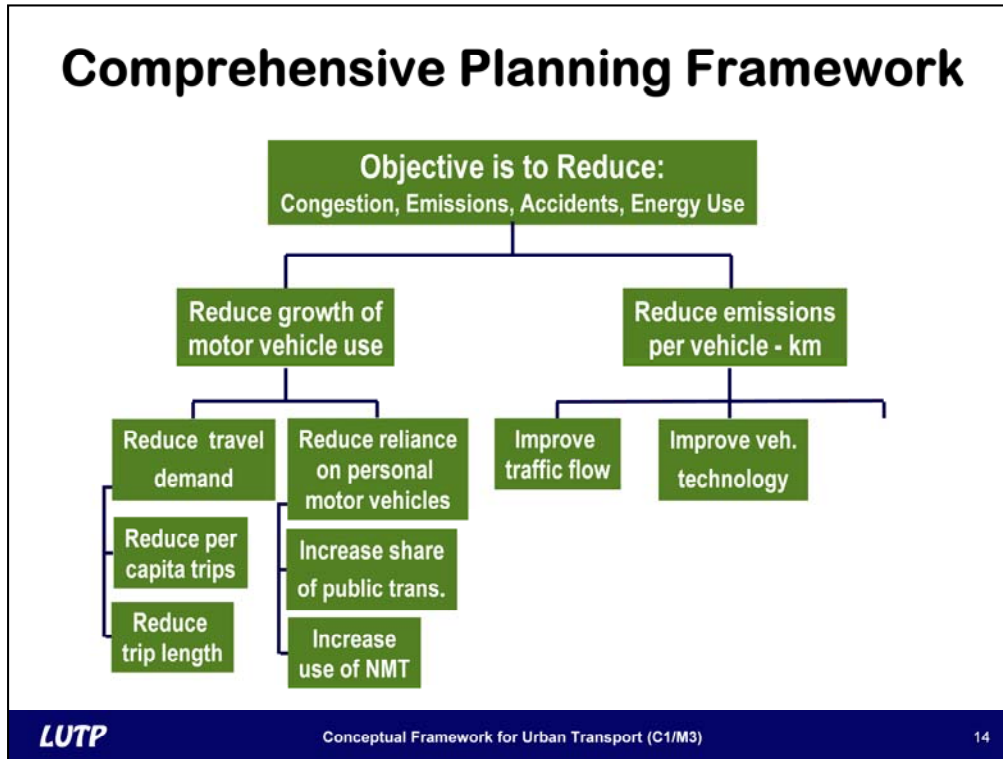
If people are not using their own vehicles, they are walking, cycling, using public transport, or using some kind of taxi service. Therefore, increasing the use of public transport and non-motorized modes of travel will have the effect of reducing the reliance on personal motor vehicles.

Having said this, let's now come to the other side of the picture, where we are trying to reduce the emissions per vehicle-kilometer.

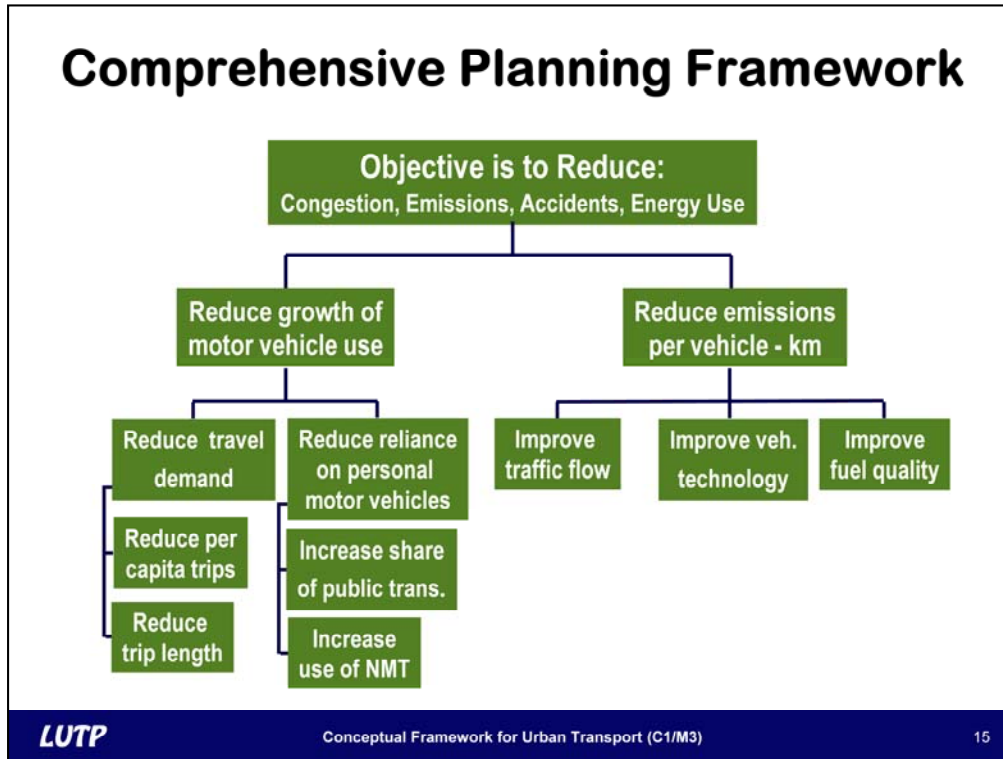


If we improve the traffic flow, vehicles will move at a steady speed and idle less. Idling means vehicles still have their engines running, but are not moving. This emits pollutants without serving any transport demand.

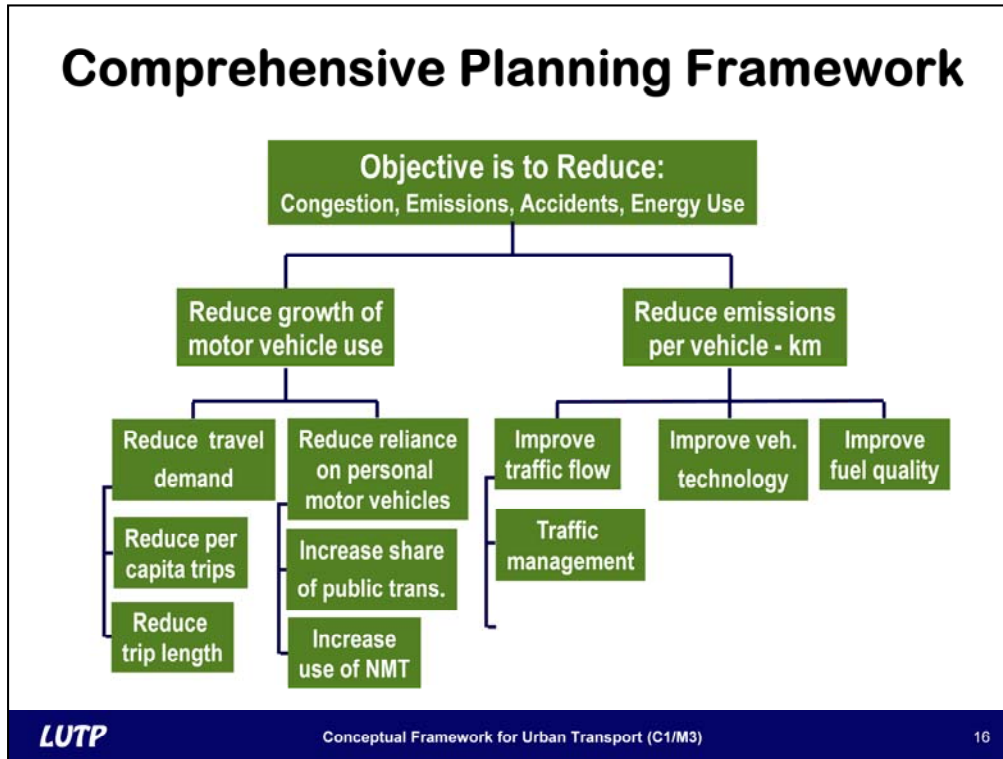
Therefore, improving traffic flow is one way of reducing the emissions per vehicle-kilometer.



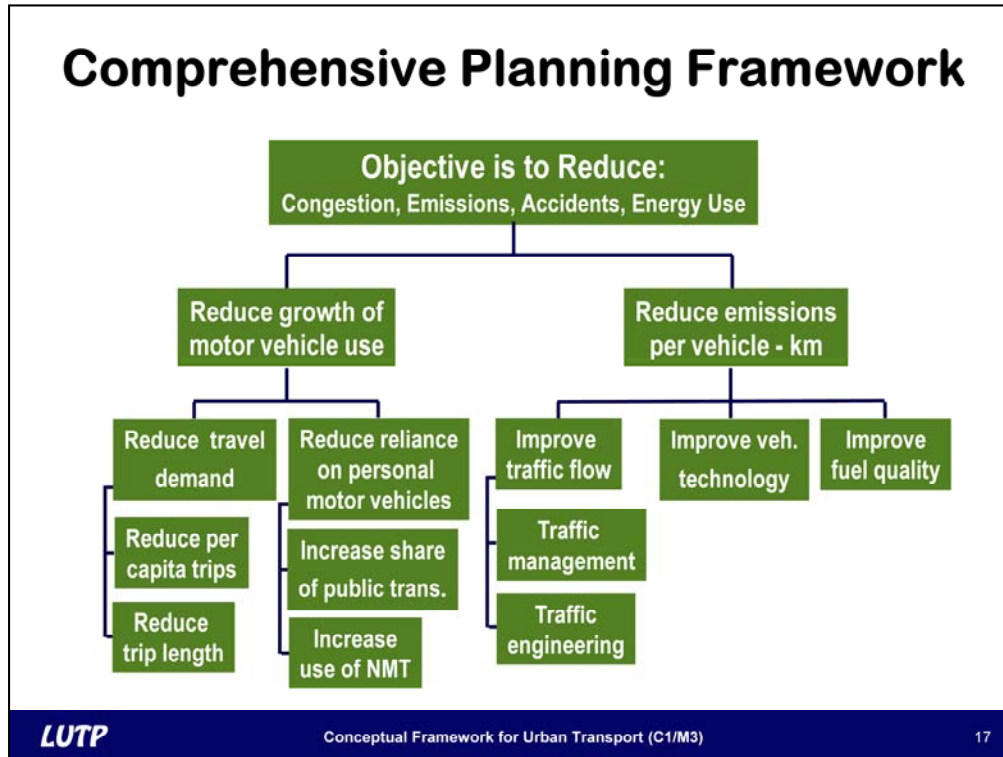
Improving vehicle technology is another way of reducing emissions per vehicle-kilometer. Vehicles that are more energy-efficient and consume less fuel per kilometer are more efficient. Many countries have established stringent emission norms to regulate emission levels.



Improving fuel quality is yet another way of reducing the emissions per vehicle-kilometer.



Two ways of improving traffic flow are improved traffic management and...



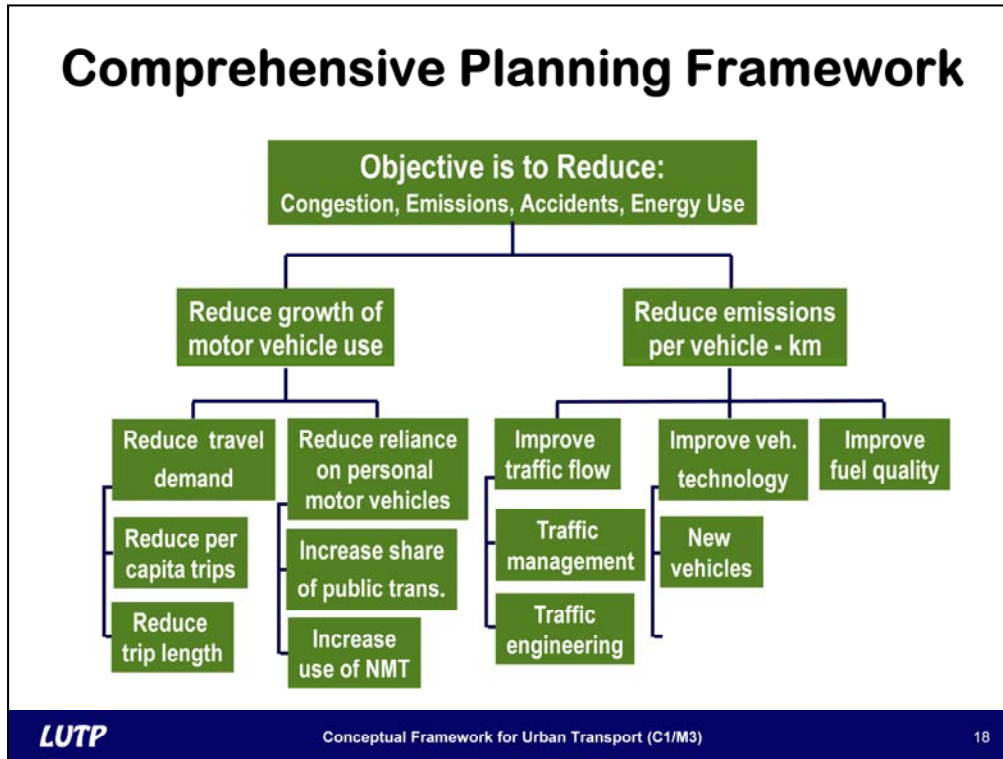
... traffic engineering. When vehicles move in the same lane, but at different speeds, the slowest vehicle determines the speed of the traffic. Segregating slow-moving vehicles from fast-moving vehicles can help improve traffic flow. Similarly having lanes for different speeds help improve traffic flow.

Disruptions in traffic flow can also be caused by the violation of lane discipline and rash driving. These are dealt with through better traffic management.

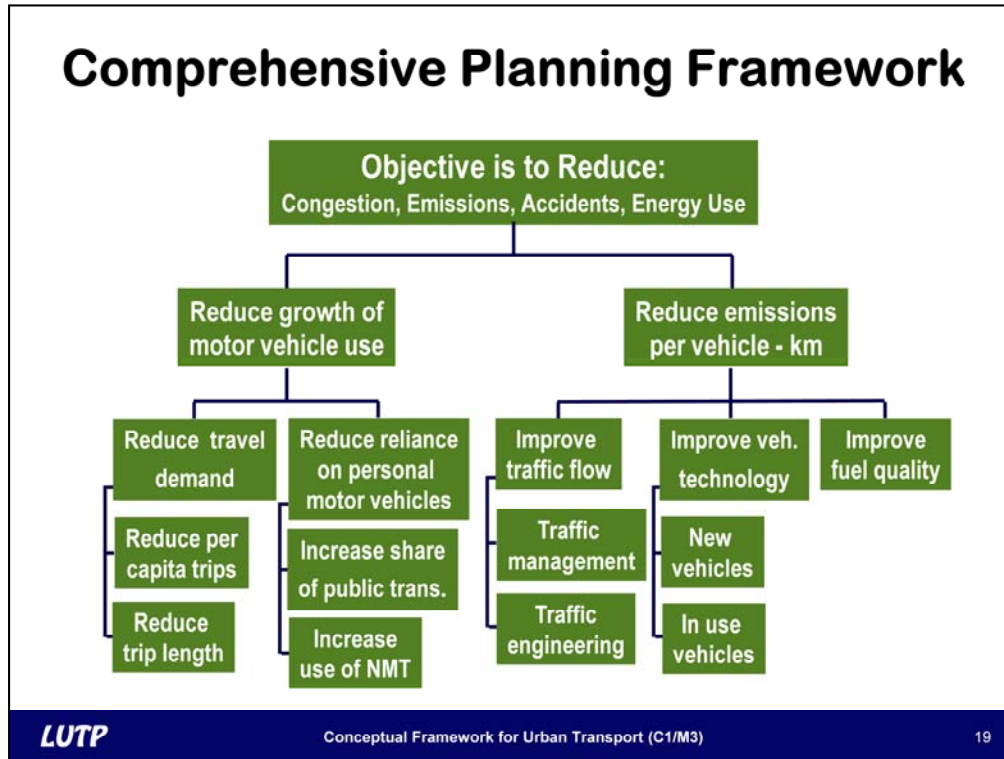
Traffic engineering looks at the design of the facilities that guide the movement of traffic. For example:

- Poor quality of roads can impact traffic flow.
- Poor design of intersections or roundabouts can impact traffic flow.
- Well designed traffic lights along a major corridor can help improve traffic flow.

These are issues that need to be looked at as part of good traffic engineering.



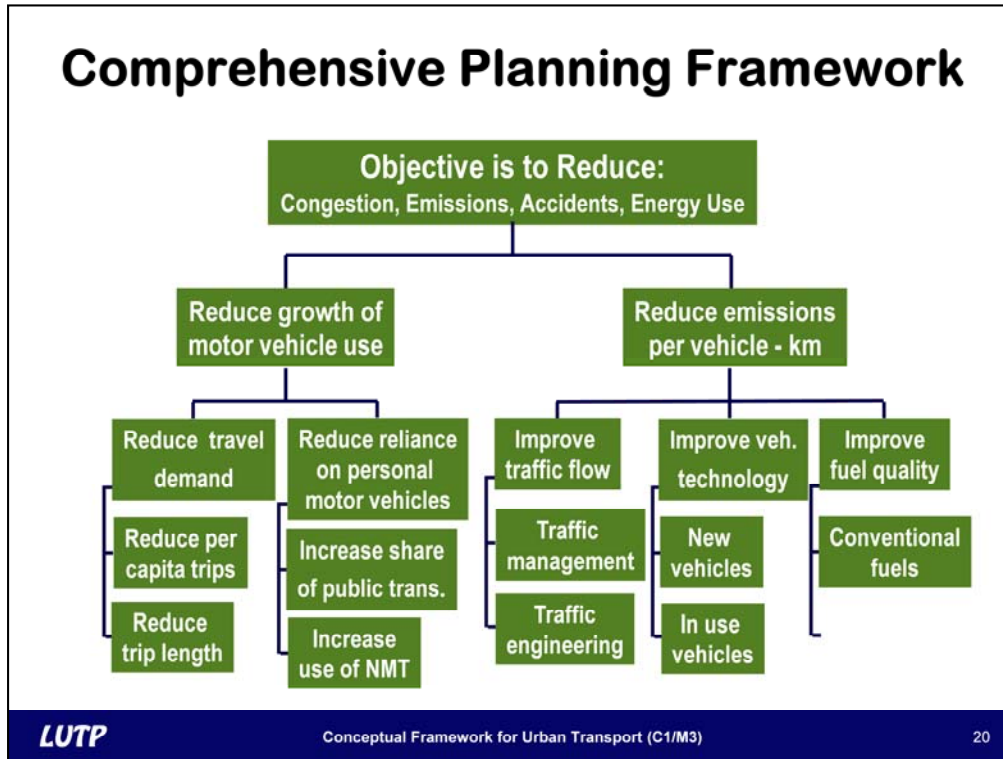
Vehicle technology needs to be take into account both for new vehicles and...



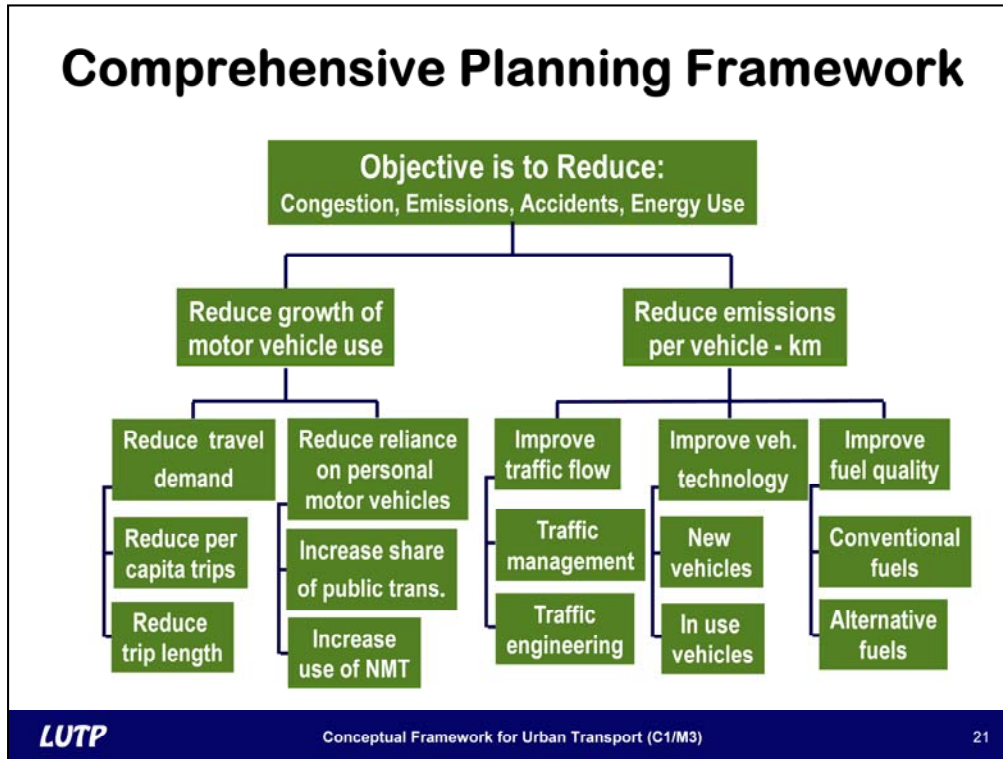
... the vehicles that are currently on the road.

It is possible to bring in new technology to improve fuel efficiency in new vehicles.

For the existing vehicles, ensuring better maintenance is a way of reducing the emissions per vehicle-kilometer. This can be done by having stringent maintenance standards or a requirement for every vehicle to undergo a maintenance check every few years to retain its certificate of registration.

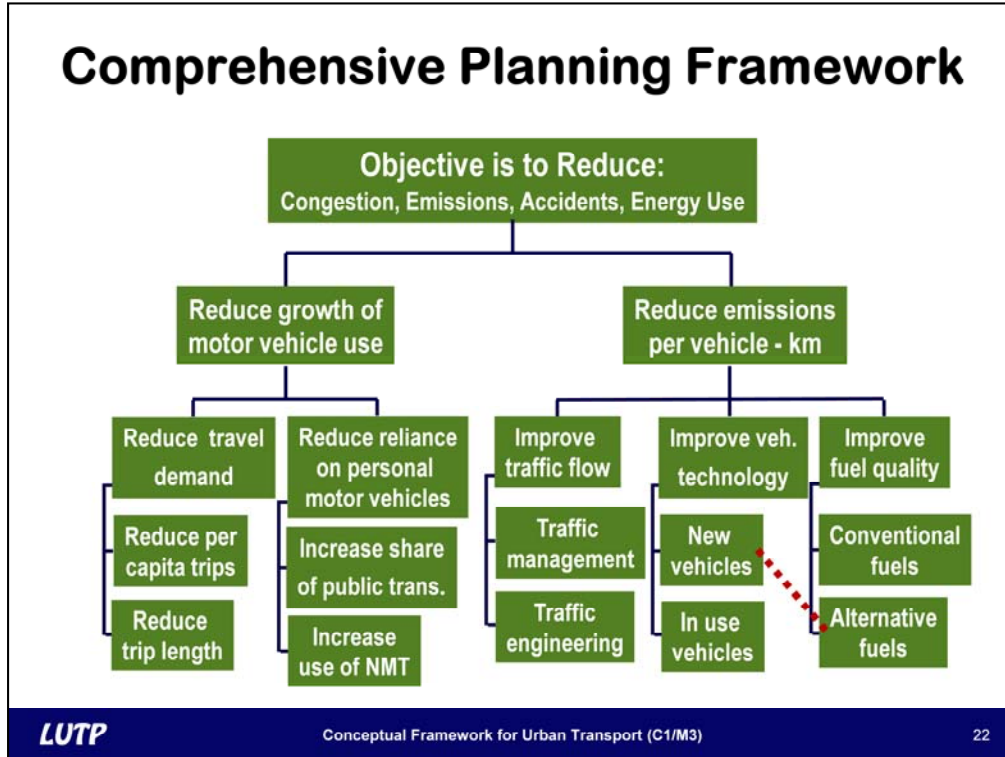


Improving fuel quality can mean looking at the quality of conventional fuels like gasoline and diesel or ...

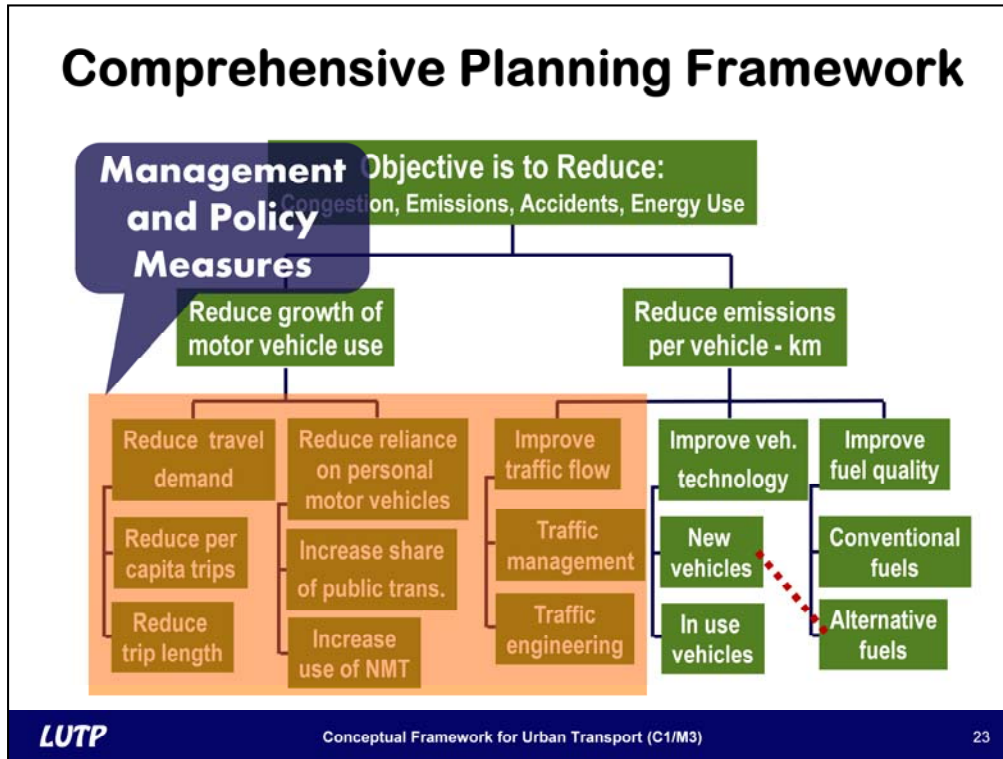


... looking at alternative fuels that may be cleaner.

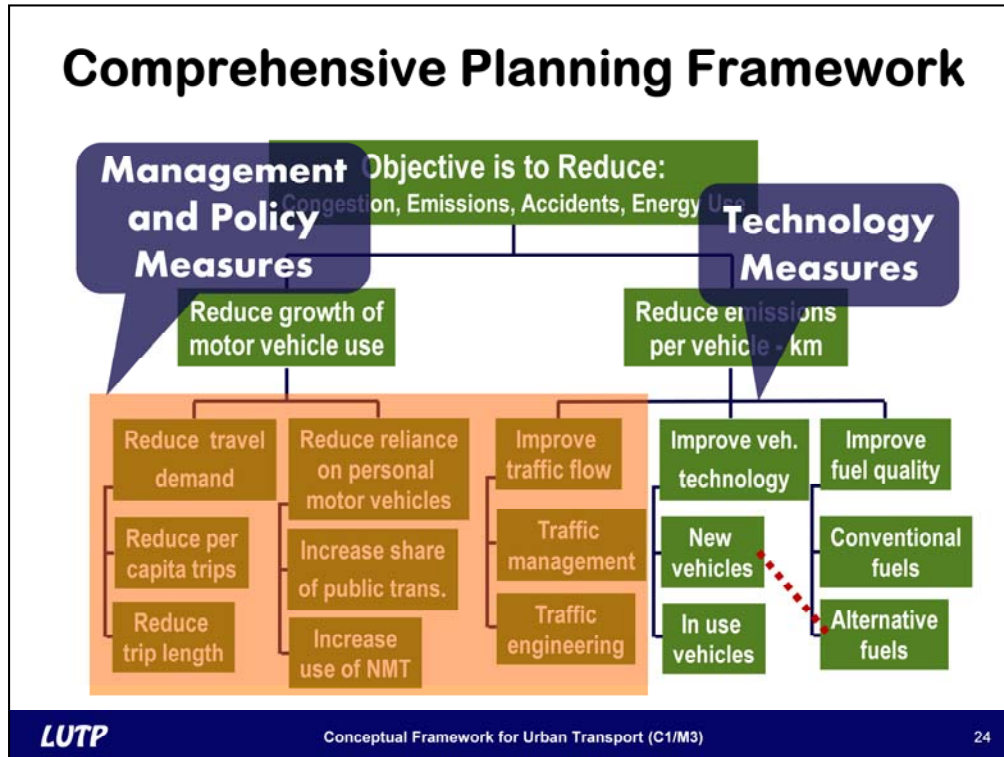
Compressed natural gas (CNG) and electricity are generally considered cleaner than the conventional fuel. Thus, initiatives that seek to introduce such alternative fuels would help reduce the emissions per vehicle-kilometer.



Alternative fuels will generally be possible only for new vehicles, though there have been examples of cleaner fuels being introduced in old vehicles as well, such as the use of CNG kits in diesel buses. The buses can be the same, but a CNG package can replace the diesel fuel system. In some cases this is possible.



The left side of the framework, which you see shaded in light red, could be referred to as management and policy measures.



The right side of the framework, which contain boxes outside the shaded region, could be termed as technological measures.

Thus, a combination of policy/management measures and technological measures can lead to a sustainable transport system.

Summary



- **Framework is powerful, effective**
 - **Easy to understand**
 - **Helps show positive and negative impacts of specific interventions**
 - **Supports holistic approach**

We have shown that this framework is powerful and effective. It is easy to understand. It helps organize and communicate the benefits of specific interventions. In this conceptual framework we can look at the impact of specific interventions and assess which boxes are positively impacted and which are negatively impacted.

It is through such a comprehensive framework that a more holistic approach can be adopted to assess the impact of specific interventions.

Try to think of a few interventions and see what the positive and negative impacts would be.

