

Towards a cleaner Public Transportation System for Costa Rica

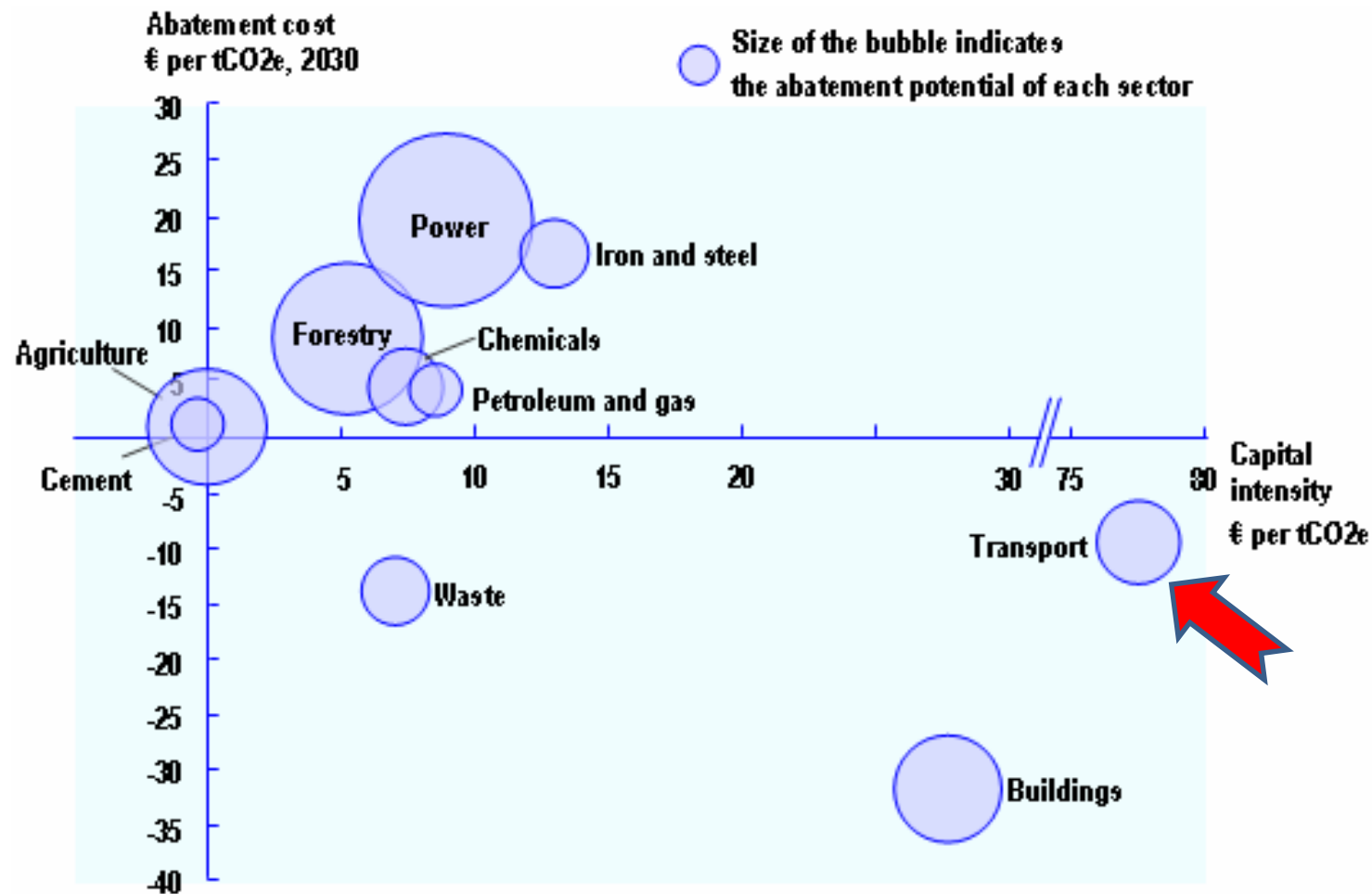
DR. RENÉ CASTRO SALAZAR

Minister of Environment, Energy and
Telecommunications

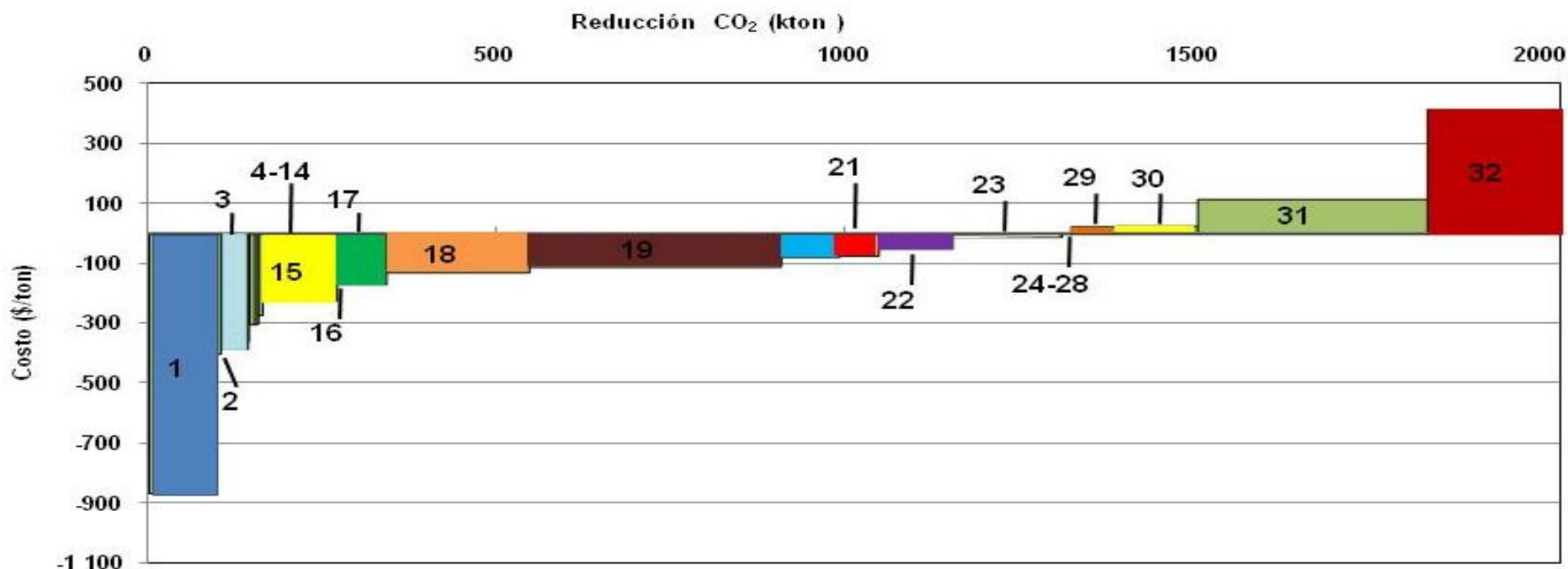


December 2012

Capital intensity by abatement measure



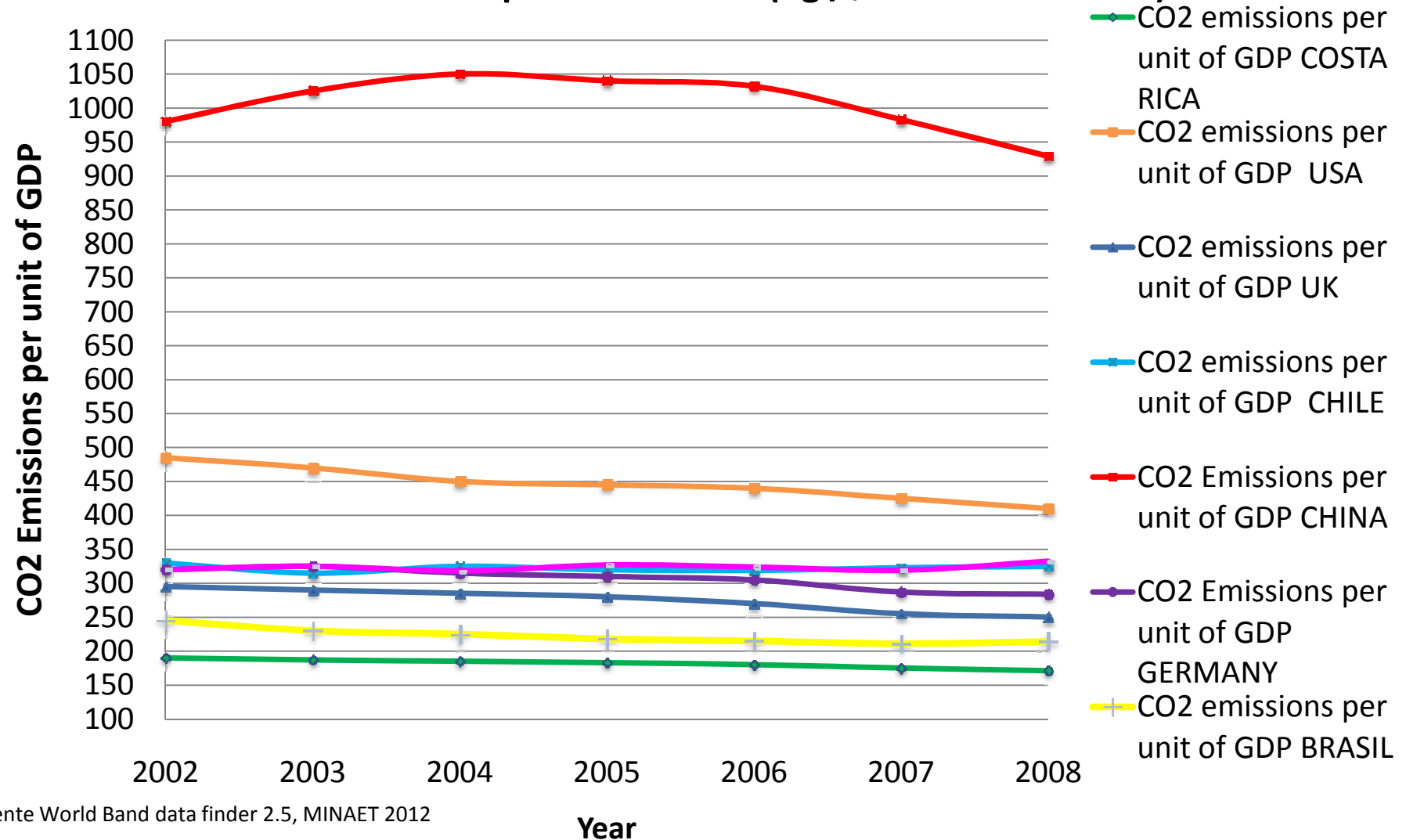
Costa Rica: Abatement Curve-



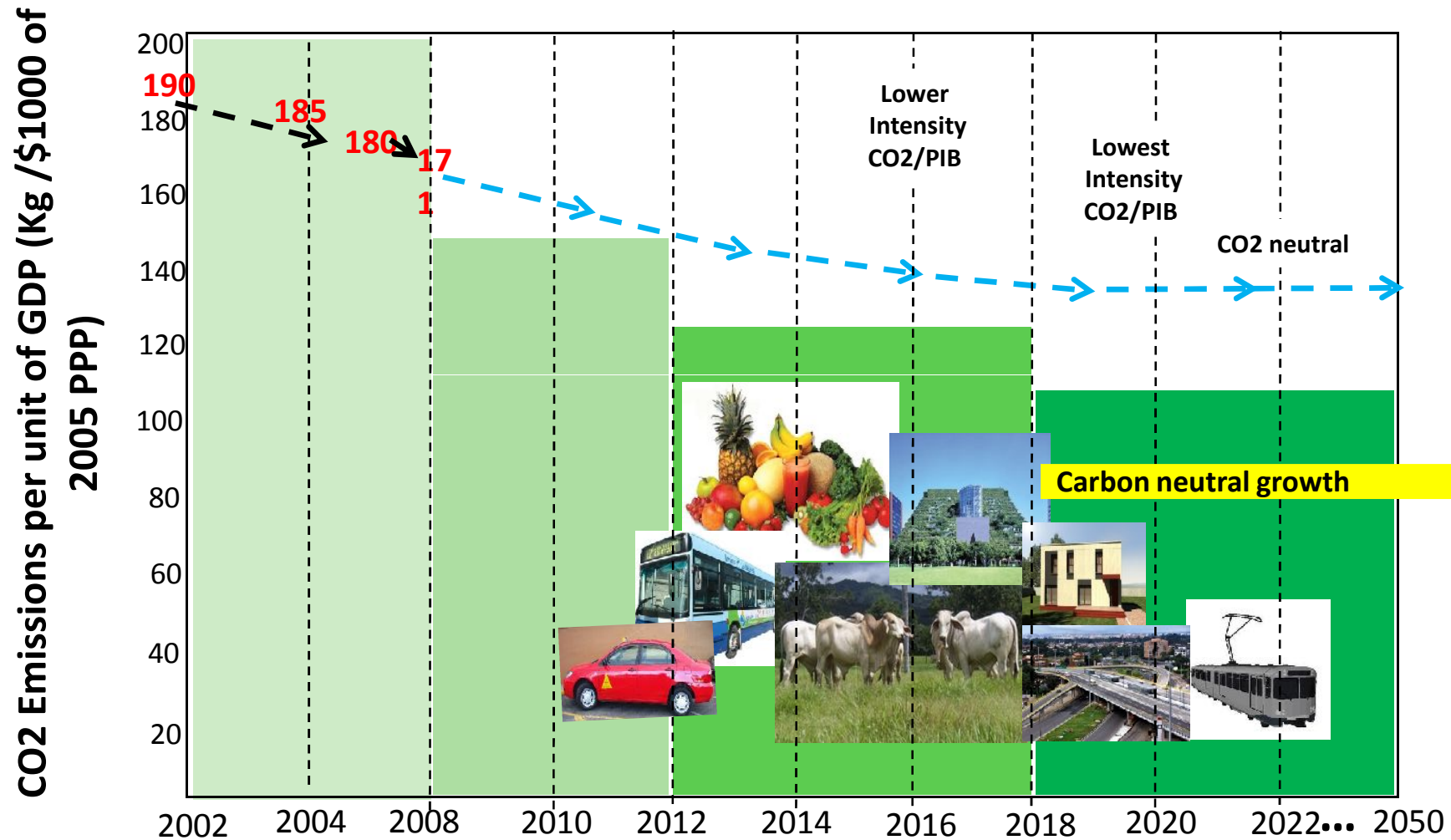
1 Conversión a LPG	12 Cambio de lámparas	23 Car Pooling
2 Jornada laboral 4 días	13 Uso de sistemas fotovoltaicos	24 Plan de ahorro energético
3 Cambio de Residencia	14 Agilización Trámites	25 Uso de calderas más eficientes
4 Uso de lámparas más eficientes	15 Incremento Marchamo	26 Biodiesel
5 Uso de motores más eficientes	16 Vehículos Aire	27 Bioetanol
6 Uso de A/C de bajo consumo	17 Vehículos Eléctricos	28 Flex Fuel
7 Cambio de cocinas a vitro cerámica	18 Transporte Público	29 Establecimiento de tarifas y precios
8 Conducción Eficiente	19 Descongestionamiento	30 Híbridos
9 Refrigeradoras más eficientes	20 Ciclovías	31 Tren Eléctrico
10 Capacitación en el sector educación	21 Restricción a circulación S. J.	32 Sustituir Bunker: 50% Gas Natural, 50% Electricidad
11 Uso de timers en calentadores de agua	22 Restricción a circulación C. R	

Fuente: Estudio para la Introducción de Tecnologías Limpias y Eficientes en el Mercado Nacional, realizado por CONENERGY GROUP para la DSE, diciembre 2009

CO2 Emissions per unit of GDP (Kg /\$1000 of 2005 PPP)

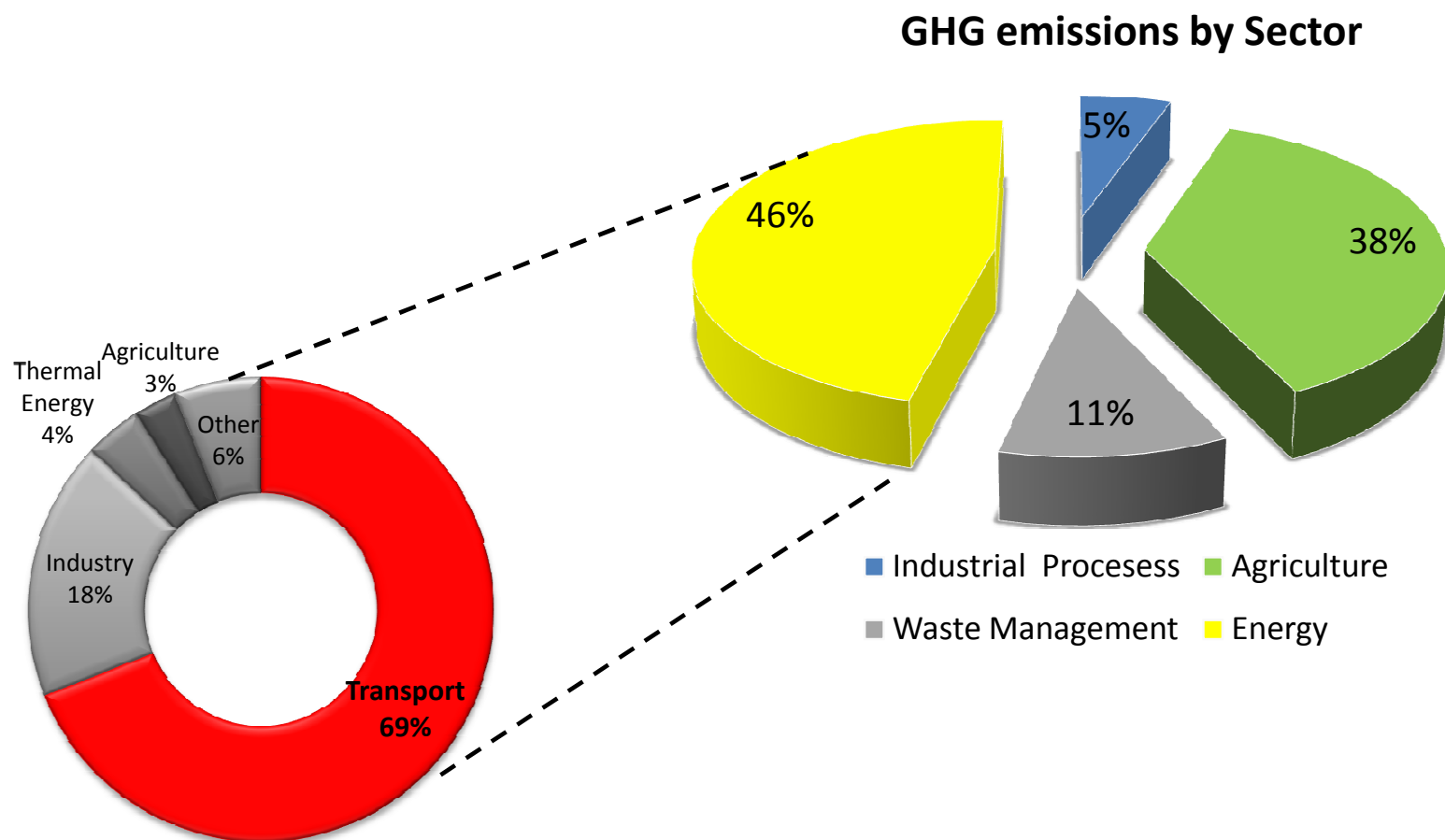


Goal: Costa Rica CO2 neutral by 2021



In the transition to economic competitiveness economic sectors can reduce their emissions intensity and increase their share in GDP

Our greatest source of emissions is the Energy Sector: TRANSPORTATION



Source: Reporte Needs 2010/ Segunda Comunicación Nacional 2009

Promote cleaner and efficient technologies and fuels

1 - Improving energy efficiency using current technologies:
engine modification, improve transmissions, aerodynamics ...

2 - New fuels and cleaner vehicles: electric, hybrid ...

3 - Introduction of cleaner fuels: 2nd generation bio-fuels, LPG, LNG, hydrogen, etc.

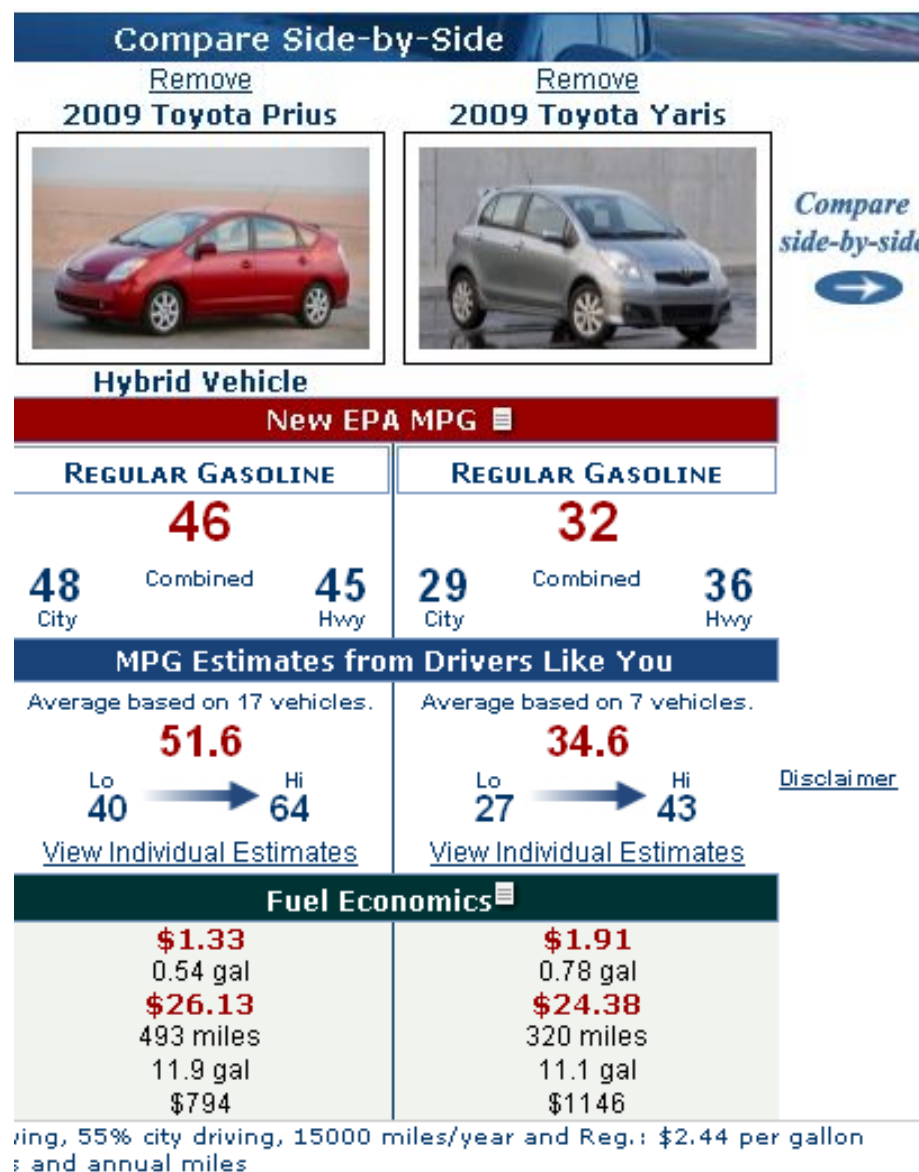
4 - Consumer information, labeling

5 - "Eco-driving" & Education

6- Mass Transport System

New energy efficient vehicles

- Comparison of hybrid vehicle with a gasoline vehicle
→
- 42% less CO2 emissions in case of Prius!



New energy efficient vehicles

FIRST IN LATIN AMERICA: Hydrogen-fuelled bus launched in São Paulo

Science

Written by Fabiana Frayssinet / Inter Press Service

MONDAY, 20 JULY 2009 01:42



SÃO PAULO—The government of the state of Sao Paulo in southern Brazil has launched the first hydrogen-fueled bus in Latin America—the first step toward environmentally sustainable public transport of the future.

Developed by the Empresa Metropolitana de Transportes Urbanos (Emtu), a mixed company controlled by the state government, the hydrogen bus will shortly be transporting passengers in the state capital, São Paulo, a city of 20 million people.

The bus will run on the metropolitan corridor, a dedicated busway linking São Paulo suburbs, between the districts of São Mateus and Jabaquara, a 33-kilometer journey one way, and will cover an estimated distance of 278 kilometers a day.

The coordinator of the Brazilian hydrogen bus project, Emtu's Carlos Zundt, said this is the first hydrogen-powered public-transport vehicle in Latin America. The project is supported by public, private and international sponsors like the World Bank and the United Nations Development Program (UNDP).

Unlike a diesel engine, in which fossil fuels are burned, combining with oxygen to produce energy and carbon dioxide—the main greenhouse gas—a hydrogen-powered motor relies on an electrochemical reaction, Zundt told Inter Press Service (IPS).

"When hydrogen reacts with oxygen, water and electricity are produced, but no polluting carbon dioxide," he said.

Source: Business Mirror. 2009.

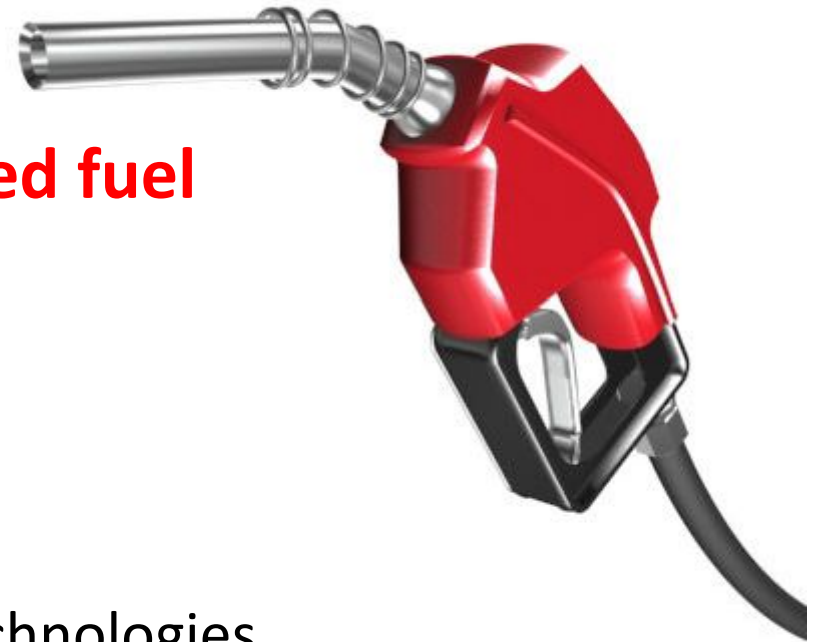
- In Costa Rica there is a research going between the National Oil Refinery (RECOPE), Ad Astra Rocket (NASA technology) and Cummins to use hydrogen and methane as fuel on engines for heavy transport cargo.



Introduction of cleaner fuels

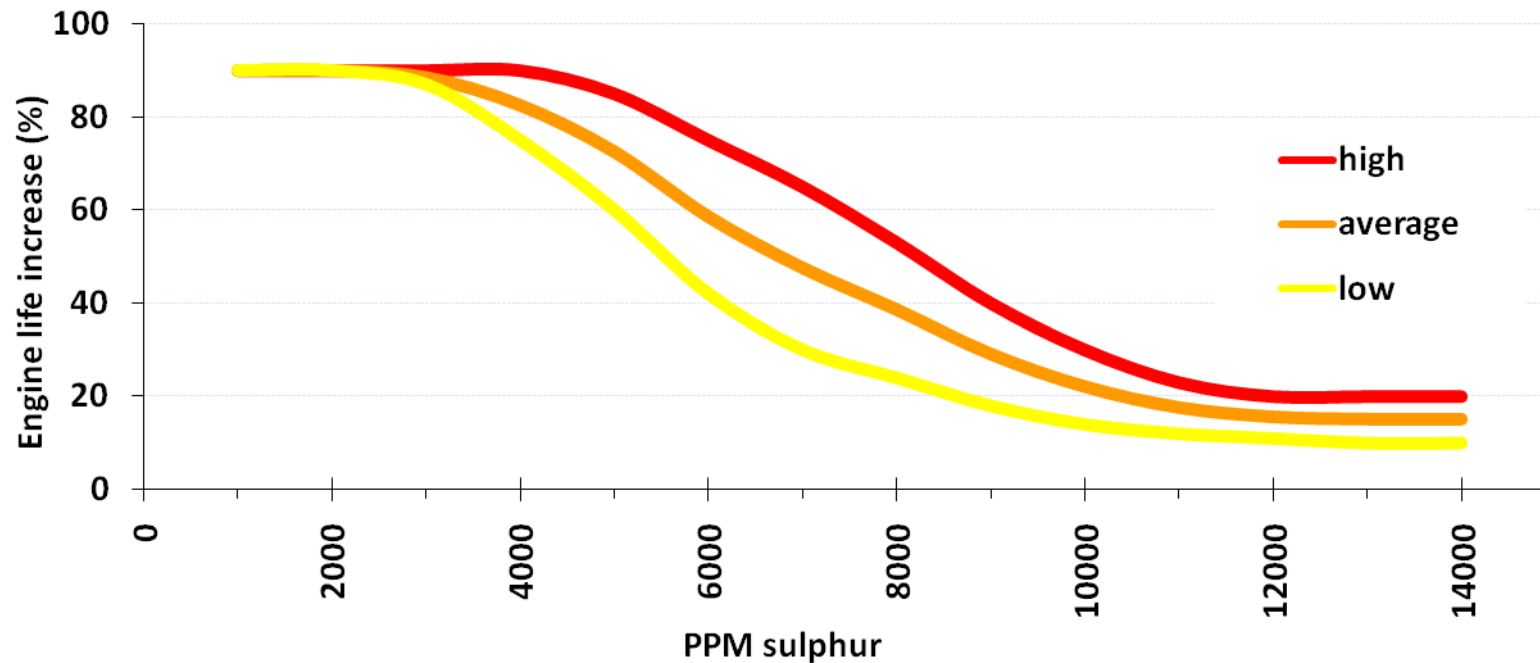
Low sulphur content & unleaded fuel

- It has a direct effect on emissions
- Allows use of vehicles with new technologies which significantly reduce pollutants



Introduction of cleaner fuels

Effect of sulfur on the life of vehicle

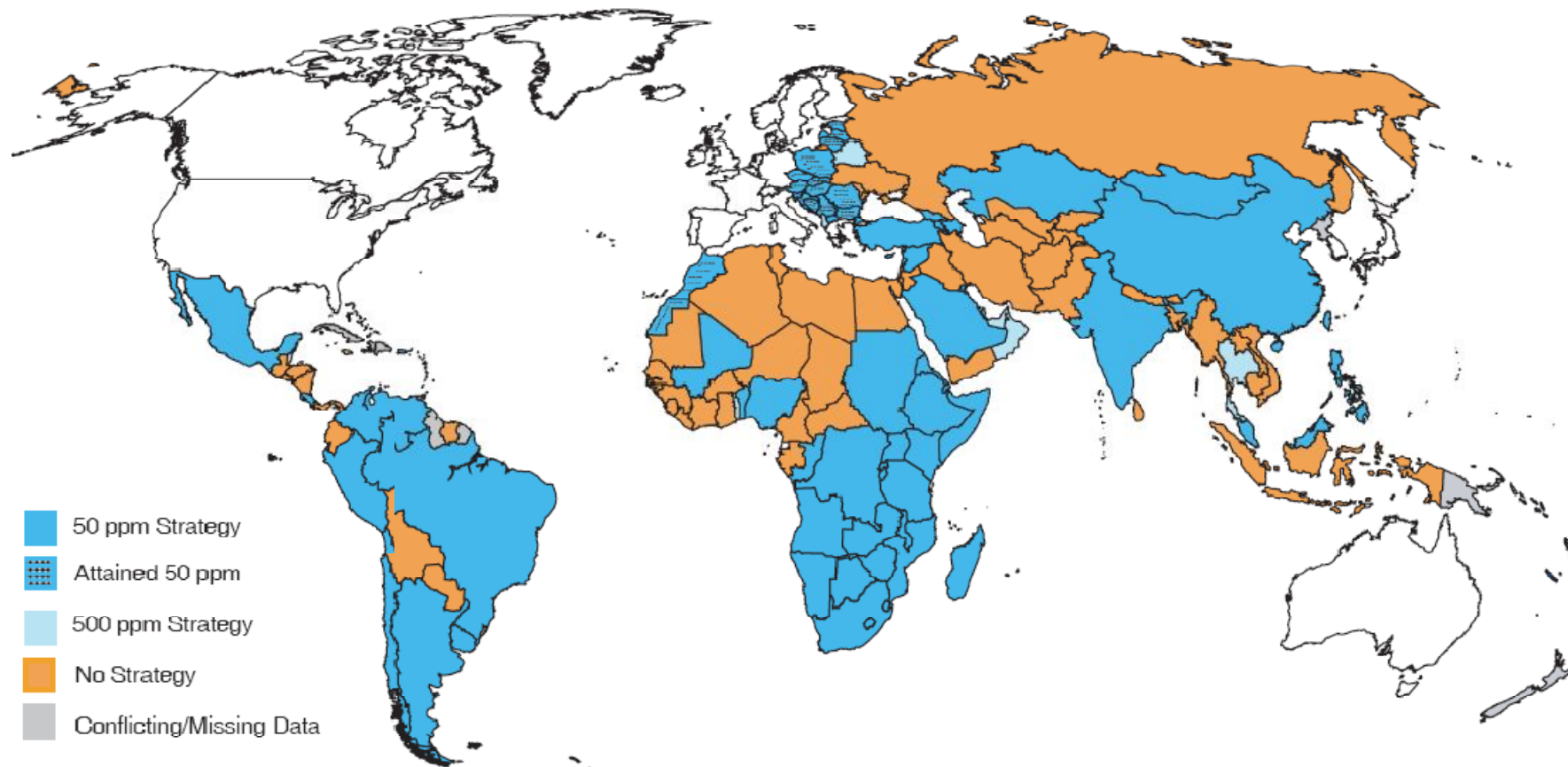


Sulfur decreased from 15.000 to 1.000 ppm (1.5% to 0.1%) leads to an increased useful life of a vehicle in a 80 to 90%

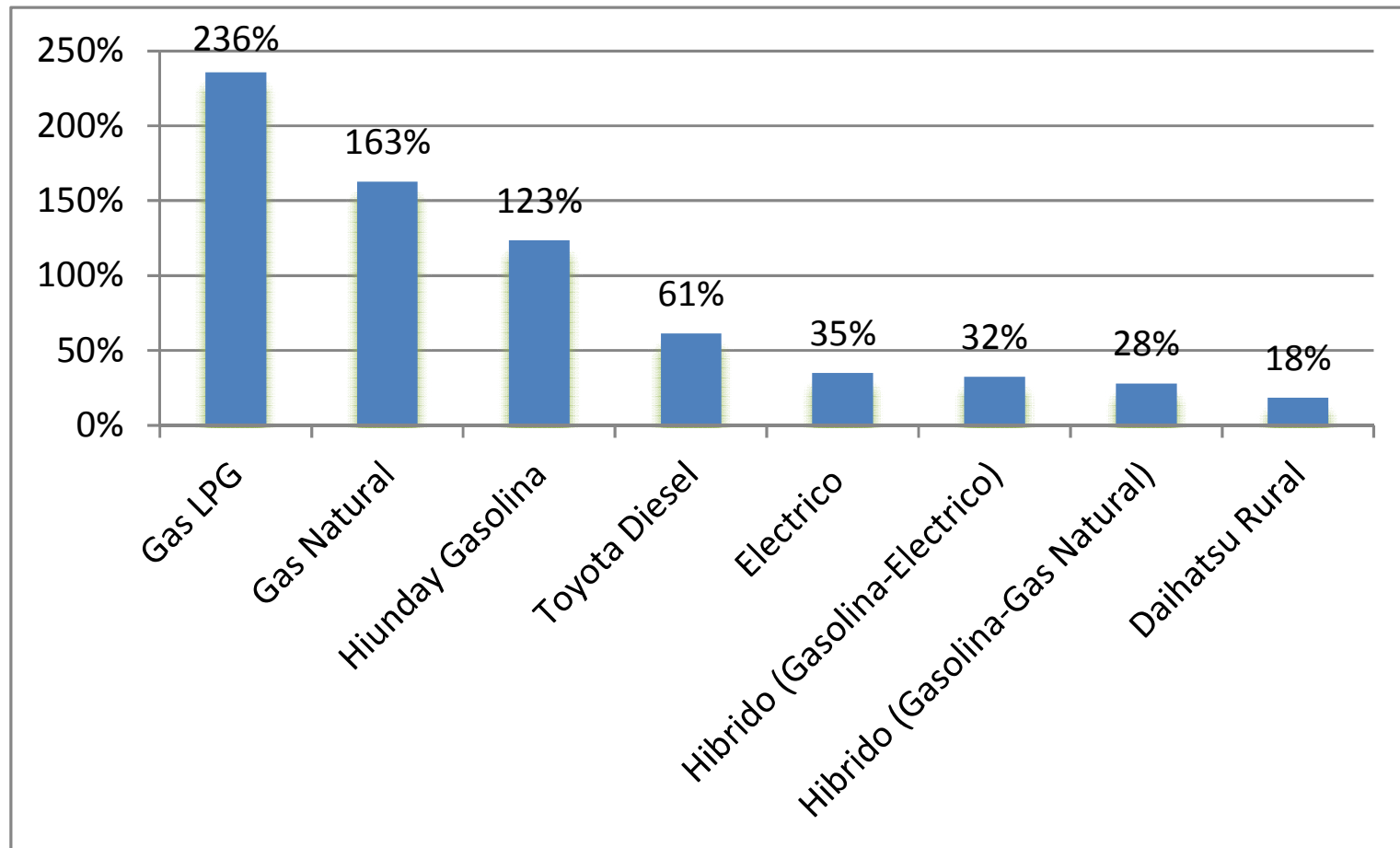
Overall trend with respect to the objectives of sulphur



Diesel Fuel Sulphur Levels: Global Status
50 ppm Target - 2009



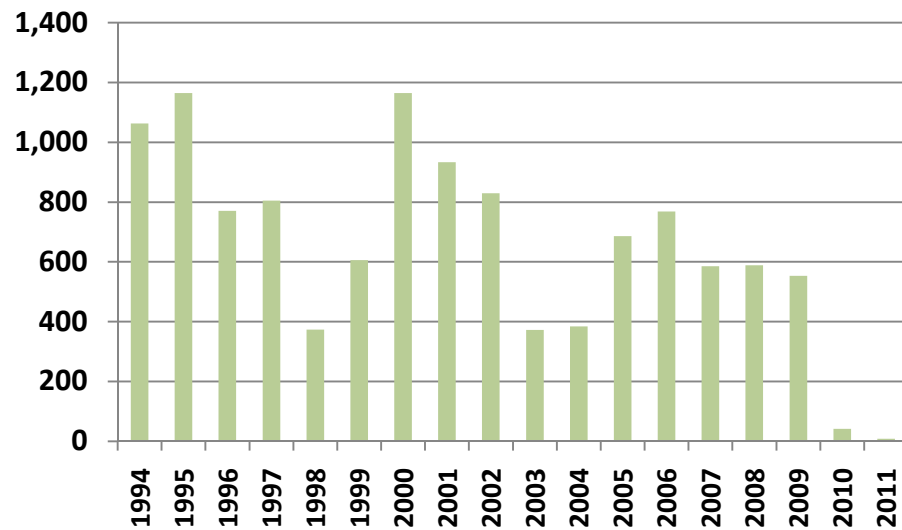
Costa Rican Studies reveal the IRR for different technologies in taxis, March 2012



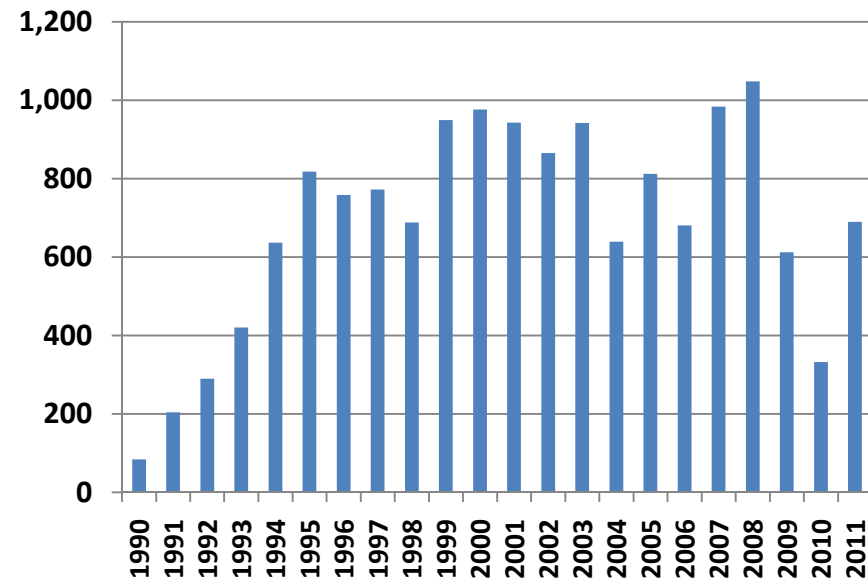
Fuente: Encuesta aplicada a concesionarios de taxi, CINPE-2012, INS, CCSS, Ministerio de Hacienda

Need to renovate Public Transport System in C.R.

Quatity of Taxis and ages

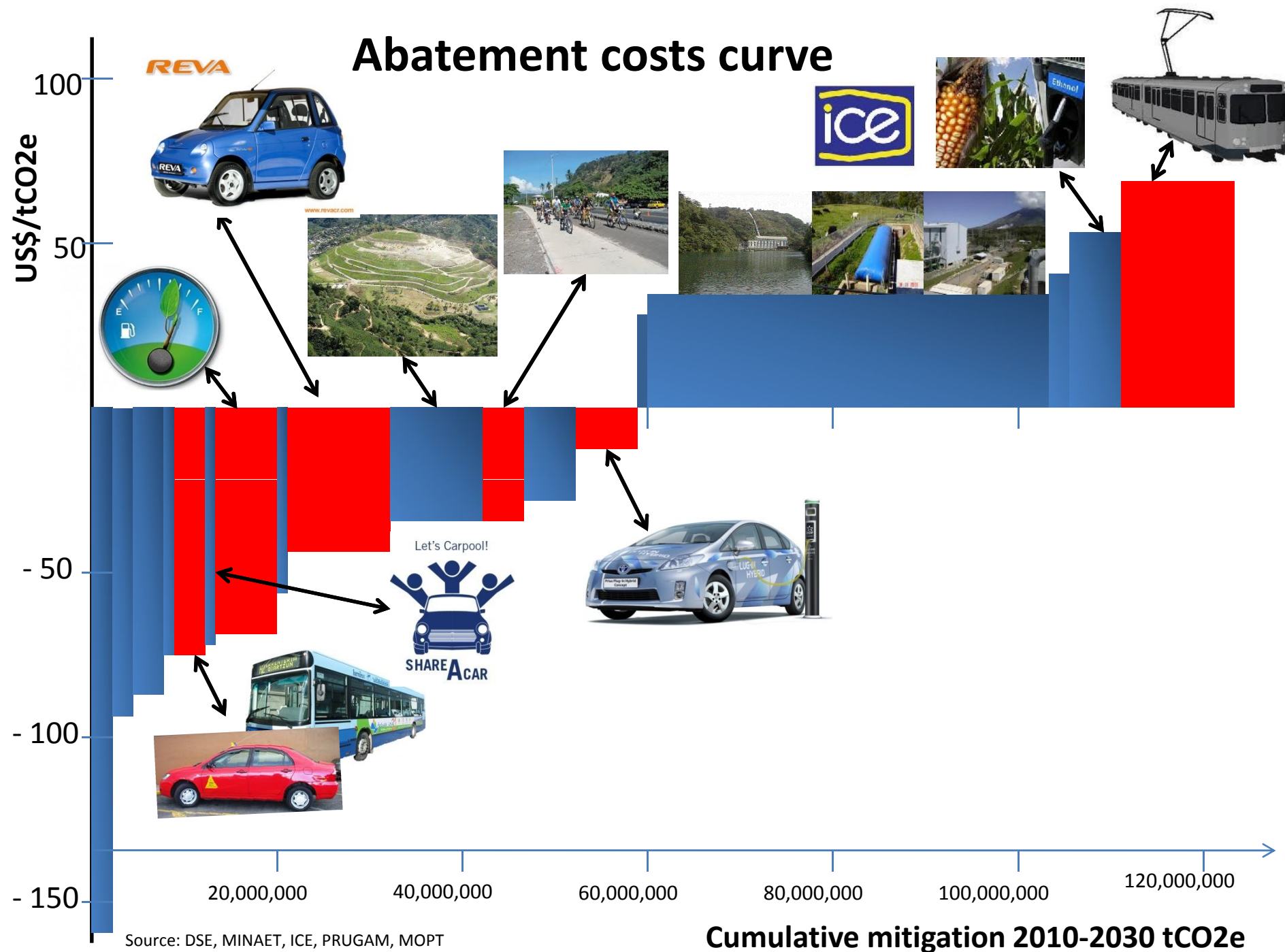


Quantity of buses and ages



Source: DSE 2010.

Abatement costs curve



We are working on a NAMA for the public transportation sector

