

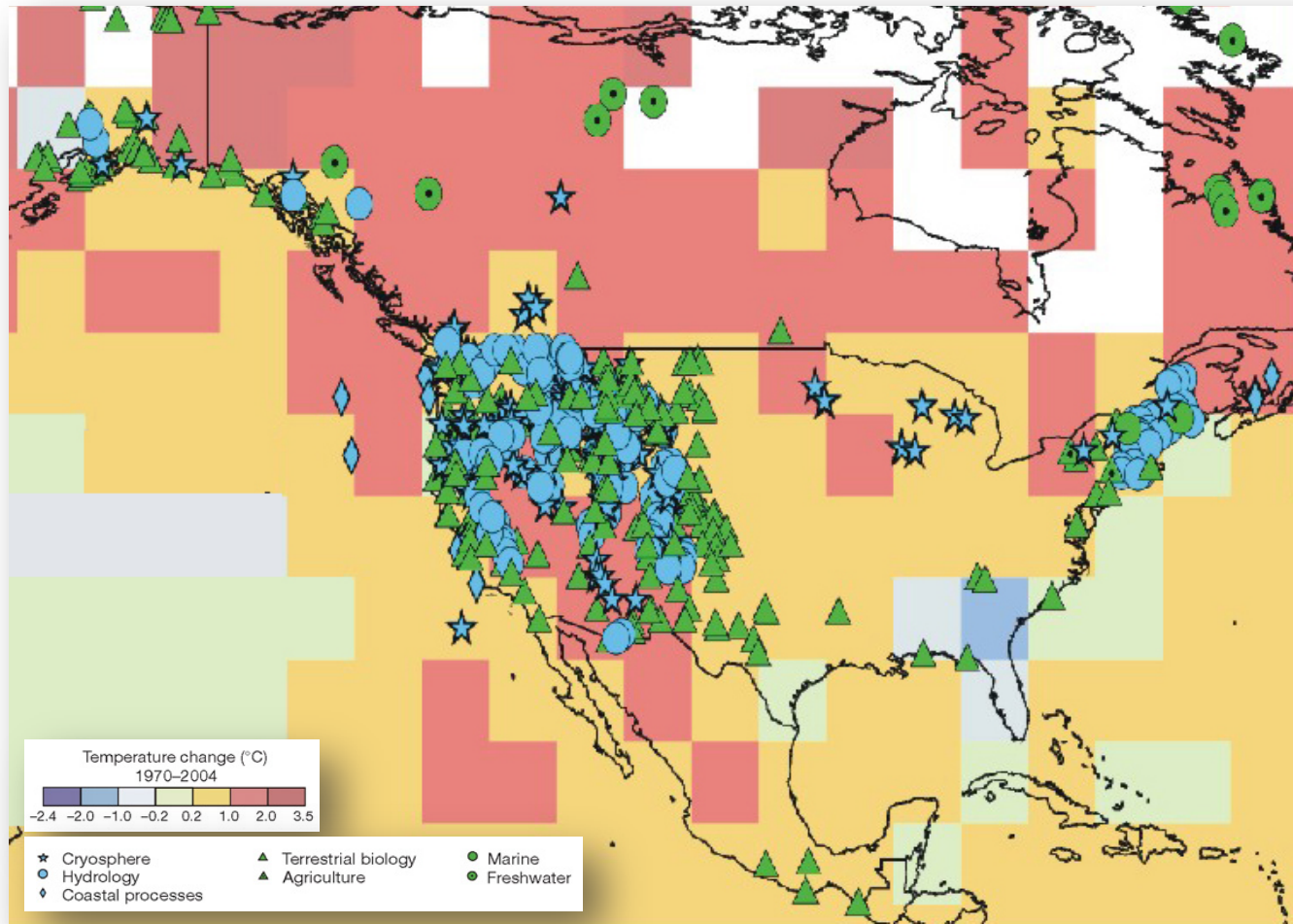
Towards climate policy coherence in North America

Mitigation strategies

Rodolfo LACY

June 2009

PHYSICAL AND BIOLOGICAL IMPACTS IN NORTH AMERICA SINCE 1970

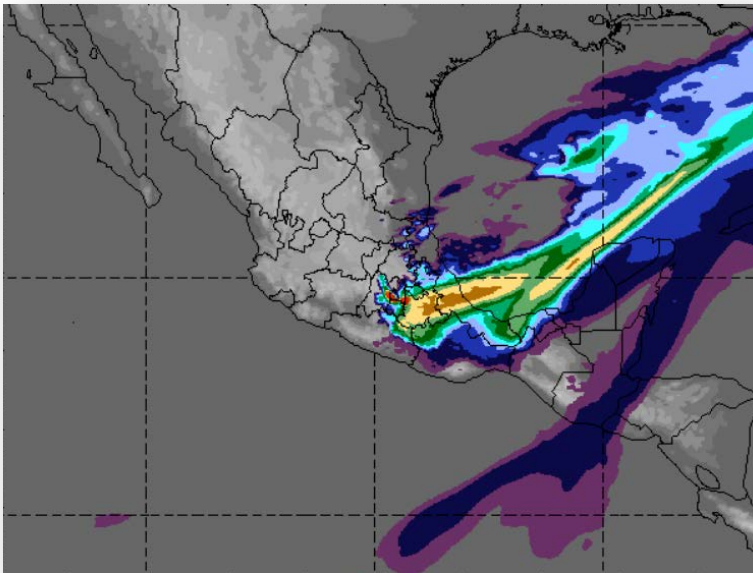


SOURCE: C. Rosenzweig, D. Karoly, M. Vicarelli, P. Neofotis, Q. Wu, G. Casassa, A. Menzel, T. L. Root, N. Estrella, B. Seguin, P. Tryjanowski, C. Liu, S. Rawlins & A. Imeson, 2008. *Attributing physical and biological impacts to anthropogenic climate change*. Nature 453, 353-357(15 May 2008)

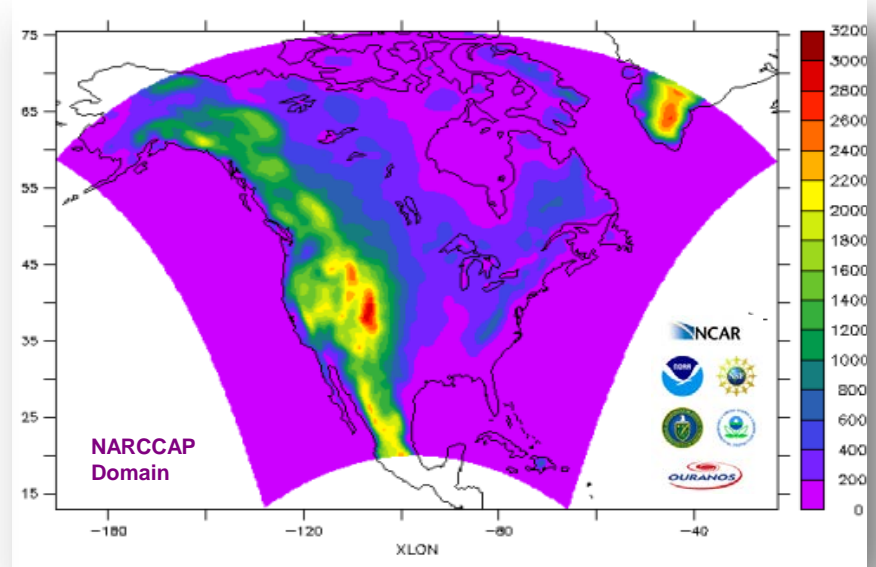
SCIENTIFIC RESEARCH PROGRAMS

We need more regional research programs on the basic science of climate change...

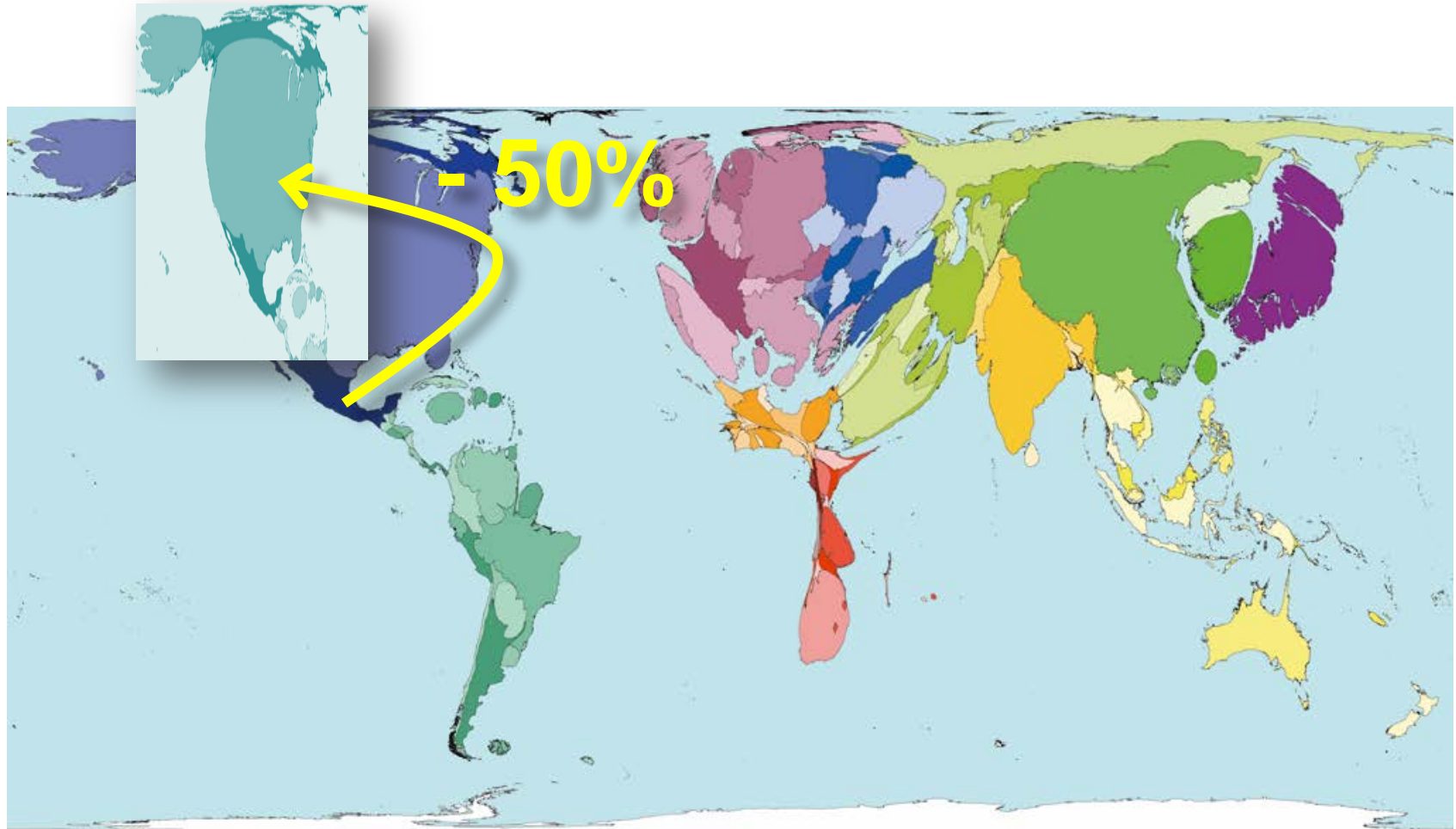
MILAGRO Project
NCAR



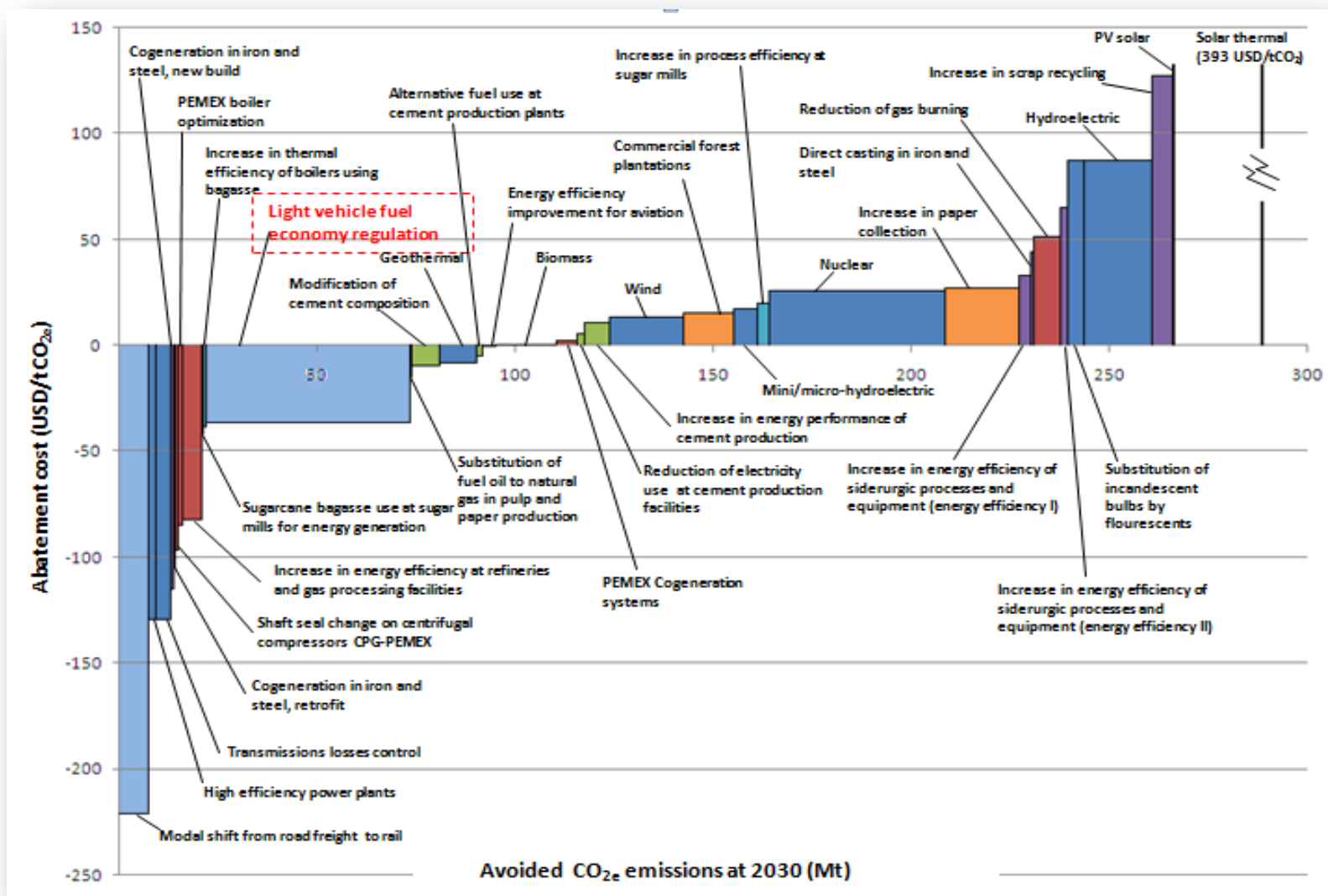
The North American Regional Climate Change
Assessment Program (NARCCAP)



NORTH AMERICA GHG EMISSIONS

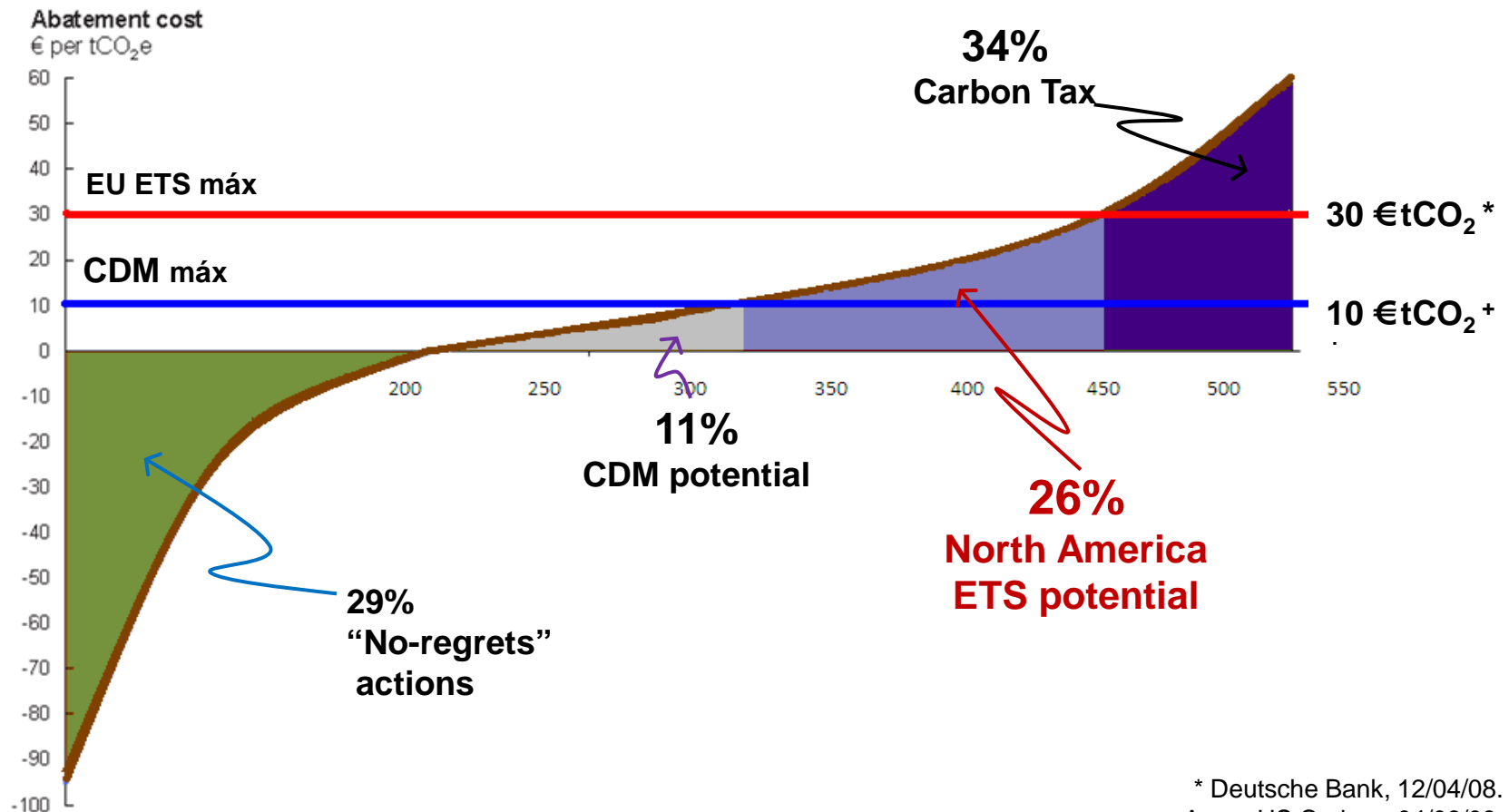


MEXICAN ABATEMENT STRATEGIES COSTS



MEXICAN ABATEMENT STRATEGIES COSTS

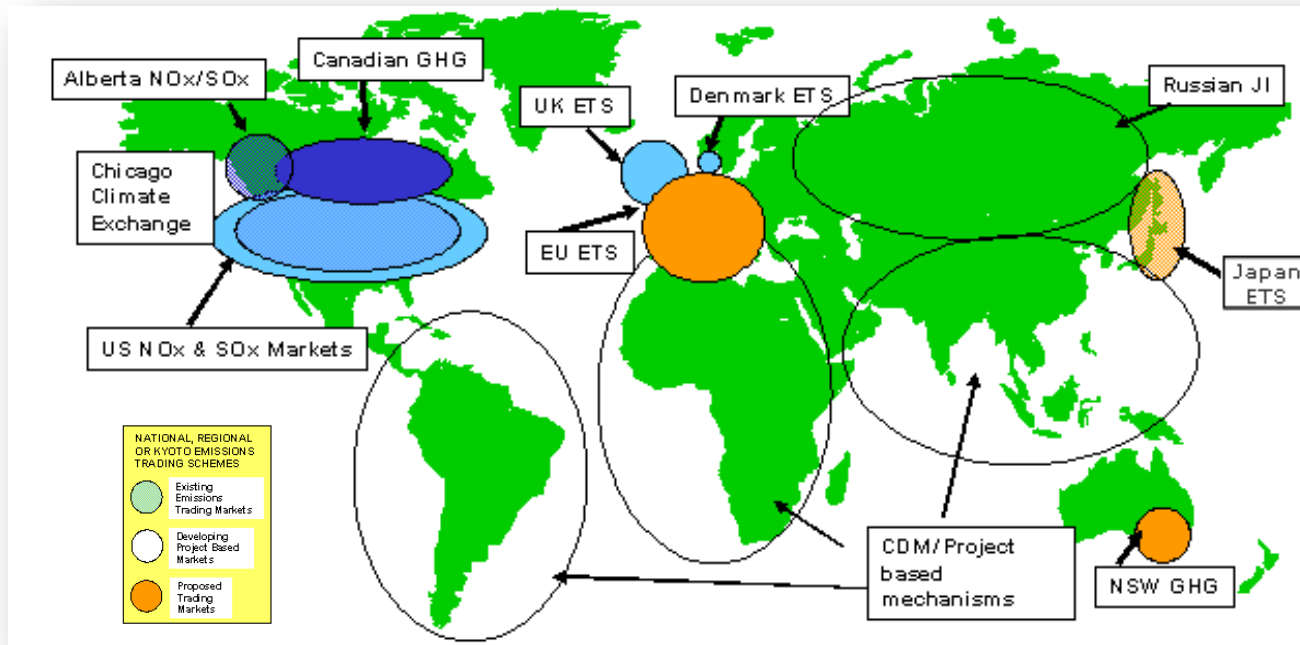
2030 Potential Mitigation Actions 535 MtCO₂e (144 actions in 11 sectors)



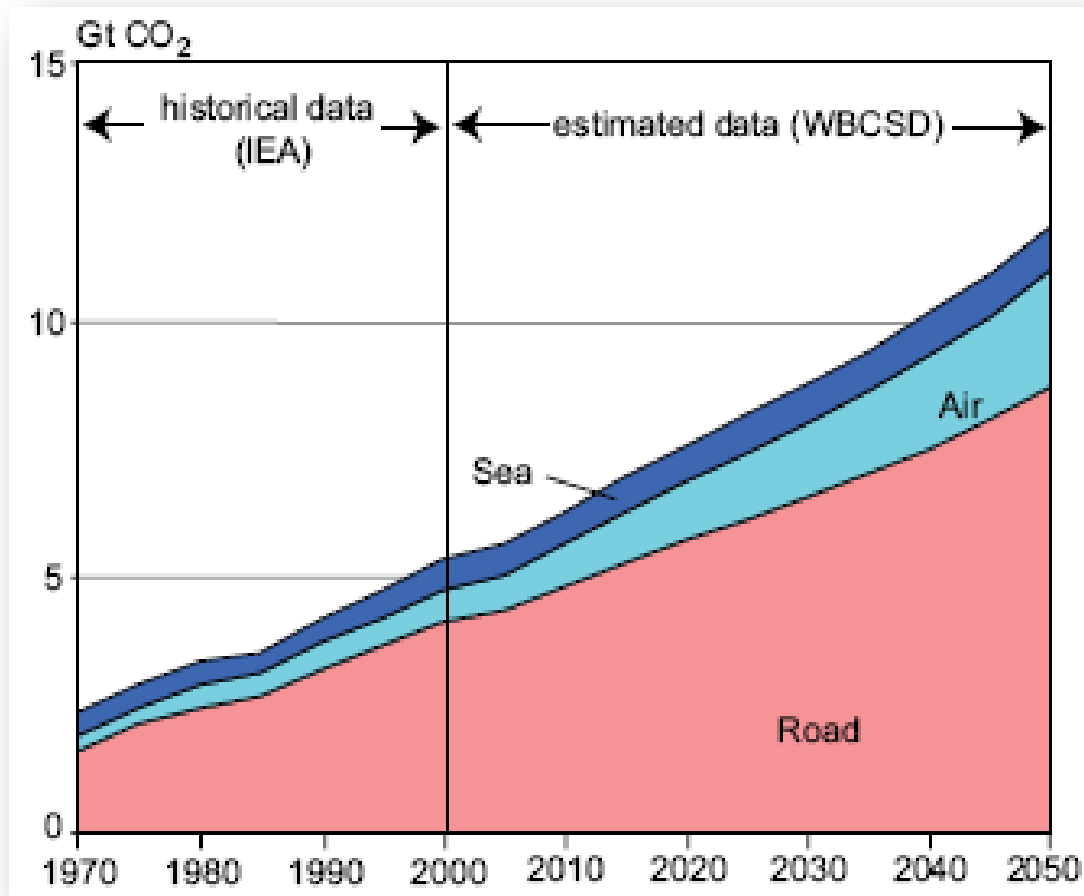
* Deutsche Bank, 12/04/08.
+ Argus US Carbon, 04/06/09.

BACKGROUND SCENARIO

- Voluntary or mandatory Emissions Trading Systems are barely incorporating the transportation sector. There are only 2 transport CDM projects (<0.1%)
- Mexico doesn't have any experience in cap-and-trade systems



TRANSPORT EMISSIONS



Transport energy use and carbon emissions are projected to be about **80%** higher than current levels by 2030

“20 in 15” Molina’s Proposal



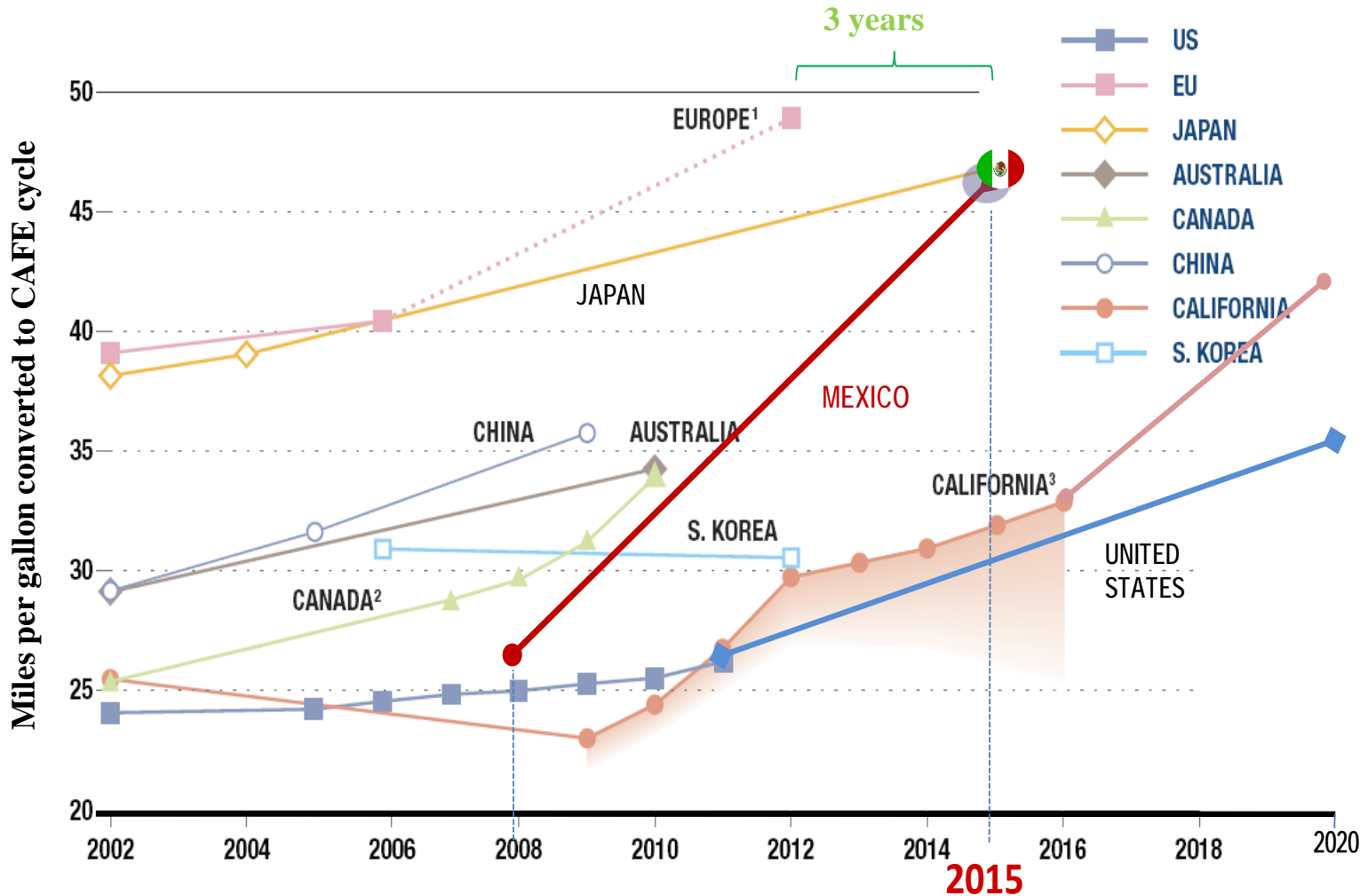
April 18, 2008

*“Our proposal is to go from a weighted average of 12 km/l to an average of **20 km/l** by 2015 for light new vehicles...*

*Stated in terms of emissions, current weighted average of 180 g CO₂/km could be reduced to **130 g CO₂/km**”*

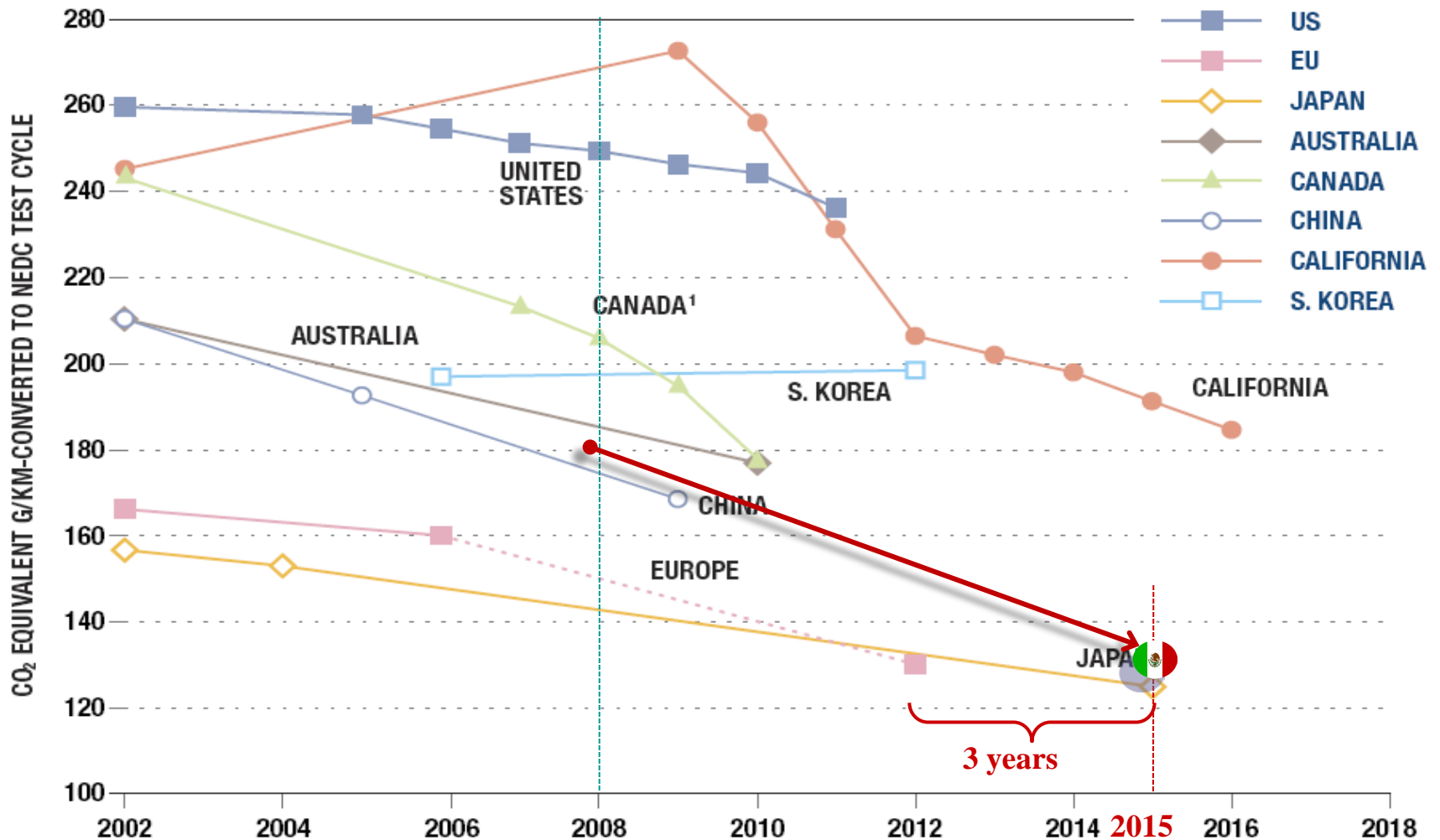
2015 Proposal

Expressed in terms of MPG



2015 Proposal

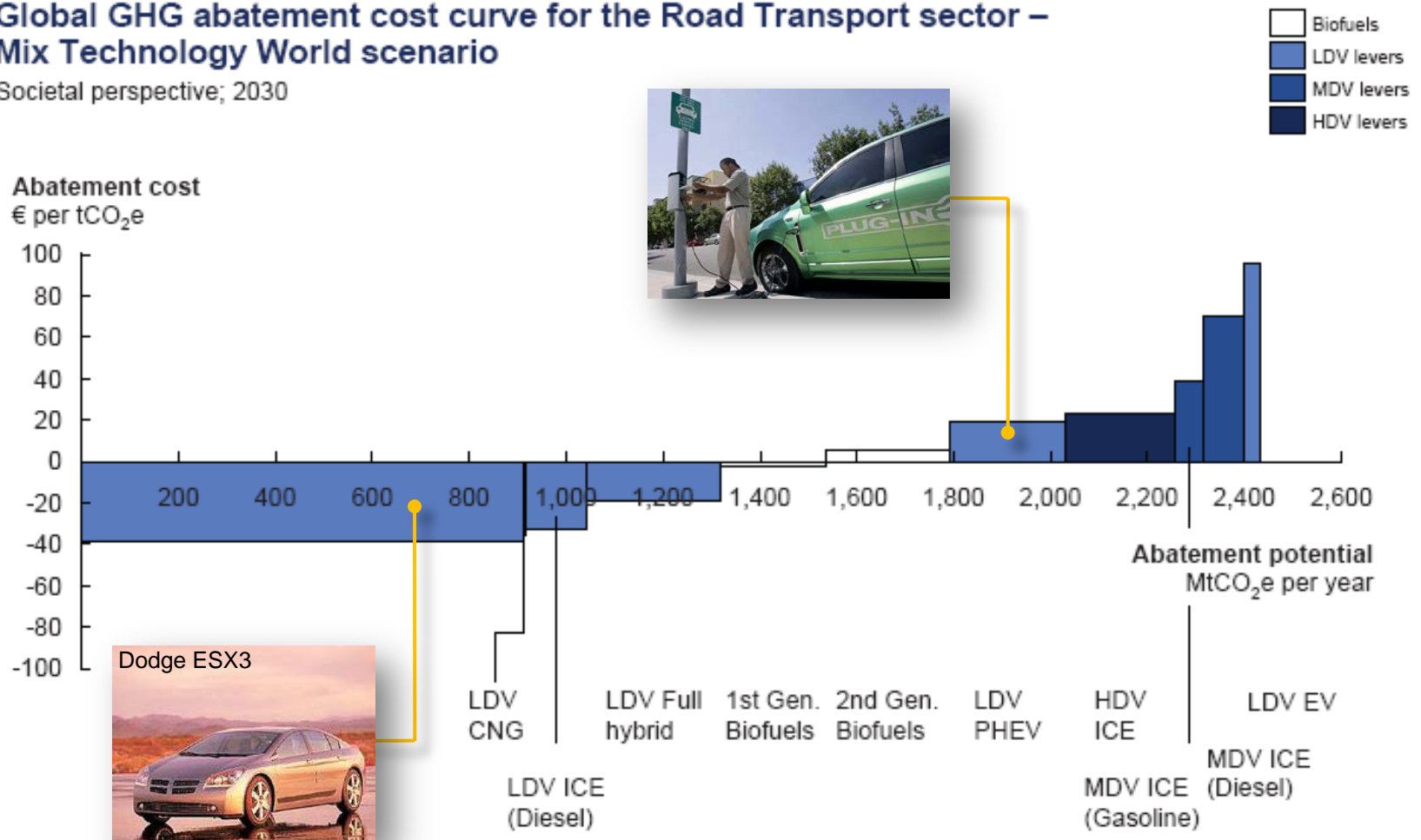
expressed in terms of gCO₂/km



Global Abatement Strategies Costs for Road Transport Sector

Global GHG abatement cost curve for the Road Transport sector – Mix Technology World scenario

Societal perspective; 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €100 per tCO₂e in a penetration scenario if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.

Source: Global GHG Abatement Cost Curve v2.0

Improvement packages for gasoline internal combustion vehicles

Improvement packages in gasoline internal combustion vehicles		LDV México
Package 1	<ul style="list-style-type: none"> Variable valve control Engine friction reduction (mild) Low rolling resistance tires Tire pressure monitoring system Mild weight reduction 	-129.3 US\$/tCO ₂ e
Package 2 = P1 +	<ul style="list-style-type: none"> Medium displacement reduction (downsizing) Medium weight reduction Electrification (steering, pumps) Optimized gearbox ratio Improved aerodynamic efficiency Start-stop 	-74.4 US\$/tCO ₂ e
Package 3 = P2 +	<ul style="list-style-type: none"> Strong displacement reduction (downsizing) Air conditioning modification Improved aerodynamic efficiency Start-stop with regenerative braking 	-45.5 US\$/tCO ₂ e
Package 4 = P3 +	<ul style="list-style-type: none"> Direct injection (homogeneous) Strong weight reduction (9%) Optimized transmission (including dual clutch, piloted gear box) 	-36.7 US\$/tCO ₂ e
Gasoline-Full Hybrid Gasoline-Plug-in Hybrid	<ul style="list-style-type: none"> P4 + Full hybrid 60 km range – 66% electric share 	-10.2 US\$/tCO ₂ e
Electric vehicle	<ul style="list-style-type: none"> 200 Km range Energy demand electric drive 250 WH per km 	

Improvement packages for **diesel** internal combustion vehicles

Improvement packages in diesel internal combustion vehicles		
Package D1	<ul style="list-style-type: none"> • Medium downsizing • Engine friction reduction • Low rolling resistance tires • Tire monitoring system • Mid weight reduction (1%) 	-68.5 US\$/tCO ₂ e
Package D2 = PD1 +	<ul style="list-style-type: none"> • Piezo injectors • Medium downsizing • Medium weight reduction • Electrification (steering, pumps) • Optimized gearbox ratio • Improved aerodynamic efficiency 	-49.4 US\$/tCO ₂ e
Package D3 = PD2 +	<ul style="list-style-type: none"> • Torque oriented boost • Air conditioning modification • Improved aerodynamic efficiency • Start-stop with regenerative braking 	-22.8 US\$/tCO ₂ e
Package D4 = PD3+	<ul style="list-style-type: none"> • Increase injection pressure • Strong downsizing (instead of medium downsizing) • Strong weight reduction 	-23.8 US\$/tCO ₂ e
Diesel-Full Hybrid	<ul style="list-style-type: none"> • PD4 +Full hybrid 	

WHAT TO TRADE?

GHG Offsets coming from:

- ✓ Reductions in the fuel economy and the lifetime carbon emissions of motor vehicles (CAFE, GHG standards)
- ✓ Fuel switching programs (CNG, Biofuels, clean electricity, carbon free hydrogen, etc.)



- ✓ METRO, BRT or any public transport projects
- ✓ Fleet replacement and scrapping programs
- ✓ Modal shift (Trucks by Railroad)

FREIGHT OPTIONS*

How to move
each ton?



18
kg CO₂/ton



89
kg CO₂/ton



>1,000
kg CO₂/ton

*Mexico data

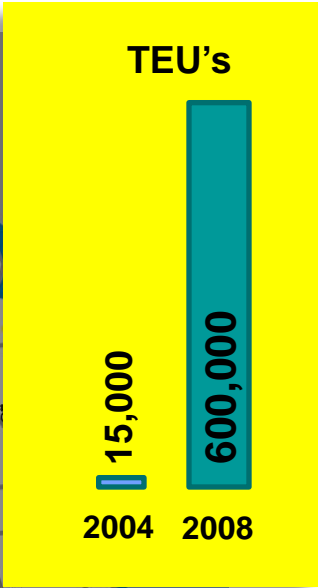
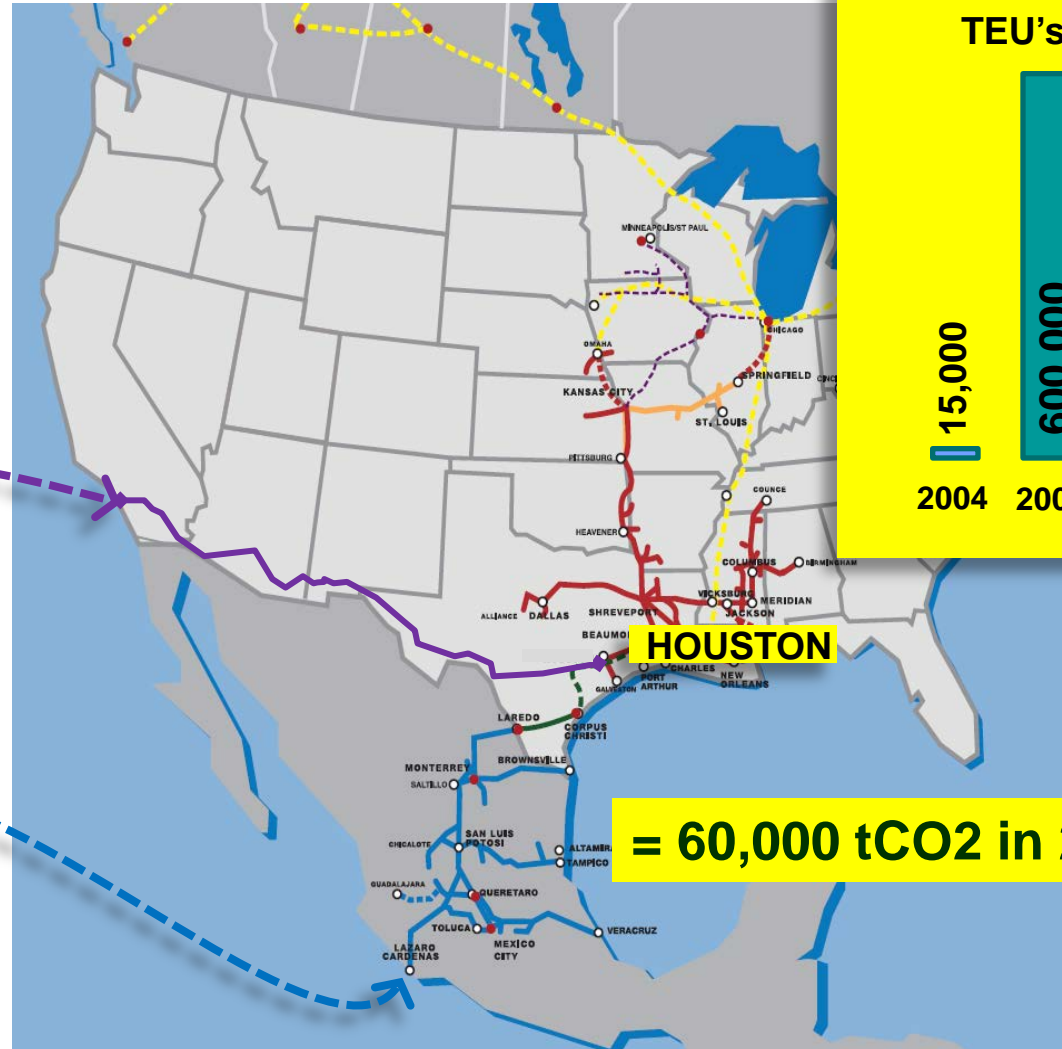
COMPETITIVE LOGISTIC SOLUTIONS TO MITIGATE CLIMATE CHANGE

(ex. Multimodal Railroad Corridor Lázaro Cárdenas-Houston)



The Mexican route reduces:

- 350 km
- 72 hrs
- 100 USd/TEU
- 100 tCO₂/1000TEUs



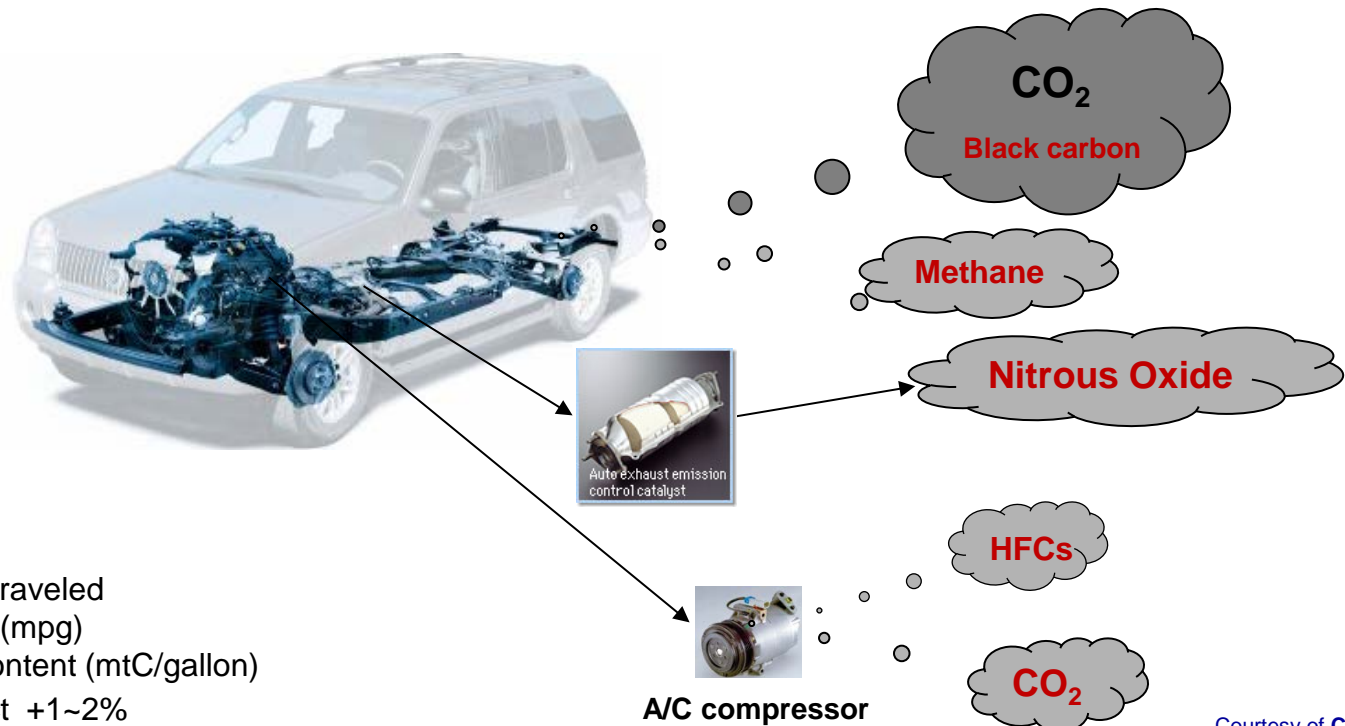
= 60,000 tCO₂ in 2008

TEU = Twenty-foot Equivalent Unit” contenedor de 20 pies de largo.

WHAT TO TRADE?

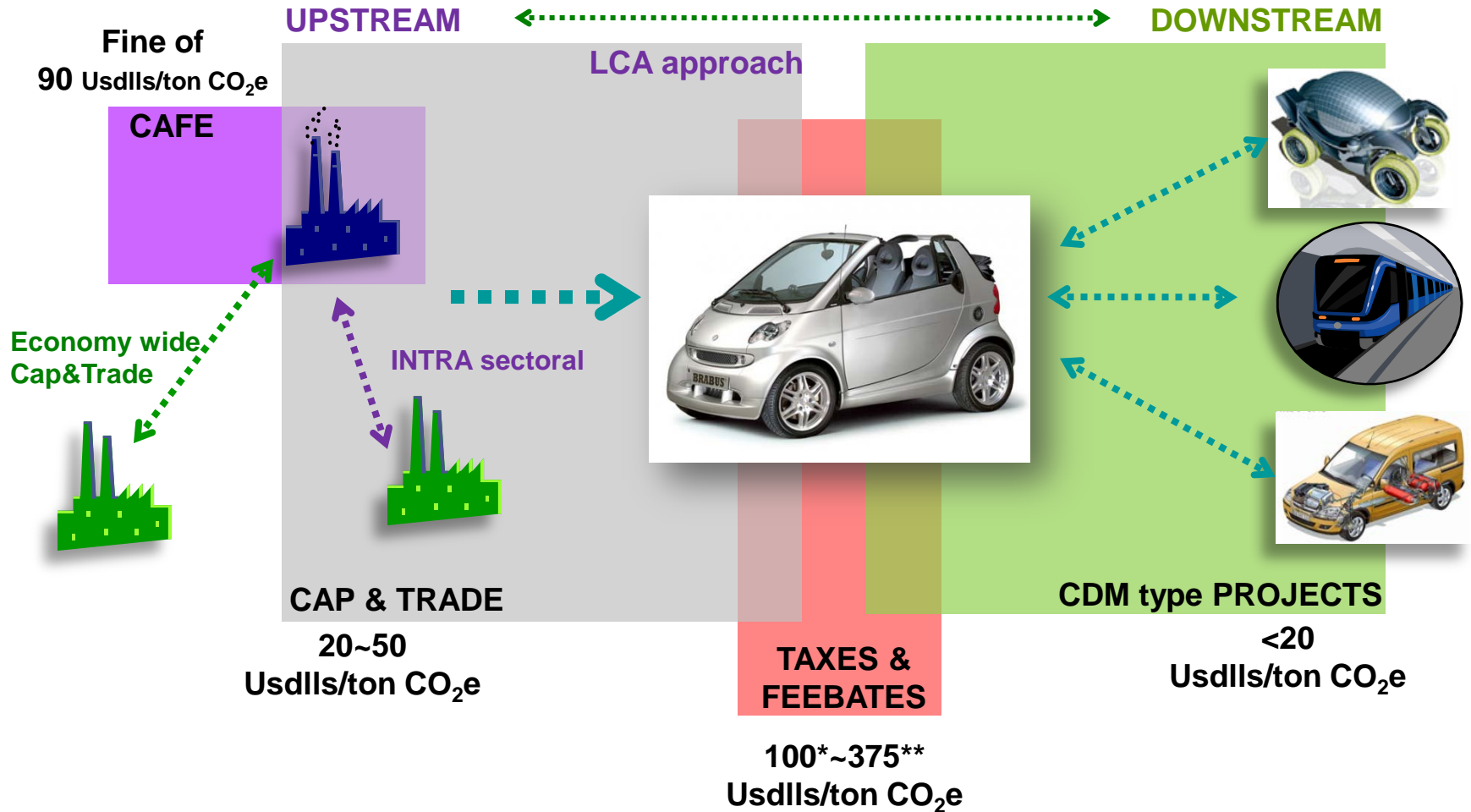
We need a more comprehensive concept of the Lifetime Carbon Burden of motor vehicles:

$$LCB = (RE) VMT \times (CF) FE^{-1} \times C_{conc}$$



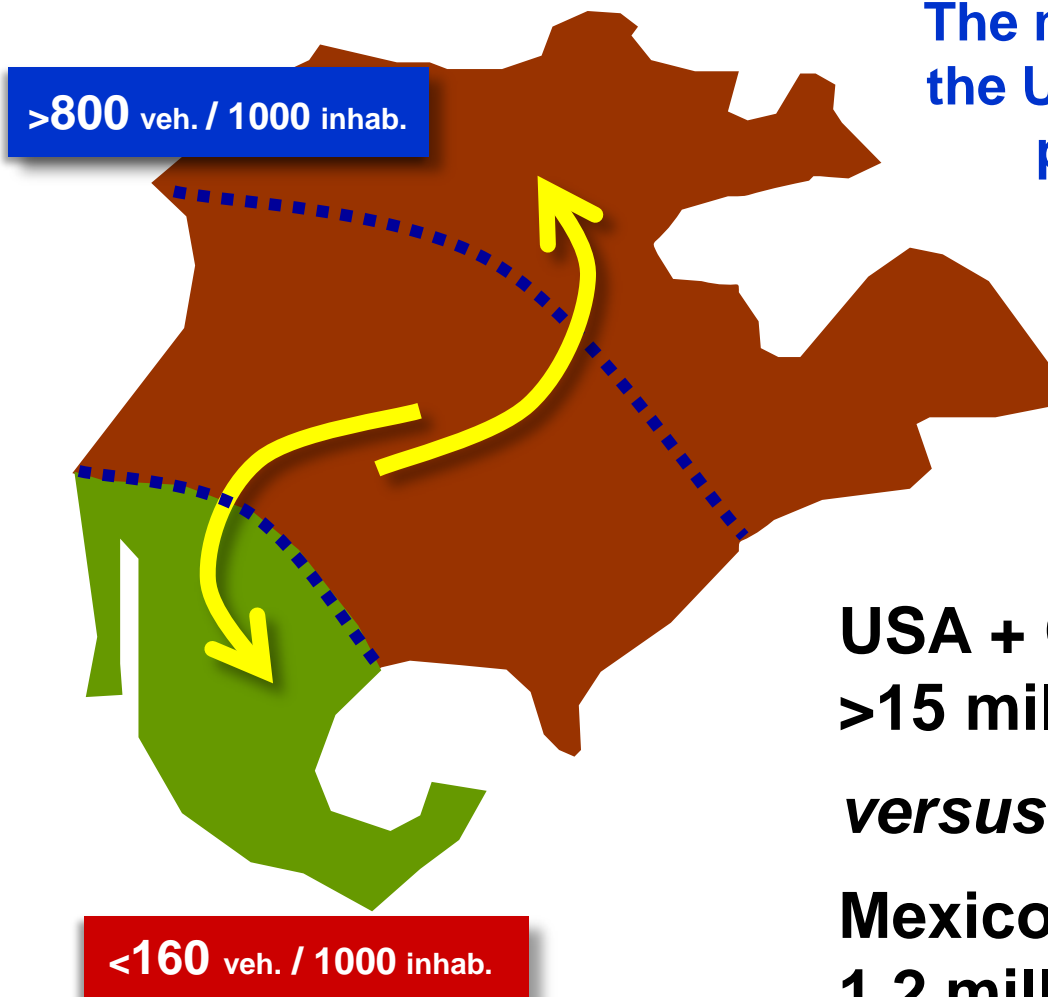
- VMT** = Vehicle Miles Traveled
- FE** = Fuel Economy (mpg)
- C_{conc}** = Fuel Carbon content (mtC/gallon)
- RE** = Rebound Effect +1~2%
- CF** = Correction Factor ≈15% in the US

HOW TO TRADE IT?



*California Feebate proposal
**Guzzler Tax

NO POLICY option...



The market of used cars from the U.S is causing a pollution problem in Canada and a strong pressure on the Mexican automobile production, certainly an unseen Carbon leakage

USA + Canada:
>15 million **used** vehicles per year

versus

Mexico:
1.2 million **new** vehicles per year

“CHOCOLATES”

>3,364,000 used vehicles from the US, 10 to 15 years old, were exported to Mexico between Nov. 2005 and Dec. 2008



28%



51%



21%

<6 Km/liter

OPPORTUNITIES

In the Cap and Trade system that the US Congress is analyzing (*Waxman-Markey bill*), there are some opportunities to build a regional North American market or integrated markets:

- ✓ **Clean Transportation.** Promotion of electric vehicles
- ✓ **Transportation Efficiency.** CAFE-GHG standards and promotion of public transport
- ✓ **International offsets credits**, based in multilateral agreements (NAFTA)
- ✓ **Pending and problematic issues:**
 - Project types and sizes
 - Additionality
 - Measuring performance
 - Carbon leakage (ex. *chocolate vehicles?*)



¡GRACIAS !

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