

**WP29 Round Table on  
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**How to Finance  
Climate Change Mitigation and Adaptation**

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## Main Messages

1. Financial needs are uncertain but high as scenarios tell us
2. Carbon finance does not get traction in transport
3. A broad reform agenda self-finances much of the transition



# Financial needs for low-carbon transport are uncertain

- Sources of uncertainty
  - Climate change: Do we have to insure against catastrophic change?
  - Technological perspectives: Which low-carbon technologies will be available and affordable?
  - Policy uncertainty: What international agreement? Will good examples invite followers?



## Financial needs for low-carbon transport are uncertain

- Precaution and technical pessimism lead to high cost estimates
  - More emphasis on changing the modal composition of infrastructure
  - Stronger increase on transport costs and higher negative impact on economic development
- Few scenarios contain a fully developed transport sector and forecast strongly different roles of the transport sector for future emissions



# Financial needs for low-carbon transport are uncertain: Forecast differences

**Cutting energy-related emissions in half by 2050 requires deep decarbonization of the power sector**

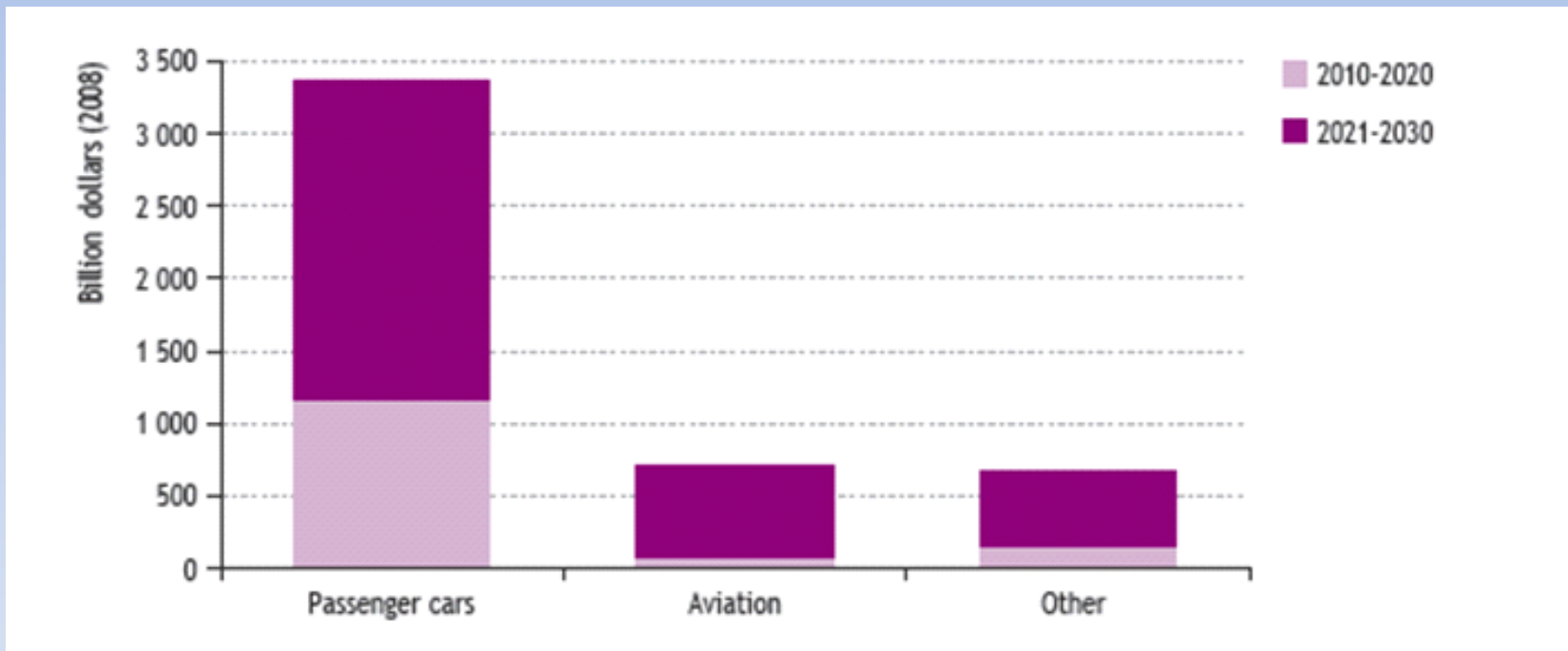
Estimated % of carbon that must be removed by sector, 2005–2050		
Sector	IEA	MiniCAM
Power	-71	-87
Building	-41	-50
Transport	-30	+47
Industry	-21	-71
Total	-50	-50

*Sources: WDR team based on data from IEA 2008b; Calvin and others forthcoming.*



# Financial needs for low-carbon transport are high, mitigation

## Cumulative incremental investment in transport by mode relative to the baseline, \$ billions



Source: IEA, World Energy Outlook 2009



# Financial needs for low-carbon transport are high, mitigation

Global cumulative incremental investment 2010 – 2030 and CO2 savings in 450 ppm scenario relative to baseline

	Incremental investment, \$ billion	CO2 savings due to low-carbon technologies (GT)	Indirect CO2 savings (GT)	Total CO2 savings (GT)
Power generation	1745	5.8	3.5	9.4
Biofuels supply	405	n.a.	n.a.	0.4
Industry	1056	1.7	1.5	3.2
Buildings	2533	0.6	1.9	2.5
Transport	4730	1.2	0	1.2
<b>Total</b>	<b>10469</b>	<b>9.3</b>	<b>6.9</b>	<b>16.7</b>



## Financial needs in transport generate less savings

- Best performing sector:  
power generation 5.35 Gt CO<sub>2</sub> savings per trillion invested
- Least performing sector:  
transport with 0.25 Gt CO<sub>2</sub> savings per trillion invested
- Result is conditional on narrow policy agenda measuring success exclusively in CO<sub>2</sub> savings



# Financial needs for low-carbon transport are high, adaptation

Overall adaptation needs, early studies

Study	New investment flows (\$ billions)	Percent of new investment sensitive to climate	Additional costs to reduce risk from climate change (percent)	Costs (\$ billions)
World Bank (2006)	1760	2-40	10-20	9-41
Stern (2007)	1760	2-20	5-20	4-37
UNDP (2007)	3112	2-33	5-20	5-67
UNFCCC (2007)	5417 <sup>a</sup>	0.7-2.7	5-20	2-41

No account of infrastructure gaps in developing countries.



## Financial needs for low-carbon transport are high, adaptation

- International Institute for Environment and Development (2009) estimates the incremental annual costs for adaptation in all low- and middle-income countries over 20 years to be \$ 15.9 to 63.2 billion
- Estimate includes closing financial gap according to demands associated with Millennium Development Goals.



# Before the use of carbon finance cut harmful subsidies

## Annual potential diesel subsidy savings, 2007

<i>Country</i>	<i>Diesel price 2008, \$ cents/liter 1)</i>	<i>Annual potential subsidy savings, \$ mill.</i>
Algeria	20	1951.49
Argentina	58	1482.45
Bahrain	13	258.84
Brunei	21	89.55
India	70	2055.18
Indonesia	42	2853.79
Iran	3	12464.40
Mexico	54	3276.93
Myanmar	52	235.72
Saudi Arabia	9	10062.54
Sri Lanka	75	42.65
Thailand	64	1756.66
United Arab Emirates	62	730.18
Venezuela	1	1865.80
Yemen	17	218.29



# Carbon finance does not get traction in transport

## 1. Carbon markets

- Joint implementation is irrelevant: no transport project
- CDM: > 4200 projects in the pipeline, 2246 registered in June 2010
  - 3 of them in transport
  - Investment share is 0.11 percent of the total



# Carbon finance does not get traction in transport

## 2. Global Environment Facility (GEF)

Project Type	Number of Projects, Total	Number of Projects, Transport	GEF Grant \$ millions	Co-financing \$ millions	Total, \$ mill.	Transport Share of the Total, in %
<b>Enabling Activities</b>						
<i>Total</i>	280		172.3	25.98	198.28	
<i>Transport</i>		0				0.00
<b>Medium Sized Projects</b>						
<i>Total</i>	117		101.66	512	613.68	
<i>Transport</i>		6	5.65	20.84	26.49	4.32
<b>Full Sized Projects</b>						
<i>Total</i>	423		2563.14	17494.66	20057.8	
<i>Transport</i>		22	176.77	2165.24	2342.01	11.68



# Transport in Clean Technology Fund Country Programs

- In 6 of the 12 country programs of the CTF, transport is included, in Kazakhstan and Ukraine in Phase II.
- Where transport is included it is significant.



# Transport in Clean Technology Fund Country Programs

Indicative Country Investment Plans endorsed by the CTF, total in \$ millions and transport share in %

<i>Country</i>		<i>Total investment</i>
Colombia	Total	3145
	Transport share	77.1319555
Egypt	Total	1921
	Transport share	45.0286309
Mexico	Total	6197
	Transport share	38.728417
Philippines	Total	2780
	Transport share	12.5899281
Thailand	Total	4263
	Transport share	29.7208539
Vietnam	Total	3445
	Transport share	33.3817126



## A broad reform agenda self-finances much of the transition

- Fiscal incentives that maximize welfare effects lead to fiscal revenues to finance the transition
  - Costing carbon: the global dimension
    - A gallon of gasoline contains 0.0024 tons of carbon.
    - Shadow price of \$ 20, \$ 30 or \$ 300 per ton of carbon would translate into 5, 12, and 72 cents per gallon (less than market volatility in recent years).
    - Leads to annual fiscal revenues of about \$ 10, 24 and 145 billion per year for the US, if no significant reduction in vmt occurs.



## A broad reform agenda self-finances much of the transition

- Fiscal incentives that maximize welfare effects lead to fiscal revenues to finance the transition, cont.
  - Costing local air pollution
    - Would lead to a mile charge of 1 to 8 cents per mile in Los Angeles area.
    - In 2003 40.84 billion vehicle miles were driven in the Los Angeles area (district 7 of Caltrans).
    - Implies a revenue potential of \$ 400 million to \$ 3.26 billion for the Los Angeles Area.



## A broad reform agenda self-finances much of the transition

- Fiscal incentives that maximize welfare effects lead to fiscal revenues to finance the transition, cont.
  - Willingness to pay for the reduction of health effects is lower in poorer countries but not by much.
  - Estimates of the income elasticity of the WTP is between 0.26 and 0.6.



## A broad reform agenda self-finances much of the transition

- Fiscal incentives that maximize welfare effects lead to fiscal revenues to finance the transition, cont.
  - Costing congestion
    - Congestion is local, but some estimates average for the national level
    - Averaged congestion costs for the US example are 3.5 cents per mile (Small and Parry) to 5 cents per mile (FHWA).
    - Implies a revenue potential of \$ 58 to 83 billion per year.



## A broad reform agenda self-finances much of the transition

- Fiscal incentives that maximize welfare effects lead to fiscal revenues to finance the transition, cont.
  - Costing external accident costs
    - Estimate of 2 to 7 cents per mile for the US.
    - Implies a revenue potential of 33 to 117 billion in 2007.



## Conclusions

- Financial needs to achieve a low-carbon transport sector are high if based on a narrow climate change agenda.
- The transport sector has not done well to attract carbon finance. Benefit-cost ratios are small compared to other sectors when benefits are narrowly defined.
- Benefit-cost ratios increase substantially if co-benefits in congestion reduction, accident prevention and local air pollution are included.
- Fiscal revenues could even allow for secondary benefits from reducing dysfunctional taxes.



Thank you!

