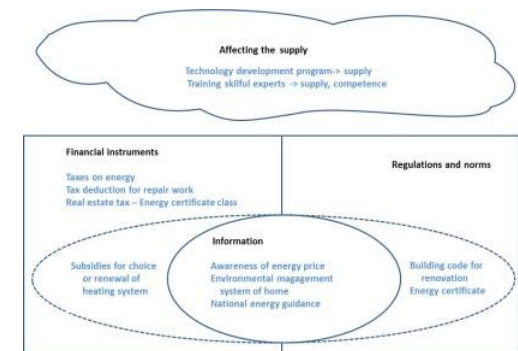


# Combinations of policy instruments to decrease the climate impacts of housing, personal transport and food

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# First: We consider the whole 'system' when we talk about the consumption

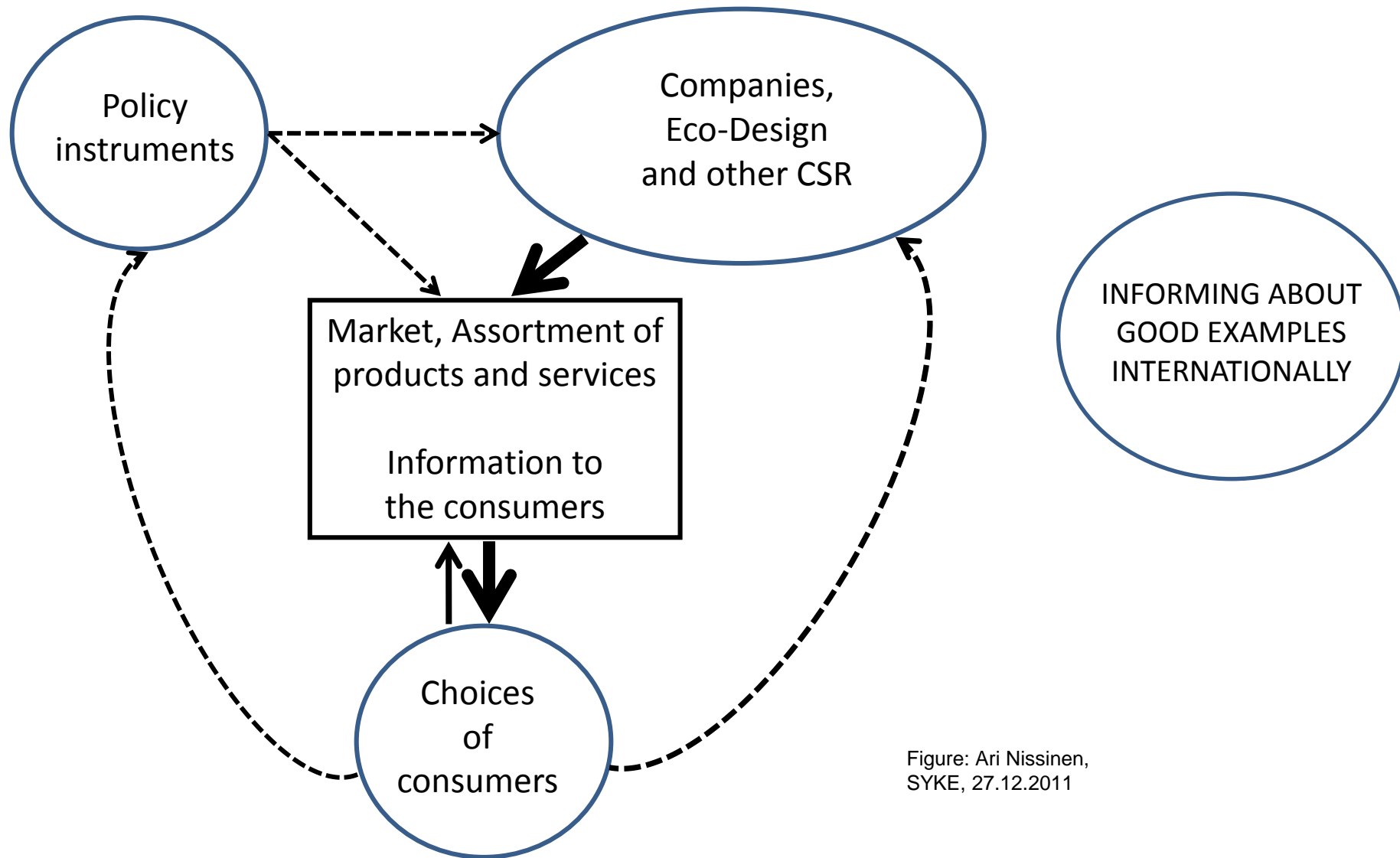


Figure: Ari Nissinen,  
SYKE, 27.12.2011

# Aims of the KUILU-study

- evaluate the existing policy instruments in Finland that can decrease the greenhouse-gas emissions from housing, passenger traffic and food
- develop packages of instruments that would improve the policy effectiveness regarding decreasing of greenhouse gas emissions caused by consumption of households

# The process to develop and assess the policy packages

- (1) identification and screening of existing instruments that can have major effects on the climate impacts of consumption
- (2) evaluation of the impacts of the policy instruments
- (3) a workshop with policy makers for identification of possible new policy instruments and suitable policy packages
- (4) evaluation of the impacts of the policy packages
- (5) a final workshop with policy makers to develop recommendations.

## Recent annual GHG emission levels, in million tons (MT) of CO<sub>2</sub>-eq.


Sectors	Levels 2005	Levels 2009
Housing - from energy use	9.6	10.6
- via ETS* sectors	7.2	8.3
- via other sectors	2.4	2.3
Transport - from energy use	7.5	7.4
- via ETS sectors	0.6	0.7
- via other sectors	6.9	6.7
Food - from production chain (I-O)	8.5	

*Finland's total  
greenhouse gas (GHG)  
emissions are  
around 70 Mt*

\* EU Emission Trading System

# Estimated decrease in annual greenhouse-gas emissions due to existing policy instruments

Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	Further information
Building code for new buildings, energy efficiency requirements	4 000 000	Decrease in year 2008. Requirements were introduced to the building code in year 1976.
EU Energy label	170 000	Decrease in year 2010. The labelling was started in year 1994.



Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	Further information
Building code for new buildings, energy efficiency requirements	4 000 000	Decrease in year 2008. Requirements were introduced to the building code in year 1976.
EU Energy label	170 000	Decrease in year 2010. The labelling was started in year 1994.

Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	Further information (see more in Heiskanen et al. 2012)
	Shortly after the introduction of the instrument	In year 2020 or 2030
Effects of eco-design directive on appliances at households	340 000	In year 2020.
Taxes on energy	340 000	During a couple of years after increased taxes in year 2011.
Subsidies for choice or renewal of heating system, blocks of flats	40 000	In year 2007.
Subsidies for choice or renewal of heating system, houses	25 000	In year 2007.
Tax deduction for repair work	(25 000)	Estimated to be at the same level as subsidies, no separate statistics.
Energy experts in block of flats	1 400	In year 2005.
National energy guidance	40 000	In year 2020.
Energy certificate	700 000	In year 2030.
Real-time metering of electricity consumption	60 000	In year 2020.
Land use planning for more compact community structure	36 000	In year 2020.
Road pricing / Road user charges	140 000 (700 000)	In year 2020, when 20 % of traffic in the priced roads. (In parenthesis if all roads involved).
Taxes on fuels	180 000	In year 2010, with 10% increase in prices and 2.5% decrease in traffic.
Public transport ticket for employees as a part of the salary	430	In year 2000.
Dependence of purchase tax and annual tax on the CO <sub>2</sub> emission of the vehicle	800 000	In year 2020.
Promotion of sustainable development in the restaurants of the public sector (lunch meals in schools, kindergarten etc.)	62 000	In year 2020, assuming one vegetarian lunch per week, and subsequent increase of 10 % at homes.
Separate collection for biowaste	73 000	In year 2009.
Beverage packaging tax	57 000	In year 2009, beer.

Table 3  
in the paper

# Estimated decrease in annual greenhouse-gas emissions due to various policy instruments:

## 1) Housing

Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	
	Shortly after the introduction of the instrument	In year 2020 or 2030
Effects of eco-design directive on appliances at households		340 000
Taxes on energy	340 000	
Subsidies for choice or renewal of heating system, blocks of flats	40 000	
Subsidies for choice or renewal of heating system, houses	25 000	
Tax deduction for repair work	(25 000)	
Energy experts in block of flats	1 400	
National energy guidance		40 000
Energy certificate		700 000
Real-time metering of electricity consumption		60 000

# Estimated decrease in annual greenhouse-gas emissions due to various policy instruments:

## 2) Personal traffic

Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	
	Shortly after the introduction of the instrument	In year 2020 or 2030
Land use planning for more compact community structure		36 000
Road pricing / Road user charges		140 000 (700 000)
Taxes on fuels	180 000	
Public transport ticket for employees as a part of the salary	430	
Dependence of purchase tax and annual tax on the CO <sub>2</sub> emission of the vehicle		800 000



# Estimated decrease in annual greenhouse-gas emissions due to various policy instruments:

## 3) Food

Policy instrument	Estimated decrease in emissions [t CO <sub>2</sub> e/a]	
	Shortly after the introduction of the instrument	In year 2020 or 2030
Promotion of sustainable development in the restaurants of the public sector (lunch meals in schools, kindergartens etc.)		62 000
Separate collection for biowaste	73 000	
Beverage packaging tax	57 000	

# Interactions between policy instruments were considered

Direct (D) Interaction				Indirect (I) Interaction		Fundamental mismatch (F)
prerequisite D P	supportive D S	replacing D R	conflicting D C	increased potential I/P	reduced potential R/P	F
+ weak	+ weak	+ weak	- weak	+ weak	- weak	
++ moderate	++ moderate	++ moderate	-- moderate	++ moderate	-- moderate	
+++ strong	+++ strong	+++ strong	--- strong	+++ strong*	--- strong*	
0 none	0 none	0 none	0 none	0 none	0 none	

\*) less likely to occur

# Example of interaction effects review table – case housing

Asumisen ohjauskeino-matriisi	a) Rakentamismääräykset	b) Eco-Design direktiivin vaikutukset laitteisiin	c) Energiaverot	d) Asuinkerrostalojen energia-avustus	e) Pientalojen energia-avustus (2006-2008)	f) Kotitalous-vähennys	g) Energia-ekspertti-toiminta	h) Energia-neuvonta	i) Energia-todistus	j) Reaali-aikainen sähkö-nmittaus	k) EU:n energia-merkki
A1 Rakentamismääräykset		A1-b 0	A1-c 0	A1-d 0	A1-e 0	A1-f 0	A1-g 0	A1-h 0 Mutta rakennusvalvonnan neuvonta tärkeää!	A1-i E/L + Uudet tiukat rakentamäär. -> hyvä energialuokka	A1-j 0	A1-k 0
A2 Eco-Design direktiivin vaikutukset laitteisiin			A2-c S/K + On mahdollista välttää veroja uusilla energiatehokkailla laitteilla	A2-d 0	A2-e 0	A2-f 0	A2-g S/K + Ekspertti voi neuvota uusista energiatehokkaista laitteista	A2-h S/K + Neuvoja voi neuvota uusista energiatehokkaista laitteista	A2-i S/K + Uudet kiinteistö-laitteet. -> hyvä energialuokka	A2-j S/K + Uudet energiatehokkaat laitteet näkyvät mittauksissa	A2-k S/K +++ Uudet saavat hyvän A-luokan. Lisä-info joka annetaan merkissä.
A3 Energiaverot				A3-d E/L ++ Verot kannustavat investoimaan, ja avustus myös	A3-e E/L ++ Verot kannustavat investoimaan, ja avustus myös	A3-f E/L ++ Verot kannustavat investoimaan, ja vähennys myös	A3-g S/K + Energia-ekspertti voi motivoida energiansäästöä veroilla	A3-h S/K + Energia-neuvoja voi motivoida energiansäästöä veroilla	A3-i E/L + Energia-verojen vuoksi kannattaa hankkia hyvän energialuokan asunto	A3-j S/K ++ Verot motivoivat seuraamaan ja vähentämään sähkönkulutusta	A3-k E/L ++ Energiaverot motivoivat valitsemaan energiamerkin perusteella
A4 Asuinkerrostalojen energia-avustus					A4-e S/E +++ Loogista ja tasapuolista että molempia tuetaan. Voisiko yhdistää yhdeksi avustukseksi	A4-f 0	A4-g S/K +++ Ekspertillä suuri rooli remontin suunnittelussa	A4-h S/K ++ Neuvonnalla suuri rooli remontin suunnittelussa	A4-i S/K +++ Avustuksella ja investoinnilla energialuokka saadaan paremmaksi	A4-j S/K ++ Mittauksella voidaan löytää remontin kohteita, ja osittain todentaa remontin tehoa	A4-k S/K ++ Remontissa voidaan valita hyvän energialuokan laitteita
A5 Pientalojen energia-avustus (2006-2008)						A5-f S/S Tarvittaisi selkeitä ohjeita, kummasta korvataan. Vähennys ei kohdennu yhtä selvästi energieremontteihin.	A5-g 0 Pientalossa ei ole muita eksperttejä kuin asukas itse	A5-h S/E +++ Neuvonnan tulee vastata avustusta koskeviin kysymyksiin	A5-i S/K +++ Avustuksella ja investoinnilla energialuokka saadaan paremmaksi	A5-j S/K ++ Mittauksella voidaan löytää remontin kohteita, ja osittain todentaa remontin tehoa	A5-k S/K ++ Remontissa voidaan valita hyvän energialuokan laitteita

*Sorry, in Finnish!*

*Codes from the previous table were used, but in Finnish. E.g. S/K = D/S*

# Policy package for climate-friendly housing

## Affecting the supply

Technology development program -> supply  
Training skilful experts -> supply, competence

### Financial instruments

Taxes on energy  
Tax deduction for repair work  
Real estate tax – Energy certificate class

### Regulations and norms

### Information

Subsidies for choice  
or renewal of  
heating system

Awareness of energy price  
Environmental management  
system of home  
National energy guidance

Building code,  
also for renovation  
Energy certificate

# Policy package for climate-friendly personal traffic

## Affecting the supply

Supply of public transport, paratransit  
Links between car drive, cycling and public transport  
Network of cycling routes, safety of walking and cycling

## Financial instruments

Taxes on transport fuels + tax on vehicle purchase + annual tax on vehicle versus tax on driven kilometers  
Deleting subsidies for car drive  
Emission trading for households?

## Regulations and norms

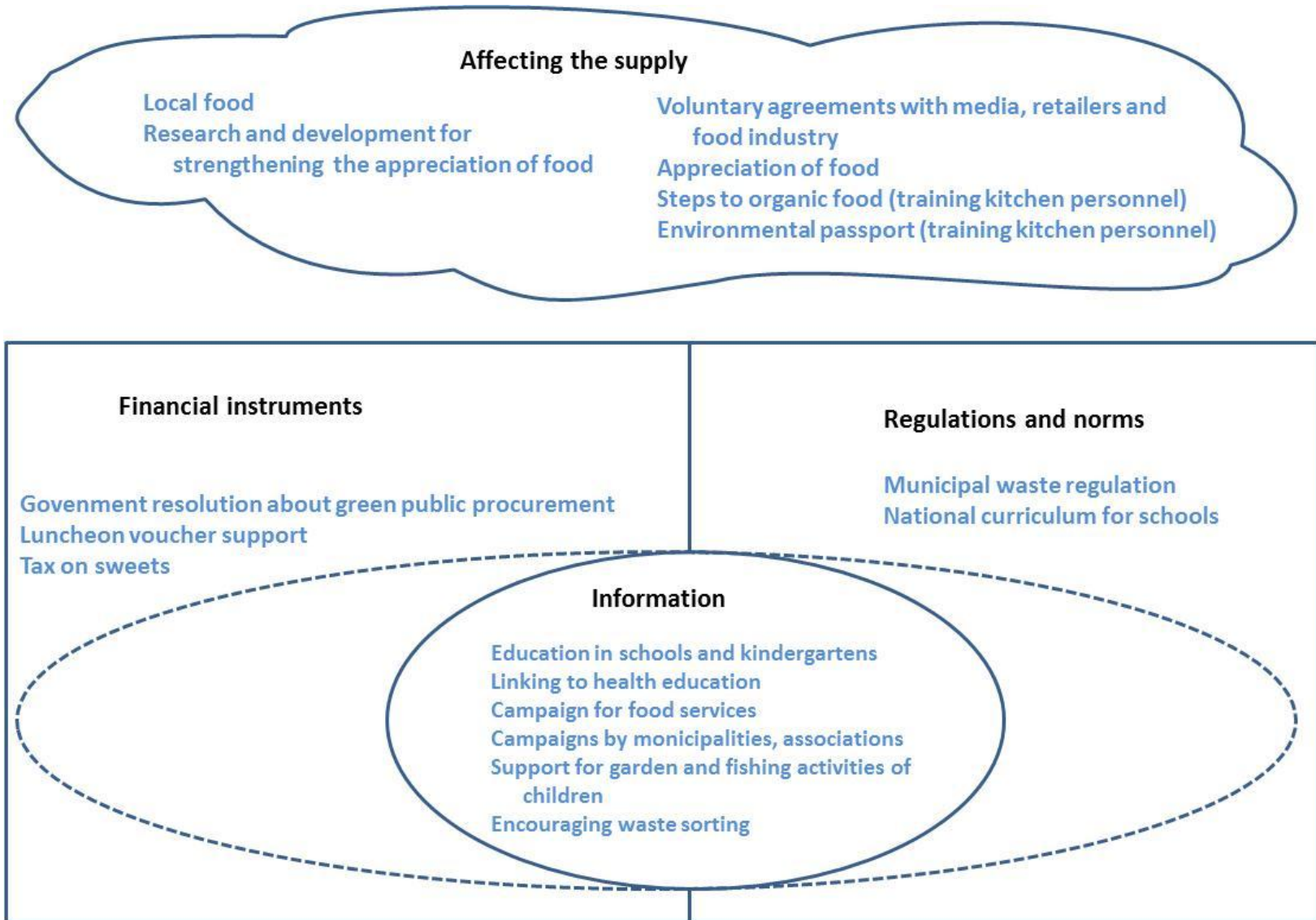
Community structure

## Information

National timetable and ticket system for public transport

More information about car choice  
Eco-drive courses  
Household monitoring and feedback system (Climate Bonus)

# Policy package for climate-friendly food



# Decrease in emissions 2020

<b>Housing</b> - from energy use	<b>Personal traffic</b> - from energy use	<b>Food</b> - emissions of production chain, cooking, and waste phase
Decrease altogether 2.0 Mt* - renovations 1.3 Mt - habits 0.36 Mt - choice of eco-design appliances 0.34 Mt  <i>Compare with:</i> Emissions 2009, 10.6 Mt	Decrease altogether 2.1 Mt - public transport, walking and cycling 0.07 Mt - stronger differentiated taxes on cars and higher fuel taxes 0.92 Mt - tax on driven kilometers 1.0 Mt - information 0.1 Mt  Emissions 2009, 7.4 Mt	Decrease altogether 0.5 Mt - low-emission catering 0.13 Mt - appreciation of food (less waste) 0.35 Mt  Emissions 2005, 8.5 Mt

\*Assuming that relative emissions of electricity and district heat, g/kWh, do not change, and that the total room area does not increase. Decrease in emissions is 3.2 Mt when assumed change in energy production is taken into account, out of which 1.5 Mt would be the effect of the policy package.

# Conclusions

Existing policy instruments in Finland have had large impacts on greenhouse-gas emissions.

The assessment of the developed policy packages indicated that the efficiency of the measures can be increased.

When a set of instruments is examined as a whole, as combinations of policy instruments or 'policy packages', the synergy benefits between measures can be reinforced and hence overall effectiveness can be improved.

Acceptability of the policy instruments is a prime issue.

Good implementation of each policy measure plays a crucial role for acceptability.

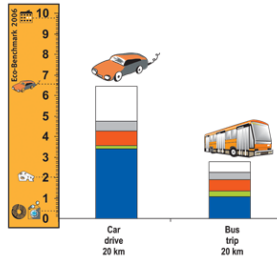
Long-term consistency and evidence of the effectiveness of the measures are essential both for the success and for the acceptability of climate policy.



# Focus of SYKE on consumption: research, tools

## Eco-Benchmark 2006

Environmental impacts of consumption choices, LCA

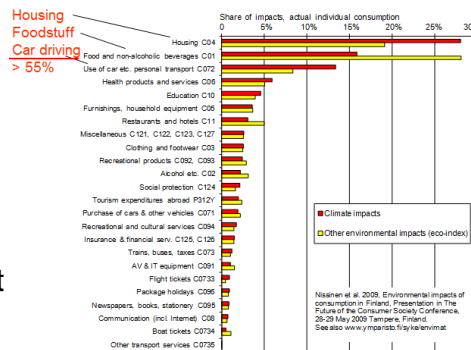


[www.syke.fi/en](http://www.syke.fi/en) > Eco-Benchmark

## Envimat 2009

Big picture about the economy of Finland, including consumption

[www.syke.fi/en](http://www.syke.fi/en) > Envimat



## Climate Diet 2010

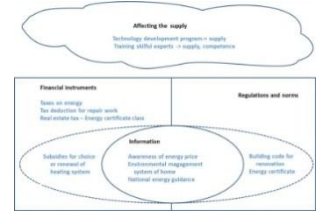
Carbon footprint calculator for people and TV-program

[www.ilmastodieetti.fi](http://www.ilmastodieetti.fi)



## KUILU-project 2012

Policy instruments for climate conscious housing, traffic and food



## Eco-Home 2013-2014:

Tools and services for eco-efficient household consumption and renovations

