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# Linking Carbon Footprints, Personal Emission Monitoring, and Reward Systems

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*The CLIMATE BONUS research consortium*

*<http://extranet.vatt.fi/climatebonus>*



- Rationale & main features of the project
- Demo version of the internet monitoring service
- The consumer pilot in brief
- Instrumental interaction effects and potential (gu)estimate
- Conclusions

- Climate change policies have to step up, this means
  - Extension of instrumental portfolio, notably when the current portfolio gets less effective
  - Extension to hitherto minimally addressed groups and mechanisms, i.e. the production-consumption chain -> **consumers**
- Current policies addressing household consumption
  - Taxes (positive income elasticity necessitates repetitive raising .....political acceptance issues)
  - Standards ('floor' in market; may fail to promote progress unless large bureaucracy)
  - Labelling (sometimes effective, if well communicated and combined with incentive schemes)
  - Information / Education (needs repetition to keep up the effect)

### **Fill the information gap *effectively***

- At the production *and* the consumption side
- Link consumer signals to production decisions
- Complement and reinforce current instruments rather than competing with those

### **Essential elements:**

- Incentives for households and retailers/producers
- Flexible design and development path
- Easy understandable information and advice
- Aims for and incites to prolonged use
- Advance innovations in information systems and (consumer) products
- Adequate monitoring and transparency
- Appealing to the ever more self-assertive consumer, who is nonetheless prepared to take responsibility

- CLIMATE BONUS is an example of how to put **Sustainable Transition** into operation
- CLIMATE BONUS is a **pre-study** providing a **road map**
  - data acquisition and co-ordination strategy and a data quality assurance strategy for carbon footprint generation
  - demonstration version of the intended information system for consumers
  - test of the usability and feasibility of the system from a consumer and from a retailer perspective
  - evaluation of the intended system's economic and environmental impacts
  - overview of prerequisites for the development of an actual system and recommendations for the various partners and interest groups

- Credible data for carbon footprints – eventually – at the individual product-brand level
- User friendly monitoring and feedback system for households
- A reward systems for households that succeed to achieve lasting emission reductions (possibly also a reward system for retail chains or product chains)
- . . . . .
- Intended indirect effect of speeding up of market entry of low emission alternatives
- Linkage options to exploit JI/CDM regarding carbon management in the supply chain; offsetting option



## **What is a carbon footprint?**

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### *Product / supply chain oriented definition*

- It represents the amount of greenhouse gases (or at least CO<sub>2</sub>) emitted during the production (and consumption) stages up to the current state of the product

### *Activity entity oriented definition*

- It represents the annual amount of greenhouse gases (or at least CO<sub>2</sub>) wound up in the activities of the assessed entity (process, mill, company, household, country)

### *Carbon footprinting methods*

- Simple engineering analysis
- Input-output models (PIOT/MIOT/dynamic MFA/...)
- Standard / narrow scope LCA
- Elaborate / wide scope LCA .... EPD .... PAS2050

# VATT *Many similar services emerge*

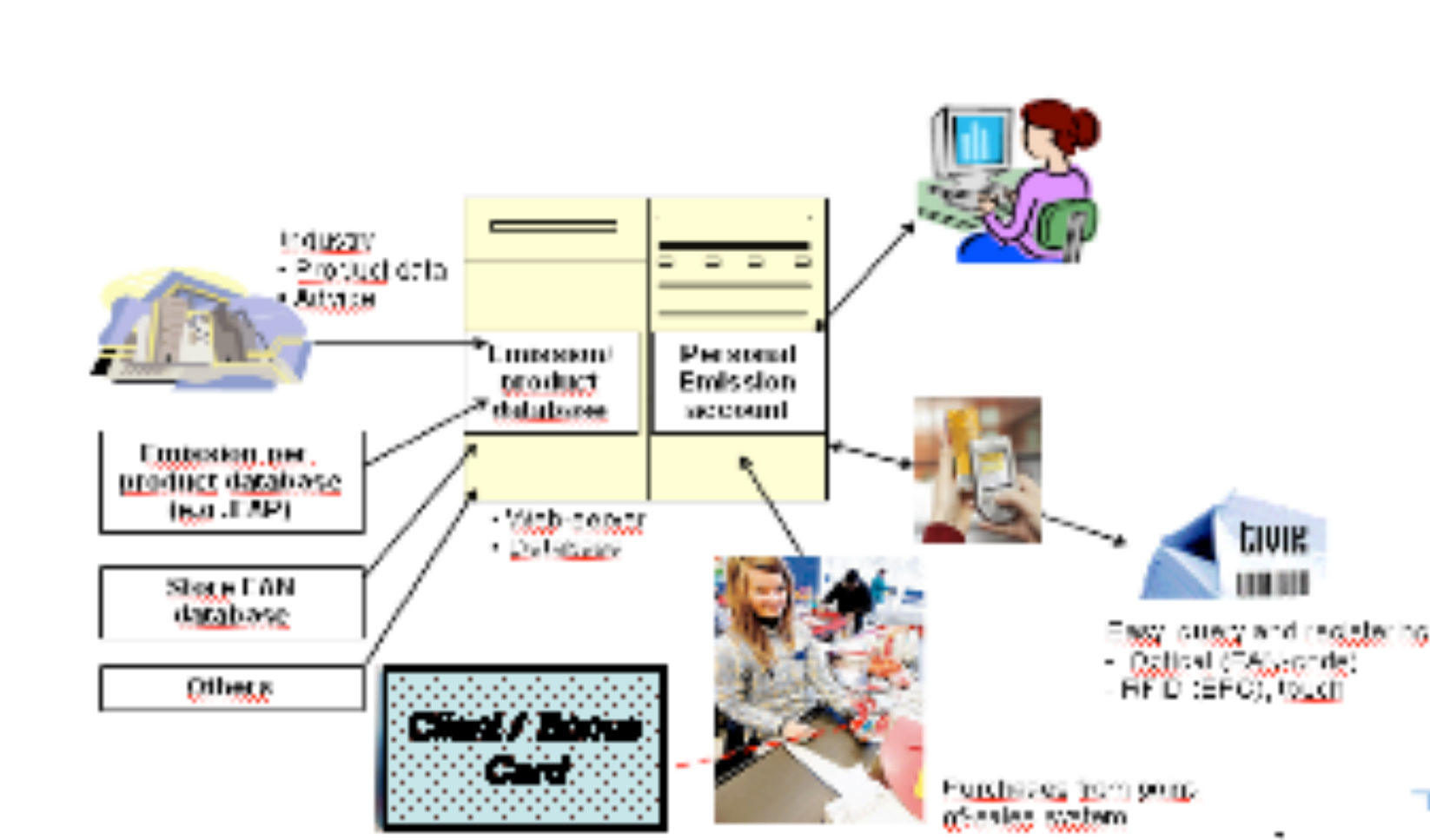
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- Carbon offset brokerage + background info: commercial / NGOs
- Green credit & bank cards: e.g. VISA, Barclays
- *Carbon footprinting* + background info
  - Initiatives in e.g. UK (Carbon Trust, TESCO), France (E.Leclerc, Casino), Japan, Finland (Elovena), Switzerland (Migros), Germany (PCF) and Belgium (start-up), US
- Mixed local initiatives
  - Climate, local produce, social issues (NU Spaarpas – Rotterdam (2003), Umwelt Plus Karte (various German cities); Belgium (Flanders)
- **Mostly simple or medium quality footprint calculators with low transparency**
- *Carbon footprinting* + monitoring + rewards (bonus) + info
  - **The CLIMATE BONUS concept**



# VATT Demo version of a monitoring system for consumers 1

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A similar architecture is working for the Nutrition Code monitoring service



# Demo version of a monitoring system for consumers 2

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Climate Bonus

Your household: John Smith | [Log off](#)

**Main page**  
Summary  
Logbook  
Personal profile  
Help  
Contacts  
Additional info

**Groceries**  
Summary  
Add groceries  
Prior analyzed groceries  
Estimated emissions  
Monitoring expenses  
Additional info

**Traffic**  
Summary  
Estimated emissions  
Add fuel purchase  
Add public transportation  
Additional info

**Housing**  
Summary  
Electricity  
District heat

### Summary - as of Tuesday 24.3.2009

Household's climate impact

Emissions: 18.1.2009 - 24.3.2009

Section	kgCO <sub>2</sub> eq	kgCO <sub>2</sub> eq/€
Groceries	209	0.20
Traffic	814	9.10
Housing	614	2.22
Other	* 402	0.45
<b>Total</b>	<b>* 2,039</b>	<b>0.92</b>
Compensation	-200	-15.00
<b>Total incl. compensation</b>	<b>* 1,720</b>	<b>0.89</b>

\*): Crude estimate (Data includes some constructed emission- and expense information)  
kgCO<sub>2</sub>eq/€ means accumulated emissions. kgCO<sub>2</sub>eq/€ -indicator shows households emissions per euro.  
Groceries CO<sub>2</sub>-eq -numbers are fictional. Usage in other contexts is not allowed.

### Compare your emission level

Period: 38 days (23.2.2009 - 24.3.2009)

Your household	1,097 kgCO <sub>2</sub> eq
Others	973 kgCO <sub>2</sub> eq



# Demo version of a monitoring system for consumers 2a

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 Kulutusmenoryhmä		 kgCO <sub>2</sub> ekv		 kgCO <sub>2</sub> ekv/€
 Elintarvikkeet	209		10.8%	0.20
 Liikenteen energiankulutus	814		42.0%	9.10
 Asumisen energiankulutus	554		28.6%	3.36
 Muu kulutus	* 359		18.5%	0.45
<b>Yhteensä ilman kompensaatiota</b>	<b>* 1,937</b>		<b>100.0%</b>	<b>0.93</b>
 Päästökompensaatiot	-300		-15.5%	-15.00
<b>Yhteensä kompensaatio huomioon otettuna</b>	<b>* 1,637</b>		<b>84.5% / 100.0%</b>	<b>0.58</b>

# VATT *Included product categories*

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Approx. 80% of attributable emissions

- *Foodstuffs* – in the pilot 21 categories; ambition is *much more disaggregation towards specific products*
- *Home energy* – heating fuels, district heat, electricity (incl. option for ‘green power’)
  - Own data entry in the pilot
- *Transport* – motor fuel, public transport
  - Own data entry in the pilot
- Other categories superficially included
- Option for declaring emission compensation

- *35 households (+ 5 volunteer researchers)*
- *10 K-group supermarkets in 3 different cities*
- *Automatic registration of food purchases via loyalty card when paying*
- *Pilot duration:*
  - *Pre-registration phase profiling form in early January 2009*
  - *Purchase registration and monitoring & feedback from mid January to mid February*
  - *Ex-post evaluation form and group discussions in March 2009*

- *The results of the pilot show that the participated consumers were interested in the monitoring and feedback system of GHG emissions, and they regarded it as potentially useful to their households*
- *Consumers' interest to use the system more intensively requires the development and improvement of the system, especially its usability, reliability and credibility, as well as attractiveness*
- *It seems that the monitoring and feedback system together with a reward system have potential to incite consumers to change their purchase and consumption behaviour – and to reduce greenhouse gas emissions*
- *Consumers stressed that simultaneously the supply of low emission product alternatives in the shops have to be increased, and that the monitoring and feedback system should be adopted by as many retail and service chains as possible*

# VATT Policy instrument interactions (1)

## Housing (energy):

?

- Mostly complementing (adding effect)
- Some options for verification (e-label)
- Competing with DSM/smart metering

## Transport:

- Mostly complementing (adding effect)
- Some options for verification
- No seriously competing systems on offer

## Food stuffs:

- either new, complementary or conflicting, depending on label scheme
- No competing system on offer

*Static effects  
owing to  
behavioural  
change*

# VATT *Policy instrument interactions (2)*

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*Dynamic effects owing to  
technology change and market development*

## Innovation effects:

- Clearer indications of demand for low emission products -> boosting market introduction of such products
- yes; but so far hard to judge

## Links to voluntary emission markets:

- Funding of emission reduction investments in production phases in return for verified emission rights (JI ; CDM)
- Further linking to compensation services



- Given the very limited experience gathered while adding earlier experience on feedback etc. → preliminary (gu)estimate:
  - Static reduction potential (food): ~2 – 3 MT
    - part of this outside Finland
    - Inclusion of mobility adds significant potential
    - new habits may not last forever
  - Dynamic reduction potential: much more
    - but ... beware of double counting
- 2MT ~ 3MT CO<sub>2</sub>-eq. could represent a value of 50 ~ 75 mln. €/year by 2020

## ***Some key conclusions***

3 sets of factors determine the effectiveness of the CB system:

1. accuracy, comprehensiveness, and tractability of the recorded emissions per product chain, product group, etc
2. the appeal and incitement effect of the monitoring and feedback service for consumers
3. the deployment strategy of the system in conjunction with product-market strategies of products and product groups included in the system

The system has to evolve over time with gradually more and more verified product level footprints

## ***Some key conclusions***

- If user friendly, personally tailored, etc. a good part of the households is interested to join
- From a commercial point of view there is a range of ambition levels possible for the envisaged system. For (global) society more ambitious levels are called for
- Prime focus and value added in food and mobility; links with energy – smart metering sensible (to keep overview)
- Follow-up development of the system through parallel commercial experiments in close co-operation with more in-depth research

# VATT

## Consortium

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- TEKES
- Kesko
- Elisa
- Nokia
- Stora Enso
- HK Ruokatalo
- Tuulia International

### *Co-operation:*

- Oxford University ECI (UK)
- Foundation 'Milieu Centraal' (NL)
- Manchester University
  - Sustainable Consumption Institute (UK)





## ***Research team***

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*Thank You!*

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TELL US AGAIN WHY WE NEED THREE HUNDRED HORSEPOWER TO GET GROCERIES.

# VATT Appendix – project reports

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## WP1

Perrels, A., Hongisto, M., Hyvönen, K., Katajajuuri, J.M., Nissinen, A. (2009), *A quick scan of climate policy services and of underlying data system approaches*, VATT Research report 143:1

## WP3

Usva, K., Hongisto, M., Katajajuuri, J.M., Nissinen, A. (2009), *Towards a system of assured carbon footprints applicable to product carbon labelling – Climate Bonus project report (WP3)*, VATT Research Report 143:2

## WP4

Perrels, A., Nissinen, A., Sahari, A. (2009), *Reviewing key building blocks of an integrated carbon footprinting and consumer purchases' monitoring & reward system*, VATT Research report 143:3

## WP5

Hyvönen, K., Saastamoinen, M., Timonen, P., Kallio, A., Hongisto, M., Melin, M., Södergård, C., Perrels, A. (2009), *Kuluttajien näkemyksiä kotitalouden ilmastovaikutusten seuranta- ja palautejärjestelmästä*, VATT Research report 143:4.

## WP6

Perrels, A., Nissinen, A., Sahari, A. (2009), *The overall economic and environmental effectiveness of a combined carbon foot-printing and feedback system*, VATT Research report 143:5.

## Synthesis report

Perrels, A., Hongisto, M., Hyvönen, K., Katajajuuri, J.M., Nissinen, A., Usva, K. (2009), *Sustainable Consumption and Production Exposed – Synthesis report of the CLIMATE BONUS study concerning combined use of carbon footprinting, monitoring, feedback, and rewards*, VATT Research report 143:6.