



# Irish Integrated Modelling Project

*Premise, Progress and Plans*

19th May 2010  
Andrew Kelly



# IMP Ireland Project overview

<b>Duration</b>	3 years
<b>Timeline</b>	2008-2011
<b>Funding</b>	Principally EPA with AP EnvEcon co-funding
<b>Principal Models</b>	GAINS and TREMOVE
<b>Principal investigator</b>	Andrew Kelly
<b>Team</b>	Small core team but strong and very active national linkages
<b>Project steering group</b>	EPA, SEAI, Met and 5 Government Departments represented

Premise

# WHAT ARE THE PROJECT OBJECTIVES?

# Core objectives of IMP Ireland

## Capacity

*Develop & maintain  
GAINS – REMOVE for  
use nationally*

*Create & secure  
National capacity*

*Build & manage  
resources and  
associated tools*

## Outputs

Reports & guides

International  
publications

Data & analysis

## Support

National Departments  
& Agencies

International research  
community

Research linkages

Progress

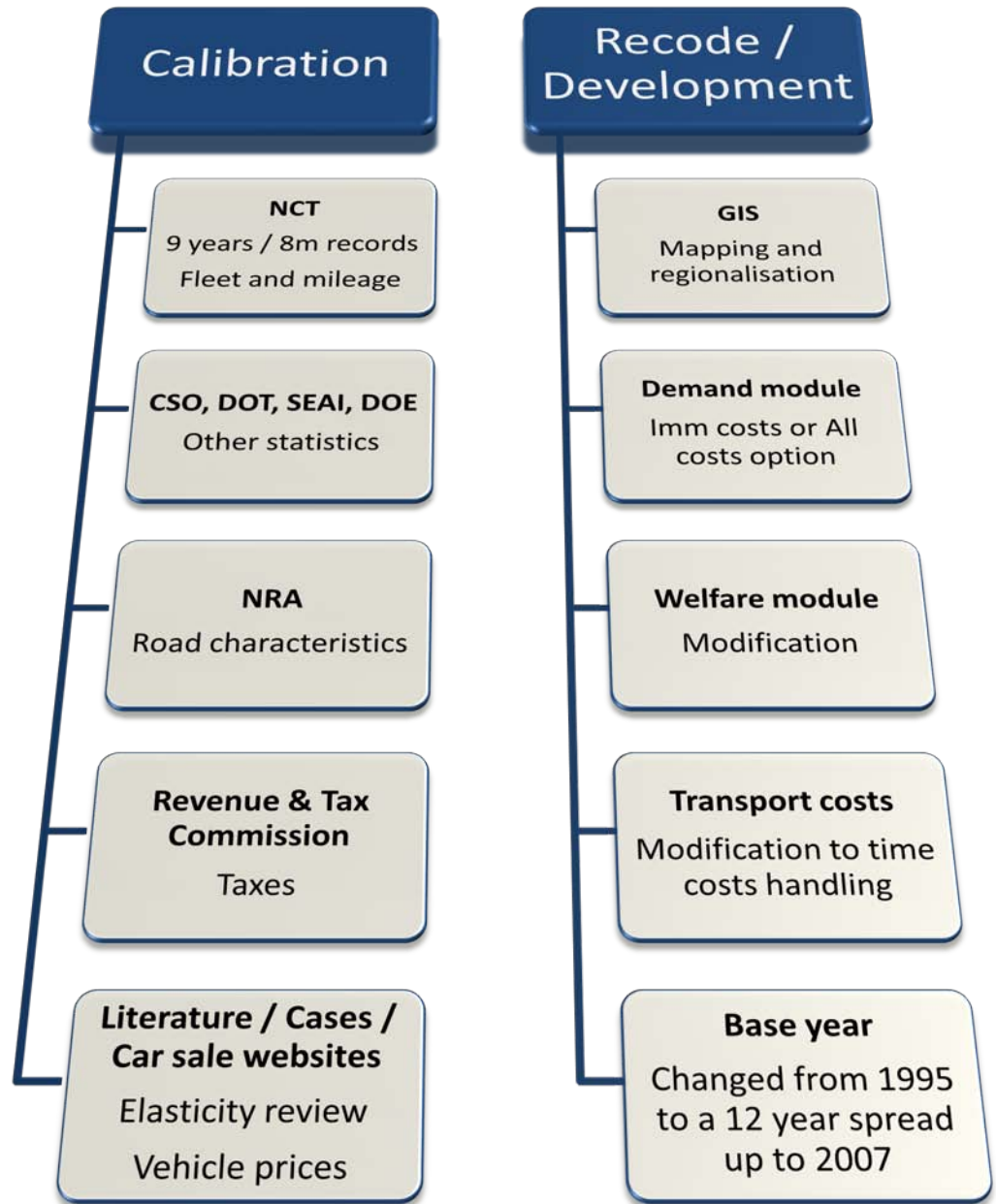
# WHAT PROGRESS HAS BEEN MADE?

## TREMOVE Work

The list on the right presents a selection of some of the key developments and ongoing work with the TREMOVE model for Ireland.

As with any model, updates are required over time, however, we consider the model functional – requiring ‘tweaking’ when being setup for a policy run.

TREMOVE offers us a useful tool to evaluate a broad range of policies and measures associated with a challenging and complex sector.

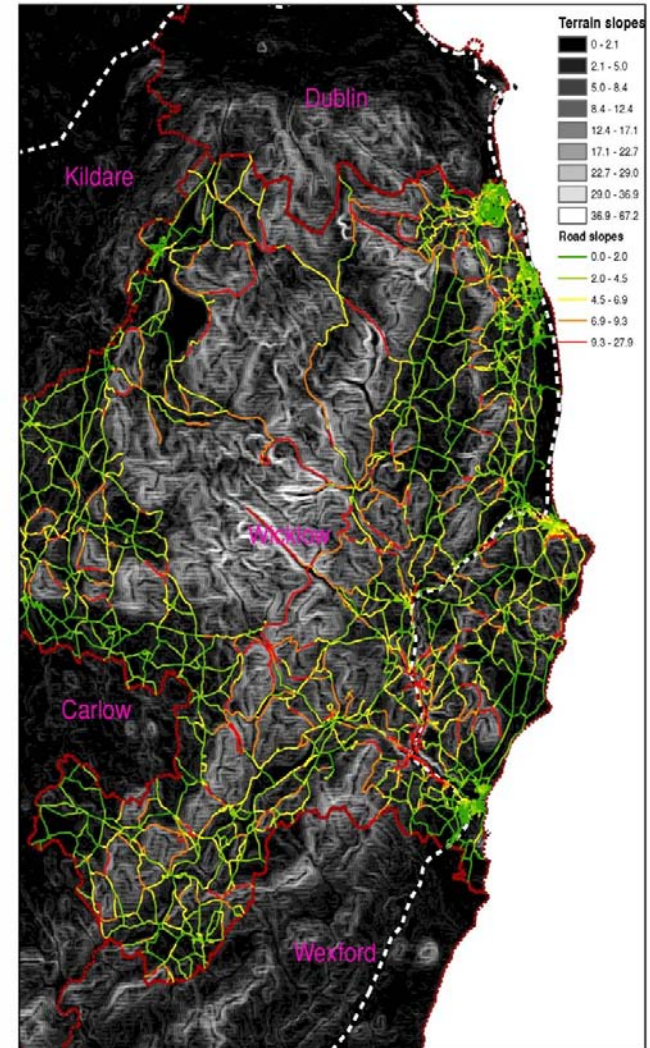
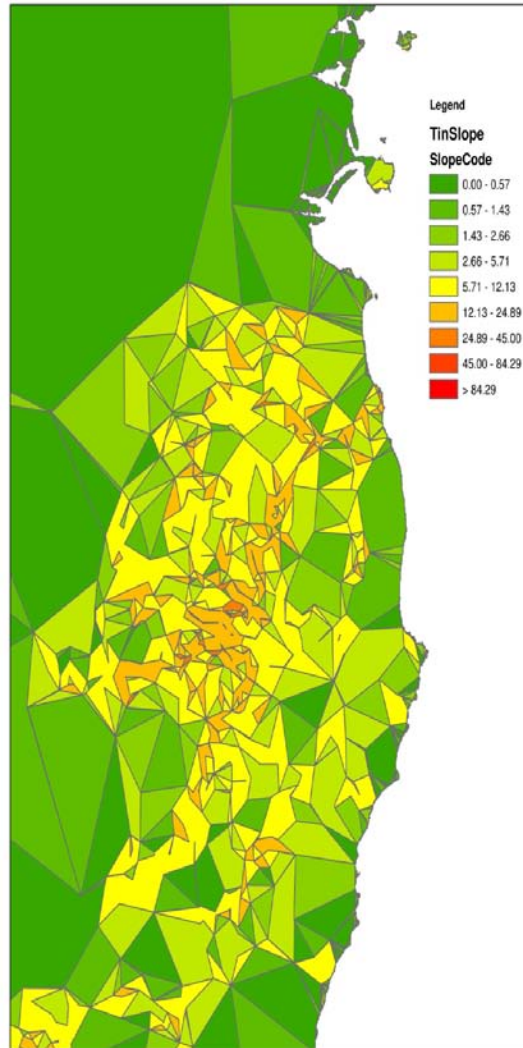


# TREMOVE GIS

Example on the right is exploring the slope of road areas in the greater Dublin area.

This work has then been overlaid against the URBIS Street map layer.

This can then be used to estimate improved parameters for the TREMOVE calculation of emissions from goods vehicles.



# TREMOVE Paper I

*Assessment of the impacts of ownership and usage based carbon related taxation on fleet structure, emissions and welfare – Key assumptions identification for policy*

The first full paper based on TREMOVE analysis has been completed, submitted and accepted to EAERE World Congress, and will be submitted to a journal in the summer. The paper tests the impact of varied carbon related taxation, also illustrating sensitivity to three key parameter assumptions. The piece concludes with recommendations for policy design.

## CO<sub>2</sub> emission and energy consumption reduction between simulation and basecase

Scenario		Only fuel carbon tax			VRT and motor carbon tax			VRT, motor and fuel		
		All costs	Imm costs	High EOS	All costs	Imm costs	High EOS	All costs	Imm costs	High EOS
CO <sub>2</sub>	2015	-1.85%	-3.37%	-3.69%	-0.06%	-0.37%	-0.36%	-1.92%	-3.72%	-4.04%
	2020	-1.87%	-3.42%	-3.73%	-0.06%	-0.56%	-0.54%	-1.93%	-3.95%	-4.24%
	2030	-1.84%	-3.47%	-3.77%	-0.11%	-0.78%	-0.76%	-1.95%	-4.21%	-4.48%
Egy	2015	-1.87%	-3.38%	-3.71%	-0.11%	-0.42%	-0.41%	-1.98%	-3.78%	-4.1%
	2020	-1.89%	-3.45%	-3.76%	-0.13%	-0.63%	-0.61%	-2.03%	-4.05%	-4.34%
	2030	-1.88%	-3.51%	-3.81%	-0.21%	-0.87%	-0.85%	-2.08%	-4.34%	-4.61%



## Transport Paper II

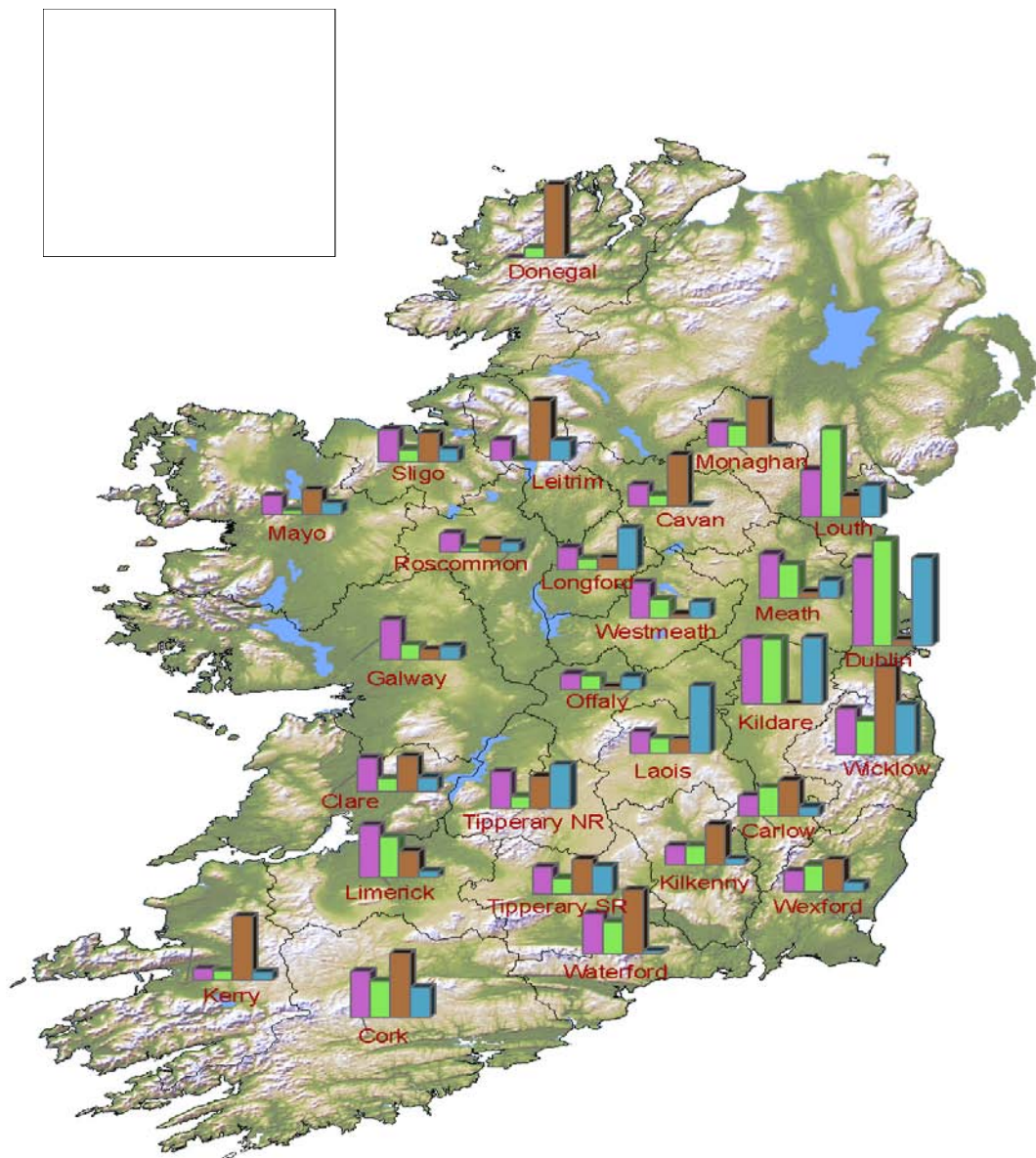
*Do regional characteristics affect the distribution of car engine sizes?*

*—A longitudinal multinomial logit study based on county data of Ireland*

The map on the right illustrates the county characteristics which explain the purchase probabilities.

Examined birth rates, disposable income, public transport service, population densities and road characteristics to understand the factors which contribute toward car engine size preferences in the vehicle purchase decision.

Has relevance for policies focused on gradual fleet evolution characteristics.



# GAINS Core Work

## National Collaboration

Linking with EPA, SEAI and Government departments on related work – Coordination of efforts and information

Emission comparison work – Harmonisation efforts



## International Linkages

Collaborating and making connections with relevant international research teams and processes



## Basic Scenario Development

Energy adaptation to GAINS

Refining controls for GAINS

Researching other parameters



## Accessibility Guides for the model

Agriculture

Energy

Controls



## Reporting & Analysis

Reports on policy topics – e.g. NOx challenge

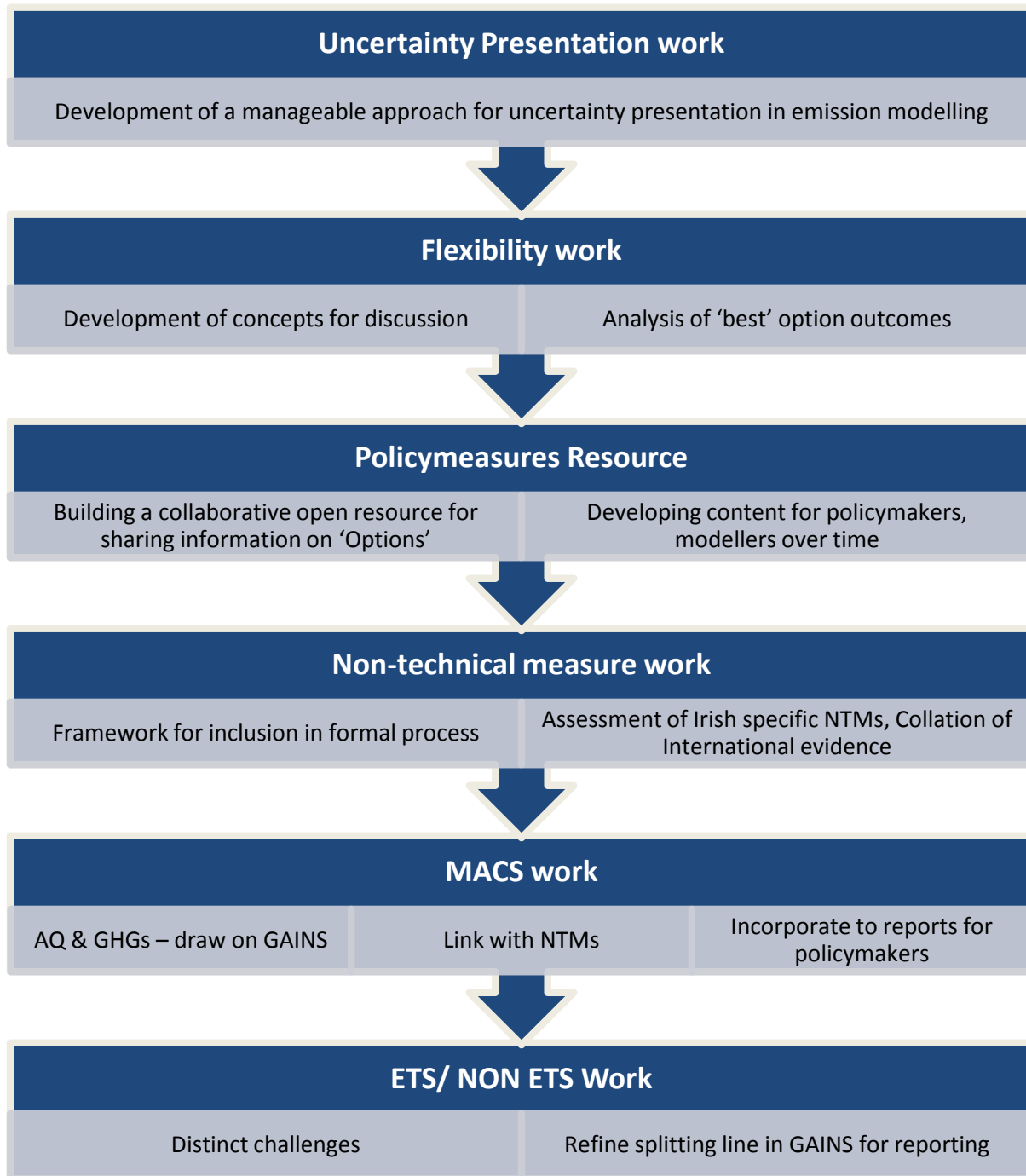
Analysis for policy process - e.g. Gothenburg, 30% step

ESR & FSR for presenting outputs

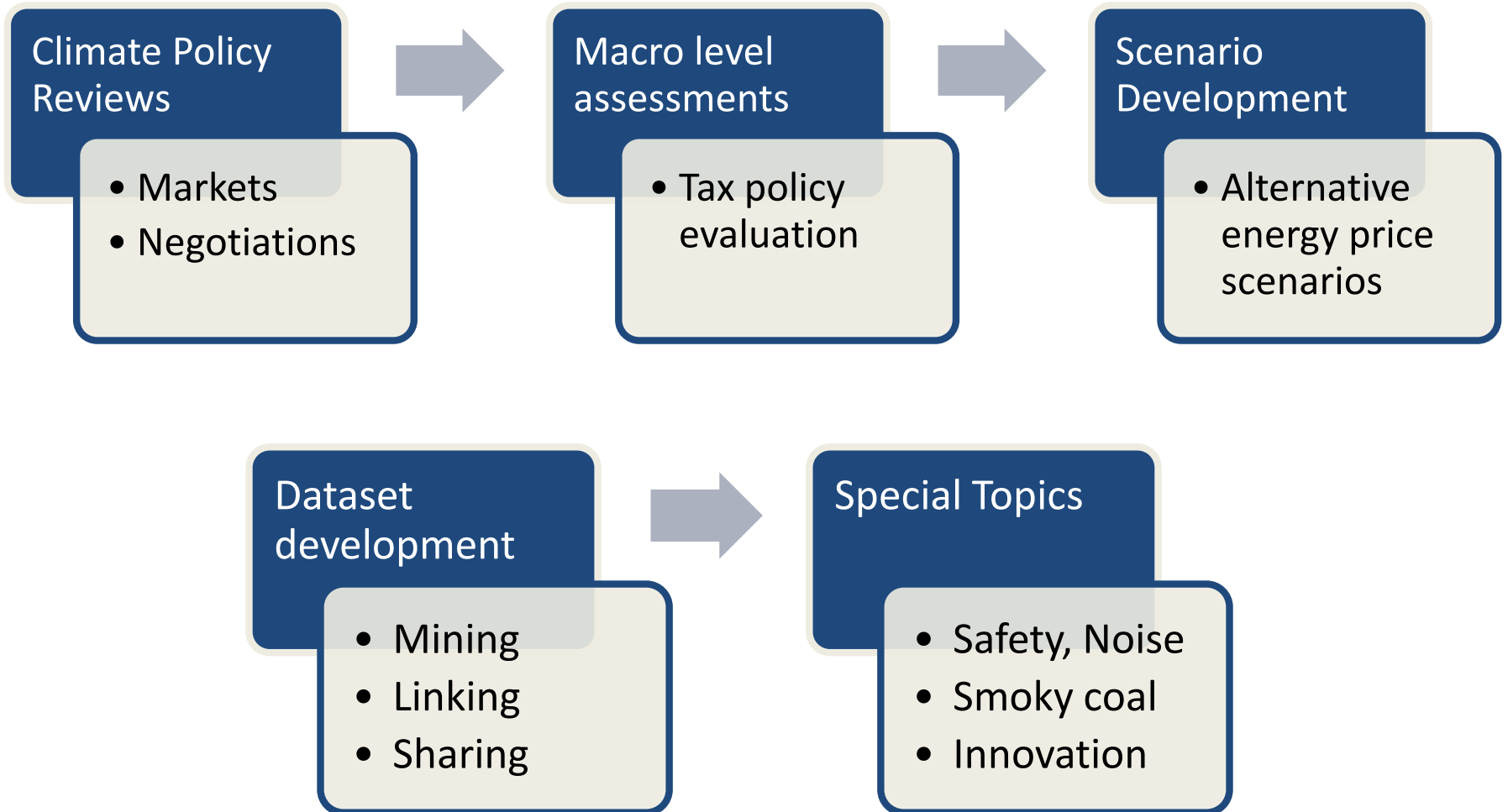
## GAINS Peripheral Work

Much of the recent work could be described as peripheral to the actual 'modelling' component of the project.

However, we saw these as important areas to develop, where we felt we were in a position to make a useful contribution.



## Other modelling related work



Outputs to Public and Private Domains

# FORMAL OUTPUTS

## Published Papers in Oct

Profiling road transport activity: Emissions from 2000 to 2005 in Ireland using national car test data      Transport Policy

Setting national emission ceilings for air pollutants: policy lessons from an ex-post evaluation of the Gothenburg Protocol      Env. Sci & Policy

## Journal Submitted Papers in Oct

Assessment of the impacts of ownership and usage based carbon related taxation on fleet structure, emissions and Welfare (with SEAI?)      Transport Policy

Competitiveness and the allocation of allowances in phase 3 of the EU ETS      Climate Policy

Presenting uncertainty: A practical approach for the assessment and illustration of uncertainty in emissions modelling      Atmospheric Environment

A MNL model analysis of car purchase decisions in the republic of Ireland      Transportation Research P

Flexibilities – An evaluation of flexible compliance mechanisms for use in conjunction with transboundary pollution regulation with Netherlands Environmental Assessment Agency      Env & Resource Economics

## Planned draft Papers in Oct

A framework for the integrated evaluation of NTMs in climate and transboundary air pollution modelling and policy

Innovation and the potential for technology deployment in the Irish ETS sector with Kyoto University

Environmental taxation policy paper

Miscellany Paper – Could focus on smoky coal ban, waste policy, etc.

Transboundary Air Pollution policy – number of potential angles with TFIAM collaborators

Transport paper - number of potential angles likely to draw on NCT and GIS – link with SEAI on a paper

## Reports Finalised in Oct

RAINS model overview

Climate air and energy report 2009

2020 Ceiling analysis report

Climate and Energy report 2010

Disproportionate challenge report

Origins of the EU ETS Report

Making GAINS report

Annex I calculator tool Brief

Pathway NOX 2010-2015

GHG Capacities within GAINS Brief

TREMOVE model overview V1 / V2

GHGs MACC and GAINS Brief

Flexibilities for Ceilings V1 / V2

NOx taxation in Europe Brief

Full Scenario Report 2009

Theory of Pollution Control Brief

Exec Scenario Report 2010

Vehicle weight classification Brief

Environmental Modelling AQ & GHGs - Chapter

2010 Update - NOX 2010-20 Options Report

Other reports and briefs as work evolves

## Guides Finalised in Oct

Agricultural Guide Version 1 with IIASA

Energy Guide Version 1

Control strategies Guide for GAINS

TREMOVE Guide Version 2

Harmonisation Report V1 / V2 / V3

Sectoral Focus Report – Transport I

Sectoral Focus Report – Power – I

## Other outputs to date

20 external presentations delivered

15 sets of meeting reports delivered

Cover letters, national scenario submissions, and considerable correspondence with IIASA, TFIAM, NIAM, Commission

Numerous smaller informal support and assessment reports by request

Miscellaneous media/magazine articles



Plans

# WHAT IS NEXT?

## NEXT STEPS GAINS

### Example

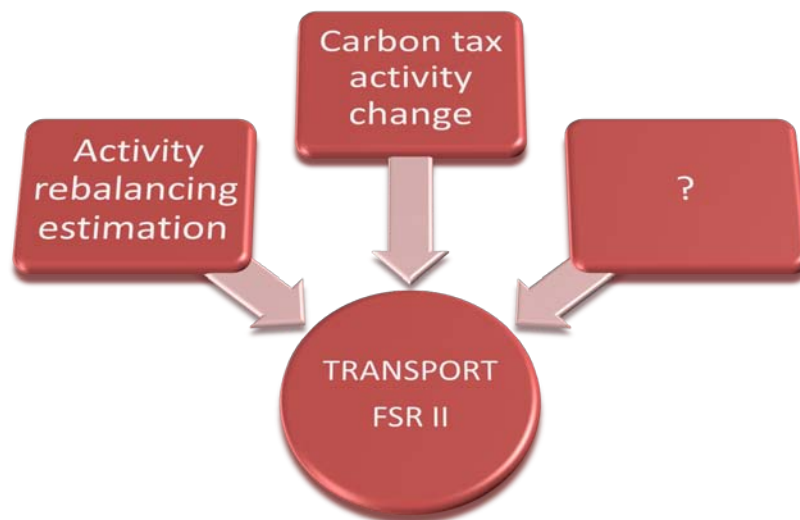
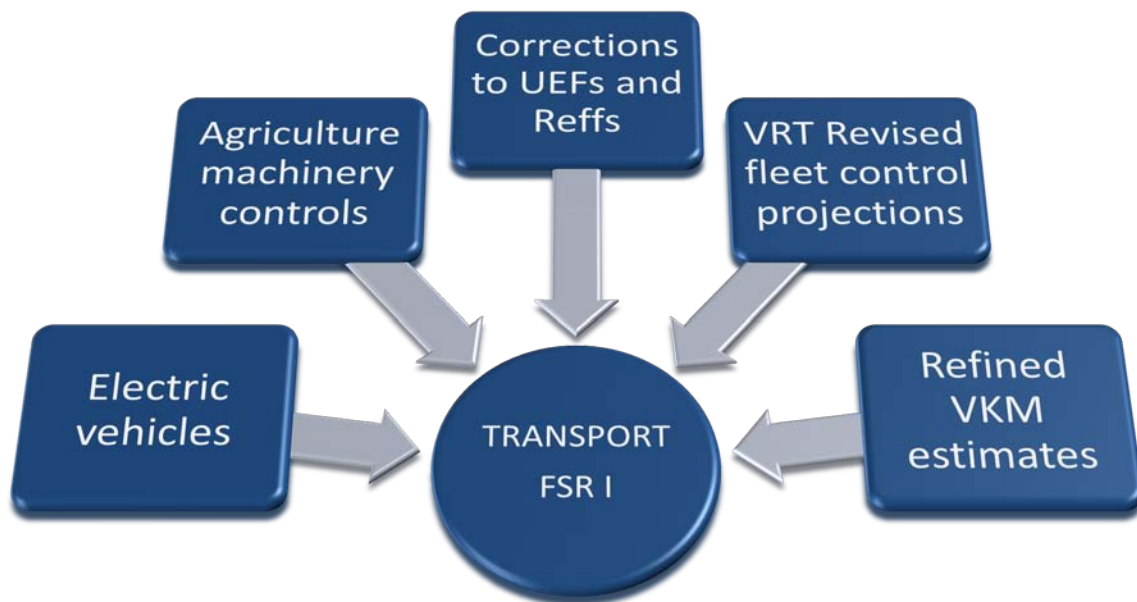
#### *Sectoral focus reports - SFR*

There are individual aspects of the modelling which are best approached individually as mini-research topics.

Number of areas can be improved while still remaining imperfect. Transport and Power first.

In essence there are parameters to be changed where we are confident we can make more the model more representative of reality, whilst still uncertain of the precision.

For example evidence for agriculture revisions, activity rebalancing etc.

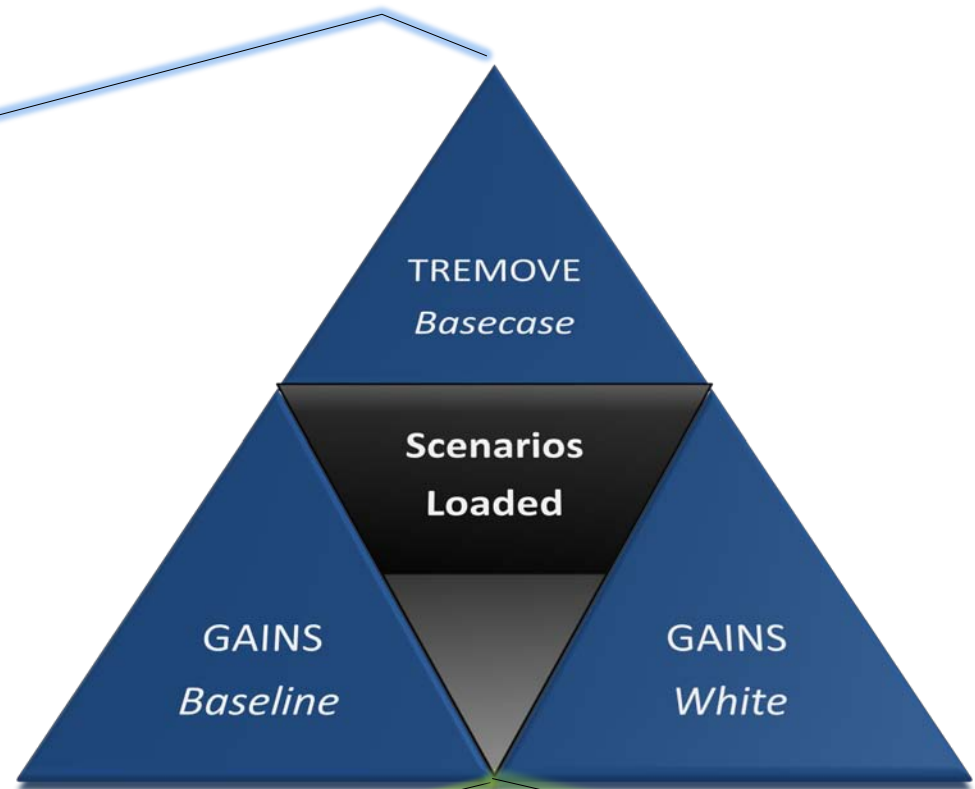


### ***TREMOVE Improvements***

- Improvements from new NCT work
- Improvements from new CSO data
- Fleet updates from current paper work
- Experiment with elasticity
- GIS link development and refinements
- Sensitivity analysis and reprogramming

### ***GAINS Improvements***

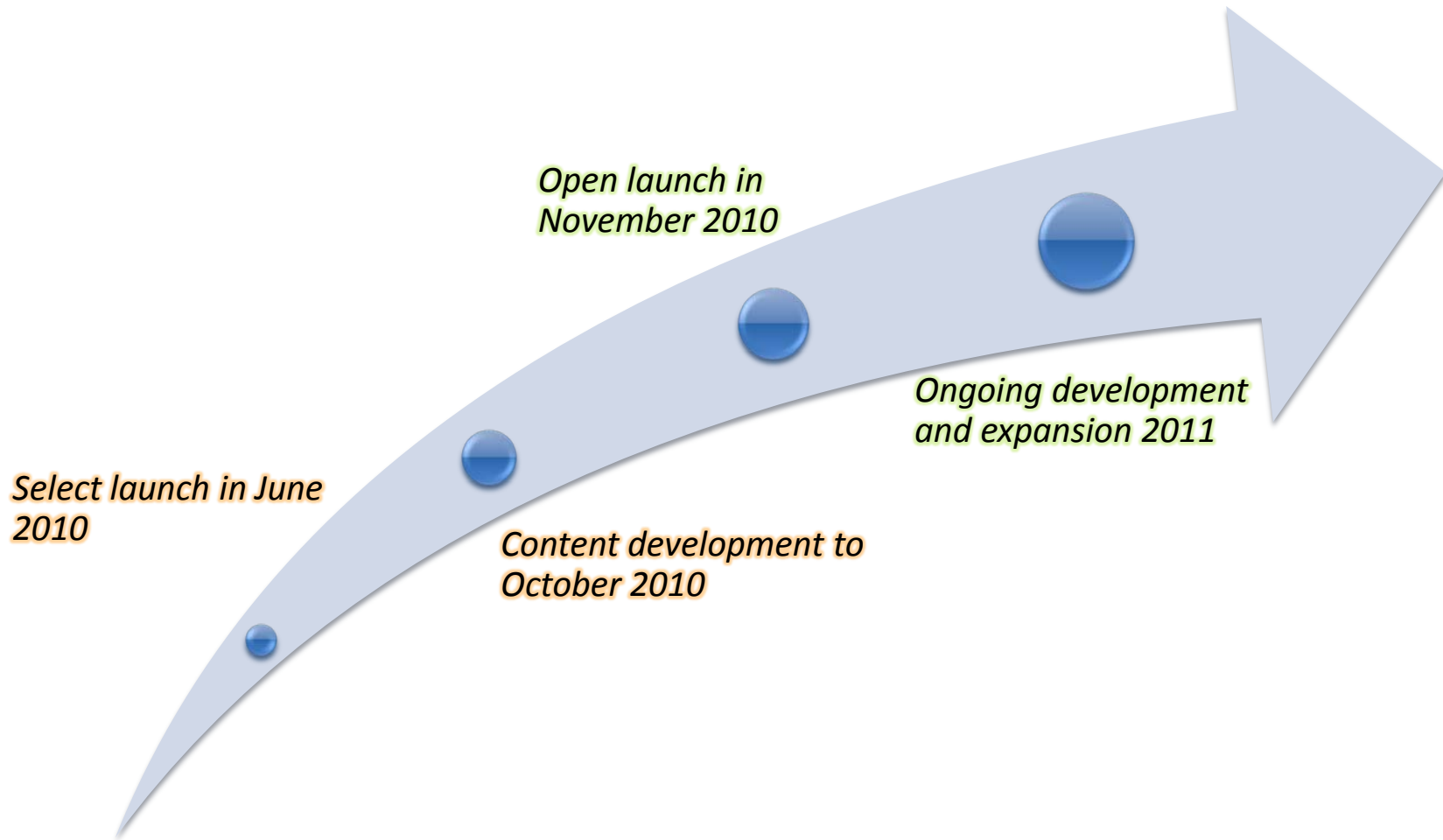
- Emission comparison files for AQ
- Emission comparison files for GHGs
- Comparisons to guide later SFRs
- Sectoral focus report – Transport I
- Sectoral focus report – Power I
- Review and improve energy splitting system
- Refinements to waste and processes
  
- Continue MACS development work
- Continue Uncertainty presentation work



### ***Longer term GAINS improvements***

- Link to TIMES for controls evidence
- Research appliance characteristics
- Review energy efficiency assumptions
- Research renewable potentials (Priv/Comm)
- Defining new controls e.g. Ag, NTMs

# Polycymesures development timeline





**Policymeasures.com** is an open development resource for information related to the design, use and analysis of policies and measures for the environment. In the bar above you can jump straight to the browsing menus for the **policy measures database** or the **reading resources** section. In the search box below you can scan the resource by keyword.

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Reports & Reading  Policy Measures Database  Keyword

## GET INVOLVED

Register or login to contribute new information and comment on and develop the existing knowledge base.

## RECENT PUBLICATIONS & POLICY MEASURES

### Waste Water Charge (Germany)

Published by EEA (European Environment Agency)  
Posted on 09/06/08  
[Climate](#), [Specific Example](#), [Transport](#), [Germany](#)

### Greenhouse Gas Emission Trends and Projections in Europe 2009

Published by EEA (European Environment Agency)  
Posted on 09/06/08  
[Air](#), [Europe](#)

## NEWS FEED

UNEP Highlights Green Economy Strategy  
04/01/2010 [PolicyMeasures.ie](#)

IPPC permits for pig farms vary widely - report  
04/01/2010 [Envirocentre.ie](#)

Electronic Companies Enjoy a Rub of Green with the Adoption of Environmental-friendly Practices  
04/01/2010 [Envirocentre.ie](#)

## EVENTS CALENDAR

**09 FEB** **Climate Semiar**  
UCD Dublin.

**15 FEB** **Environmental Policy Seminar**  
UCD Dublin.

## FEATURED POLICY MEASURE

**Land use and Transport Planning**  
Last updated 09/06/08

## FEATURED PUBLICATION

**Origins of the Emissions Trading Scheme in the EU**  
Report by IMP Ireland  
Posted 09/06/09

## MOST VIEWED

- Green Transportation Agreement
- Hydropower Revival Plan
- Implementation of the EU Energy Services Directive

## MOST COMMENTED

- National Promotion of Eco Driving 22
- Carbon labelling for cars and appliances 17
- Tax Benefits for Energy-Efficient Cars 11

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## Links

The following are links to the websites of some of the core development teams and contributors for this site, as well as general links of relevance to those with an interest in environmental policy and modelling.

### Irish Connections

AP EnvEcon  
University College Dublin  
Environmental Protection Agency  
Department of Environment, Heritage and Local Government  
Department of Agriculture and Food  
Sustainable Energy Ireland

[www.apenvecon.com](http://www.apenvecon.com)  
[www.ucd.ie](http://www.ucd.ie)  
[www.epa.ie](http://www.epa.ie)  
[www.environ.ie](http://www.environ.ie)  
[www.agriculture.gov.ie](http://www.agriculture.gov.ie)  
[www.sei.ie](http://www.sei.ie)

### International Agencies

AP EnvEcon  
University College Dublin  
Environmental Protection Agency

[www.apenvecon.com](http://www.apenvecon.com)  
[www.ucd.ie](http://www.ucd.ie)  
[www.epa.ie](http://www.epa.ie)

### Research Units & Institutes

AP EnvEcon  
University College Dublin  
Environmental Protection Agency

[www.apenvecon.com](http://www.apenvecon.com)  
[www.ucd.ie](http://www.ucd.ie)  
[www.epa.ie](http://www.epa.ie)

### Networks

AP EnvEcon  
University College Dublin  
Environmental Protection Agency

[www.apenvecon.com](http://www.apenvecon.com)  
[www.ucd.ie](http://www.ucd.ie)  
[www.epa.ie](http://www.epa.ie)

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Some intro text to go here.



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Short description can go here



### NON-TECHNICAL OPTION

Short description can go here



### SPECIFIC EXAMPLE

Short description can go here



### GENERIC EXAMPLE

Short description can go here

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- » Climate
- » Climate & Air
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- » Land Use
- » Transport
- » Waste
- » Water
- » Other

### MOST RECENT

- » Green Transportation Agreement
- » Hydropower Revival Plan
- » Implementation of the EU Energy Services Directive

### MOST VIEWED

- » Green Transportation Agreement
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| <a href="#">&gt; Agriculture</a> | <a href="#">&gt; Land Use</a>  | <a href="#">&gt; Water</a> |
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## Search Results

Carbon Emissions

Search

Policy Measures Database  Reports & Reading  Keyword

### Search Results for 'Carbon Emissions'

There are 19 results



#### Quality Bus Corridor (QBC)

In many urban areas, political and infrastructural restrictions have limited the feasibility of road pricing as a response to urban congestion...

Measure | Non-technical (Generic Example) | Climate & Air | Transport



#### Euro standards (for road vehicles)

Emissions trading is a market based instrument. Emissions trading schemes (ETS) can take one of two forms...

Climate & Air | Non-technical (Generic Example) | Energy



#### Draft emissions reporting

A draft template for how emissions from a modelled scenario may be presented as part of the broader reporting package...

Reports | Energy | Climate | Climate & Air



#### Congestion charging

Congestion charging is a non-technical measure involving a system of charging users of a transport network in periods of peak demand to reduce traffic congestion...

Climate & Air | Non-technical (Generic Example) | Transport



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## Congestion charging

**Topic:** [Climate & Air](#)  
**Type:** [Non-technical option – Generic Example](#)  
**Theme:** [Transport](#)

[» View All](#)

### Summary

Congestion charging is a non-technical measure involving a system of charging users of a transport network in periods of peak demand to reduce traffic congestion. In general it is applied to congestion on public urban roads. However, application of this policy has generally been limited to a small number of cities, including London, Singapore, Stockholm, and Milan.

- [» Implementation](#)
- [» Impact](#)
- [» Costs and Benefits](#)
- [» Evidence and Reference](#)
- [» Modelling this Measure](#)
- [» References](#)

Last updated by [Dr. J. Andrew Kelly](#) on 09/06/08

### REFERENCE THIS SOURCE

Policymeasures.com (2010). *Congestion Charging*. Available: [www.policymeasures.com/concharg.htm](http://www.policymeasures.com/concharg.htm). Last accessed 5th April 2010

### RELATED INFORMATION

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In June 2009, the Government approved the draft Act amending the Motor Vehicles Act, regulating more types of motor vehicle (including motorcycles and mopeds), modernising the system of taxing motor vehicles by considering environmental criteria, and preventing double.

Posted by [Dr. James Murphy](#), 22/12/09

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Posted by [Dr. James Murphy](#), 22/12/09

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[EU Policy on CO2 Emissions \(Publication\)](#)

[Irish Survey on Car Usage](#)

# Concluding Thoughts

- Capacity and calibration in the IAM world are not end points. It is essential to maintain calibrated systems to hold their value.
- Comparable national capacities and methodologies are exceptionally important.
- The ongoing work by various teams in reviewing and challenging the modelling and policy process is what drives progress.
- These capacities and efforts improve the quality of data to the models, drive progress in modelling methodologies and can support 'buy in' from policy makers.
- Further work on developing broader understanding (if not expertise) with the models may assist in generating more support for their use in policy processes.
- NIAM initiative, TFIAM forum, policymeasures hopefully – are vital for sharing ideas and harmonising approaches.

*We are extremely appreciative of the forum and friends we have in TFIAM who have enabled us to progress with this work. You have been a very open and supportive group.*

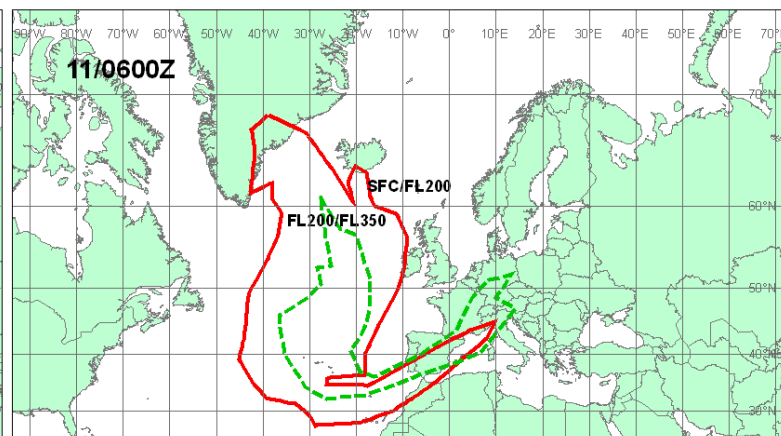
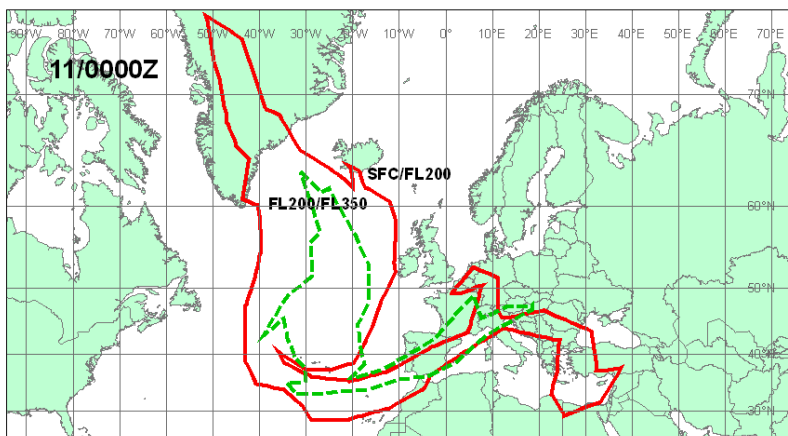
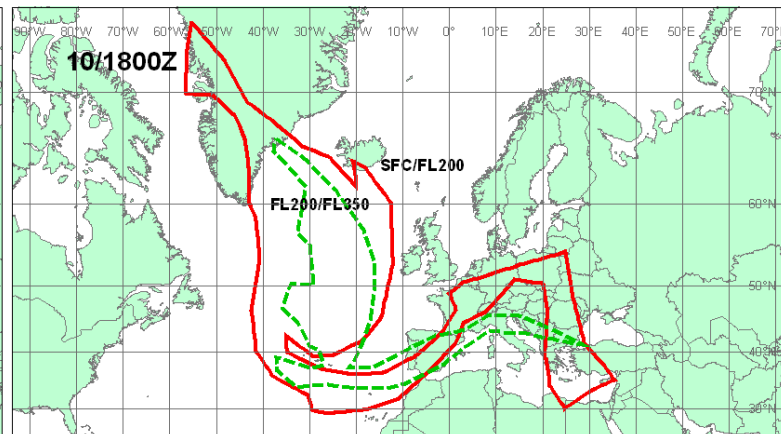
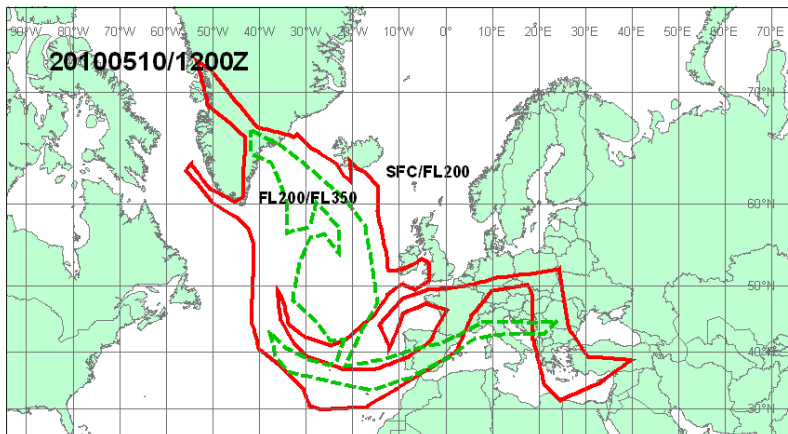
*Thanks for coming to Dublin.*



[Andrew.Kelly@APEnvEcon.com](mailto:Andrew.Kelly@APEnvEcon.com)



# Can we engage Iceland in TXB world?



VA ADVISORY  
DTG: 20100510/1200Z  
VAAC: LONDON  
VOLCANO:  
EYJAFJALLAJOKULL1702-02  
PSN: N6338 W01937  
AREA: ICELAND

SUMMIT ELEV: 1666M  
ADVISORY NR: 2010/100  
INFO SOURCE: ICELAND MET OFFICE  
AVIATION COLOUR CODE: RED  
ERUPTION DETAILS: ERUPTION CONTINUES  
WITH PLUME HEIGHT TO FL160.

RMK:  
NXT ADVISORY: 20100510/1800Z