

IORA conference, 2017

Introduction to the E3-India macroeconomic model

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Introduction to E3-India

- Background
- Basic model description
- What it looks like
- Inputs and outputs
- Economic pedigree

Background and Rationale

- Macroeconomic modelling assists policy makers with planning future policies and regulations
- In India many of these policy makers are at state level
- E3-India aims to provide insights at state level of the impacts of future policy
 - it is developed from the well-established E3ME global model
 - each state is further broken down to 20 sectors

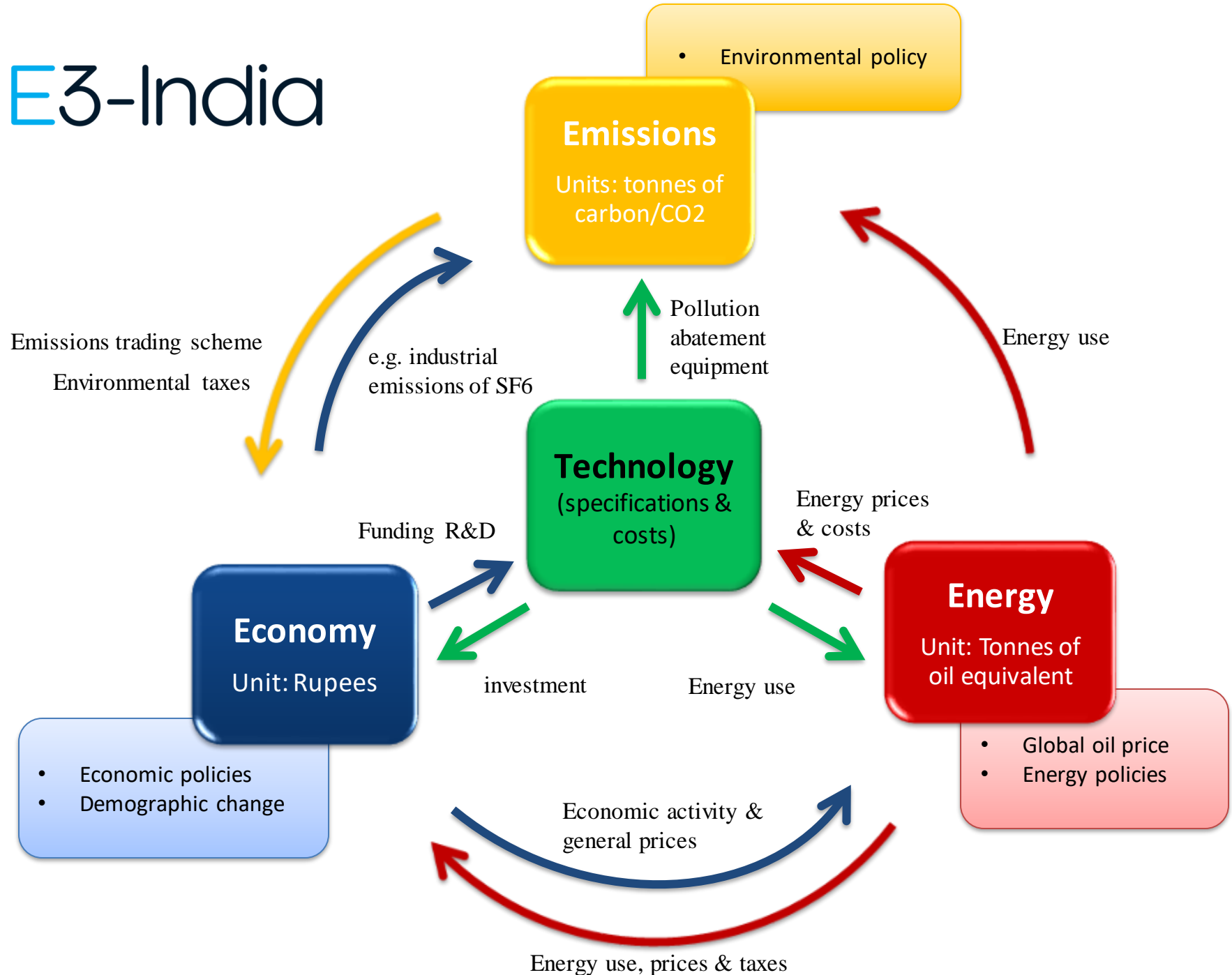
The Collaborative Effort



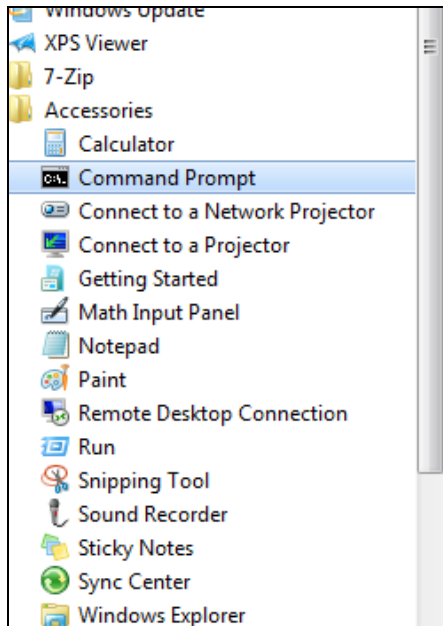
- Cambridge Econometrics has developed the model and will continue to maintain it and provide support
- It will be made available to researchers in India under licence
- The aim is to develop a community of users in India

<https://en.wikipedia.org/wiki/Cambridge>
<https://openclipart.org/>

E3-India



The Basic Software



```
ca: Command Prompt - runmodel
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

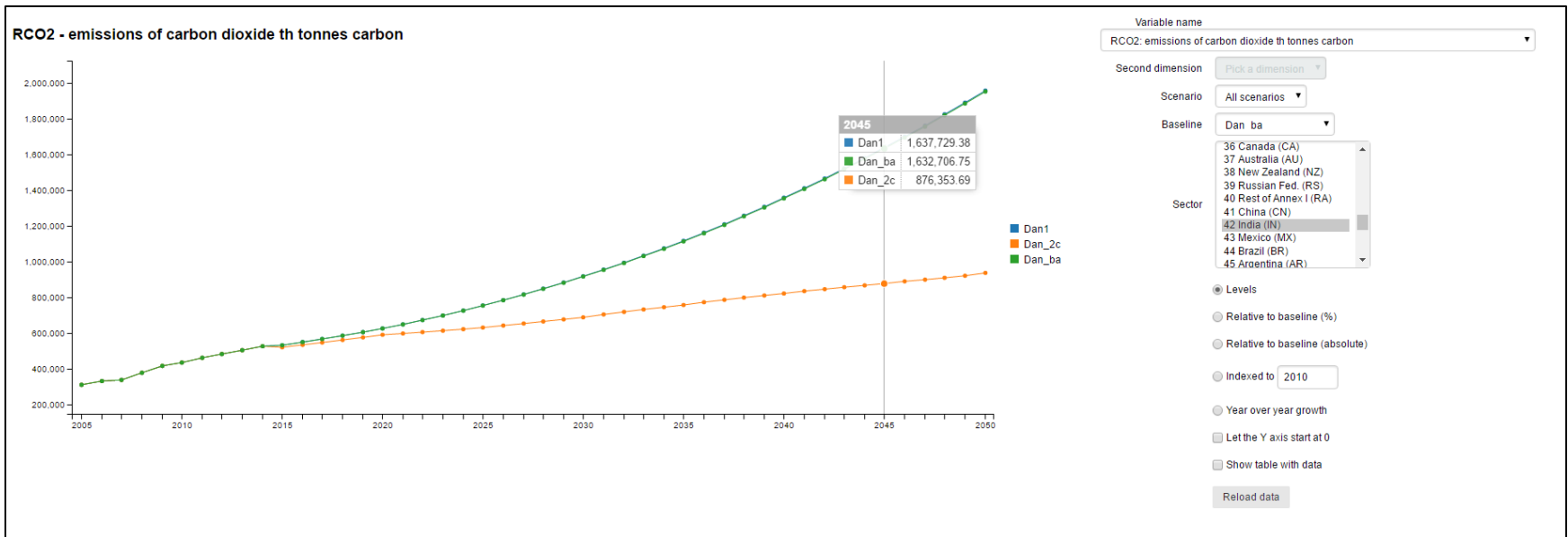
C:\Users\agm>cd c:\e3me_ub
c:\E3ME_UB>runmodel

c:\E3ME_UB>E3ME6\E3ME6 In History Asns\Assumptions Scenarios\B_ETS Databank Output\History UER\QDUM
E3ME46 SUMMARY SOLUTION FOR EACH YEAR <See DATA\UER.TMP for details>
Last iteration for 53 region(s) as % change <D> previous year:
DATE IT GHG DGDG DSC DSU DSX DSM DPSH DPCE DPSX DPSM DAW BTRA PBRA UNRA
1995 12 38*****
1996 10 38 3.3 3.3 5.1 6.1 5.4 2.1 2.3 1.7 2.6 1.9 0.0 1.1 5.0
1997 10 38 3.7 3.3 4.6 8.9 7.6 1.1 1.0 6.8 8.2 8.8 0.0 0.5 5.0
1998 10 38 2.4 3.3 3.1 3.4 5.0 1.0 0.0 -1.3 -3.0 -4.0 1.1 0.0 0.3 5.0
1999 11 38 3.4 3.3 4.2 4.0 5.6 0.0 0.0 4.4 4.4 4.6 9.9 0.0 0.1 5.0
2000 11 38 4.3 3.3 5.7 9.6 9.4 2.2 1.4 6.6 16.3 19.0 17.2 0.0 -0.4 5.0
2001 10 39 1.7 3.3 5.5 1.7 1.7 2.2 1.2 1.2 -1.7 -1.3 1.1 0.0 0.2 5.0
2002 12 39 2.0 3.3 2.2 3.0 4.2 2.2 2.2 3.0 3.0 -5.4 -2.2 0.0 0.6 5.0
2003 11 40 2.0 3.3 1.1 4.3 5.2 2.2 2.2 3.0 3.0 -7.6 -0.0 0.0 0.8 5.0
2004 9 41 4.1 3.3 1.1 10.2 11.0 4.4 4.4 0.2 1.1 1.1 -1.3 0.0 0.7 5.0
2005 9 45 3.6 3.3 2.2 7.5 8.5 4.4 4.4 5.5 0.0 3.9 4.1 0.0 0.5 5.0
2006 11 46 4.1 3.3 3.3 10.1 10.1 4.4 4.4 5.5 3.8 2.7 4.3 0.0 0.2 5.0
Time taken (minutes): 0.88

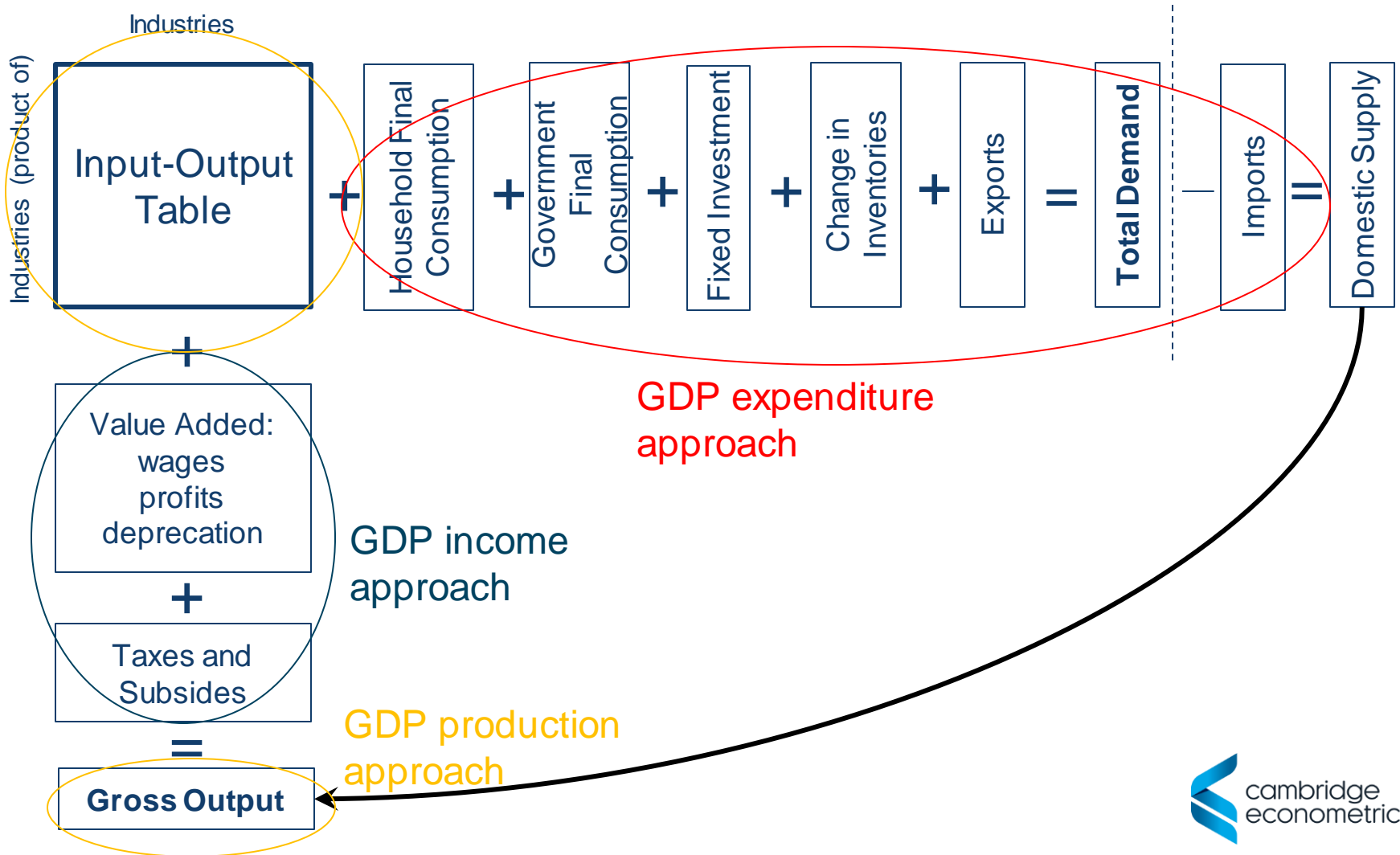
c:\E3ME_UB>E3ME6\E3ME6 In EnForecast Asns\Assumptions Scenarios\B_ETS Databank Output\EnForecast UER\QF3B
E3ME46 SUMMARY SOLUTION FOR EACH YEAR <See DATA\UER.TMP for details>
Last iteration for 53 region(s) as % change <D> previous year:
DATE IT GHG DGDG DSC DSU DSX DSM DPSH DPCE DPSX DPSM DAW BTRA PBRA UNRA
2007 11 47 3.9 3.3 3.3 5.0 6.6 6.8 1.6 0.0 0.0 -0.7 1.6 0.0 0.2 5.0
2008 11 46 1.4 3.3 0.8 5.0 2.0 2.7 0.0 0.0 3.0 4.7 0.0 0.0 0.1 5.0
2009 12 46 -2.1 -1.1 -0.9 -10.2 10.9 6.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2010 16 47 4.1 3.3 3.3 11.4 12.4 1.1 1.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2011 36 49 2.0 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2012 34 49 2.7 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2013 35 50 2.0 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2014 35 51 3.0 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2015 44 52 3.0 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2016 51 54 3.1 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2017 51 55 3.2 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2018 44 56 3.2 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2019 40 57 3.2 3.3 3.3 11.1 11.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.0
2020 38 58 3.3 3.3 3.3 4.0 3.6 3.3 3.3 2.5 2.5 3.3 3.8 0.0 0.0 5.0
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The model runs on a standard Windows desktop PC or laptop

The Interface

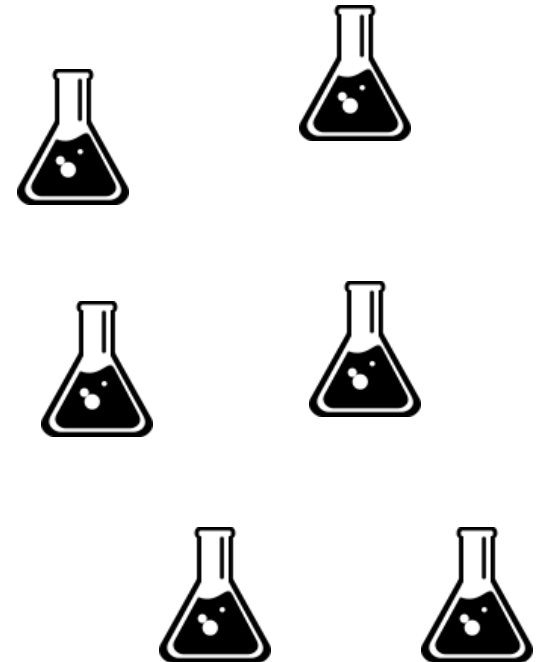


National Accounting Framework



Example Policies

- Energy and climate policy:
 - energy efficiency programmes
 - support for renewables
 - carbon and energy tariffs and taxation
- Economic policy more generally:
 - basic fiscal policy
 - government expenditure patterns



Main Model Outputs

- GDP and output
 - GDP, output by sector, GVA by sector
- Other economic indicators
 - consumption
 - investment
 - prices and inflation
 - trade
- Labour market
 - employment by sector
 - unemployment
 - wage rates
 - labour supply
- Energy and environment
 - energy consumption by fuel type and fuel user
 - energy prices
 - CO₂ emissions by sector, other GHG emissions

The technical slide...

- Macro-econometric model based on a post-Keynesian framework
- Optimisation not assumed, no general equilibrium
- Demand = Supply... but
- Demand \leq Potential Supply
- Under the right conditions it is therefore possible for regulation to increase output and employment

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