

Environment and Economics

Macro- and microeconomic analysis of marine energy

Michelle Gilmartin
Fraser of Allander Institute, University of Strathclyde

Key areas of research

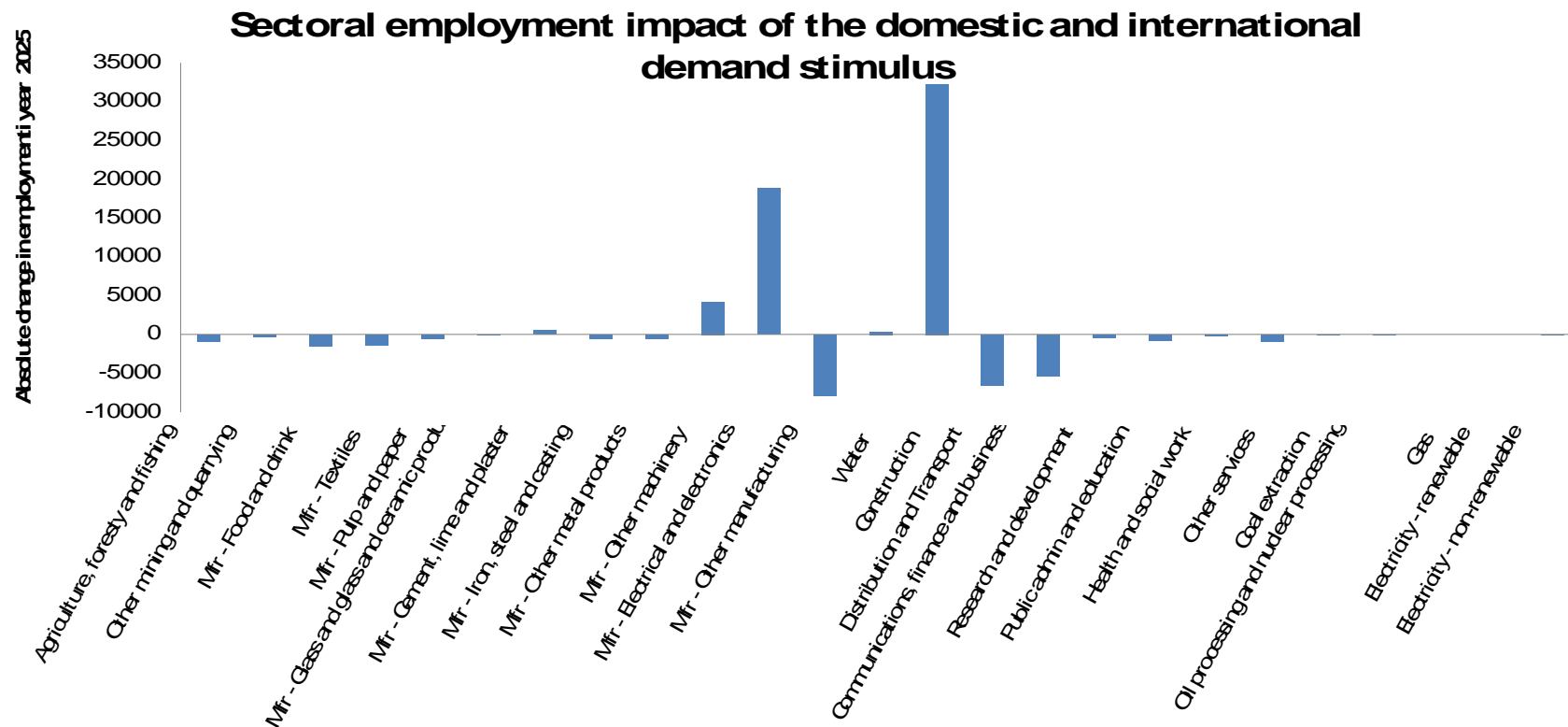


- Macroeconomic impacts of marine energy developments on the Scottish & UK economies
- Costs and benefits of wave and tidal energy provision
- Portfolio theory applications for wave and tidal energy in UK and Scotland

Macroeconomic impacts



- Macroeconomic stimulus via renewables development is an objective of government policy

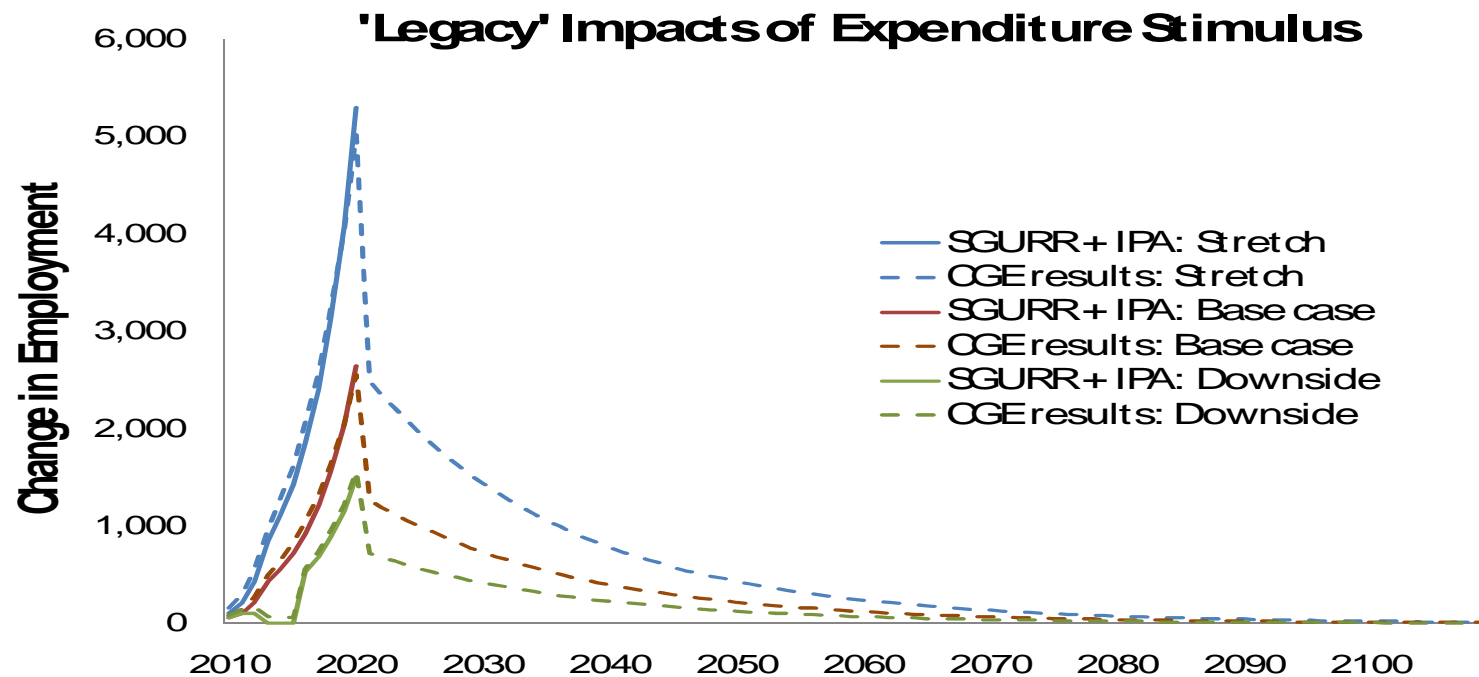


- We can quantify the macro- and sectoral distribution of impacts from marine energy developments on Scottish & UK economies

Testing the link between marine energy installations and regional employment



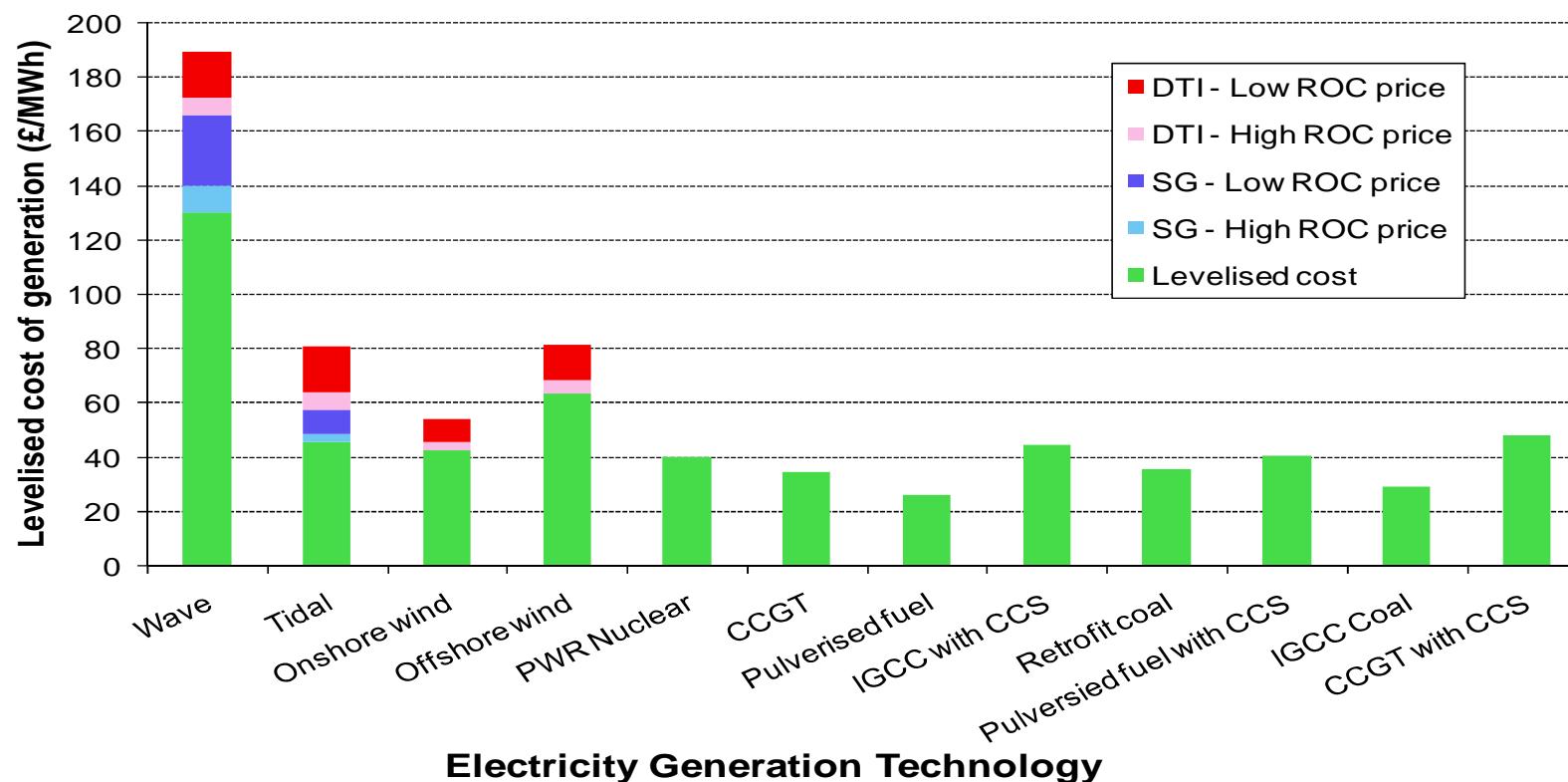
- Our economic modelling offers significant ‘added-value’ to policy makers’ knowledge base



- Potential for ‘legacy’ impacts of expenditures
- Sectoral employment changes & potential areas of skill shortage

Levelised costs

- To help assess the appropriateness of policy measures in supporting the cost competitiveness of marine energy



- We identify levelised costs compared with other technologies
- And assess the impact of ROC banding on cost comparisons

Cost benefit analysis for marine energy



- CBA is important because the notion of social optimality drives public investment

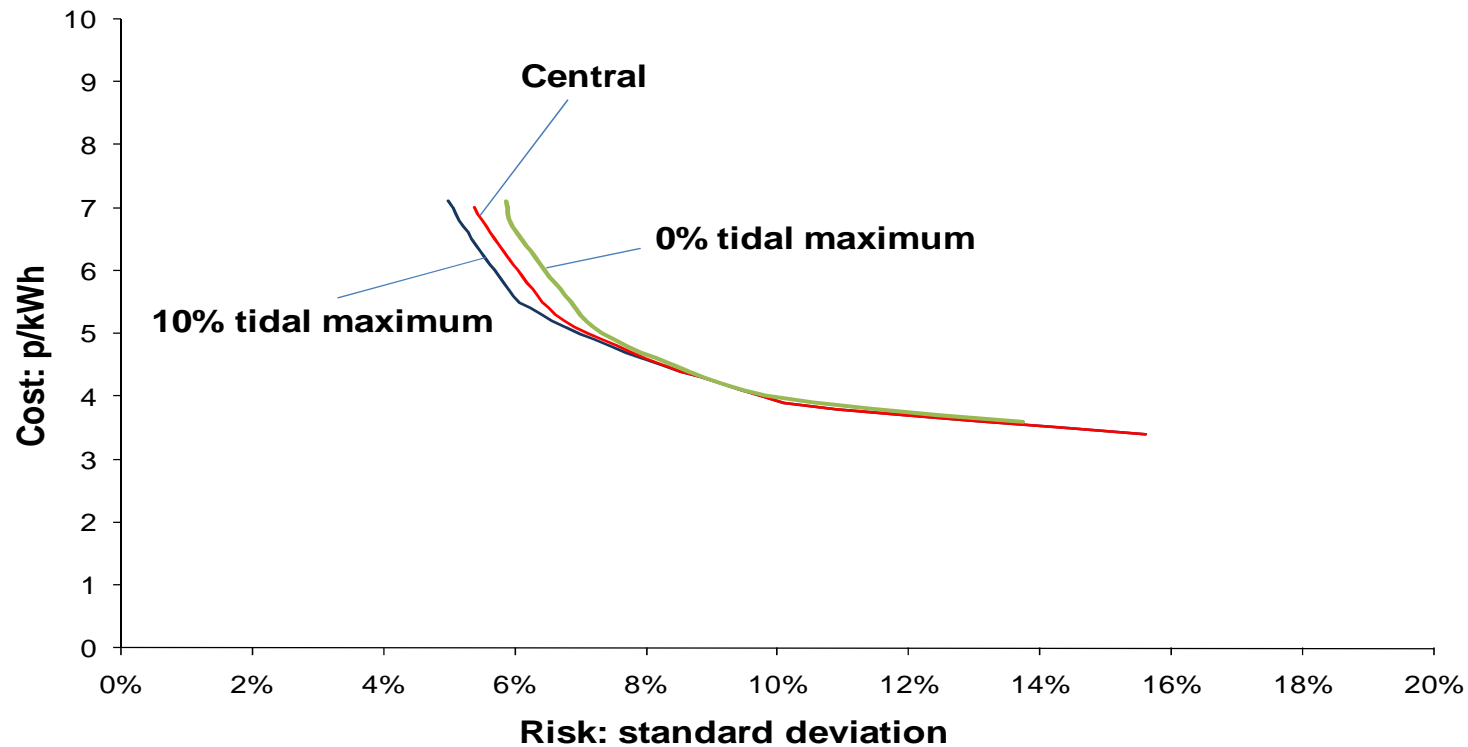
	£ MILLIONS	TIDAL DISPLACES GAS	TIDAL DISPLACES COAL	TIDAL DISPLACES WIND
COSTS	CONSTRUCTION	67.61	53.04	35.38
	O&M	13.38	10.96	-9.95
	EXTRA BALANCING COSTS TO GRID	-	-	-
	CO2 RELEASED DURING MANUFACTURE	0.85	1.93	-
	VISUAL DISAMENITY	-	-	-74.08
	NON-USE DISAMENITY	-203.71	-203.71	-
	TOTAL COSTS	-121.87	-137.78	-48.65
BENEFITS	AVOIDED FUEL COSTS	45.47	15.17	-
	AVOIDED GDP LOSSES	6.06	6.06	-
	AVOIDED CO2 DURING OPERATION	19.40	43.91	-
	TOTAL BENEFITS	70.93	65.14	-
NET PROJECT BENEFIT		192.80	202.92	48.65

- Wave and tidal could offer welfare-improving possibilities to Scotland relative to other technologies

Portfolio theory (1)



- Helps demonstrate the role that marine energy could play in increasing energy diversity and security



- We quantify the contribution of wave and tidal technologies to reducing electricity portfolio cost variability

Portfolio theory (2)



- UK-wide portfolio analysis
- Examining sensitivity of results to
 - the impact of technology-specific learning rates
 - the costs of countering resource variability
- Helps identify efficient investment strategies for public expenditure

Looking forward



- Further development of: macroeconomic impact analysis; costs and benefit calculations; portfolio theory applications
 - Use of intertemporal CGE models
 - Local environmental impacts for CBA
 - Costs of ‘compensation’ for variability of marine resources
- Range of policy options for marine renewables, both at regional and national levels.
- Policy assessment of Climate Change Committee
- Interaction between a possible carbon tax and existing fiscal energy measures, such as ROCs