

# Economic Value of Geoscience in Ireland



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# Background to Study

Based on study carried out by SLR (ex-CSA) staff with economists Jerome Casey & Co. Ltd on behalf of Geological Survey of Ireland during 2007

***“Economic Study of the Impact of Geoscience Sector in Ireland”***

Published subsequently by GSI as ***‘Gaining Ground’ (2008)***

- Based on 2006 data – a snapshot in time
- Thanks to Dr Peadar McArdle at GSI for permission to use data



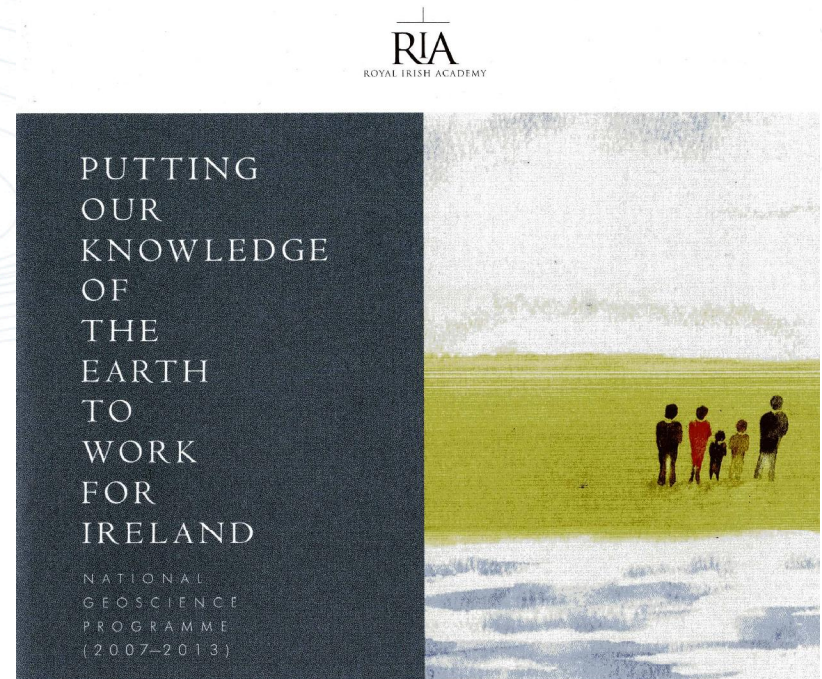
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# National Geoscience Programme (NGP 2007-2013)

**NGP estimated that geoscience-based industry contributes > €2 billion annually to the Irish economy:**

- mine production of zinc and lead
- quarrying of aggregates
- gypsum
- dimension stone
- natural gas production - Kinsale
- potential gas production - Corrib



IRELAND—REPRESENTING INTERNATIONAL EXCELLENCE IN GEOSCIENCE



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# TODAY'S PRESENTATION

- **Geoscience as Economic Activity**
  - Core/ Non-Core Activities
  - Methodology
  - Multipliers
- **Economic Assessment**
  - Value by category
  - Direct/ Indirect Values/ % GNP
- **Geoscience Research & Training**
- **International Comparisons**
  - Public supports for Geosciences
- **Conclusions**



# Geoscience as an Economic Activity\*?

Core Activity	Non-Core Activity
<p>Mining/ Mineral Exploration</p> <p>Petroleum Production/ Exploration</p> <p>Peat Production</p> <p>Quarrying/ Construction Materials</p> <p>Laboratories</p> <p>Consultancy Services</p> <p>Engineering Services</p> <p>Drilling</p> <p>Public Sector Geoscience (<i>geological survey/ academia/ aspects of water/ waste/ environmental management</i>)</p>	<p>Manufacturing Concrete Blocks</p> <p>Bord Gais activities</p> <p>Local Authorities' activities</p> <p>Landscape Tourism</p> <p>Arts &amp; Crafts</p>

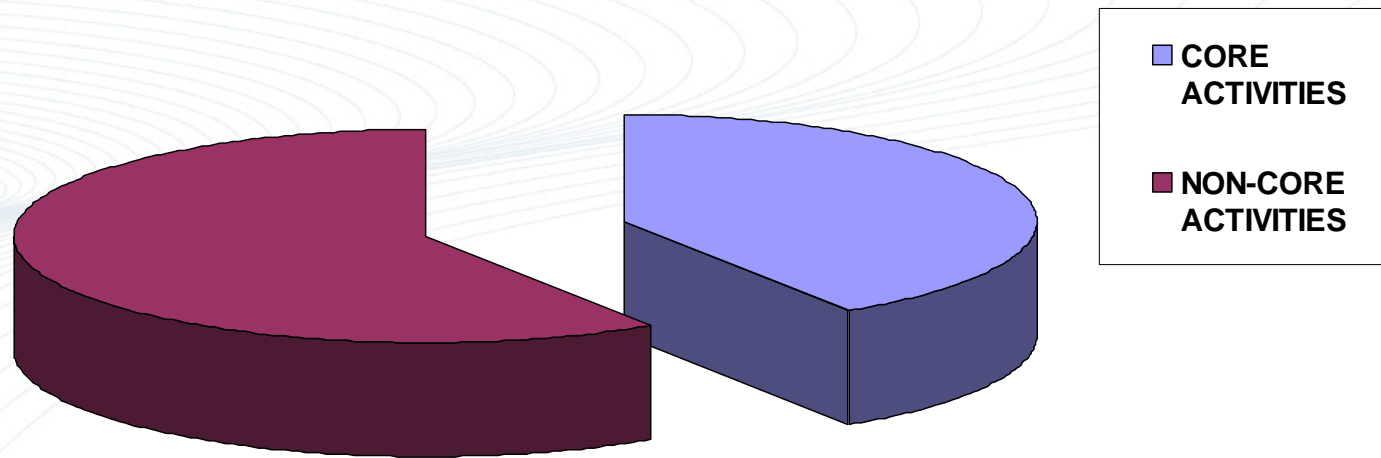
*\*Based on CSO's NACE Rev1.1 / PRODCOM economic activity classifications and established economic principles*



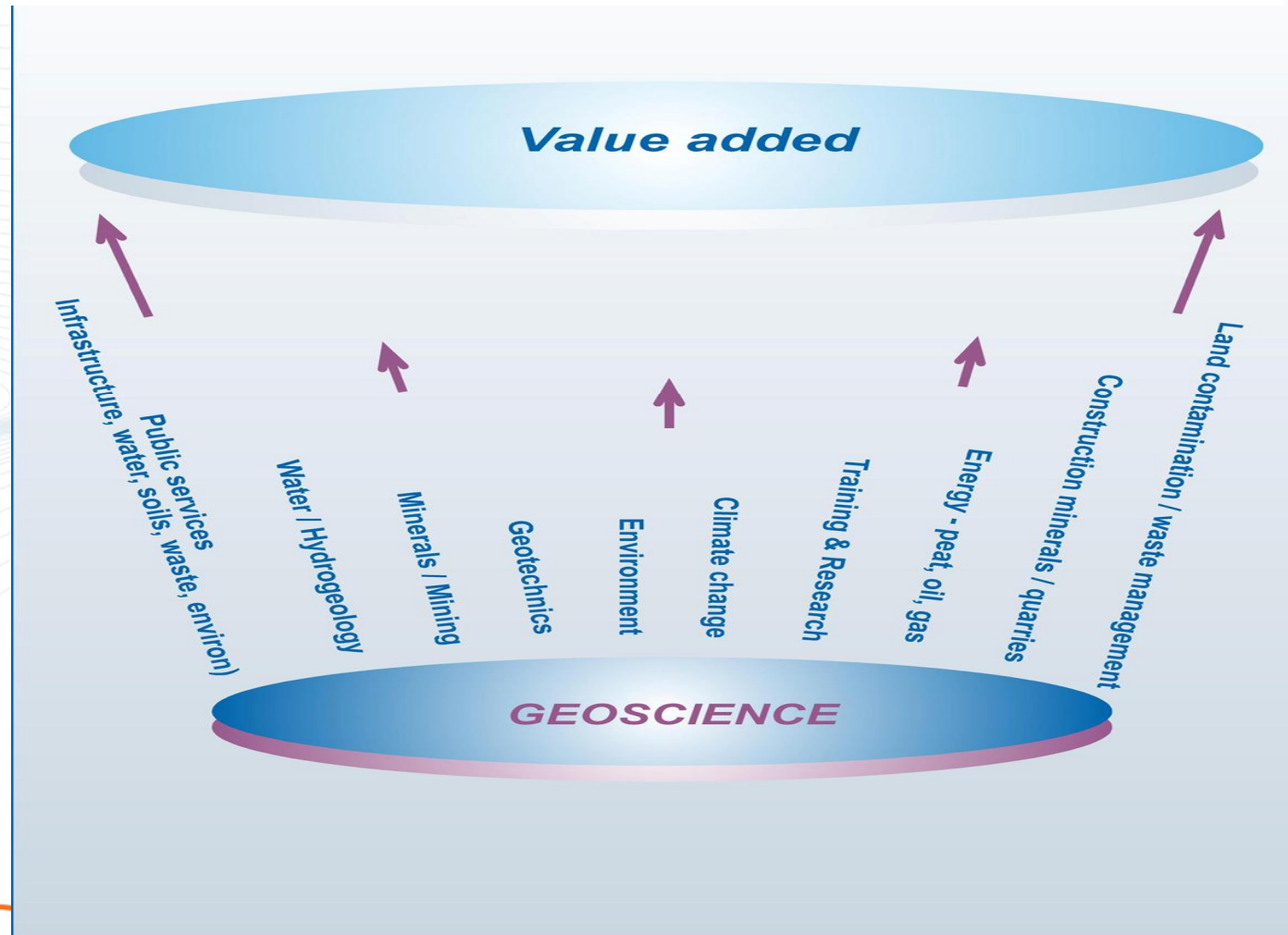
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# Core & Non-Core Activities as % of Total Geoscience Economic Value



# Geoscience is a deeply embedded & frequently “hidden” economic activity



# Research Methodology

## **Top Down:**

- Categorise Geoscience categories of Economic Activity (CSA/ NACE/ EU)
- CSO 'input/output' data (I-O tables) – *52 sectors insufficient (!)*
- Census of Industrial Production/ PRODCOM/ Annual Census of Services

## **Bottom Up:**

- Questionnaire of Irish geoscience community (83% response rate)
- Interviews with key participants EMD/ IGI/ IAH/ EI/ ICF/ IAEG/ RIAGC
- Irish & international Geological Survey Organisations
- Academia/ Research institutes/ Teagasc/ Marine Institute/ PAD/ EPA
- Desk/ Web searches
- Company Records Office/ CSO/ UK Office for Nat. Stats
- Tourism Ireland/ Fáilte Ireland/ Craft Council of Ireland



# Geoscience – Gross Value Adding (GVA)

Base Economic Activity	Multiplier*
Mining/ Mineral Exploration	0.6
Petroleum Production/ Exploration	0.6
Peat Production	0.49
Quarrying/ Construction Materials	0.6
Laboratories	0.62
Consultancy Services	0.51
Engineering Services	0.51
Drilling	0.51
Public Sector Geoscience	0.64
Academic Research	0.76
Manufacturing Concrete Blocks	0.6
Bord Gais activities	0.6
Local Authorities' activities	0.57
Landscape Tourism	0.66
Arts & Crafts	0.6

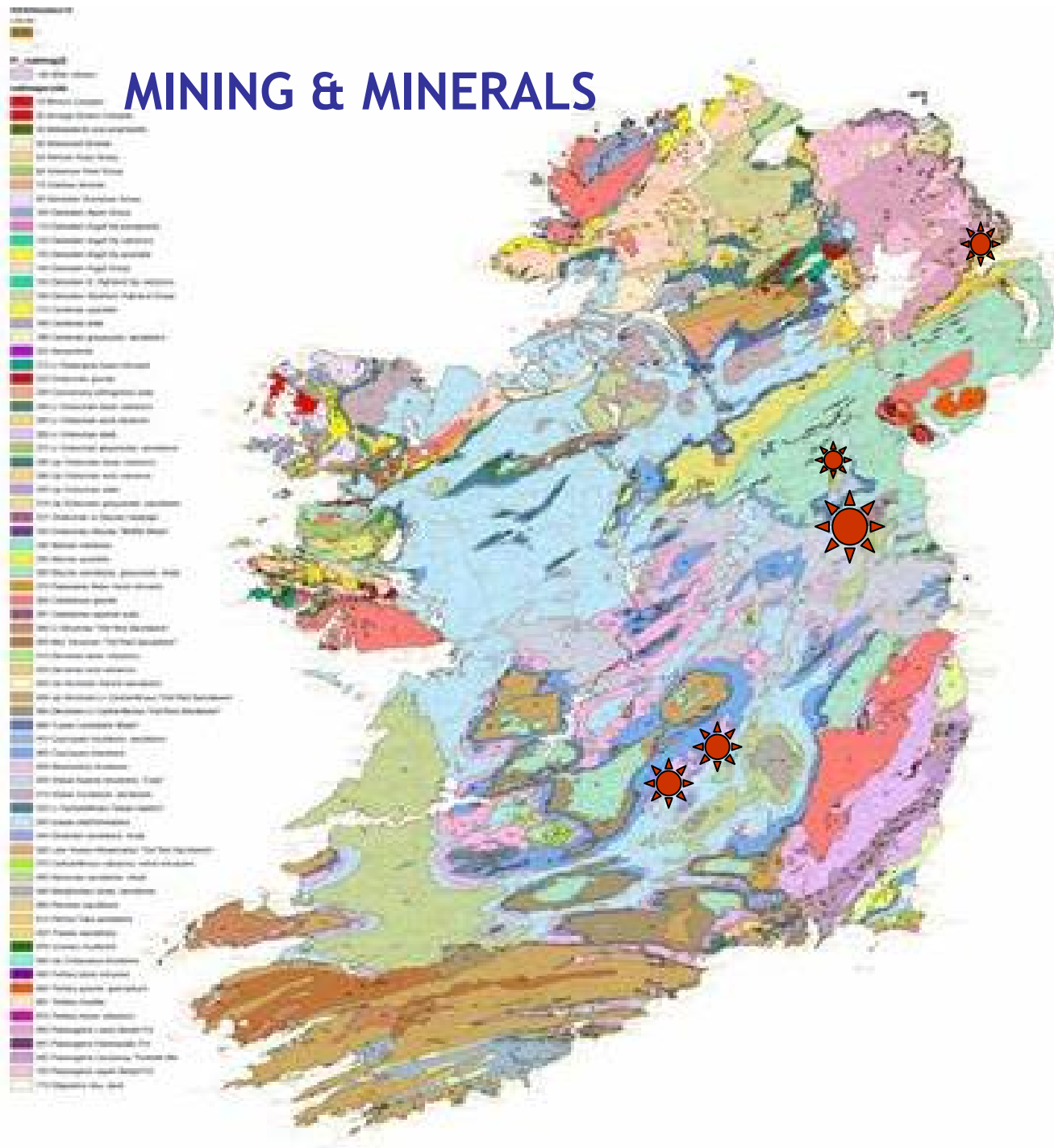


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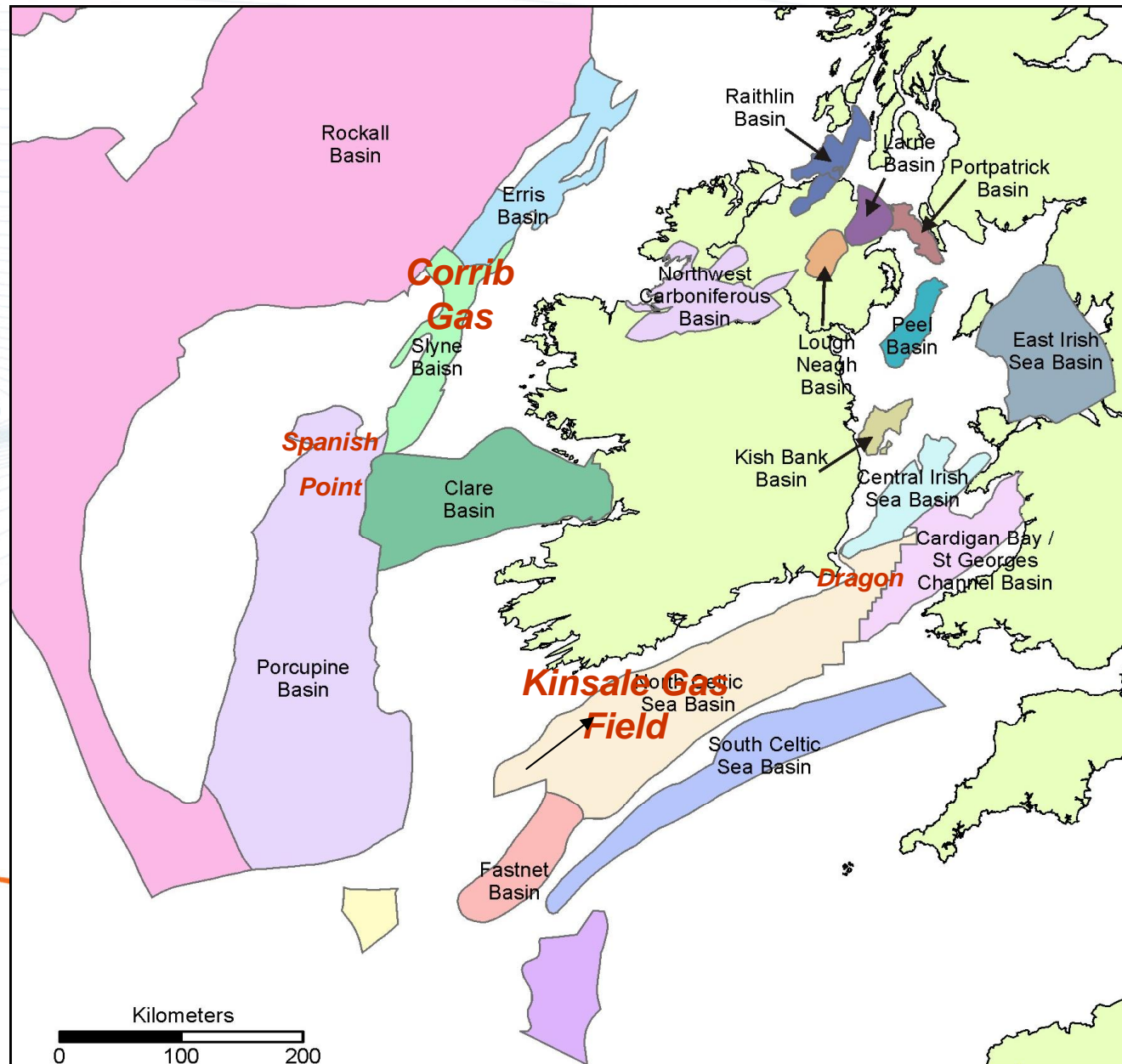


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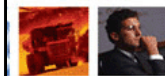
# MINING & MINERALS



# Offshore Energy Fields



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# Mining / Exploration/ Energy/ Quarrying 2006

## CORE ACTIVITIES € million

	Value	Value Added	Jobs
<b>Mining Companies</b>	<b>316.50</b>	<b>235.6</b>	<b>1250</b>
<b>Mineral Exploration</b>	<b>12.91</b>	<b>6.45</b>	<b>100</b>
<b>Petroleum Production/ Exploration</b>	<b>695.15</b>	<b>476.78</b>	<b>690</b>
<b>Extraction of Construction Materials</b>	<b>1039.00</b>	<b>554.60</b>	<b>5900</b>
<b>Extraction of Peat</b>	<b>164.11</b>	<b>76.60</b>	<b>953</b>



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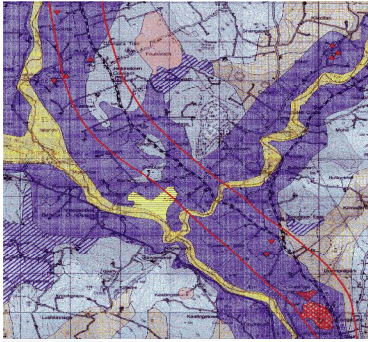
# Private Sector: Geoscience Services 2006

## CORE ACTIVITIES € million

	Value	Value Added	Jobs
Laboratories	5.83	3.61	95
Consultancy Companies	31.33	15.27	226
Individual Consultants	2.17	1.12	32
Drilling	113.00	57.63	1095
Engineering/ Geotech Companies	31.58	16.11	550



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# Public Sector Geoscience 2006

## CORE ACTIVITIES € million

**Geological Survey of Ireland/  
Petroleum Affairs Division/  
Environment Protection Agency/  
Teagasc/ Marine Institute**

**Value**

**Value Added**

**Jobs**

**4.12**

**2.64**

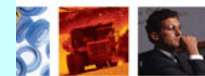
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**Geoscience Research  
(TCD/ UCD/ UCC/ UCG/ DIAS/ Met E/  
SEI/ EPA / MI/ GSI etc)**

**13.48**

**10.24**

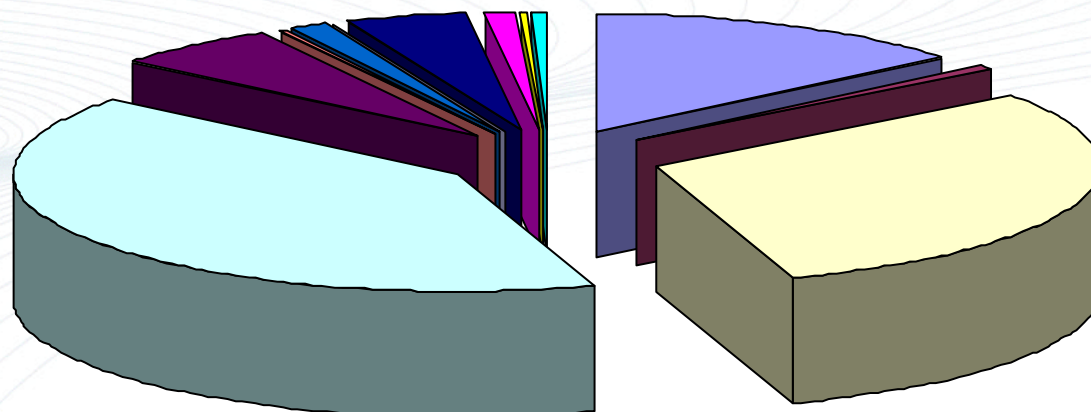
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# Core Geoscience Activities as % of Total Core Value



- Mining Companies
- Mineral Exploration
- Petroleum Prodn/Exploration
- Extraction of Construction Materials
- Extraction of Peat
- Laboratories
- Geo/ Environmental Consultancy
- Individual Geo-Consultants
- Drilling Companies
- Engineering/ Geotechnical Cos (10%)
- GSI/PAD/ EPA/ Teagasc/ MI
- Academic Research



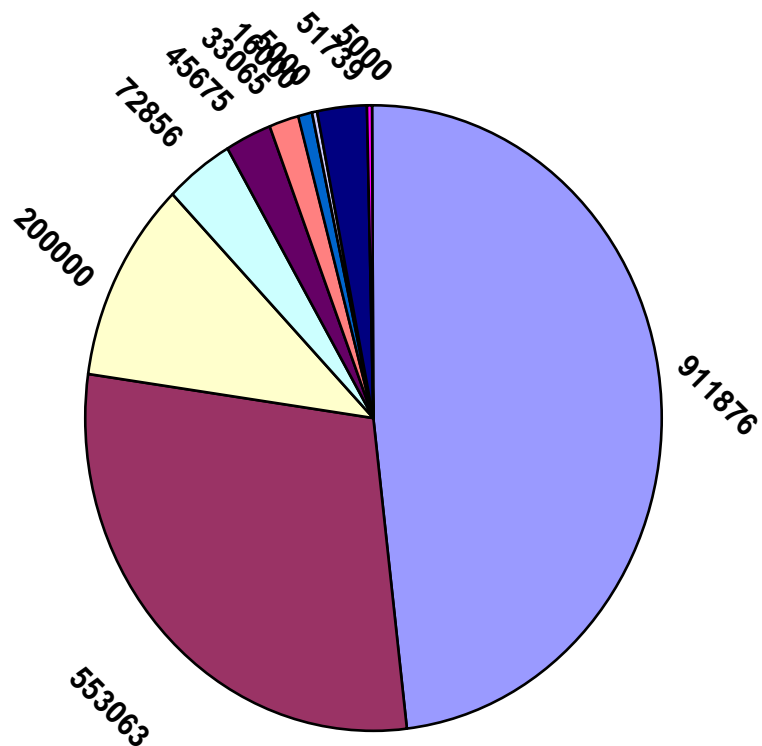
## Non-Core Geoscience Activities 2006

### NON-CORE ACTIVITIES € million

	Value	Value Added	Jobs
<b>Manufacturing Construction</b>	<b>1389.00</b>	<b>833.4</b>	<b>8542</b>
<b>Distribution &amp; Trade : Gas</b>	<b>867.00</b>	<b>311.93</b>	<b>671</b>
<b>Local Authorities Geo-expenditure</b>	<b>1033.47</b>	<b>435.82</b>	<b>7653</b>
<b>Landscape Tourism</b>	<b>299.00</b>	<b>263.34</b>	<b>3078</b>
<b>Arts &amp; Crafts</b>	<b>65.85</b>	<b>39.5</b>	<b>646</b>



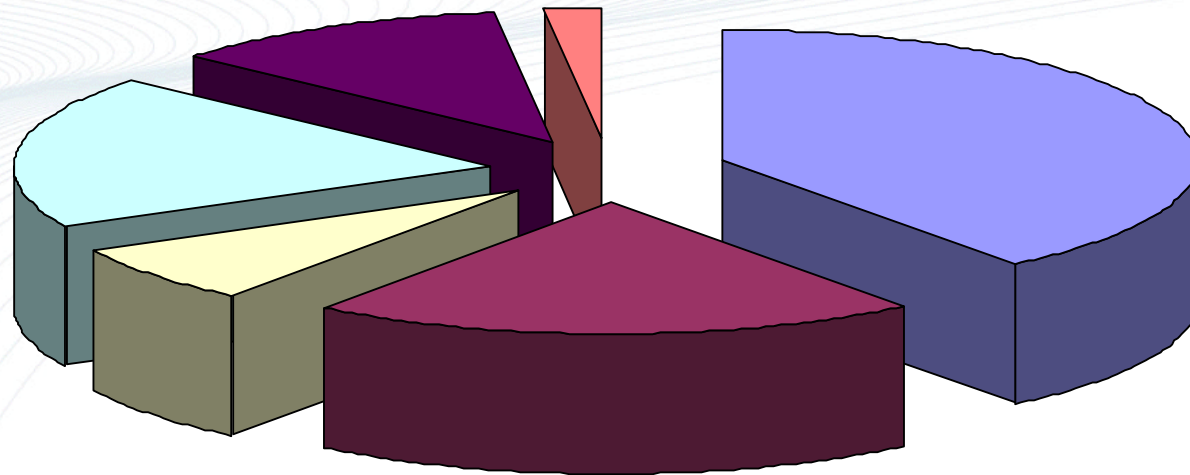
# Landscape Tourism 2006



- Cliffs of Moher Visitor Centre
- Giants Causeway
- Aillwee Cave
- Connemara National Park
- Glenveagh National Park
- Dunmore Cave
- Slieve League
- Cuilcagh Geopark
- Marble Arch Caves
- Copper Coast Geopark



# Non-Core Geoscience Activities as % of Total Non-Core Value

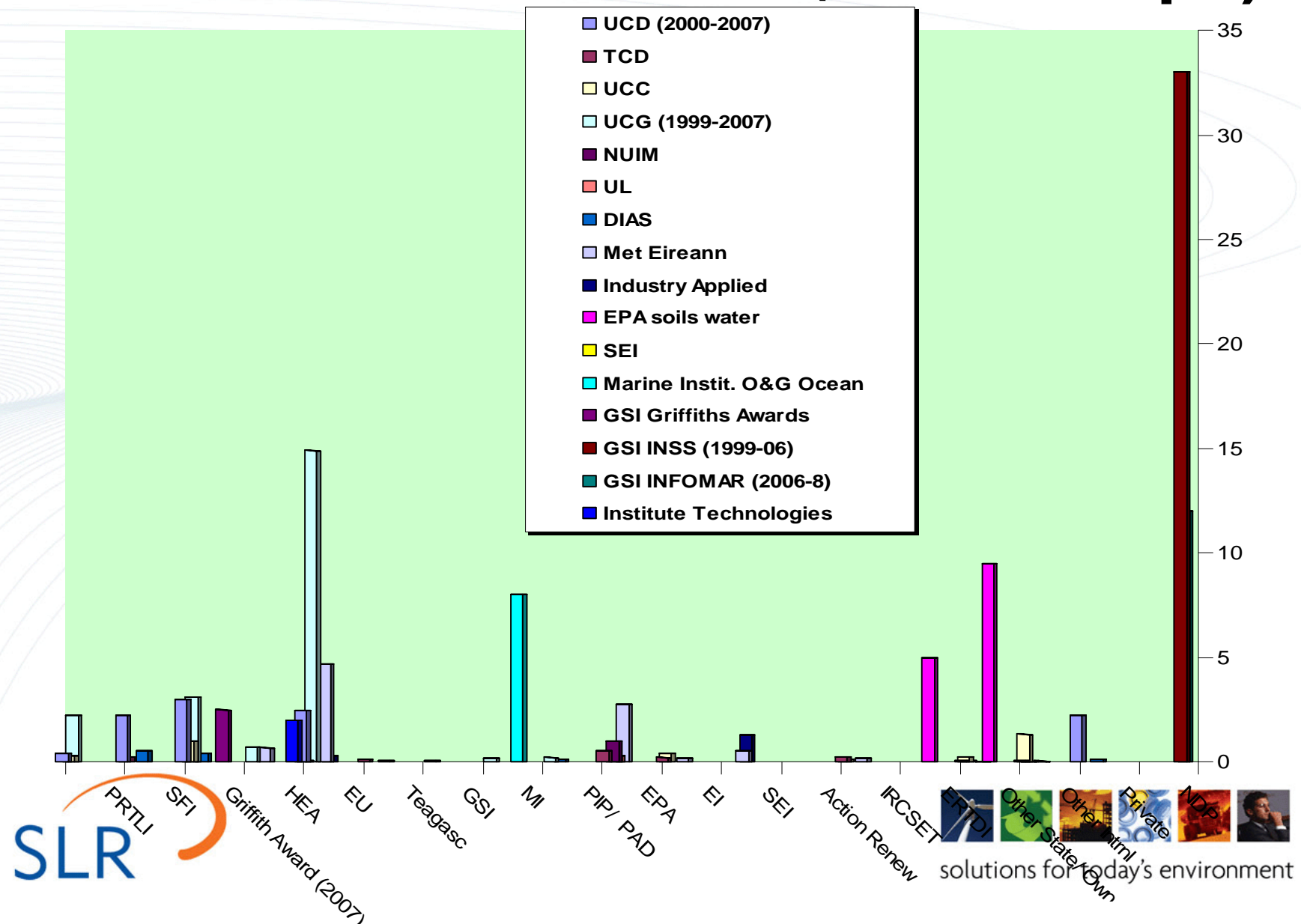


- Manufacturing Construction Materials
- Distribution & Trade - Bord Gais
- Local Authorities Geo-Expenditures
- Geo-Related Construction Investment
- Landscape Tourism
- Arts & Crafts

# Geoscience Training & Academia in Ireland

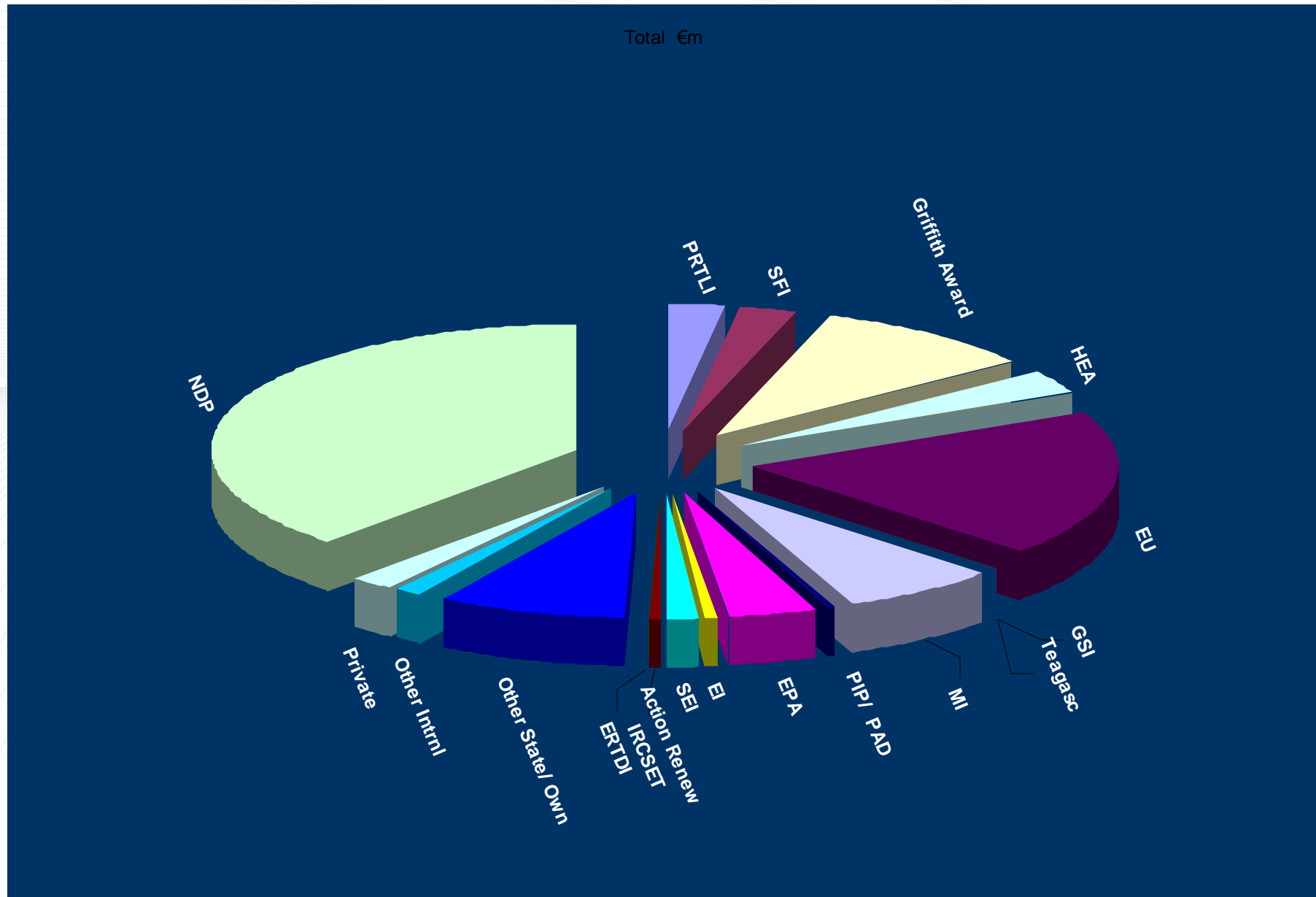
Activity	Number	Comment
Academics	67	
Average No. Graduates (p.a.)	60* 105**	*4 univs; Geology major  **Includes all geo-related, in colleges, ITs
Post Graduates	84	
Post Doc/ Res. Fellow	50	
Geo-Research Groups	36	<p> Palynology and Organic Petrology;  Organic Chemistry;  Geology of Ireland;  Hydrogeology; /  Igneous Petrology;  Seismic and Basin Analysis;  Carbonate Diagenesis;  Isotopes in Ecosystems;  Volcanic and Magmatic Processes </p>

# Geoscience Research in Ireland (€ 13.48 m/pa)





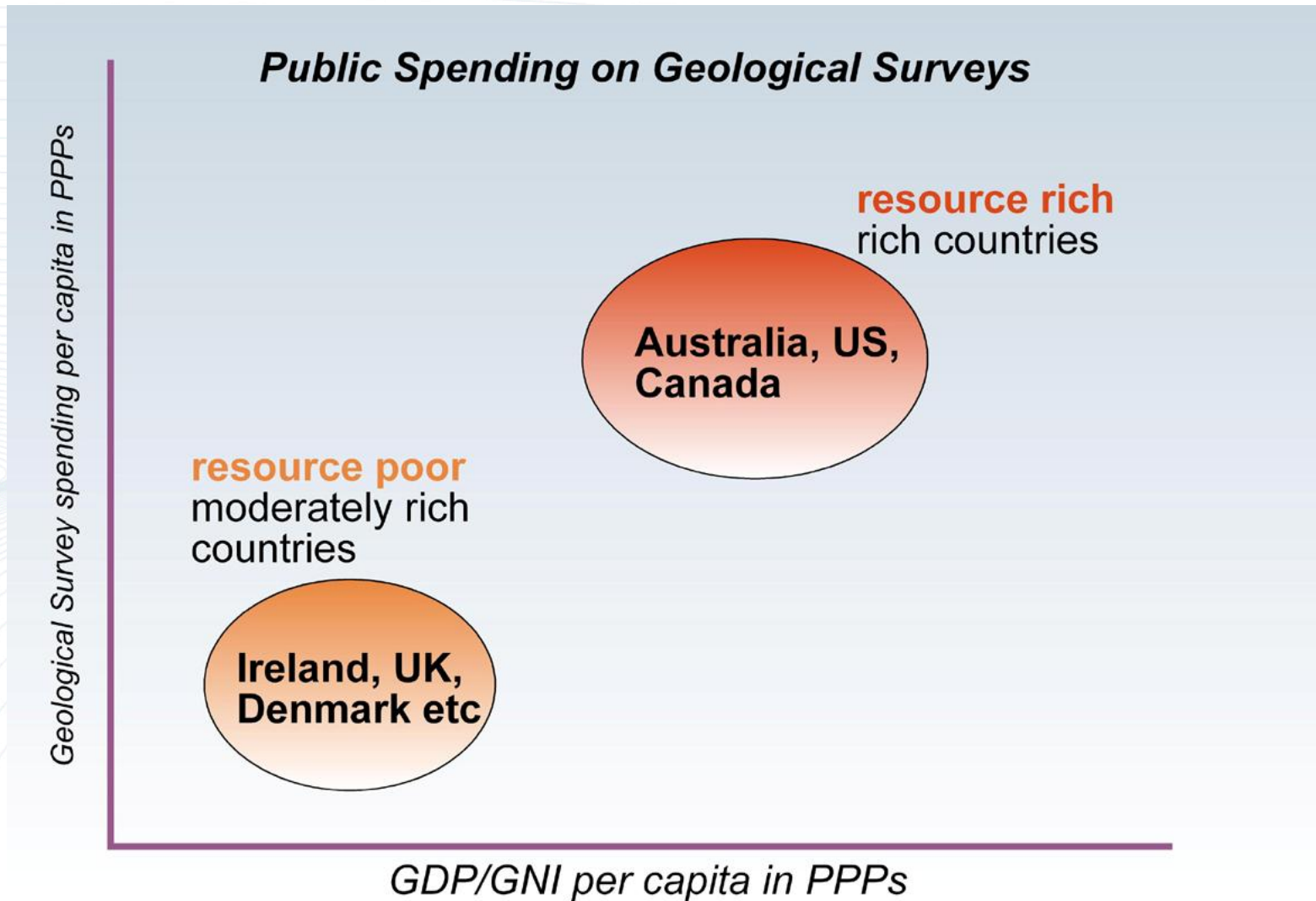
# % Funding of Geoscience Research in Ireland



# Value of Geological Survey Activity

Geol Survey spend by Country (€ m)		Geol. Survey spending per capita (PPP \$)	GDP per capita PPP as % OECD average
<b><i>Resource-Poor + Moderately-Rich Countries</i></b>			
Ireland	€4.46m	1.03	110*
N. Ireland	€0.97m	0.62	87
Germany	€64m	0.87	105
G. Britain	€55.9m	1.02	109
Sweden	€26.4m	2.35	110
Finland	€56.7m	10.96	105
<b><i>Resource-Rich + Rich Countries</i></b>			
Australia	€52.7m	3.07	113
USA	€650m	3.21	144
Canada	€88.5m	5.04	121

# Public Spending on Geological Survey Activity





# Geoscience Salaries & Jobs (2006)

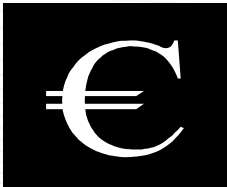
Irish private sector salaries (2006) reported at  
**€45,000 - €50,400 pa**

- Lower than average public sector salaries in 2006

Total jobs **30,054**

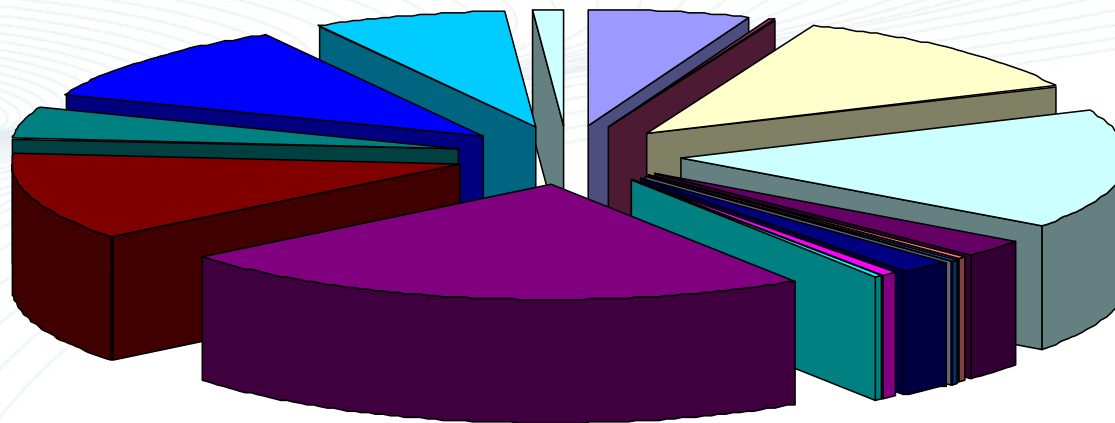
- 37% in core activity/ 63% in non-core

# Summary: Economic Value of Geoscience (2006)

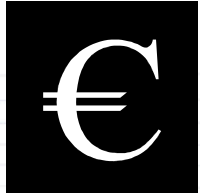
	Turnover (€ M)	Gross Value Added (€ M)	No. of Jobs
Core	2,432	1,458	11,127
Non-Core	3,754	1,884	18,926
<b>TOTAL</b>	<b>6,186</b>	<b>3,342</b>	<b>30,053</b>

# Geoscience Activities as % of Total Geoscience Economic Value (2006)

**Gross Value Added € 3.34 bill (2.24% GNP)  
1.5% of total employment**



- Mining Companies
- Mineral Exploration
- Petroleum Prodn/Exploration
- Extraction of Construction Materials
- Extraction of Peat
- Laboratories
- Geo/ Environmental Consultancy
- Individual Geo-Consultants
- Drilling Companies
- Engineering/ Geotechnical Cos (10%)
- GSI/PAD/ EPA/ Teagasc/ MI
- Academic Research
- Manufacturing Construction Materials
- Distribution & Trade - Bord Gais
- Local Authorities Geo-Expenditures
- Geo-Related Construction Investment
- Landscape Tourism
- Arts & Crafts



## CONCLUSIONS: Economic Value (2006)

- Overall, the Direct contribution of the Geoscientific sector in terms of gross value added was **€3.34billion, or 2.24% of GNP.**
- Direct + Indirect gross value added to national income arising from the Geoscience sector was **€4.24bn, equivalent to 3.0% of GNP**
- Geoscience employed over 30,000, or 1.5% of workforce
- Average salaries in professional private sector were between €45,000 - €50,900, lower than average public sector salaries in 2006.





## CONCLUSIONS: The Future...

**Core geoscience services driven by regulatory requirements (EU, Irl) >> strong growth in 2006, but downward pressure due to current decline**

- **Non-core activity likely reduced due to decline in construction**
- **Ireland's per capita spending on GSI is ~ UK (BGS), but 10% of that of Finland**
- **Geoscience research funding is low: Irish third level institutions receive €13 m pa in research funding, with < 5% allocated under PRTL and SFI**
- **Ireland's obligations under EU Directives & Kyoto Protocol require increased public spending on geoscience.**
- **Ireland must develop stronger foundations in geo-research and public services in building a 'knowledge-based society'.**

# ***Economic Value of Geoscience in Ireland***

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