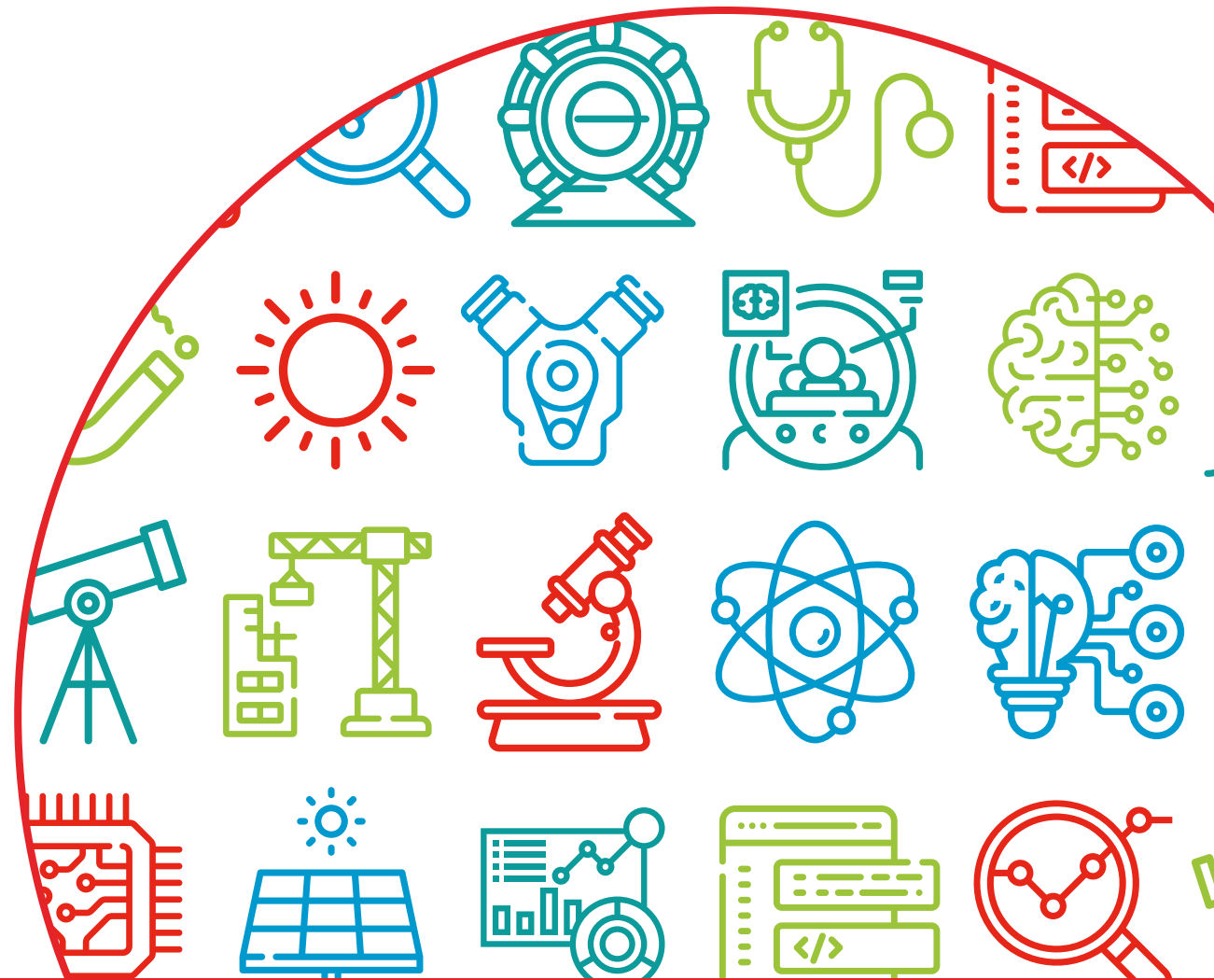


The contribution of physics to the Northern Irish economy

Executive summary



The Northern Irish physics sector is a growing force and the industries which use physics are becoming integral to the economy. In Northern Ireland, physics-based industries (PBIs) employ more than 48,800 full time equivalent (FTE) employees and contribute 7.3% of NI's gross domestic product (GDP). Labour productivity is high at £71,966 per worker, per year.

A project commissioned by the Institute of Physics (IOP) and conducted by the Centre for Economics and Business Research (CEBR) shows the performance and growth of the sector between 2010-2019. Read the full report at <https://www.iop.org/strategy/productivity-programme/physics-and-economy>.

What is the physics sector?

Physics-based industries (PBIs) are industries whose enterprises demonstrate PBIs are industries whose enterprises demonstrate:

- A)** ongoing research and development (R&D) which consistently makes use of physics knowledge (and the R&D activity can be expected to significantly affect the fortunes of businesses within the industry), or
- B)** those where underlying technology supporting the industry requires significant physics knowledge for continued operation.

The largest parts of the physics sector are Physics Manufacturing (which includes, but is not limited to, the production of a wide range of goods, from fibre optic cables to aircraft and medical equipment to support civil and defence objectives) and Physics Science and Technology, which includes, but is not limited to, technical testing and analysis and practical scientific consultancy. Physics machine services and sales, along with medical equipment sales, represent downstream servicing and sales of the goods physics manufacturing creates. The energy, oil and gas extraction and telecoms industries are major standalone industries with physics at their heart.

In 2019...

*All figures are rounded.

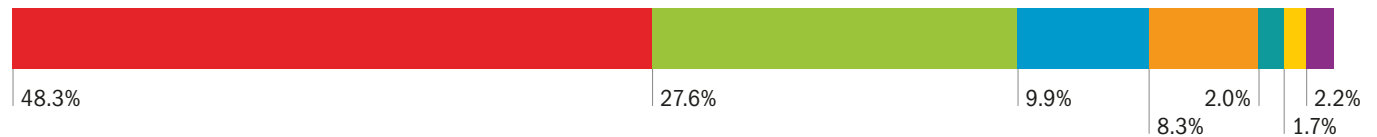
Employment - Full time equivalents (FTEs - thousands)

Total: **48.8**



Number of enterprises (thousands)

Total: **5,285**



Gross value added - GVA (£bn)

Total: **3.51**

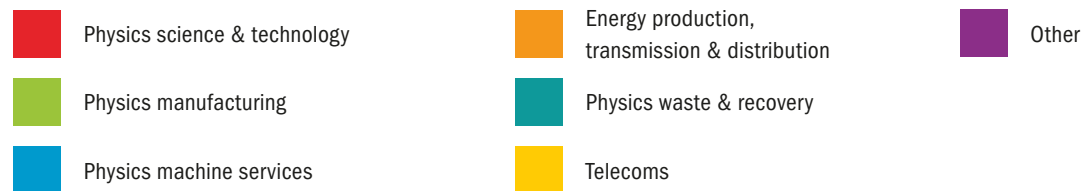


Turnover (£bn)

Total: **10.13**



Industry



The physics sector is highly productive and a significant contributor to the Northern Irish economy

In 2019...

GVA contribution

£3.5bn

The physics sector directly generated £3.5bn Gross Value Added (GVA), 7.3% of total Northern Irish GDP.

National breakdown

Northern Irish PBI GVA contribution is slightly below that in the other UK nations:

- English PBIs contributed £190bn in GVA - 10% of total English GDP.
- Scottish PBIs contributed £28bn in GVA - 17% of total Scottish GDP.
- Welsh PBIs contributed £7.3bn in GVA - 10% of total Welsh GDP.

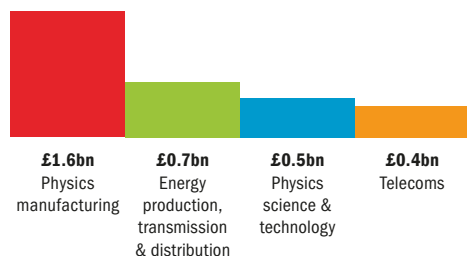
- Northern Irish based PBIs contributed £3.5bn in GVA - 7% of total Northern Irish GDP.

UK total: **£229bn** - 11%



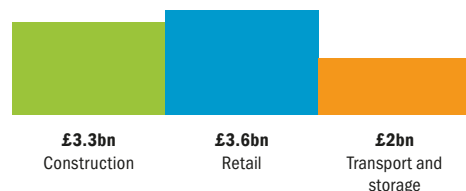
Spotlight on industry

The PBI sub-sector with the greatest GVA contribution was physics manufacturing, totalling £1.6bn, followed by energy production, transmission & distribution (£0.7bn), physics science & technology (£0.5bn), telecoms (£0.4bn).



Sectoral comparison

The Northern Irish physics sector generated a similar level of annual GVA to the construction (£3.3bn) and Retail (£3.6bn) sectors. The PBI sector generated greater GVA than the transport and storage sector (£2bn).



Turnover

£10bn

The physics sector generated £10bn in turnover.

National breakdown

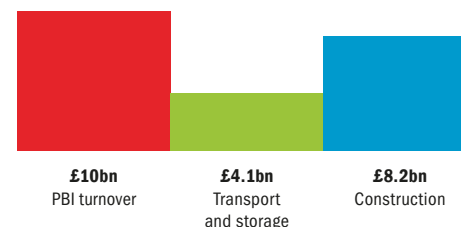
- English PBIs generated £533bn in turnover.
- Scottish PBIs generated £64bn in turnover.
- Welsh PBIs generated £26.7bn in turnover.
- Northern Irish PBIs generated £10bn in turnover.

UK total: **£634bn**



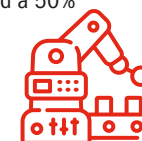
Sectoral comparison

- PBI turnover (£10bn) is more than double that of the transport and storage sector (£4.1bn), and tops the construction sector by £2bn (£8.2bn).



Spotlight on industry

The sector with the greatest turnover is Physics Manufacturing (£4.7bn), which had a 50% share of PBI turnover across the decade. This is followed by energy production, transmission and distribution (£3.2bn).



Labour productivity

Labour productivity sat at £71,966 per worker, per year.

This is higher than the rate seen in Wales.

- Scotland - £129,000
- England - £81,300
- Wales - £64,828



The number of physics enterprises in Northern Ireland is large and growing

In 2019...

There were **5,285** physics enterprises operating in Northern Ireland – **7%** of all Northern Irish enterprises.

The majority of Northern Irish physics enterprises are SMEs (**98%**), which employ a maximum of **9** people.



- 90% (4,785) of enterprises were categorised as micro companies.
- 8% (410) of enterprises were small (10-49 employees).
- 2% (90) were medium (50-249 employees) or large (250+).

Figures are rounded.

Sectoral comparison

The size of Northern Irish physics sector enterprises is similar to the UK PBI average.

- 92% of firms are micro enterprises.
- 6.6% are small.
- The remaining 1.4% are medium or large.



Northern Ireland had a total of **5,285** businesses in the physics sector (**7%** of all Northern Irish enterprises)

Wales had a total of **12,170** businesses in the physics sector (**12%** of all Welsh enterprises)

Scotland had a total of **27,235** businesses in the physics sector (**15%** of all Scottish enterprises)

England had a total of **305,445** businesses in the physics sector (**13%** of all English enterprises)

The physics sector is a significant employer in Northern Ireland

In 2019...

Total employment

48,842 FTEs

The sector directly employed more than **48,842 FTEs**.
This accounted for **7% of total Northern Irish employment**.



National breakdown

These figures are consistent, but slightly below that of the other UK nations:

- English PBIs directly employed 2,338m FTEs - 10% of total English employment.
- Scottish PBIs directly employed 220,000 FTEs - 10% of total Scottish employment.
- Welsh PBIs directly employed 113,138 FTEs - 10% of total Welsh employment.
- Northern Irish PBIs directly employed 48,842 FTEs - 7% of total Northern Irish employment.



Compensation of employees

£34,791

Average employee compensation.



Sectoral comparison

This is a strong figure compared to other Northern Irish sectors. It is double average employee compensation in the retail (£16,147) and transport and storage (£17,887) sectors, and two thirds greater than compensation in the construction sector (£20,992).

National breakdown

Employee compensation in Northern Ireland lags behind that in England, Scotland and Wales:

- English PBIs had a total of £98bn employee compensation - £41,990 per FTE worker on average.
- Scottish PBIs had a total £10.4bn employee compensation - £47,000 per FTE worker on average.
- Welsh PBIs had a total of £4.1bn employee compensation - £36,089 per FTE worker on average.
- Northern Irish PBIs had a total of £1.7bn employee compensation - £34,791 per FTE worker on average.



The physics sector grew across the decade

Between 2010-2019...

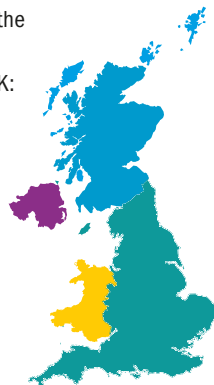
GVA

47%

Northern Irish PBI GVA rose by 47%.

This is a significantly higher growth rate than seen in the other UK nations, demonstrating the sector's transformative development across the decade to catch up with the rest of the UK:

- The GVA generated by English PBIs grew by 23%
- The GVA generated by Scottish PBIs grew by 0.5%
- The GVA generated by Welsh PBIs grew by 20%
- The GVA generated by Northern Irish PBIs grew by 47%



The greatest contributor to this strong development in Northern Ireland is the Physics Manufacturing sub-sector. The GVA generated by this sub-sector grew by 33.4% over the period, compared to 18.0% on average across the UK.

Number of enterprises

41%

The number of physics enterprises grew by 41%.

Turnover

27%

Northern Irish PBIs experienced a turnover growth of 27%, from £8bn in 2010. This is in line with the UK-wide PBI turnover growth rate (24%).



Labour productivity

21.3%

Labour productivity increased by 21.3% from £59,340 to £71,966.

Labour productivity growth was much higher in the PBI sector (21.3%) than in Northern Ireland as a whole (4.5%), showing the substantial development of the sector across the decade.

Employment

21%

Employment in the physics sector grew by 21%. This is higher than the UK PBI average of 13%, showing how the nation continued to catch up across the decade.



Compensation of employees

The total Northern Irish PBI compensation of employees (COE) bill grew by 44% across the decade, from £1,181bn to £1,699bn.

This was a higher growth rate compared to employment, meaning that average employee compensation increased by 19% (from £29,304 to £34,791).



Compared to other nations

- Average English COE/FTE increased from £36,103 to £41,990 (16% across the decade).
- Average Scottish COE/FTE increased from £43,000 to £47,000 (9% across the decade).
- Average Welsh COE/FTE increased from £27,711 to £36,089 (30% across the decade).
- Average Northern Irish COE/FTE increased from £29,304 to £34,791 (19% across the decade).



More information and the methodology

The Institute of Physics (IOP) worked with the Centre of Economic and Business Research (CEBR) to quantify the contribution of Physics-Based Industries (PBIs) between 2010-2019 across the Northern Irish economy. For the full findings and methodology, see <https://www.iop.org/sites/default/files/2022-01/Physics-and-the-Economy-Northern-Ireland.pdf>.

The Institute of Physics (IOP) is the professional body and learned society for physics in the UK and Ireland. It seeks to raise public awareness and understanding of physics, inspire people to develop their knowledge, understanding and enjoyment of physics and support the development of a diverse and inclusive physics community. As a charity, it has a mission to ensure that physics delivers on its exceptional potential to benefit society.

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