



# AWS Impact

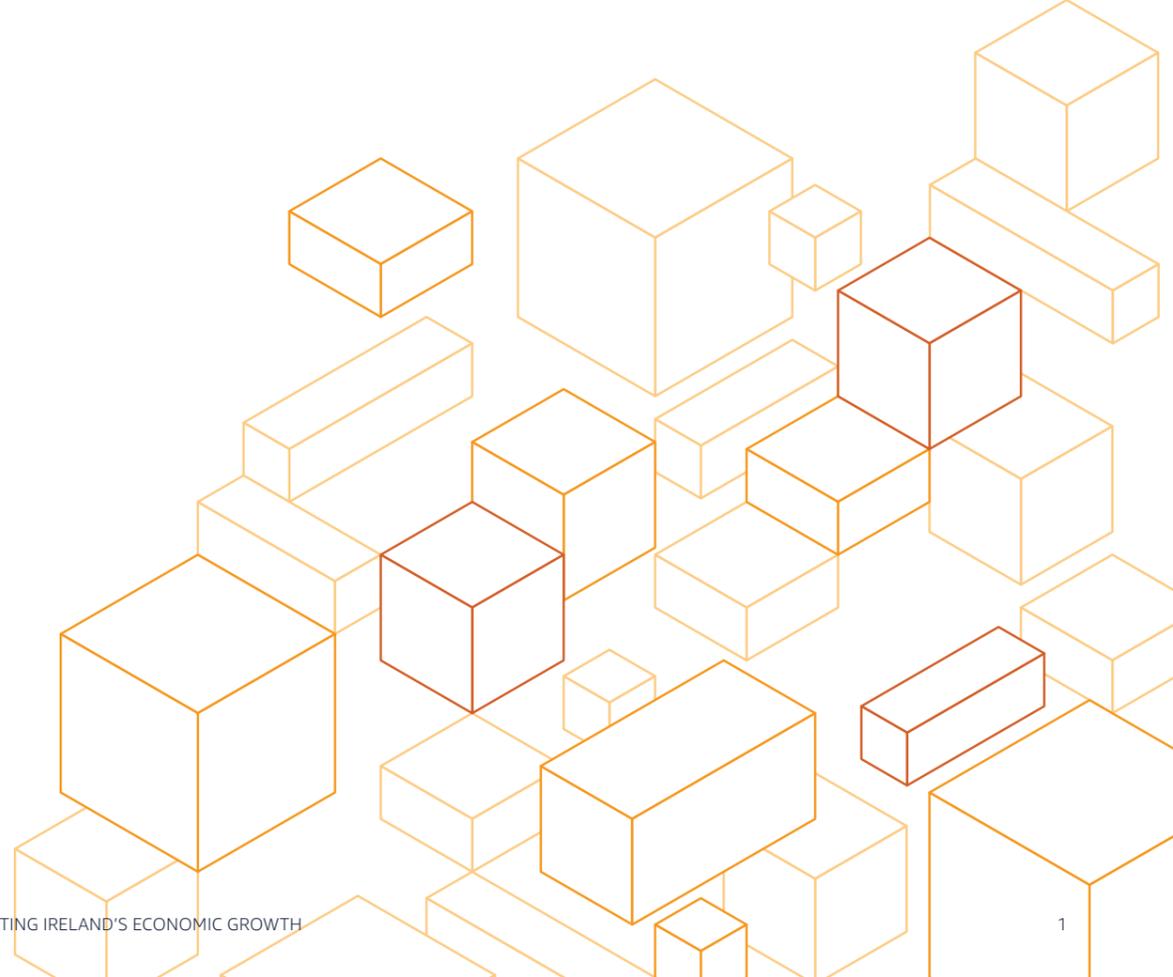
## Supporting Ireland's Economic Growth

AWS generates jobs and economic output, enables over 550 Irish enterprises and creates increased export opportunities for Irish businesses



# Contents

- Executive Summary .....2**
- Key Findings .....4**
- Indecon’s approach .....6**
- SECTION 1**
- AWS generating jobs, economic output, and R&D.....7**
- SECTION 2**
- AWS enabling over 550 Irish enterprises,  
local communities and skills development.....12**
- SECTION 3**
- AWS creating increased export opportunities  
for Irish contractors.....19**
- Our Sustainability Story .....24**



# Executive Summary



For over a decade, Amazon Web Services (AWS) has invested in developing data centres and services in Ireland. This report (**AWS Impact: Supporting Ireland's Economic Growth**) sets out the positive impact of this investment using an evidence-based study carried out by Indecon International Economic Consultants (Indecon).

The main findings of this analysis are that AWS's investments in the period **2011-2020** have delivered positive impact to Ireland in **three broad areas**:

## 1 Generating more jobs and growth in Ireland

Sustaining **8,700** jobs



Generating growth in economic output of **€1.45 billion** a year



Increasing economic output by almost **€7.5 billion**

Investing over **€4.4 billion** in direct capital & operational spend **2011-2020**



## 2 Strengthening the local supplier network

Enabling over **550** suppliers from major construction companies to local contractors to expand their operations, **enhance** their skills & **support** local communities



## 3 Creating increased export opportunities for Irish contractors

Irish contractors now export to **20 countries** worldwide



In 2020, AWS spent **€228 million** with Irish contractors on our data centres abroad

# Key Findings

The main findings of Indecon's analysis are that AWS's investments in the period 2011-2020 have delivered positive impact to Ireland in three key areas, they are: (1) generating more jobs and economic growth (2) supporting a large local supplier network and (3) increasing export opportunities for Irish suppliers. These findings are summarised below and outlined in detail later in this report.

## 1. AWS is generating more jobs and growth in Ireland

AWS opened its first infrastructure region in Ireland in 2007 and today AWS supports over **8,700** jobs across the Irish economy. This is made up of over 3,000 employees in AWS, nearly 4,000 people working for contractors and sub-suppliers and a further over 1,700 in induced employment from these activities.

AWS's operations in Ireland have resulted in an expanded economic output in the period 2011 to 2020 of almost **€7.5 billion**<sup>1</sup>. This includes over **€4.4 billion** in direct capital and operational spend.

AWS generated growth in economic output of an estimated **€1.45 billion** in 2020 and is forecast to exceed **€1.5 billion** each year in 2021, 2022 and 2023.

Since 2015, AWS has invested over **€100 million** in design engineering in Ireland, focused on ensuring that we run our infrastructure in the most sustainable way; and **€88 million** in R&D, equal to approximately 5% of all R&D spending by large companies in Ireland.

## 2. AWS's presence in Ireland has strengthened the local supplier network supporting over 550 Irish suppliers

AWS has generated business for an estimated over **550** Irish suppliers or sub-suppliers across the economy including major construction contractors, mechanical and electrical suppliers, professional services and a wide range of services provided by local businesses.

Many Irish companies, including Hanley Engineering, Collen Construction and Dannan Air are among the businesses that have grown alongside AWS in Ireland over the last decade.

The requirement to support AWS's rapid growth in Ireland has led to the development of enhanced technical skills and increased knowledge transfer in sub-supplier firms in areas such as engineering and electronics, helping Ireland to upskill its workforce and maintain its reputation as a global leader in digital services.

AWS has generated business for over **550** Irish suppliers and sub-suppliers across the economy.



<sup>1</sup>This figure accounts for our investments in capital and operational spend and does not include the additional benefits associated with Irish business and public sector leveraging AWS technologies.

## 3. AWS is creating increased export opportunities for expert Irish suppliers

The experience and knowledge Irish businesses have gained in supporting the development of AWS data centres has enhanced the reputation of these suppliers in overseas markets, and they are now exporting their expertise to AWS and other data centre operators in **20** countries around the world.

In the past five years (2015 to 2020) the value of contracts won by Irish firms in the construction and development of AWS data centres overseas has increased 14-fold from **€16 million** in 2015 to an estimated **€228 million** in 2020<sup>2</sup>.

### About AWS

Amazon Web Services (AWS), a subsidiary of Amazon.com is the world's most comprehensive and broadly adopted cloud platform. Millions of customers - including the fastest-growing start-ups, largest enterprises, and leading government agencies - are using AWS to lower costs, become more agile, and innovate faster.

AWS provides cloud technology to a range of start-ups such as Airbnb, Intercom and Swrve, telehealth providers such as MyClinic365, as well as established businesses like Ryanair, Bank of Ireland and Netflix. In addition, Government agencies such as Ordnance Survey Ireland (OSI) and the European Commission as well as not-for-profits and universities are using AWS technologies to reduce costs, innovate, grow and scale their operations.

Cloud computing allows organisations to access technology services, such as computing power, storage, and databases as needed, instead of owning and maintaining their own physical data centers and servers.

In addition to over 3,100 Amazon and AWS employees in Dublin, Amazon employs over 1,000 in Cork and hundreds who work remotely across counties including Galway, Cork, Limerick, Tipperary, Waterford and Wexford.

For over a decade, AWS has invested in developing data centres and services in Ireland. This report (AWS Impact: Supporting Ireland's Economic Growth) sets out the positive impact of this investment.

Millions of customers - including the fastest-growing startups, largest enterprises, and leading government agencies - are using AWS to lower costs, become more agile, and innovate faster.



<sup>2</sup>This figure relates only to contracts won with AWS and does not include the value of contracts won by Irish firms overseas with companies other than AWS.

# Indecon's approach

The information contained in this report is taken from an evidence-based analysis carried out by Indecon International Economic Consultants (Indecon), a leading firm of independent research economists.

Drawing on well-established economic modelling, Indecon calculated the estimated direct, indirect and induced effects of AWS investment in Ireland.

## Direct effects

This includes the economic output generated by AWS itself, through its purchases of goods and services (including labour) from the Irish economy. For example, the wages paid by AWS to Irish employees is a direct impact, as well as spending by AWS on other Irish suppliers of services and products.

## Indirect effects

The indirect impacts arise through AWS's purchases of goods and services from other businesses and sectors in the economy to support its activities in Ireland. These purchases generate income for the supplying enterprises/industries, which they, in turn, spend on their own purchases from suppliers. For example, AWS's expenditure on Irish construction firms will lead to an increase in output from the suppliers to these construction firms.

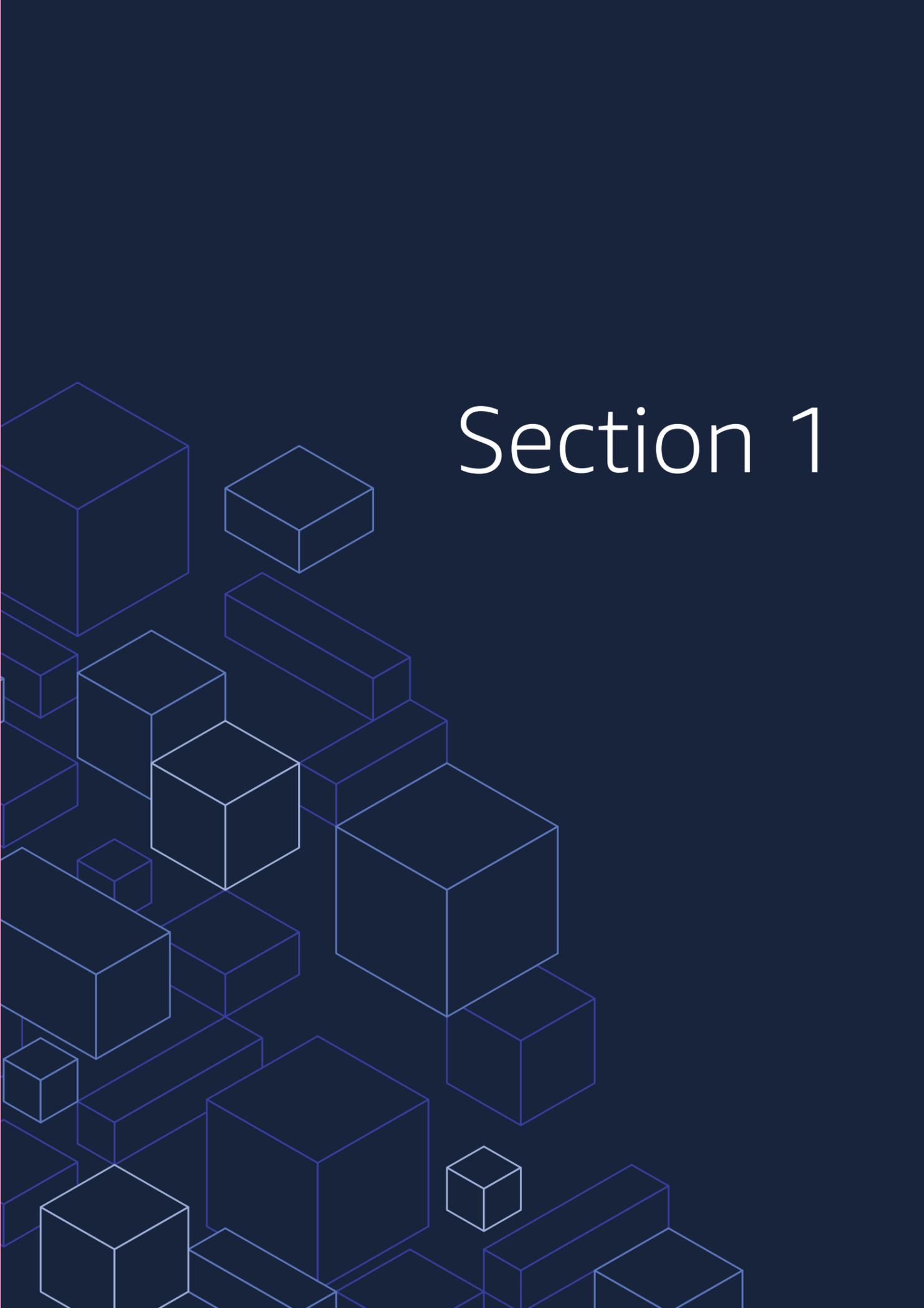
## Induced effects

As a result of the direct and indirect effects the level of household income throughout the economy will increase as a result of increased employment. A proportion of this increased income will be re-spent on final products.

Indecon's empirical evidence has examined data from a wide range of sources to present the most accurate representation of the effects of AWS investments in the Irish economy. These included:

- Central Statistics Office data
- Detailed analysis of AWS internal data on investments, operating expenditures, and employment; and
- Results of an Indecon survey of major construction and sub-supplier enterprises

# Section 1

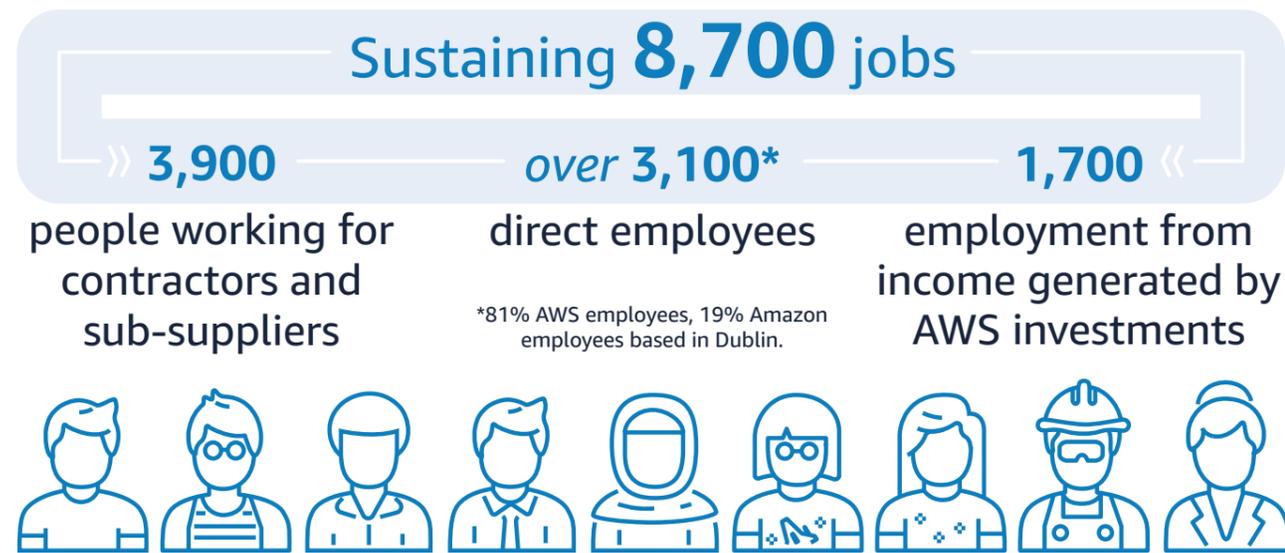


# AWS generating jobs, economic output, and R&D

## Supporting more than 8,700 jobs

To provide an overall estimate of the impact of AWS's data centres on employment in Ireland, Indecon used macroeconomic modelling and input-output analysis to estimate the direct, indirect and induced effects on employment.

Indecon's modelling found that AWS investment is:

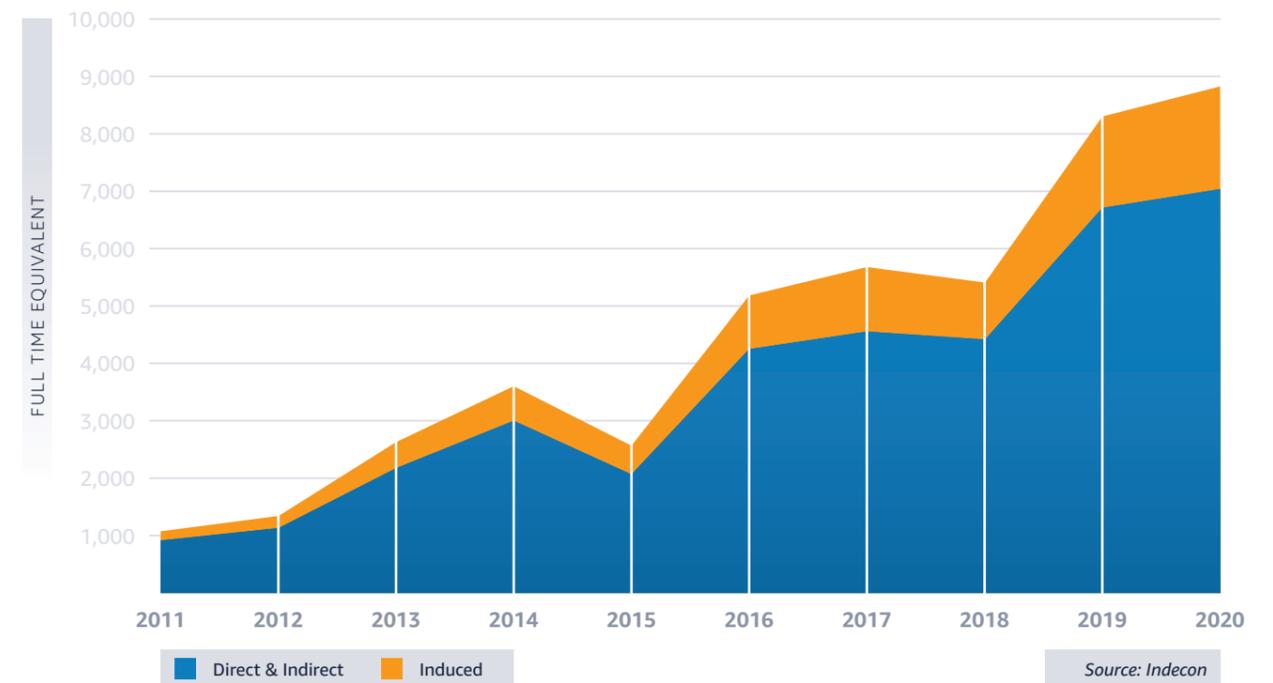


Based on IDA figures, **AWS has been in the top ten largest job creators in the IDA client base in each of the past four years.** In 2019 it ranked third nationally among this group.

**Martin Shanahan, CEO, IDA Ireland**

*"Recognising the potential of the cloud, IDA Ireland worked hard over the past 20 years to win some of the initial European data centre investments from AWS and other leading cloud players. **Cloud-enabled digital services are now pervading every industry and Ireland's reputation in this space is enabling investment across the portfolio.** The data centre infrastructure underlying the cloud also makes a broader economic contribution to the country. Amazon/AWS announcements in each of 2018 and 2020 of additional jobs bringing the Irish workforce to 5,000 in the near term are a clear example of this."*

## Impact of AWS's investment and expenditure on employment in Ireland

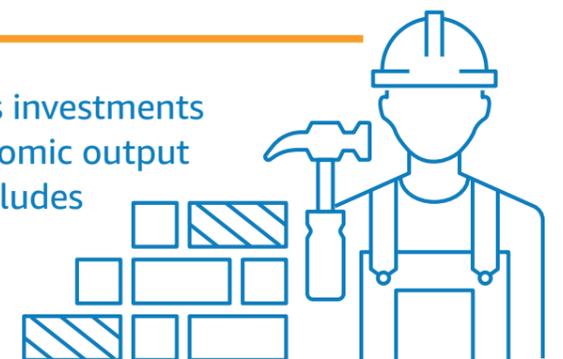


## Generating economic output of almost €7.5 billion since 2011

In addition to supporting jobs, AWS investments have helped the Irish economy to grow. AWS's spending on goods and services has a positive impact on the domestic economy creating new opportunities and prosperity across many businesses and communities.

AWS suppliers are located in all regions of Ireland, therefore the benefits of working with AWS are felt in communities nationwide. For example an AWS supplier working on construction in Dublin and Drogheda is employing staff in the midlands and buying goods, materials and services locally. In this way, AWS spending has a significant multiplier effect.

Indecon's modelling estimates that AWS's investments in Ireland have resulted in increased economic output of almost €7.5 billion since 2011. This includes over €4.4 billion in direct capital & operational spend.

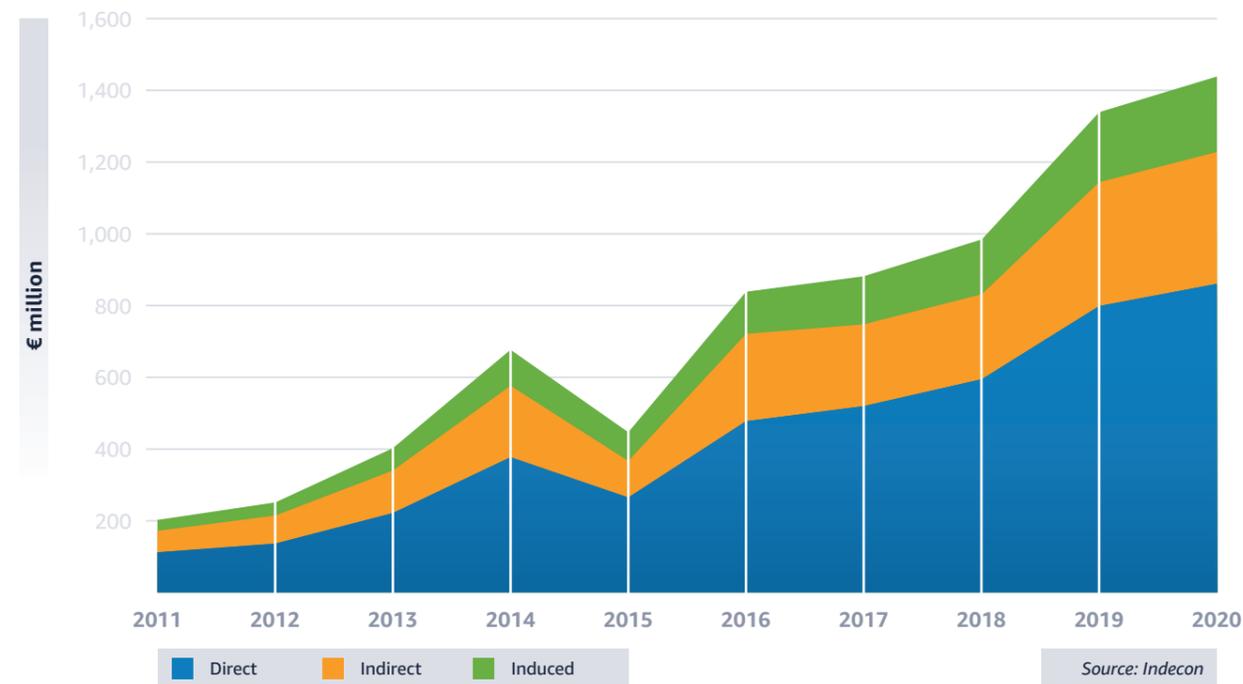


### Now generating an estimated €1.45 billion a year

In 2020, AWS's investment in the Irish economy including direct, indirect and induced impacts is expected to produce an estimated €1.45 billion in additional economic output. This figure comprises over €850 million relating to direct effects; over €360 million relating to indirect effects and, the remaining over €200 million relating to induced effects.

Additionally, forecasted expenditure figures suggest the output effects will exceed approximately €1.5 billion each year in 2021, 2022 and 2023.

### Impact of AWS investment and expenditure on output in Ireland (in € millions)



### Investing in design engineering

At AWS, we are committed to running our infrastructure in the most sustainable way and we consistently focus on energy efficiency and continuous innovation in our data centres to reduce energy and water usage.

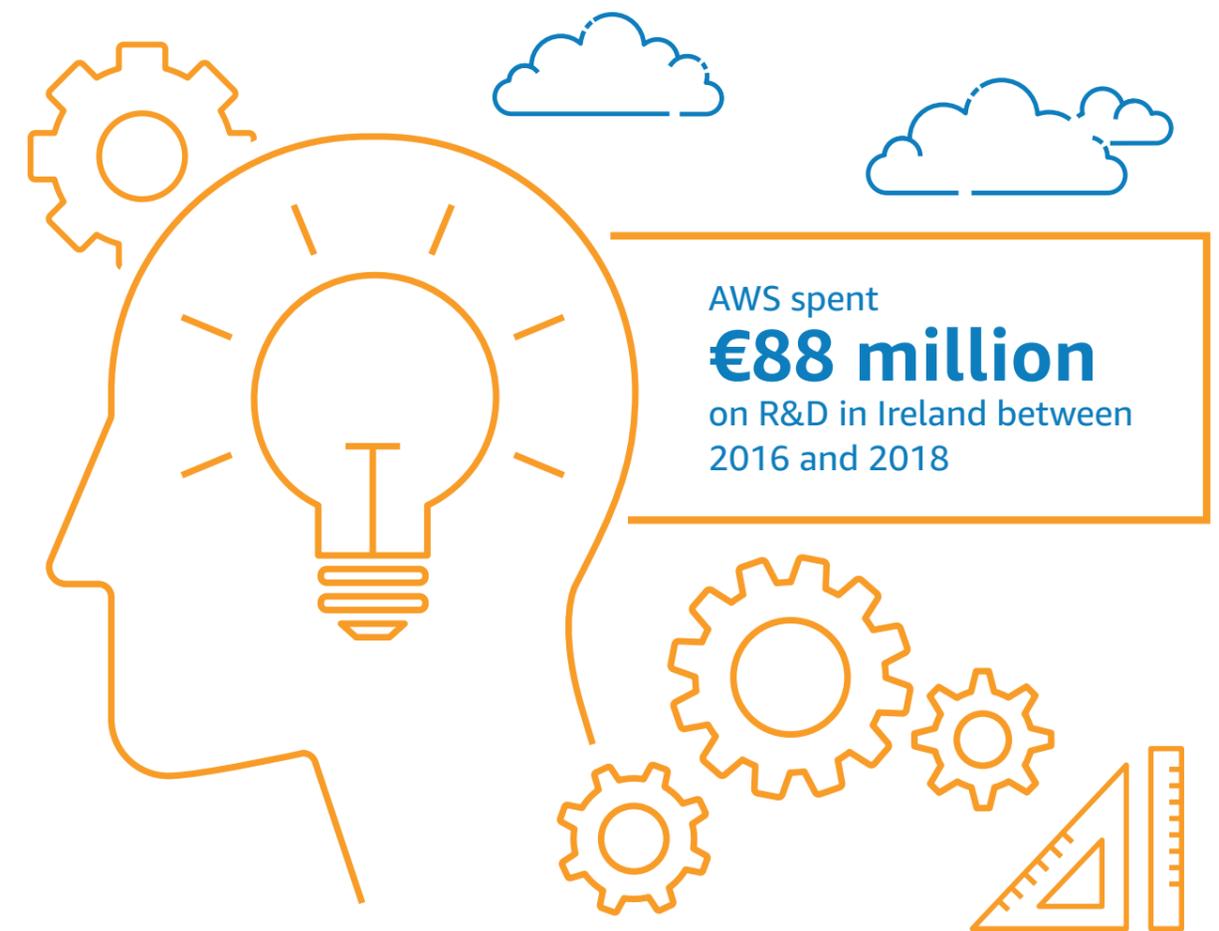
Indecon found that over the four years to 2019, AWS spent almost €71 million on design engineering for its data centres. An additional more than €30 million was spent in 2020, bringing the total over the past five years to over €100 million.

A significant driver of this investment is AWS's commitment to advanced designs and cooling systems which mean AWS data centres are more energy efficient than using traditional on-premises data centres. A recent report by international research company 451 found that AWS can help customers reduce the carbon footprint of their IT operations by up to 88%. Design engineering initiated in Ireland is often replicated in AWS data centres built abroad.

### Investing in R&D

Indecon found that AWS spent €88 million on R&D in Ireland between 2016 and 2018, equal to approximately 5% of all R&D spending by large companies (250+ employees). That figure is set to continue to grow as AWS builds its innovation capacity in the country, with the level of 2019 expenditure almost 16 times the amount spent in 2016.

R&D expenditure typically covers investment in technologies that enable AWS customers to rapidly innovate and grow. One example of a critical R&D project carried out by Dublin-based staff is the delivery of CloudWatch, an integral service that ensures effective and secure cloud-operations for AWS global customers, including the BBC, Panasonic and JustEat. CloudWatch was built in and continues to be maintained in Dublin.



# Section 2

## AWS enabling over 550 Irish enterprises, local communities and skills development

AWS's investments in Ireland have resulted in engagement with hundreds of Irish construction contractors, mechanical and electrical suppliers, professional services firms, and a wide range of logistics services provided by local enterprises.

Indecon's survey found that an estimated over 550 sub-suppliers have worked with firms supplying services to AWS, reflecting the wider impact on domestic enterprises.

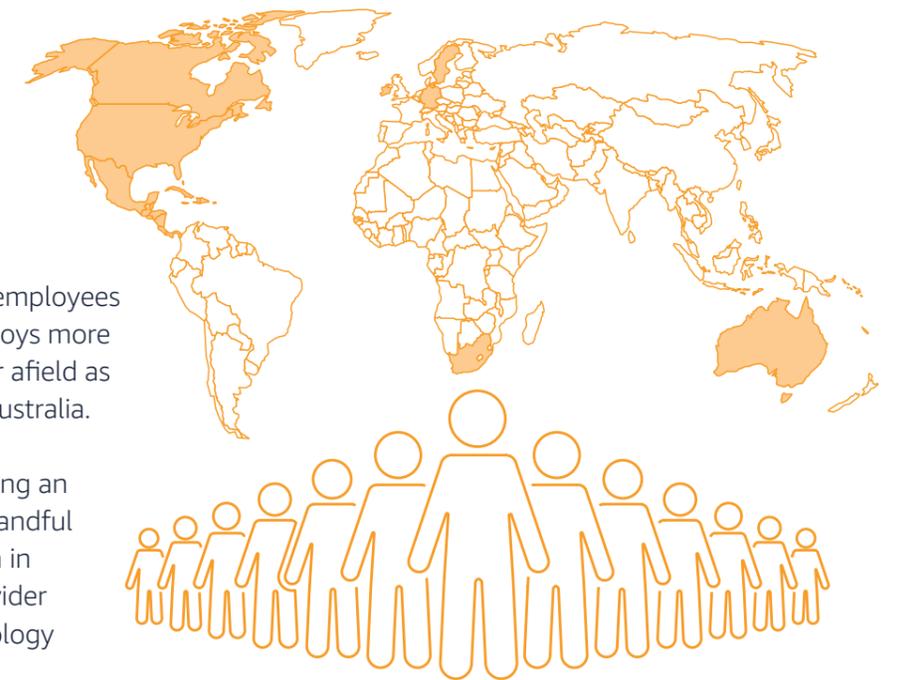
This relationship with AWS has brought a range of benefits to these Irish businesses and their surrounding communities, including opportunities to expand and scale, enhancing their technical skills and talent, supporting specialised clusters of SMEs and benefitting the communities where AWS facilities are located.



### The Hanley Energy Story

In 2009, Hanley Energy had three employees in Ireland. Today the business employs more than 260 people, with offices as far afield as North America, South Africa, and Australia.

The company has evolved from being an electrical engineering firm with a handful of staff in the middle of a recession in Ireland, to a specialist systems provider offering highly sought-after technology and expertise the world over.

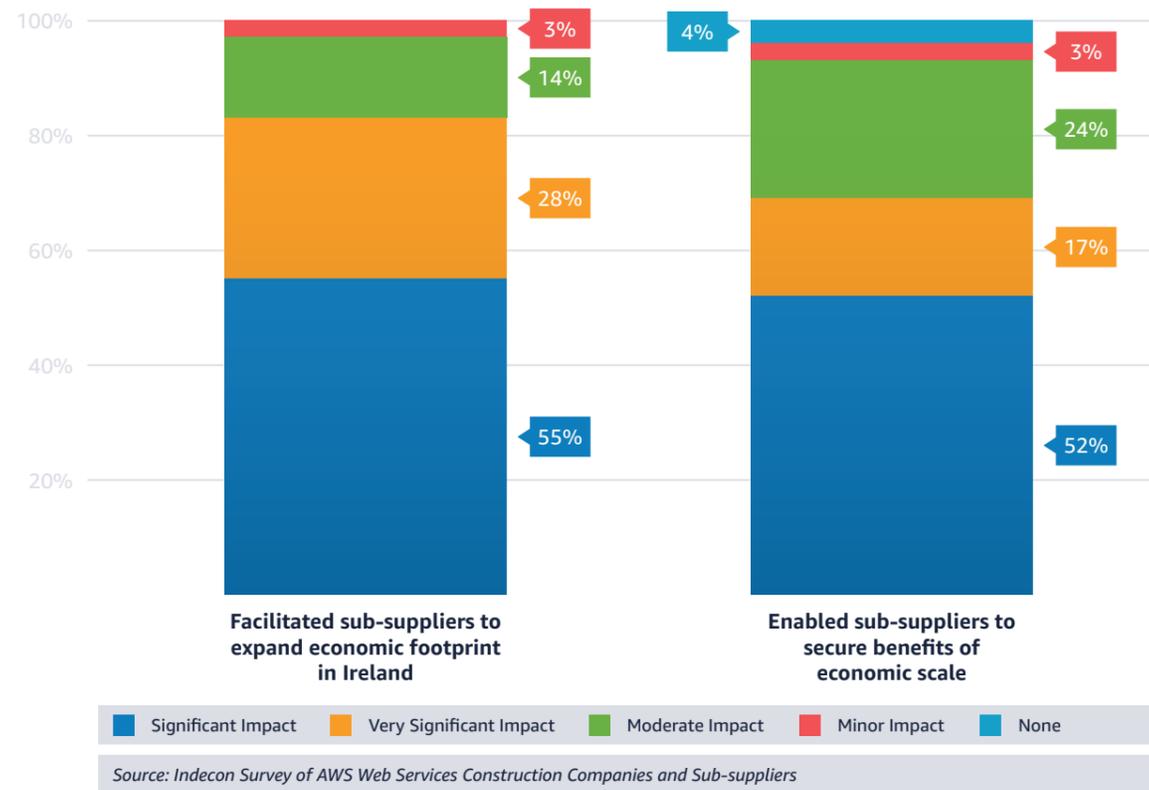


### Dennis Nordon, Managing Director, Hanley Energy

*"Much of our growth can be credited to a single technical solution that we developed with AWS in Ireland. We partnered with AWS to create the concept and prototype in 2012, then AWS deployed it in its data centres worldwide by the end of 2014. Ireland was in the depths of a recession when AWS approached us. We've benefitted hugely by working with the company. That's true for other businesses in the area too. **AWS recognised the skills and capabilities on offer in Ireland and invested in the country at a time when other businesses were looking elsewhere.**"*

## Impact of AWS data centres in facilitating sub-suppliers to expand their economic footprint and to secure benefits of economies of scale

83% of the companies that participated in the survey said that AWS had a significant or very significant impact in facilitating sub-suppliers to expand their economic footprint in Ireland. Nearly 70% said that AWS enabled sub-suppliers to secure benefits of economies of scale.

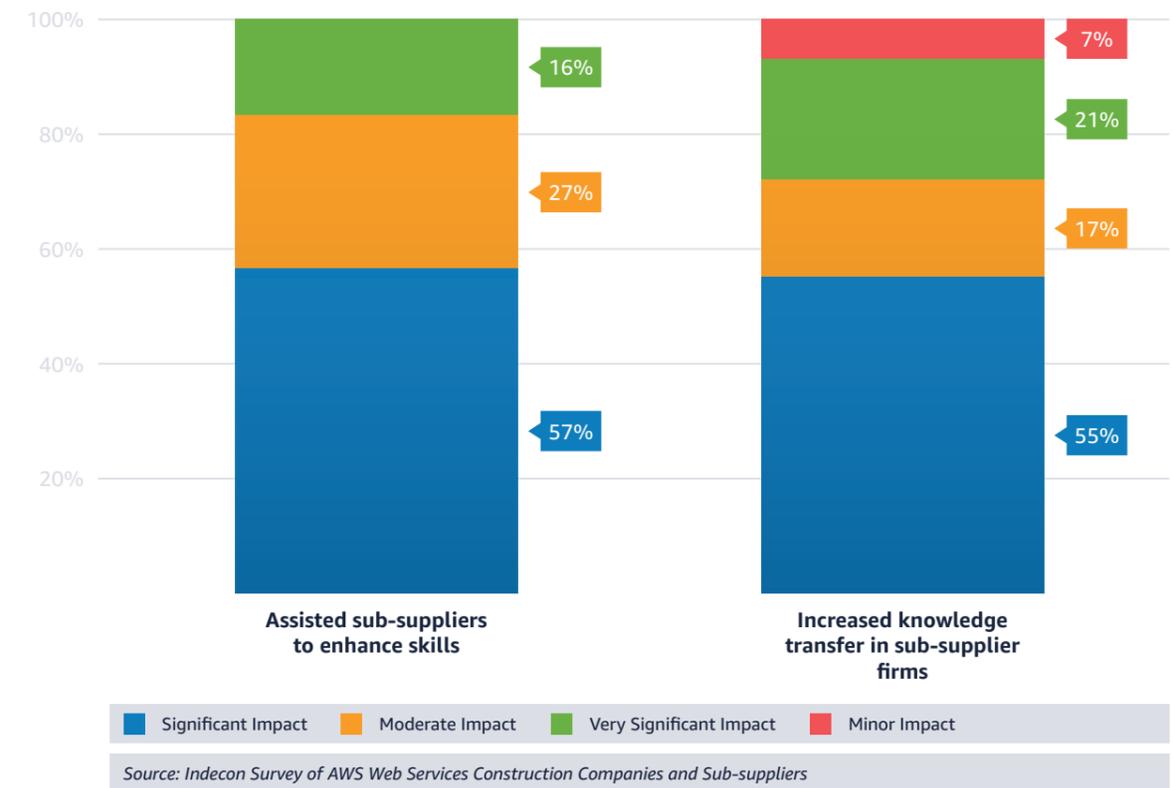


## Enhancing skills in suppliers, facilitating apprenticeships, developing talent

Indecon also found that all respondents agreed that AWS had helped to enhance skills among their sub-suppliers, especially in areas such as engineering and electronics.

Indeed, almost three-quarters said the effect was either very significant or significant. They were also of the opinion that there was an impact on increasing knowledge transfer in sub-supplier firms, underscoring the wider way in which the operation of Irish data centres can help to raise skills in associated sectors. Over half of survey respondents agreed that their business with AWS had helped their company to facilitate additional apprenticeship opportunities.

## Impact of AWS data centres in assisting sub-suppliers to enhance skills and increase knowledge transfer in other sub-supplier firms



Tom Parlon, CEO, Construction Industry Federation

*"The construction industry's competence has long been a key attraction to foreign direct investment. Working for and with companies like AWS has been transformative technologically, culturally and reputationally for our industry; and has fuelled an export boom for construction companies. The skills we have acquired in the past decade mean we are recognised as global leaders in data centre development with exports growing by nearly 10% for the past two years."*

## Developing local talent

AWS seeks talent in the communities where we operate, and has developed bursary programmes, in partnership with Technological University Dublin (TU Dublin) in Tallaght and in Blanchardstown, which enable students to learn the necessary skills to train for a career working in data centres. In 2020 AWS was awarded the Technology Ireland industry award in the category *Excellence in Talent Development* for the AWS Data Centre Technician and Data Centre Engineering Operations courses.

The courses train students to FETAC Level 6 in installation, configuration, maintenance, repair, and security of a data centre's hardware and networking systems.

Participants learn all the skills they will need to begin a career in data centres and cloud computing, and the course offers the chance to put those skills to the test with paid work placements on offer with AWS. In this way local people are able to upskill and secure invaluable hands on experience - and in some cases full time employment - that will challenge them to achieve more in a new career. Following two successful cohorts from the programmes, over 70% of graduates from the Data Centre Technician Programme have started exciting permanent roles in AWS and other cloud computing companies.

### Thomas Stone, Principal, TU Dublin Tallaght Campus

*"Working with a global cloud leader such as AWS will give students in the Tallaght community, and across Dublin, a superb opportunity to gain 21st century knowledge, the skills needed to secure in-demand jobs, and build a career path for the future. **We couldn't be more delighted to have the leadership and expertise of AWS to help us create this programme, which shows how academia and industry working together can create opportunities for local communities.**"*



## Supporting Irish start-ups

In 2020, AWS and Enterprise Ireland commenced collaboration to provide entrepreneurs and early stage companies access to a range of resources, benefits and technologies to help them innovate and grow. The AWS Activate programme has been made available to Enterprise Ireland start-up companies, including New Frontiers Phase II programme participants and High Potential Start-Ups (HPSUs) with the aim of helping them internationalise faster. Since the programme launched in January 2020, Enterprise Ireland HPSUs have availed of €5.4 million in AWS credits through AWS Activate.

Our Tandem is an Enterprise Ireland HPSU client that has benefited from AWS Activate. Using AWS, the company built a continuous feedback and coaching performance management tool that tracks and collates development analytics to accelerate performance and increase employee engagement.

## Our Tandem

### Aisling Teillard, CEO and Founder, Our Tandem

*"We were delighted to avail of the **AWS Activate programme that has brought our company significant cost savings through our grant of free AWS credits.** This has made a real difference to our technology team. The AWS credits combined with access to developer support, architectural guidance and the expertise of the AWS team during the current climate is a great support tool as we work remotely."*

## Promoting specialised clusters

A cluster is where a group of suppliers and sub-suppliers come together to provide a suite of specialist supports to a data centre operator. Survey respondents agreed that AWS's investment has facilitated the development of a specialised cluster of sub-suppliers to the Irish data centre industry. Some 86% of respondents rated the impact as either very significant or significant.

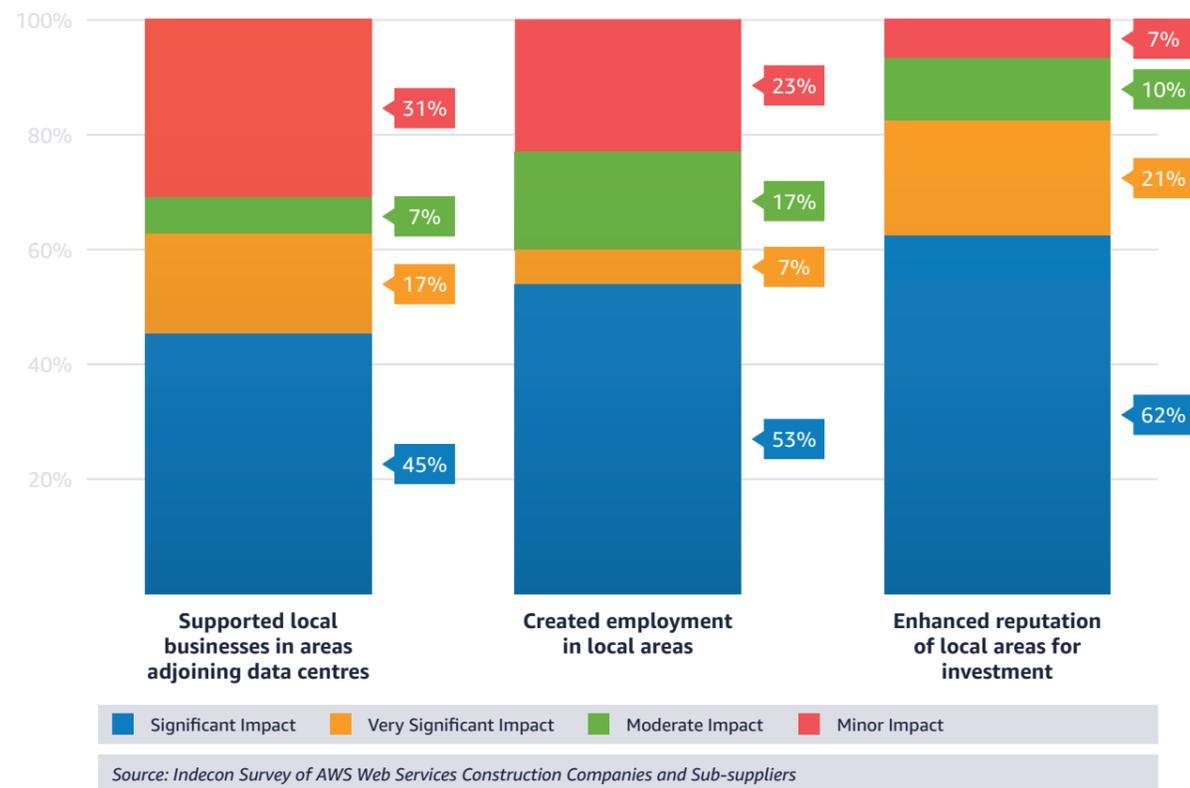
For example, a direct AWS supplier based in Meath manufactures and provides electrical control panels to AWS data centres. To build the panels the supplier sources the mild steel enclosure from a specialist steel fabricator in Dundalk, Co Louth. The specialist steel fabricator sources components such as mild steel and powder paint from other companies in their region. Additional components needed, such as electrical components and shipping crates, are all sourced from other Irish sub-suppliers. This example demonstrates the knock on effect to multiple sub-suppliers as a result of one product being used in AWS data centres.



## AWS benefitting communities

Investment also brings benefits to local communities as more spending takes place across a variety of services and amenities. Indecon research found that 62% of respondents thought the effect on businesses in areas adjoining data centres was either very significant or significant, with 60% similarly confident of the effect in boosting local employment. Some 83% also agreed there was a very significant or significant impact on enhancing the reputation of local communities for investment.

## Impact of AWS data centres on local communities



## Alan Dunne, Managing Director, Celtic Contractors

"AWS investment in our community has been hugely beneficial for local businesses like Celtic Contractors. **AWS construction sites produce a significant economic benefit to the locality - newsagents, hardware stores etc - as well as providing sponsorship and donations to local communities, which is a great benefit to areas that did not see building works on such a scale until AWS started developing. Supporting the local economy by engaging local suppliers is very valuable to SMEs in the area.**"

# Section 3

# AWS creating increased export opportunities for Irish contractors

## Facilitating export growth

Indecon's survey found a positive impact of AWS's investments on the ability of the supplier base in Ireland to specialise and reach the scale required to open up significant export opportunities. Suppliers, such as Hanley Energy, Colleen Construction and Dannan Air, are now exporting to 20 markets worldwide. These include major European markets like the UK, Germany and the Netherlands as well as projects in Japan and Australia.



**Julie Sinnamon, Chief Executive, Enterprise Ireland**

*"The growth of the data centre industry in Ireland has seen the emergence of a number of expert technical firms across engineering, manufacturing, logistics and construction. These firms are now realising their global ambition and exporting around the world. Enterprise Ireland's Irish Advantage programme promotes the unequalled reputation, from design to engineering and electrical services, that Irish companies have earned delivering large, complex projects internationally. That is something we should be proud of."*



## The Colleen Story

Colleen Construction is a family-owned business established in 1810 with a strong reputation for building quality and excellence. The company has successfully tendered for a range of clients including large multi-national corporations, private companies, local authorities and state authorities.

Today Colleen Construction has 350 employees across Sweden, Germany and Ireland.



**Tommy Drumm, Managing Director, Colleen Construction**

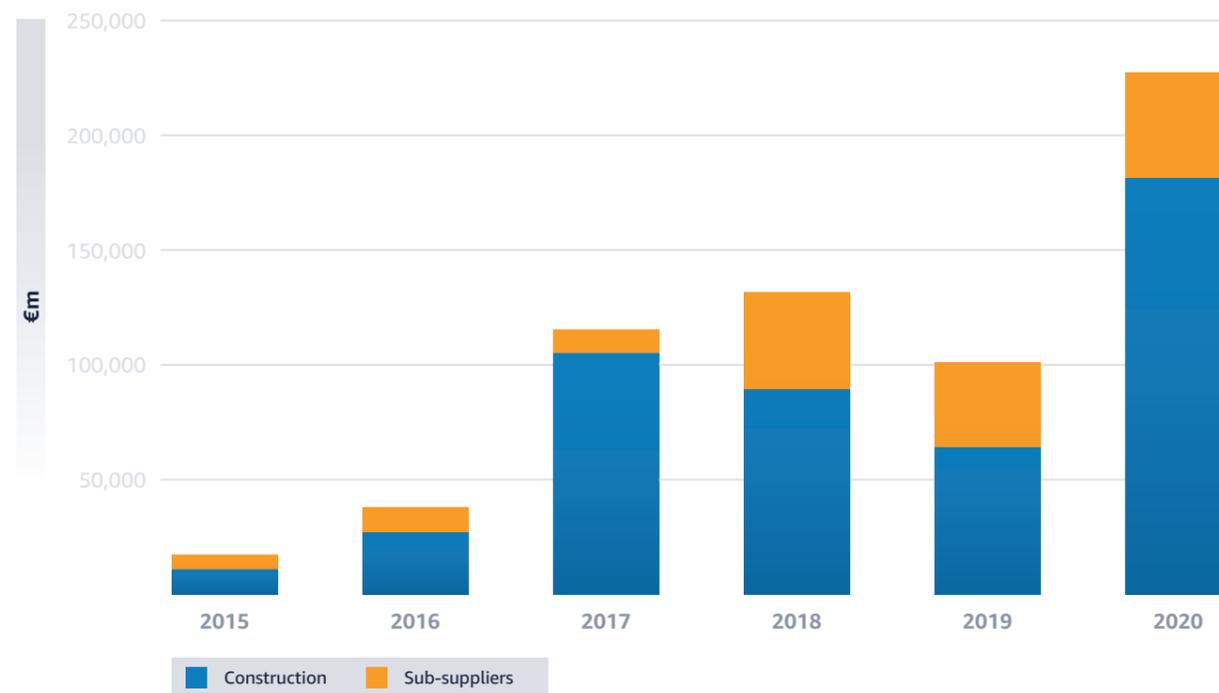
*"Our growth is credited entirely to our work with AWS data centres. Working with AWS makes it easier for us to mobilise within a new market - they help us with local knowledge, research and supporting infrastructure."*

***A company like AWS at the leading edge of innovation is invaluable to Ireland as it gives us an opportunity to raise the bar on our capabilities nationally, and then we keep learning as we expand and travel further afield."***

## Overseas AWS contracts

Working with AWS as its investments in Ireland grew, many Irish companies built specialist expertise and grew in partnership with the company as it developed operations around the world. Now Irish firms are leaders in providing materials and services to data centres globally. At AWS, this is evidenced by a big increase in the export value of contracts over the last five years with Irish firms involved in our data centres outside of Ireland. The value of these contracts increased 14-fold over the period, rising from €16 million in 2015 to an estimated €228 million in 2020.

### Export Value of Contracts on Overseas AWS data centres (in € millions)

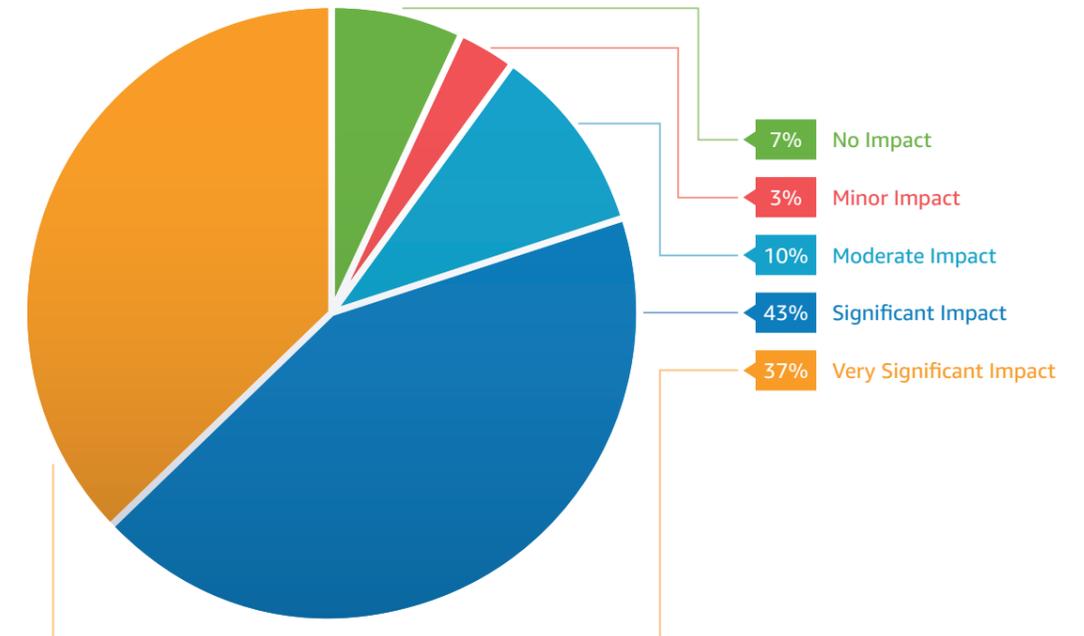


Source: Indecon Survey of Amazon Web Services Construction Companies and Sub-suppliers

In the past five years the value of contracts won by Irish firms in the construction and development of AWS data centres overseas has increased 14-fold from €16m in 2015 to an estimated €228m in 2020.

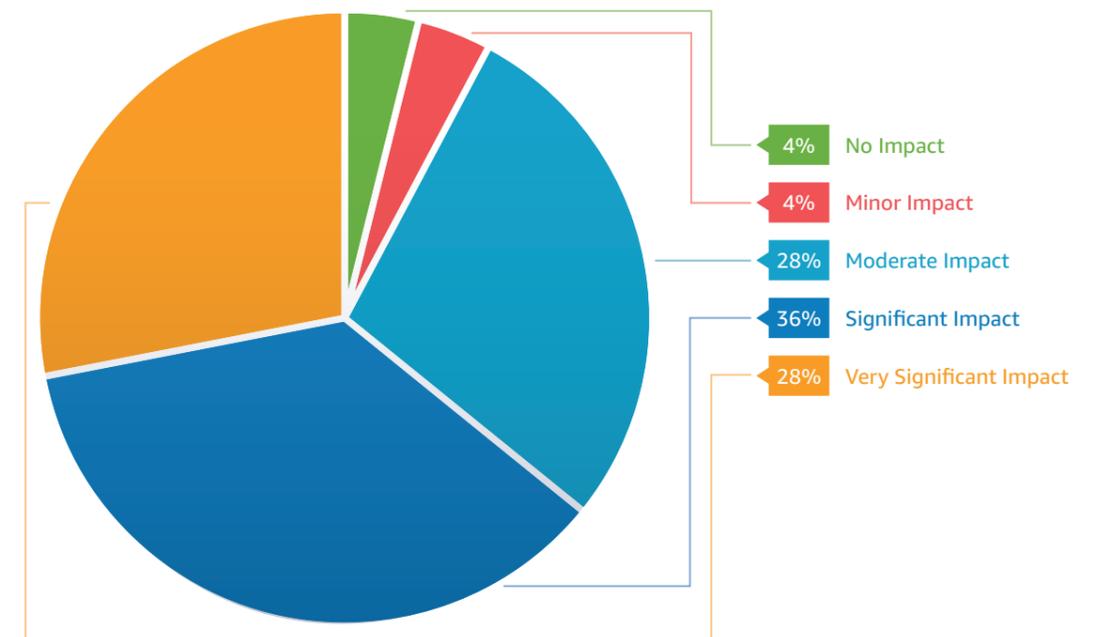
## Improving market reputation

While there are obvious direct effects of AWS's investment in Ireland, there are important indirect effects for suppliers too. For example, 80% of survey respondents agreed there was a very significant or significant effect on improving their market reputation.



## Leading to export opportunities

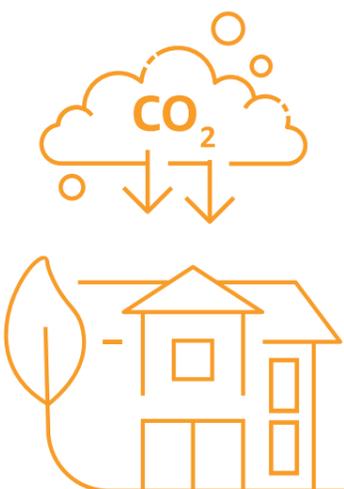
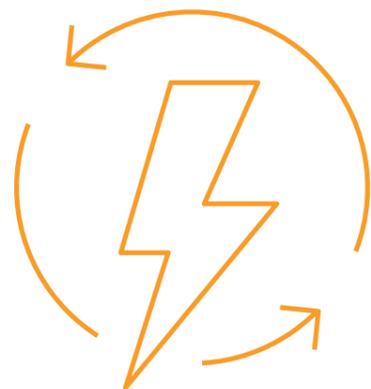
Two-thirds of surveyed firms agree that AWS data centres have had either a very significant or significant impact on the facilitation of exports.



# Our Sustainability Story

Our commitment to growing and thriving in Ireland goes hand in hand with our commitment to sustainability. In 2019, Amazon co-founded The Climate Pledge, a commitment to be net zero carbon across our business by 2040, 10 years ahead of the Paris Agreement.

We are on a path to powering our operations with **100% renewable energy by 2025**, 5 years ahead of the initial 2030 target.



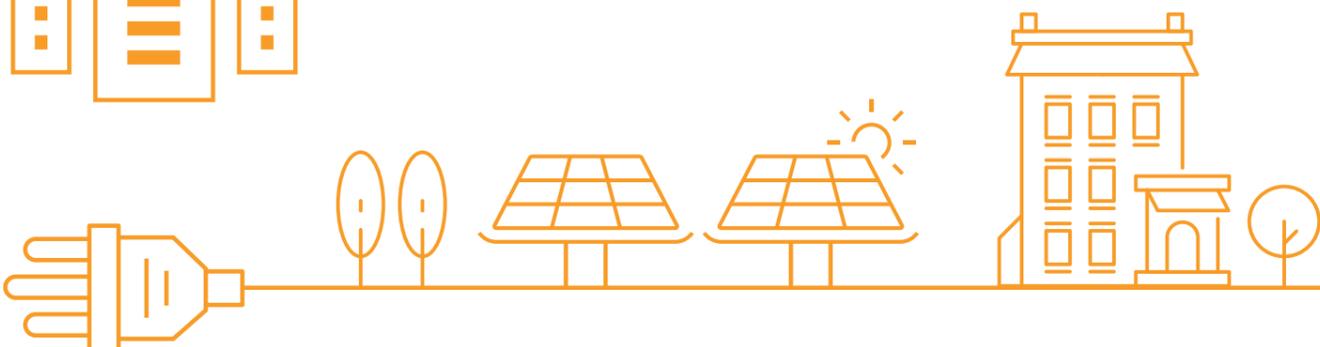
AWS was the first organisation in Ireland to sign unsubsidised Corporate Power Purchase Agreements (CPPAs). We announced two renewable energy projects in 2019 in Donegal and Cork, and in 2020 announced a third project in Galway.

In total, these three projects are projected to add **229 MW of renewable energy** to the Irish grid each year, **reducing carbon emissions by 366,000 tonnes of CO<sub>2</sub>** annually, and producing enough renewable energy to power **185,000 Irish homes**, per annum. These three Amazon renewable projects will help Ireland meet its 2030 renewable energy targets.

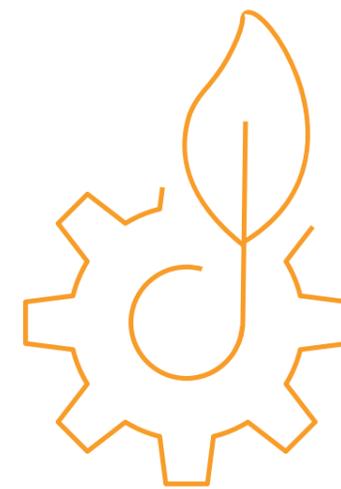
**Once all projects are operational, we will be the largest single corporate buyer of renewable energy in the country.**



AWS is also supporting the sustainability efforts of communities in Ireland. One way we are doing this is by providing excess heat from our data centres in Tallaght, South Dublin. The new District Heating Scheme will recycle heat from a custom-built solution that provides heat from the recently-completed AWS data centre to public sector, residential, and commercial customers.



The system will initially **heat 47,000 m<sup>2</sup>** of public sector buildings – an area almost **ten times the size of the city's Croke Park stadium** – as well as 3,000m<sup>2</sup> of commercial space and 135 affordable rental apartments. This is projected to save **1,500 tonnes** of carbon per annum during the first phase of the Tallaght District Heating Scheme, the equivalent of a **60%** reduction in carbon emissions.



Customers in Ireland, and around the world, are also able to support their own goals to become sustainable by moving to the cloud. In fact, the results of a recent study of US enterprise data centres by 451 research found AWS data centres to be **3.6 times more energy efficient** than the traditional alternative and achieved an **88% reduction in carbon footprint** for workloads that moved from on-premises data centres to AWS, helping our customers to become greener in the cloud.

In addition, AWS customers utilise our services to make progress on their broader sustainability goals, from smart agriculture to optimising manufacturing processes.

Amazon has built a significant presence in Ireland and we are proud to contribute to Ireland's strong international reputation as a global technology leader. We are even prouder to be contributing to help Ireland meet its renewable energy targets, while working towards **our commitment to be net zero carbon by 2040.**





