Data centers responsible for Climate Change

By Group 5

-Calvin Lobo

-Shreyasi Kendurkar

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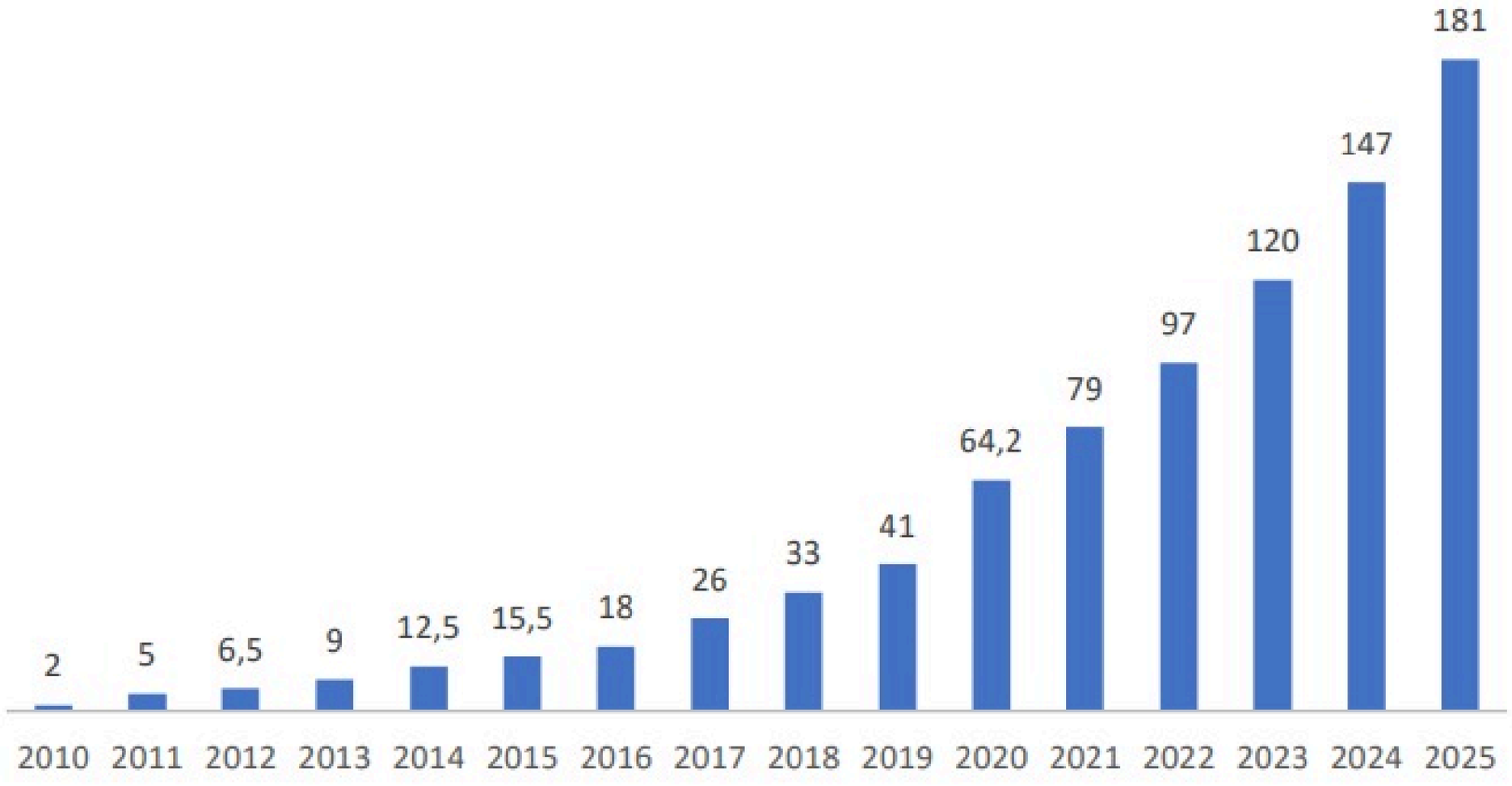
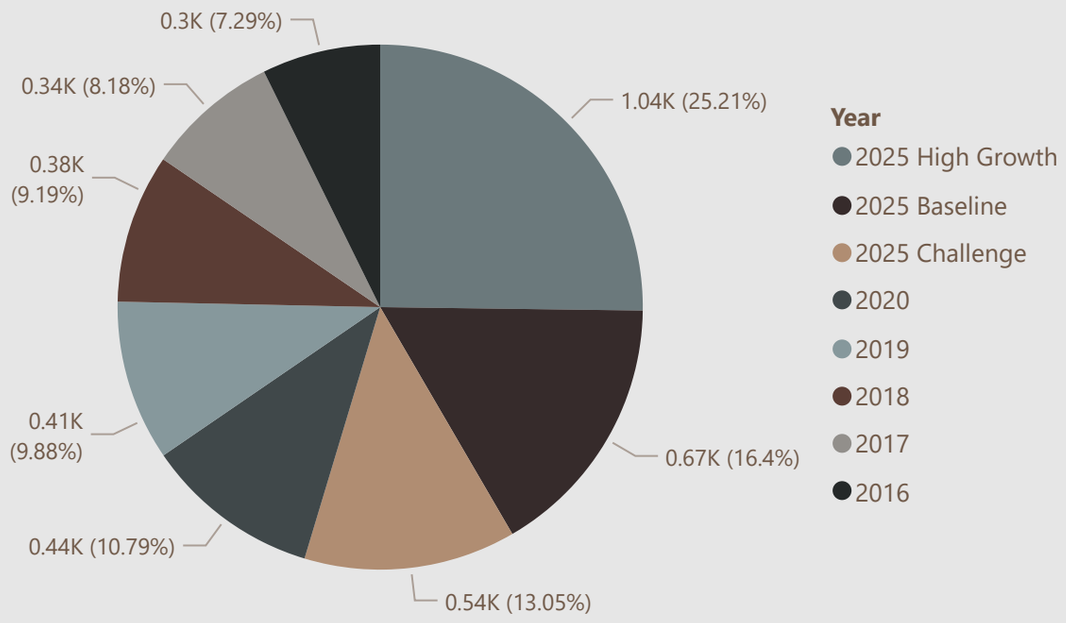
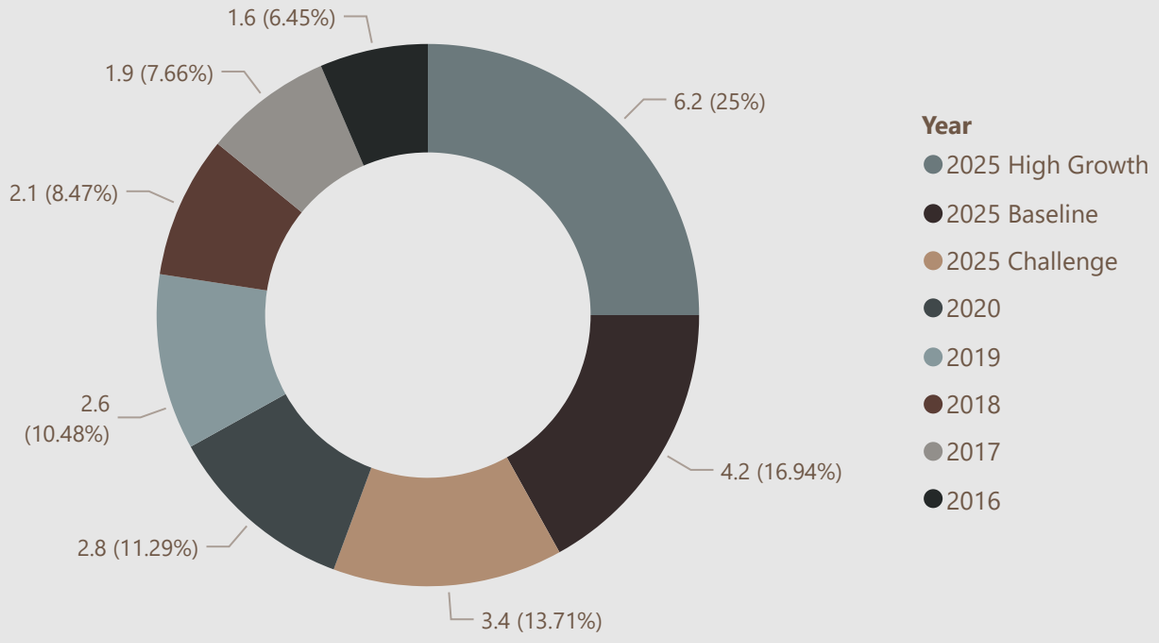


Volume of data created in the world in Zettabytes. Data obtained in: (Statista Research Department 2022)

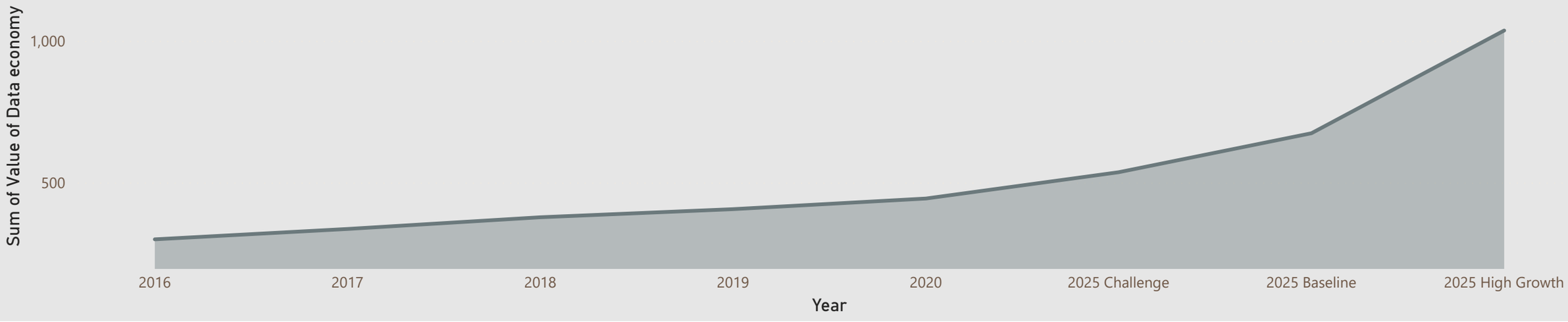
Sum of Value of Data economy by Year



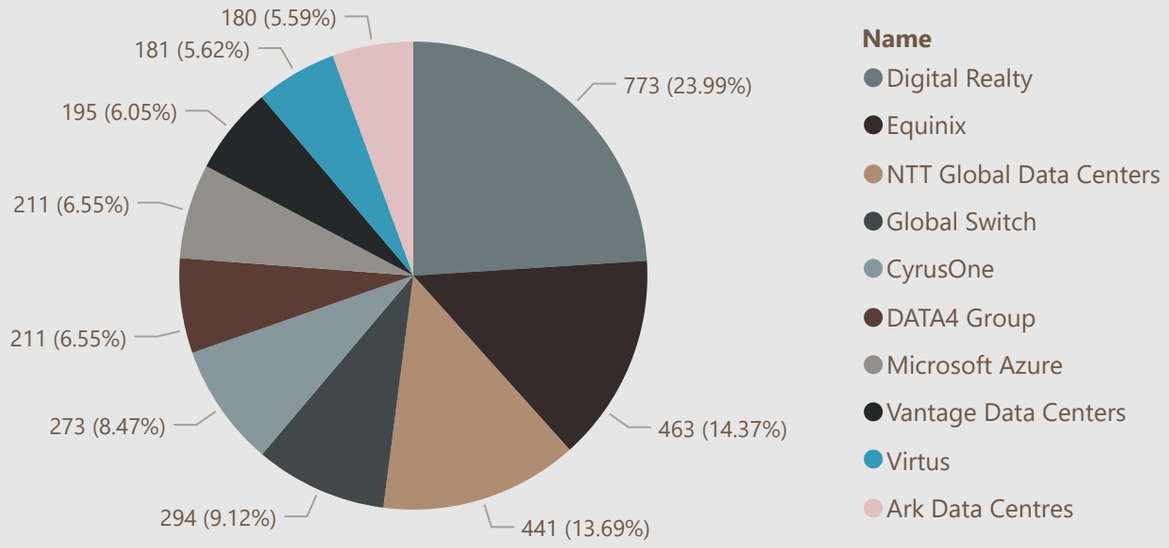
Sum of Data economy's impact on GDP in EU and UK 2018-2025 (in percentage) by Year



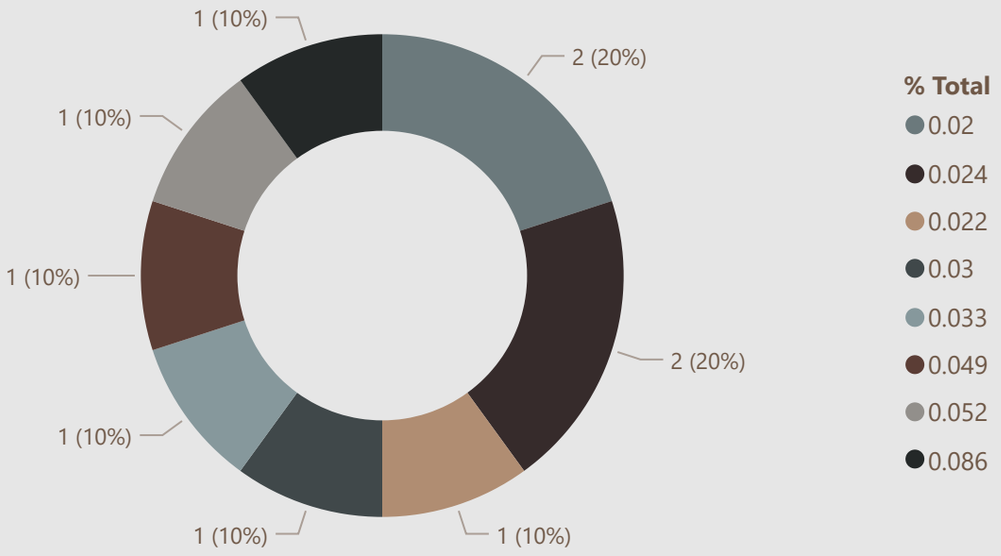
Sum of Value of Data economy by Year



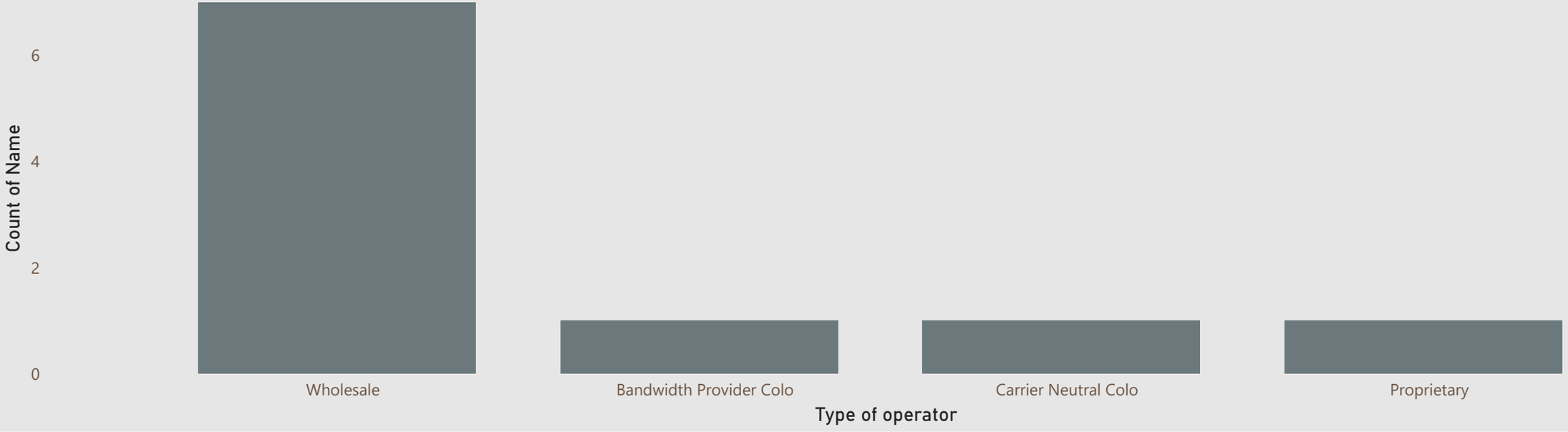
Sum of Power capacity MW by Name

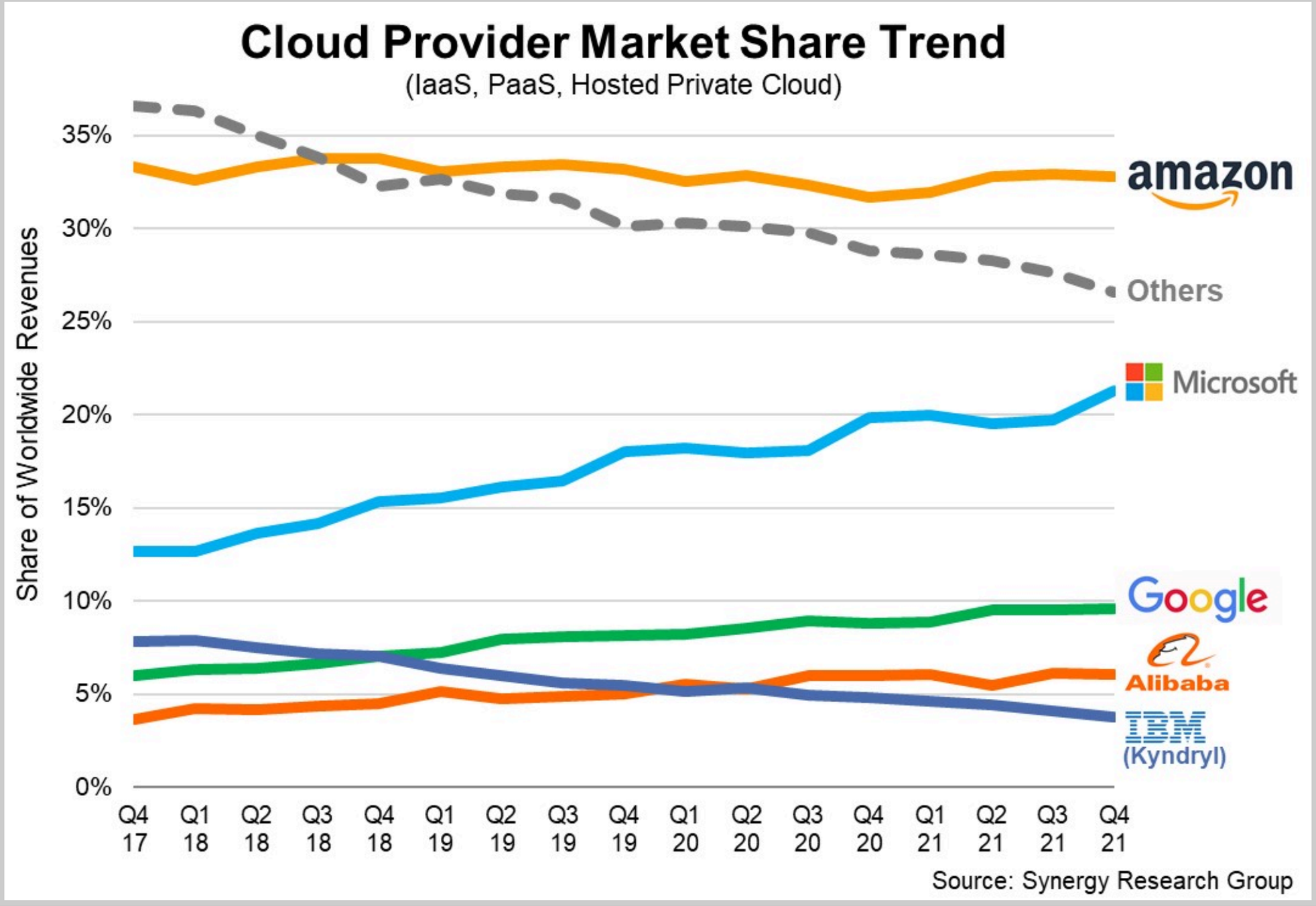


Count of Name by % Total

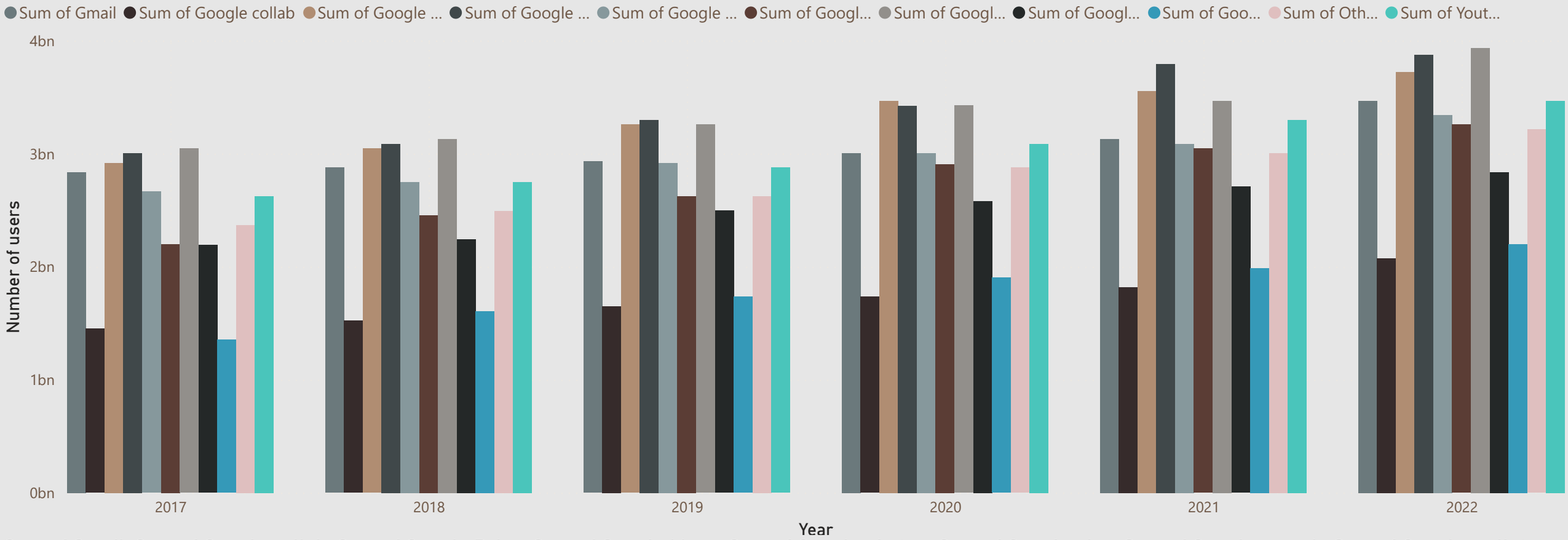


Count of Name by Type of operator

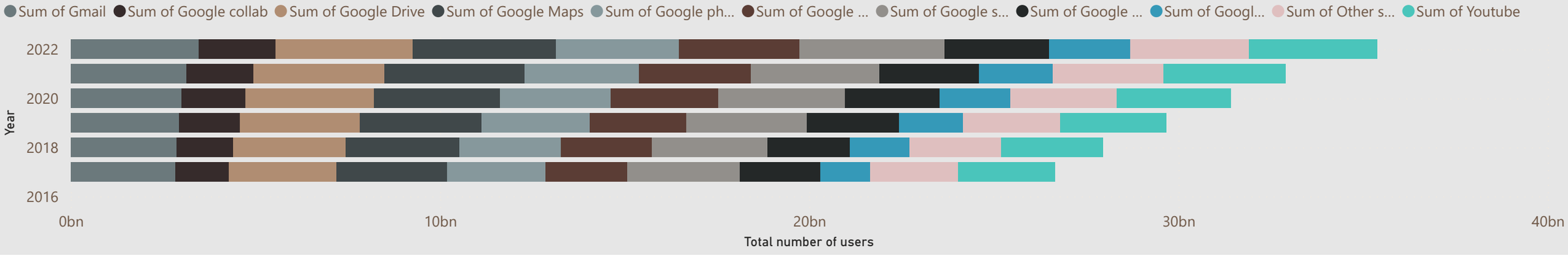



Cloud Provider Market Share Trend
(IaaS, PaaS, Hosted Private Cloud)
Share of Worldwide Revenues
35%
30%
25%
20%
15%
10%
5%
0%
Q4 17
Q1 18
Q2 18
Q3 18
Q4 18
Q1 19
Q2 19
Q3 19
Q4 19
Q1 20
Q2 20
Q3 20
Q4 20
Q1 21
Q2 21
Q3 21
Q4 21
amazon
Others
Microsoft
Google
Alibaba
IBM
(Kyndryl)
Source: Synergy Research Group

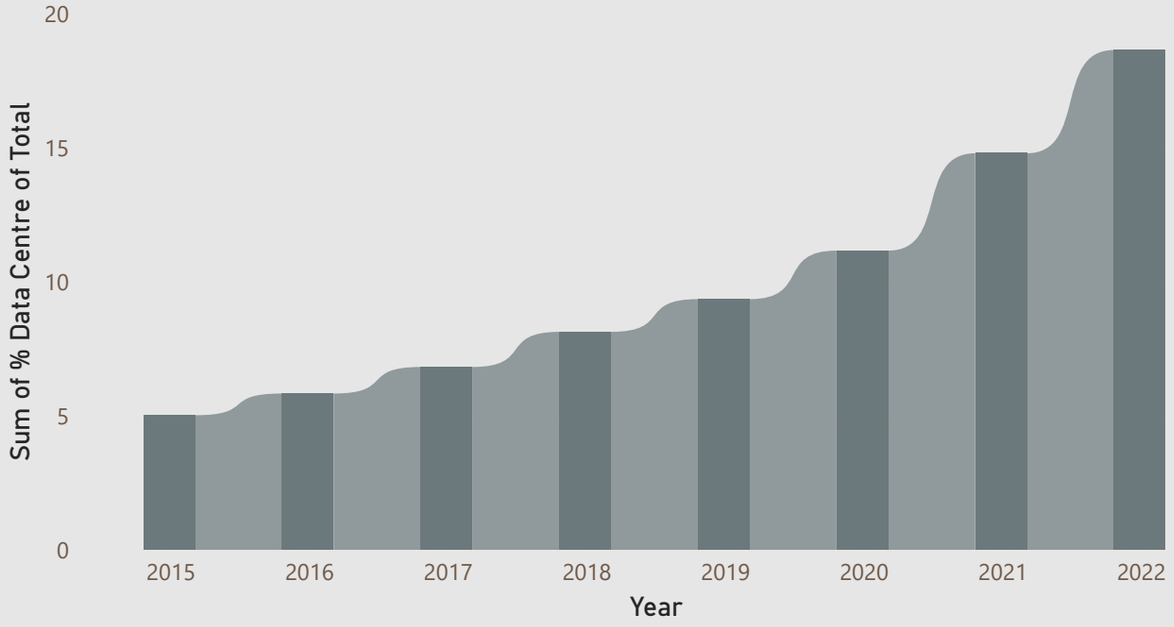
Comparison of revenue of various google products



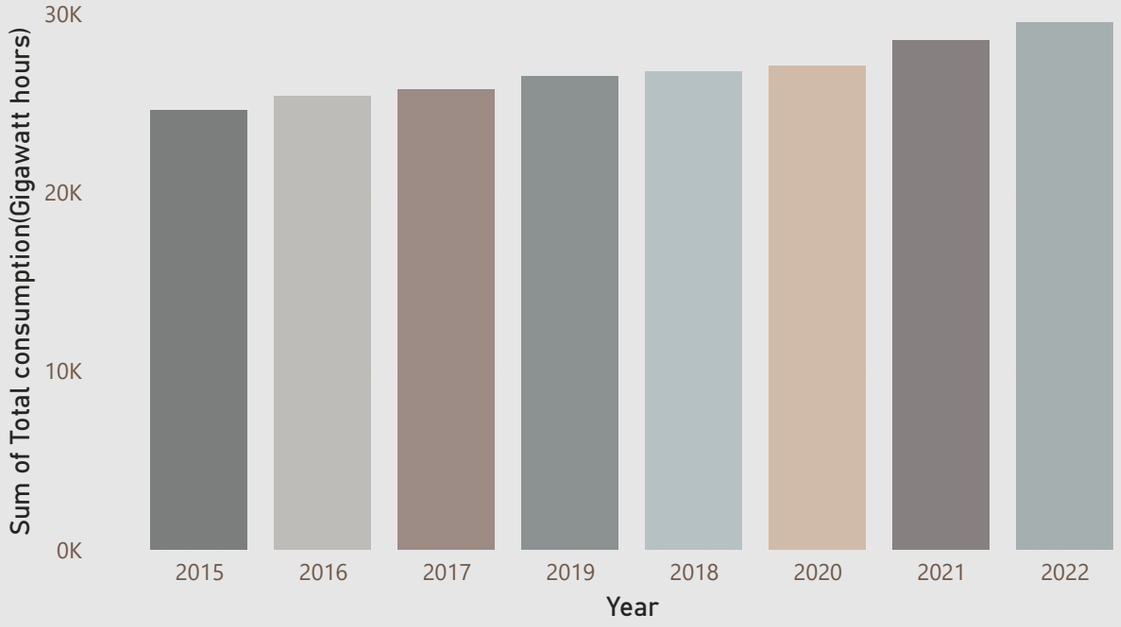
Sum of Gmail, Sum of Google collab, Sum of Google Drive, Sum of Google Maps, Sum of Google photos, Sum of Google play, Sum of Google search, Sum of Google wallet, Sum of Google workspace, Sum of Other services and Sum of Youtube by Year



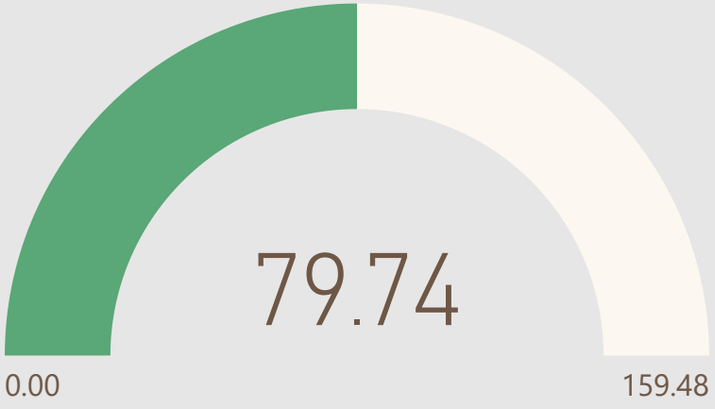
Total % Data Centre by Year



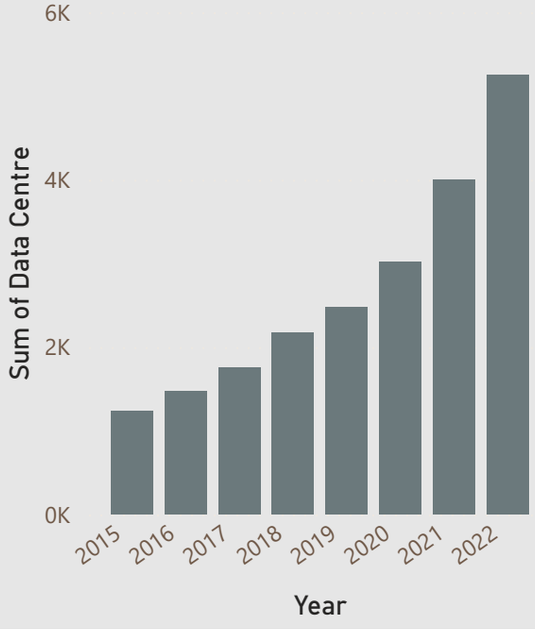
Total consumption(Gigawatt hours) by Year



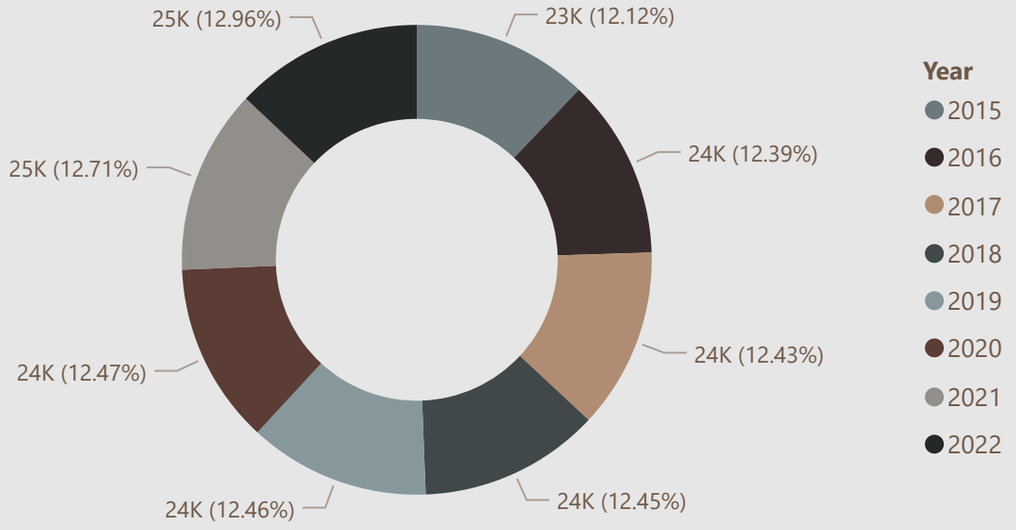
Total % Data Centre

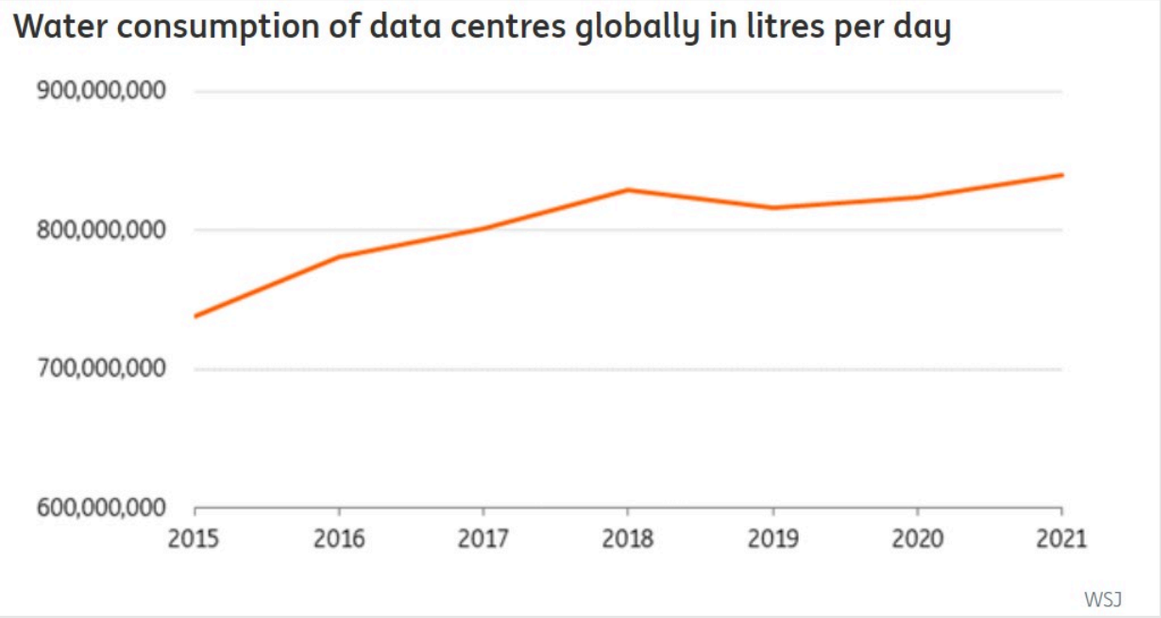


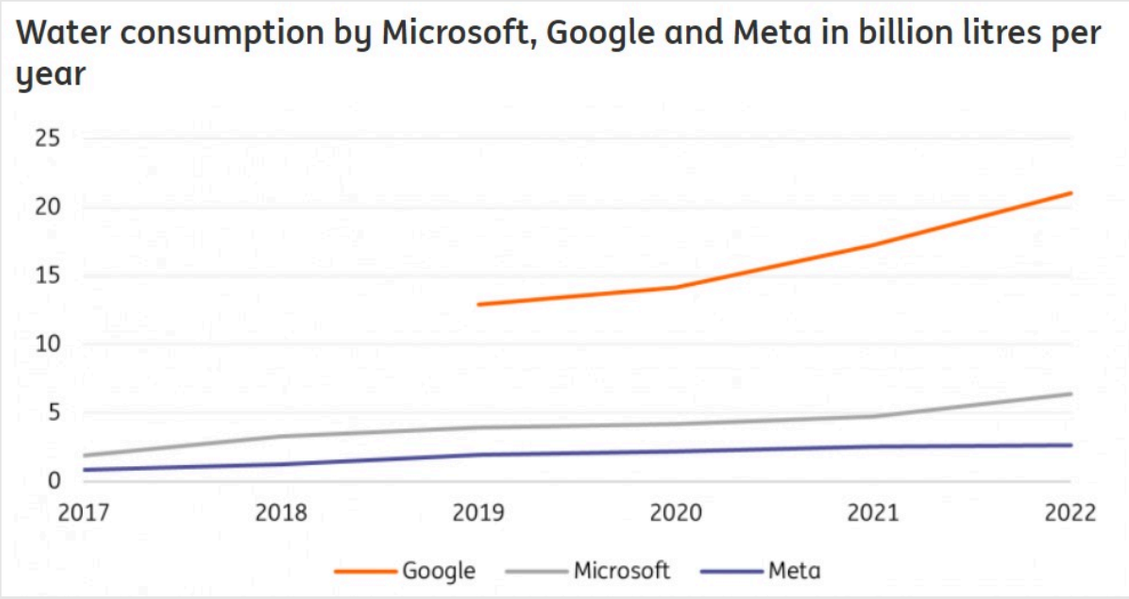
Sum of Data Centre by Year



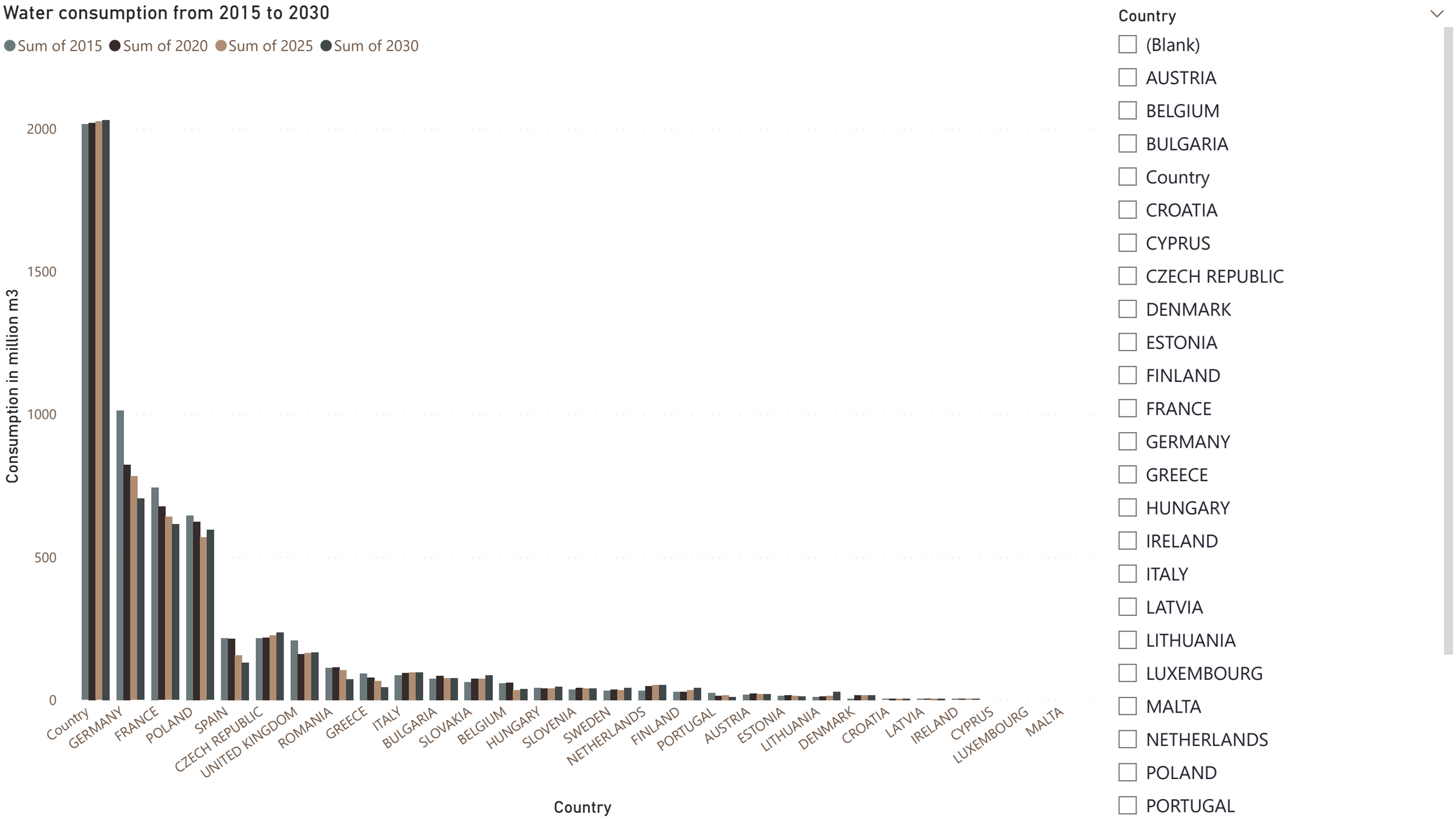
Other Metered Customers by Year







- Data centres owned by large multinationals, including Facebook and Amazon, are using the same amount of water as some of Ireland's largest towns at a time of reduced supply.
- In weather where cooling is required, an average data centre could use between 500,000 to 5 Million litres per day.
- Planning documents for Amazon's data centres, seen by the Business Post, showed one in Dublin 17 could use 296,000 litres of water a day, while a facility on Belgard Road could use 319,680. Another Amazon data centre in Blanchardstown could use 328,800 litres a day.
- Planning documents filed by Google for one two-storey, 30,000 sq m data centre estimated water supply demand for the facility is expected to be 59,400 litres a day. It was estimated that water demand may rise to 140,000 litres a day during "humidifier season".
- Last year, the Climate Neutral Data Centre Pact (CNDCP), a self-regulatory initiative signed by 74 data centre operators and 23 associations, presented its proposed metrics for water conservation to the European Commission.

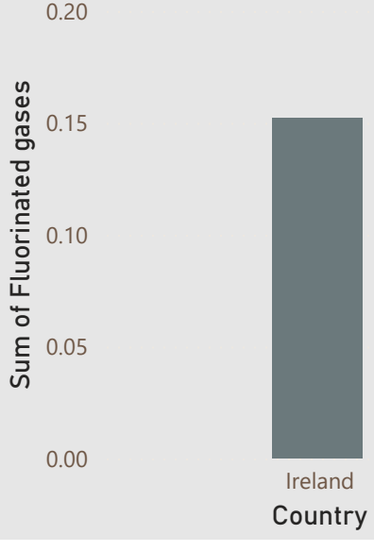

Water consumption from 2015 to 2030
Sum of 2015
Sum of 2020
Sum of 2025
Sum of 2030
Consumption in million m3
2000
1500
1000
500
0
Country
GERMANY
FRANCE
POLAND
SPAIN
CZECH REPUBLIC
UNITED KINGDOM
ROMANIA
GREECE
ITALY
BULGARIA
SLOVAKIA
BELGIUM
HUNGARY
SLOVENIA
SWEDEN
NETHERLANDS
FINLAND
PORTUGAL
AUSTRIA
ESTONIA
LITHUANIA
DENMARK
CROATIA
LATVIA
IRELAND
CYPRUS
LUXEMBOURG
MALTA
Country
Country
(Blank)
AUSTRIA
BELGIUM
BULGARIA
Country
CROATIA
CYPRUS
CZECH REPUBLIC
DENMARK
ESTONIA
FINLAND
FRANCE
GERMANY
GREECE
HUNGARY
IRELAND
ITALY
LATVIA
LITHUANIA
LUXEMBOURG
MALTA
NETHERLANDS
POLAND
PORTUGAL

Map

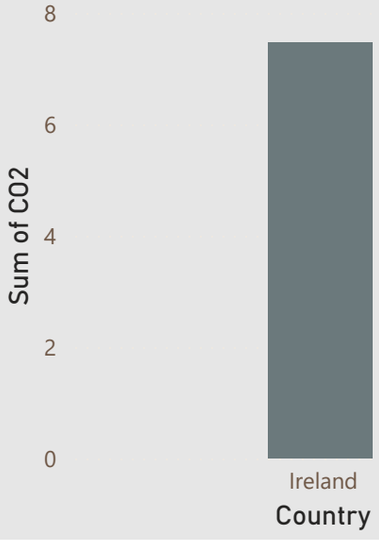
Country

- (Blank)
- Austria
- Belgium
- Bulgaria
- Croatia
- Cyprus
- Czechia
- Denmark
- Estonia
- Finland
- France
- Germany
- Greece

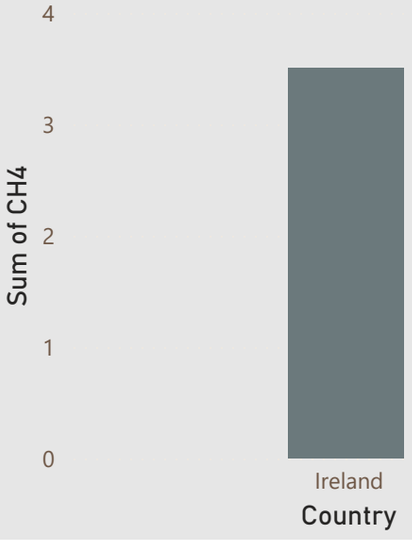
Fluorinated gases by Country



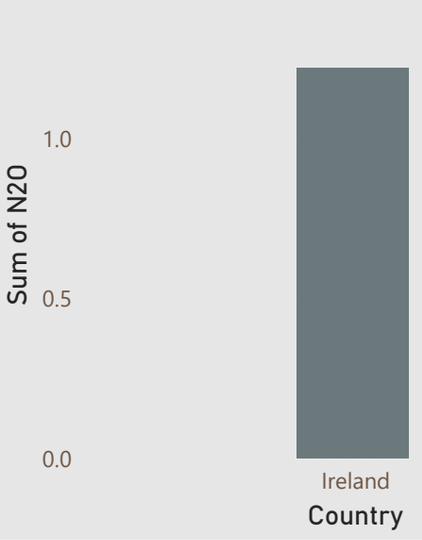
CO2 by Country



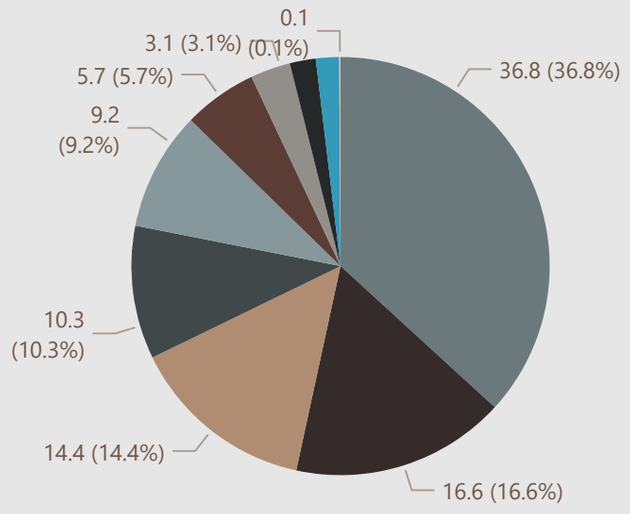
CH4 by Country



N2O by Country

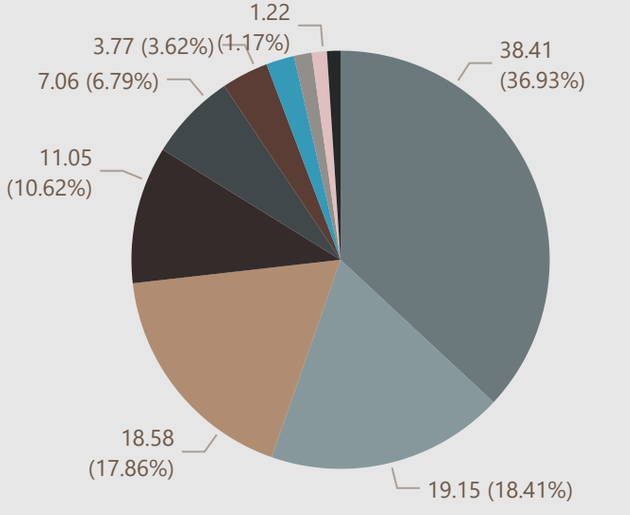


Sum of Contribution in 1990 by Category



Category
- Agriculture
- Residential
- Energy Industries
- Manufacturing Com...
- Transport
- Industrial Processes
- Waste
- Public Services
- Commercial Services
- F-gases

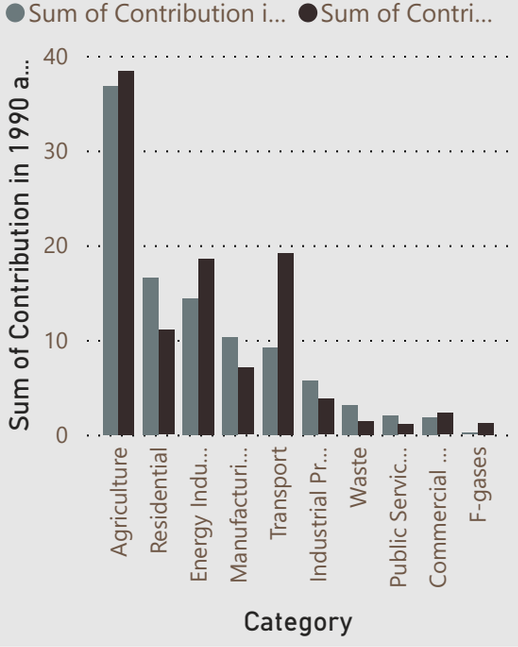
Sum of Contribution in 2023 by Category



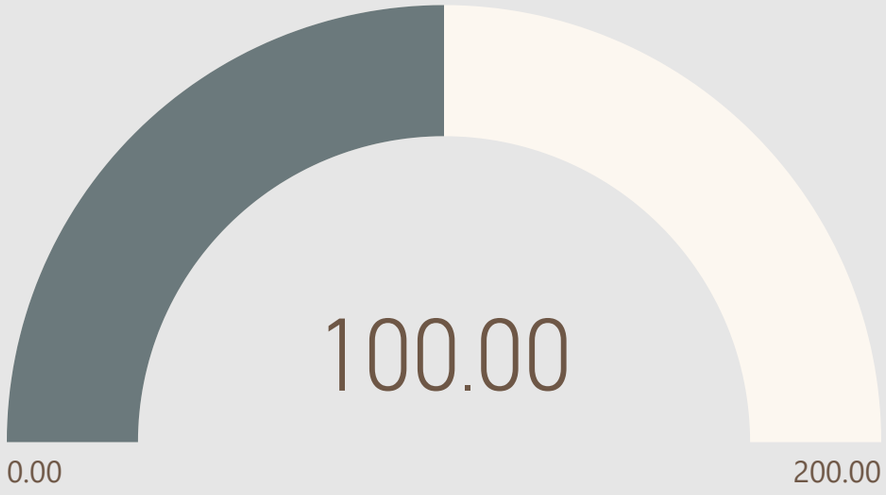
Category
- Agriculture
- Transport
- Energy Industries
- Residential
- Manufacturing Com...
- Industrial Processes
- Commercial Services
- Waste
- F-gases
- Public Services

Category
- [ ] Agriculture
- [ ] Commercial Services
- [ ] Energy Industries
- [ ] F-gases
- [ ] Industrial Processes
- [ ] Manufacturing Combustion
- [ ] Public Services
- [ ] Residential
- [ ] Transport
- [ ] Waste

Comparison between 1990 and 2023



Sum of Contribution in 1990



Sum of Contribution in 2023

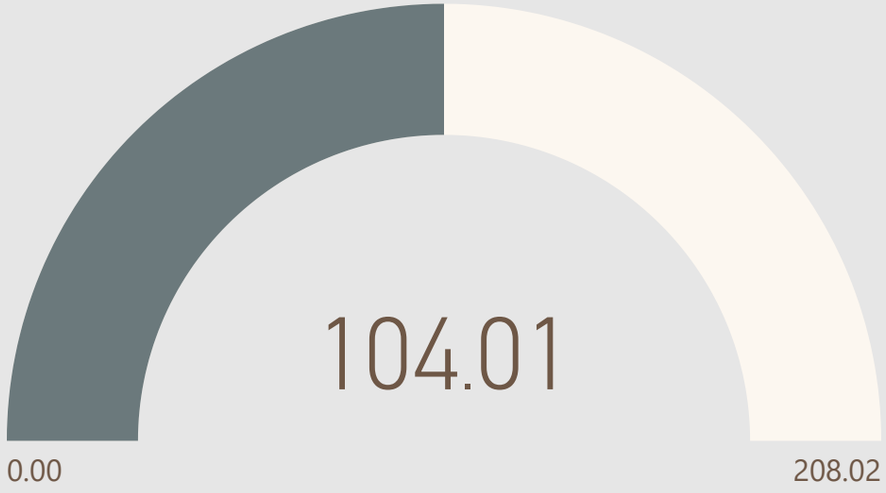
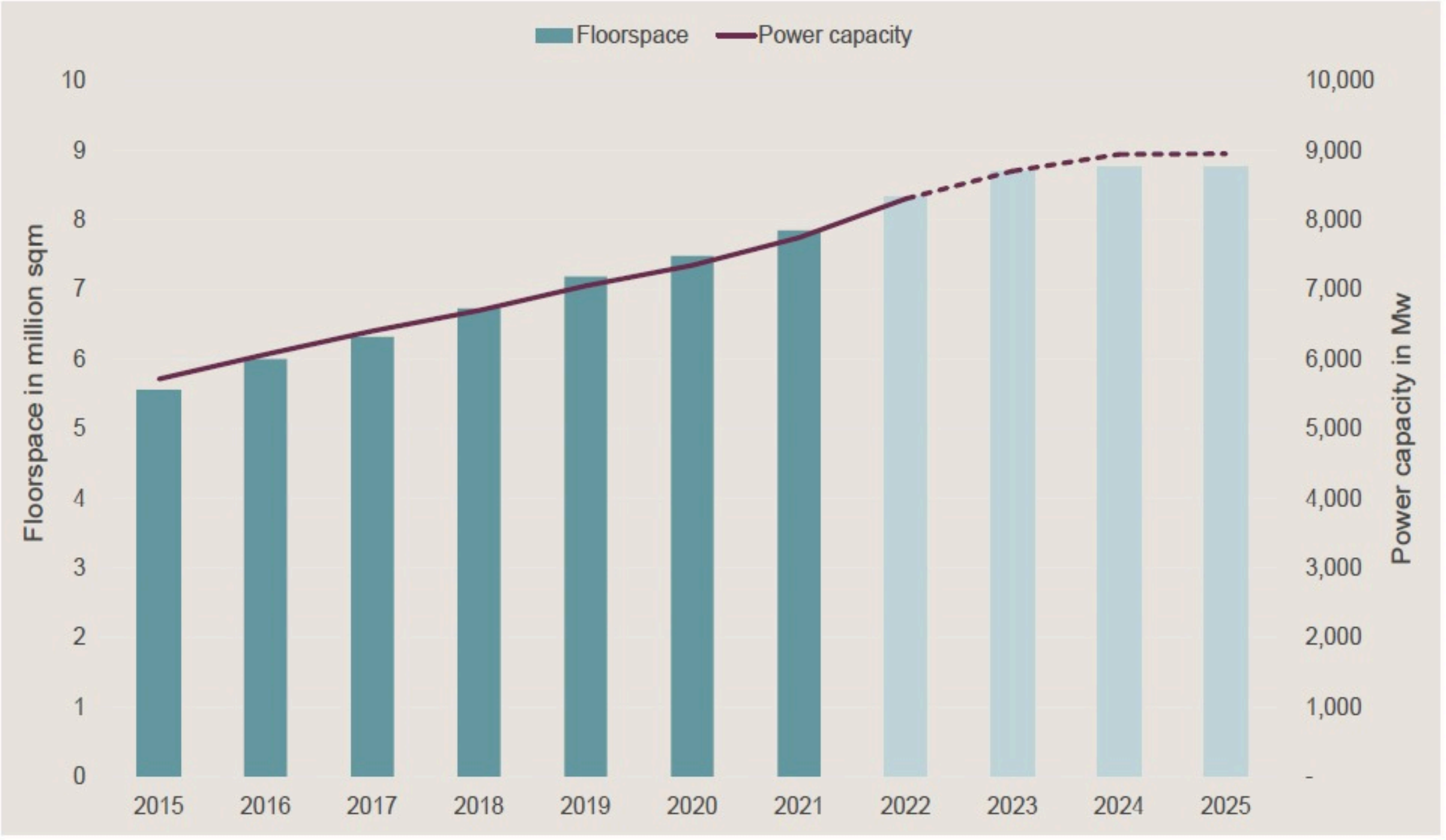
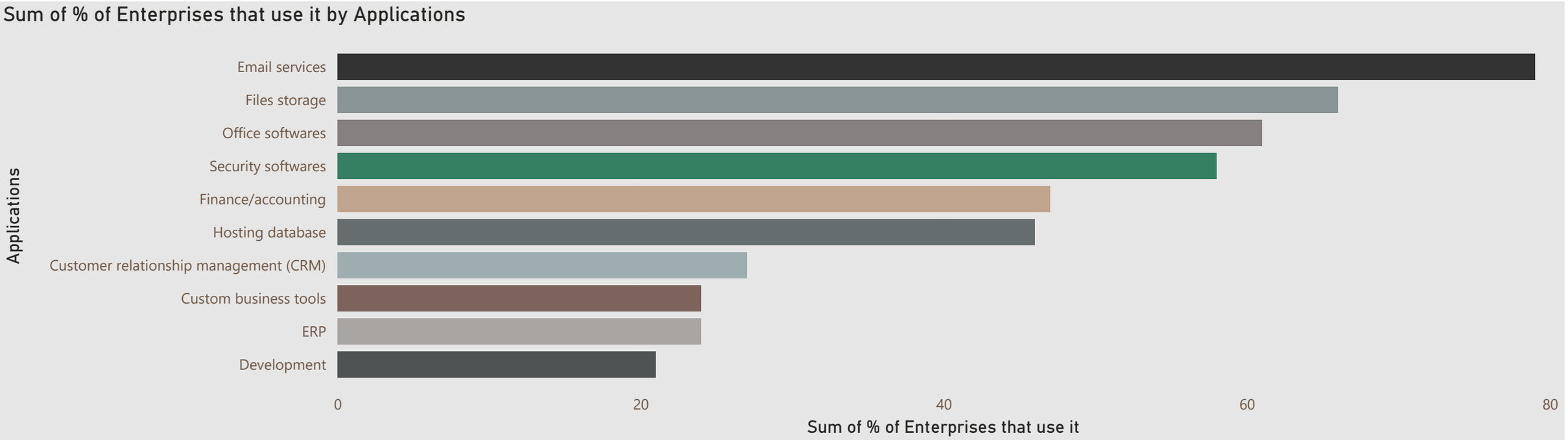
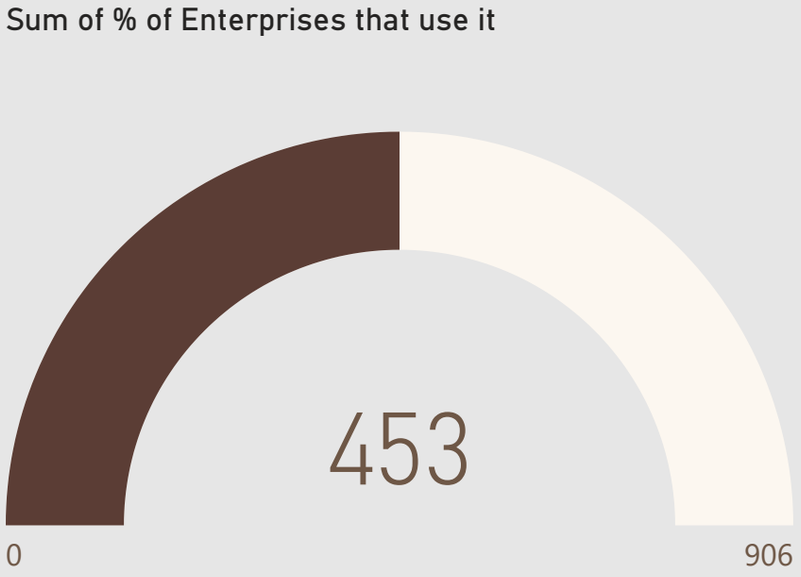


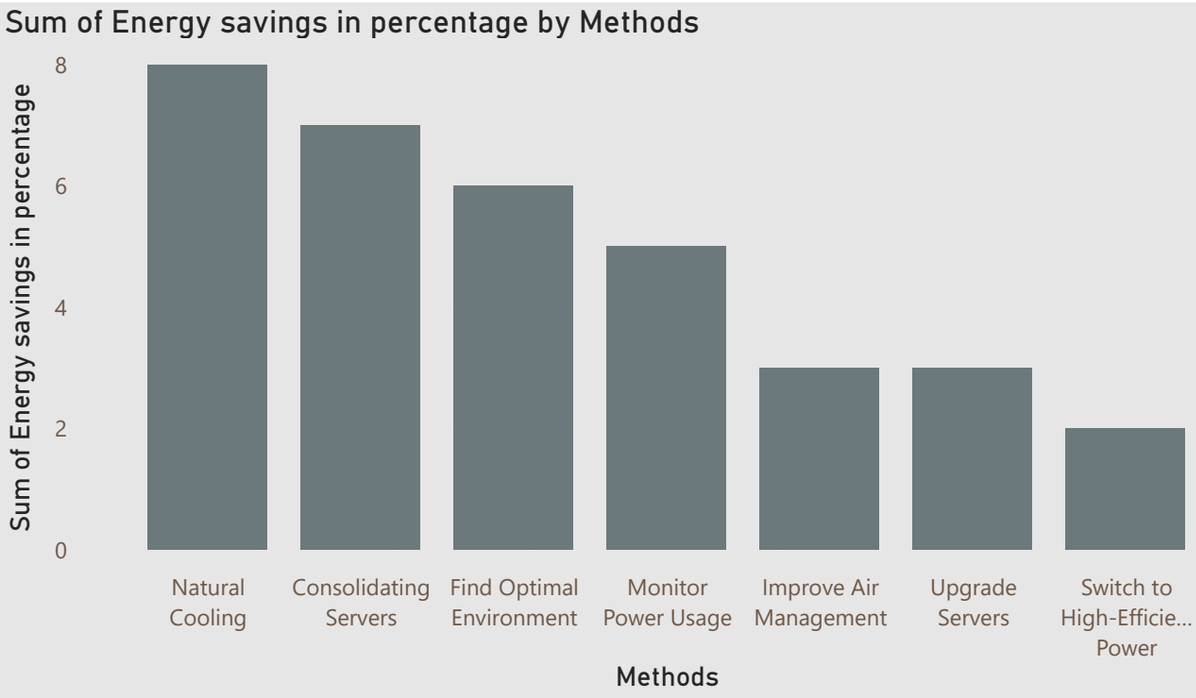
Fig 6: European data centres power capacity and floor space

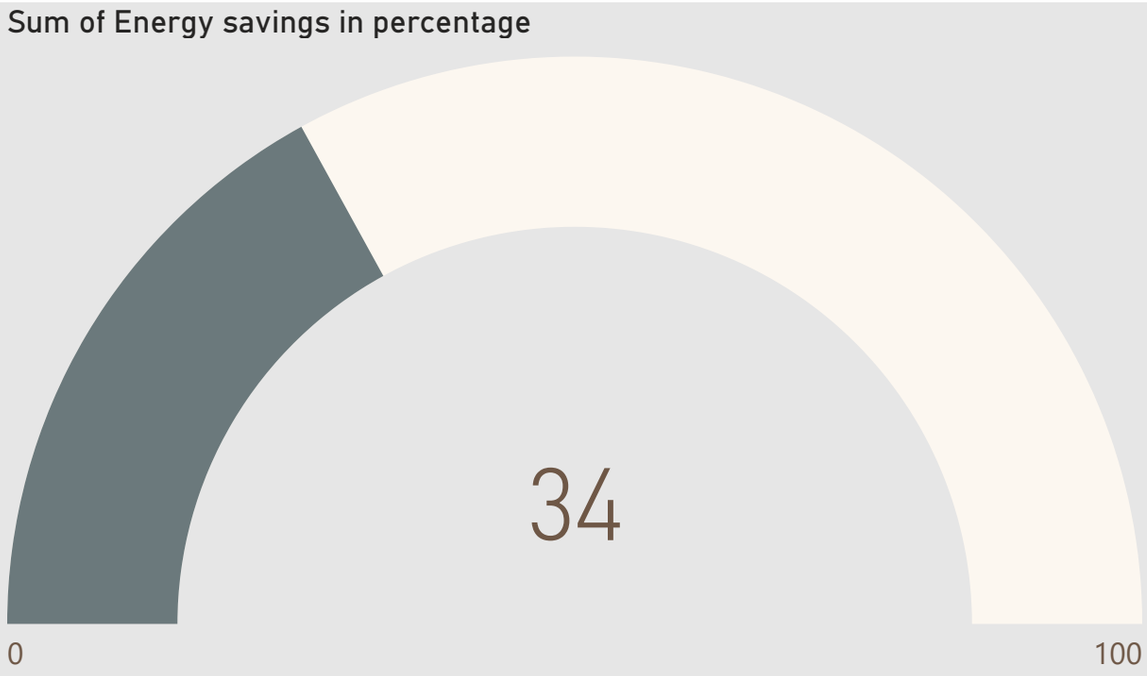






- Cloud-based technology offers mobility, ensuring workers can access resources in the cloud in real-time from any location or device.
- Businesses using cloud computing can scale up or down their IT features based on business requirements.
- Cloud computing offers many advanced data security features to guarantee data safety and security.
- The cloud has unlimited storage capacity for all types of data.
- Cloud environments allow easy sharing of real-time data across teams within an organization, which improves collaboration and team performance.
- Software and security are regularly managed by software vendors on behalf of the users.





- Consolidate Servers: Turn off any dead servers and optimize your existing servers.
- Upgrade Servers: Move to energy efficient servers.
- Change To High-Efficiency Power:This removes inefficiencies with multiple AC/DC conversions.
- Monitor Power Use:Continuously check the servers for optimal efficiencies. This allows a data center to only use the amount of power needed and doing away with obsolete servers.
- Implement Natural Cooling:Create effective cooling methods to use outside air. This reduces energy costs by 40 percent!
- Improve Air Management: Redesign data center air management to prevent re-circulation of hot air from IT systems.
- Find Optimal Environment: If possible, pick an environment that has cooler temperatures, low humidity and good airflow for your data center.