

Minimising Power, Equipment & VAT Costs on HPC Services for Financial Services

There is growing demand from financial services firms for access to data centres offering high performance computing (HPC) capabilities. The increasing availability of a variety of advanced analytics and the plethora of data and data types that are now consumable are facilitating analyses that require large amounts of compute power. However, no single HPC data centre offering is the same, and forward-thinking CTOs and CIOs are aware that the location of the data centre they utilise can significantly reduce the cost of their HPC usage for big data analytics.

For services that are not time sensitive, such as risk position analyses or margin calculations, some EU-domiciled financial institutions are looking to utilise data centre services based in near-shore locations within European Economic Area (EEA) or European Free Trade Association (EFTA) member states as they offer significant cost advantages. For example, the Icelandic government – which is both an EEA and EFTA member state – implemented tax obligations designed to attract offshore business. In particular, Iceland has made the provision of e-services by companies domiciled inside of Iceland to foreign clients exempt from the need to charge value-added tax (VAT) on top of the cost

of the services.¹ Likewise, a similar low-tax arrangement is offered under Norwegian tax law, which makes both Iceland and Norway fiscally attractive jurisdictions for the consumption of electronically-transmitted data centre services, and especially those services that are compute intensive, like HPC, which would otherwise incur heavy power costs in data centres located in traditional financial hubs such as London or Frankfurt.²

Comparatively, other EEA or EFTA member states do not offer similar types of VAT exemptions. For example, Switzerland requires companies domiciled within the country to pay VAT on e-services supplied to foreign firms (see **Figure 1**).³ Outside of EEA or EFTA member states, VAT or US state-level sales tax rates levied on the provision of e-services are often high (see **Figure 2**).

Above and beyond the VAT levied, electricity prices are another key component of a financial services' firms cost considerations when selecting a data centre provider, especially when deploying HPC. **Figure 3** shows the average electricity price for industry per MWh, as of Q1 2018, for some key EU financial centres. The low costs of electricity in Iceland and Norway are linked to the fact that a large

Figure 1: VAT Obligations for Three Major non-EU European Countries for e-services supplied to foreign firms.

Sources: Directorate of Internal Revenue⁴, mondaq⁵ and Just Landed⁶

European Free Trade Association Member State	Are E-services Exempt from VAT?	Reason for VAT E-services Exemption
Iceland	Yes	Electronically supplied services are considered used where the buyer is domiciled or has a venue of operations.
Norway	Yes	The supply of goods and services outside Norway is VAT free, as well as the supply of goods and services "for use abroad" which uses the destination principle for various supplies.
Switzerland	No	B2B supplies of services (including e-services) are subject to VAT in the country in which the consumer is located, rather than the supplier's country of residence, with the business consumer required to account for VAT using the reverse charge mechanism (whereby they act as both the supplier and the consumer, charging themselves the VAT where appropriate, and then claiming it back).

¹ RSK Directorate of Internal Revenue. *Value Added Tax*. [online] Available at: <<https://www.rsk.is/english/companies/value-added-tax/>> [Accessed 29 October 2018].

² Avalara VATlive, 2018. *Norwegian VAT Rates and VAT Compliance*. [online] Available at: <<https://www.vatlive.com/country-guides/europe/norway/norwegian-vat-rates/>> [Accessed 29 October 2018].

³ KPMG, 2018. *Switzerland: VAT Rate Reduction Effective 1 January 2018*. [online] Available at: <<https://home.kpmg.com/xx/en/home/insights/2017/09/tnf-switzerland-vat-rate-reduction-effective-1-january-2018.html>> [Accessed 29 October 2018].

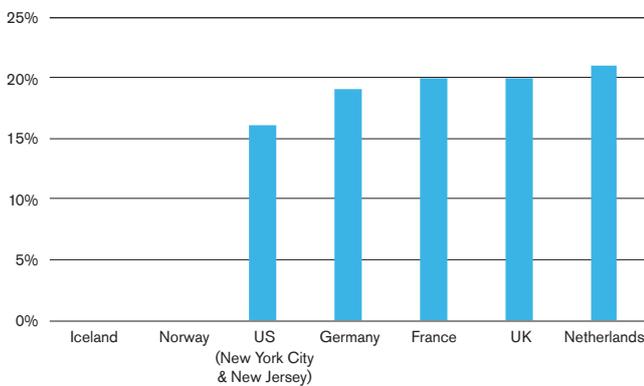
⁴ RSK Directorate of Internal Revenue. *Value Added Tax*. [online] Available at: <<https://www.rsk.is/english/companies/value-added-tax/>> [Accessed 29 October 2018].

⁵ Mondaq, 2018. *Norway: Value Added Tax in Norway*. [online] Available at: <<http://www.mondaq.com/x/21987/Corporate+Tax/Value+Added+Taxation+in+Norway>> [Accessed 29 October 2018].

⁶ Just Landed, 2018. *Taxation in Switzerland*. [online] Available at: <<https://www.justlanded.com/english/Switzerland/Switzerland-Guide/Business/Taxation-in-Switzerland>> [Accessed 29 October 2018].

Figure 2: The VAT Rate Charged on Electronic Services in Major Financial Centres

Sources: European Commission⁷, NYC Department of Finance⁸ and State of New Jersey; Department of Treasury⁹



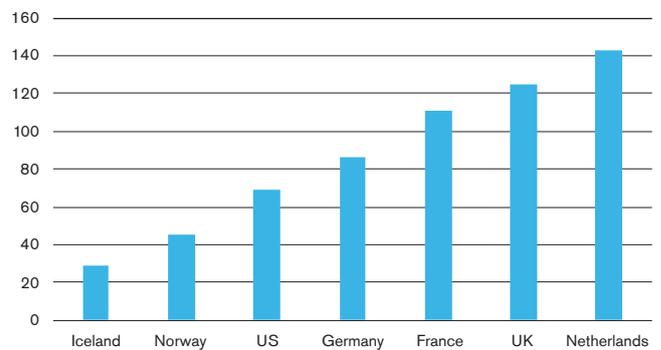
volume of its domestically-generated power supply – indeed, all of it in Iceland’s case – comes from renewable energy sources. The reliable nature, steady base-flow and under-utilisation of these sources mean that foreign companies using electronically-provided services in those countries can be offered an electricity tariff by a data centre provider that is fixed for 10 years or more. Additionally, it is also possible in Iceland to sign a 12-year fixed-price electricity contract with a data centre services provider.

Presenting a Real-world Example

A financial institution that wishes to engage a data centre to run a non-time sensitive, intensive HPC service would be charged for large-ticket items such as colocation, equipment and electricity, as well as for a range of smaller line items. The worked example shown in **Figure 4** illustrates the price differential for e-services provided to a foreign firm by a data centre located in Iceland and one located in the UK, looking specifically at the large-ticket items, over five-year contractual period.

Figure 3: Electricity Prices by Country for Industry as of Q1 2018 (USD/MWh)

Sources: International Energy Agency¹¹ and Verne Global



This price differential arises mainly from both the VAT exemptions as well as the significantly lower cost of electricity in Iceland. However, the leasing of e-services equipment is also VAT-free in Iceland, and this advantage is included in the example shown in **Figure 5**. In the example, a financial institution would lease the equipment it needs to undertake the e-services for a fixed period rather than owning it outright, thereby taking advantage of an additional VAT exemption.

The example rests on the following assumptions:

- A large financial services client;
- A 100-rack deployment;
- Each rack at 10 kW;
- Leased equipment;
- Power usage at 90% load; and
- 3% indexation across the colocation and power costs.

⁷ European Commission, 2018. *Current National VAT Rates*. [online] Available at: <https://ec.europa.eu/taxation_customs/business/vat/telecommunications-broadcasting-electronic-services/vat-rates_en> [Accessed 29 October 2018].
⁸ NYC Department of Finance, 2018. *New York State and City Sales and Use Tax*. [online] Available at: <<https://www1.nyc.gov/site/finance/taxes/business-nys-sales-tax.page>> [accessed 29 October 2018].
⁹ State of New Jersey; Department of Treasury, 2018. *Division of Taxation*. [online] Available at: <<https://www.state.nj.us/treasury/taxation/ratechange/su-overview.shtml>> [Accessed 29 October 2018].
¹⁰ Landsvirkjun, 2018. *Long Term Contracts with Competitive and Predictable Prices*. [online] Available at: <<https://www.landsvirkjun.com/productservices/energyproducts/data-centers/competitive-energy>> [Accessed 29 October 2018].
¹¹ International Energy Agency, 2018. *Key World Energy Statistics*. [online] Available at: <<https://www.iea.org/statistics/kwes/>> [Accessed 29 October 2018].

Figure 4: Example of Estimated Costs for a 1,000kW HPC Service in a Data Centre in Iceland and in The UK for Five Years.

Sources: Verne Global, GreySpark analysis and Ofgem¹²

Five-year Projection	Iceland (GBP)	UK (GBP)	Iceland (EUR)	UK (EUR)
Colocation Cost	£ 6,052,415	£ 6,052,415	€ 6,839,229	€ 6,839,229
VAT on Colocation Cost	£ -	£ 1,210,482.96	€ -	€ 1,367,845.75
Cost of IT Infrastructure Leased	£ 12,190,000	£ 12,190,000	€ 13,774,700	€ 13,774,700
VAT on IT Infrastructure Leased	£ -	£ 2,438,000	€ -	€ 2,754,940
Power Cost for 1MW Service	£ 1,829,161	£ 7,325,015	€ 2,066,952	€ 8,277,267
VAT on Power Used	£ -	£ 1,226,400	€ -	€ 1,403,614
Total Cost	£ 20,071,576	£ 30,442,312	€ 22,680,880	€ 34,417,595

This research illustrates the sensitivity of data centre costs to data centre's location. Big ticket savings that could be made by choosing a near-shore data centre operator include:

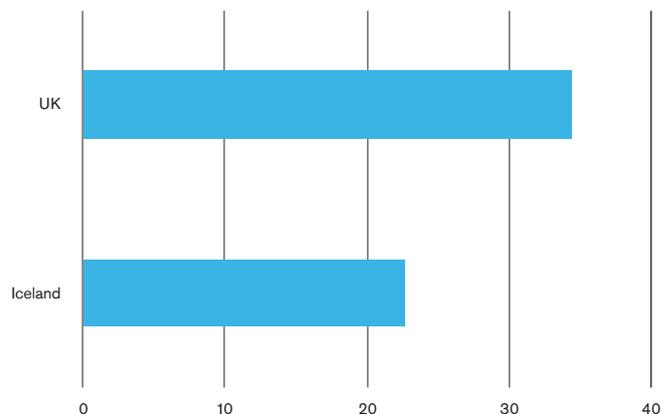
- **Power Costs** – both fixed price tariffs and VAT exemptions; and
- **Service Costs** – VAT exemptions for both the colocation service and on the cost of leasing equipment.

The worked example above shows that although the VAT charges, or lack of them, create the largest estimated cost benefit for financial firms wishing to near-shore the infrastructure for their HPC services, the fixed electricity tariff extending out to a 5-year horizon provides huge benefits compared with more volatile energy prices available in other locations.

GreySpark believes that CTOs and CIOs from financial institutions must carefully consider the possible financial advantages to be gained of utilising the services of a data-centre in a near-shore location such as Iceland or Norway in the delivery of non-time sensitive, HPC services.

Figure 5: Estimated Difference in Cost Over Five Years (GBPmn) of using a UK Data Centre Rather than an Icelandic Data Centre for HPC Services

Source: GreySpark analysis



¹² Ofgem, 2018. *Wholesale Market Indicators*. [online] Available at: < <https://www.ofgem.gov.uk/data-portal/wholesale-market-indicators> > [Accessed 07 November 2018].

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