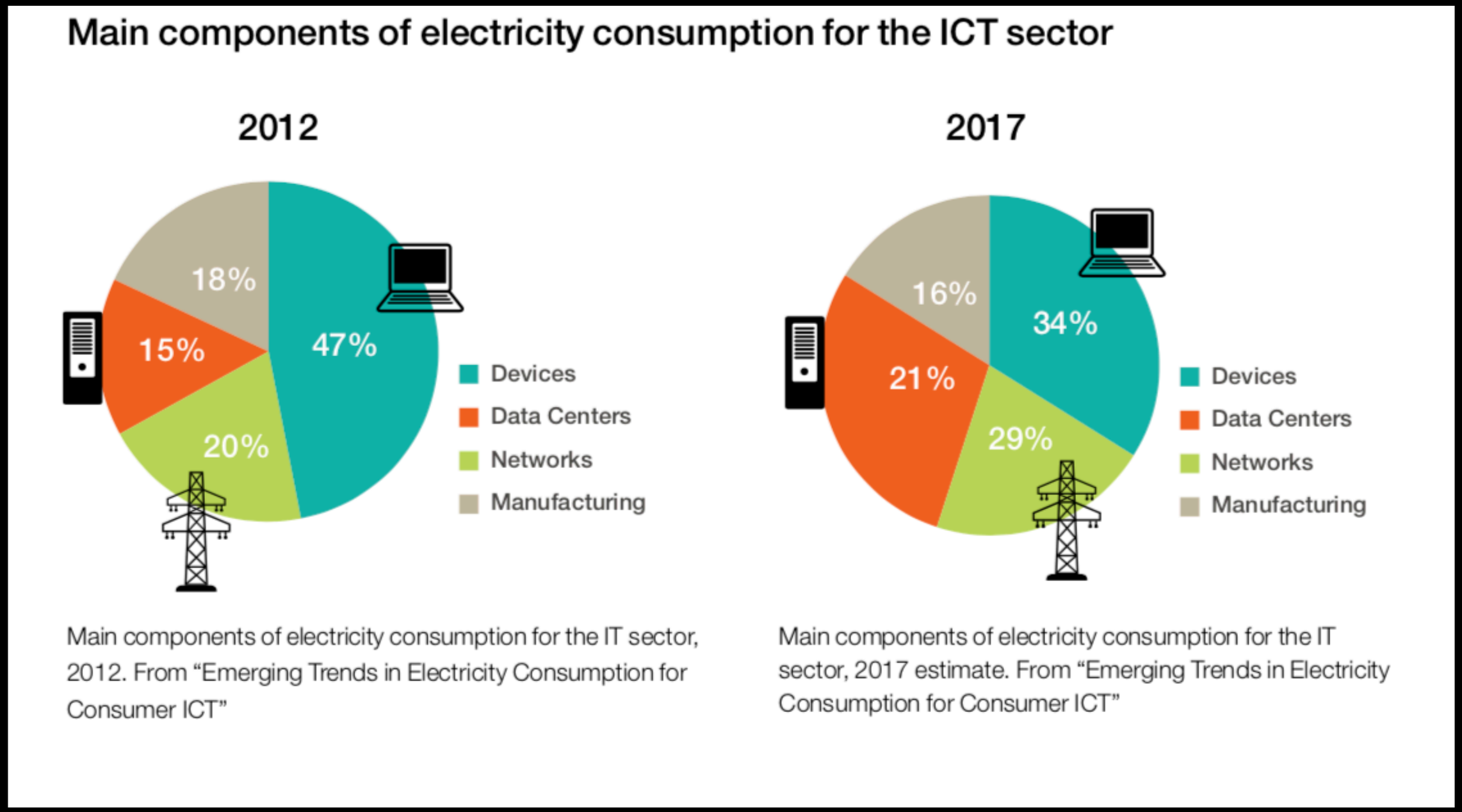
Carbon Cost of Internet Usage

My hypothesis

- **The internet uses electricity**
- **There is a carbon cost associated with generating electricity**
- **This carbon cost is distributed in a complex way because the internet is really complicated**
- **End users have no way of seeing this hidden cost**
- **I should be a killjoy and make a tool to tell them off**

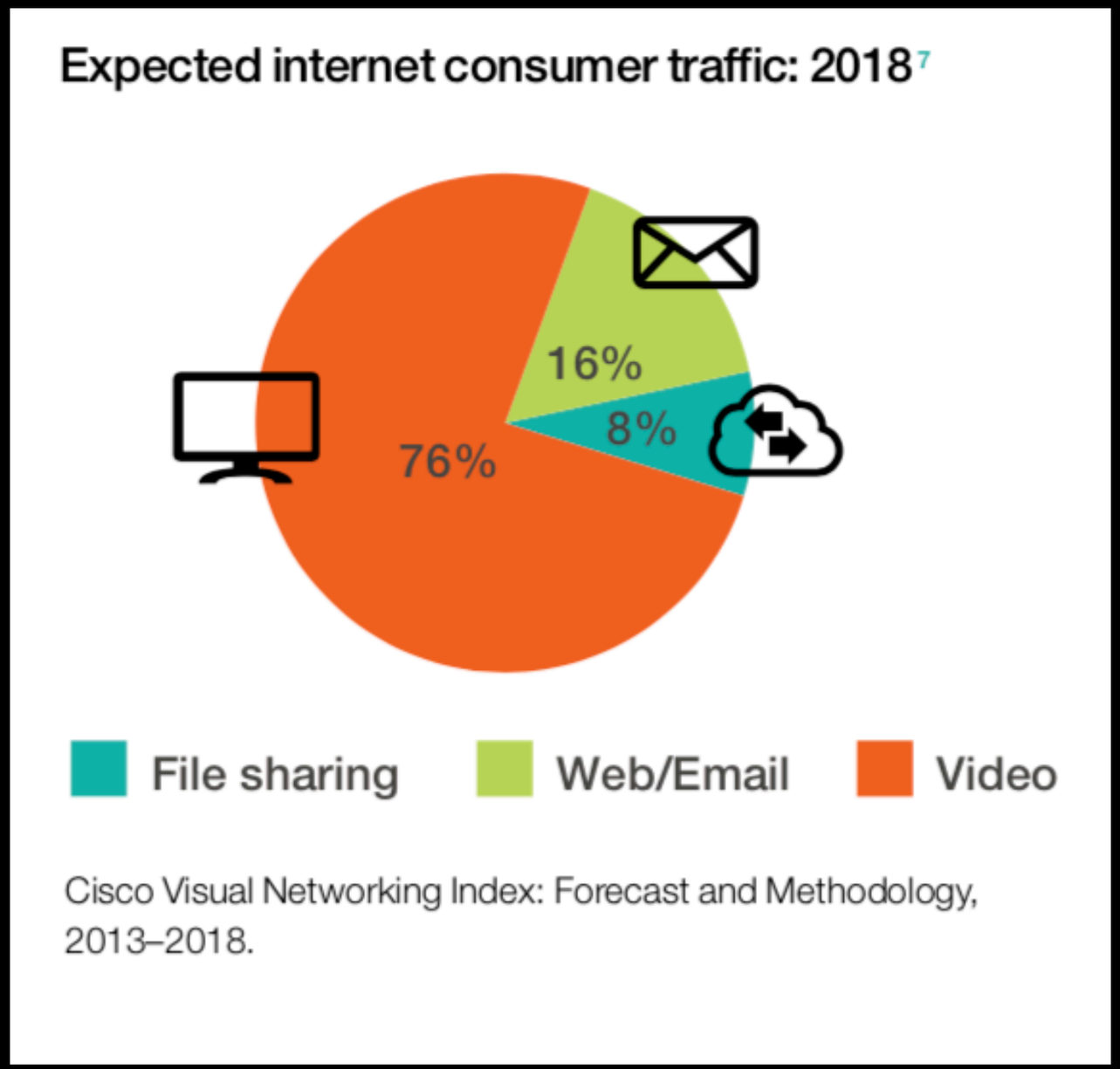
The internet uses electricity



Main components of electricity consumption for the IT sector, 2012. From “Emerging Trends in Electricity Consumption for Consumer ICT”

Main components of electricity consumption for the IT sector, 2017 estimate. From “Emerging Trends in Electricity Consumption for Consumer ICT”

Video streaming is on the rise



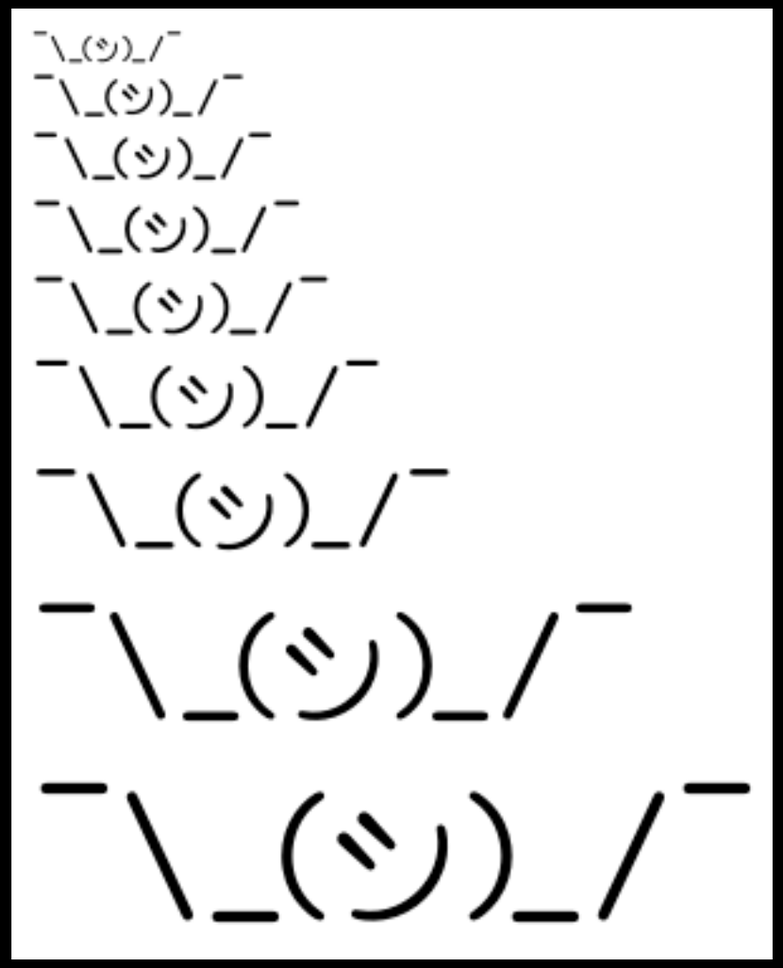
Cisco Visual Networking Index: Forecast and Methodology, 2013–2018.

How much electricity?

‘The internet releases around 300m tonnes of CO2 a year – as much as all the coal, oil and gas burned in Turkey or Poland, or more than half of the fossil fuels burned in the UK’

A random article on the Guardian from 2010

What kind of electricity?



It depends….

Worst case

New device, made using dirty electricity

Manufacturing

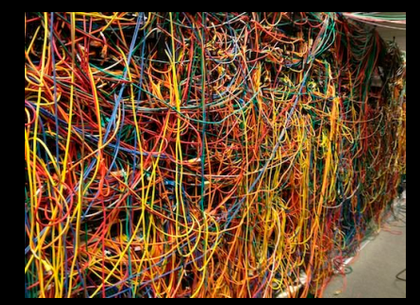
New, power hungry device

Device

Inefficient network, powered by dirty electricity

Network

Inefficient Data Centre Powered by dirty electricity



Data Centre

Best case

Old device, made using clean electricity

Manufacturing

Old, power frugal device

Device

Efficient network, powered by clean electricity

Network

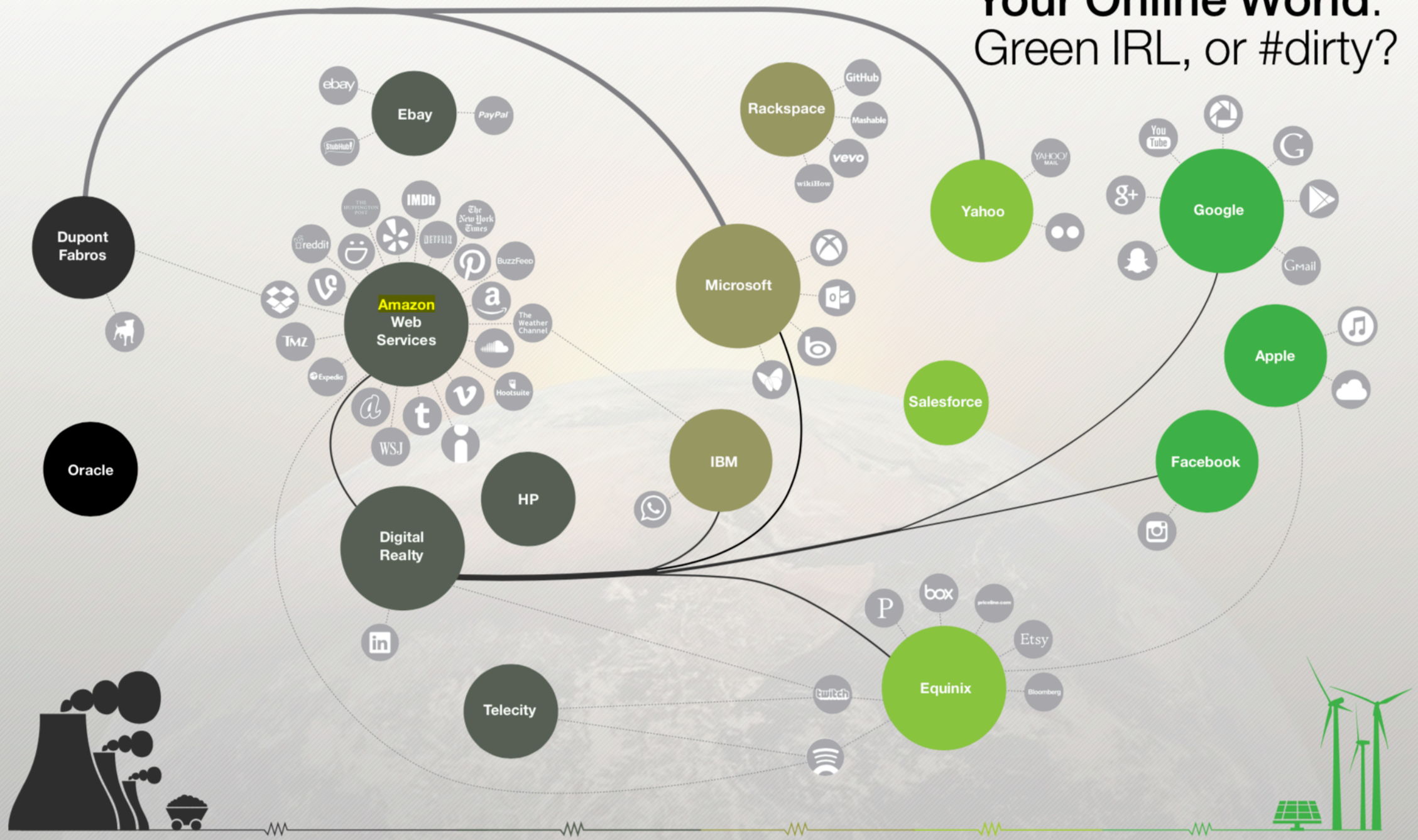
Powered by clean electricity

Data Centre

Let’s talk about the cloud

- Almost certainly more efficient (and less energy intensive) than maintaining your own solution
- Providers vary in their commitment to renewable energy sources (AWS, cough cough)

Your Online World:
Green IRL, or #dirty?



While the companies assessed in this report own or operate their own data centers, most companies either rent server space in colocation facilities, host their operations with cloud computing vendors and content delivery networks, and many employ some combination of these options.

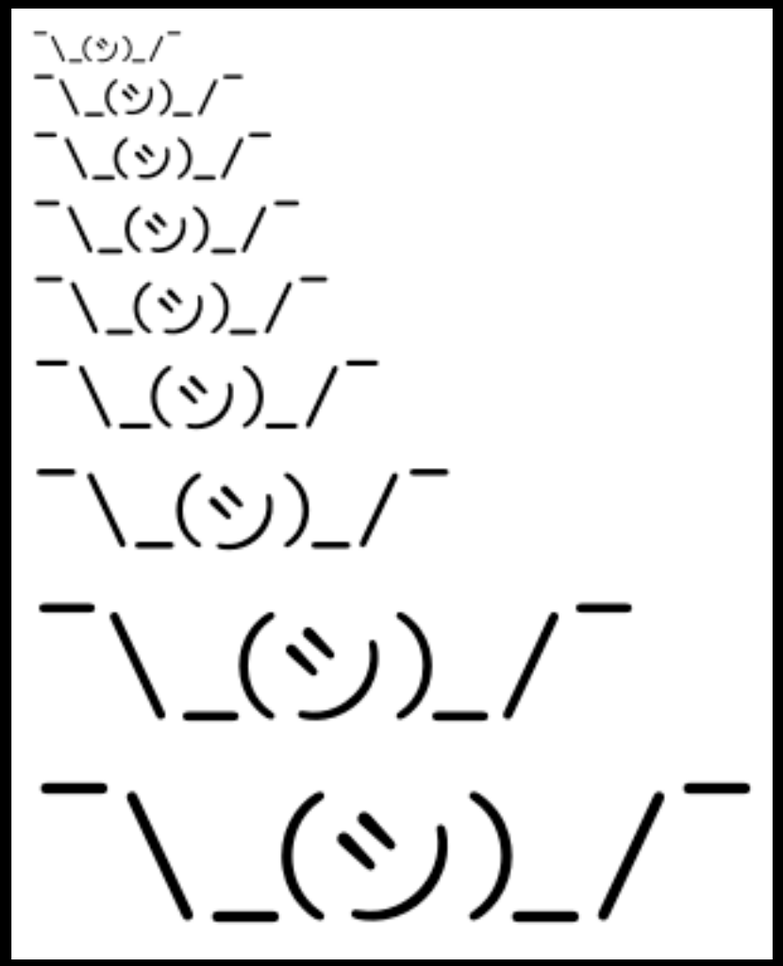
While these customers may not operate the mega data centers that Google, Amazon and Microsoft do, their role in building a greener internet is just as important. Data center operators and cloud computing vendors will prioritize powering with renewable energy only when their customers demand it, and those customers need to step up to the challenge.

Outside of the colocation companies, no company could do more to make our favorite sites green than Amazon Web Services. AWS is the dominant player in cloud computing, owning over one fourth of the market by one estimate, over triple the market share of Microsoft, its nearest competitor.[105] AWS customers should push the company to become more transparent about its energy footprint, and to make clear what strategies and principles it is using to reach its 100% renewable energy goal, particularly in its dirtiest regions, like Virginia.

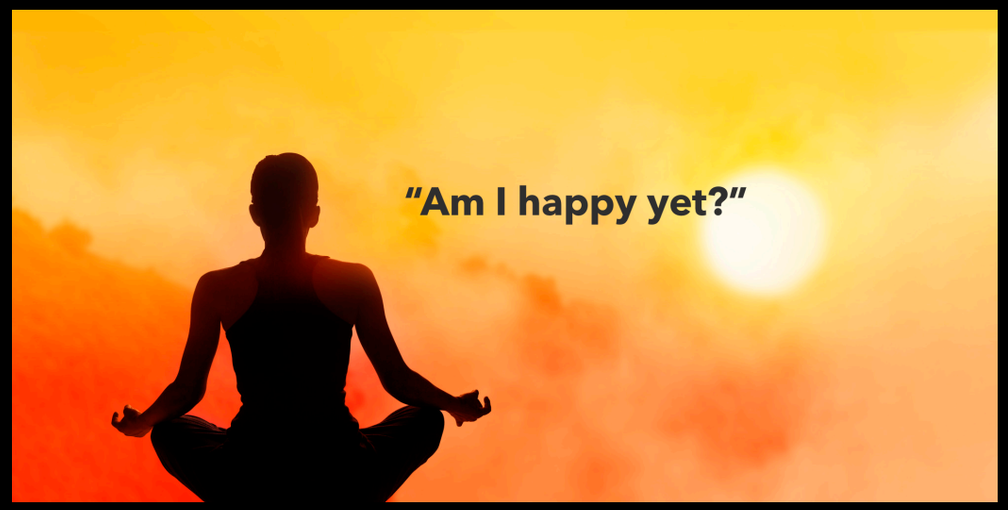
The graphic on this page offers a sampling of where some of the internet's most popular sites and services are being hosted – and the relative greenness of the energy that those data centers are using. Energy demand symbols are not drawn to scale and are meant to offer a relative indication.

So the internet is bad for the planet?

It depends...



What would you be doing instead?



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What would you be doing instead?

Vs

Vs

What can I do as a consumer?

- **Don’t buy loads of new tech all the time (manufacturing)**
- **Use smaller, more energy efficient devices (device)**
- **Replace more energy intensive activities (travel, going out etc.) with online activities. Don’t do both.**
- **Don’t keep loads of tabs open that you are not using. Each one will continue making network requests behind your back. (network)**
- **Consider ‘voting with your clicks’ and preferring video streaming services that use data services that have committed to using renewable energy (data centre)**

What can I do as a tech professional?

- **Don’t buy loads of new tech all the time (manufacturing)**
- **Use smaller, more energy efficient devices (device)**
- **Use cloud solutions in favour of building your own (data centre)**
- **Telecommute**
- **Where possible, choose data providers that have made a real commitment to using renewable energy. This would currently exclude AWS. (data centre)**
- **Don’t make loads of unnecessary network requests when building applications and limit the quantity of data being transferred (network)**

It sure would be nice to have a tool to help consumers 🤔

Johnnie Walker beat me to it :(

Conclusion

- There is a carbon cost associated with internet usage and it is difficult to track
- Consumers may lack the information needed to ‘vote with their clicks’ and boycott certain online services
- Replacing energy intensive offline activities with online activities is likely to be beneficial from an energy perspective
- There are still improvements that can be made to the infrastructure of how online services are provided to make them less carbon intensive
- It is unclear how best to incentivise/pressure companies to adopt practices in line with a more environmentally friendly internet

What should I make my chrome extension do instead?