ENABLING TECHNOLOGY 2020

The Enabling Technologies of a Low-Carbon Economy:

A Focus on Cloud Computing

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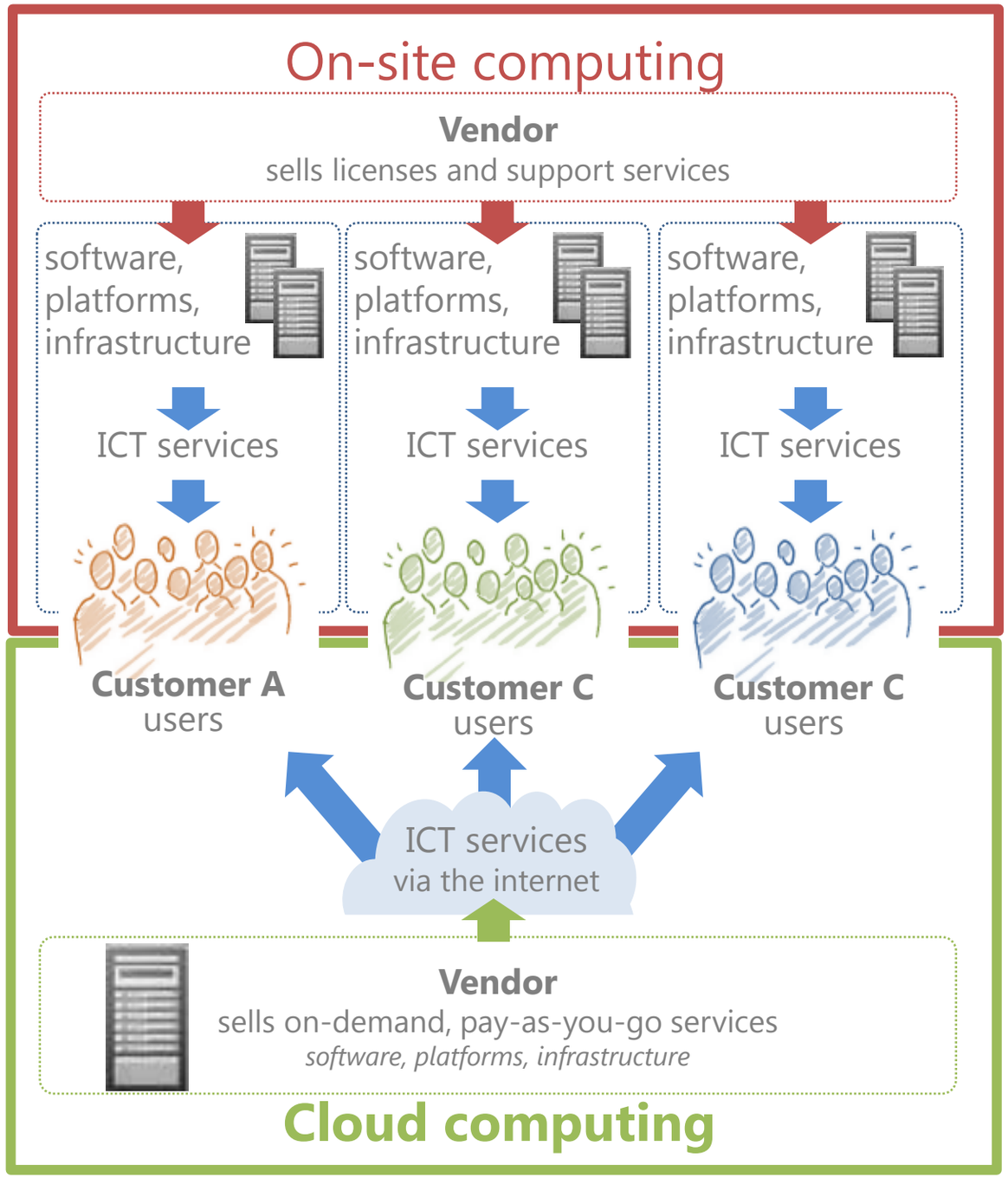
What is cloud computing?

Cloud computing enables computing services (software, platforms, infrastructures etc.) that are traditionally provisioned on-site within organisations to be delivered across the internet, on-demand from purpose built data centres.



What is cloud computing?

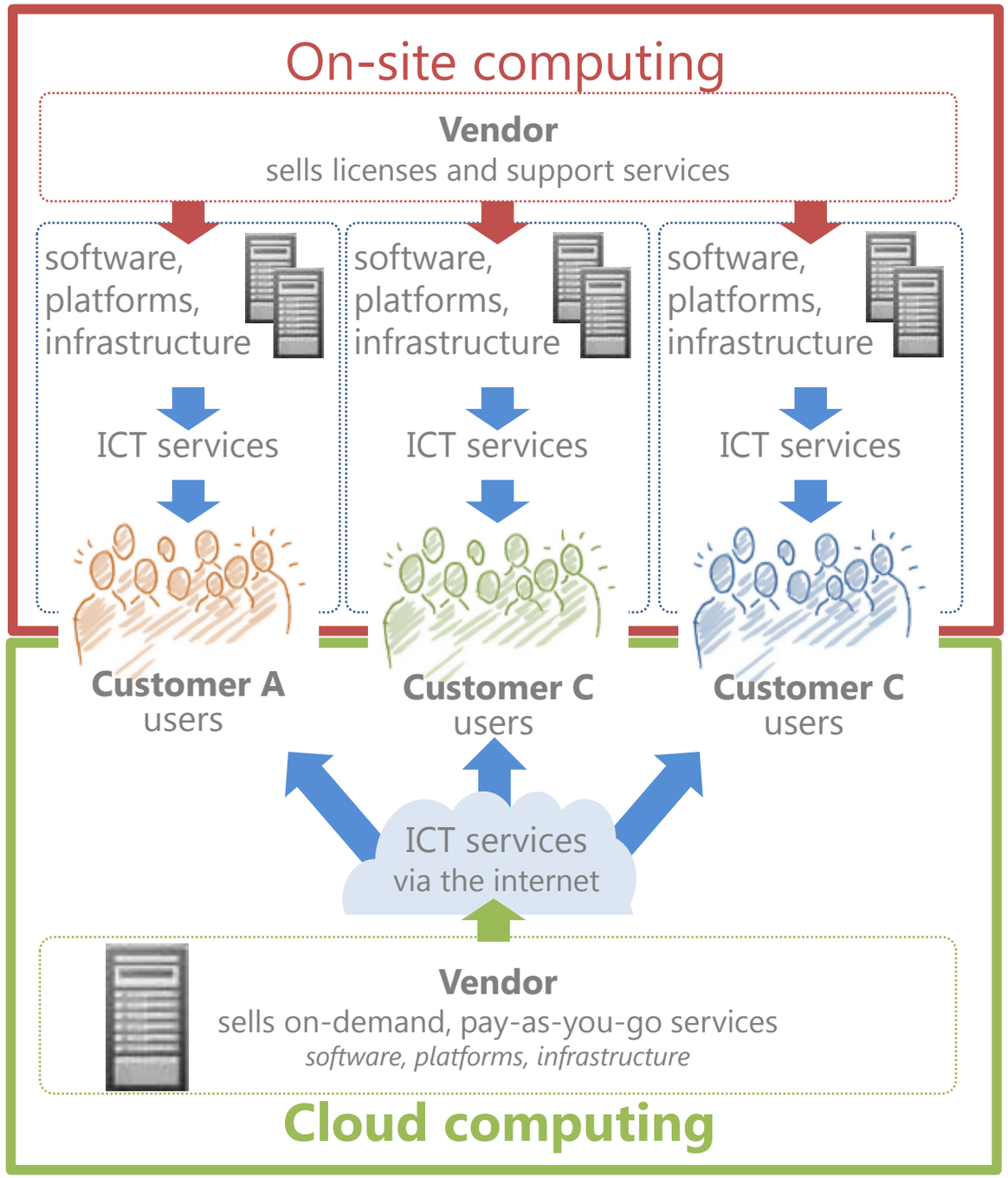
Cloud computing =

an enabling technology of

GHG abatement.

Because data centres are significantly more energy efficient than distributed servers.

But are they?



Cloud computing - the scope of our study

Analysis limited to 3 cloud-based services

(1) Email

(2) Customer Relationship Management (CRM)

(3) Groupware

A shift to cloud computing can enable:	**PRIMARY**	**SECONDARY**
(-) a direct decrease in emissions	**In scope:** GHG emissions saved by switching off on-site servers **Out of scope:** dematerialisation (e.g. no more CDs for software)	**Out of scope** (e.g. additional applications)
(+) a direct increase in emissions	**In scope:** GHG emissions associated with the full life cycle (build, use, disposal + embedded) of replacement cloud infrastructure	**No secondary direct ICT emissions**
(+) an indirect increase "rebound effects"	**Out of scope:** the potential that **c**loud may increase demand for computing	**Out of Scope:** the potential that enterprises redeploy redundant on-site servers for new capacity

The GHG abatement potential of cloud

Potential GHG abatement of Cloud Computing

4.5Mt CO2e

from the adoption of cloud-based email, CRM and groupware applications.

$2.2+ billion (USD) economy-wide savings in energy bills

if:

- 80% of all organisations (public and private) adopt,
- Organisations switch off their on-site servers when they switch to the cloud

This is GHG abatement equivalent to:

2% of the ICT sector's own footprint could be abated

Cloud-based email, CRM and groupware is 95% more energy efficient:

For every 1 tonne of GHG emitted by a vendor, 20 tonnes are abated from customers.

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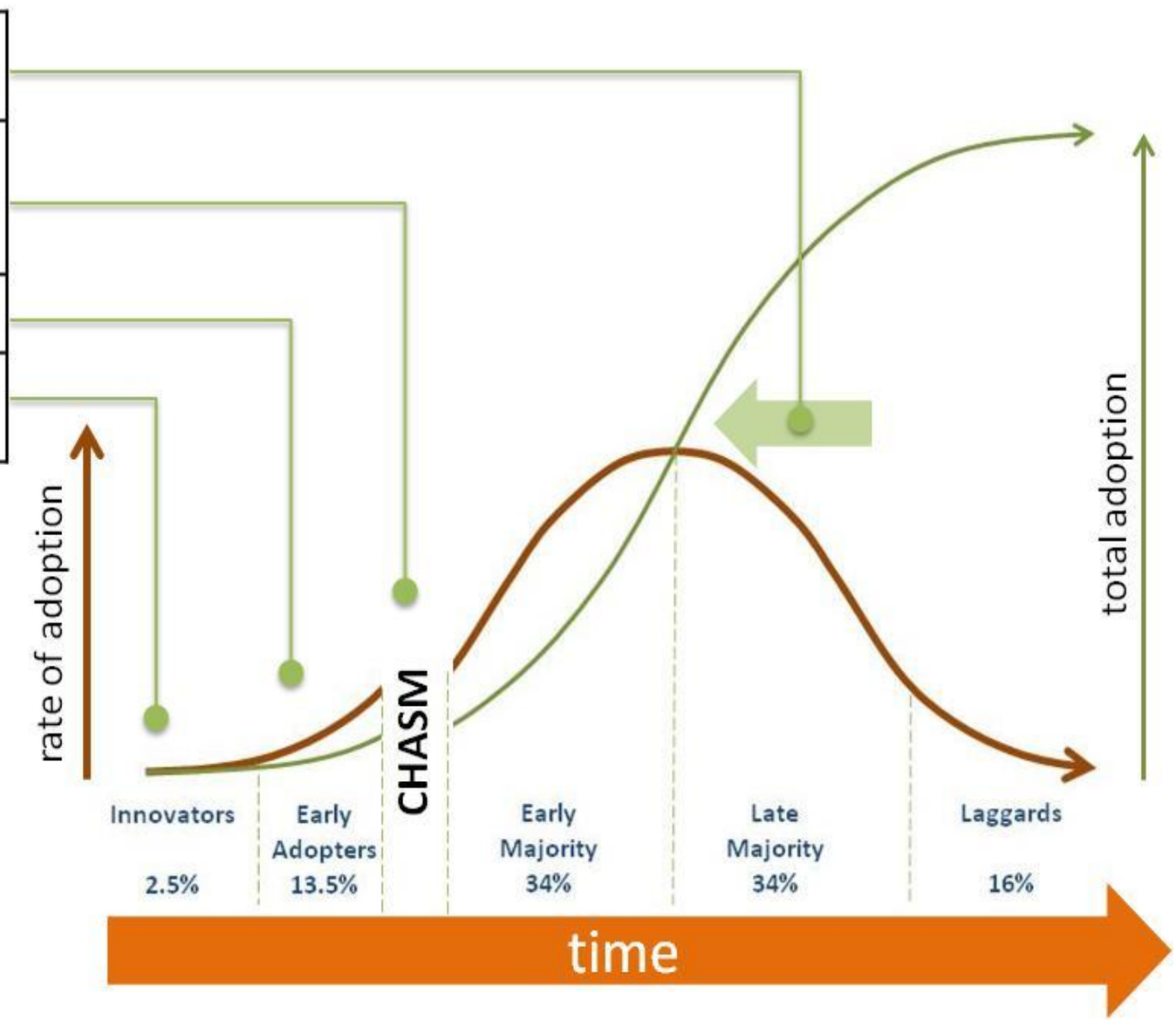
Understanding barriers

Are business leaders and policy makers doing enough to create an enabling environment for technologies such as Cloud to flourish?

A. To accelerate the adoption of technologies that deliver energy efficiency
B. To help enabling technologies cross the chasm to the mainstream from early markets
C. To support the growth of early markets
D. To stimulate the invention of new enabling technologies



Common commercial behaviour barriers

- Are concerns over data security driven more by the threat of change and loss of control than reliable evidence regarding security/privacy?

- Is the one-size-fits-all marketing messages prevailing?
- What is the true business case for cloud?

Recognising and responding to behavioural challenges

Marketing approaches

Four common barriers created by cloud vendor behaviour

Influence over decision makers.

Economic Impact Assessment

- Do cloud vendors have real influence over their potential clients' strategic decision-making beyond operational IT?

- Are cloud vendors presenting a clear economic case to firms considering cloud computing?

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Understanding barriers: public policy

To understand the likely <u>impact of policy instruments</u> we in created a new approach to facilitating joined up debate between industry and policy makers.

		Types of Policy Instrument			
		Regulatory	*Economic*	*Behavioural*	*Government Leadership*
Ways in which instruments can support vendors	A. Does it accelerate the adoption of technologies that deliver energy efficiency ?				
	B. Does it help enable technologies to cross the chasm from early niche to mainstream markets ?				
	C. Does it support the growth of early markets				
	D. Does it stimulate the invention of new enabling technologies				

Policies and their context for the ICT sector

We suspect policies are creating uncertainties or unclear signals to the market

Are policy makers failing to:

1. directly embrace the enabling potential of the ICT sector.
2. demonstrate an understanding of the technology invention and diffusion cycle.
3. present clear intent and targets for GHG reduction with ICT.
4. embrace regulatory, economic, behavioural and governmental leadership policy instruments to understand the 'joined up' impact that policies might have?

How the barriers might impact adoption of cloud

The extent to which Cloud Computing will achieve broad penetration remains unclear. Barriers that delay adoption could reduce the GHG abatement potential of cloud by 50%.

Commercial uncertainty

Policy-based uncertainty

2.3Mt CO2e

Uncertainty = barriers that might slow adoption.

Slower adoption through to 2016 could half the GHG abatement.

4.5Mt CO2e

What do you think? Are business leaders and policy makers doing enough to create an enabling environment for enabling technologies?

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