



Energy Innovation

Energy Economics Summer School 18 -21 February 2019

Agenda

- » Callaghan Innovation
- » Why innovation?
- » What is innovation?
- » How Callaghan works with energy businesses
- » Digital Energy Hub
- » Breaking new ground
- » Solving customer problems

Innovation is Critical to NZ's Future

INNOVATION =

Increased Productivity

Economic Diversification

Export Growth

Sustainability

Wage Growth

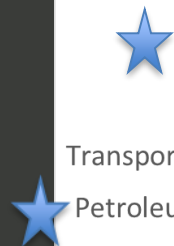


What does good look like?

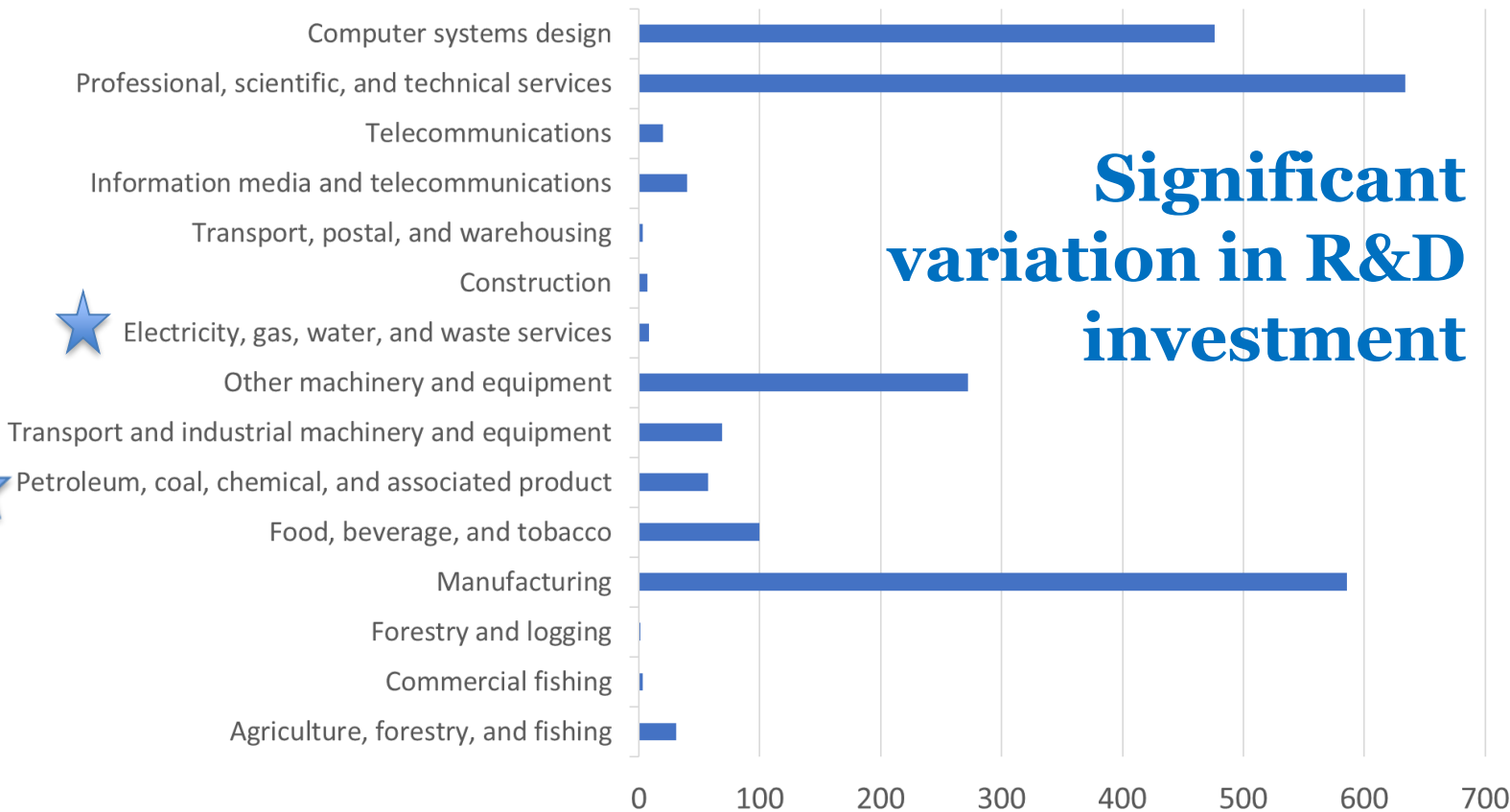
Business-led R&D by NZ's largest tech companies

# companies by revenue band	Revenue band	R&D as % of Revenue
5	>\$200m	6%
38	\$50-\$199m	10%
90	\$10-49m	12%
67	<\$10m	25%

Largest 200 technology companies
Technology Investment Network Report 2017

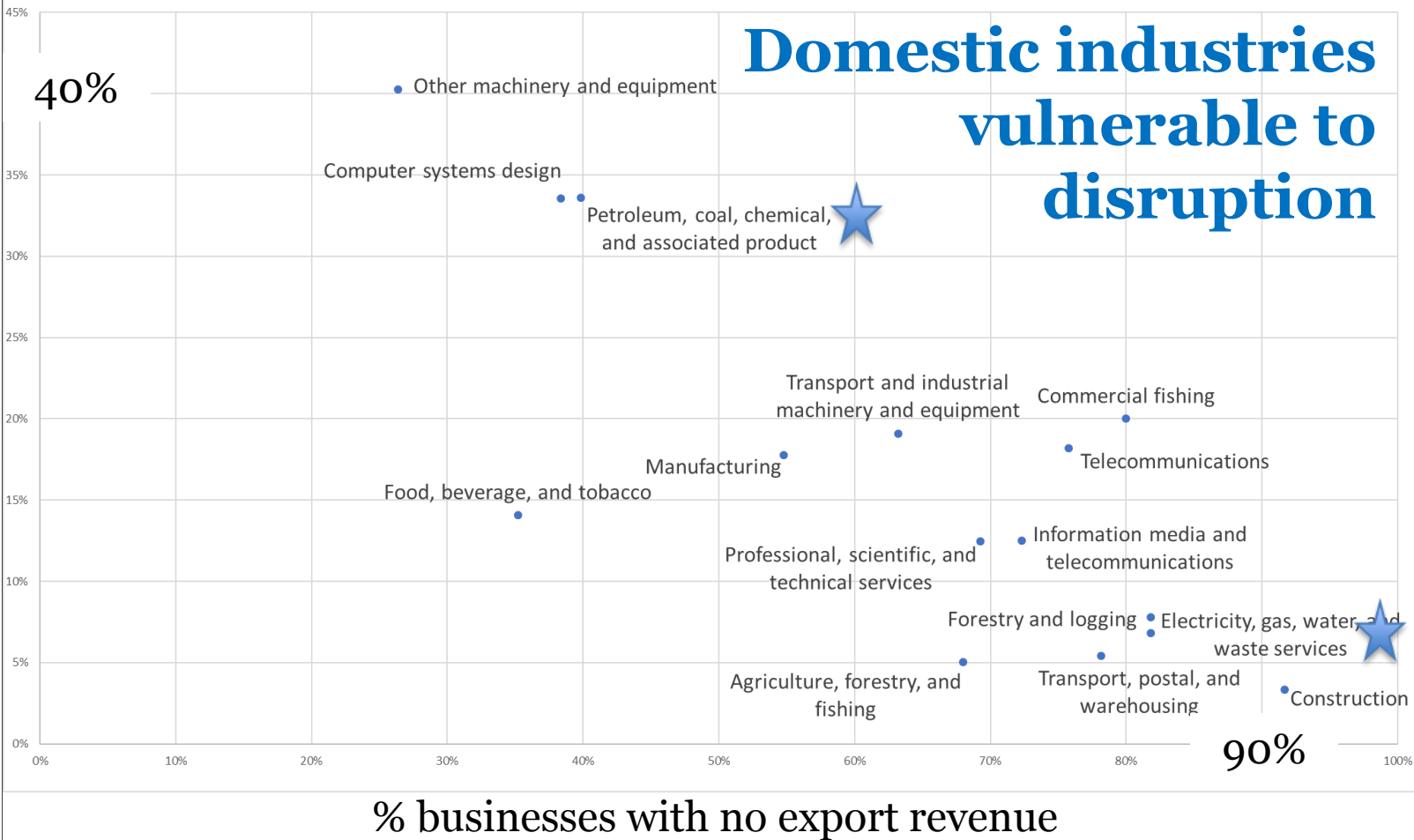


Research & Development by Industry (\$, 2016)



StatsNZ, 15 of the 40+ industries and sub-industries shown

% businesses investing in R&D



Rationale for business- led energy innovation in NZ

- » Convert potential technology disruption into opportunity
- » Business growth
- » Future employment, revenue & exports
- » Next generation of emission reduction technologies
- » Demand from EVs and digital technologies
- » 100% renewable electricity by 2035

What is innovation?

Structured Innovation

TEN TYPES OF INNOVATION

THE DISCIPLINE OF BUILDING BREAKTHROUGHS

“If in principle we are all in
favour of innovation,
in practice we try to make our
world safe and certain.”

DOBLIN

a Deloitte business

“Innovation is the elegant integration of many things.”

Larry Keeley, Founder, Dublin

Profit
Model

Network

Structure

Process

Product
Performance

Product
System

Service

Channel

Brand

Customer
Engagement

CONFIGURATION

OFFERING

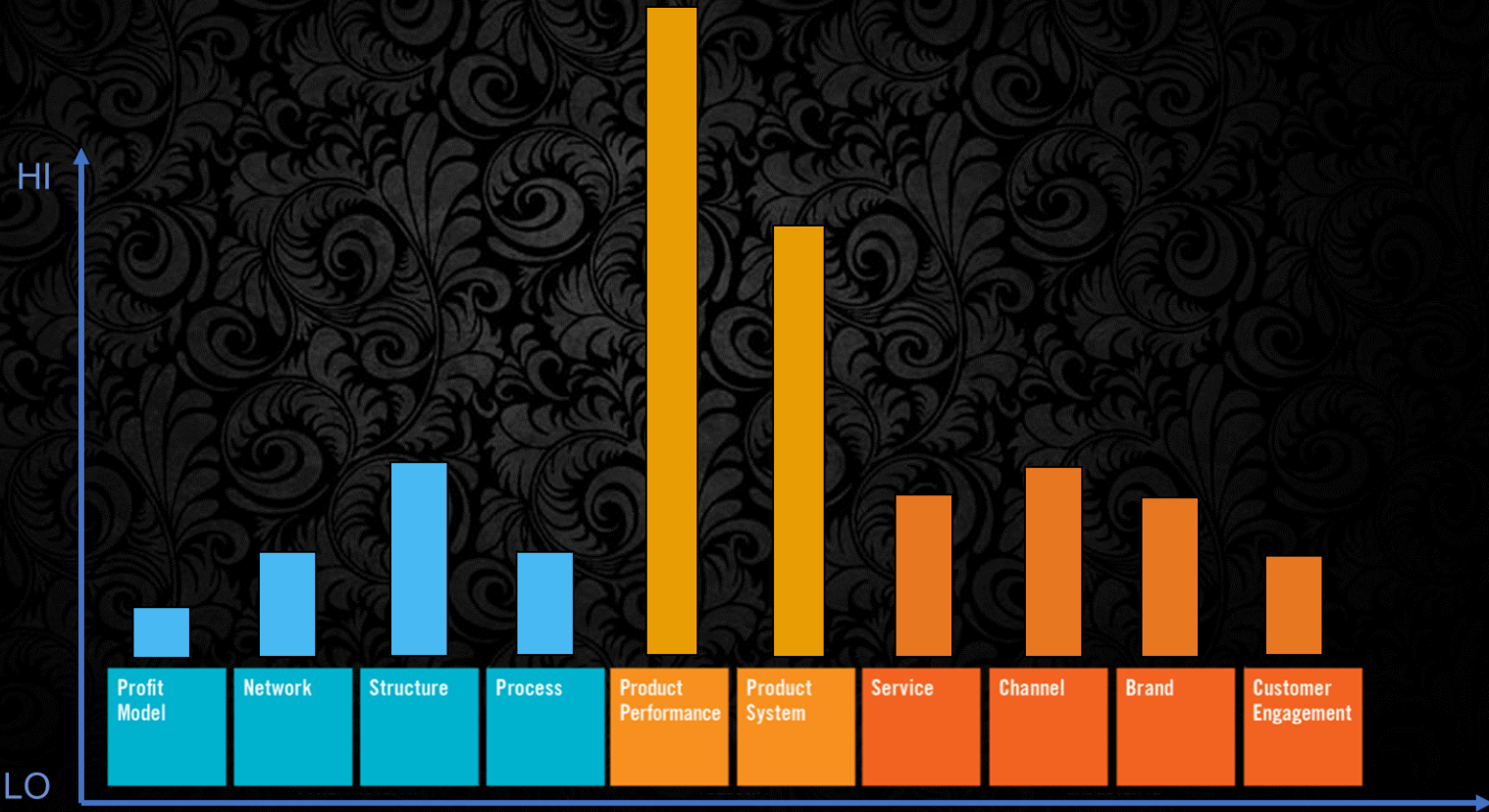
EXPERIENCE

DOBLIN

a Deloitte business

Volume of innovation efforts

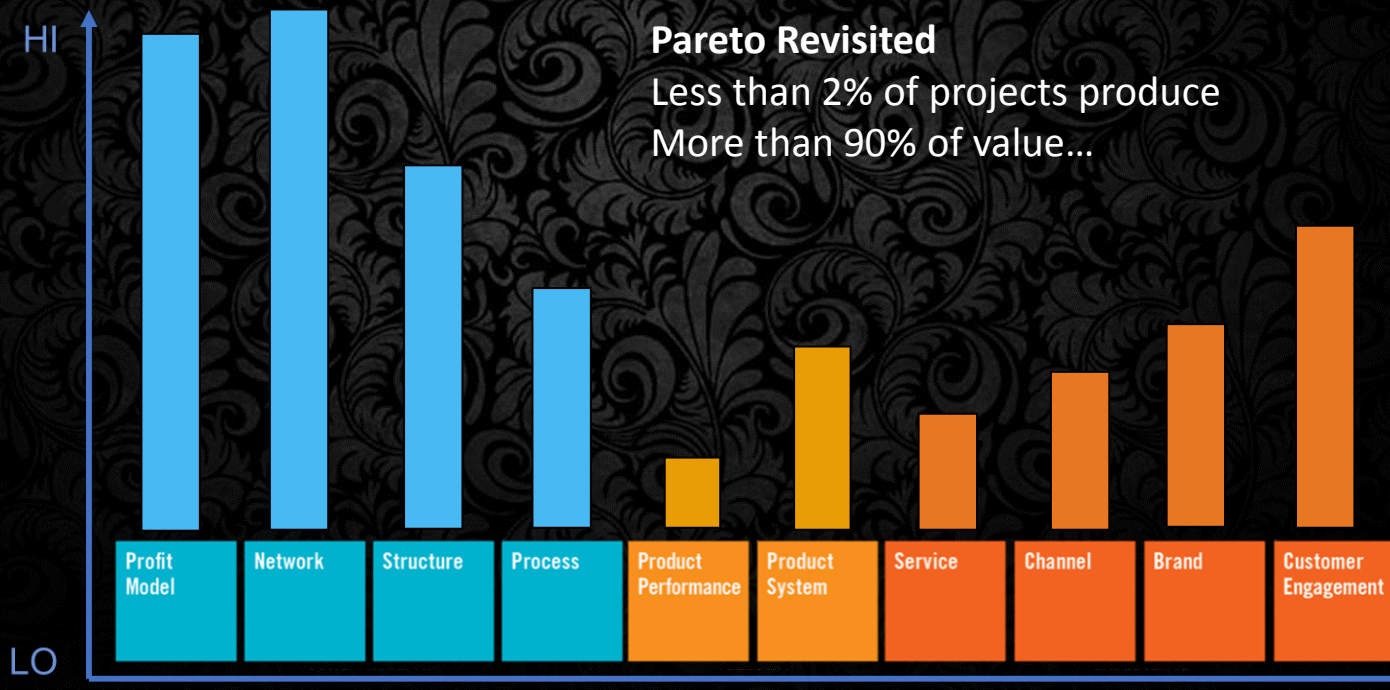
10 years 2002 - 2012



Source: Doblin

Cumulative value creation

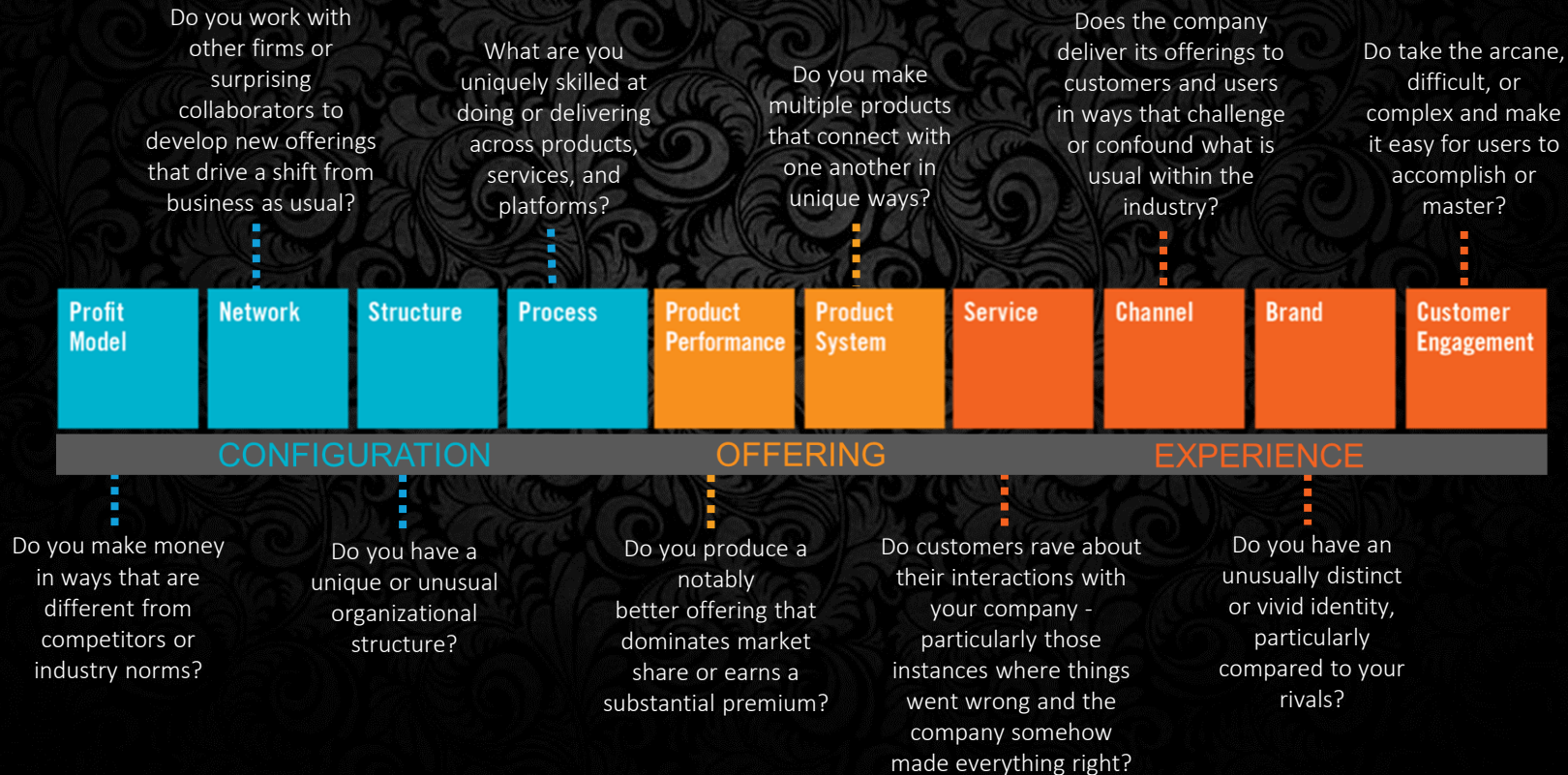
10 years 2002 - 2012



Source: Doblin

Doblin research shows that
businesses using their
framework are
9 times more successful with
their innovation efforts

10 Types of Innovation



10 Types of Innovation



How does Callaghan work with energy businesses?

Energy businesses we partner with



emhTrade



embrium



pure kiwi mettle



OikoLab

HIRINGA



enatel

SOLARCITY





Keeping up with exponential technologies

Think Big. Start small. Scale fast.

How we work with energy businesses

	R&D	Programs	Grants
Mitton	◆		◆
Unison	◆	◆	◆
Embrium	◆	◆	◆

“Funding and support from Callaghan Innovation has enabled GoodMeasure to go from strength to strength, investing in R&D to further the development of cutting-edge meter-data communications technology in New Zealand.”

Peter Sandston, Business & Channel Development Manager, [GoodMeasure](#)





LIGHTNING LAB *Electric*

sponsored by



powered by

CREATIVE|HQ

CallaghanInnovation

What if established & start up businesses worked together more?



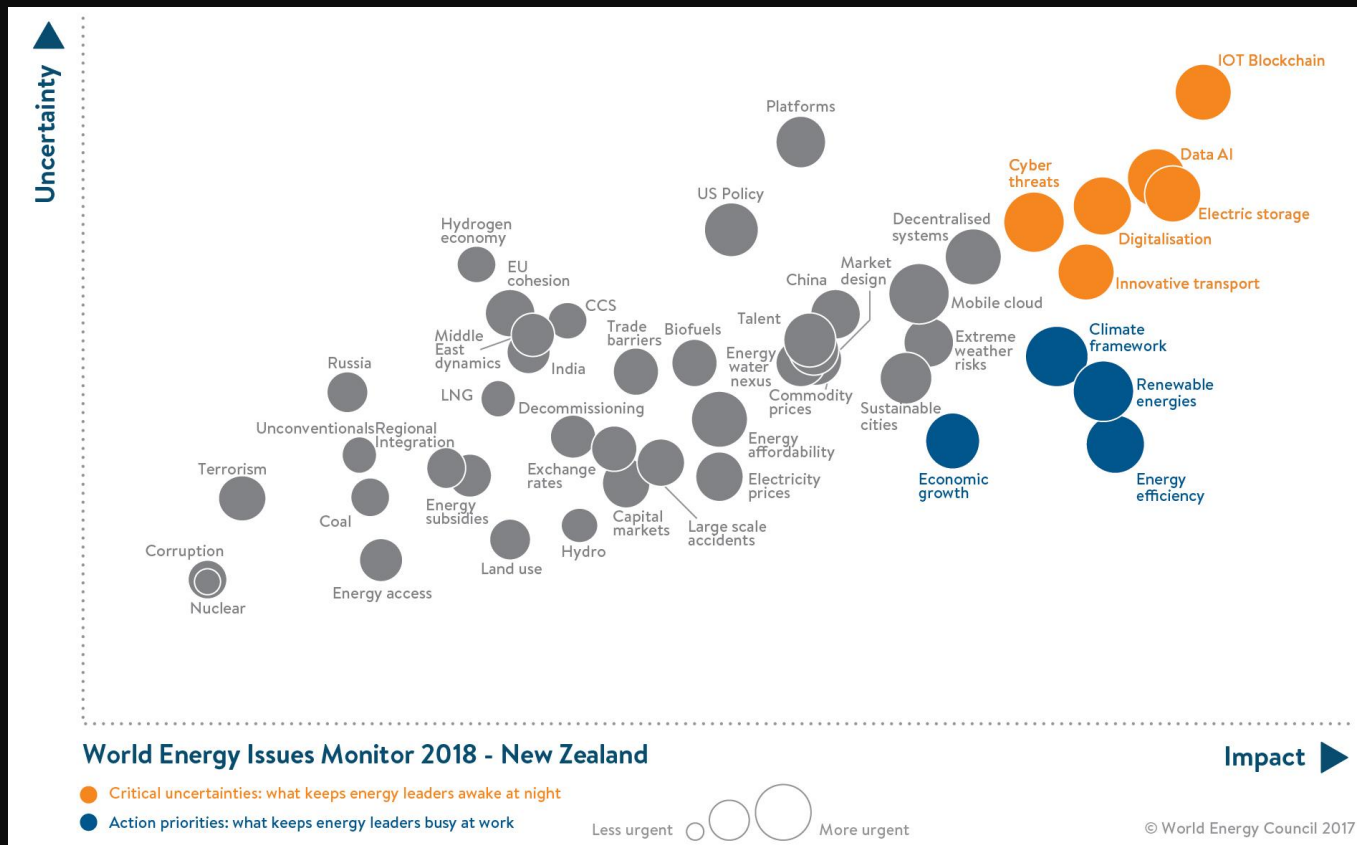
The logo for Callaghan Innovation, featuring the company name in a sans-serif font inside a yellow square, with a small teal graphic element at the bottom right.

Callaghan
Innovation

DIGITAL ENERGY HUB.NZ

Liberating energy innovators

Critical issues - IOT, Data, AI



Voice of the Innovative Energy Business

"We want to revitalize our innovation.... we're talking to big players about their assets...we need to understand machine learning."

"We felt isolated whilst validating our IoT technology"

"We're trying to innovate, have lots of ideas...want to find out who to team up with"

"We've developed data analytics software but don't know how to commercialise."

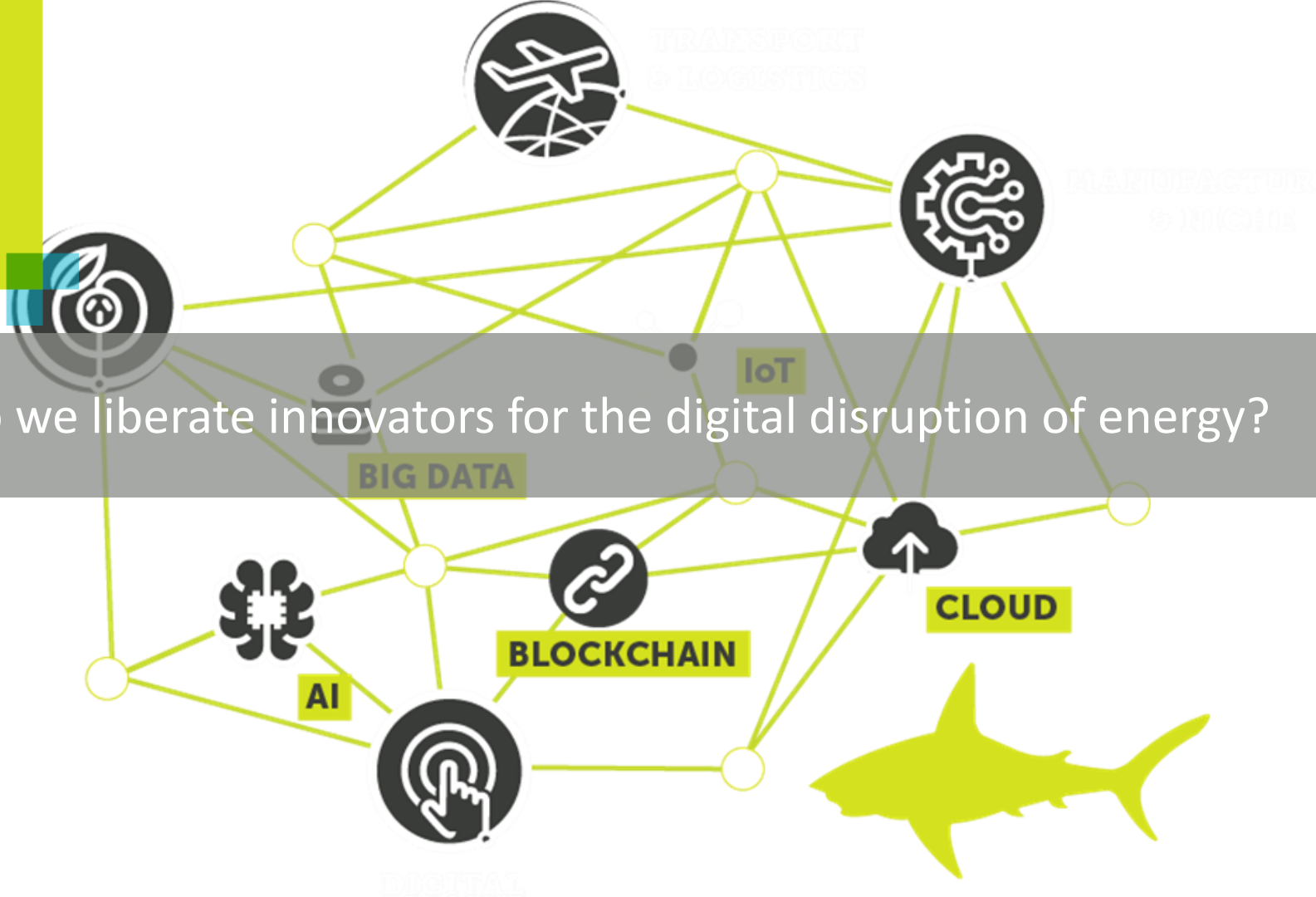
"Our team arose from software industry.... We needed help to find an energy industry partner."

"Callaghan Innovation's support of Harmonic in the fields of innovation and R&D capability development have helped position us as the leading data science practitioner in specific industry sectors, such as energy, across Australasia."

Phil Shepherd, CEO, [Harmonic](#)

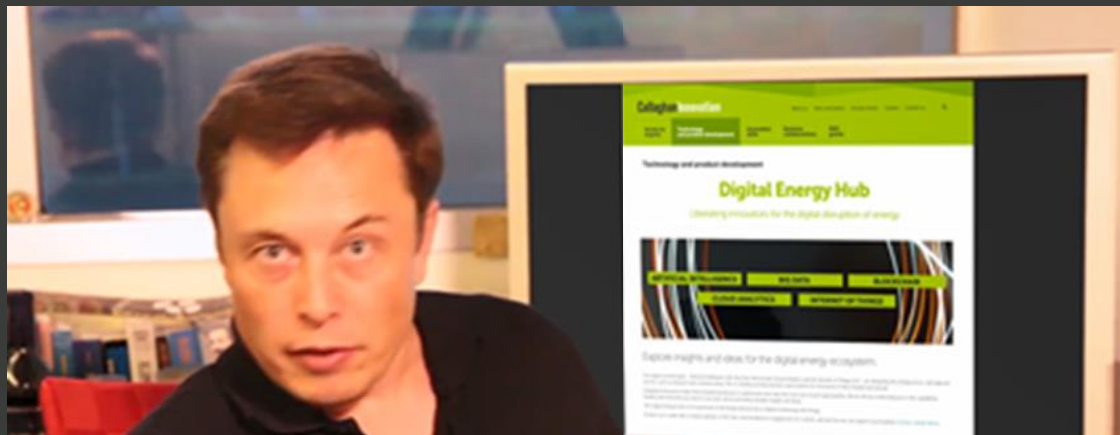
"We've never been more productive, nor have we iterated so quickly as we did through the Lightning Lab Electric."

How do we liberate innovators for the digital disruption of energy?





Liberating energy innovators



- Collaborate on energy innovation that breaks new ground
- Explore how digital technologies can address customer problems
- Invest in R&D like technology companies
- Connect with Callaghan Innovation and the Digital Energy Hub

Breaking new ground

Rocket Lab CEO, Peter Beck, has acknowledged the importance of Callaghan Innovation's help, saying:

"The funding towards the development phase of our Electron launch vehicle was critical, allowing us to invest significant capital, time and expertise into developing all our systems in-house. The innovations that resulted mean we now have a vehicle with an unprecedented low price, which is highly manufacturable."

What if we could radically reduce the cost of satellite launches?

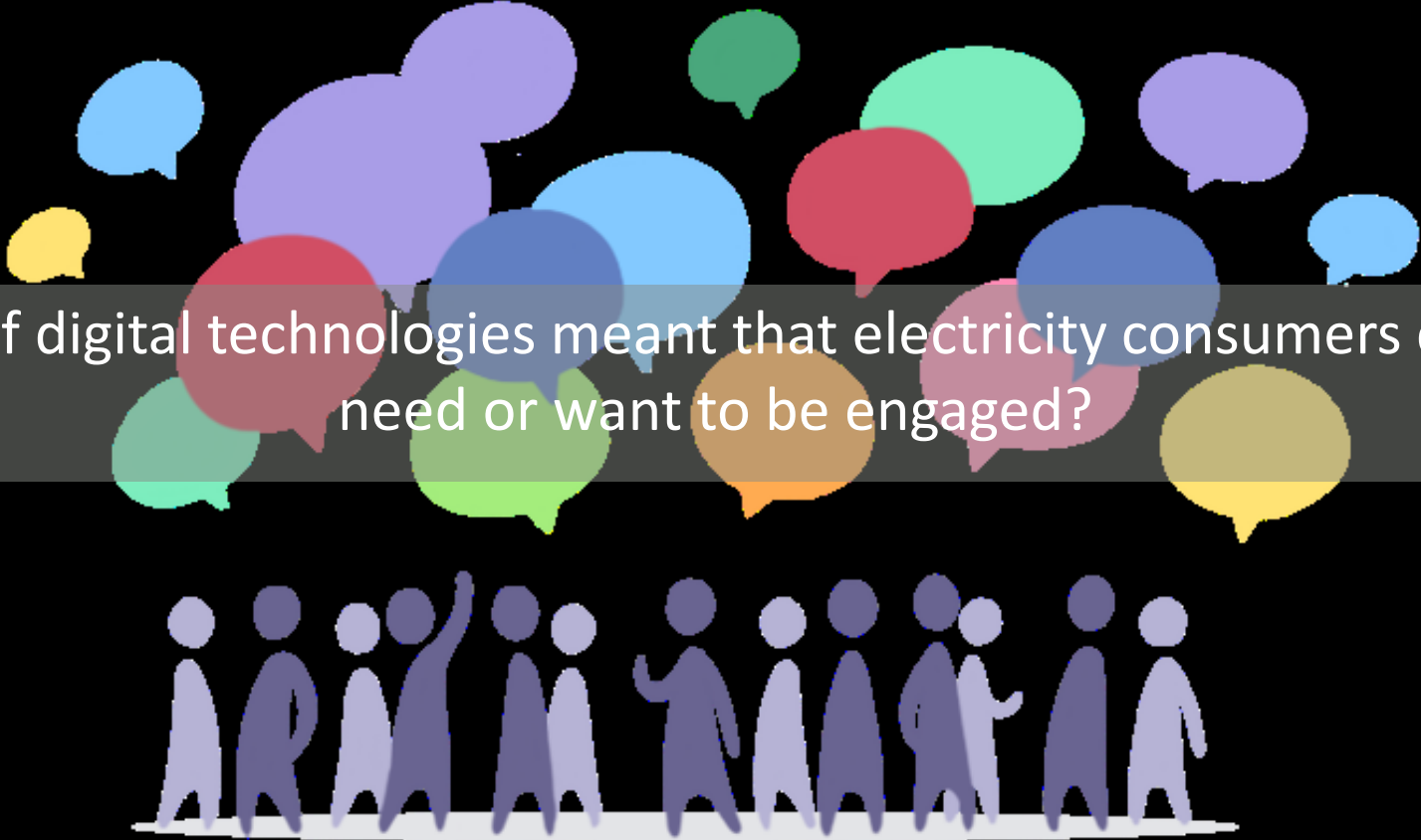





What if Artificial Intelligence reduced energy demand by 30-40%?



What if Blockchain authenticated emission reductions in NZ and overseas?



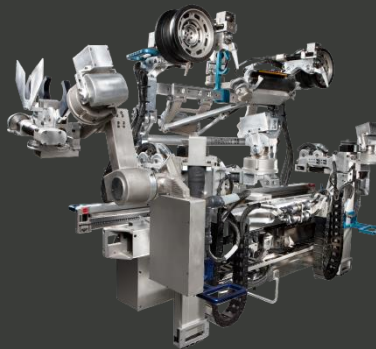
What if digital technologies meant that electricity consumers did not need or want to be engaged?

A photograph of an offshore oil rig against a clear blue sky. The rig's complex structure, including its derrick and various support beams, is visible. The image is slightly blurred, giving it a sense of scale and distance. A semi-transparent grey banner is overlaid across the middle of the image, containing white text.

What if energy and composite materials businesses worked together to create new technology for export?

Solving customer problems

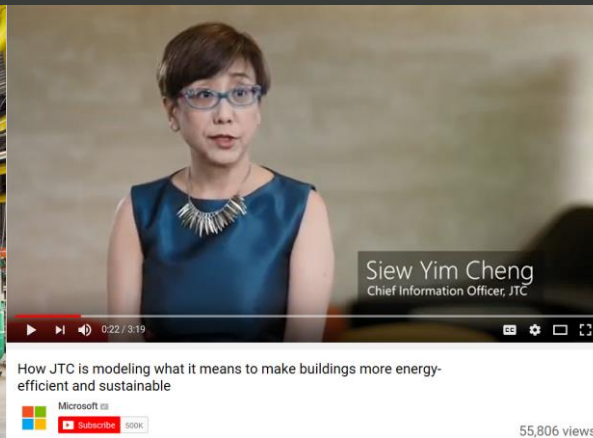
“We want to improve the way we inspect our physical assets.”



“We want to find a better way to invest in our electricity network.”



“We’ve tried everything but want to
reduce energy consumption further.”

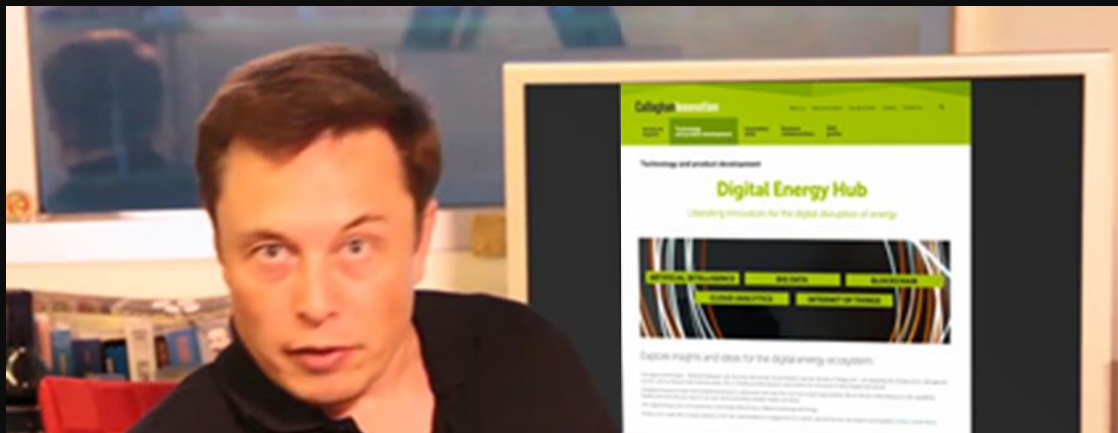


Agenda

- » Callaghan Innovation
- » Why innovation?
- » What is innovation?
- » How Callaghan works with energy businesses
- » Digital Energy Hub
- » Breaking new ground
- » Customer problems

“Anyone who has never made a mistake has never tried anything new.” - Albert Einstein.

Make boldness a habit



“I think that’s the single best piece of advice: constantly think about how you could be doing things better and questioning yourself.” - Elon Musk

Contact:

James Muir

Business Innovation Advisor – Energy & Environment

james.muir@callaghaninnovation.govt.nz

@CallaghanEnergy

DigitalEnergyHub.nz