Digital Energy Hub

ERANZ Talking Heads
November 2017

James Muir
Electricity retailers

» Innovative pricing plans and service offerings
» Nimble, data rich, digital savvy
» Technology companies
“One hundred inspired New Zealand entrepreneurs can turn this country around. That is the challenge for us all.”

Sir Paul Callaghan, 1947–2012

Rukuhia te wāhi ngaro, hei maunga tātai whetū
Explore the unknown, pursue excellence
Niche guys finish first

» Technological innovation will lift NZ’s productivity
» Our future lies in the unexplored niches
» Our tech sector is leading the way in R&D investment.
Business R&D is critical

R&D SPENDING BY NEW ZEALAND BUSINESSES IN 2016

0.6% of GDP compared with OECD average of 1.6%
**TIN200 companies invest 6-25% in R&D**

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### REVENUE BAND COMPARISON

<table>
<thead>
<tr>
<th>Revenue Band</th>
<th>Total Revenue</th>
<th>Revenue Growth %</th>
<th>As a Percentage of Audit &amp; Salaries</th>
<th>R&amp;D %</th>
<th>Revenue Per Employee</th>
<th>Revenue by Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&gt;200m</td>
<td>$3.725B</td>
<td>7.4% / $256m</td>
<td>35%</td>
<td>6%</td>
<td>$250.0</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>$50-199m</td>
<td>$3.821B</td>
<td>9.2% / $322m</td>
<td>33%</td>
<td>10%</td>
<td>$230.9</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>$10-49m</td>
<td>$2.064B</td>
<td>7.1% / $137m</td>
<td>42%</td>
<td>12%</td>
<td>$214.2</td>
<td>R&amp;D</td>
</tr>
<tr>
<td>$&lt;10m</td>
<td>$399m</td>
<td>4.9% / $19m</td>
<td>60%</td>
<td>25%</td>
<td>$169.6</td>
<td>R&amp;D</td>
</tr>
</tbody>
</table>
Our Offer

What we do

Deliver innovation services to businesses:

- R&D
- Innovation skills programmes
- Grants

Our expenditure

$307.4m
2017/18 EXPECTED SPENDING

$204.8m
GRANTS

$45.7m
PERSONNEL

$27.1m
SCIENCE PROJECTS & SUBCONTRACTS

$29.8m
OTHER

Our reach

2473 ORGANISATIONS ENGAGED WITH US IN 2016/17
Energy is one of our priority sectors
We help businesses succeed through technology

“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

“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
“Our team arose from software industry…. Lightning Lab helped us find an energy industry partner.” Polyanio

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

“We have no need to engage with Callaghan.”

“We’re not good at promoting our work…..”
"We've developed data analytics software but don't know how to commercialise."

"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"
Digital Energy Hub
Digital Energy – Example technology providers

**Artificial Intelligence**
- Qrius
- facebook
- AUT
- Centre for Artificial Intelligence
- Department of Computer Science
- Machine Learning Group
- Callaghan Innovation
- Google
- ARRIA

**Big Data**
- MINDFLEX
- WhereScape
- 11 Ants Analytics
- DATAMINE
- pwc New Zealand
- New Zealand Analytics Forum
- Qrius

**Blockchain**
- centrality
- THE BLOCKCHAIN NZ

**Cloud**
- intergen
- DATACOM
- AWS
- Google
- Microsoft
- PROVOKE
- Instillery

**IoT**
- New Zealand IoT Alliance
- Cisco
- Intergen
- 6ostream
- Vodafone
- Spark
- KotahiNet

Contact Callaghan Innovation for further information
Tech is exponential, culture is not.

› How will Blockchain affect my business?
› Over what timeframe?
› What next?

“The hurdle - users must be willing and able to change business processes and collaborate with customers, suppliers, and competitors in ways they never have before”

Ron Beatty
Electricity Authority
How will Blockchain affect retailers?

» Reduce transaction costs
» Encourage service bundling
» Increased focus on data availability, privacy, security & accuracy
» Gradual erosion of volumes
» Less engaged customers
## NZ Electricity Sector and Blockchain

<table>
<thead>
<tr>
<th>Co-ordination &amp; Complexity</th>
<th>Novelty</th>
<th>Substitution</th>
<th>Transformation</th>
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</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td><em>Replaces how we do business</em></td>
<td><em>Completely novel applications</em></td>
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<tr>
<td></td>
<td></td>
<td>• Distributed energy P2P</td>
<td>• Smart contracts, Transactive Grid</td>
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<tr>
<td></td>
<td></td>
<td>2022/2023</td>
<td>2027+</td>
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<tr>
<td>Low</td>
<td>High</td>
<td><em>Single Use</em></td>
<td><em>Localization</em></td>
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<td></td>
<td></td>
<td><em>Less costly, focused solutions</em></td>
<td><em>Private network across organizations</em></td>
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<tr>
<td></td>
<td></td>
<td>• Bitcoin as payment option</td>
<td>• Bank, electricity retailer, telecom</td>
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<tr>
<td></td>
<td></td>
<td>• Internal database</td>
<td>• Retailer + distribution company</td>
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<tr>
<td></td>
<td></td>
<td>2018</td>
<td>2019/2020</td>
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What next?

» Bring Blockchain into product roadmaps
» Double down on technology & innovation
» Connect with Callaghan Innovation
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