

An aerial photograph of a mining site in an arid, brown landscape. In the lower-left quadrant, there is a large rectangular area covered with rows of solar panels. To the right of the solar panels, a complex of industrial buildings and structures is visible, including several large, circular water treatment tanks with green water. The site is surrounded by sparse vegetation and dirt roads.

## Case Study: How are large scale hybrid systems making an impact on mining operations?

Andrew Drager - Head of Development (Off-Grid and Hybrid)



IMARC 30/10/2019

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An aerial photograph of a mining and solar farm site in a desert. The landscape is arid and brown. In the center-right, there is a large industrial complex with several buildings, a large circular structure, and a large rectangular pond. To the left of this complex, there are several large, rectangular solar panels. In the top right corner, there is a large, circular, multi-tiered structure, possibly a water treatment plant or a large storage tank. The overall scene shows a significant industrial and agricultural presence in a dry, open environment.

## Agenda:

1. What does juwi know?
2. What are other mines doing?
3. Why are they doing it?
4. What is the impact if I do it?

An aerial photograph of a mining and solar farm site in a desert landscape. The image shows a large industrial complex with various structures, including a prominent tall, conical structure, and several large rectangular solar panels. The surrounding terrain is arid and brown, with some green vegetation and a winding road. The text 'Agenda:' is overlaid on the left side of the image.

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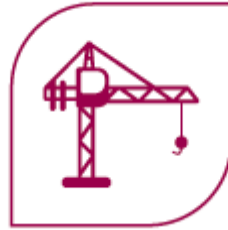
# juwi: Our Business



**Develop**



**Design**



**Construct**



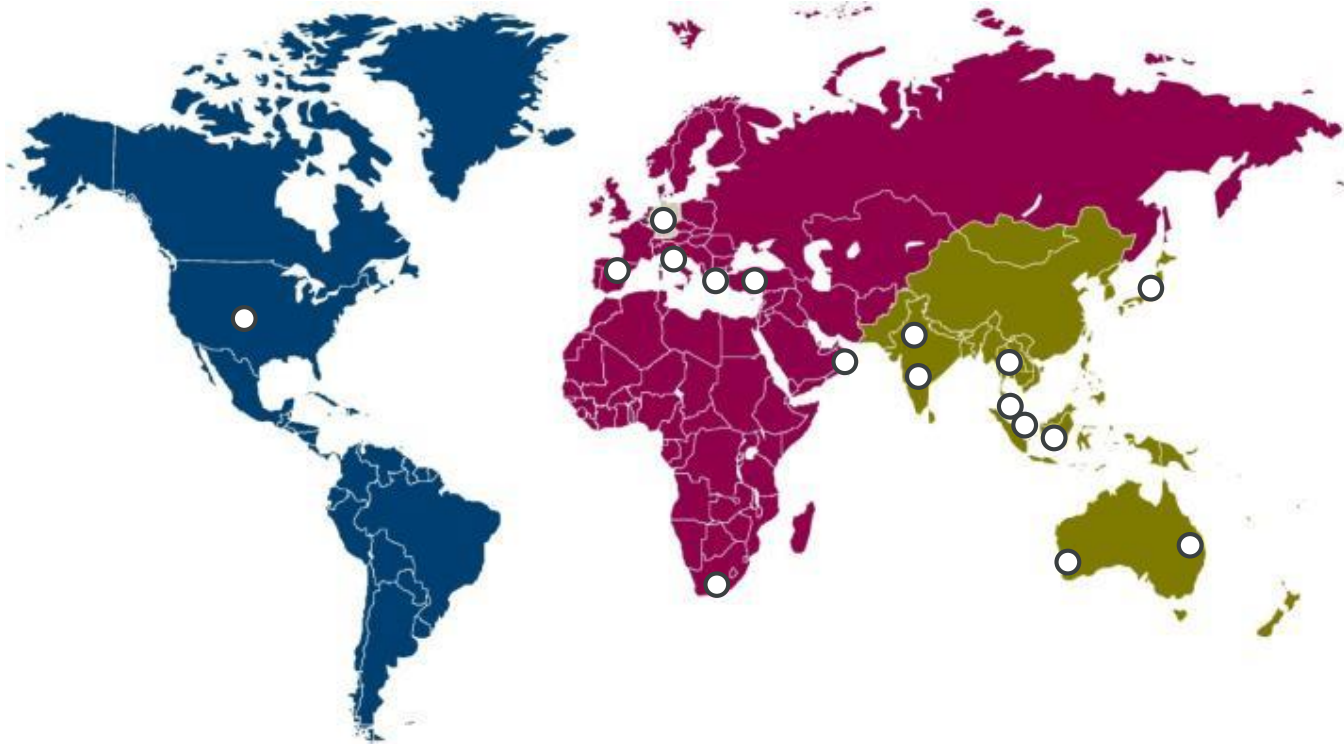
**Financing**



**O&M**



# juwi: Office Locations



# juwi: Figures



**\$10 B**  
Invested

**5 GW**  
Installed

**6 M tons**  
CO<sub>2</sub> / year  
saved

**1,700**  
Solar PV  
Systems

**1,000**  
Wind  
Turbines

**850**  
Employees

An aerial photograph of a mining and solar farm site in a desert landscape. The image shows a large industrial complex with various structures, including a prominent tall, conical structure, and several large, rectangular solar panels. The surrounding terrain is arid and brown, with some green vegetation and a winding road. The text 'Agenda:' is overlaid on the left side of the image.

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# Recent Renewable Energy Announcements



**22 MW**  
Goldfields

**30 MW**  
B2Gold

**60 MW**  
Fortescue

**13 MW**  
NordGold

**26 MW**  
Harmony

**500MW**  
BHP

# Historical Project: Sandfire – DeGrussa Mine (2016)



**20%**  
Renewable  
Energy

**5 M**  
Liters Diesel  
Saved p.a.

**6 Yr**  
PPA Term

**12 kt**  
CO<sub>2</sub>  
reduction

**10 MW**  
Solar

**6 MW**  
Battery



# Current Project: Goldfields – Agnew Mine (2019)



**60%**  
Renewable  
Energy

**10 Yr**  
PPA Term

**40k t**  
CO<sub>2</sub>  
reduction

**4 MW**  
Solar

**18 MW**  
Wind

**13 MW**  
Battery

# Future Project: TBA (2020)



**>80%**  
Renewable  
Energy

**10 Yr**  
PPA Term

**US\$45**  
per MWh

**100MW**  
Solar

**100MW**  
Wind

**50MW**  
Battery



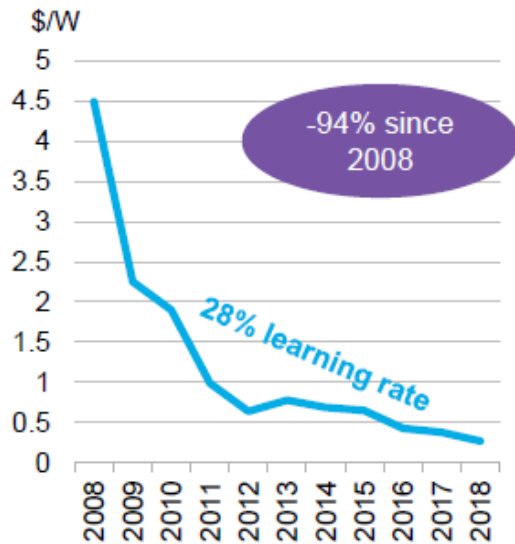
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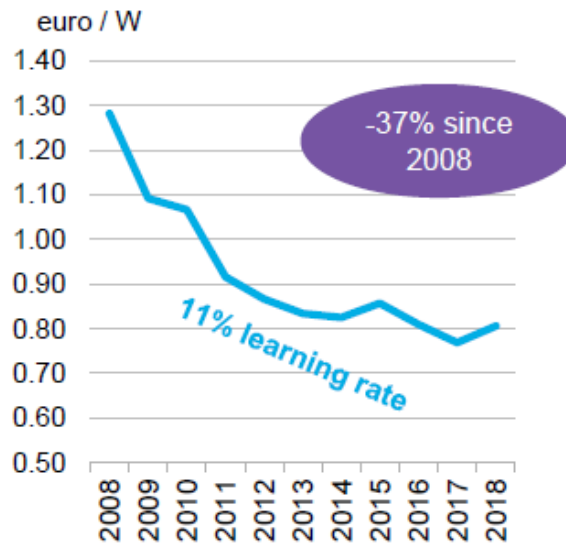
# Renewable Energy: continues to get cheaper



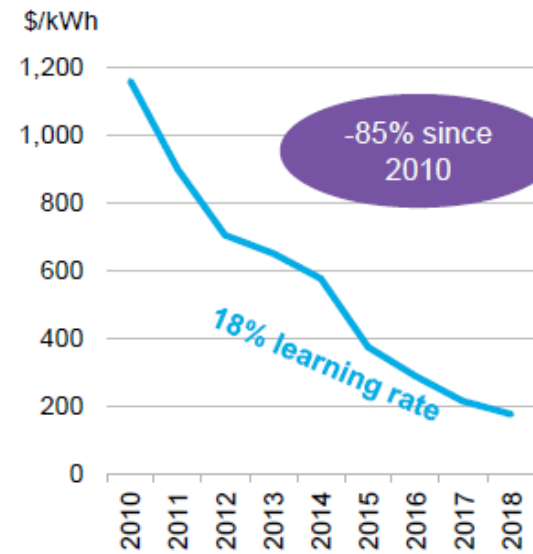
## Solar PV module prices



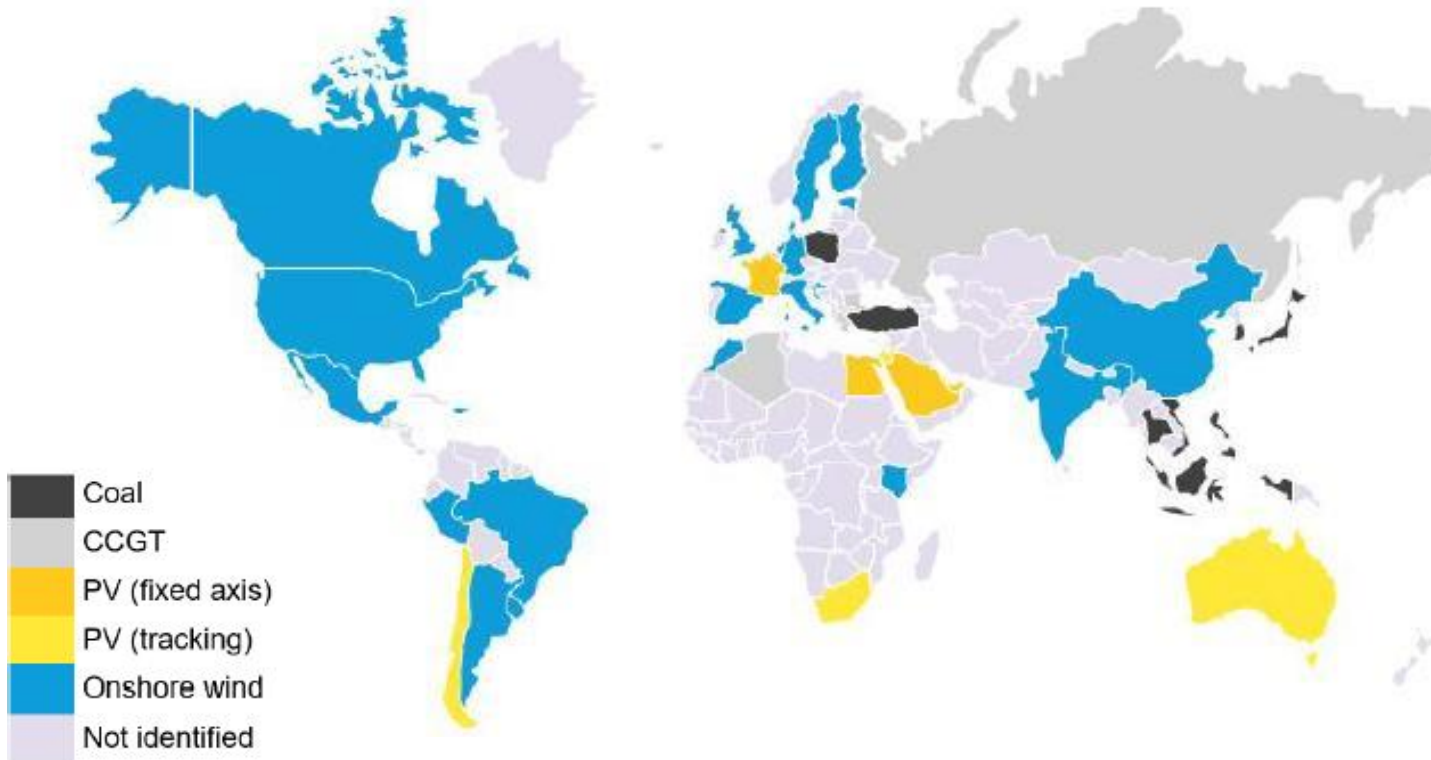
## Onshore wind turbine prices



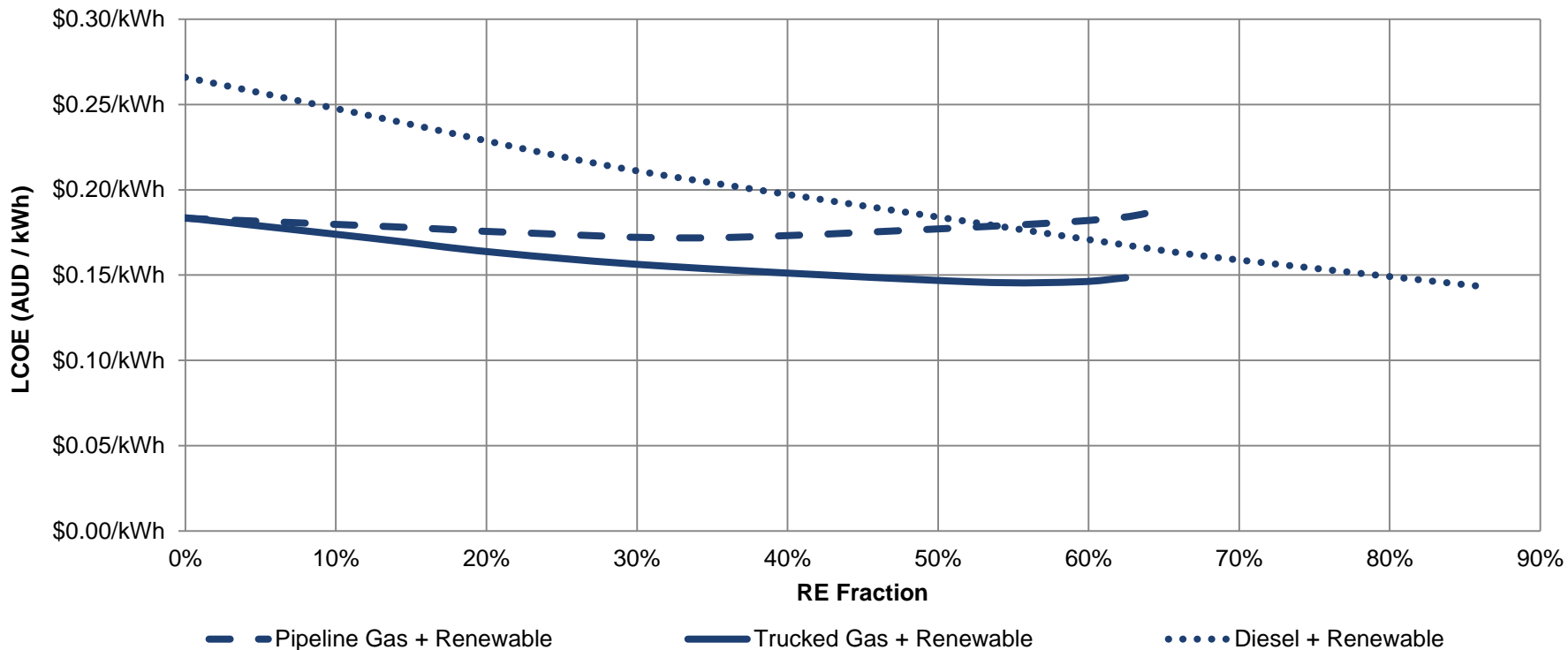
## Lithium-ion battery prices



# Renewable Energy: cheapest power in major markets



# Renewable Energy: LCOE Comparison





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juwi

## Impact: Cost

↑  
Complex

↑  
Land

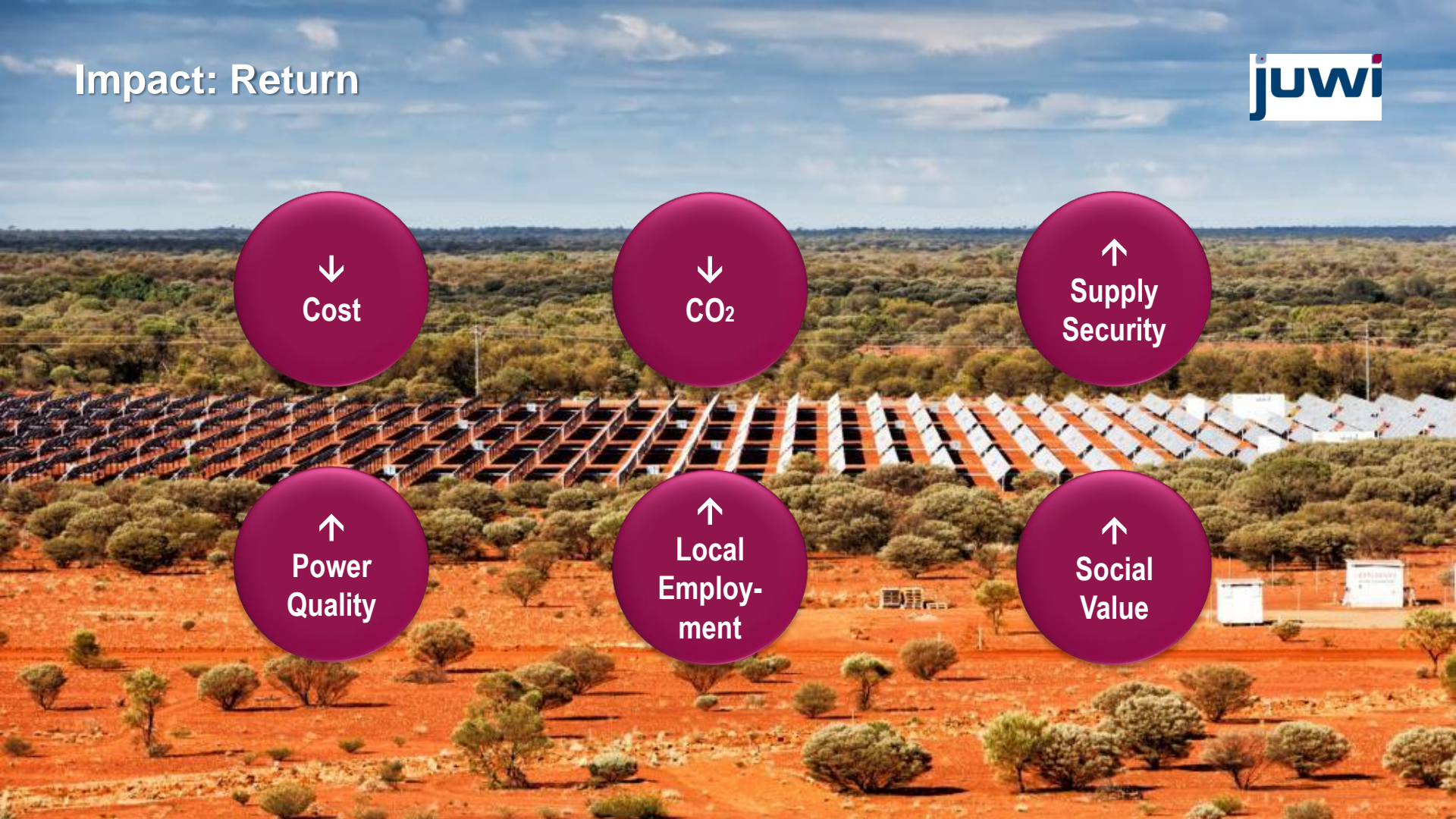
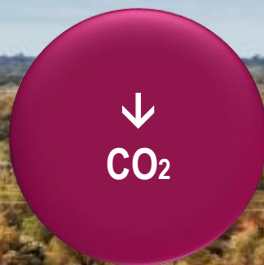
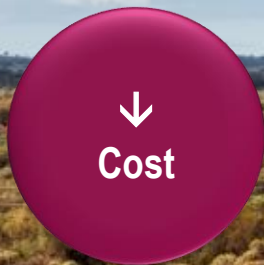
↑  
People

↑  
Liability

↑  
Demand  
Mgmt.

↑  
Time

# Impact: Return



Impact: Business as usual



Questions?

**juwi Hybrid IQ**

## Thank You

Dave Manning  
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Perth- Brisbane-Cape Town

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