



Government of Western Australia Department of Mines, Industry Regulation and Safety



## WA-Array – a new State-wide survey

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### Rationale

- As we transfer into a zero carbon economy large areas of the State are expected to accommodate renewable energy projects, including those required to support a future hydrogen energy industry
- Mining areas need to safeguard against competing land uses
- Most deposits so far found are in areas with exposed bedrock
- We need to look undercover
- Builds on AusArray completed in the other states



Passive seismic is one of the few methods of investigating deep below the crust into the sub-lithospheric continental mantle and to the lithosphere/asthenosphere boundary

## Why do we need to image the LAB?

See previous presentation by Graham Begg



## How do we image the crust and LAB?

- Teleseismic earthquake receiver functions using both P- and S-waves
- Full wave-form and bodywave tomography
- Ambient noise studies





### Timeframe

Deployment has just started last week in the SW











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# Deployment plan

- 1500 points
- 9 regions
- Year 1 Southwest
- Year 2 Youanmi-Carnarvon
- Year 3.....
- 10 years to complete



#### Timeframe

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Calendar Year	202	2022			2023	2023			2024				2025			2026		.6				2027			2028		3			2029		1		2030				2031			20		32
Financial Year																																											
	q3	q4	q1	q2	q3	q4	<b>q1</b>	q2	q3	q4	q1	q2	q3	q4	q1	q2	q3	q4	q1	q2	2 q	3 о	4	q1	q2	q3	q4	<b>q1</b>	q2	q3	q4	<b>q1</b>	q2	q3	q4	q1	q2	q3	q4	q1	q2	q3	q4
Area																																											
Southwest																																											
Youanmi-Carnarvon																																											
Central																																											
Eastern Goldfields																																											
Albany-Fraser/Madura																																											
Central East																																											
Pilbara-Hamersley																																											
Canning-Paterson																																											
Kimberley																																											

# Equipment

- 165 broadband seismometers
- Solar powered
- Recording at 250 sps
- 12 GB of data per year per station
- 20TB per year



#### Access

- Some very remote areas
- >50 of points inaccessible by land vehicle
- Access by 4WD or helicopter





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## Practical plan

- Deployment for 1 year
- Data collection every 6 months
- Data QA/QC very important
- Standard products will be pushed out for each region within 1 year
- More products to become available as research facilities and algorithms allow
- Waveform data available through AusPASS after 1 year

#### Products

Standard products include

- cover thickness map
- depth to Moho map
- lithospheric thickness map
- 3D Vsv crustal wavespeed model
- 3D Vsv upper mantle wavespeed model
- 3D Vp upper mantle wavespeed model
- 3D ?Vp and ?Vs upper mantle wavespeed model
- upper mantle strain field map
- local seismicity map and catalogue
- and more.....



Example of such products from the COPA array in the Capricorn

#### Products will be available through GeoVIEW.WA

#### Who we are



Project Manager Ruth Murdie Senior Seismologist John O'Donnell Stakeholder Engagement Mick McMahon