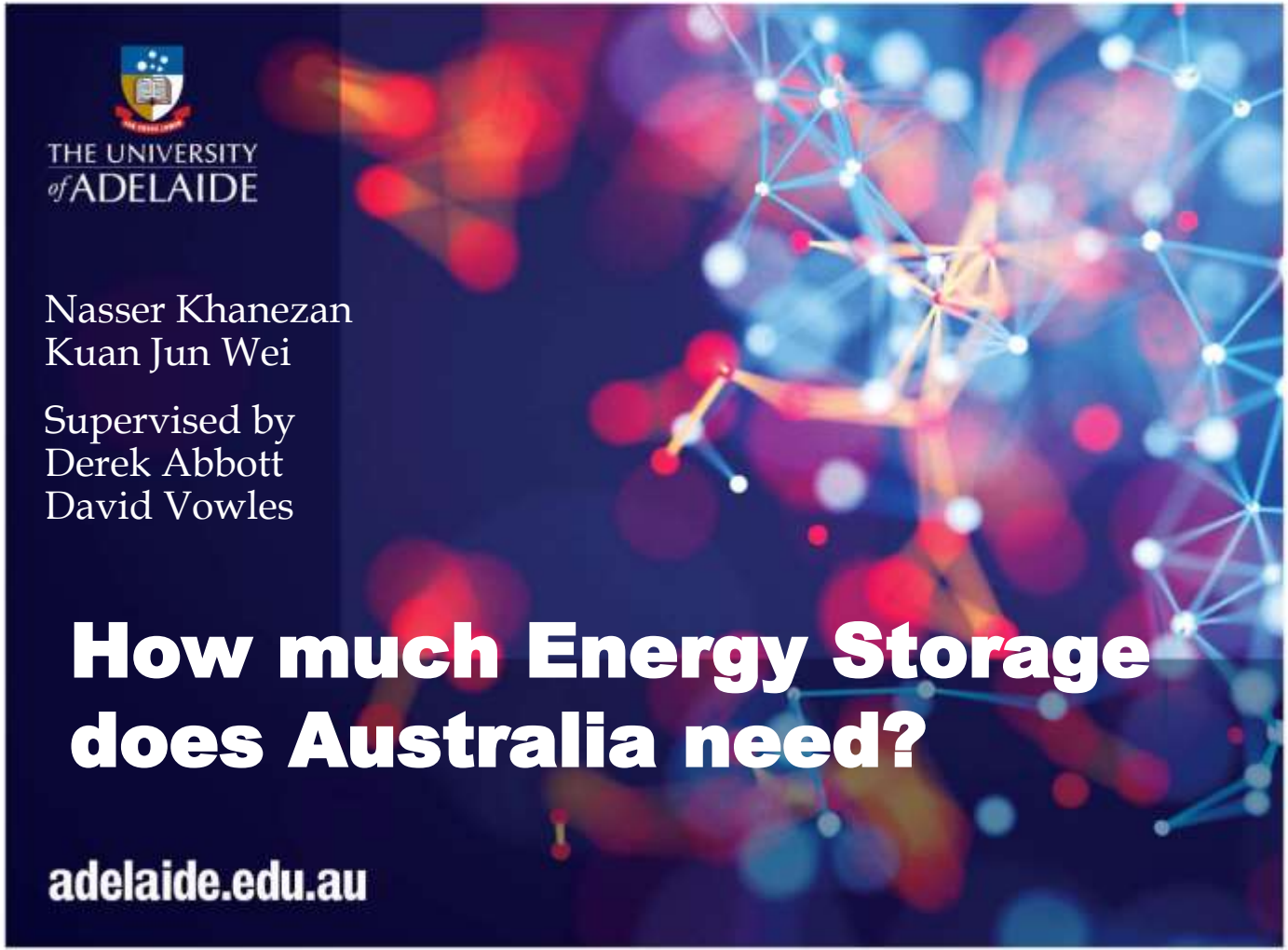
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How much Energy Storage does Australia need?
adelaide.edu.au

Outline

- Introduction
  - Project Aims and Motivation
- Project Summary
  - Data Source
  - Data Analysis Research and Steps
- Energy Storage Strategies
- Types of intermediate storage
- Project Management
  - Work Breakdown structure
  - Gantt Chart
  - Challenge and Budget
- Conclusion

Introduction : Project Aims and motivation

- **Aim: to Gain perspective on how much energy storage is needed to ensure demand supply balance due to the intermittency of renewable energy sources.**

- **Motivation: A significant amount of renewable energy generation has been added since 2018. In 2019, 24% of Australia's electricity generation is from renewables.**

Project Summary: Generation Data Source

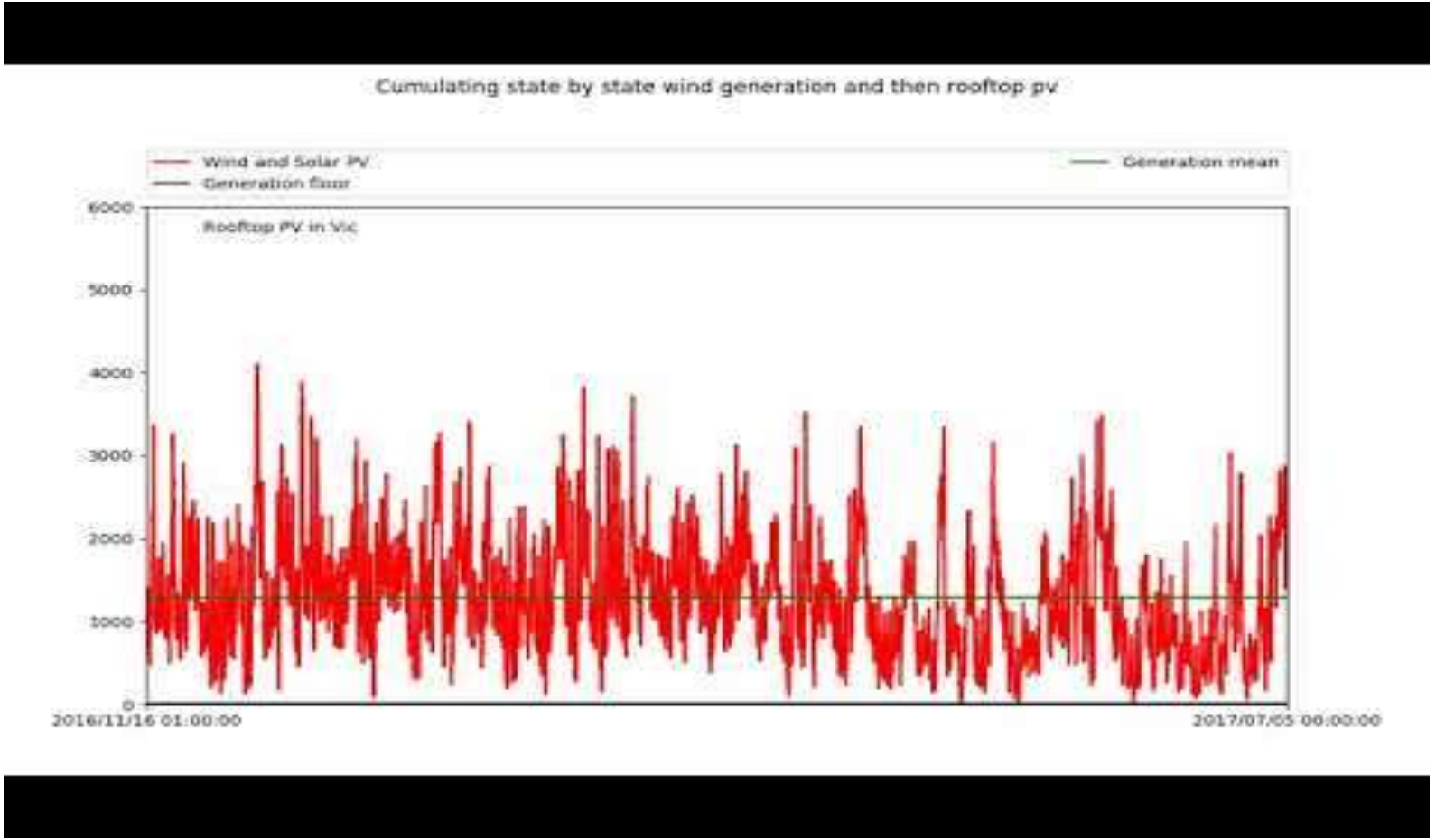
- Australian Energy Market Operator (AEMO)

- Bureau of Meteorology (BOM)

Project Summary: Data Analysis and Research steps

- Collecte data from AEMO website.
- Determine the storage requirements for today's Renewables
- Determine how much renewable energy is required to retire all fossil fuel generation
- Determine the minimum amount of storage required to ensure demand-supply balance at all times. Consider various scenarios:
  - minimum renewable energy supply
  - Multiples of this minimum level with excess energy producing fuels (e.g. hydrogen)

Video :


Cumulating state by state wind generation and then rooftop pv
Wind and Solar PV
Generation floor
Generation mean
Rooftop PV in Vic
6000
5000
4000
3000
2000
1000
0
2016/11/16 01:00:00
2017/07/05 00:00:00

Energy Storage Strategies

➔ **Smarter approach:**

- **Spread the consumption of power, from the fossil fuel source, for over long period of time**
- **Reduce required fossil fuel capacity for a given storage capacity**
- **Requires good forecasting intermittent sources and load**

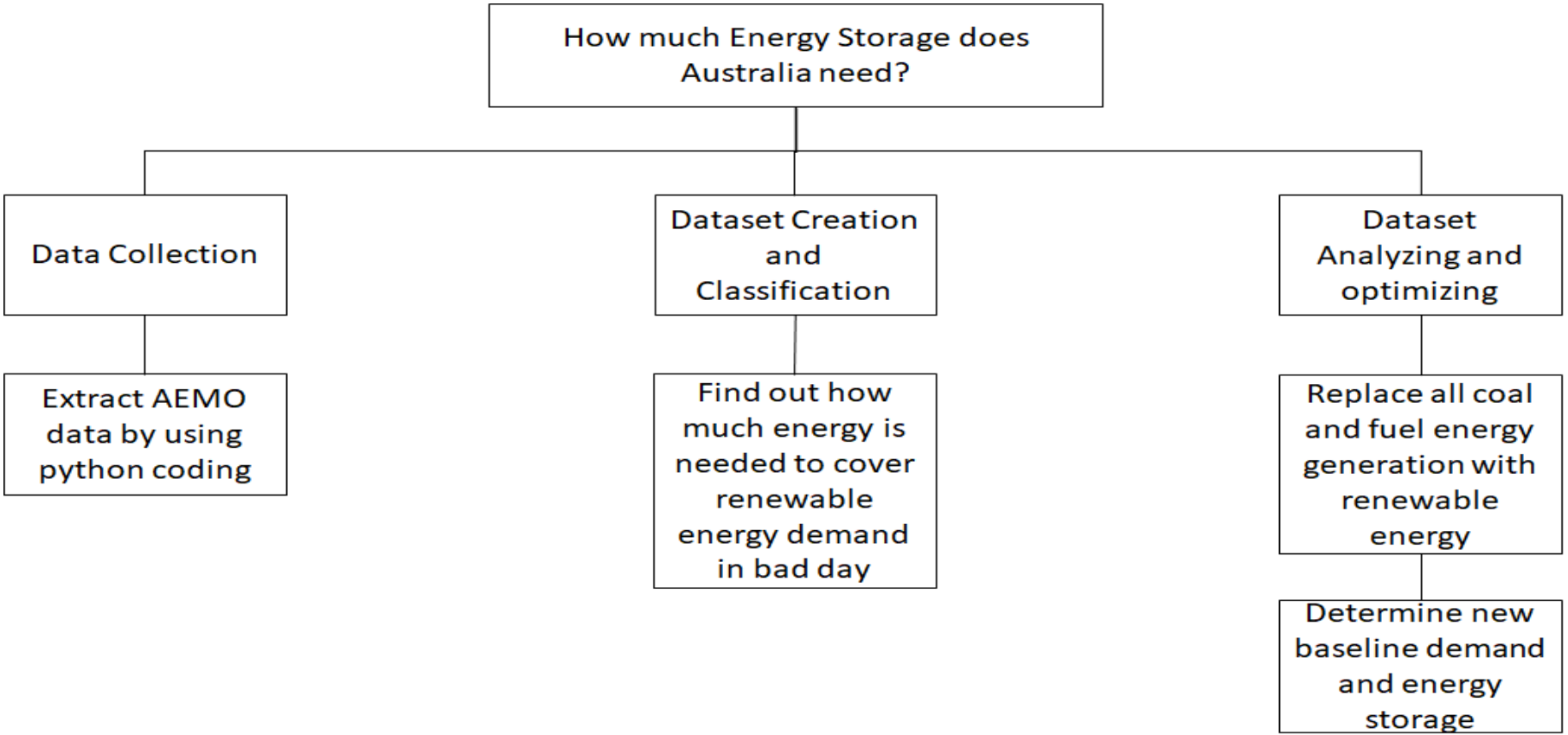
➔ **Basic approach:**

Maximally utilize the battery. Charge the battery whenever there is excess supply, then make up the deficit in the supply to the system from the battery

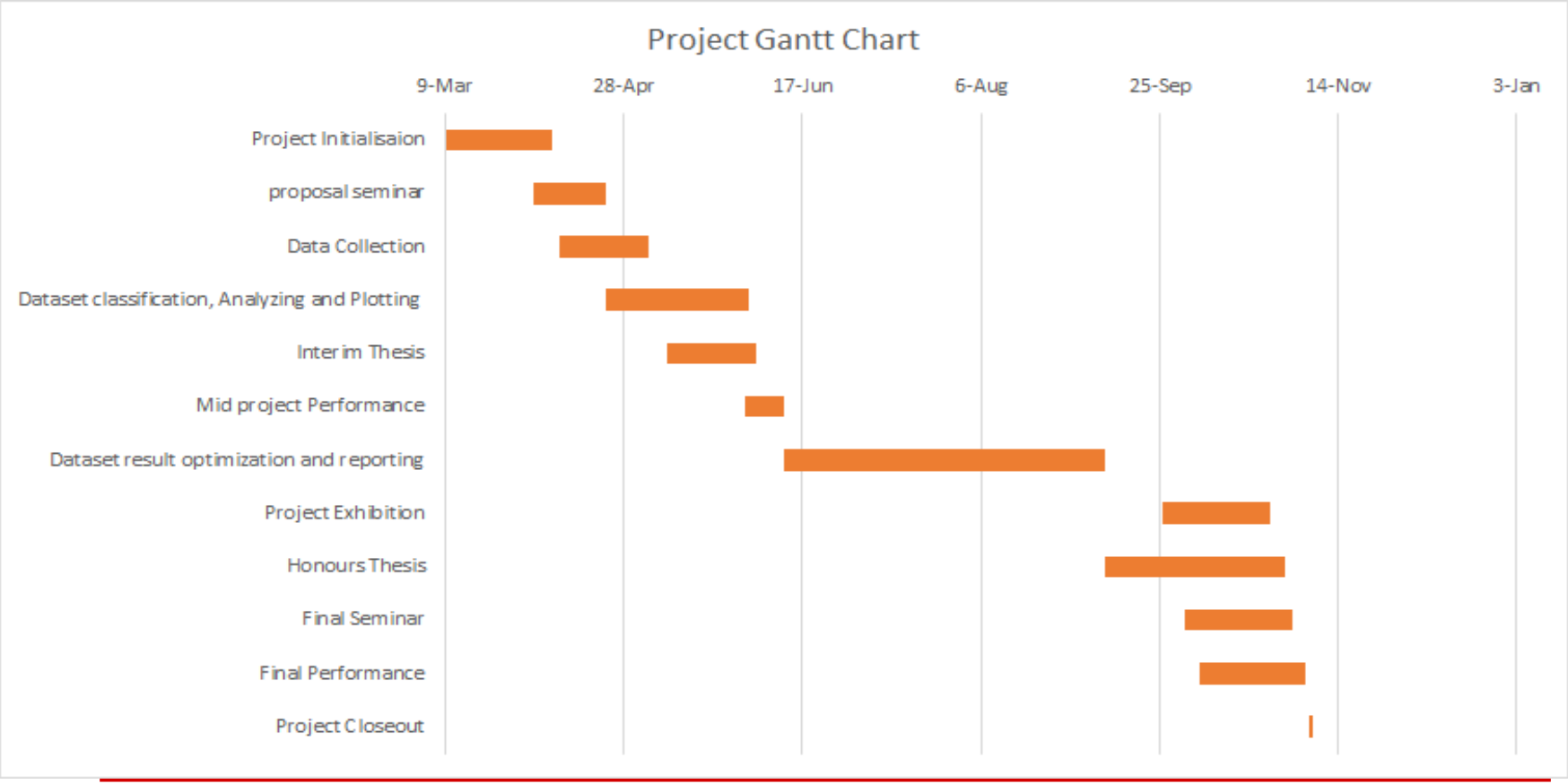
Three main types of intermediate storage

- **Batteries (mainly lithium-ion but flow types also, expensive, still very low capacity)**
- **Pumped storage hydro (established technology with very high storage capacity)**
- **Fuels – e.g. hydrogen – use renewable energy to produce hydrogen from water**

• Project Management: Work Breakdown Structure



• Project Management: Gantt Chart



- **Project Management: Challenge**

  - **Risk of progress delay due to COVID-19 lockdown**

- **Project Management: Budget**

  - **This project does not require any budget since all data sources are available for free.**

Conclusion

- Acquiring data
- Analyze to find out how much energy is needed on bad day
- Figure out the approximate energy storage using smart approach
- Future steps
- Now Falling behind
  - Work from home

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Thank you for Listening

Any Questions ?