Solar Forecasting in the Australian NEM

Jonathon Dyson

Director, Dispatch Solutions

SOLUTIONS

SOLCAST

Current & Impending Solar Installations

Existing	State	Capacity (MW)
Nyngan Solar Plant	NSW	102
Moree Solar Farm	NSW	56
Broken Hill Solar Plant	NSW	52
Royalla Solar Farm	NSW	20
Mugga Lane Solar Park	NSW	13
Gullen Range Solar Farm	NSW	9
Barcaldine Solar Farm	QLD	20
	TOTAL	**272**

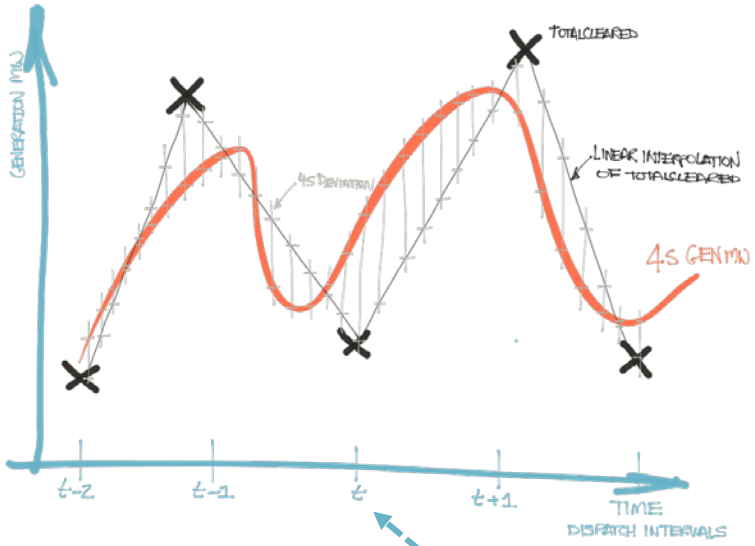
Commissioning 2018	State	Capacity (MW)
Griffith, Parkes, Dubbo	NSW	95
Manildra Solar Farm	NSW	42
White Rock Solar Farm	NSW	20
Gullen Range Solar Farm	NSW	10
Ross River	QLD	148
Sun Metals Solar Farm	QLD	125
Darling Downs	QLD	107
Clare Solar Farm	QLD	100
Lilyvale	QLD	100
Oakey 1, Oakey 2 SF	QLD	85
Whitsunday Solar Farm	QLD	57
Hamilton Solar Farm	QLD	57
Kidston Solar	QLD	50
Collinsville	QLD	42
Kennedy Energy Park	QLD	40
Longreach Solar Farm	QLD	17
Sunshine Coast Solar Farm	QLD	15
Lakeland Solar/Storage	QLD	11
Riverland Solar Farm	SA	330
Bungala Solar Project	SA	220
Tailem Bend	SA	100
	TOTAL	1790

DISPATCH SOLUTIONS

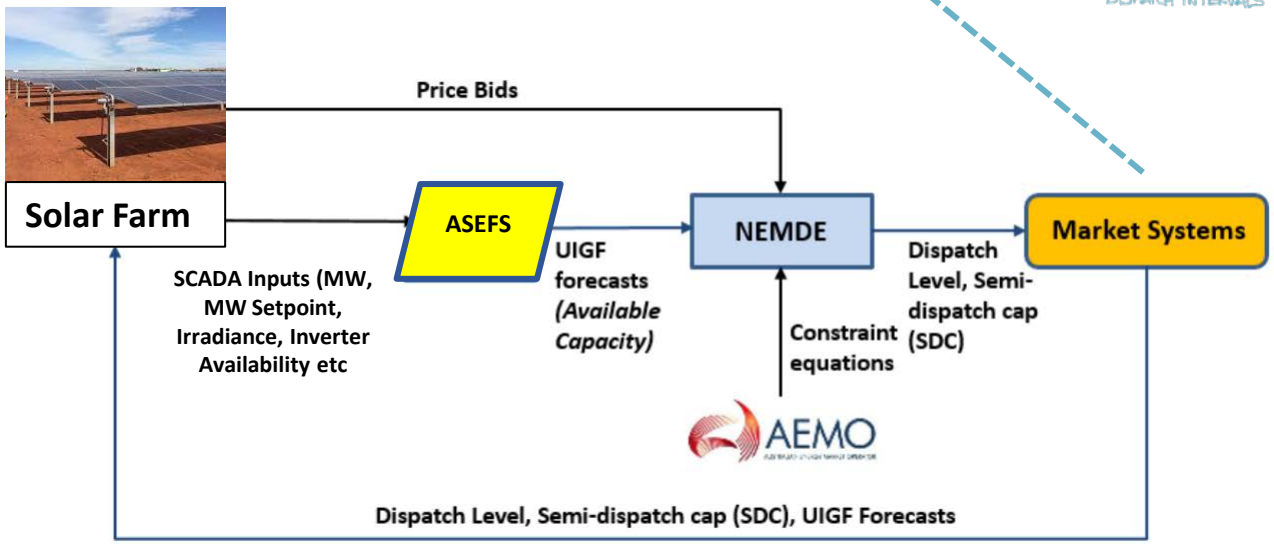
SOLCAST

Existing ASEFS Arrangements

- NEM Market Operator (AEMO) deployed the Australian Solar Forecasting System in 2013
- Utilises mix of weather and plant SCADA to estimate output
- 4-6 week tuning process of ASEFS power curve
- Recent modification to AEMO's Energy Conversion Model assisting with accuracy improvements



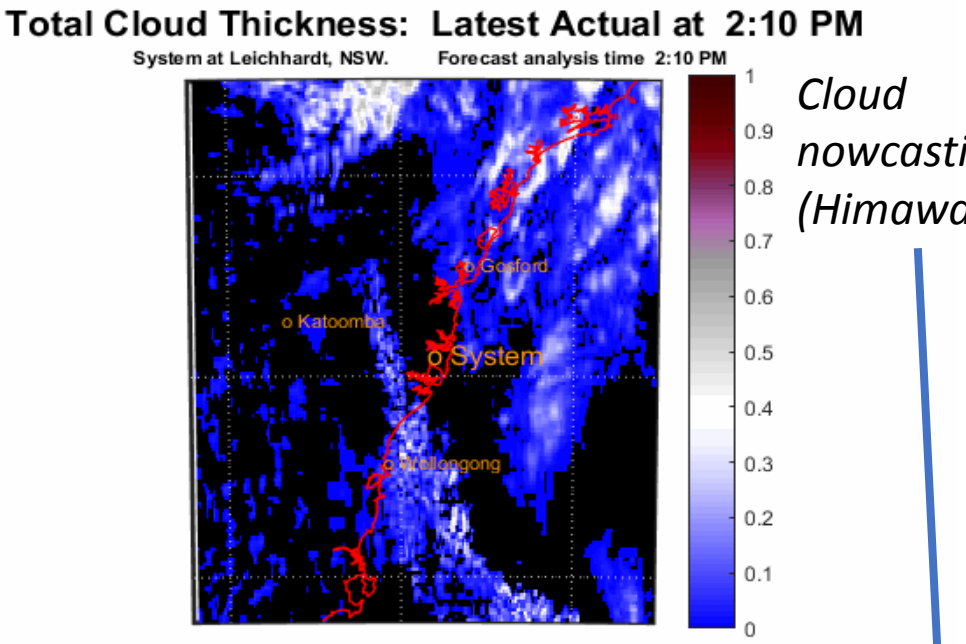
- Output utilised in 5 minute dispatch to estimate where plant will be at the end of the 5 minute dispatch window
- If the forecast is too high → more raise regulation
- If the forecast is too low → more lower regulation
- <u>Forecasts impact participant Causer Pays Factors!</u>



DISPATCH SOLUTIONS

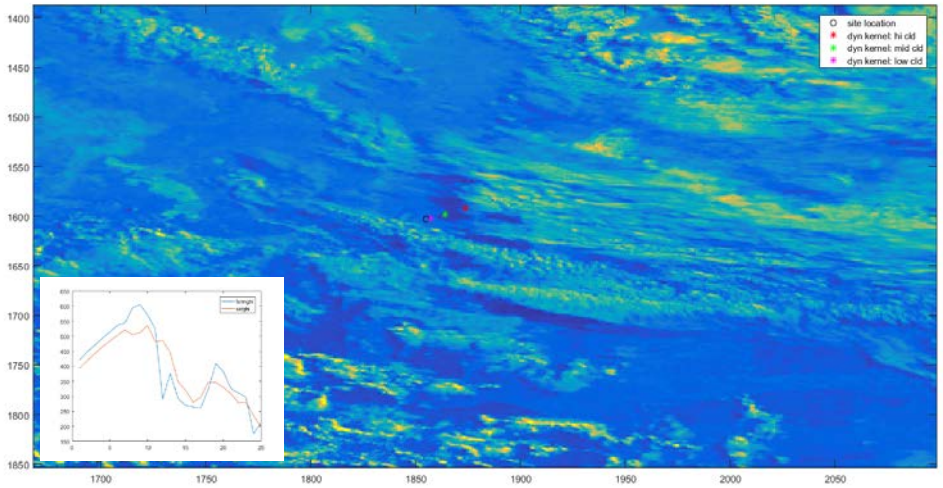
SOLCAST

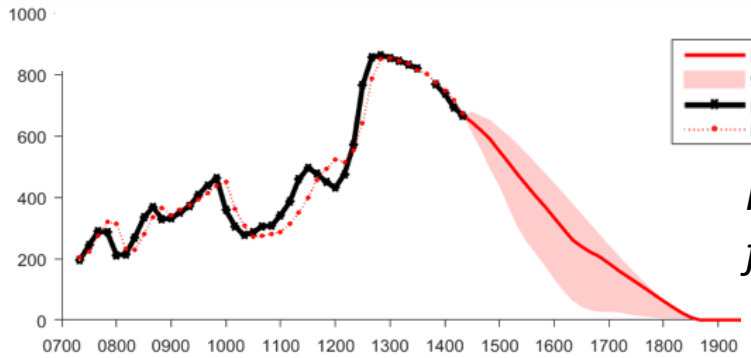
Solcast: Developments in Solar Forecasting Capability



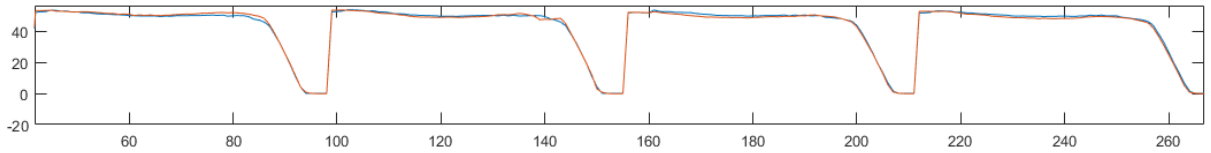
Cloud nowcasting (Himawari-8)

Cloud shadow positions: theory + validation





Farm/park power modelling: physical and empirical



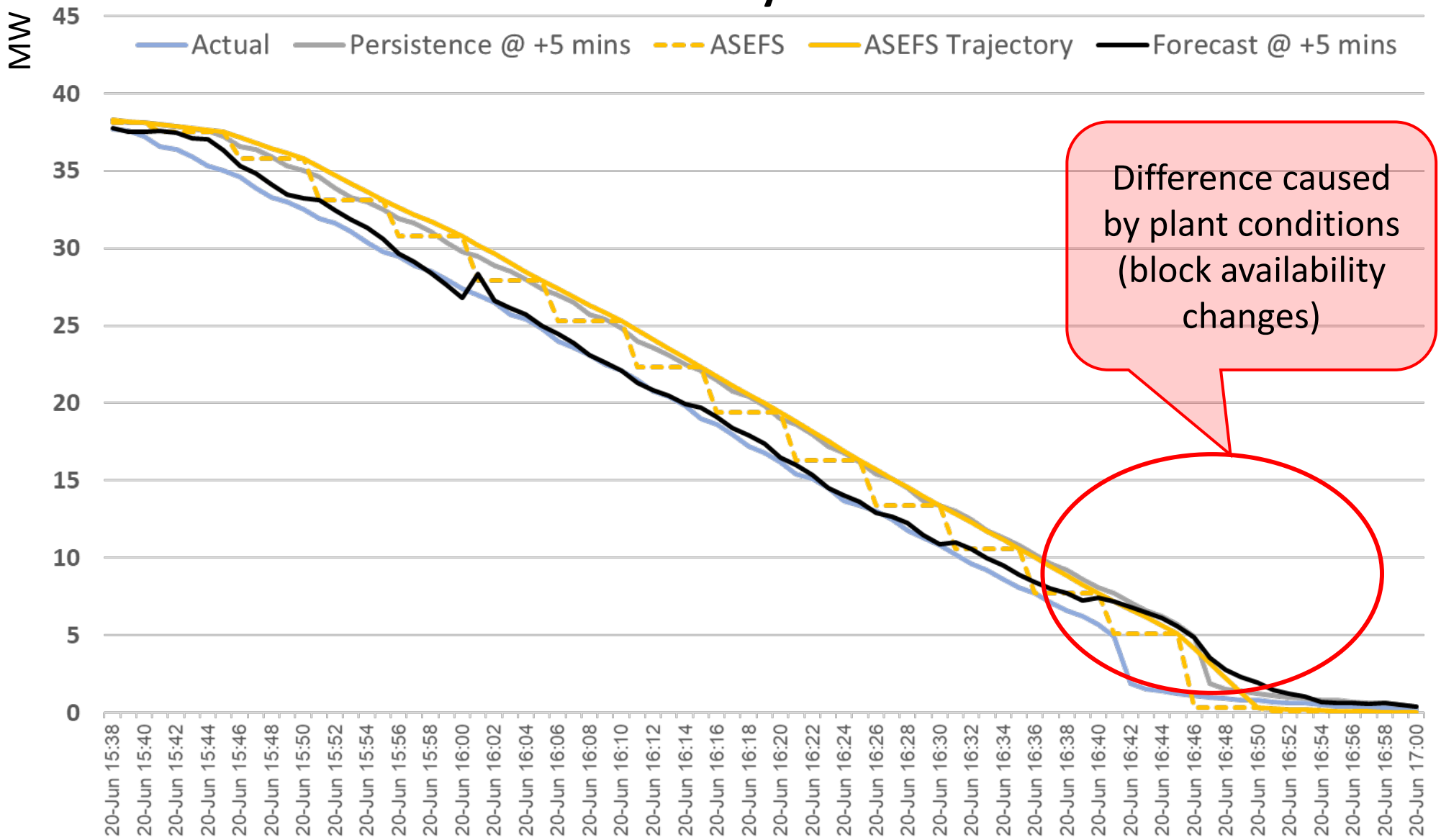
Rapid update forecasting

DISPATCH SOLUTIONS

SOLCAST

Results - Sunny

- New Forecasts had a RMSE error of 2.3 MW at the +5 minute ahead <u>before overlaying plant availability conditions</u>
- 18% benefit compared to a persistence forecast
- Forecasts had RMSE error lower than persistence on 13 out of the 14 days in late June 2017

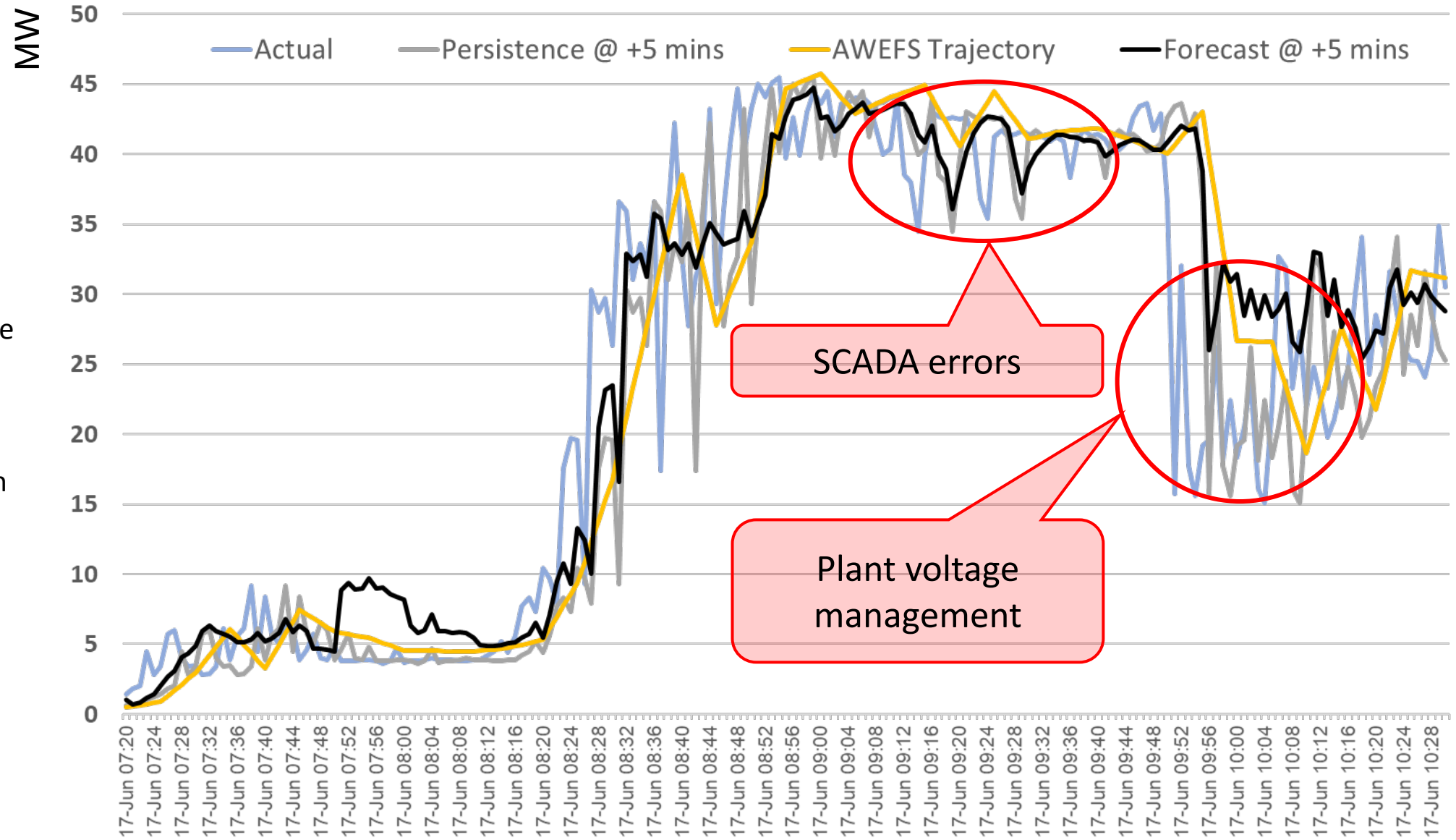


DISPATCH SOLUTIONS

SOLCAST

Results - Cloudy

- Cloudy conditions causing some difficulty
- Remains better than persistence and ASEFS
- Would have resulted in 3% improvement in RMSE on persistence.



DISPATCH SOLUTIONS

SOLCAST

Expected Future Development

- Solcast forecasting products are available globally; Local SCADA integration is on a site-by-site basis
- No sky imager required reducing implementation costs; just requires an internet connection!
- The Solcast API now delivers updated forecasts every 1 minute, within 0.4 seconds of latest SCADA data being posted to the Solcast API
- On-site physical system can fall back to persistence if internet goes down
- Enhanced integration with plant parameters
- Expansion of trials under discussion with several new large scale (80MW+) new entrants and incumbents into the NEM

For more Information …

- Paper ID 138

- Jonathon Dyson: jonathon@dispatchsolutions.com.au
- Dr Harley Mackenzie harley@dispatchsolutions.com.au
- James Luffman james@solcast.com.au
- Dr Nick Engerer nick@solcast.com.au

DISPATCH SOLUTIONS

SOLCAST