Flyers Creek Wind Farm

Planning Modification 4

Independent Planning Commission Briefing

Flyers Creek Wind Farm Pty Ltd

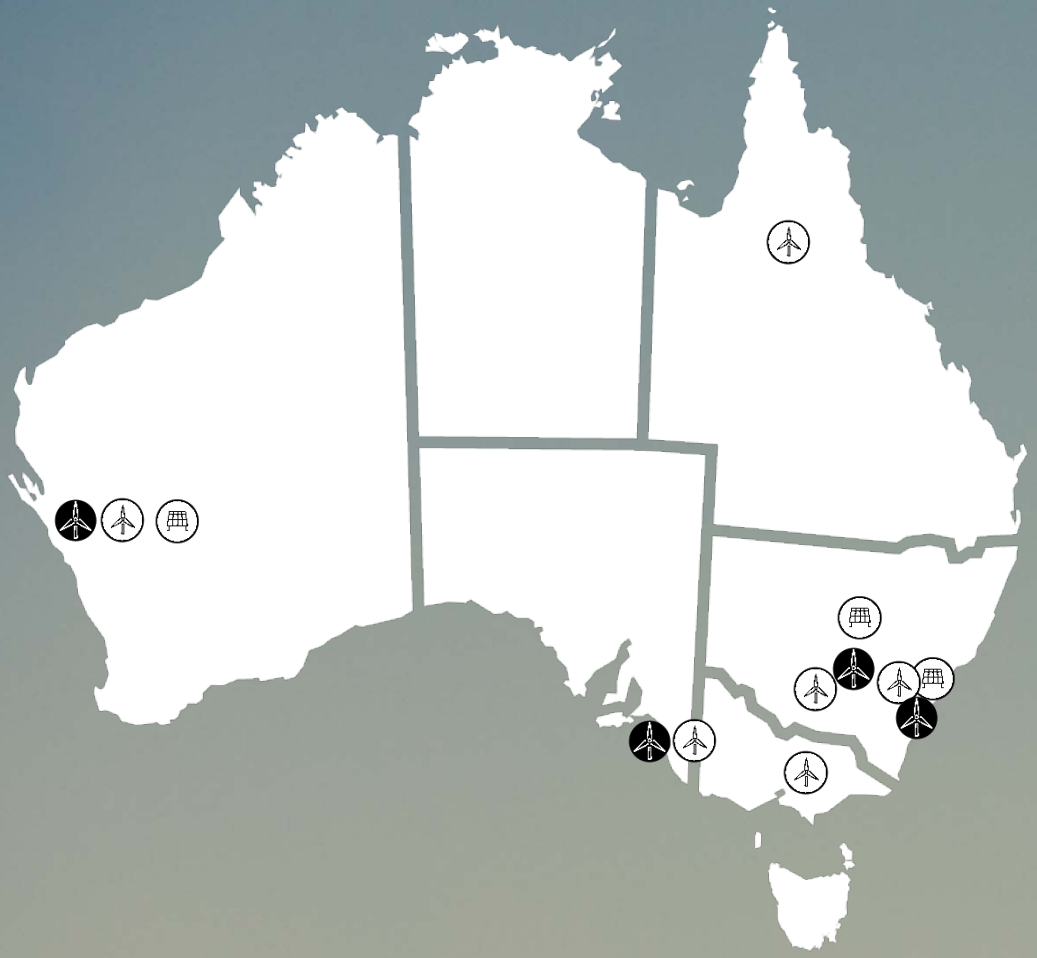
8th July 2019

Agenda

1. Introductions
2. Flyers Creek Wind Farm
3. Modification 4
4. Project Approval Conditions
5. Project Benefits
6. Clarification

1. Introductions

Infigen is an active participant in the Australian energy market. It is a developer, owner and operator of renewable energy generation assets delivering energy solutions to Australian businesses and large retailers

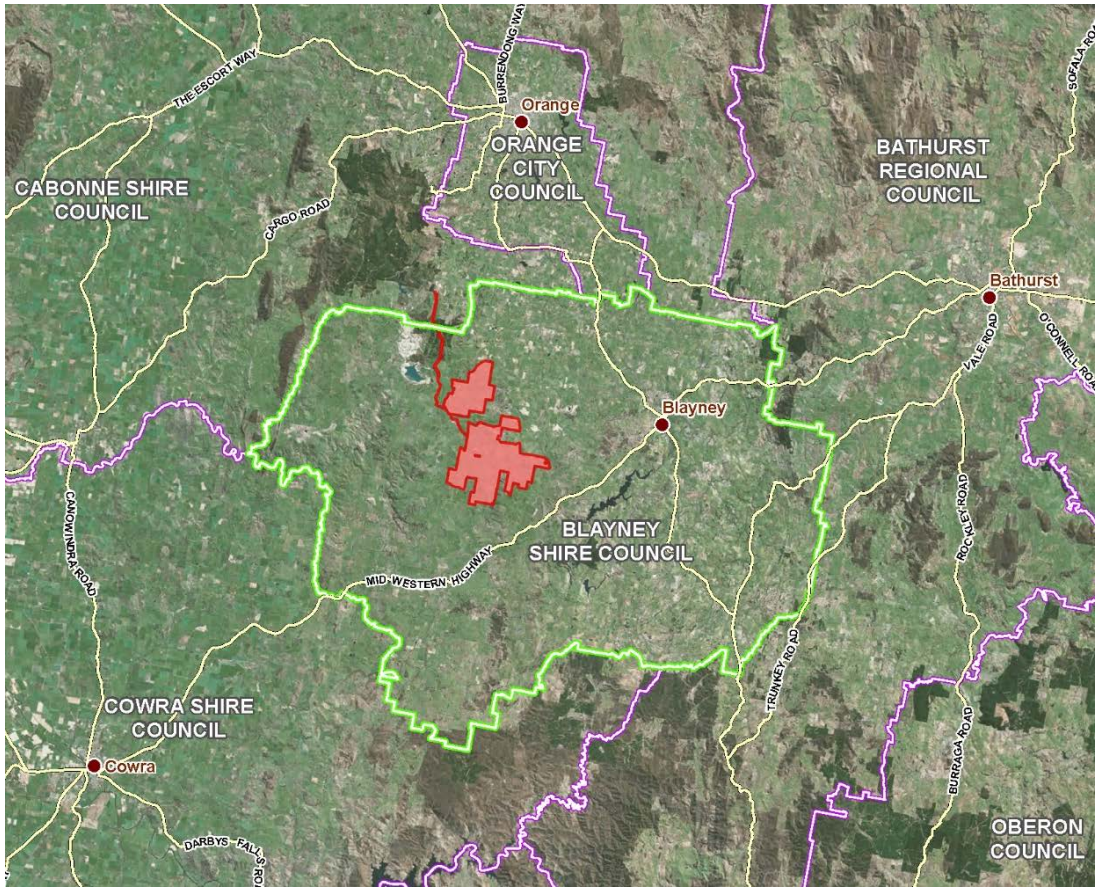


Infigen owns 790 MW of installed generation capacity operating in New South Wales, South Australia and Western Australia and sells the energy and LGCs through a combination of medium and long term contracts and through the spot market.

	Asset	Nameplate capacity (MW)	State	Commercial operation date
1	Alinta Wind Farm	89.1	WA	Jul 2006
2	Lake Bonney 1 Wind Farm	80.5	SA	Mar 2005
3	Lake Bonney 2 Wind Farm	159.0	SA	Sep 2008
4	Lake Bonney 3 Wind Farm	39.0	SA	Jul 2010
5	Lake Bonney BESS Battery[1,2]	25.0	SA	H1 FY20
6	Capital Wind Farm	140.7	NSW	Jan 2010
7	Woodlawn Wind Farm	48.3	NSW	Oct 2011
8	Bodangora Wind Farm	113.2	NSW	Feb 2019
9	Cherry Tree Wind Farm[1]	56.0	VIC	H2 FY20
10	Smithfield Gas Facility	123.0	NSW	May 2019
	Total	**873.8**		
	Operating wind farms	**669.9**		

[1] Under Construction
[2] 25MW/52MWh

2. Flyers Creek Wind Farm



- Approved **38** wind turbine project.
- Located 25km south of Orange in Central West NSW in Blayney Shire Council and Cabonne Council.
- Developed by Flyers Creek Wind Farm Pty Ltd (part of the Infigen Energy corporate group)

2. Flyers Creek Wind Farm

- **2008** 2 landowners approach Infigen Energy.
  Site feasibility commences
- **2010** Environmental Impact Assessment
- **2011** Planning Application
- **2014** Project Approval
- **2015** Modification 1: 6 month extension to comply with deferred commencement conditions
- **2016** Modification 2: removal of 132kV power line and revision of substation location
- **2017** Modification 3: changes to project boundary and reduction from 42 to 38 turbines.
- **2018** Modification 4 application: increase wind turbine envelope and reinstate 132kV power line
- **2019** Pre-construction Minor Works commence
- **2020** *Anticipated commencement of construction*
- **2022** *Anticipated commencement of operations*
- **2052** *Operational for 30 years*

Consultation

3. Modification 4

Modification to:

1. Increase the wind turbine envelope so as to accommodate the newer, more efficient turbine models now available; and
2. Include a 132kV transmission line and switching station so as to enable the Project to connect to the electrical grid.

The modification also includes some minor clarifications to project components.

DPE has recommended Modification 4 for **approval** subject to the recommended amendments being made to the Conditions.

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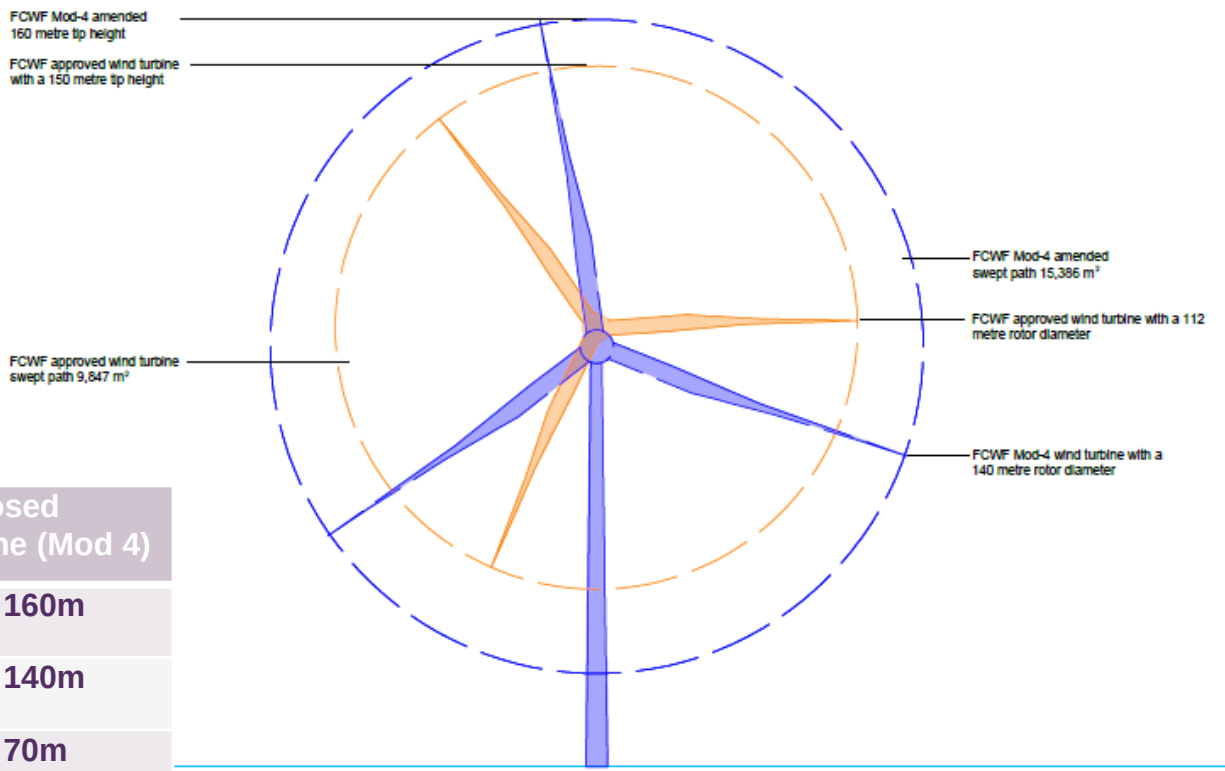
3. Modification 4 - Increased wind turbine envelope



Turbine Component (m)	Approved Turbine	Proposed Turbine (Mod 4)
Tip Height	Up to 150m	**Up to 160m**
Rotor Diameter	Up to 112m	**Up to 140m**
Blade Length	Up to 56m	**Up to 70m**
Hub Height	80m to 100m	**90m to 92m**
Installed capacity	2 to 3.6MW	**Up to 4.2MW**

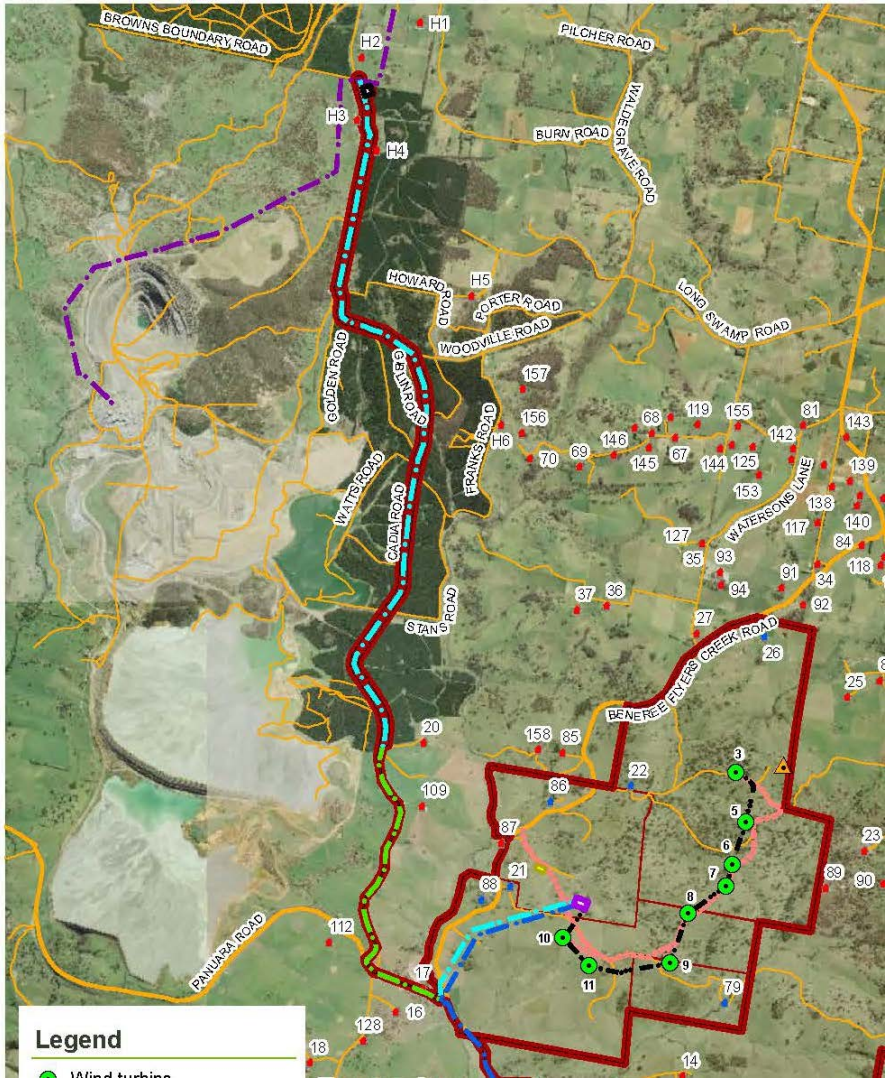
No changes to the approved locations of wind turbines are proposed as part of Modification 4.

3. Modification 4 - 132kV transmission line & switching station

- Project originally proposed to be connected to the grid via a transmission line up to 15km long.

- Proposed 132kV transmission line:
  - approximately 14km in length
  - a 45m wide easement located within a 100m route option corridor
  - Combination of overhead and underground
  - consist of overhead conductors strung along the transmission line route linking poles approximately 20 to 30m above ground

- Switching station land area maximum 100m by 100m.



3. Modification 4 – Environmental Assessment

- Updated environmental assessments were undertaken by relevant experts in relation to key aspects for the modification including:
  - Visual
  - Shadow flicker
  - Bird and bat
  - Noise
  - Traffic and transport
  - Telecommunications
  - Aviation
  - Biodiversity

- The assessments confirm that the changes contemplated as part of Modification 4 can largely be constructed and operated with minimal increase to the impacts identified for the approved project.

- It is acknowledged that Modification 4 is likely to:
  - Result in low to negligible increased visual impacts; and
  - Generate a slight increase in predicted noise levels, however levels at all relevant receivers are predicted (with mitigation) to remain compliant with relevant criteria.

- These impacts are considered to be relatively minor and able to be managed by the existing conditions of the Project Approval (as amended by Modification 4)

3. Modification 4 – Visual Impact Assessment

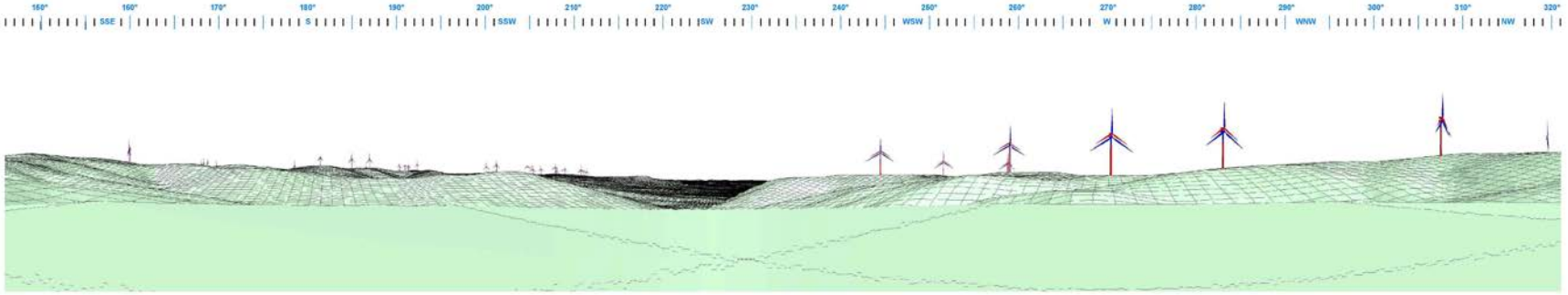
- An updated Visual Impact Assessment was carried out by Green Bean Design.

- Prepared in accordance with NSW Wind Energy Visual Assessment Bulletin Dec 2016 Guidance and assessment considered the modification elements.

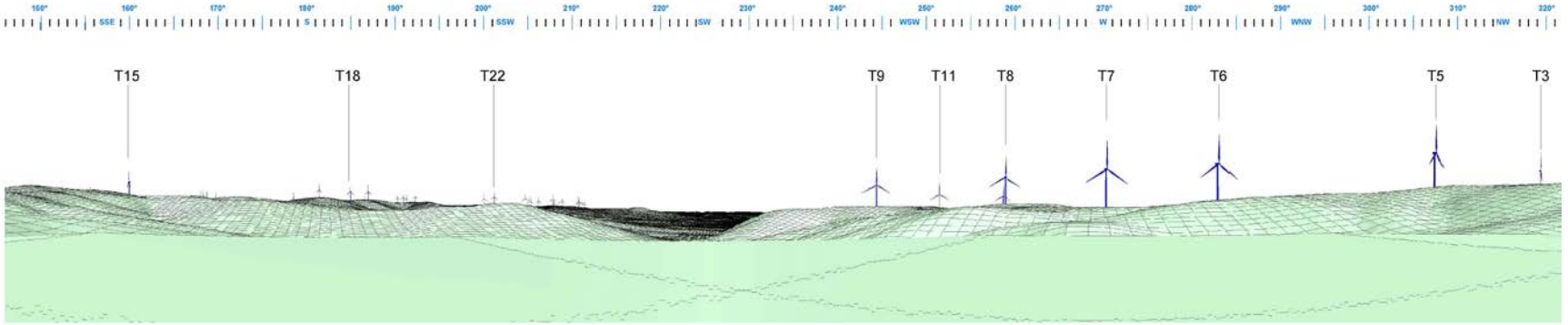
- Assessment findings:

  - The overall assessment of visual effects associated with the Modification 4 turbines is summarised as Low to Negligible. The difference between the approved turbine envelope and the proposed Modification 4 wind turbine envelope is not considered to be of a magnitude that would significantly increase visual effects associated with the approved development.
  - Additional levels of wind turbine visibility would be very limited and largely confined to upper portions of rotor blades and blade tips. Visibility toward wind turbine hubs would likely decrease where the hub is currently partially visible or located just above a ridge or hill slope view.
  - The proposed Modification 4 turbine envelope is not considered to be of a magnitude that would significantly increase visual effects and visual impact ratings associated with the approved Project.
  - The proposed reinstatement of the 132kv transmission line and associated Switching Station proposed as part of Modification 4 would be unlikely to have a significant visual impact on surrounding dwelling locations.
  - The implementation of both on site and off site landscape works would provide visual mitigation for a number of dwellings surrounding the approved Project in accordance with the Project Approval conditions, noting that the DPE have added an additional condition relating to landscaping and screening of the switching station.

3. Modification 4 – Visualisation



Flyers Creek Wind Farm, Viewpoint W9 looking south south east to north west from dwelling 89: Approved 150m tip of blade wind turbines (red) and Mod 4 160m tip of blade wind turbines (blue)
Approximate distance to closest approved wind turbine (T6) 1,144 metres



Flyers Creek Wind Farm, Viewpoint W9 looking south south east to north west from dwelling 89:
Proposed Mod 4 160m tip of blade wind turbines (blue) only

FCWF approved wind turbine at 150m tip height

Proposed FCWF Mod 4 wind turbine at 160m tip height

Notes:
Views toward wind turbines or portions of wind turbines below the green wireframe will be screened by landform.

The wireframe model does not account for existing tree cover and/or planting which may screen views toward the wind turbines.

Wire frame W9
Residence 89

Flyers Creek Wind Farm Modification 4

3. Modification 4 – Noise Impact Assessment

- An updated Noise Impact Assessment was carried out by Vipac Engineering & Scientists Ltd.

- Noise impacts were modelled based on the proposed wind turbine hub height of 92m and the noise model was run using a candidate wind turbine with a maximum tip height of 160m.

- Assessment findings:
  - The proposed modification is likely to generate a slight increase in predicted noise levels at most receivers compared to the approved Project.
  - The predicted noise levels at all relevant receivers is predicted to remain compliant with relevant criteria under the guidelines* apart from at residences R077 and R078, where a small exceedance of less than 1dB is predicted based on the modelling between the hub height wind speeds 8m/s, 9m/s and 10m/s.
  - Mitigation will be applied to ensure compliance with the Relevant Criteria:
    - micrositing relevant turbines within the micrositing limits approved under the Project Approval; and/or
    - applying wind sector management using lower turbine power modes for relevant turbines during some wind speed conditions.
  - It is noted that, given the conservative assumptions in the model (such as fully reflective ground factor and the assumption of wind blowing from all directions simultaneously from all turbines to the receivers), these mitigation measures may not be required.

- Project Approval Condition G7 was updated to reflect revised noise criteria limits (adjusted resultant from change in hub height).

* "Wind farms – environmental noise guidelines" (SA 2009) as adopted by the "Wind Energy: Noise Assessment Bulletin" (DPE 2016) ("Relevant Criteria")

3. Modification 4 – Biodiversity & Clearing

- An updated Biodiversity Impact Assessment was carried out by NGH Environmental for the 132Kv transmission line and switching station and included:
  - a 45m wide easement within a 100m route corridor; and a
  - 100m x 100m switching station land area.

- Prepared in accordance with the NSW Biodiversity Conservation Act 2016.

- Assessment required update following minor change to route of 132kV transmission line resultant from consultation with Cadia Valley Operations regarding mine subsidence zone.

- Updated Biodiversity Development Assessment report (BDAR) prepared and lodged as addendum in Nov 2018.

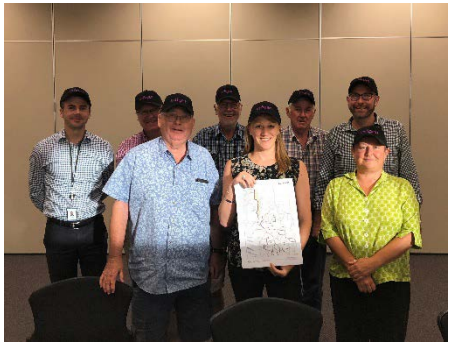
- Assessment findings:
  - The transmission line BDAR reports an *indicative* EEC clearing figure of 3.73ha and 16 hollow bearing trees. This was based on a 45m cleared corridor for the transmission line and follows an indicative route within a 100m surveyed corridor.

- Project Approval Condition D1 (a) and D3 have been updated to allow for the indicative clearing limits set out above.

3. Modification 4 – Consultation

Ongoing consultation and stakeholder engagement has been carried out throughout the development of the project. Modification 4 consultation has included the following groups or organisations:

- Community Consultative Committee
- Community within ~3km of wind turbine (Project Newsletter July 2018)
- CENREC (Central NSW Renewable Energy Cooperative)
- Host landowners
- Blayney Shire Council
- Cabonne Council
- Forestry Corporation NSW
- Cadia Valley Operations
- Aviation stakeholders (incl. CASA, AAAA, Airservices Australia, Dept of Defence, Orange City Council)
- Office of Environment and Heritage
- Environment Protection Agency
- Canobolas Zone Rural Fire Service
- NSW Rural Fire Service



3. Modification 4 – Submissions

During the exhibition period of the Modification 4 Environmental Assessment, the DPE received a total of 74 submissions. Of these submissions:

- 15 were from government agencies (all comments);
- 4 were from special interest groups (1 support, 3 object); and
- 55 were from the community (1 support, 54 object).

The majority of objections (~63%) received from the community were from members of the public residing more than 100km from the project.

17 of 54 objections were received from the community residing within 5km of the project.

Flyers Creek Wind Farm Pty Ltd:

- followed up with further discussion with several consultees;
- provided detailed responses to the issues raised in the submissions in the Response to Submissions Report (12 Oct 2018); and
- provided further information in the Clarifications Report (26 Nov 2018).

4. Project Approval Conditions

- Flyers Creek Wind Farm Pty Ltd proposed amendments to conditions in the Modification 4 application.
- DPE rejected some of those proposed and incorporated others as well as making additional amendments driven by their assessment.
- Flyers Creek Wind Farm Pty Ltd is largely content with the amendments proposed.

5. Project Benefits

- It will generate **430 GWh** of renewable electricity per year, sufficient for the average consumption of approximately **58,000 homes**
- It will contribute to:
  - replacing the 1,000 MW shortfall identified by the Australian Energy Market Operator as being required to supplement the lost generation capacity which will result from the planned closure of the Liddell Power Station in 2022.
  - the State and Federal Governments' target of providing 33,000 GWh from renewable sources by 2020;
  - the NSW Government's target of reducing greenhouse gas emissions by 60% by the year 2050; and
  - inter-generational equity by reducing greenhouse gas emissions and reducing consumption of finite fossil fuel resources.
- It will provide full time employment for a peak of **140** people during construction and up to **6 to 10** ongoing regional jobs during its operational life.
- It will result in a direct injection of approximately **$1 million per annum** to the local community through payments to landholders, permanent staff and community fund contributions.

6. Clarification

- The IPC requested that an explanation of the calculations underpinning the following statement was provided

- *"Flyers Creek Wind Farm will generate **430 GWh** of renewable electricity per year, sufficient for the average consumption of approximately **58,000 homes"***

- Example calculation as follows:
  - No of wind turbines: 38
  - Turbine installed capacity: 3.8 MW
  - Wind farm installed capacity: 144.4 MW
  - No of hours per annum: 8760
  - Average capacity factor: 34%
  - Average household consumption per annum NSW: 7.3 MWh
    (https://www.energymadeeasy.gov.au/)

  - Generation per annum (8760 * 144.MW * 34%) = **430 GWh**
  - No of homes (430 * 1000 / 7.3 MWh) = **58,904 homes**