

Grid Connection of large PV Power Plants in Germany

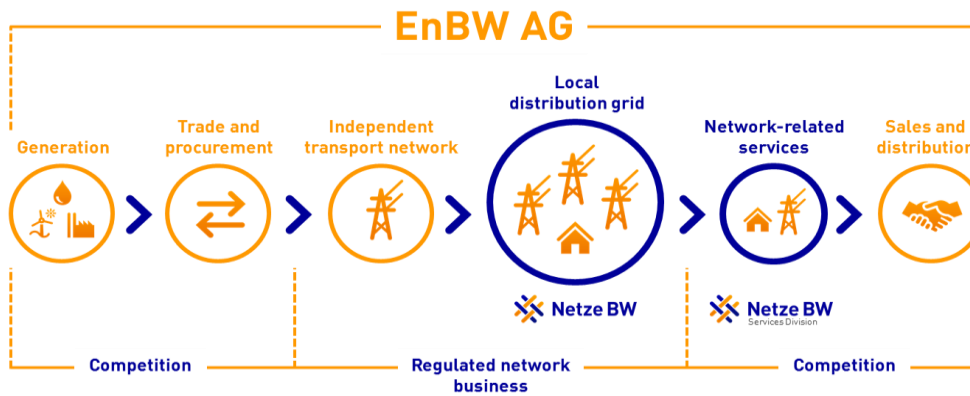
Imen Ghourabi
Netze BW GmbH
Asset Management
Power Grid Planning
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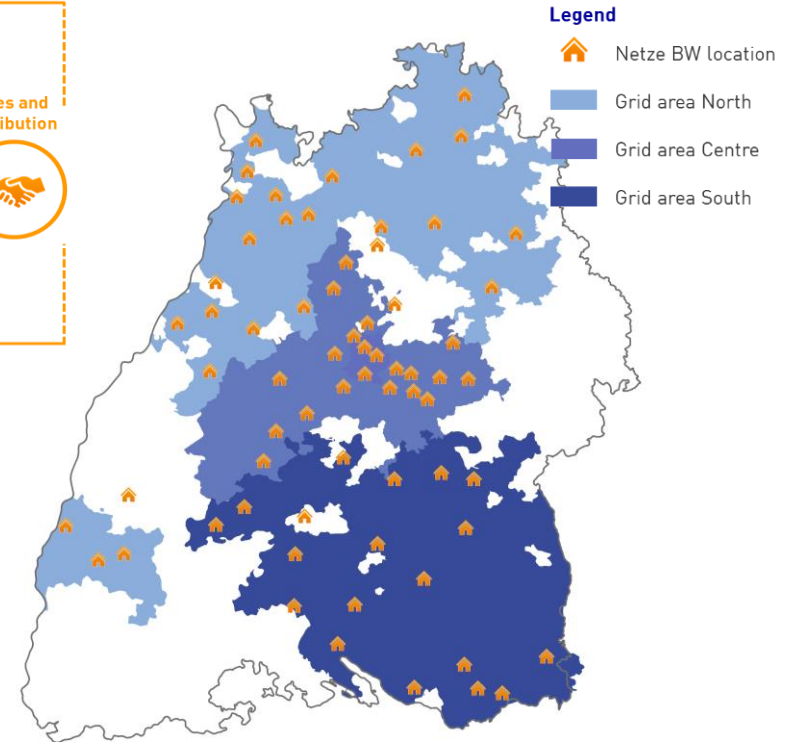
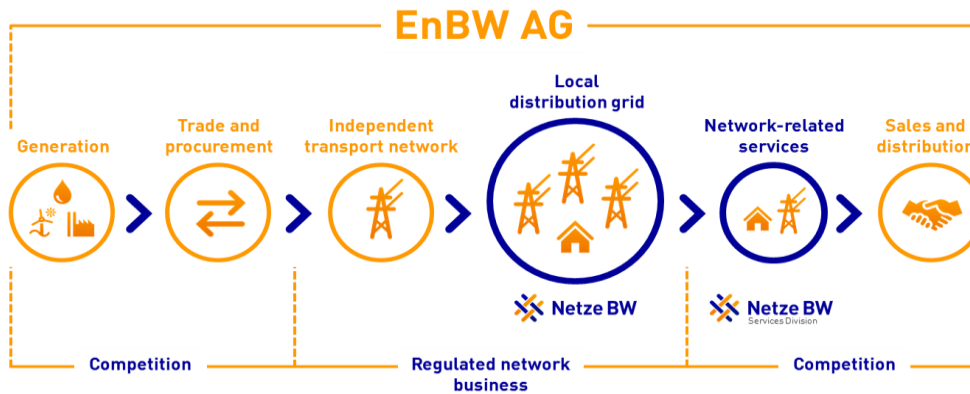


Ein Unternehmen der EnBW



- 1. Netze BW GmbH**
- 2. Grid Connection Principles according to EEG 2017**
 - a. Determination of the grid connection point
 - b. Costs
 - c. Information obligations of grid system operators
- 3. Process up to the allocation of the grid connection point (Netze BW GmbH)**



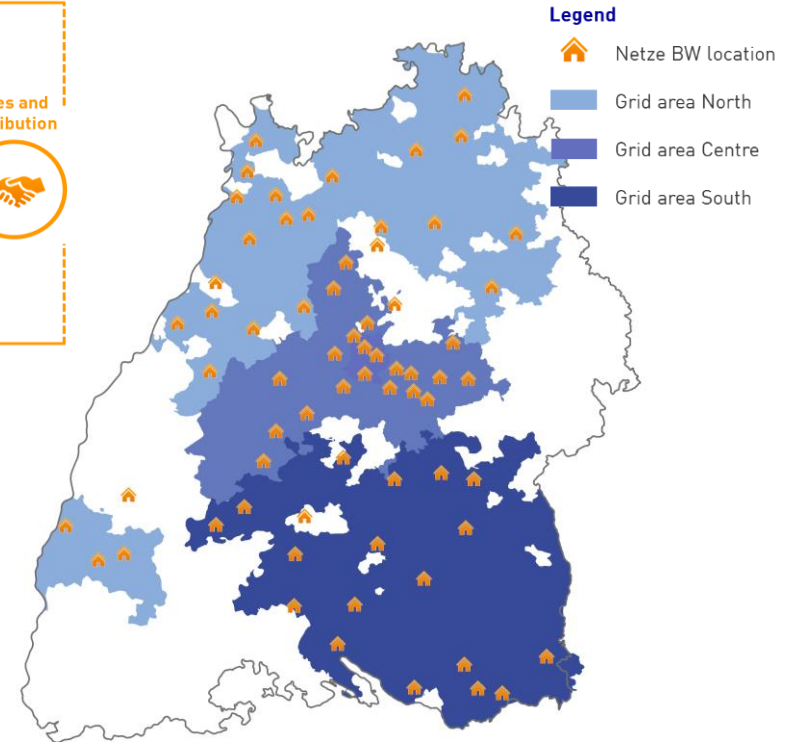
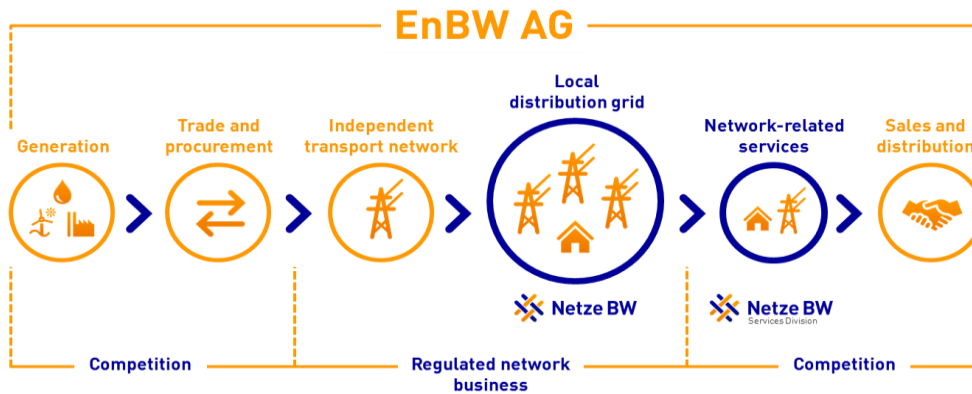


We serve Baden-Württemberg and are on site at

76 locations

across the state.





Renewable energy: approximately

155.000

facilities are connected to our grid.



4.127

MW power generation **capacity**:

Calculated in terms of **PV facility area**, this is equivalent to the area of almost **10.000 football pitches**.

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Grid Connection Principles according to EEG 2017

Determination of the grid connection point



> “ *Grid system operators must connect installations to generate electricity from renewable energy sources and from mine gas without delay and as a priority to the place in their grid system which is appropriate in terms of the voltage level and which is the shortest linear distance to the site of the installation*”. (§ 8 Abs. 5)

Exception: The same or a different grid system has a technically and economically more suitable grid connection point.

Grid Connection Principles according to EEG 2017

Determination of the grid connection point

- › “ *Grid system operators must connect installations to generate electricity from renewable energy sources and from mine gas without delay and as a priority to the place in their grid system which is appropriate in terms of the voltage level and which is the shortest linear distance to the site of the installation*”. (§ 8 Abs. 5)

Exception: The same or a different grid system has a technically and economically more suitable grid connection point.

- › The connection of power plants takes place at the grid connection point with the lowest total costs, regardless of who bears this costs. Consideration must be given to the costs deriving directly from the grid system connection (grid connection costs and network capacity expansion costs).
- › The indirect costs, such as costs for the use of a plot of land or in the case of infeed incurred line and transformer losses, are not considered.

Grid Connection Principles according to EEG 2017

Costs

- > *“The necessary costs of the connection of installations to generate electricity from renewable energy sources or from mine gas to the connection point ... and the necessary metering devices to record the electricity supplied and received shall be borne by the installation operator.” (§ 16 Abs. 1)*
- > *“The grid system operator shall bear the costs of optimising, strengthening and expanding the grid system.” (§ 17)*
- > *„The obligation shall cover all technical devices necessary for the operation of the grid system and the connection installations owned by the grid system operator or transferring to his ownership.” (§ 12 Abs. 2)*

Grid Connection Principles according to EEG 2017

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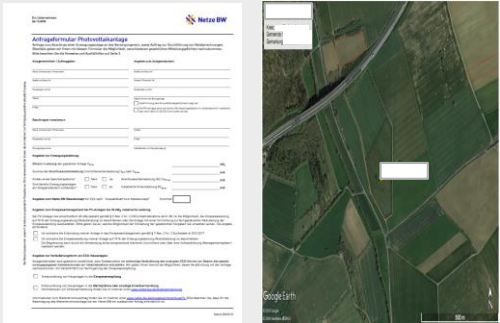

→ PV plant installation operator and grid system operator bear the costs of their own resources.

Grid Connection Principles according to EEG 2017

Information obligations of grid system operators

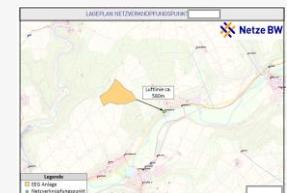
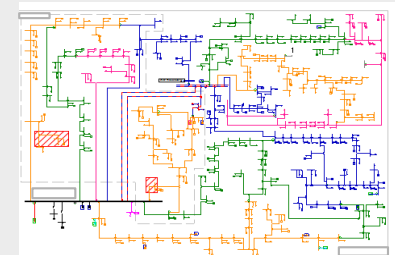
- > *“Grid system operators must transmit to those wishing to feed in electricity a precise timetable for the processing of the request to connect to the grid system without delay following receipt of a request to connect to the grid system. This timetable must state*
- 1. the procedural steps in which the request to connect to the grid system will be processed and*
 - 2. what information the parties wishing to feed in electricity must transmit from their field of responsibility to the grid system operators so that the grid system operators can determine the point of connection or can conduct their planning pursuant to Section 12.”*
(§ 8 Abs. 5)

Process up to the allocation of the grid connection point at Netze BW GmbH

Step	Description	
1	<p>The customer support of Netze BW GmbH receives the grid connection request from the installation operator of the PV plant.</p> <p>Required documents:</p> <ul style="list-style-type: none">✓ filled out request form✓ site plan of the plant	
2	<p>The customer support checks the completeness of the documentation and sends a letter "receipt of the complete feed-in request" to the installation operator. The customer support forwards the request to the power grid planning engineer to do the grid analysis.</p>	

Prozess bis zur Mitteilung des Netzverknüpfungspunktes (Netze BW GmbH)

Step	Description
3	<p>Grid analysis:</p> <ol style="list-style-type: none">1. Analysis for the grid connection point with the shortest distance to the PV plant considering the total cost.2. Total cost of this grid connection point should be converted to a radius around the plant. This results in a circle. All possible grid connection points that are within this circle should be considered. The valid grid connection point is the one with the lowest total cost.3. The request is stored in the grid calculation data and taken into account in future calculations. If the installation is not realized or the reservation expires, the request will be removed from the calculation data.
4	<p>The most economically favorable grid connection point is communicated to the installation operator. This is done in form of a letter "Communication of the network connection point" including the location plan of the grid connection point.</p>



Thank you for your attention

Netze BW GmbH
Asset Management
Power Grid Planning
Imen Ghourabi
Schelmenwasenstraße 15
70567 Stuttgart
i.ghourabi@netze-bw.de
+49 711 289 48331

