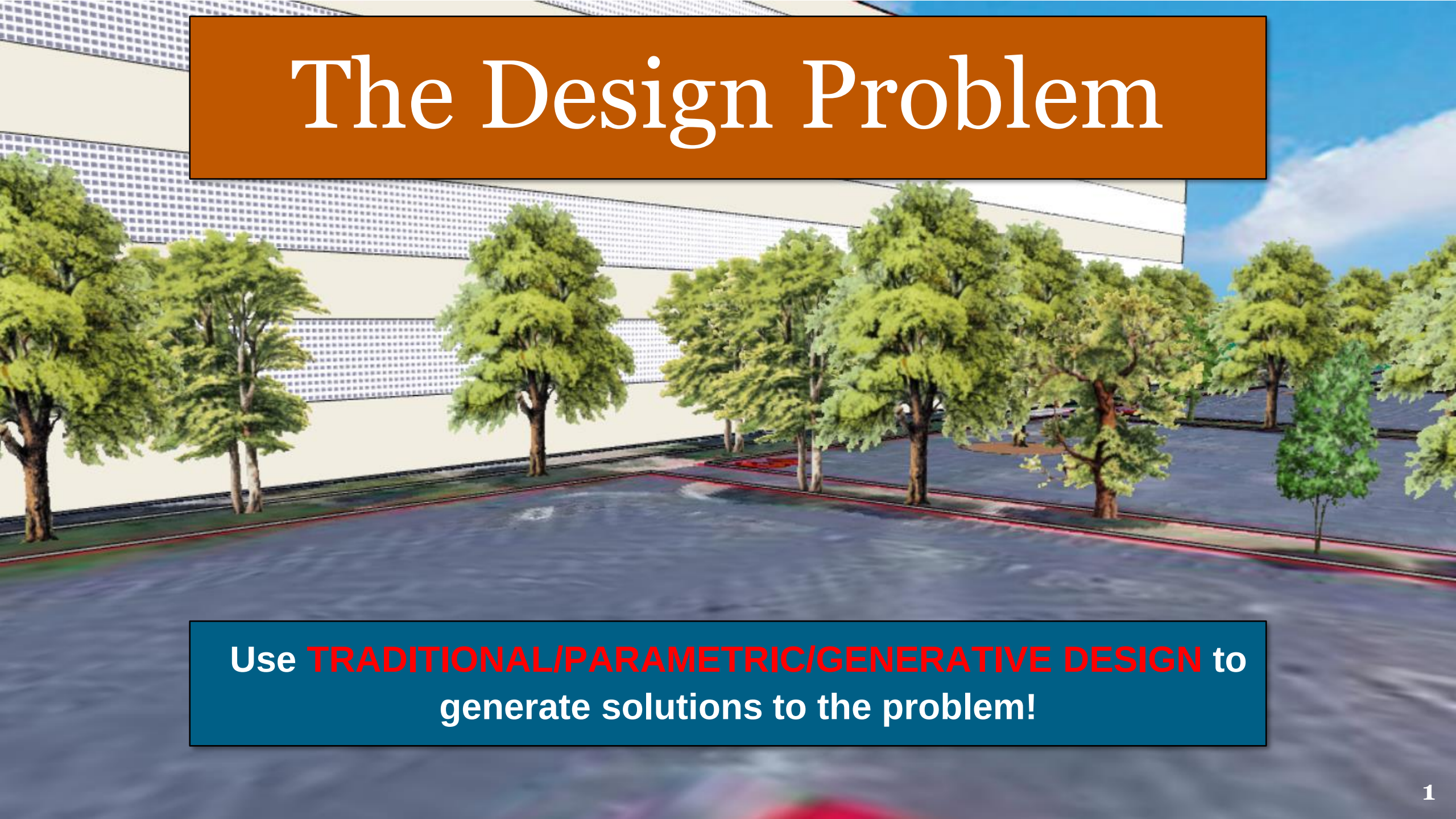
Design Statement

Author's Note: Participants this information across three documents according to the three paradigm/chapters. The design statement is the same for each of the three open-ended design problems, and participants are required to only use the paradigm they most recently learned.

Slides 1-4, and 9-11 are shown in each of the three documents received by participants. Each document contains the instructional slides relevant to that paradigm.

The Design Problem



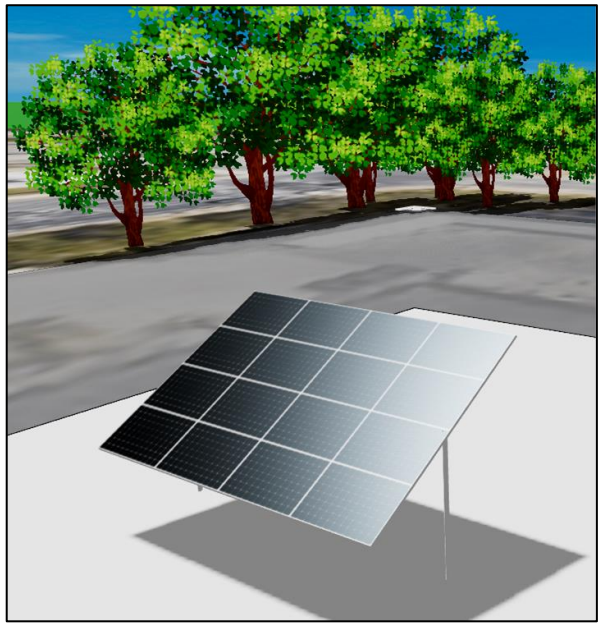
Use TRADITIONAL/PARAMETRIC/GENERATIVE DESIGN to generate solutions to the problem!

Design Statement

Project Background: The University of Texas at Austin has announced a development plan for an area on the east side of campus to include a solarized parking lot. (pic) An internal study found that these parking lots, located next to the LBJ School of Public Affairs, receive more sunlight than any other parking area on campus. **Your job** is to use **TRADITIONAL/PARAMETRIC/GENERATIVE DESIGN** in Aladdin to **design solutions for the University**.

University Board members will make the final decision on the design that is implemented. **You have been asked to submit as many designs as you can, and have also been supplied a rubric to evaluate your designs (slides 10 & 11)**. Change the design variables to explore the design space and generate different solutions. You can choose to exploring the edges of the design space, optimize one or two design variables, or a take a more balanced approach! Each design you submit should occupy a unique point in the design space.

**Do not make any changes to the financial settings in Aladdin*.



Project Link

Click here to open the Aladdin design template.

READ THIS DOCUMENT IN FULL before you start to design to avoid submitting invalid designs.

To login:

- Email - edgealaddin@gmail.com,
- Password - 0>Mx=5#1:sJ%

Solarized Parking Lot Design Area

Project Background: The University would like to solarize only one of the four lots, and has asked you to use your expertise to design in a predetermined section of Lot 4.

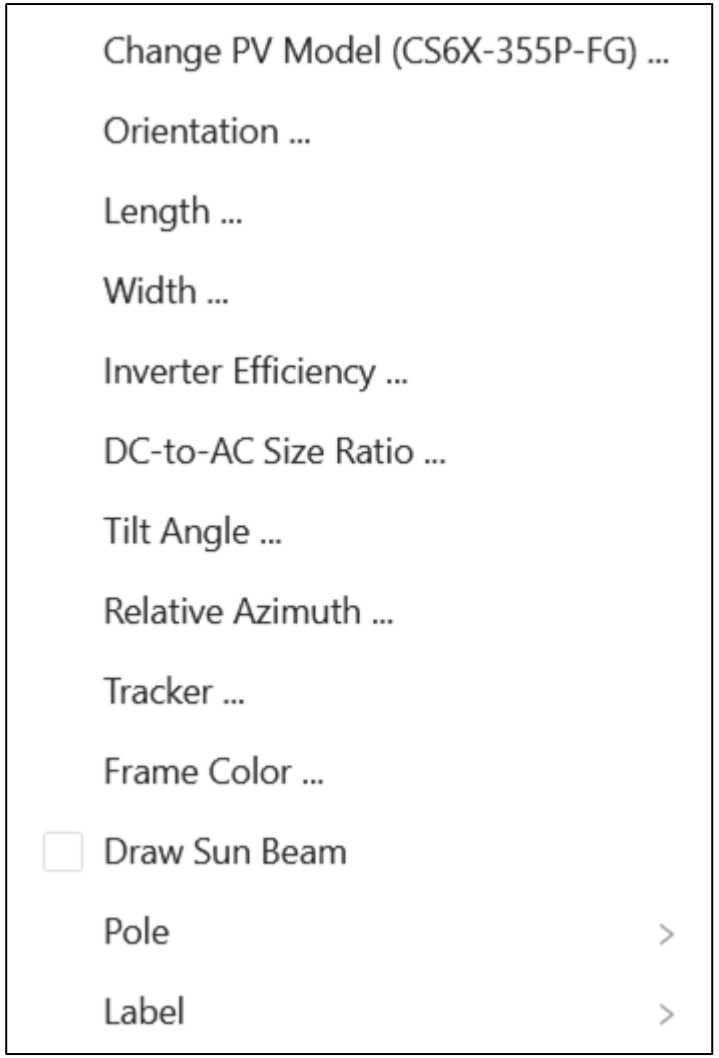
DO NOT MOVE or CHANGE the foundation or polygon.

Traditional Design - Solarized Parking Lot Design

Traditional Design Settings: In this design problem you will explore the design space by changing **four variables**.

Right click on a solar panel after placing it to edit it. **Explore the design space by manipulating the following four variables**:

1. Tilt Angle
2. Width
3. Length
4. Inter-Row Spacing (*see next slide*)

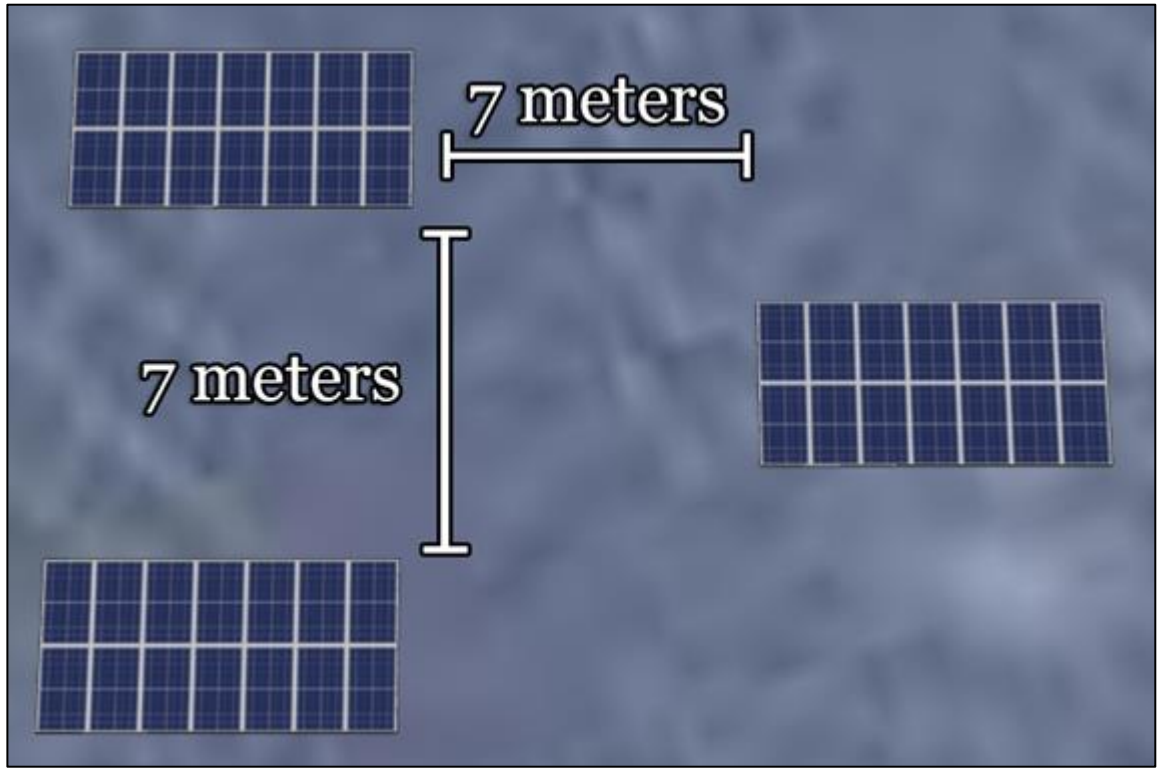


x

Traditional Design - Solarized Parking Lot Design Constraints

Traditional Design Constraints: Explore the full range for **Tilt Angle**.

To leave spacing for utility vehicles, the University has requested a minimum of 7m **Inter-Row Spacing**, and a minimum of 3.5m **Pole Height**.

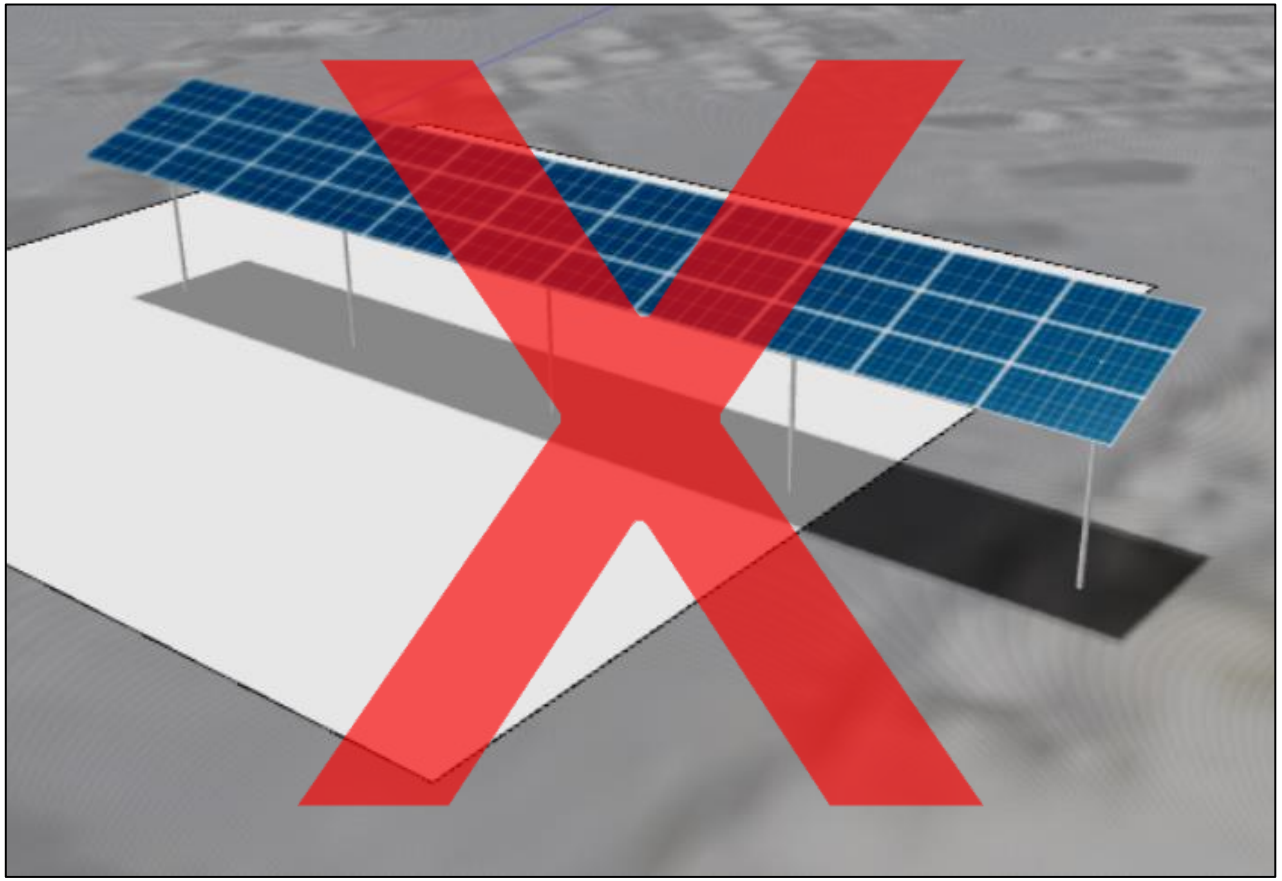


TIP: To measure Inter-Row Spacing, create an additional solar panel and set it to 7m length. You can then use this to measure the distance between two solar panels.

Traditional Design - Solarized Parking Lot Design Constraints

Parametric Design Constraints: DO NOT place any panels outside the edges of the foundation.

DO NOT change any of the other settings (Solar Panel Model, Azimuth Angle, etc.). ONLY change the three variables mentioned on the previous slide.

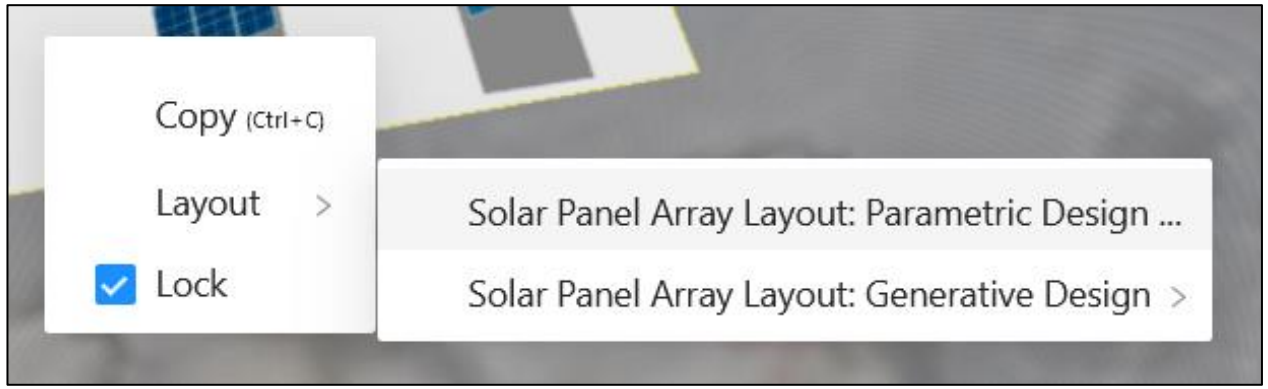


Parametric Design - Solarized Parking Lot Design

Parametric Design Settings: In this design problem you will explore the design space by changing **three variables**.

To access the Parametric Design feature, first right-click on the polygon. Click on *Layout -> Solar Panel Array Layout: Parametric Design*. Here you can find the parametric schema that defines the relationships between variables. **Explore the design space by manipulating the following three variables**:

1. Variables: Tilt Angle
2. Variables: Row Width
3. Variables: Inter-Row Spacing

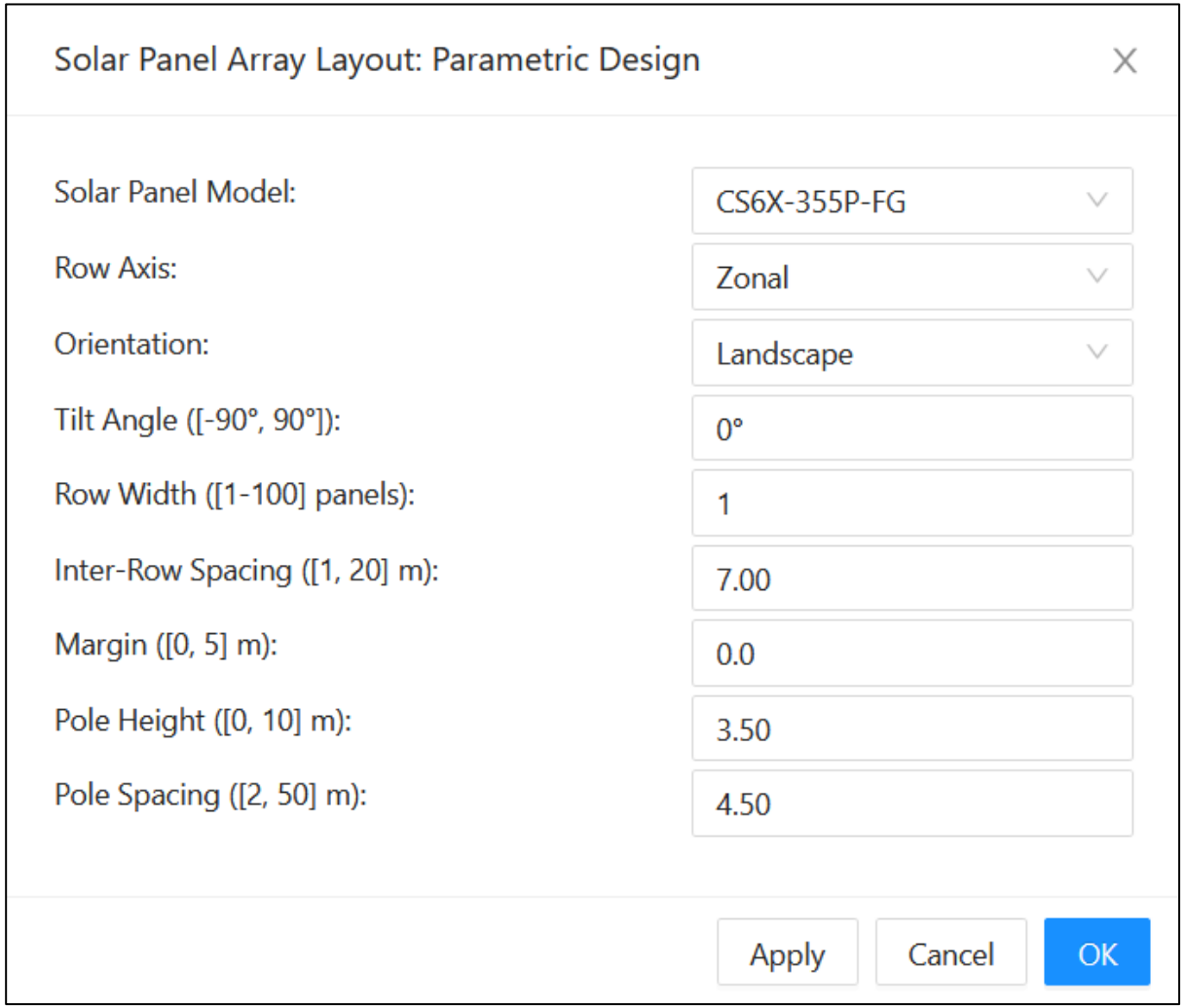


Parametric Design - Solarized Parking Lot Design Constraints

Parametric Design Constraints: Explore the full range for **Tilt Angle** and **Rows per Rack**.

To leave spacing for utility vehicles, the University has requested a minimum of 7m **Inter-Row Spacing**.

DO NOT change any of the other settings (Solar Panel Model, Row Axis, etc.). ONLY change the three variables mentioned on the previous slide.

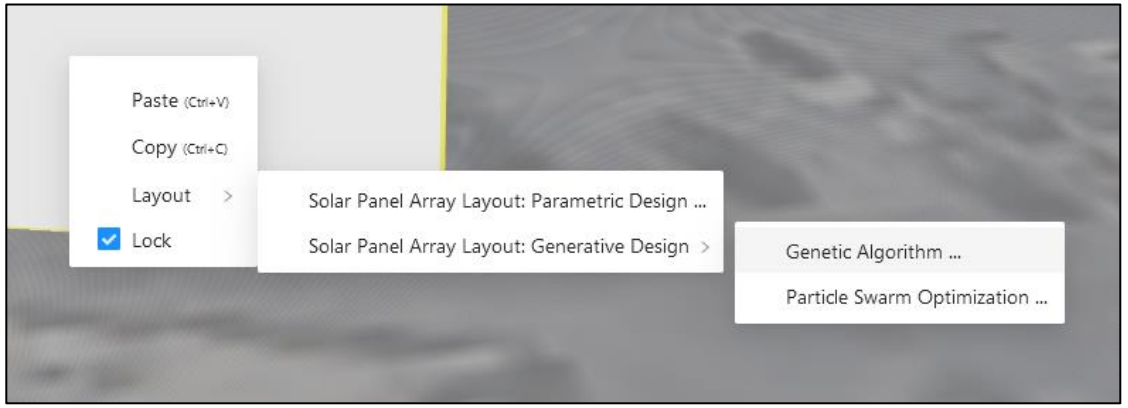


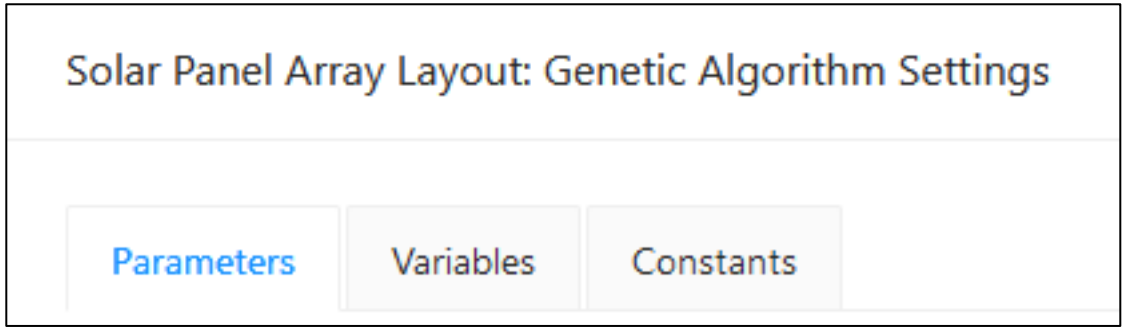
Generative Design - Solarized Parking Lot Design

Genetic Algorithm Settings: Aladdin offers many options for the generative design feature, but in this design problem you will explore the design space by changing **one parameter**, and **three variables**.

To access the Genetic Algorithm feature, first right-click on the polygon. Click on *Layout -> Solar Panel Array Layout: Generative Design -> Genetic Algorithm*. Here you can find the parameters, variables, and constants that define the algorithm as it generates designs. **Explore the design space by manipulating the following four options**:

1. Parameters: Objective
2. Variables: Range for Tilt Angle
3. Variables: Range for Rows per Rack
4. Variables: Range for Inter-Row Spacing



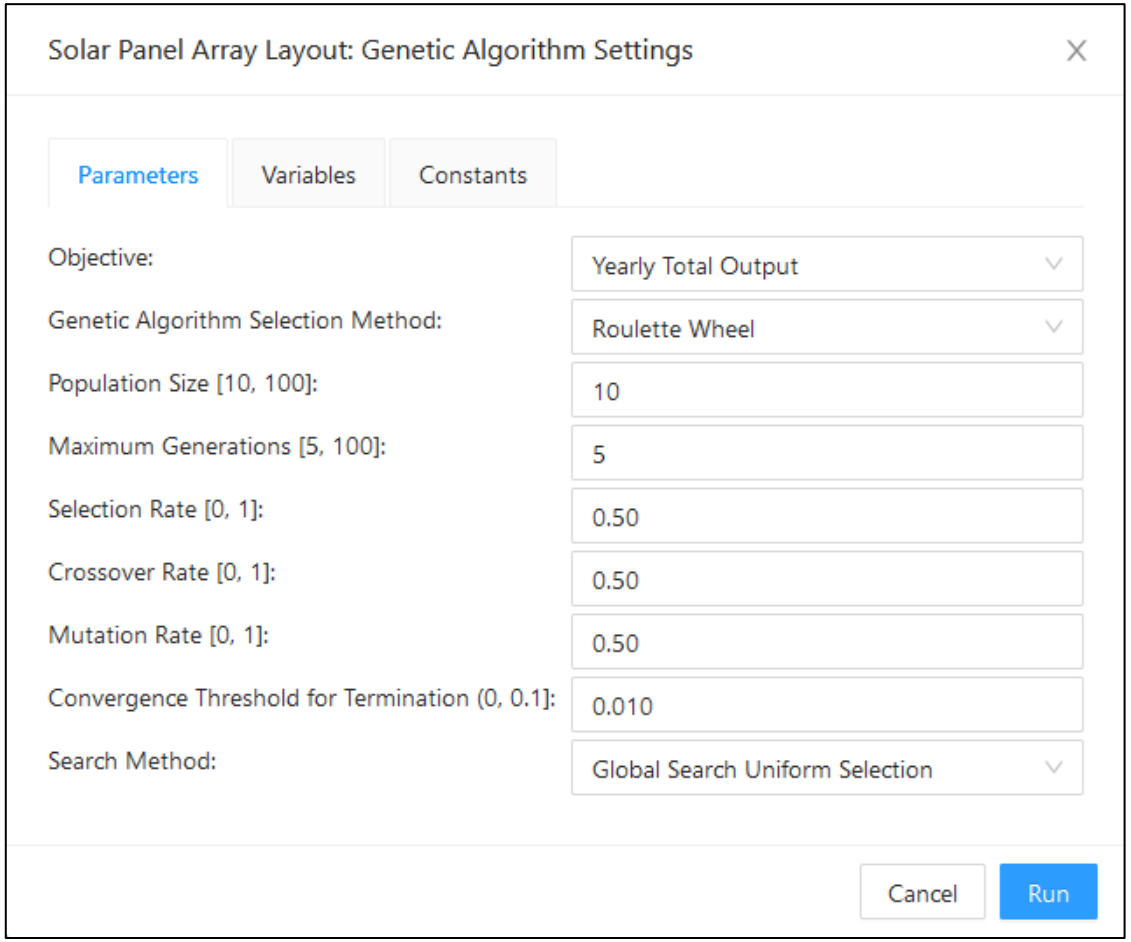


Generative Design - Solarized Parking Lot Design Parameters

Genetic Algorithm Settings: Parameters: The University is interested in maximizing both the **Yearly Profit** and the **Yearly Total Output** of the solarized parking lot.

Choose between the **Yearly Total Output** and **Yearly Profit** Objectives as you generate designs. You may use either Objective, but **DO NOT submit any designs that utilize the other Objective settings.**

Additionally, DO NOT change any of the other options in the Parameters menu.

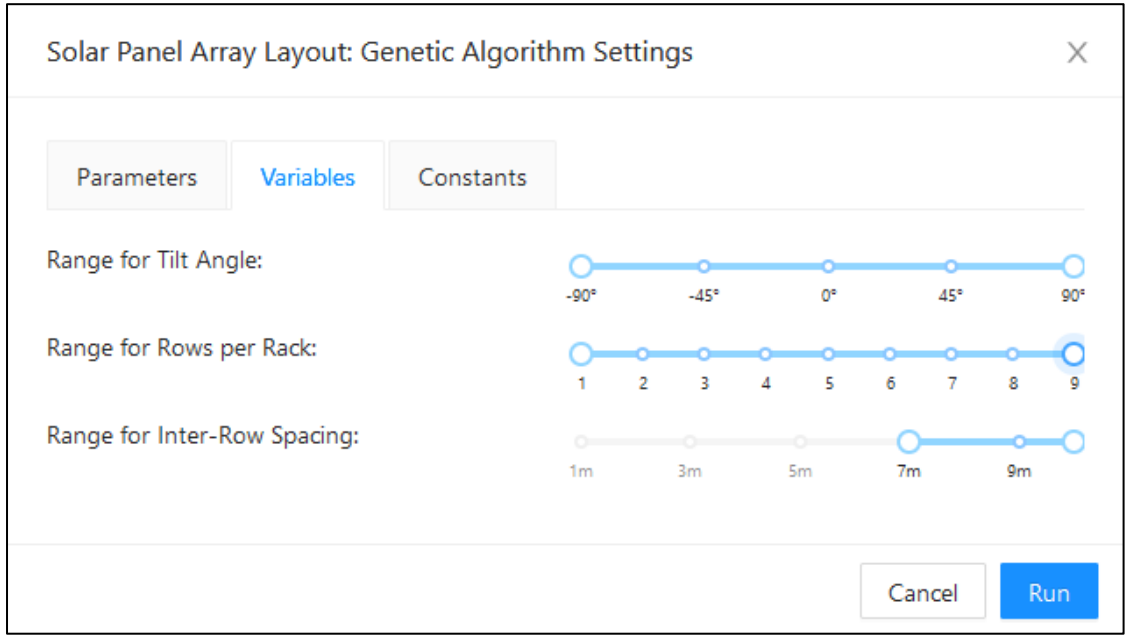


Generative Design - Solarized Parking Lot Design Variables

Genetic Algorithm Settings: Variables: You can control the design space explored by the AI via the settings in the **Variables** tab.

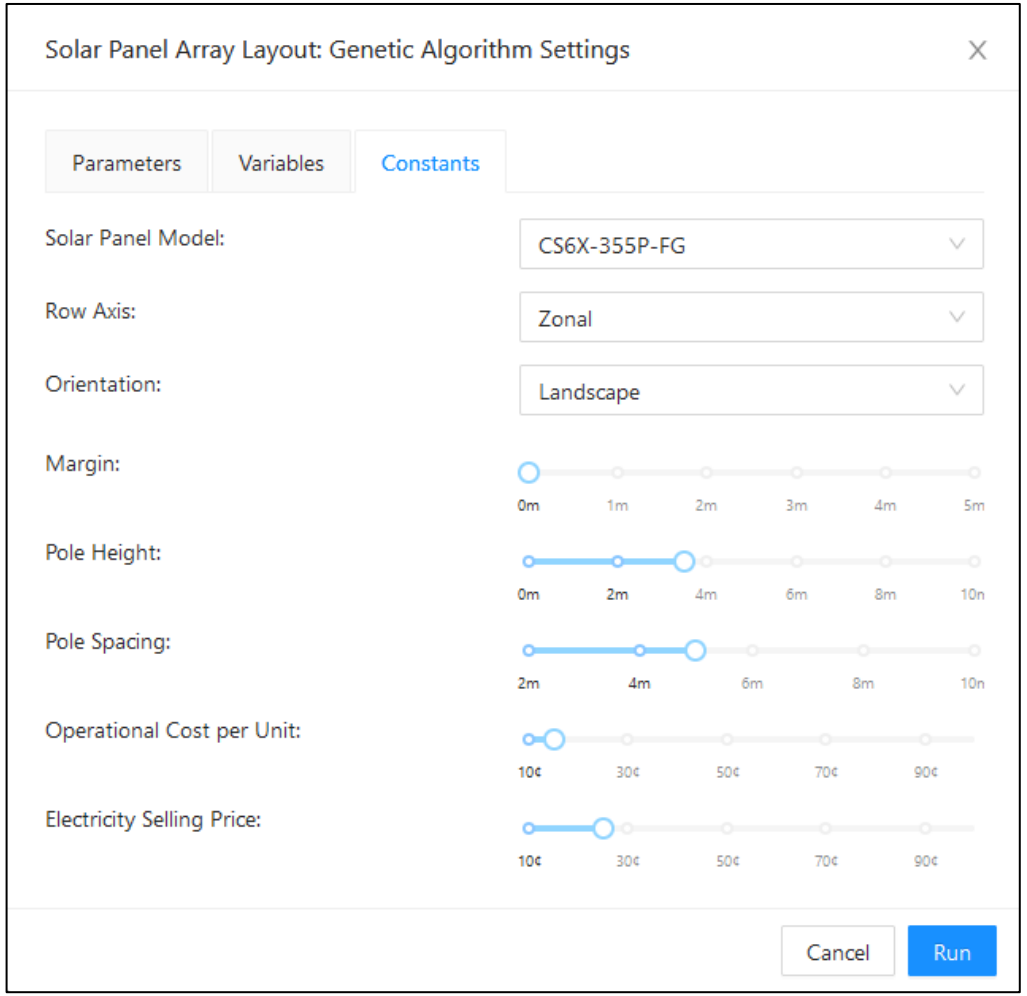
Explore the full range for **Tilt Angle** and **Rows per Rack**.

To leave spacing for utility vehicles, the University has requested a minimum of 7m **Inter-Row Spacing**.



Generative Design - Solarized Parking Lot Design Constants

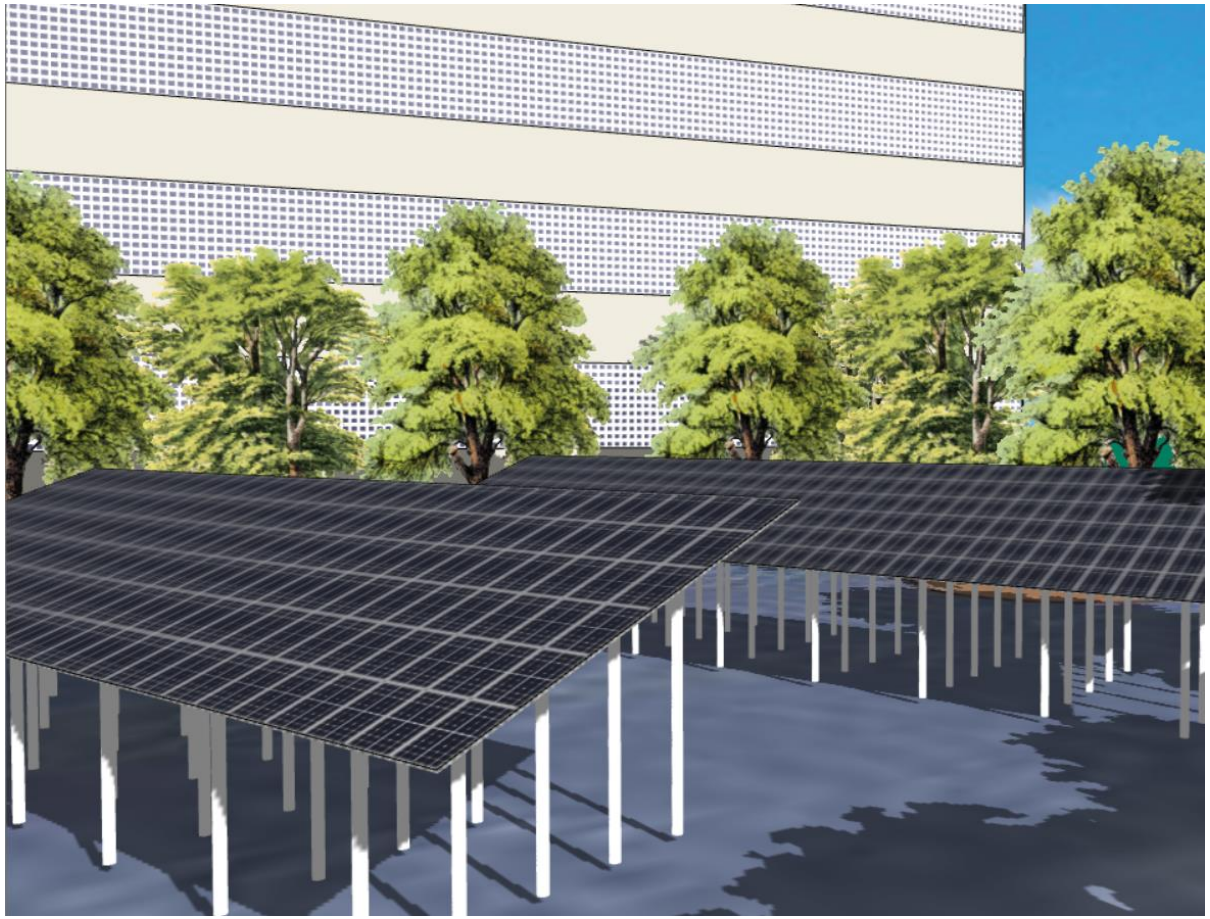
Genetic Algorithm Settings: Constants: Do not change any of the options in the Constants menu.



Solarized Parking Lot Design Constraints

Environment: Our future depends on clean energy, and one of the reasons the university initiated this campus development plan was to create a more environmentally friendly campus. Thus, **you must not remove any of the trees in the parking lot or adjacent areas**.

Of course, the project must be economically beneficial as well. **Do not remove or make any changes to** the surrounding buildings.



Solarized Parking Lot Design Rubric

Evaluate your designs using the rubric below. For example, the sample design on the right does not meet the expectations in either criterion. The rubric also serves as a hint for what is possible - aim at exceeding the expectations!

Yearly Profit ($)

>=3,300: Exceeds expectations

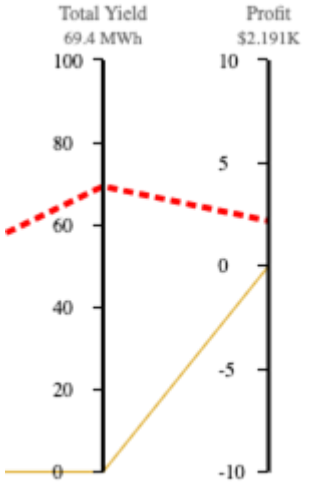
>=3,100: Meets expectations

>=2,900: Approaching expectations

<2,900: Not meeting expectations

*Aim at here!

Sample design



< 70: Not meeting expectations

>=70: Approaching expectations

>=80: Meets expectations

>=90: Exceeds expectations

Yearly Total Output (MWh)

Solarized Parking Lot Design Submission

Save your designs in Aladdin (“File > Save as Cloud File…”) and inserting their links into the appropriate spaces below. Your goal is to provide as many competitive designs as possible.

Yearly Profit ($)				
>=3,300: Exceeds expectations	*[insert link here]*	*[insert link here]*	*[insert link here]*	*[insert link here]* *Aim at here!
>=3,100: Meets expectations	*[insert link here]*	*[insert link here]*	*[insert link here]*	*[insert link here]*
>=2,900: Approaching expectations	*[insert link here]*	*[insert link here]*	*[insert link here]*	*[insert link here]*
<2,900: Not meeting expectations	*[insert link here]*	*[insert link here]*	*[insert link here]*	*[insert link here]*
	< 70: Not meeting expectations	**>=70:** Approaching expectations	**>=80:** Meets expectations	**>=90:** Exceeds expectations

Yearly Total Output (MWh)