

The Iron For Idaho Grid Game --- basic instructions for the Feb 1, 2014 version

<http://gridgame.ironforidaho.net> -- for more information

The Grid Game is based on a simulator of the swing equation created for the Idaho universities Resilient Control Systems class in Fall of 2013. It has been turned into a simple game as well now. The game is simple but entertaining.

You will get to:

Control your own micro grid manually. In the first three rounds you will adjust the Stored Power Control to balance the generated power and used power and keep the frequency close to sixty hertz. To learn a little about the theory of inertia of the swing engine grab this presentation:

<http://gridgame.ironforidaho.net/download/SwingModel.pdf>

Then after you show you can do this, now you get to take advantage of a feedback control system. Instead of manually controlling the Stored Power knob you are responsible for setting the gains of a proportional (main), integral(Sum), and differential(Rate) (PID) controller. See what happens to the response and correction of the frequency and phase when you set these gains to various values. What do you have to do to make the total phase error reduce? Play a couple rounds of this. Look at the rating bar—you need to keep the frequency and phase run pretty close to the set point (60Hz and 0 degrees) and minimize big, quick swings in the battery to maximize the rating and your score. But keep the grid going and survive another round and you'll do fine.

In the final rounds, the storage level becomes active. If you run out of storage you will have no ability to add power to stabilize the grid. If your storage gets full you will be wasting energy and will be penalized in your score. You, also, may not have enough energy from your local generation so you will need to buy more power or inconvenience some of your customers that have agreed to allow you to turn off their power. Of course both of these actions have a cost and will reduce your score. Try to choose the least expensive options from the demand response and grid dispatch tab.

Your scoreboard will be shared if you allow it to be transferred to the [gridgame.ironforidaho.net](http://gridgame.ironforidaho.net) site. Otherwise there is an option to save the score file when you quit the game.

Future version will add interactions with other micro grids and options to buy more local resources and sell extra power to other grids when you have it. Stay tuned!