

THEME AND TAKEWAYS

The user will engage with screen output and driver-type controllers to simulate meeting energy needs on a power grid. The key takeaway is that supply must always equal demand and various levels of energy generation provide that power.

Actual game play is expected to last about 60-120 seconds (timing may need to be adjusted during testing).

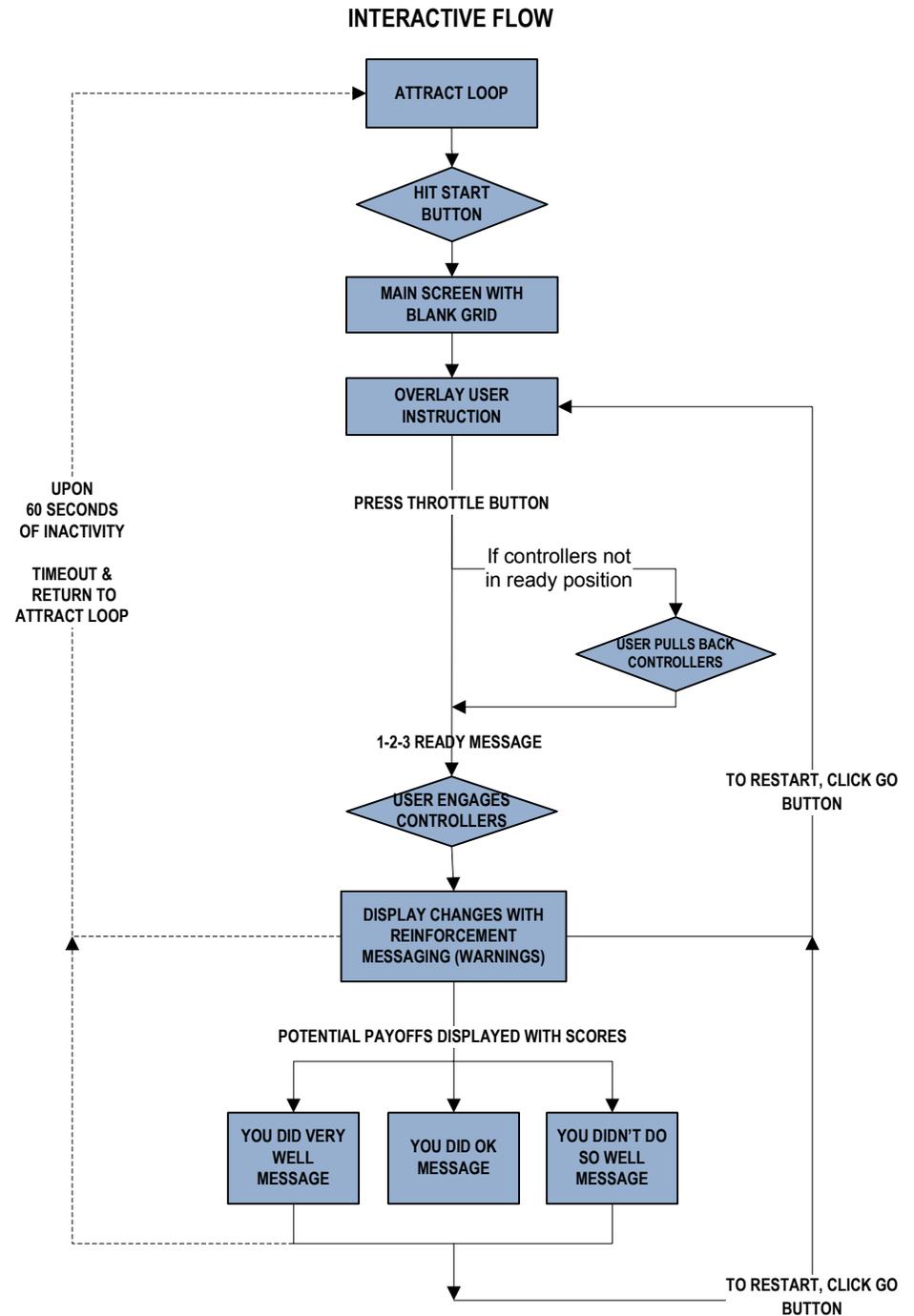
PARTS & EQUIPMENT

The custom-fabricated device is comprised of the following working parts:

- Console with phenolic resin embedment surface
- Backwall panel with graphics in steel post frame
- 46" Interactive Computers; Resolution = 1920 x 1080
- 3 Happ Throttles
- 3 Happ Interface Boards
- Industrial Push Button
- Audio Playback Speakers
- Audio Playback Amp
- Audio Playback Volume Control
- Remote Reboot Interface
- 37" - 70" Display Mount
- Cables and Connectors

USAGE DATA TO BE CAPTURED

- Each type of payoff
- Each reinforcement message
- Each start, reset, or GO action



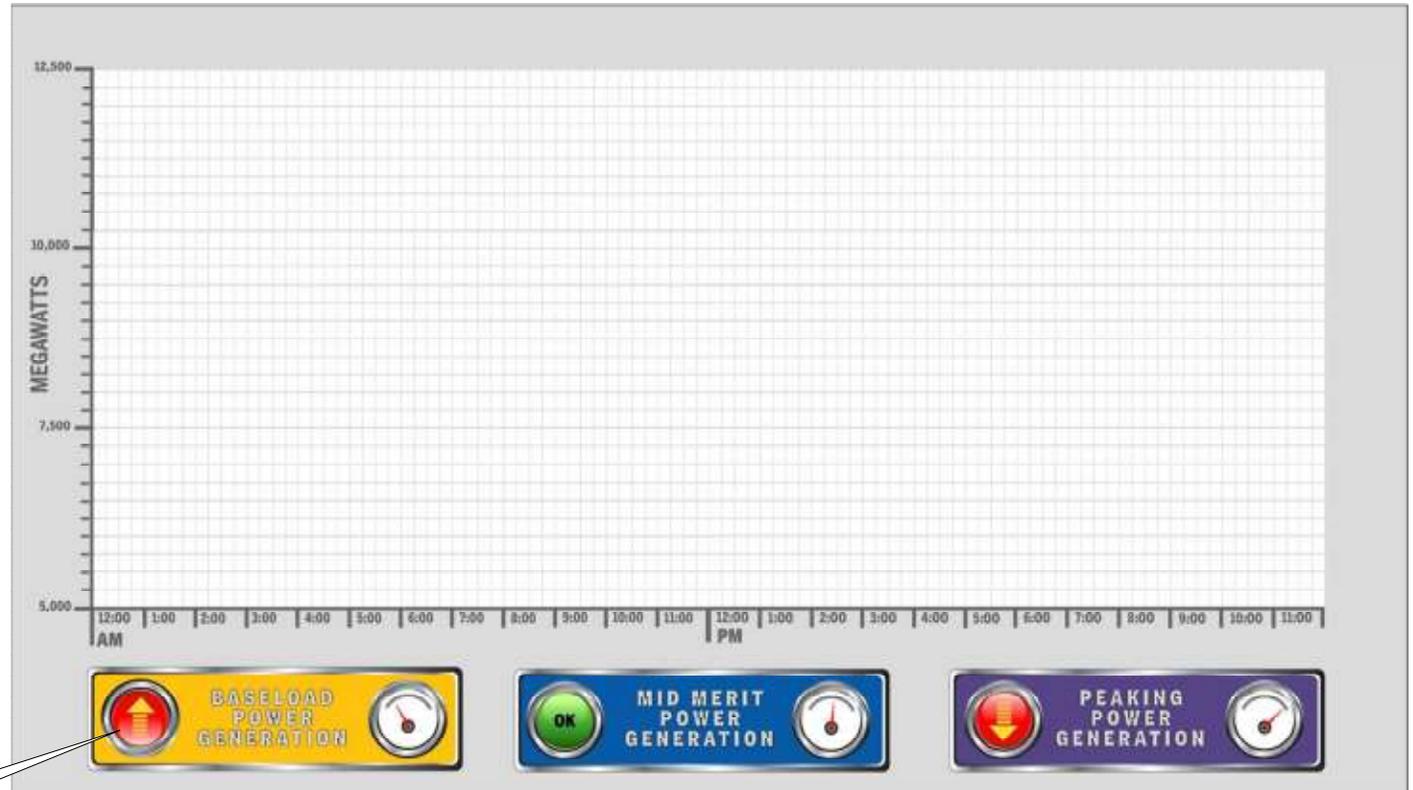
INTRODUCTION & GAME START

After the start button is pressed during the attract loop, the main screen appears.

After the main screen is shown, an instruction window is presented overlain on top. The window will consist of text. The instruction will include a prompt for the user to press the GO button to start the game.

When the GO button is pressed, a simple 1-2-3 get ready countdown indicates to the user when game play will begin.

If they are not already in that position, the user will be asked to move the throttles to their starting position. Once the throttles are in the starting position, the game can begin.

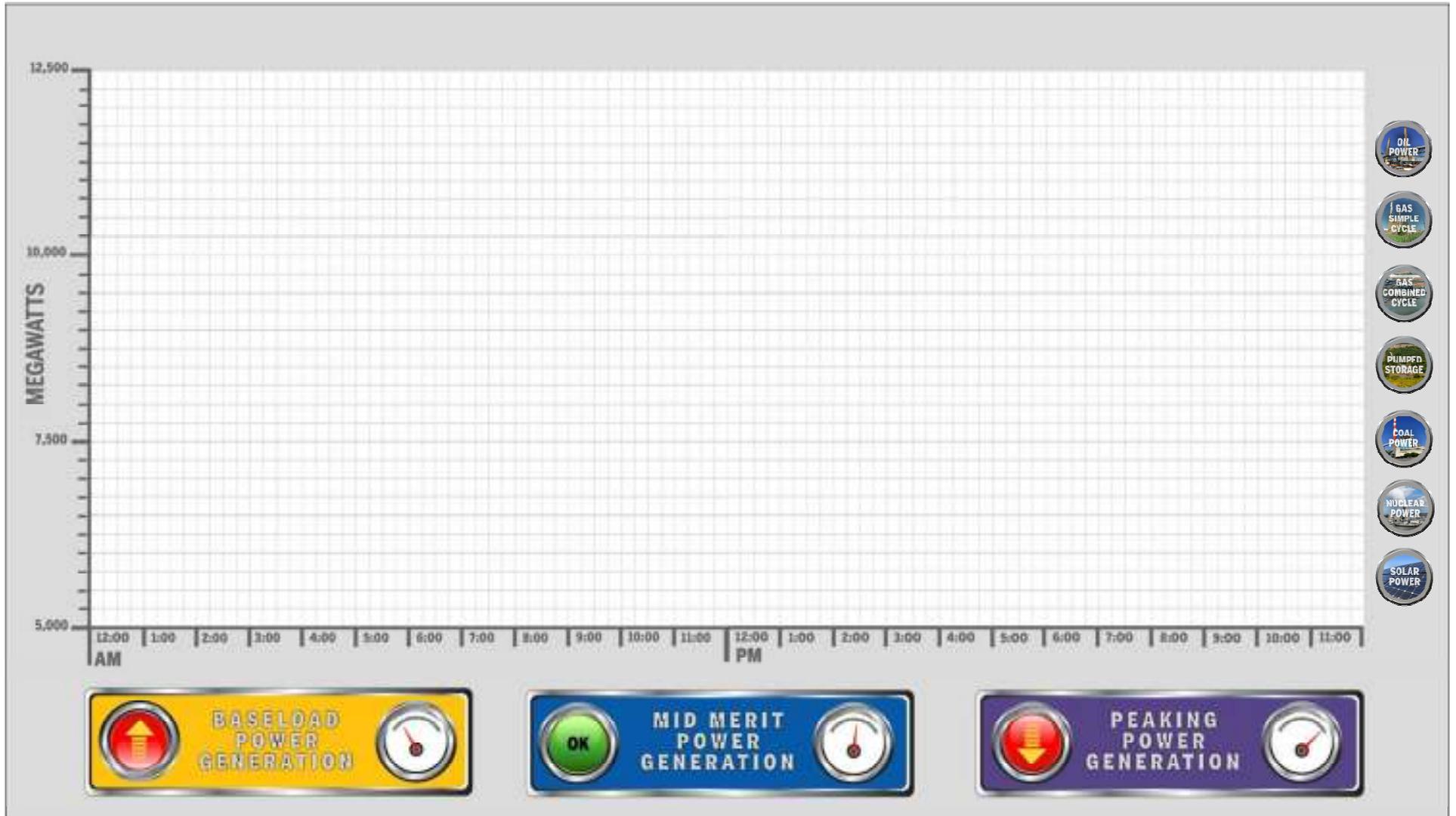


Feedback display areas for each level of energy generation

GO button



Turbo Throttle Happ (made by Suzo Happ)
<http://www.happ.com/driving/50818400.htm>,
with throttle button plugged.



GAME PLAY

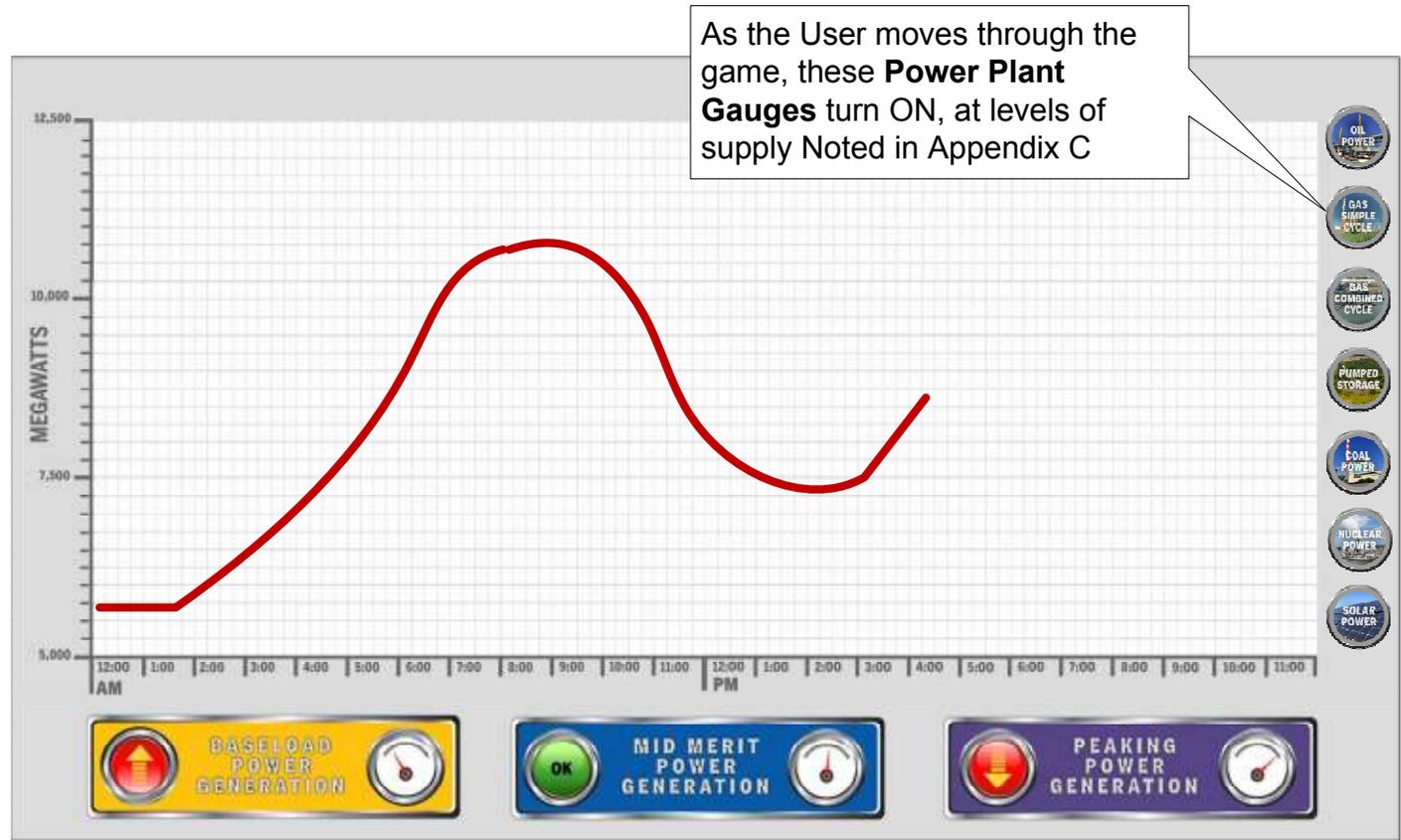
As play starts, a demand curve starts to move **at a continuous steady pace**. There is only 1 demand curve. A short amount of curve that is flat starts to allow the user to prepare for play.

The first manual thruster is engaged for the “Base Load Generation”. The user moves the thruster up or down resulting in a change in the power supplied. With the throttles, you are creating supply, which is depicted by the vertical bars. The goal is to keep your vertical bars in line with the growing demand curve line throughout the day.

A small arrow to the right of the widget gives the user a hint of the upcoming curve (~15 minutes). As the demand curve progresses to a higher power need, the user engages the second manual thruster for the “Mid-Merit Generation Load”, and it grows your bars into the Mid-Merit Generation accordingly. This creates the blue bars of the supply graph.

Finally, as the line of the curve progresses to higher demand needs, the third manual thruster is engaged for the “Peaking Generation Load” (purple bars on graph).

Power Plant gauges on the right-hand side come on at specific levels of supply.



Audio sounds are noted in Appendix A.

Feedback is provided along the way and at the end (see next pages)

GAME FEEDBACK

Feedback during game play is provided by 3 display areas above each of the three throttles.

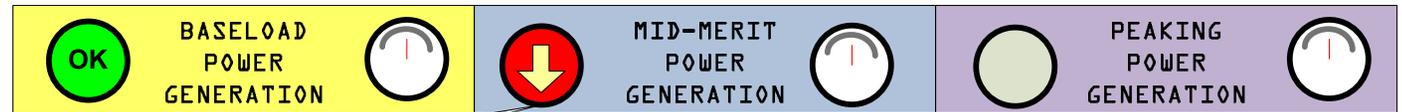
These boxes indicate OK (or sufficient) “Insufficient”, or “Excess” generation. The insufficient or excess warnings are independently triggered by the system logic if your vertical bars are not aligned with the demand curve. Adjusting the bars to match the demand curve will turn off the warning lights.

Each Feedback area also has a Power Meter, which displays, relatively, how much power is being generated for that level.

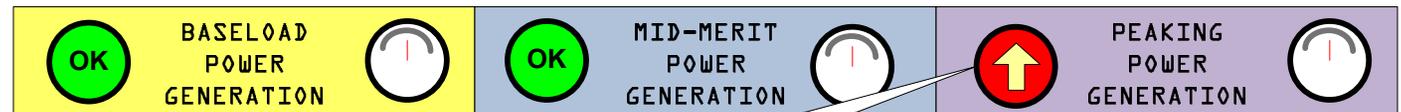
Once you’ve moved to a higher level of generation along the demand curve, and if you pull back on a lower level of generation, **the game will pause**, and you will get an insufficient warning on that level. An audio prompt will be given. Hitting the GO button will resume game play.

For example, if you are supplying Mid-Merit generation, and you pull back on the Baseload, the game will pause and you will receive a insufficient Baseload warning.

Similarly, if you are only supplying Baseload power on the curve, but you push up the peak generation, the game will pause and you will get an excessive warning on the peak generation, meaning that you are wasting valuable fuel.



In this example display shown, the user is in excess of their mid-merit generation, so the OK indicator is off, but the excess indicator is on. The Baseload supply is adequate, so that is “OK”



Similarly in this example, the user is insufficient with their Peak supply, so the OK indicator is off, but the insufficient indicator is on. The Baseload and mid-merit supplies are sufficient

GAME FINISH

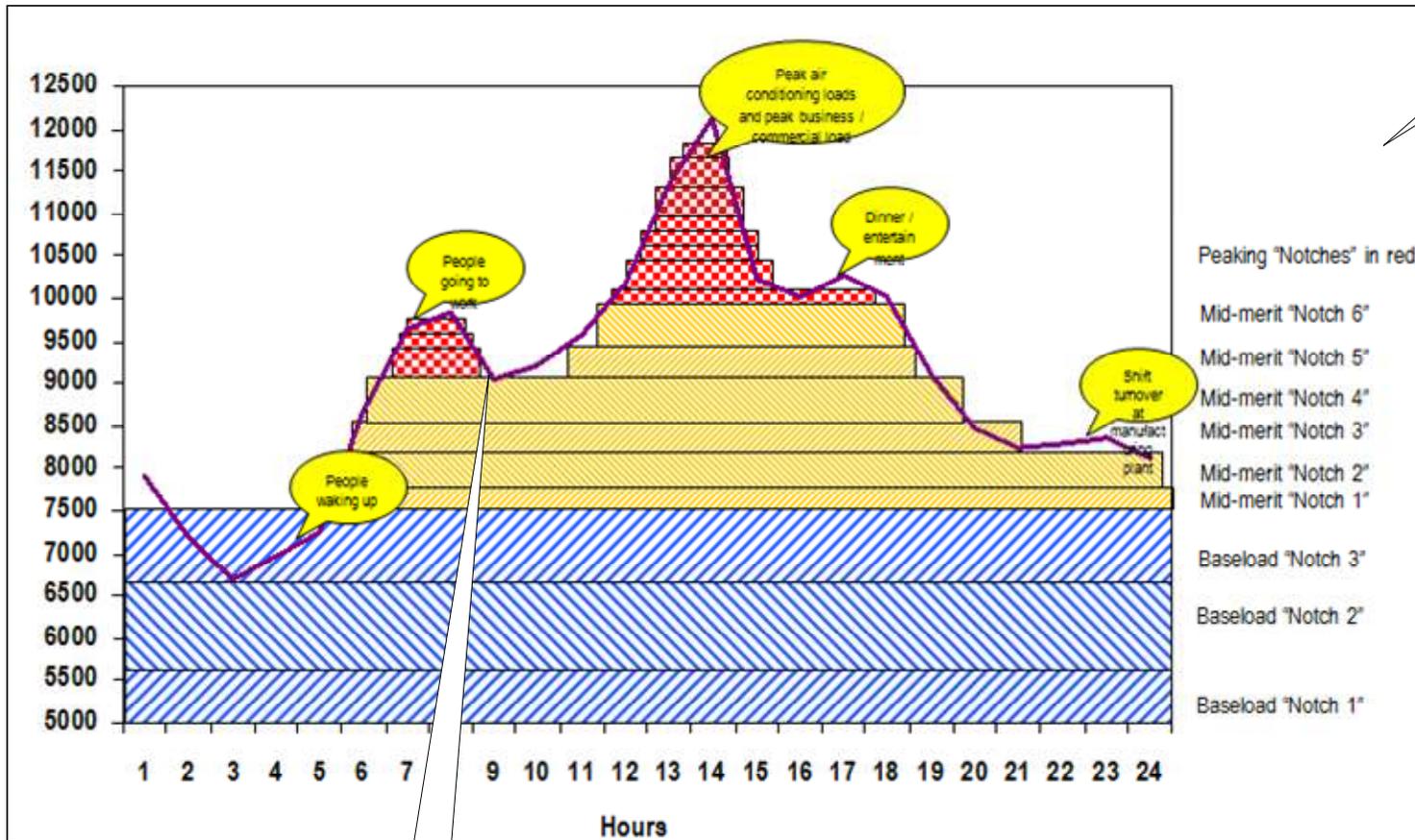
Play is finished when the demand curve reaches the end of the day. Both the final demand curve and your supply bars are shown at the end. Final feedback is presented graphically on the screen along with the curve and bars. Feedback is measured in several ways:

- % in terms of time you were on target
- % in terms of time you were insufficient
- % in terms of time you were in excess

The user will receive one of three potential overall messages with your ‘score’ (i.e., *Great Job* or *You Did Pretty Well* or *Try Better Next Time* (the math of this to be determined).

The user will also be asked if they would like to play again.

Also at the end of the day, pop-ups with information will appear on the screen. These pop-ups may provide a factoid of why the demand curve is where it is at that time of day. See Appendix B



Sample 'summer day' demand curve that will be used.

Hour	Megawatt
1	7920
2	7200
3	6680
4	6970
5	7240
6	8650
7	9660
8	9830
9	9060
10	9210
11	9580
12	10180
13	11350
14	12130
15	10220
16	10020
17	10280
18	10030
19	9100
20	8480
21	8250
22	8290
23	8360
24	8120

Despite this demand curve, note that the demand curve within the game will not call on a higher level of power generation before the previous level is maxed out.

Also, we will start the game in mid-baseload

Curve will be based on these hour values, and extrapolated in between the hours

Summary of Game Sounds:

- 1) When the intro message is brought up – some industrial sounding lever-type sounds
- 2) Sound when using throttles – hums that increase as more energy is used; 3 different hum ‘frequencies’ (one for each level of generation). Not an increase in volume
- 3) When a red arrow is indicated – a repeating warning beep
- 4) When the game is paused – another type of industrial sound. A gear, ‘ca-chink’ or locking sound. Audio voices in background
- 5) While feedback window is displayed – a soft pulsating industrial sound
- 6) When game is paused, a voice-over corresponding to the following events:
 - You are supplying Mid-Merit generation, and you pull back on the Baseload
 - You are supplying Peak generation, and you pull pack on either Mid-Merit OR Baseload.

Voice-over: **“You need to supply all the power available. View the dials on the screen and shift the lever up now.”**

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- Supplying Baseload power on the curve, have not yet maxed it out, but you push up the Mid-Merit generation OR Peak generation
 - Supplying Mid-Merit power on the curve, have not yet maxed it out, but you push up the peak generation

Voice-over: **“You need to reduce the power. View the dials on the screen and shift the lever down now.”**

Summary of When Game Pauses (Game pauses when...)

You’re on a level of generation along the demand curve, and if you pull back on a lower level of generation, **the game will pause**, and you will get an insufficient warning on that level.

2 possible scenarios:

- You are supplying Mid-Merit generation, and you pull back on the Baseload
- You are supplying Peak generation, and you pull pack on Mid-Merit
- You are supplying Peak generation, and you pull pack on Baseload

You’re on a level of generation, and you push up on a higher level of generation along the demand curve before you’ve maxed out on the lower levels, **the game will pause**, and you will get an excessive warning on that level.

Scenarios:

- Supplying Baseload power on the curve, have not yet maxed it out, but you push up the Mid-Merit generation
- Supplying Baseload power on the curve, have not yet introduced Mid-Merit, but you push up the peak generation
- Supplying Mid-Merit power on the curve, have not yet maxed it out, but you push up the peak generation

Energy Factoids (seen at end of game)

3:00 A.M. SLEEP TIME

Everyone is sleeping

7:00 A.M. OFF TO WORK

Ride the train, turn on the lights, and start the computers

2:00 P.M. TO THE MAX

Turn up the air conditioner and reach the peak of production

5:00 P.M. TIME TO RELAX

Go home, cook dinner, watch TV, and play games

11 P.M. END OF DAY

Time for bed

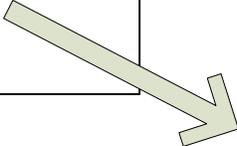
CONSTANT DEMAND (Displays in baseload area in the middle of the screen to signify all day events)

IT servers are running and airports and hospitals are operating



Right-side Power Plant sources

- Oil (peaking) Comes on at 12,120 MW
- Gas simple (peaking) Comes on at 11,525 MW
- Gas combined (mid-merit) Comes on at 9,625 MW
- Pumped storage (mid-merit) Comes on at 8750 MW
- Coal (baseload) Comes on at 6400 MW
- Nuclear (baseload) Comes on at 5000 MW
- Solar (On from 10am – 4pm)



OFF STATE

ON STATE



Game Time-Out

The game will have the standard time-out warning messaging and attract loop (similar to the other PSEG-EERC exhibits).

