The structure of our grid:

Generating companies -> GRID -> Substation -> Feeder -> Transformer -> Household

What a grid does is, it notes the demands of all the substations. Then it tells the generating companies to supply that required quantity of aggregate power.

NOTE: The substations DO NOT deal with the generating companies directly. The generating companies pool their power together in the grid, and the substations draw from that pool.

Smart Grid
Our course of work remains, surprisingly, unchanged. We still forecast the aggregate demand. We forecast supplies of each Generating Company.

Scheduling

Now suppose the demand is less than what the companies can supply together. We, obviously, can't have excess power flowing through our grid. So, the grid tells some companies to shut their production for some time. On what basis does the grid tell a company to shut its production and not some other?

There is a ranking that can established based on parameters like:

1. Cost per unit of electricity, that the generating companies charge. (The lower the cost, the higher they will be in the ranking)
2. Emission footprint (for the conventional plants supplying to the grid. Large emissions would mean downward movement in the ranking)
3. Previous records (if a generating company promised to supply some qty but failed to do so, it should move down the ranking)

Based on this ranking, we ask those gen cos to shut down first that are lower in the ranking.

When the demand is more than or equal to the supply, then we don't have a problem. We simply ask the conventional power plants to step up their production.

When the demand falls short of the supply, we look at the ranking and tell the companies at the bottom to shut down their production.