# Since ITER is expected to produce 10 times the power consumed, does this not mean that the substance produced and reused will by further extrapolation reduce the power needed by a reduction of 10? And this reduction lead to a further reduction of 10 and so on until almost no power is used?

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**Q: Since ITER is expected to produce 10 times the power consumed, does this not mean that the substance produced and reused will by further extrapolation reduce the power needed by a reduction of 10? And this reduction lead to a further reduction of 10 and so on until almost no power is used?**

A: ITER will generate fusion power that is ten times more than the power used to directly heat the plasma. Additional power is required for the magnetic field coils, although this will be much reduced at ITER as they will be superconducting. Nonetheless, as you suggest, in the fusion process there will be more power produced than is consumed – as indeed there is in any power plant.

The energy produced by the fusion reaction is mostly carried by the neutrons, which, because they are neutral in charge, are not affected by the magnetic field that confines the plasma. Instead they stream out of the plasma into the walls of the vessel where their energy can be collected and used to heat water, as in a conventional power plant. The other product, the helium nucleus, carries only 20% of the energy, but because it is charged, it stays within the plasma. So you are correct, this energetic “substance” contributes to the heating of the plasma, and replaces the need for extermal heating. At a certain point the heating caused by the helium production will be enough to turn off the external heating systems completely – this point is known as ignition – and as you point out, no further input power would be required at that stage.

Read more:
Fusion Conditions (https://web.archive.org/web/20150409140838/https://fusion.org/wpcms/fusion/how-fusion-works/fusion-conditions/)

However, for the sake of controlling the plasma, future power plants will probably operate slightly below the ignition point (although this still will produce significantly more energy output than is put in.)

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