



Steam Turbine Series Part 2: Modifying a Steam Turbine Model in THERMOFLEX

Using Steam Turbine Assembly menu
to make model match known
specifications

Feature Awareness Webinar Series

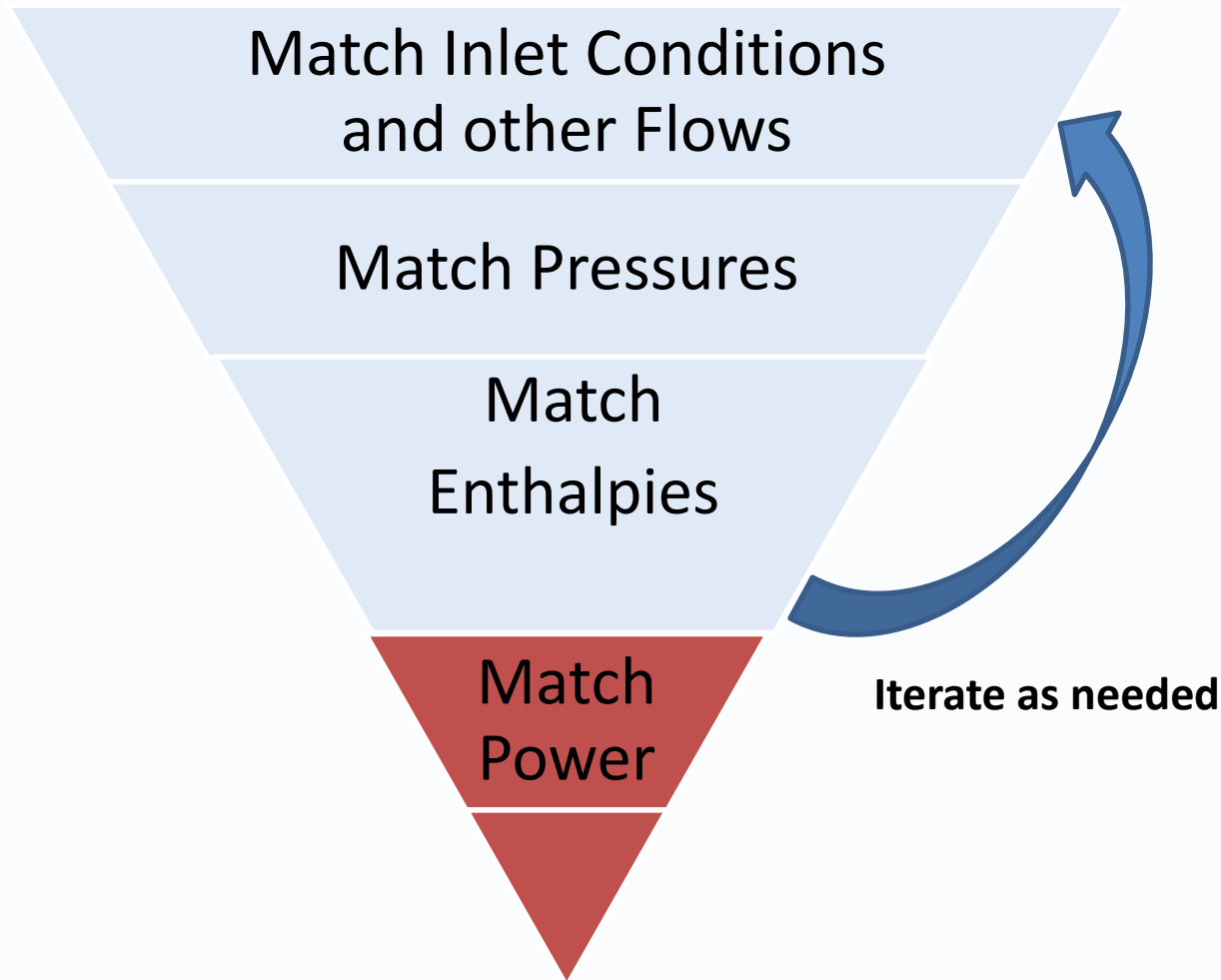
Thermoflow Training and Support

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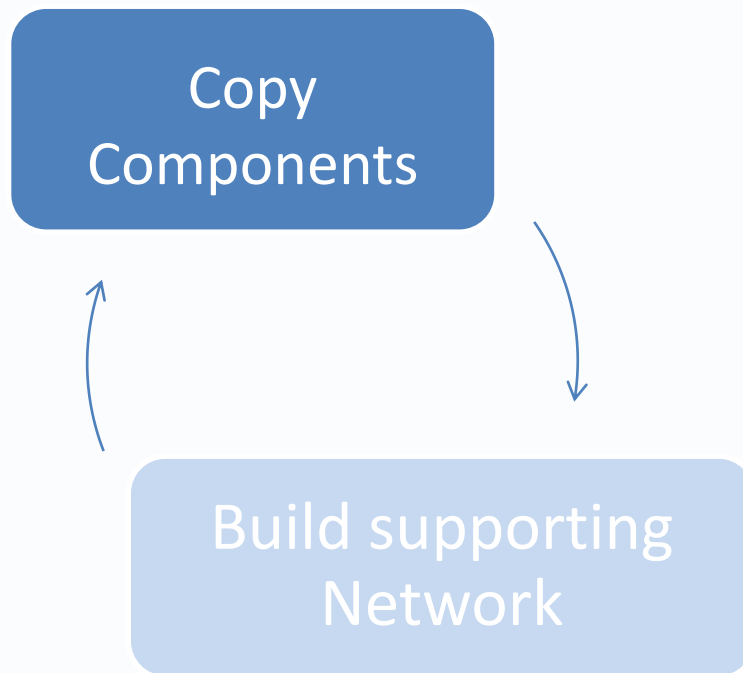


Modify a Steam Turbine Model: Tasks

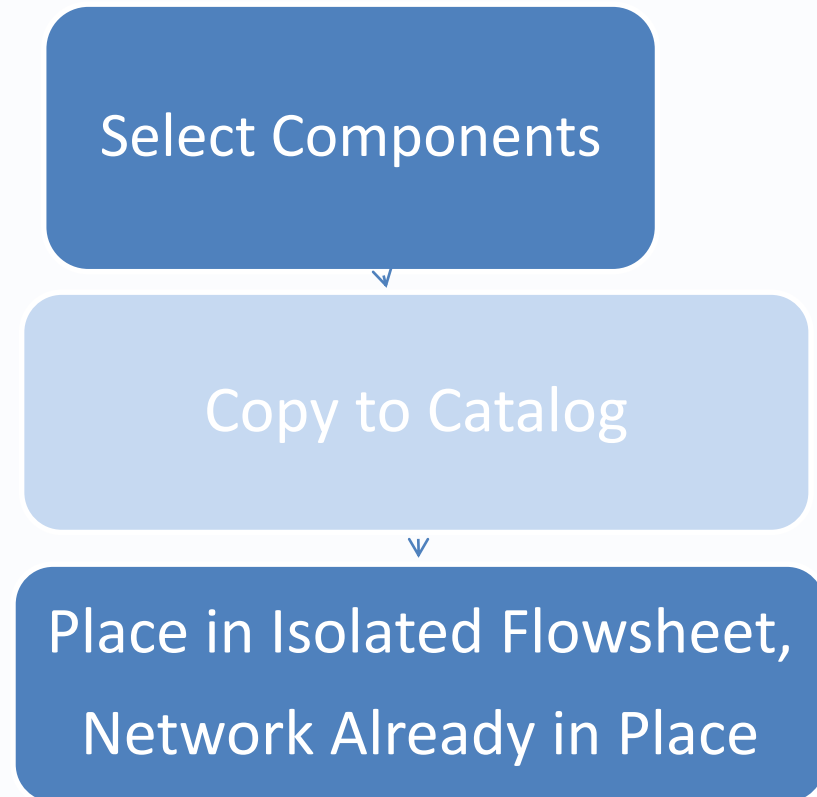


Isolate a Steam Turbine Model: Then & Now

Before

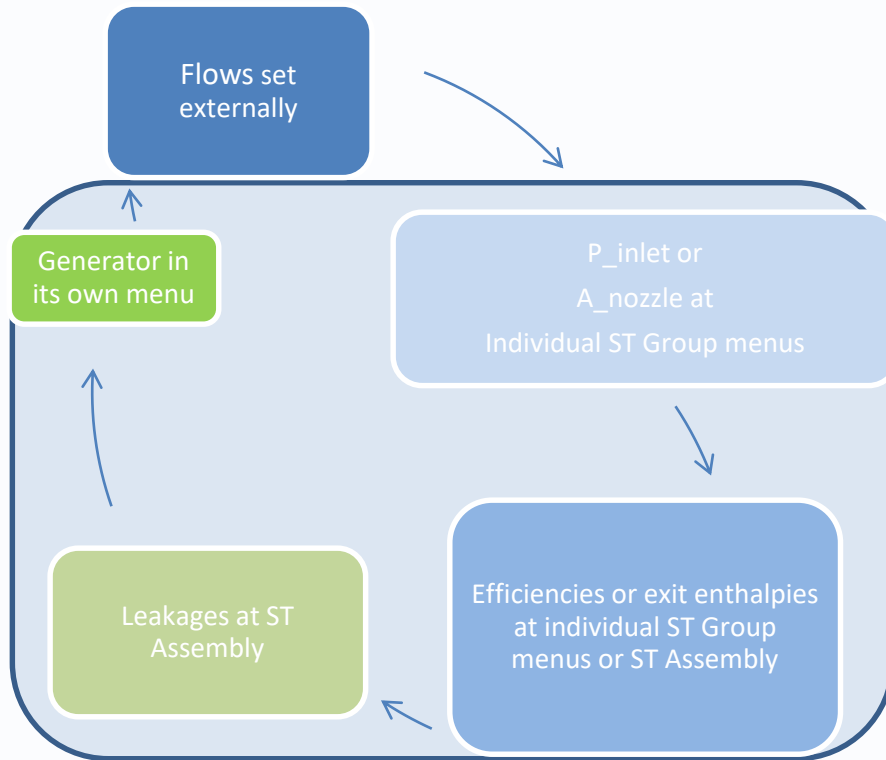


Now, w/ Catalog



Modify a Steam Turbine Model: Then & Now

Before



Now



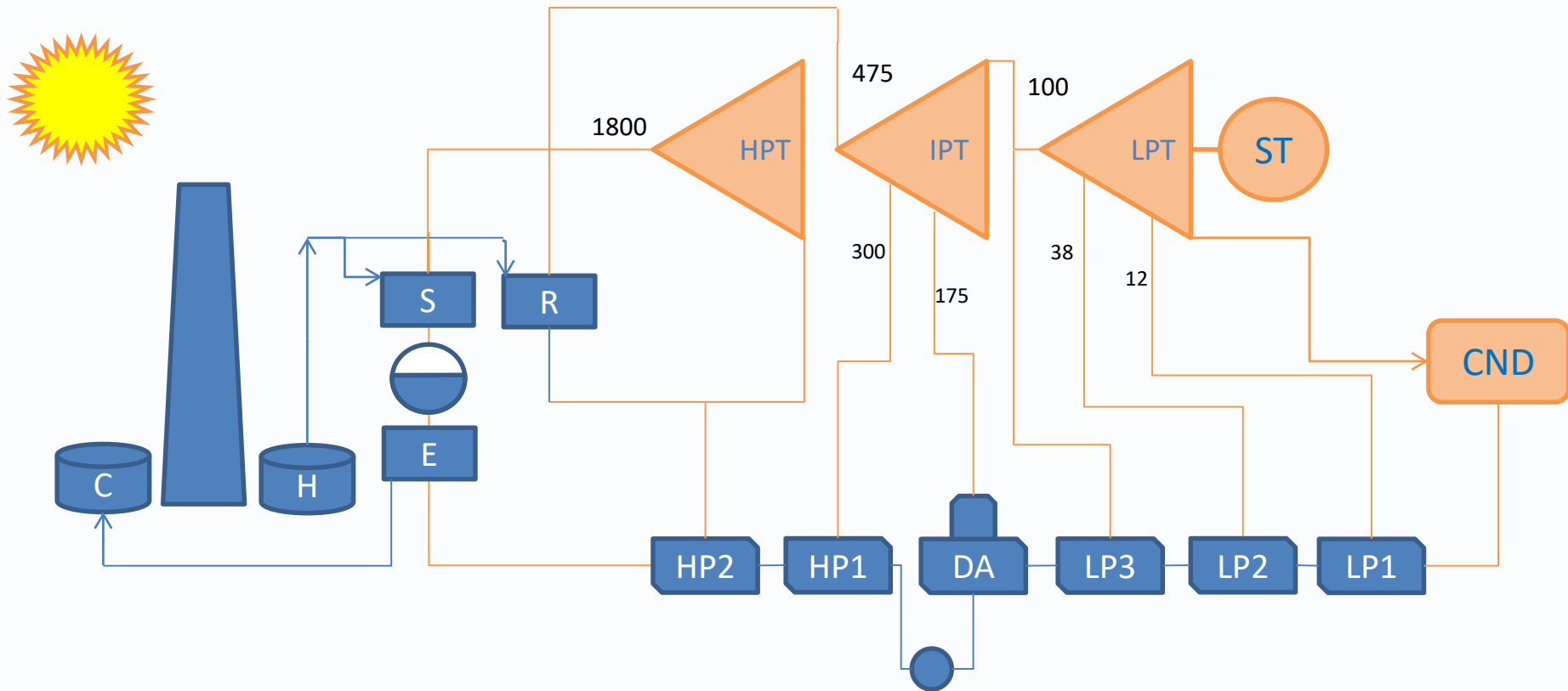
Revised ST Assembly Menu

Background:

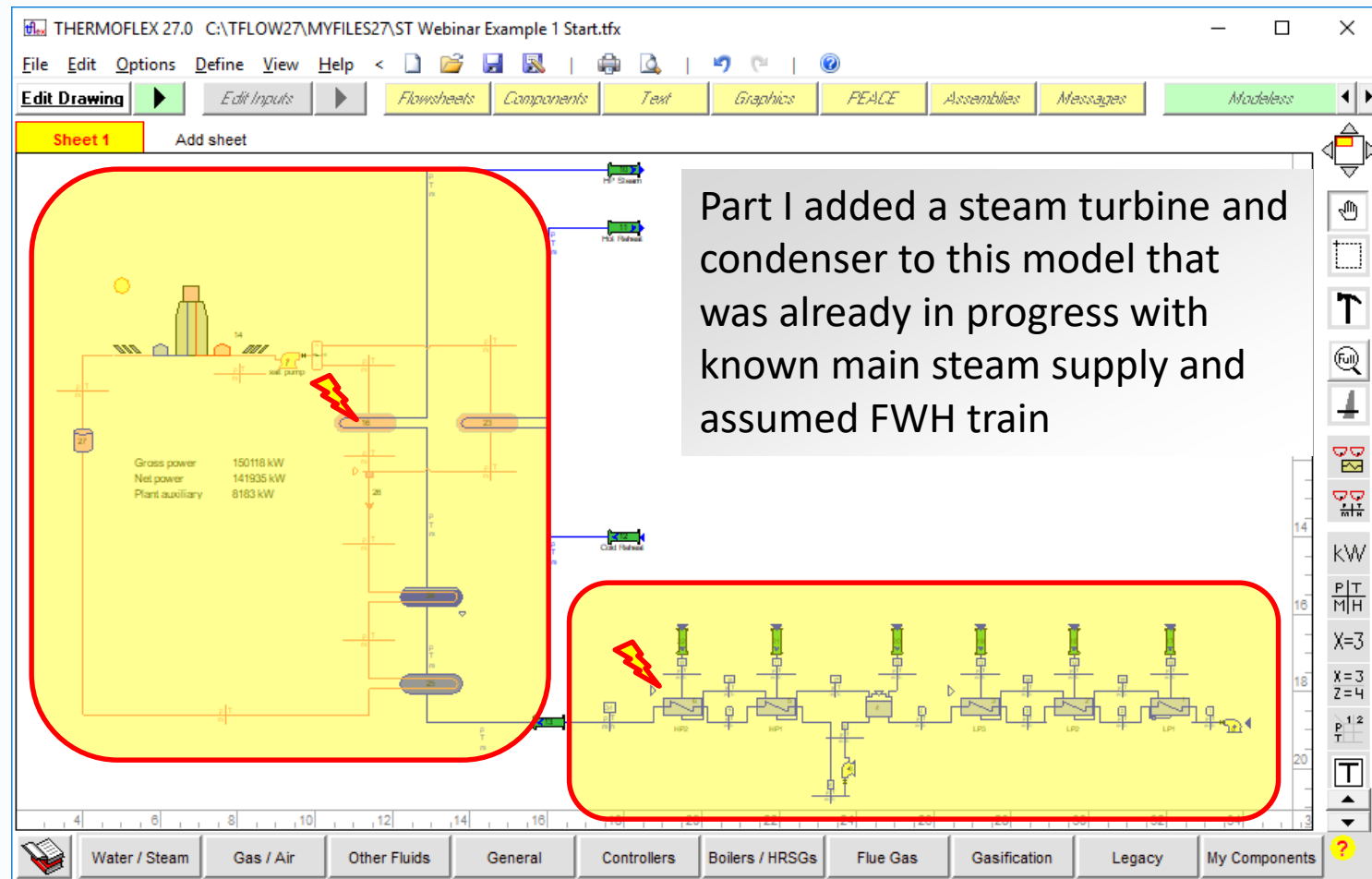
Solar Rankine Cycle of Part I

New Piece

Already-built Pieces



In Part I, we began with a Starter Model, representing a prospective system model ...

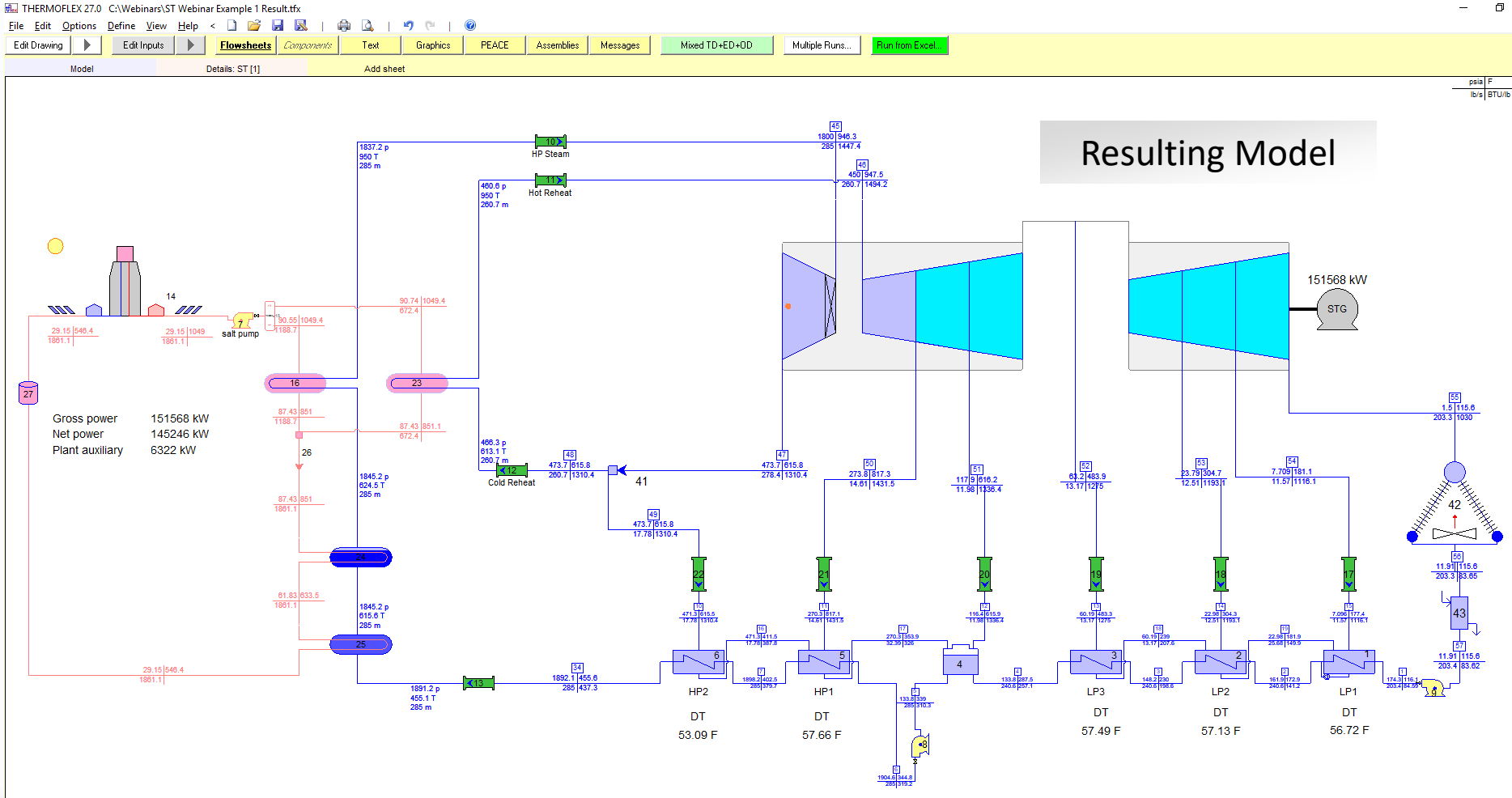


The screenshot shows the THERMOFLEX 27.0 software interface. The main window displays a process flow diagram on a yellow background, enclosed in a red rounded rectangle. The diagram includes a boiler, a steam turbine, and a condenser. A text box on the right side of the diagram contains the following text:

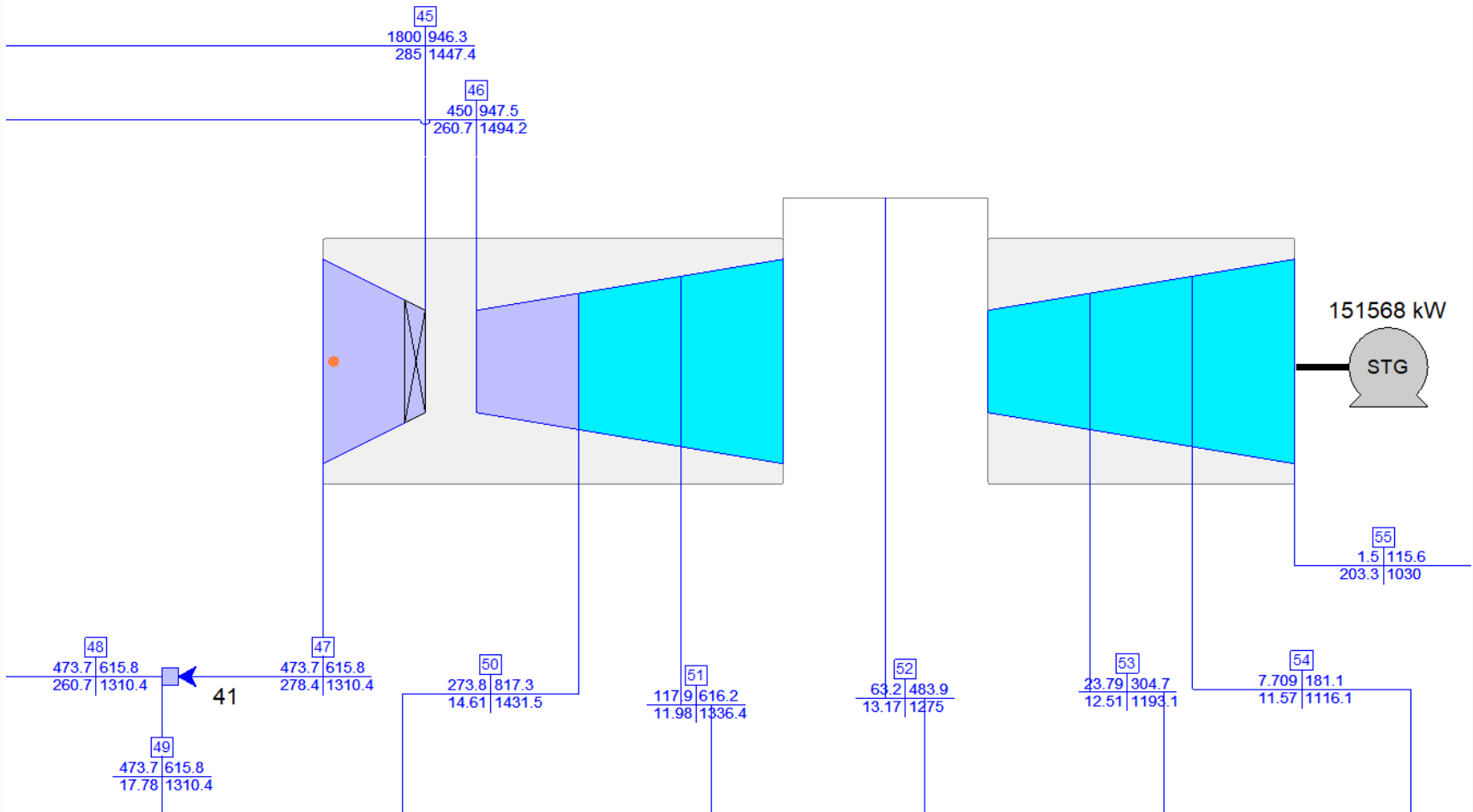
Part I added a steam turbine and condenser to this model that was already in progress with known main steam supply and assumed FWH train

Below the main diagram, there is a smaller diagram, also enclosed in a red rounded rectangle, showing a more detailed view of the steam turbine and condenser components. The software interface includes a menu bar at the top with options like File, Edit, Options, Define, View, and Help. Below the menu bar are several tabs: Edit Drawing, Edit Inputs, Flowsheets, Components, Text, Graphics, FEACE, Assemblies, Messages, and Modelless. The bottom of the interface features a toolbar with various icons and a status bar with labels like Water / Steam, Gas / Air, Other Fluids, General, Controllers, Boilers / HRSGs, Flue Gas, Gasification, Legacy, and My Components.

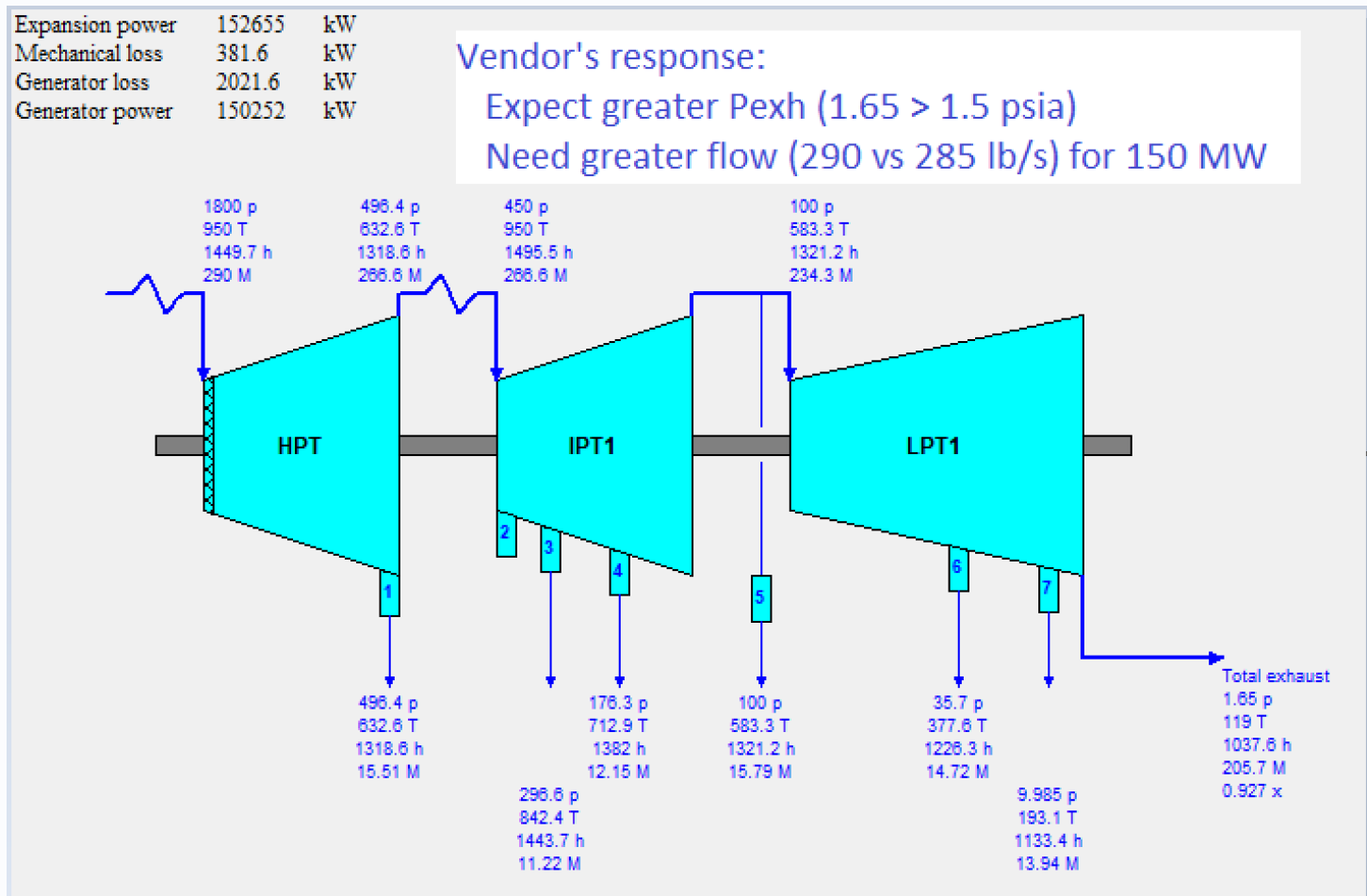
Using the ST Assembly Wizard, a new ST was added to that Starter Model. This is where we'll pick up today



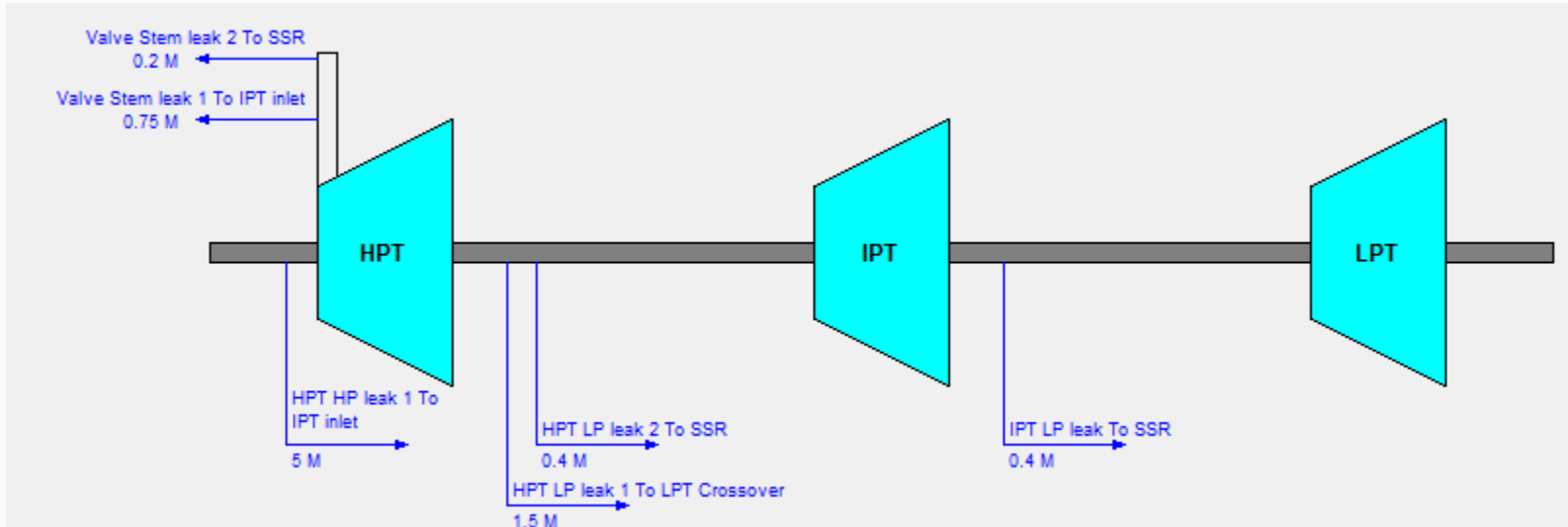
A closer look at the turbine...



Responding to a request for a proposed turbine to fit these needs, a vendor responds with a heat balance of his own...

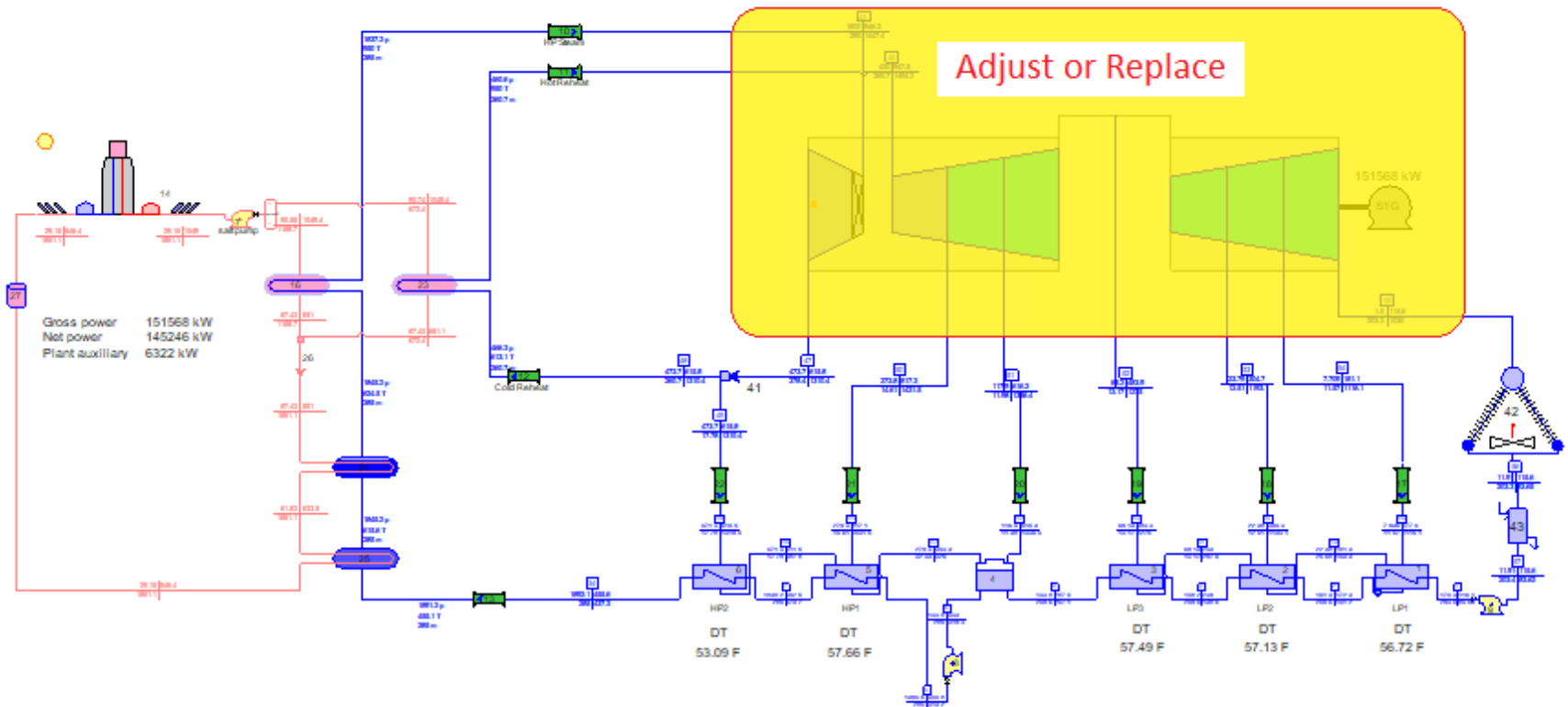


... with some details of packing leakages and exhaust loss.



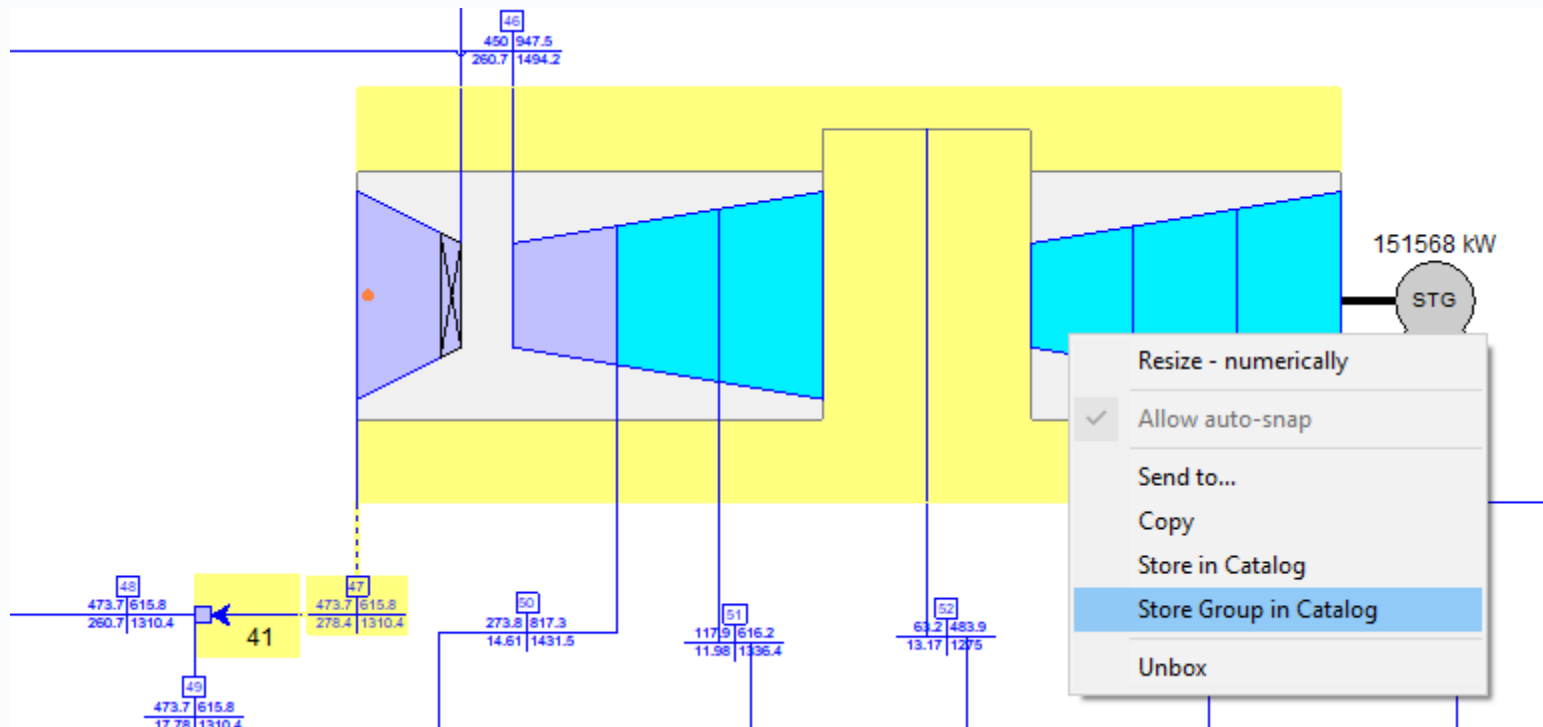
Last stage blade length	29.98	in
Last stage pitch diameter	85.00	in
Exhaust annulus area / end	55.60	ft ²

This leaves you with the task of implementing the vendor's design of the steam turbine, merging it with your developing model.



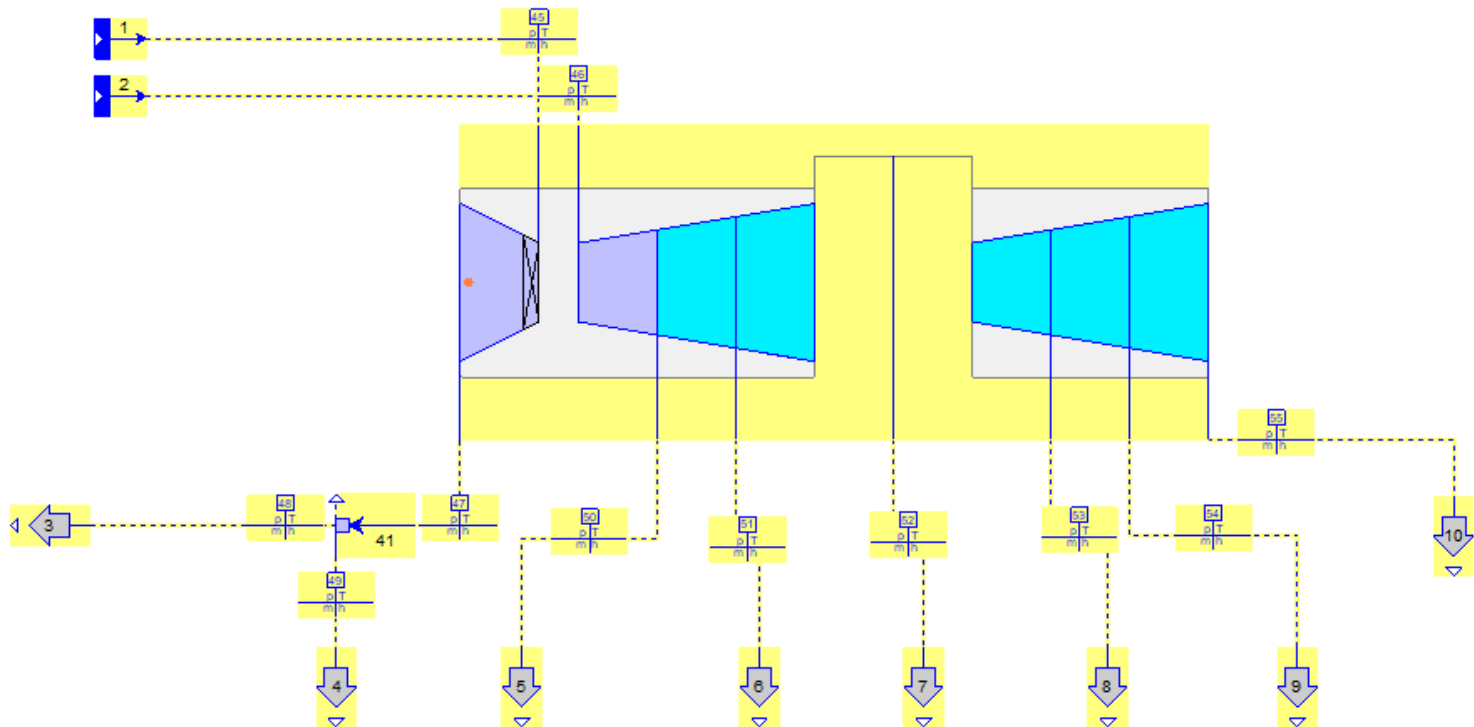
Adjusting in place leaves a lot of potential conflicts to be wrestled with. The recommended procedure is to make a copy of the subsystem, adjust it all by itself, then bring it back, as an already-designed, finished product in Off-Design.

You could copy to a new file or flowsheet directly, or place a copy in a Catalog.



Copied ST and Splitter 41 to "SolarST_plus"

An advantage of the Catalog is that, when you import that stored sub-model to a new file, it brings with it a full complement of associated elements to support the sub-model on its own.



Opened a new TFX file and selected “SolarST_plus” from Catalog. It comes equipped with Sources and Processes as supporting elements.

The Steps Involved...

- Isolate in a flowsheet free from network. I've chosen to push to and pull from a Catalog
- Impose incoming flow conditions, outgoing pressures and flows, check leakages if known, check overall flow match
- Impose whatever's needed for pressure match
- Set efficiencies or exit enthalpies, set known or assumed exhaust loss
- If all the above is done right, any small remaining disparity in power is due to generator or mechanical losses.
- Convert to Off-Design, compute, then copy modified model back to main flowsheet.

Final Results

