Argonne NATIONAL LABORATORY

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PSAT Training

Part 06
Advanced Features
Add / Delete

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Office of Science
U.S. DEPARTMENT OF ENERGY

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FreedomCAR & Fuel Partnership

Outline

- Add / delete initialization files
- Add / delete drive cycles
- Add / delete component models
- Add / delete control strategies

Creating a New File

Some of the headers of the files are not comments!!!

Editor - C:\psat_v61\component\initialization\gearbox\gb_4_au_281_15_1_072_focus.m

File Edit Text Cell Tools Debug Desktop Window Help

Stack: Base

```
%% File description
% Name : gb_4_au_281_15_1_072_Focus
% Author : A.Rousseau - ANL
% Description : Initialize the 4 speed gearbox used in the Focus
% Gear ratios 2.816 , 1.498 , 1.0 , 0.726
% Gear efficiencies have been estimated
% Model : lib_gb_automatic_map_trqloss_funTWratio
% Vehicle Type : Light


%% File content
gb.list.init = {'mass','inertia_in','inertia_out','spd_thr'};
```

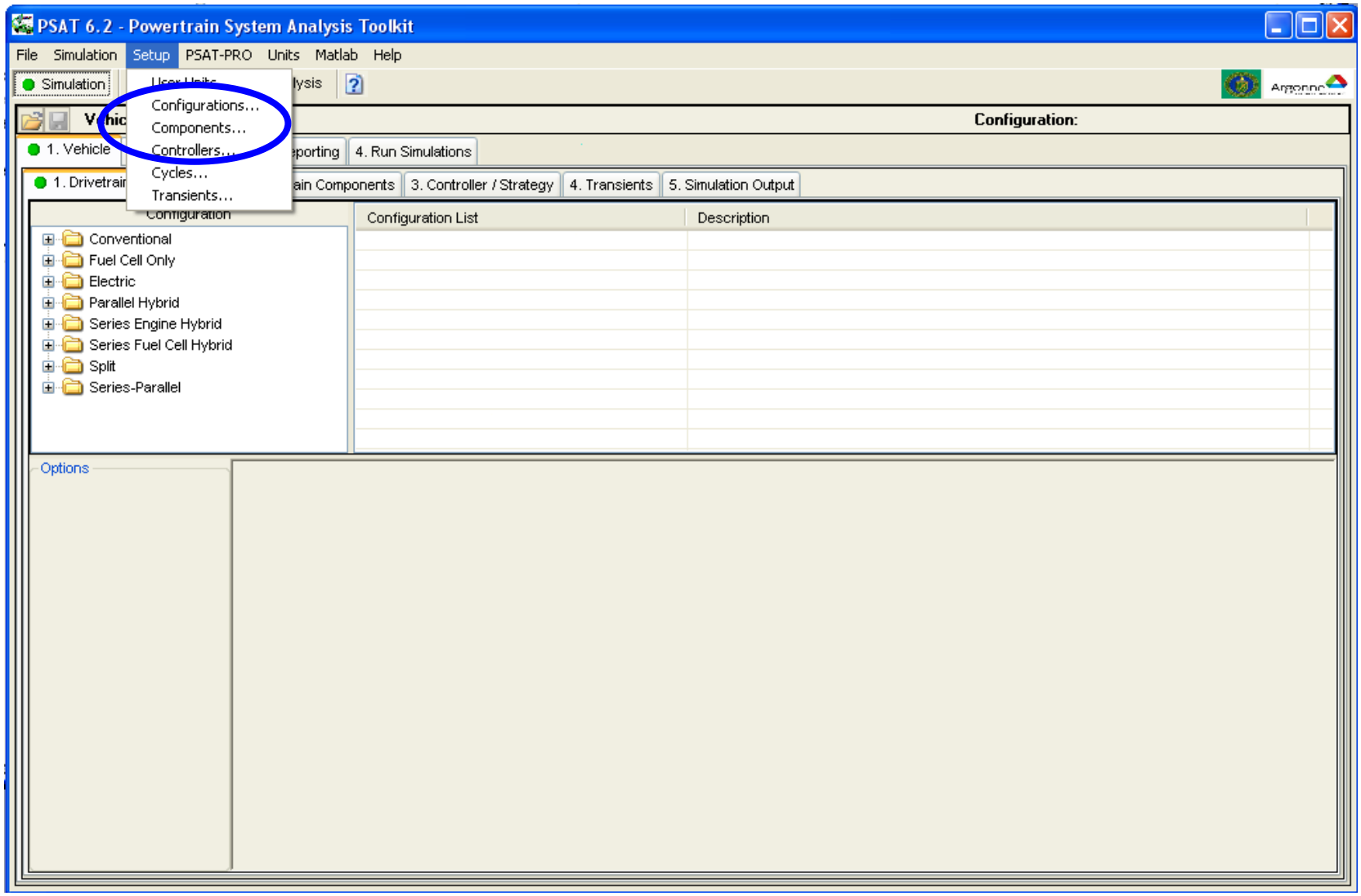
Comments

Component Model Associated with the File – Used in GUI

Vehicle Type (Light or Heavy Duty) – Used in GUI

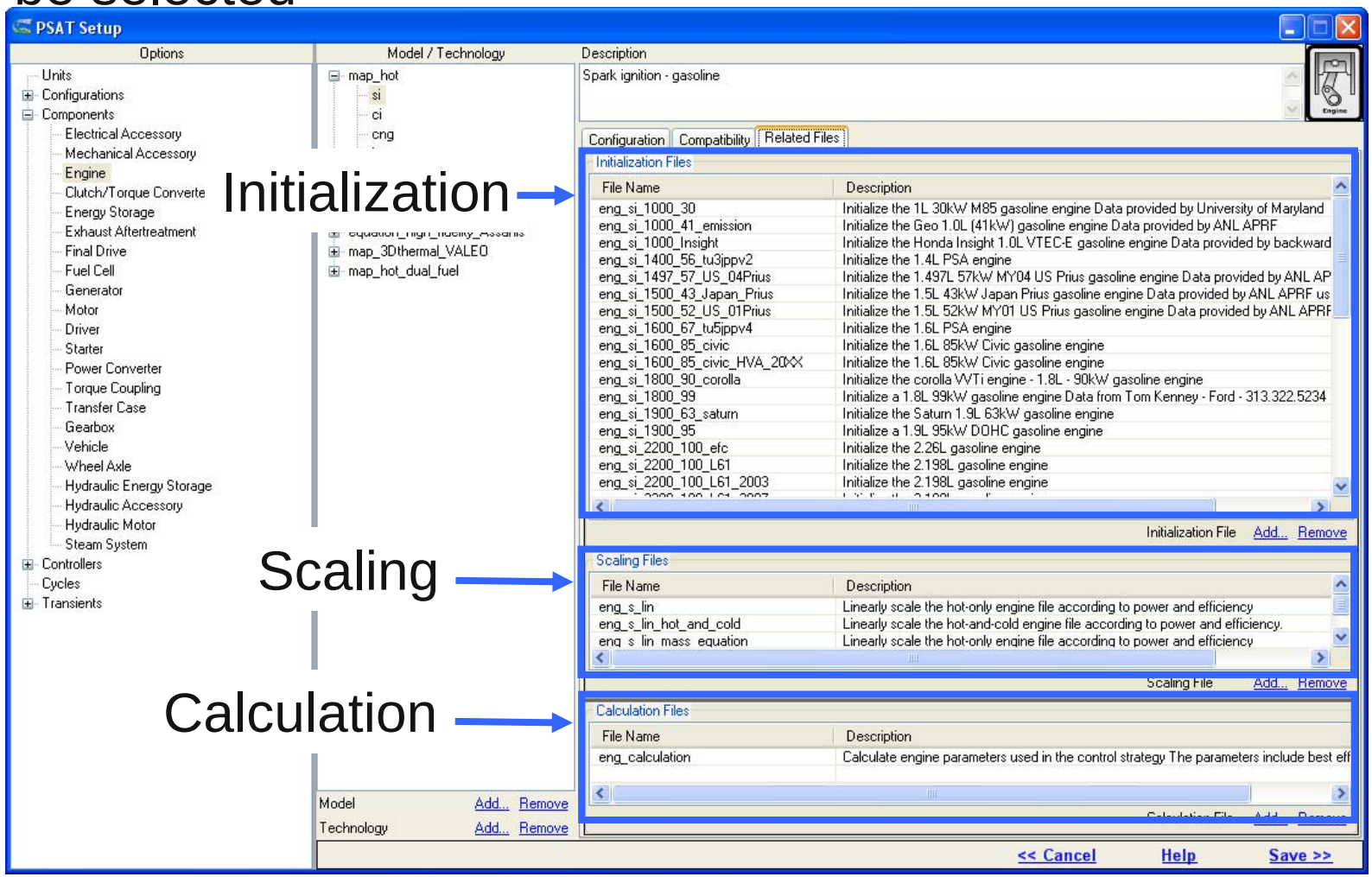
List of parameters available to the users in the GUI

Add/Delete Files from the Setup GUI

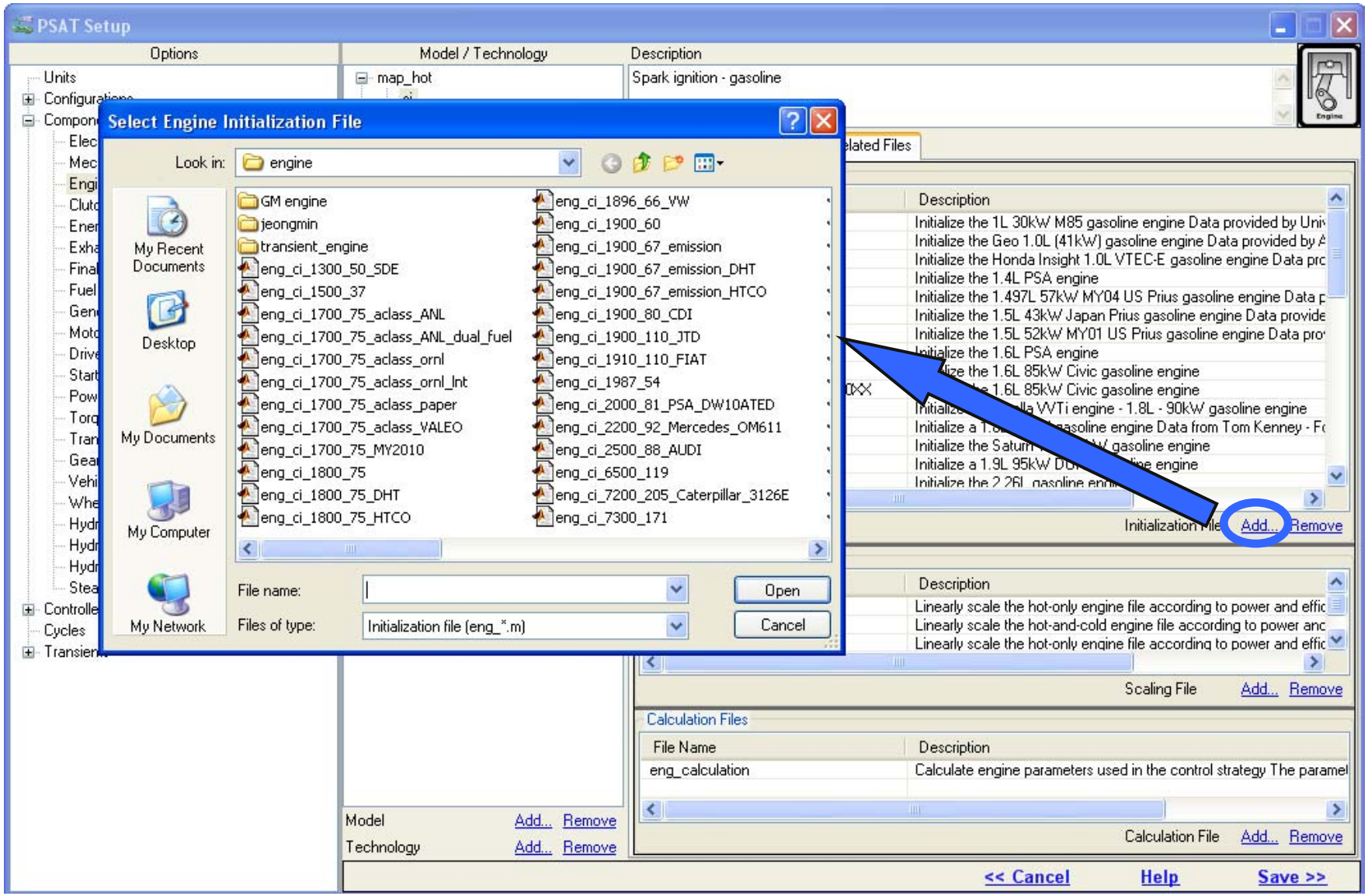


Add/Delete Files

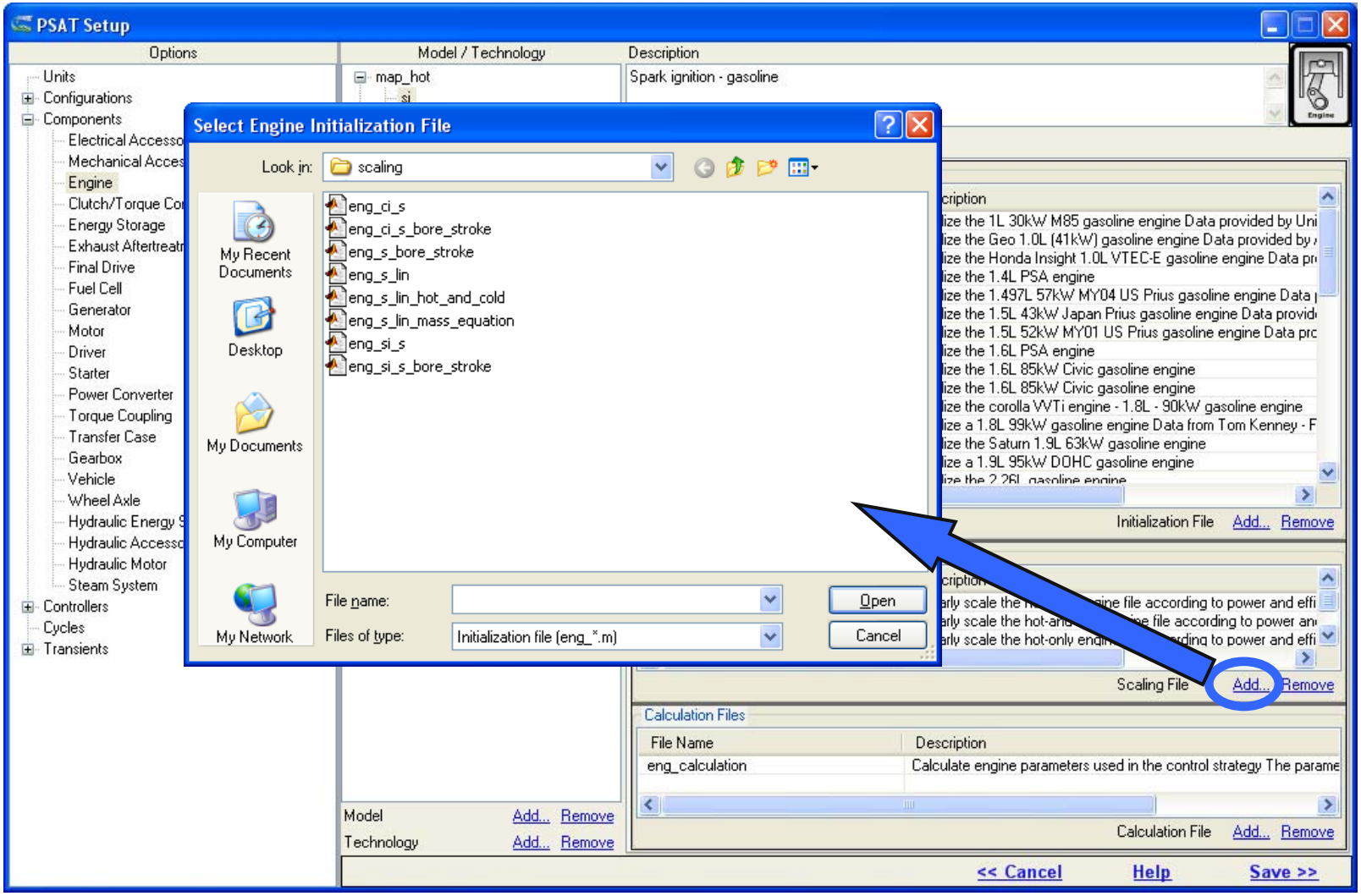
To access the list, a component model and technology have to be selected



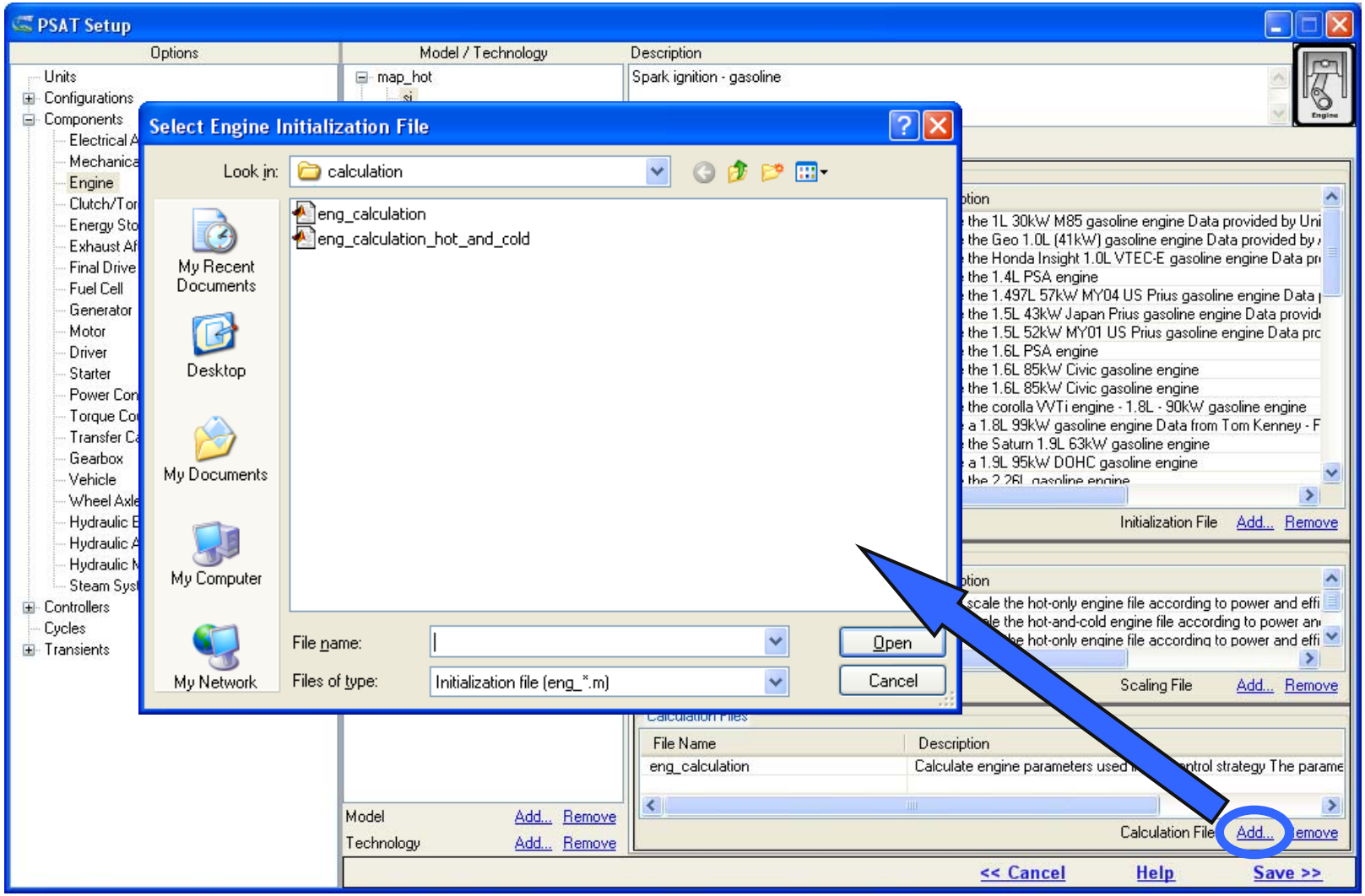
Add/Delete an Initialization File



Add/Delete a Scaling File



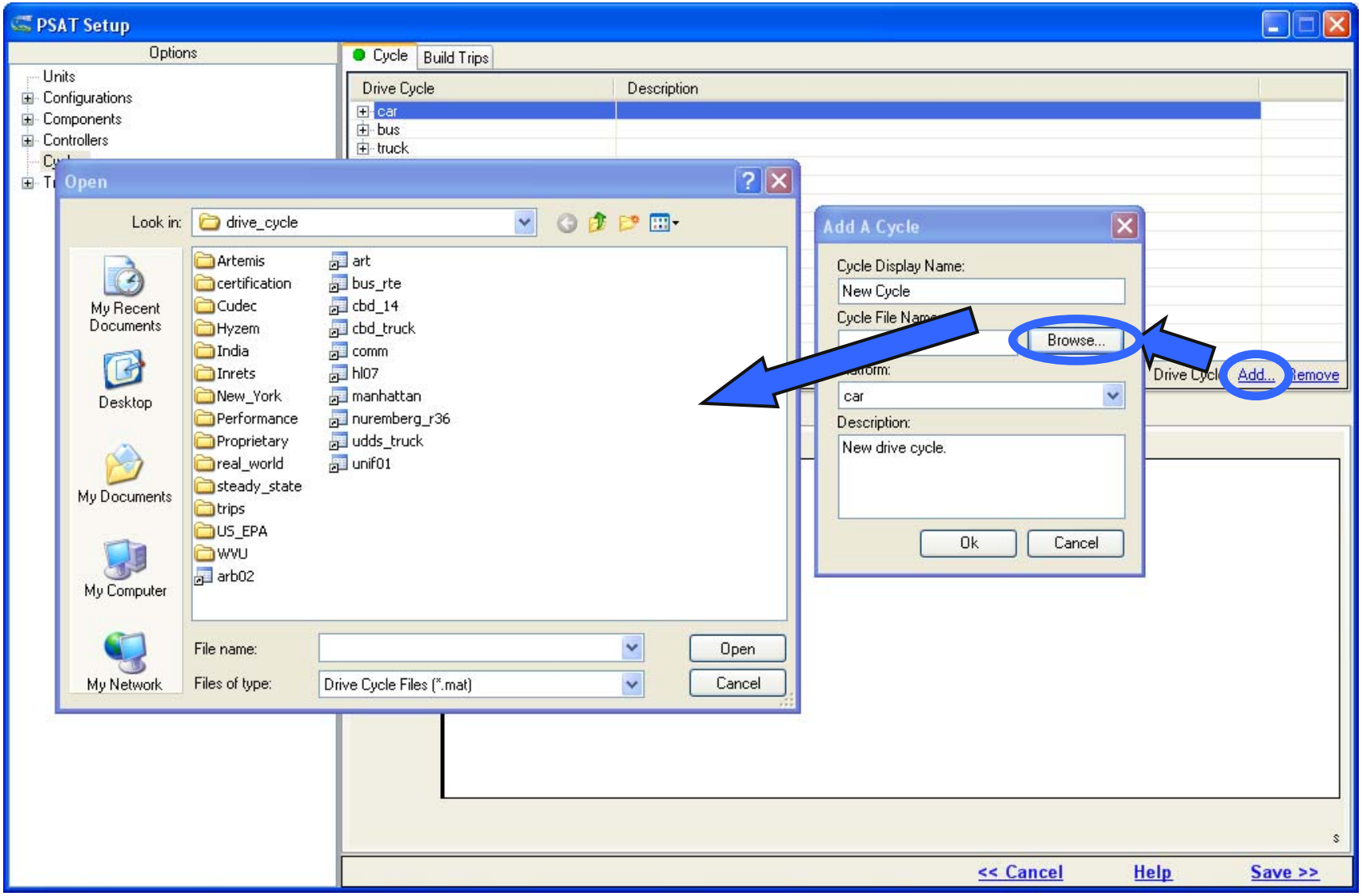
Add/Delete a Calculation File



Outline

- Add / delete initialization files
- Add / delete drive cycles
- Add / delete component models
- Add / delete control strategies

Add/Delete a Drive Cycle



Add / Delete Drive Cycle

- The information of the cycles are located in a .mat composed of 3 vectors:
  - sch_cycle (First column time, second vehicle speed in m/s)
  - sch_grade (First column time, second grade in radian)
  - sch_key_on (First column time, second key on [0 or 1])
- To create your own cycles, create the three paramters and then type:

  >> save mycycle.mat sch_cycle sch_grade sch_key_on
- Make sure your new cycle is in the proper directory (C:\psat_v62\component\initialization\drive_cycle) so it can be loaded by the GUI

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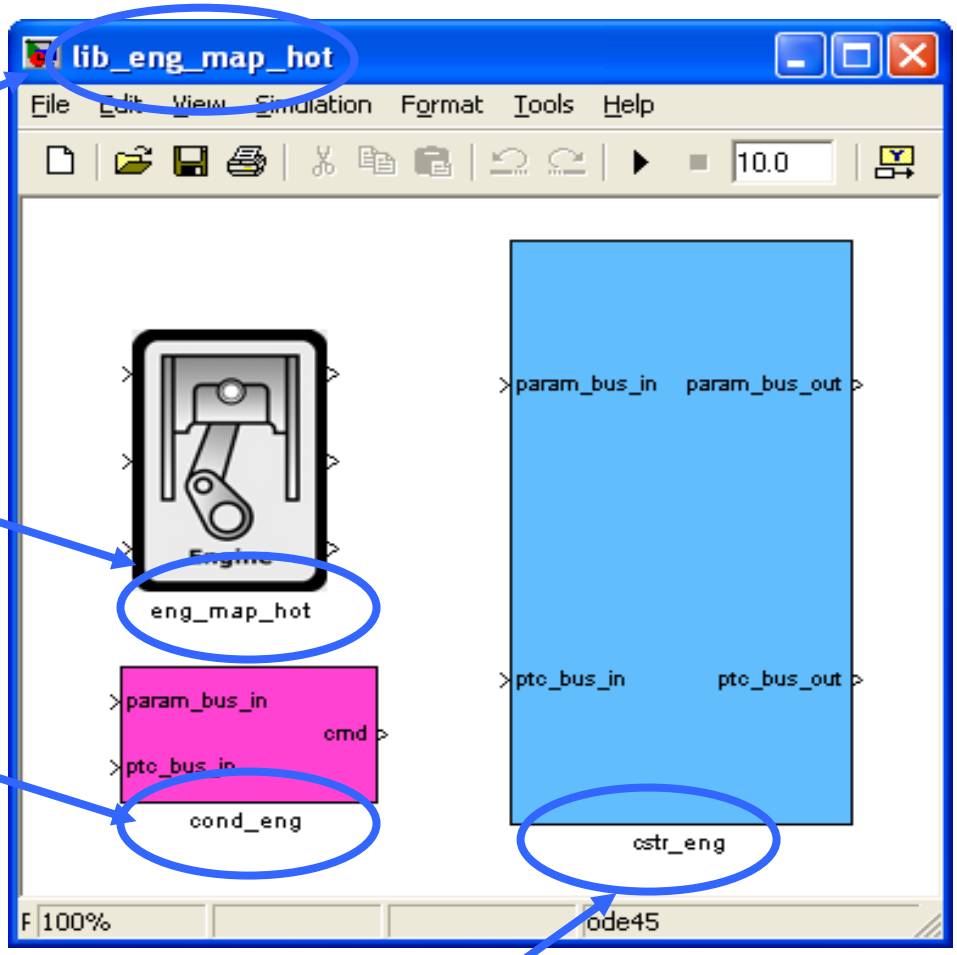
Create a Component Model In Simulink

Name of the Library

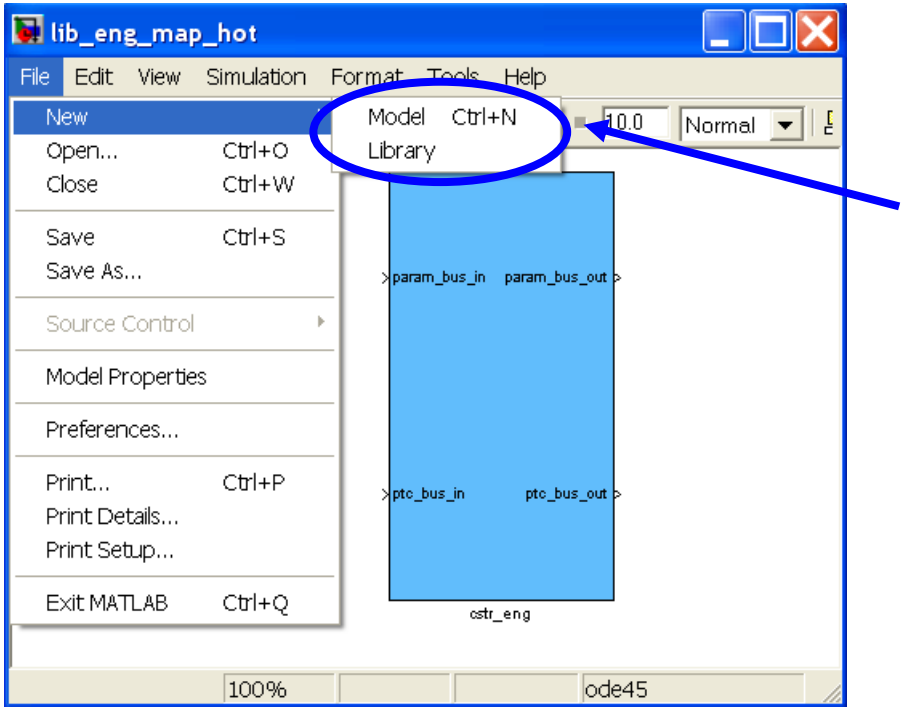
Simulink Model Version

Signal Conditioning Block



Constraints Block

When Creating a New Model, Start by Renaming an Existing one

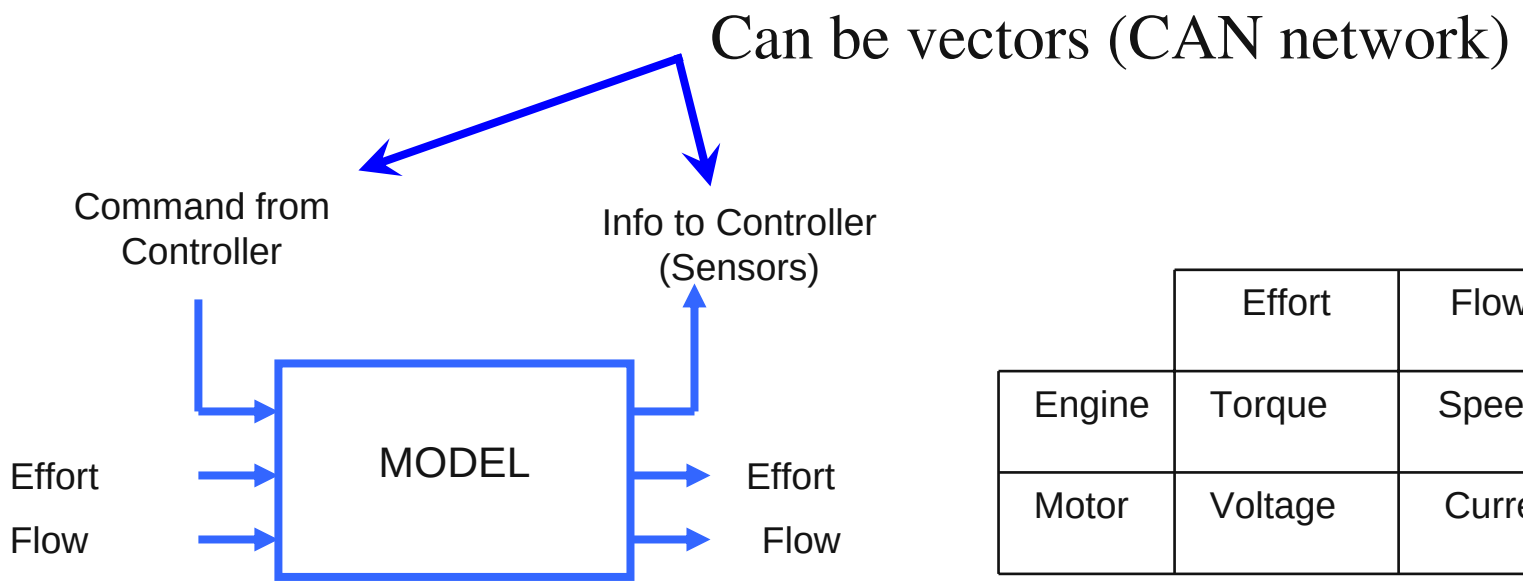


IMPORTANT

If one decides to create a a model from scratch, make sure to use “Model” and not “Library”.

Using Library leads to issues in using Matlab API and some of the PSAT functions will not work.

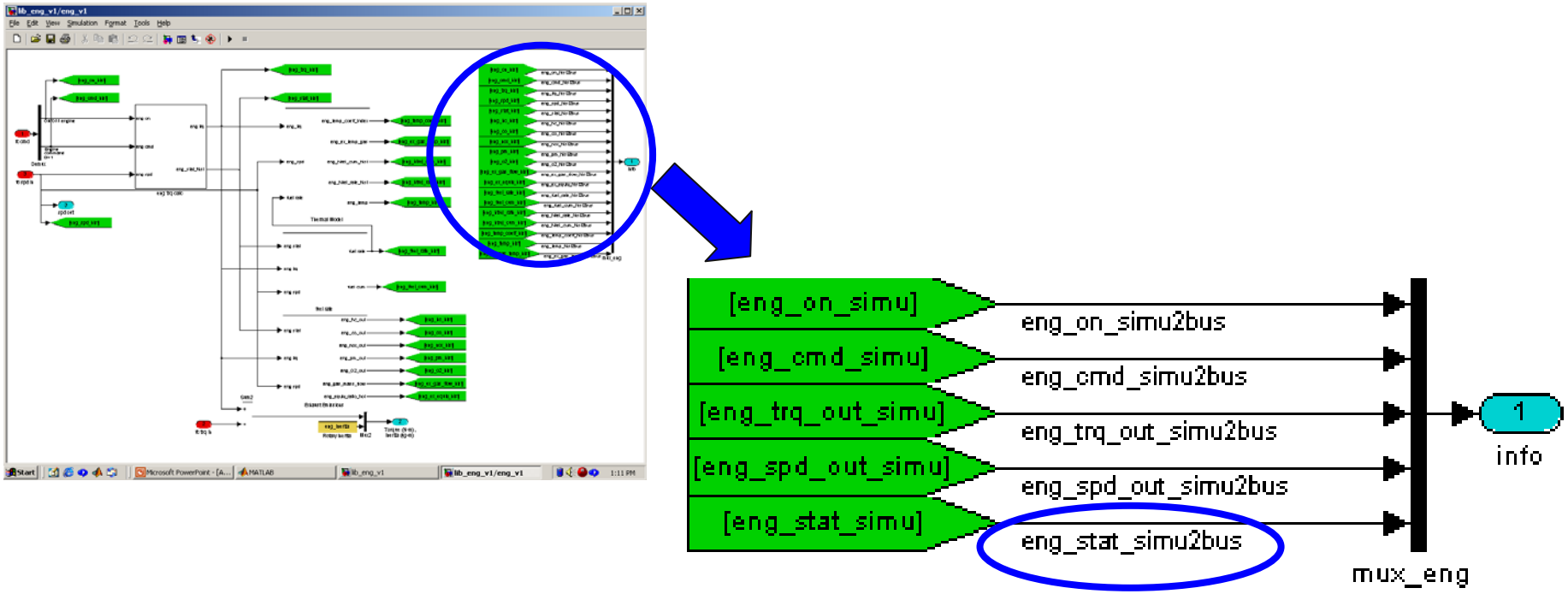
Respect PSAT Component Model Format



	Effort	Flow
Engine	Torque	Speed
Motor	Voltage	Current

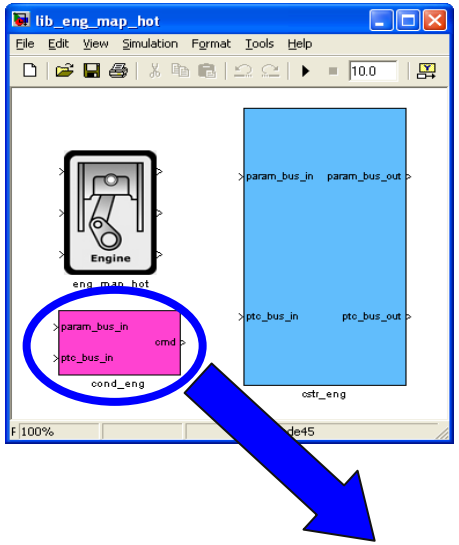
All the component models have the same number of inputs (3) and outputs (3)

Rename Mux Lines for Bus Creation



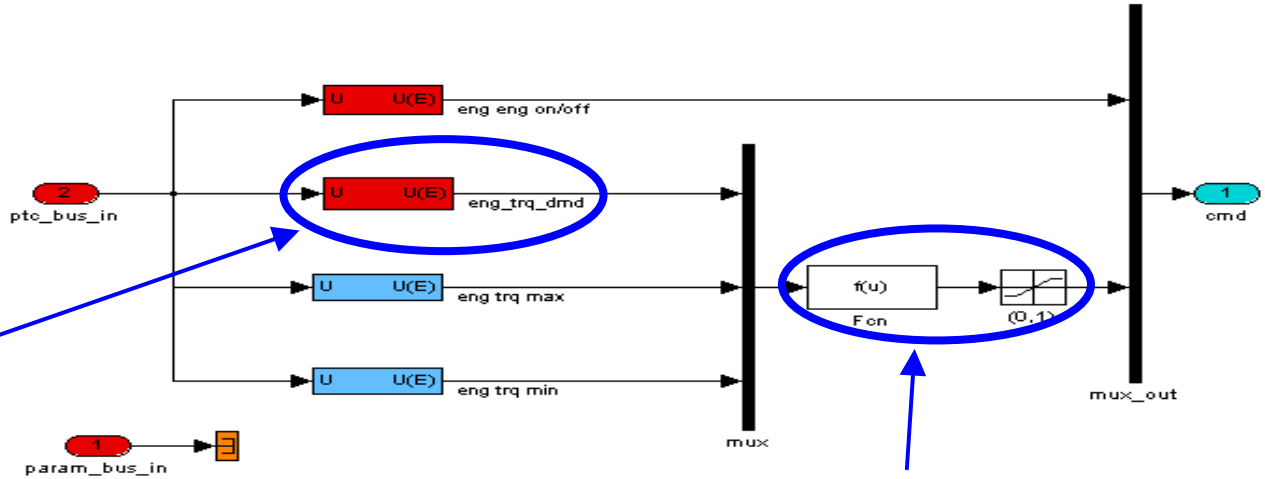
Name of the line => “name_parameter”2bus

Create A Conditioning Block



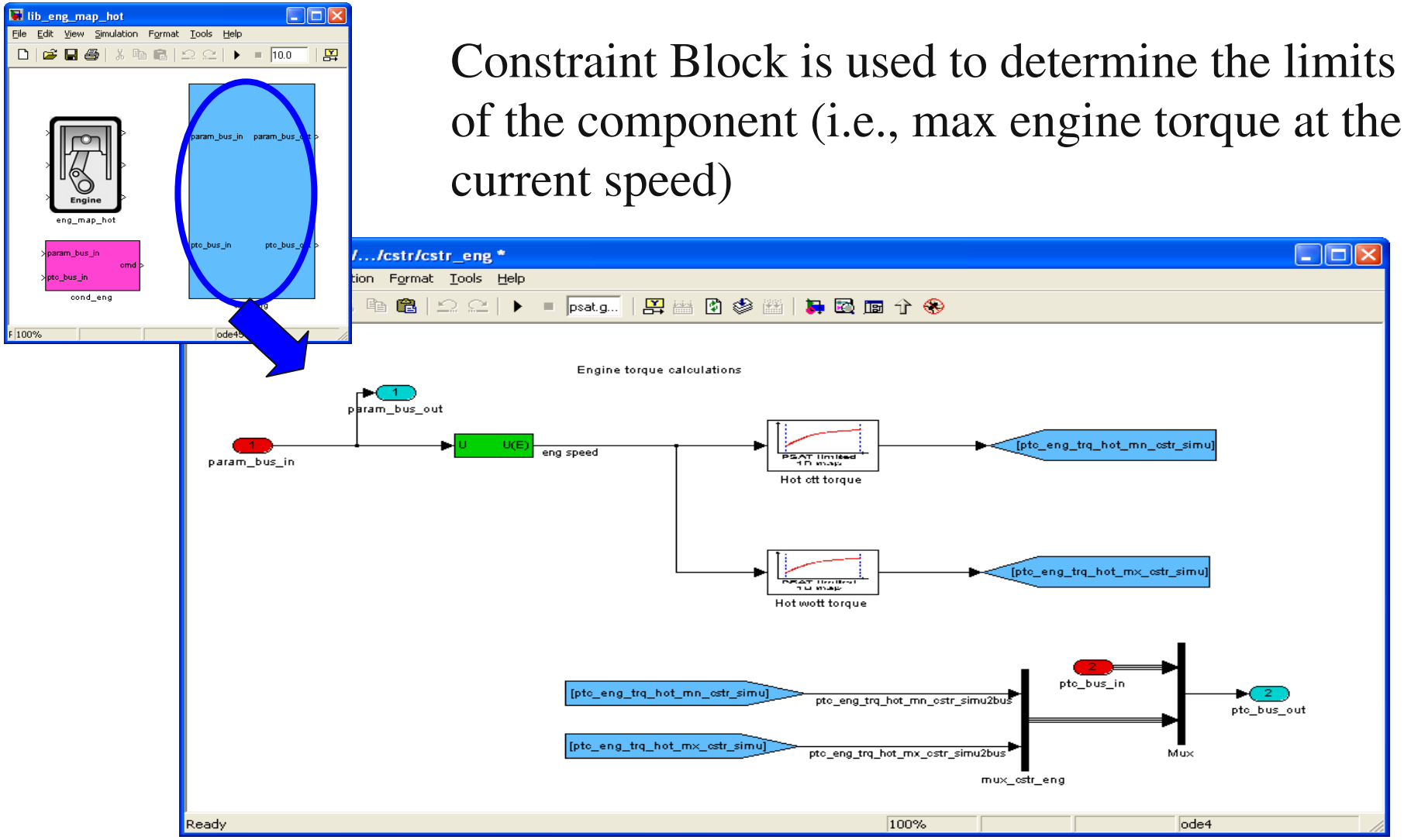
Conditioning block is used to generate inputs needed by the component model from the PTC commands

Torque demand from PTC



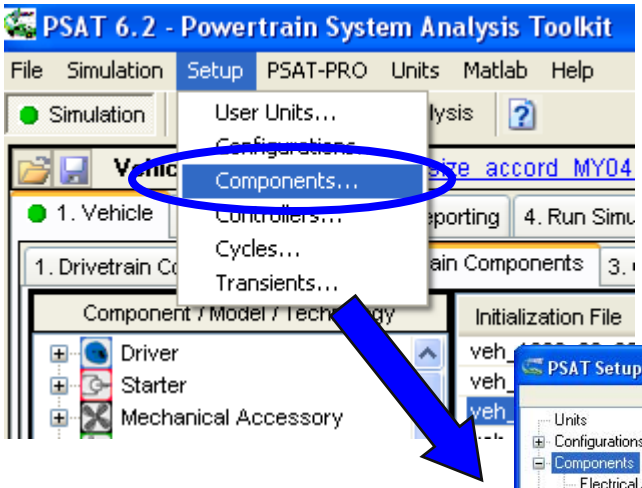
PWM to engine model

Create A Constraint Block



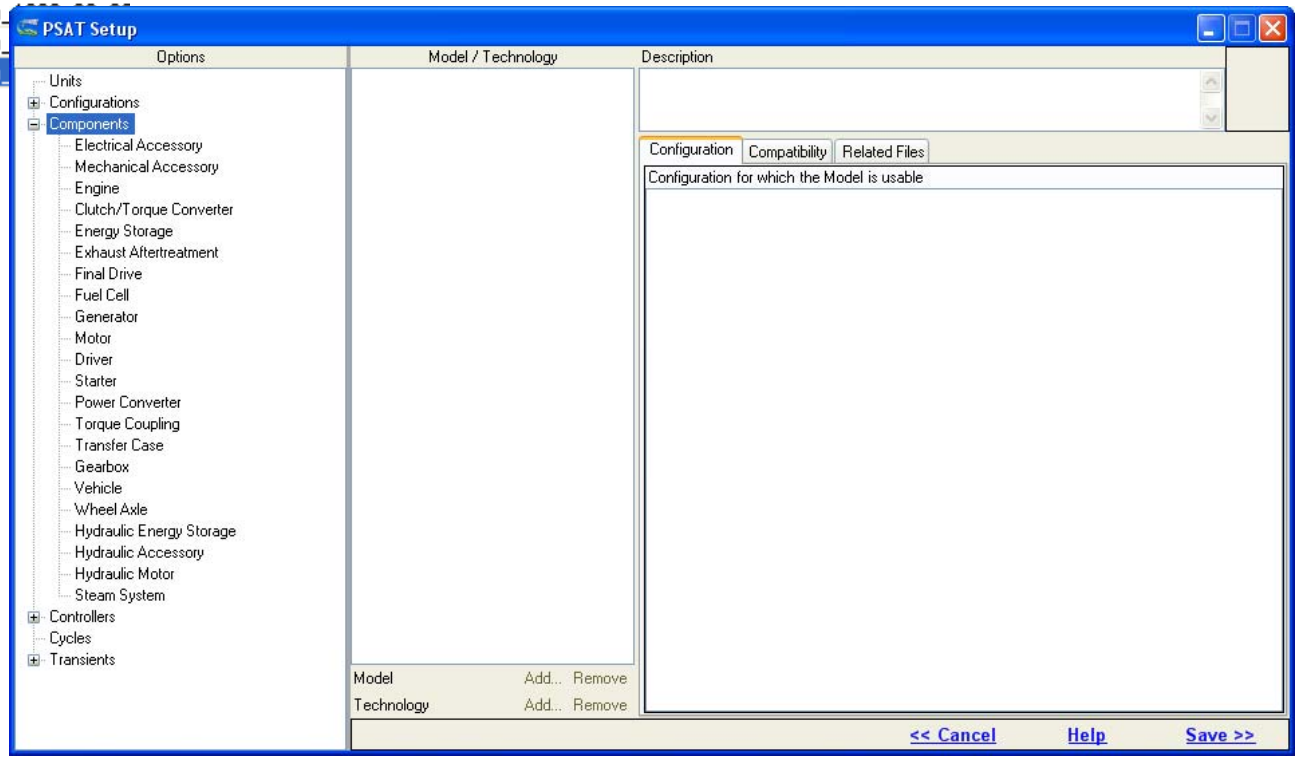
Constraint Block is used to determine the limits of the component (i.e., max engine torque at the current speed)

Add a Component Model

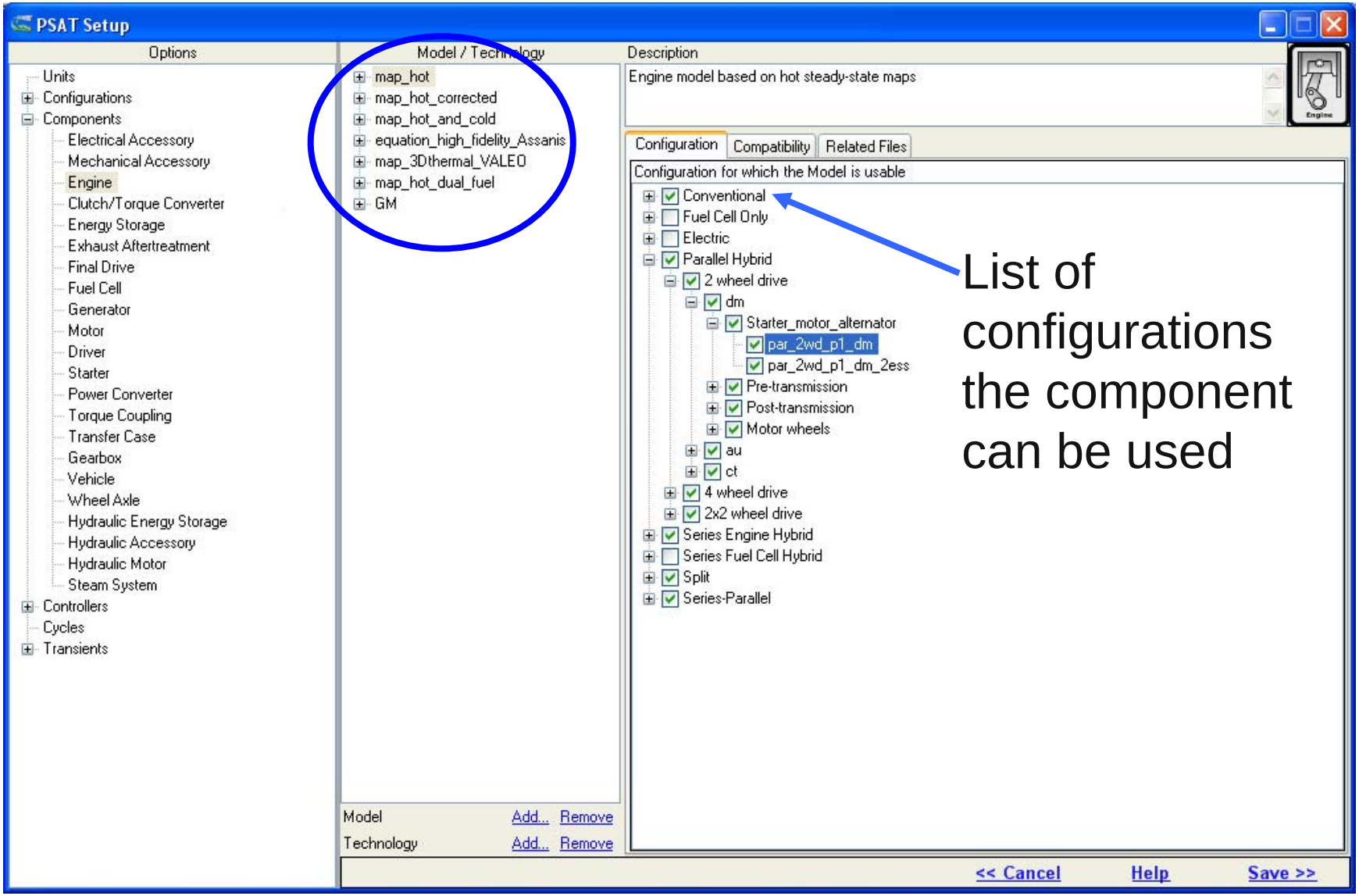


Menu used to change the units, the configurations, components and controllers compatibilities

Refer to Chapter 9 for more information

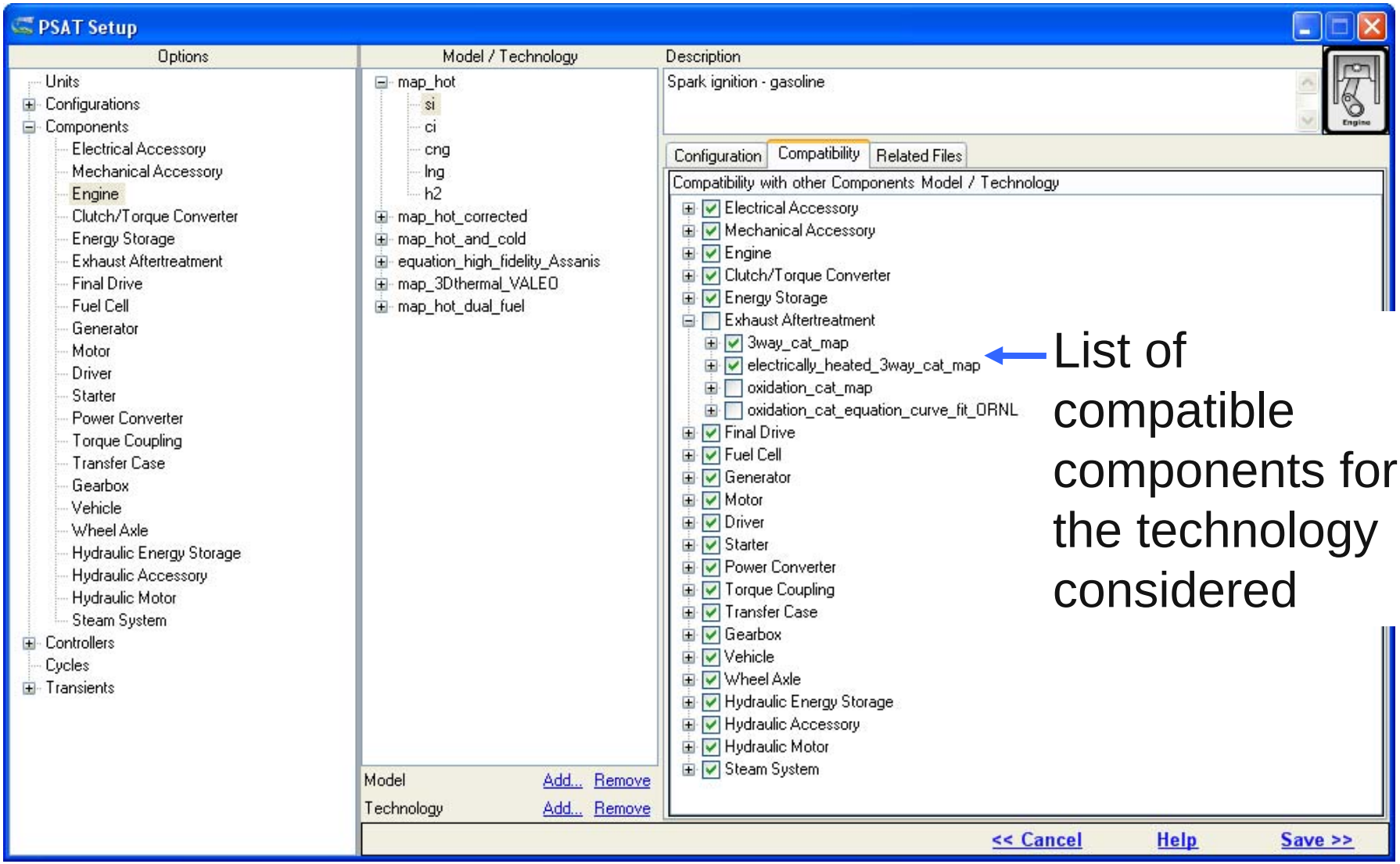


View the Model Characteristics



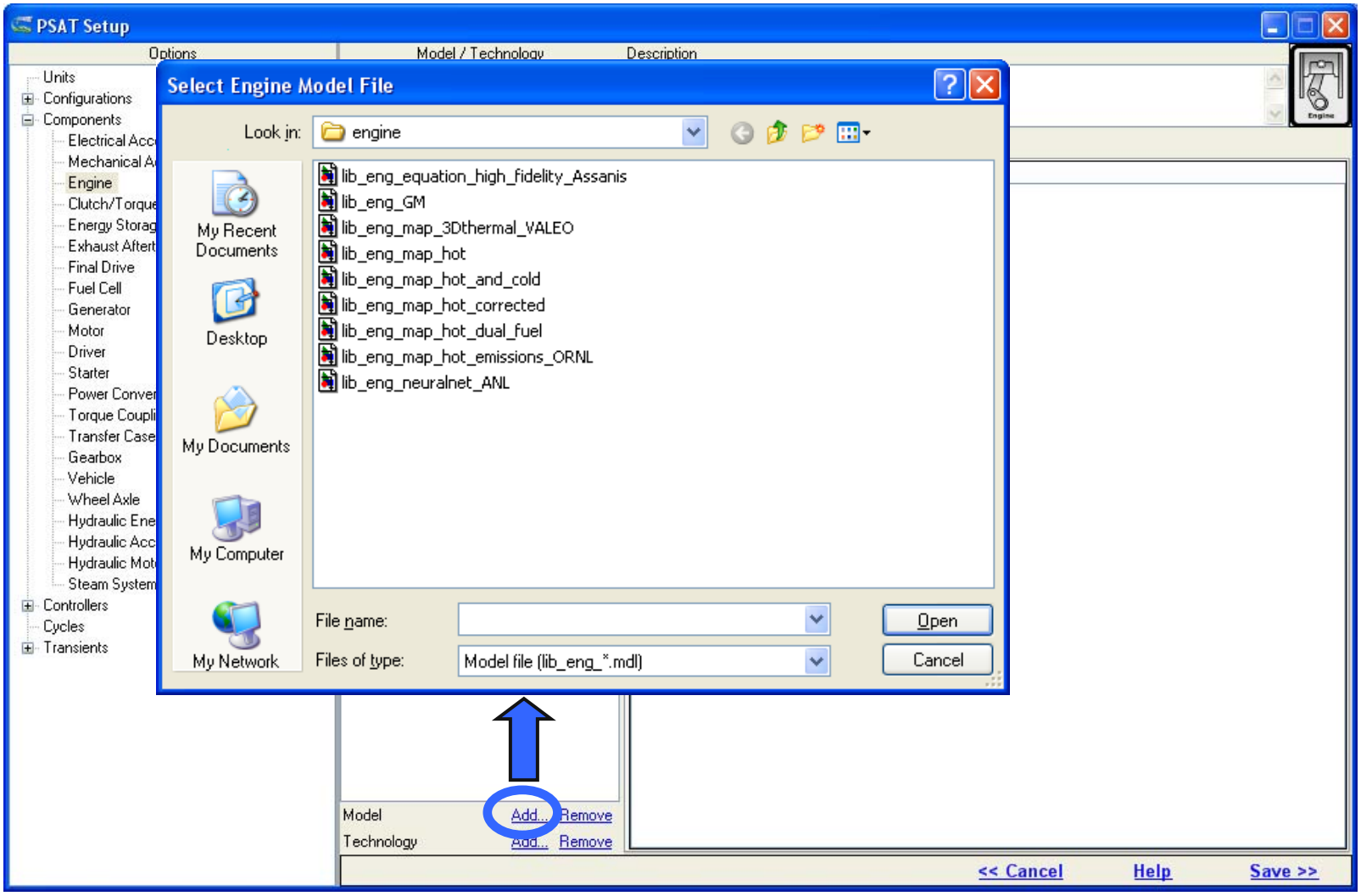
List of configurations the component can be used

View the Model Characteristics

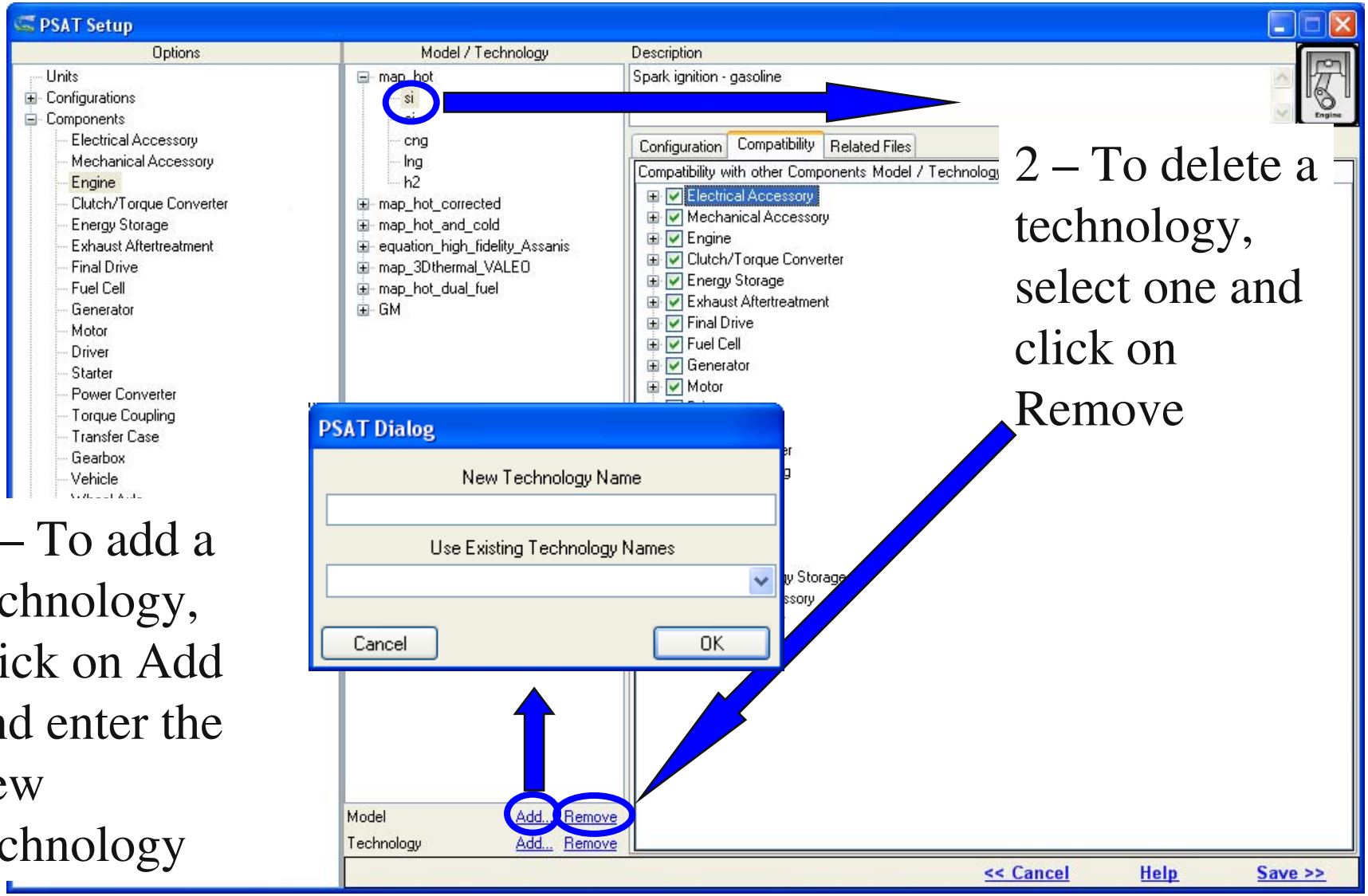


List of compatible components for the technology considered

Add/Remove Model



Add/Remove Technology



2 – To delete a technology, select one and click on Remove

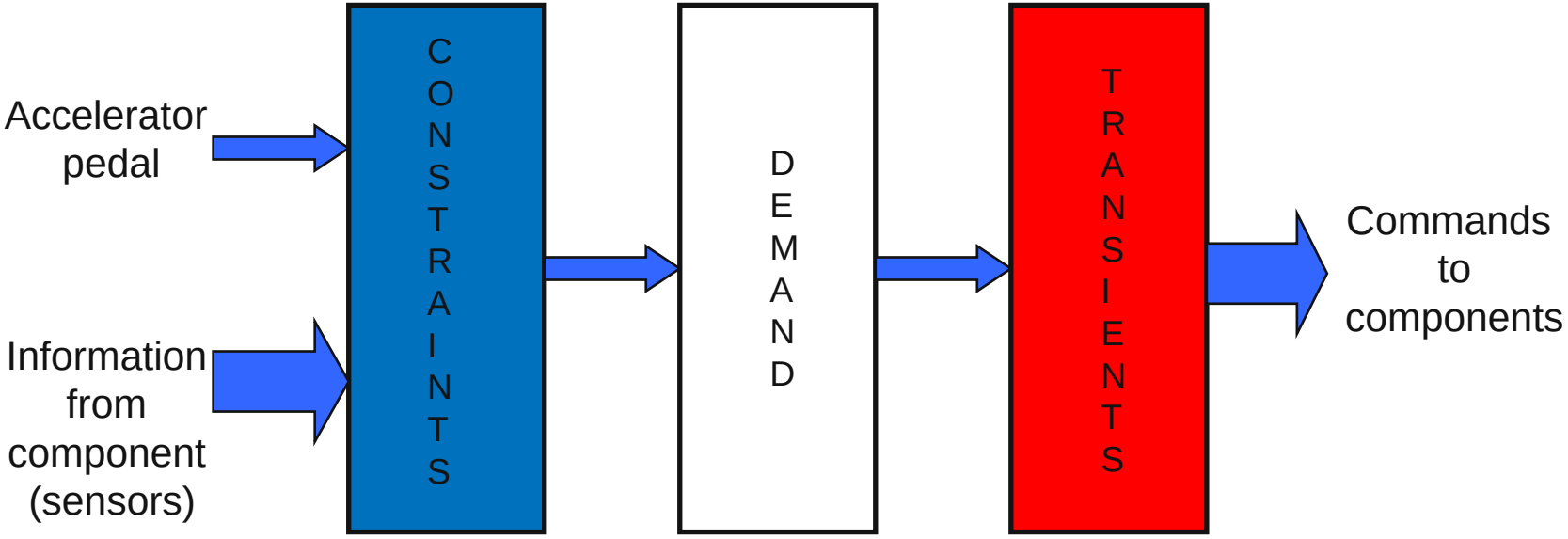
1 – To add a technology, click on Add and enter the new technology

Outline

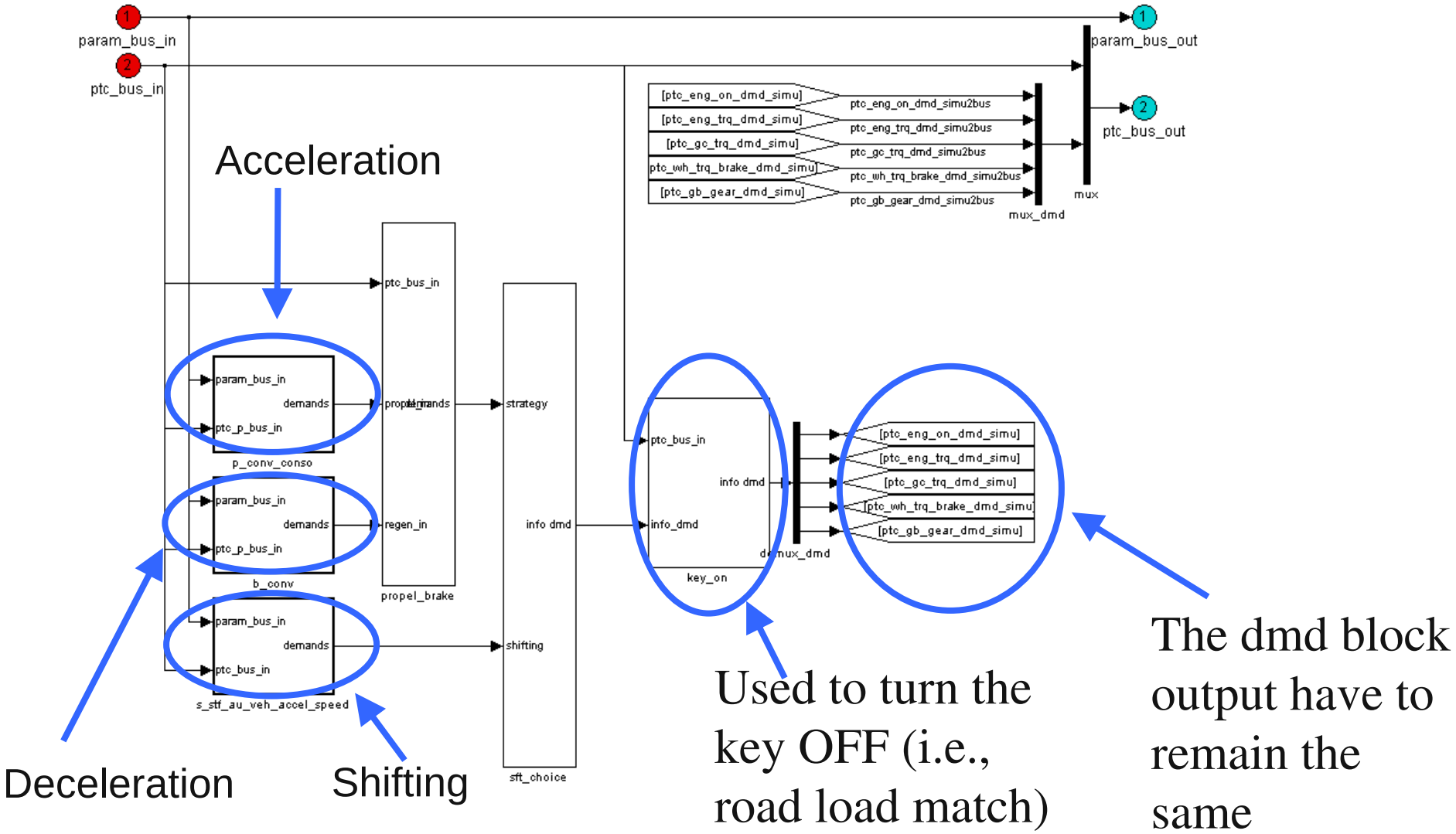
- Add / delete initialization files
- Add / delete drive cycles
- Add / delete component models
- Add / delete control strategies

Generic Power Controller Organization

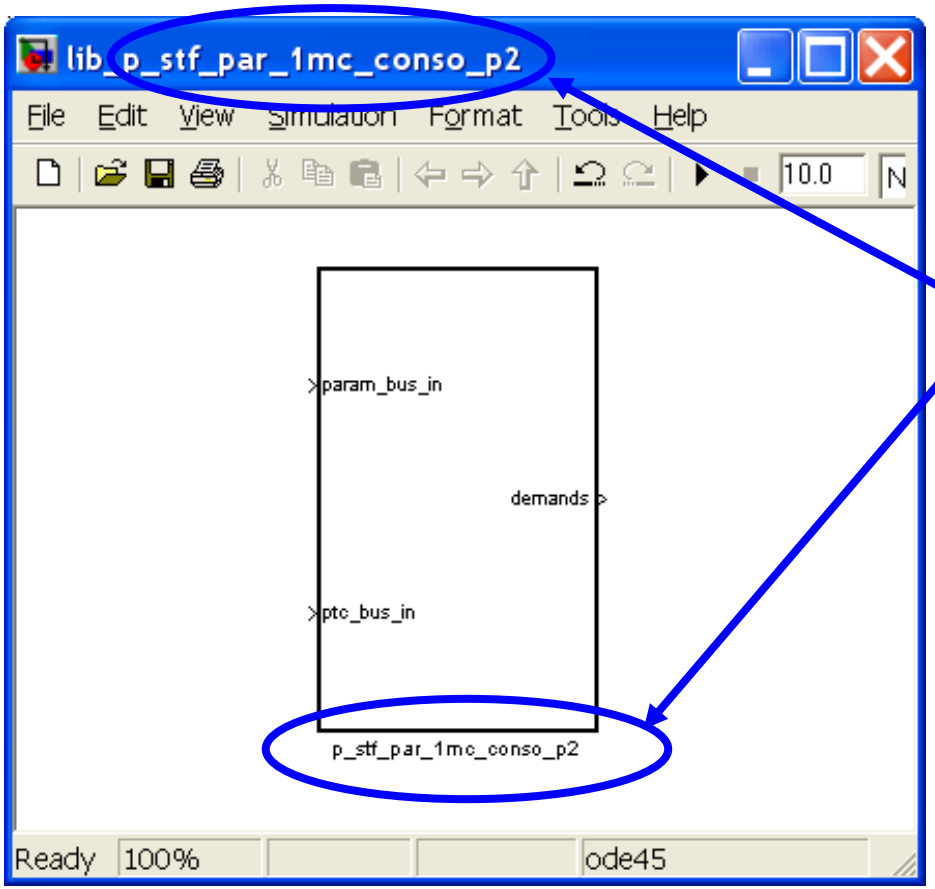
A generic organization common to all powertrains



Demand Block

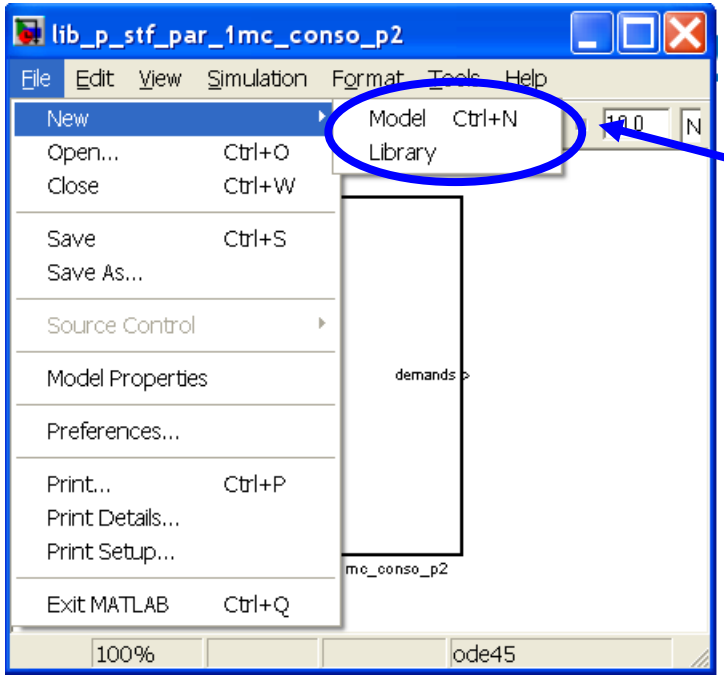


Example of Propelling Strategy Block In Simulink



Same Name

When Creating a New Control, Start by Renaming an Existing one



IMPORTANT

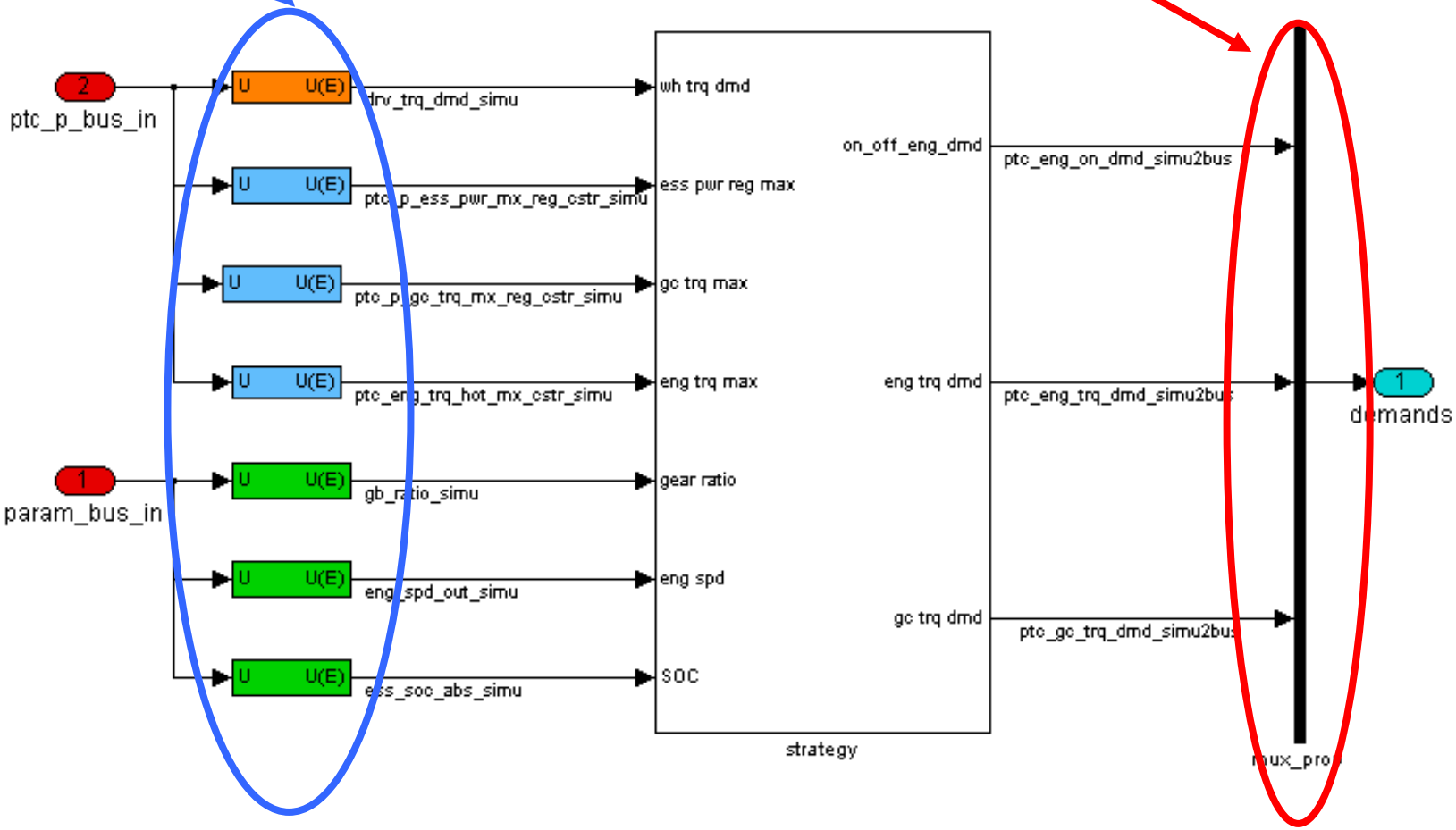
If one decides to create a control or a model from scratch, make sure to use “Model” and not “Library”.

Using Library leads to issues in using Matlab API and some of the PSAT functions will not work.

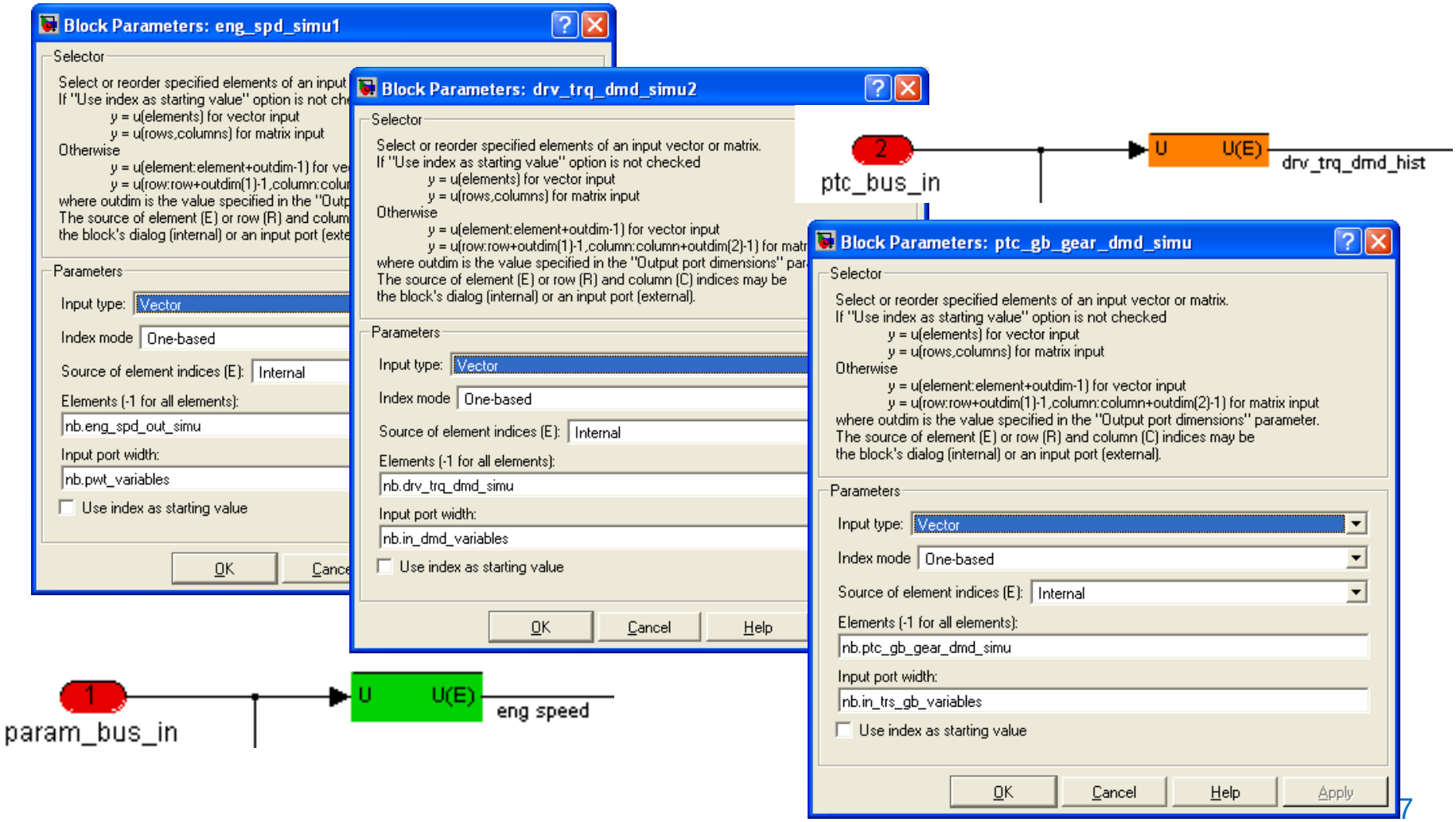
Strategy Block In Simulink

The inputs chosen have to be available from the models or the constraint block

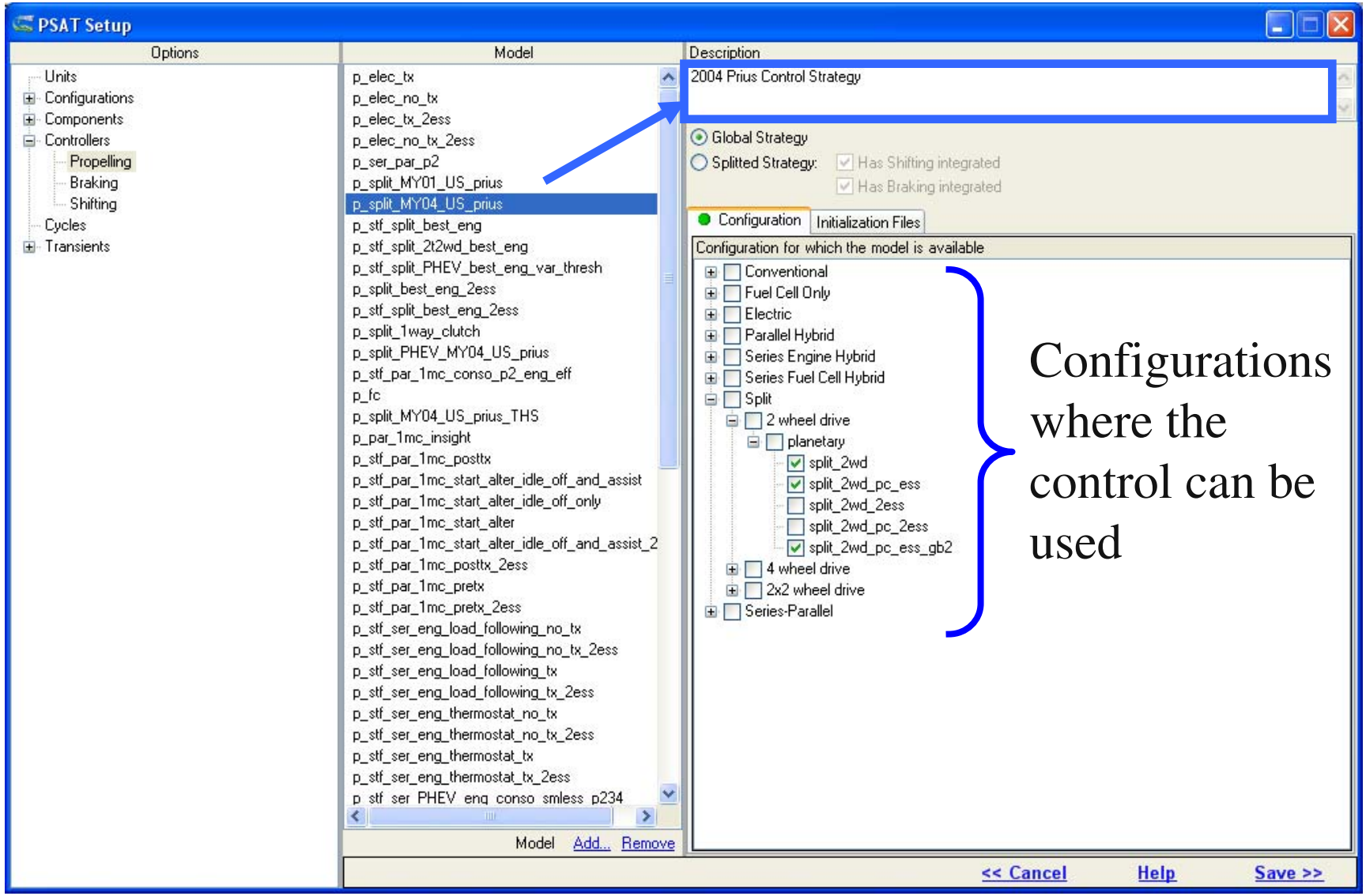
The outputs have to be the same and in the same order than the initial strategy



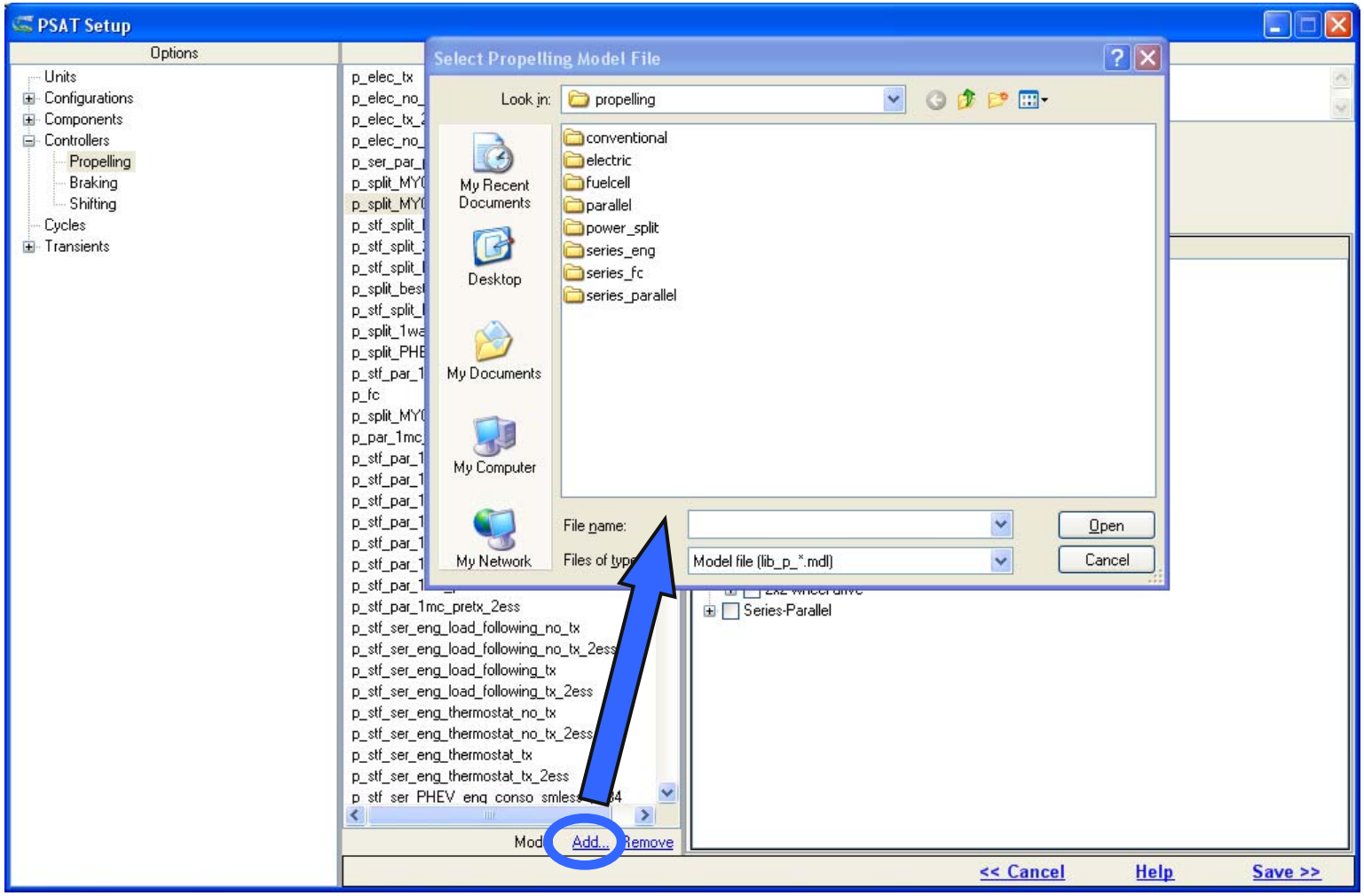
Accessing Parameters From Buses



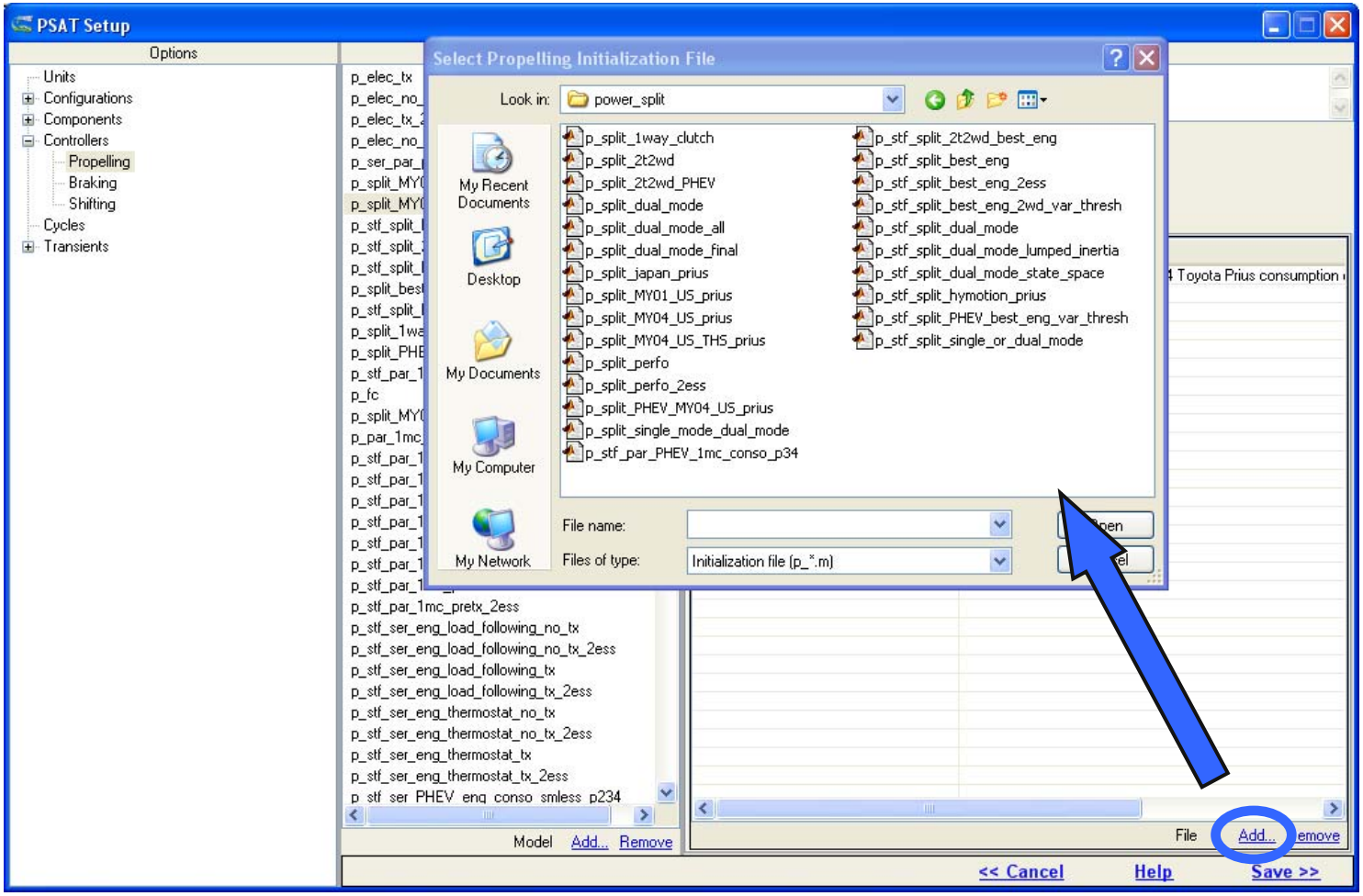
View Propel/Brake/Shifting Strategy



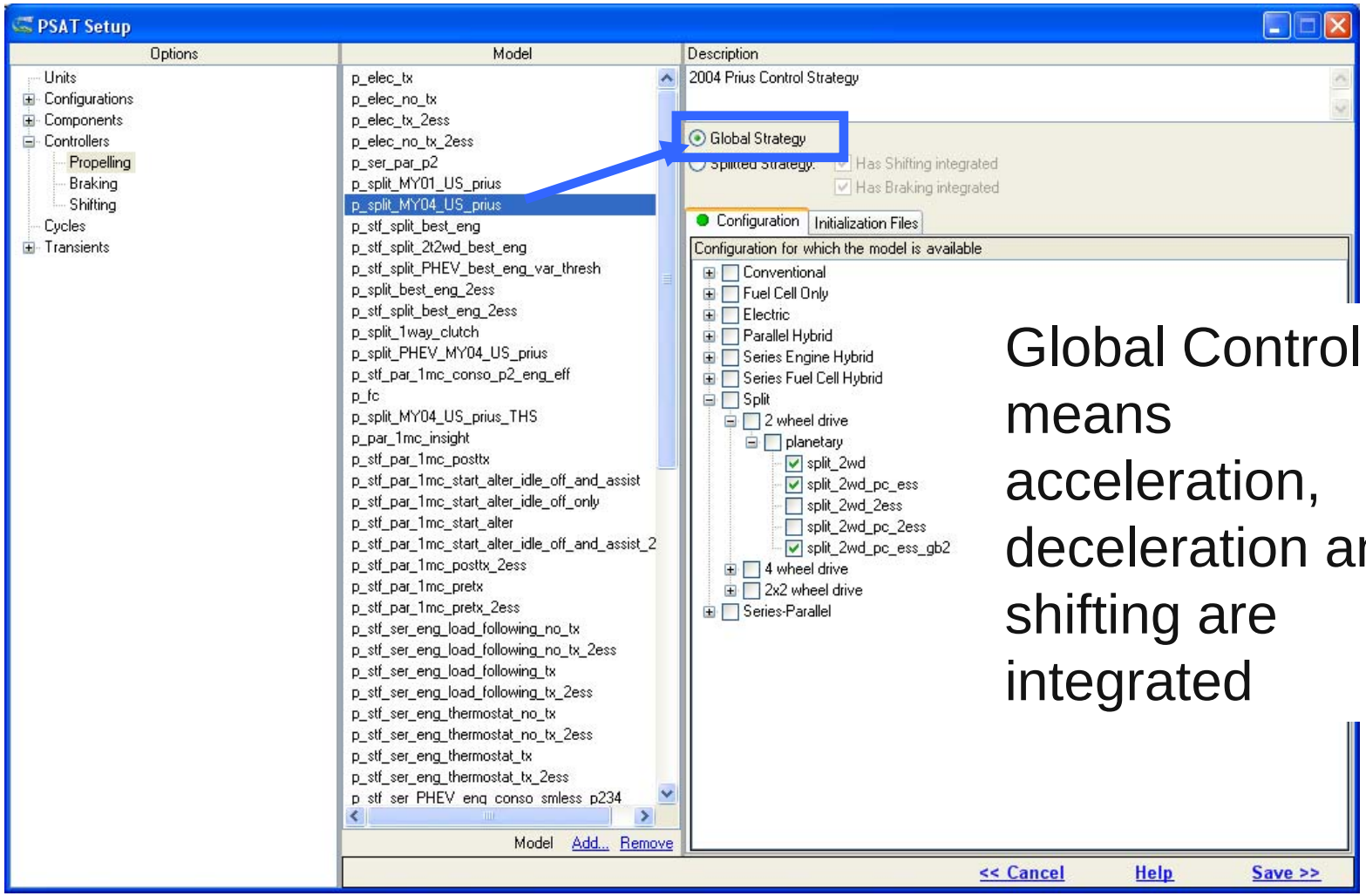
Add a Control Strategy



Add a Control Strategy Initialization File



Add a Control Strategy Initialization File



Global Control means acceleration, deceleration and shifting are integrated