Title: EmPowerSoc flow for Active Power Estimation of SOC

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EmPowerSoC is an open-source EDA tool for power estimation of SoC. It has been developed alongside the existing Qflow open-source tool chain which is currently being used for implementation of RTL to GDSII flow.

The development work was carried out by Mr. Akshat Jain, Mr. Nimesh Shahdadpuri and Mr. Naveen Dugar, bonafide students of B.E. (ECE) at NSUT under the guidance of Dr. Kunwar Singh, Assistant Professor, Department of ECE, Netaji Subhas University of Technology.

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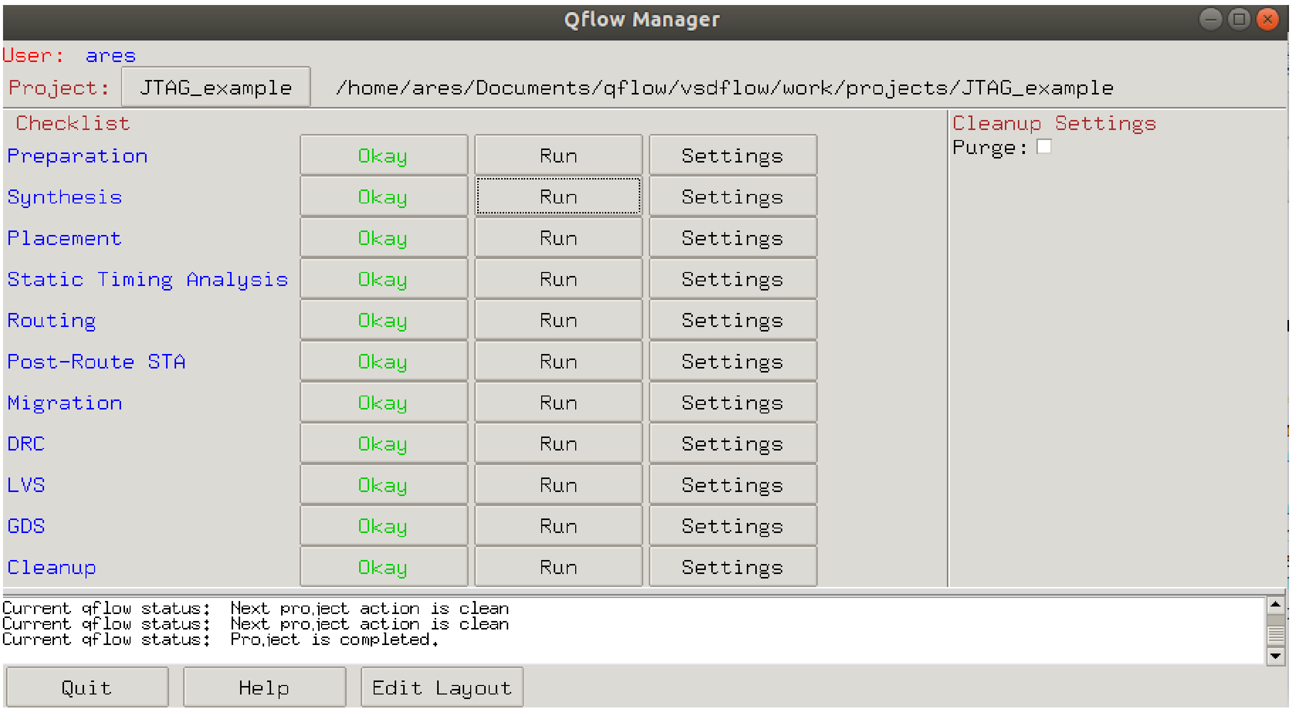
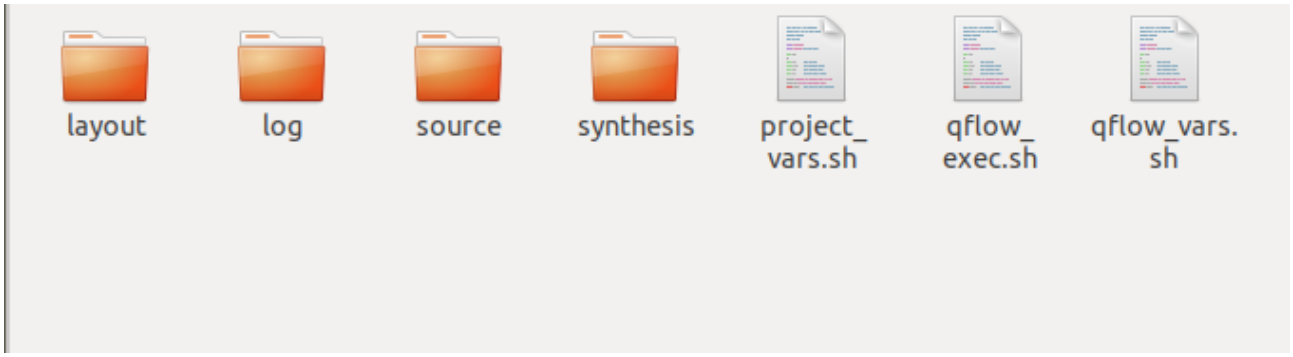
➔ Download the provided example source code verilog files for Jtag.

➔ Make project directory **"JTAG_Example"** and **"source"** directory inside JTAG_Example. Paste the JTAG verilog files inside source folder.
Use the following commands-
- mkdir JTAG_Example
- cd JTAG_Example
- mkdir source
- mv <source_location> ./source/tap_top.v
- mv <source_location> ./source/tap_defines.v

➔ In the **JTAG_Example** directory, open the qflow gui using terminal window and run the RTL2GDS flow by selecting required parameters.



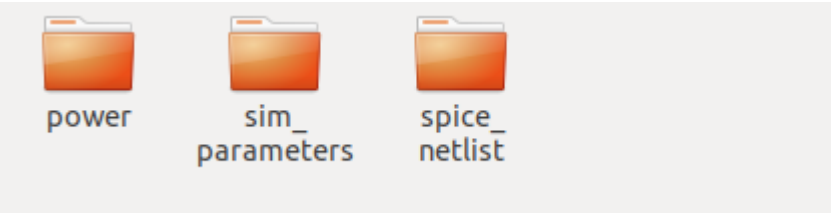
➔ After completion of RTL2GDS, these below mentioned folders should be created in the project directory.



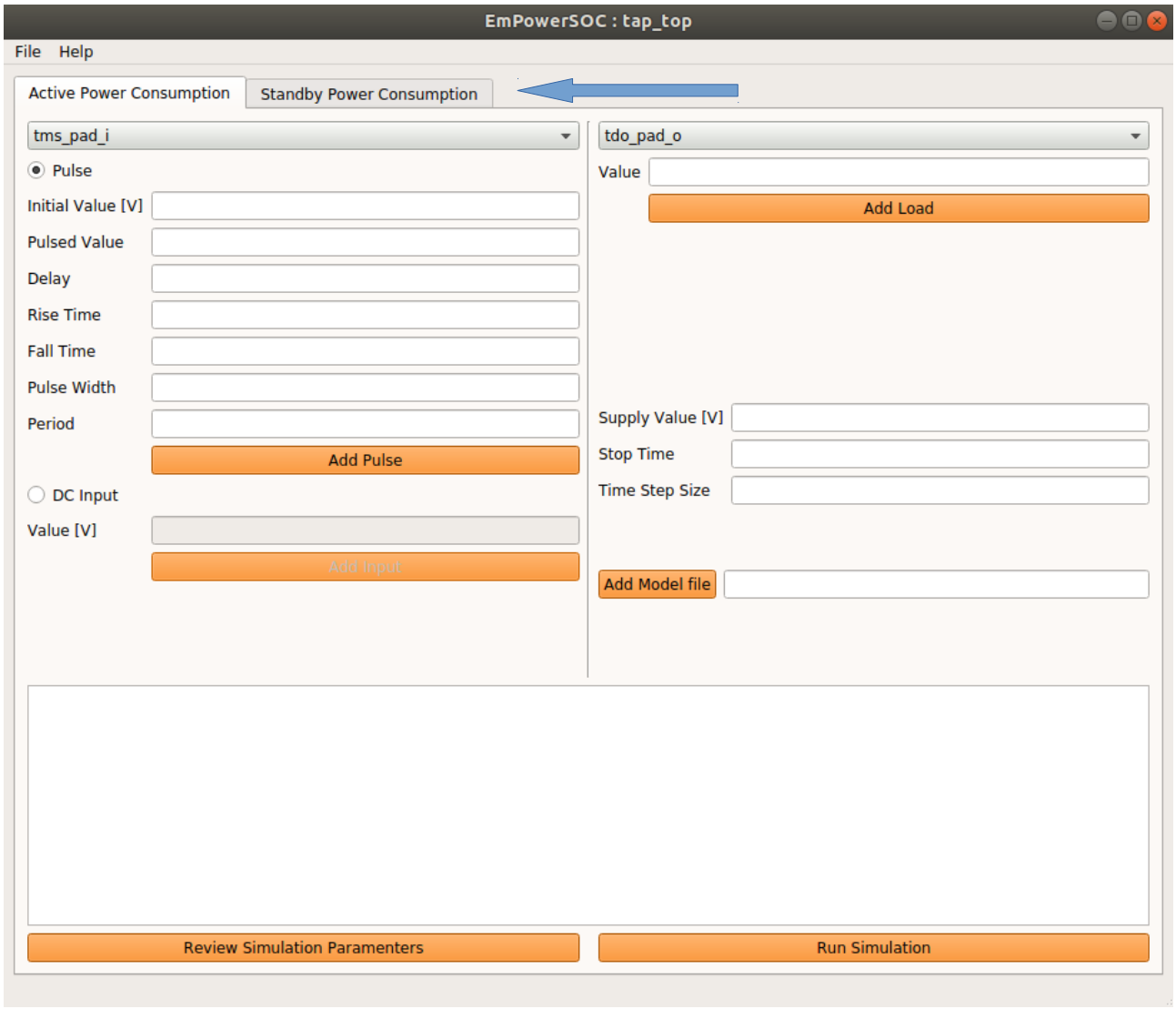
➔ Now, inside the project directory Jtag_example, right click and select open in terminal. Run the command “empower” in terminal to start EmPowerSoc.

➔ EmPowerSoc directory will be created in your project directory. It will contain 3 sub directories-

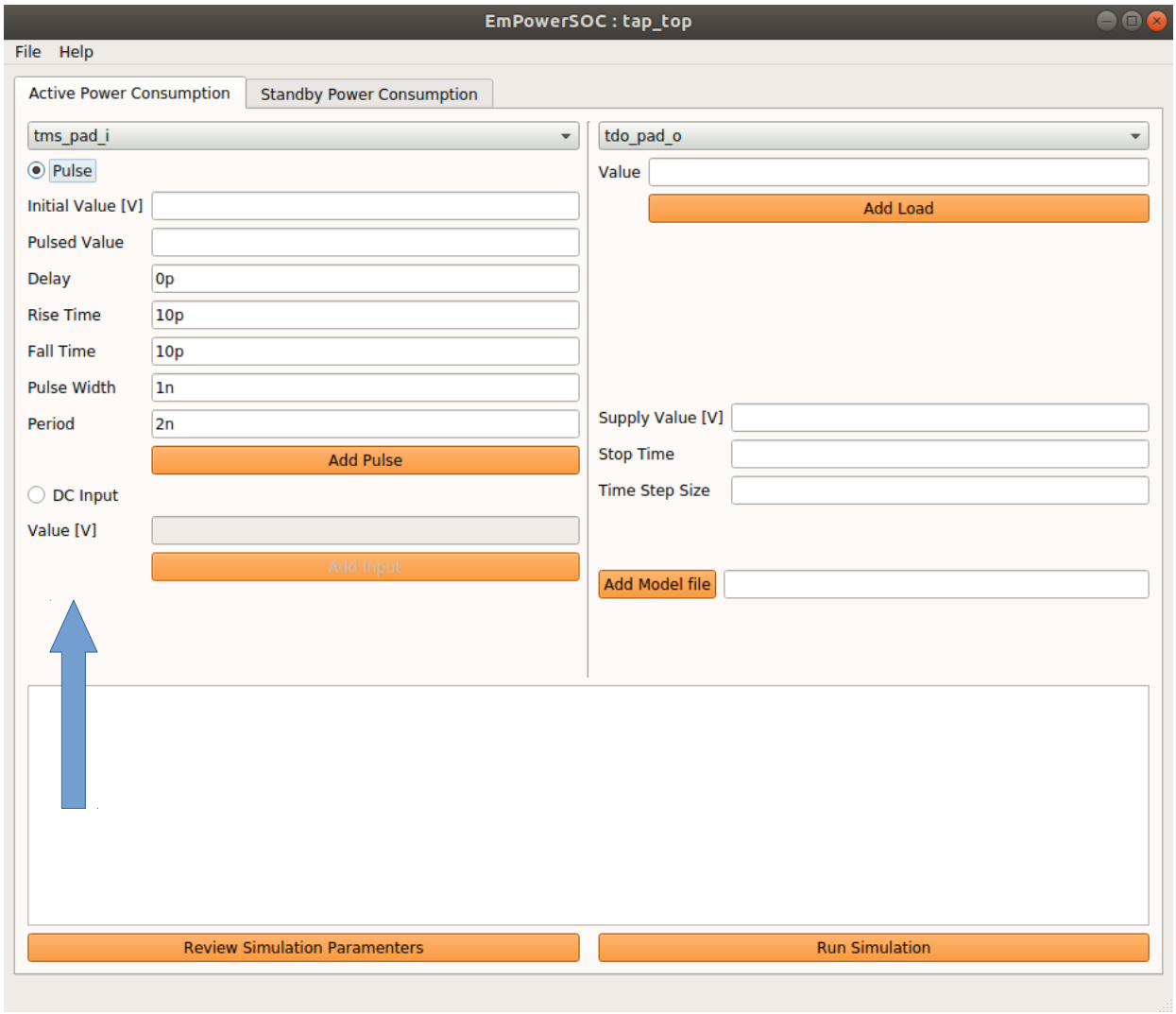
- ➔ Power – Conatins the calculated power values.
- ➔ Spice Netlist - Contains the spice netlists for all the standard cells
- ➔ Sim_Parameters – Conatins the saved project simulation parameters which can be loaded directly in the future.



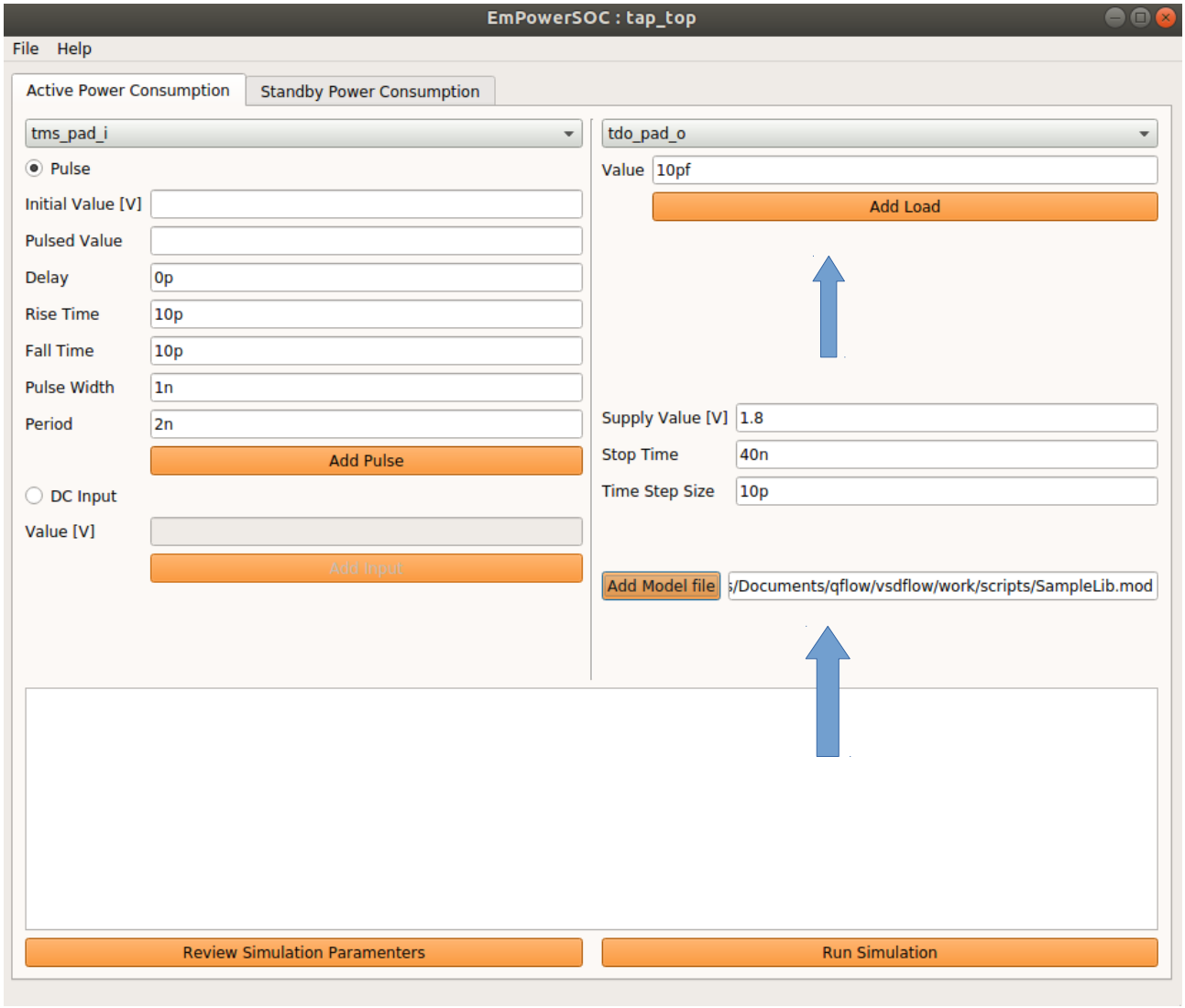
➔ In the GUI, by changing tabs you can switch between Standby Power estimation and Active Power estimation.



➔ Apply input pulses to all the required ports and add DC inputs wherever required.



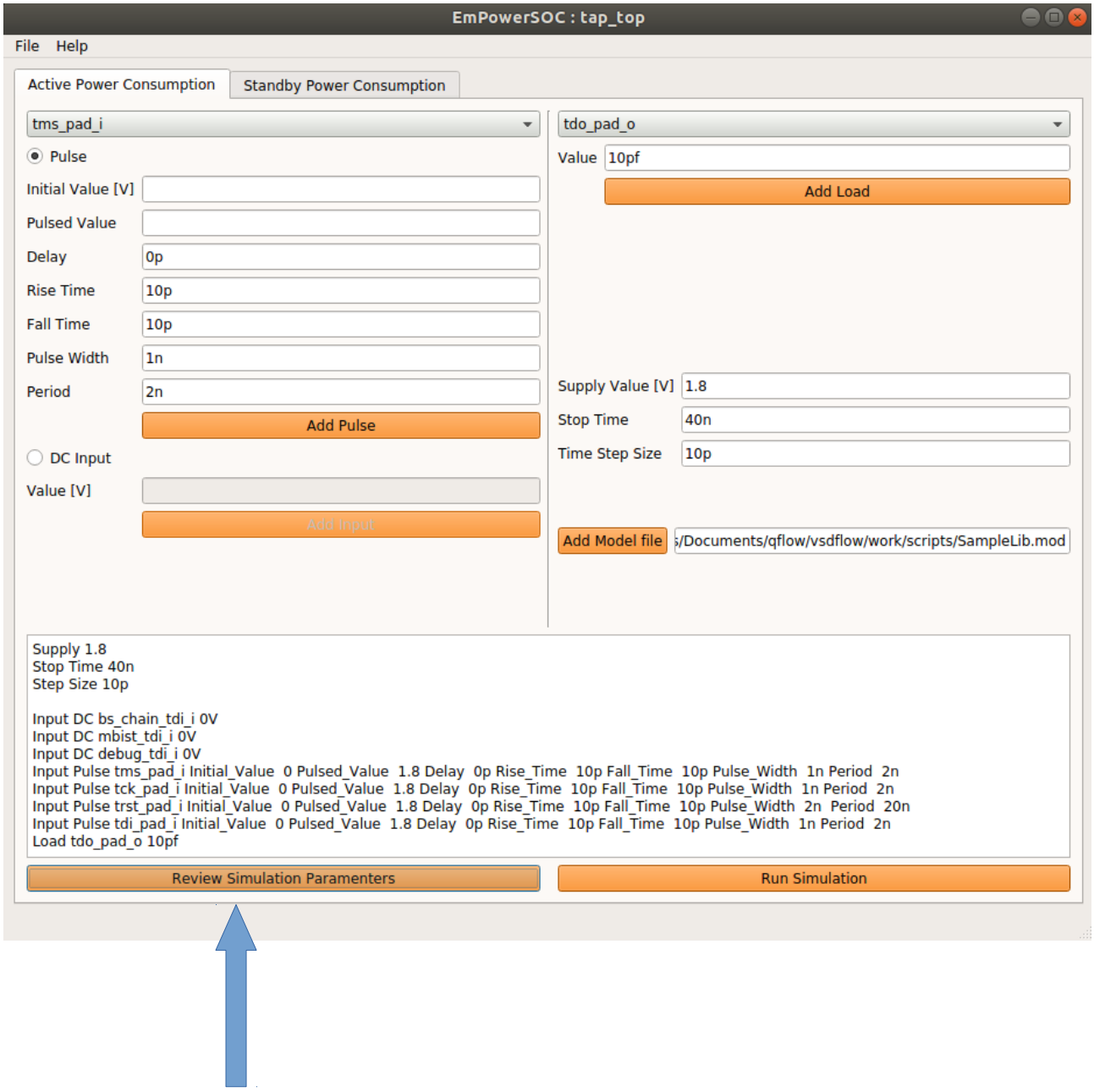
➔ Specify the load capacitances for the output nodes. And add the Supply Value, simulation time and time step for simulation.



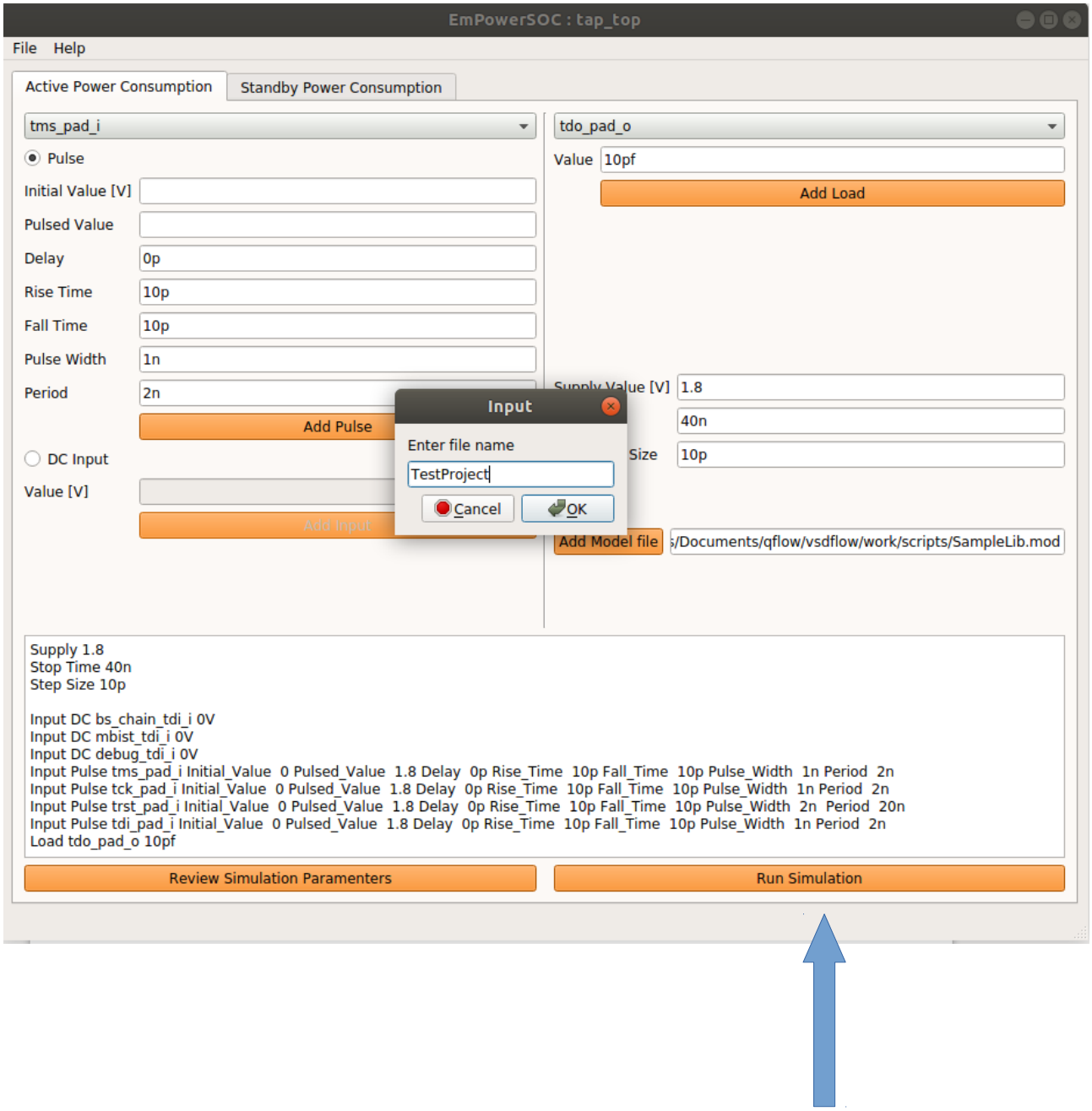
➔ Add the model file for NMOS and PMOS. We have provided a sample model file for reference.

Note: If you want to use your own model parameters, kindly ensure the library name and model name are same as the one in sample model file provided.

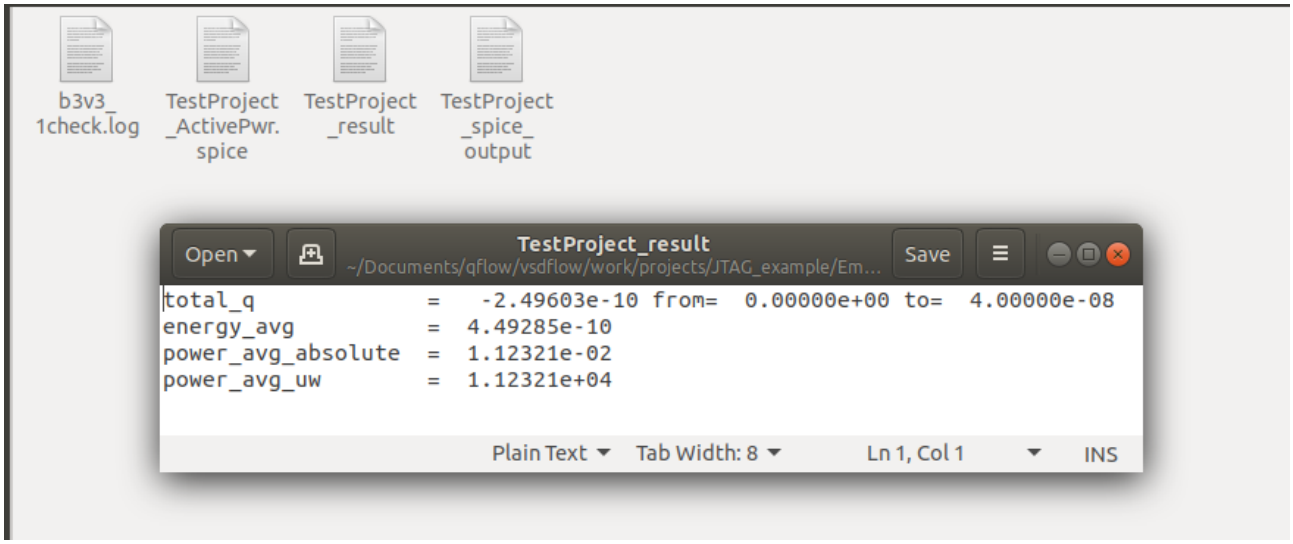
➔ Review the simulation parameters. Make any changes if necessary.



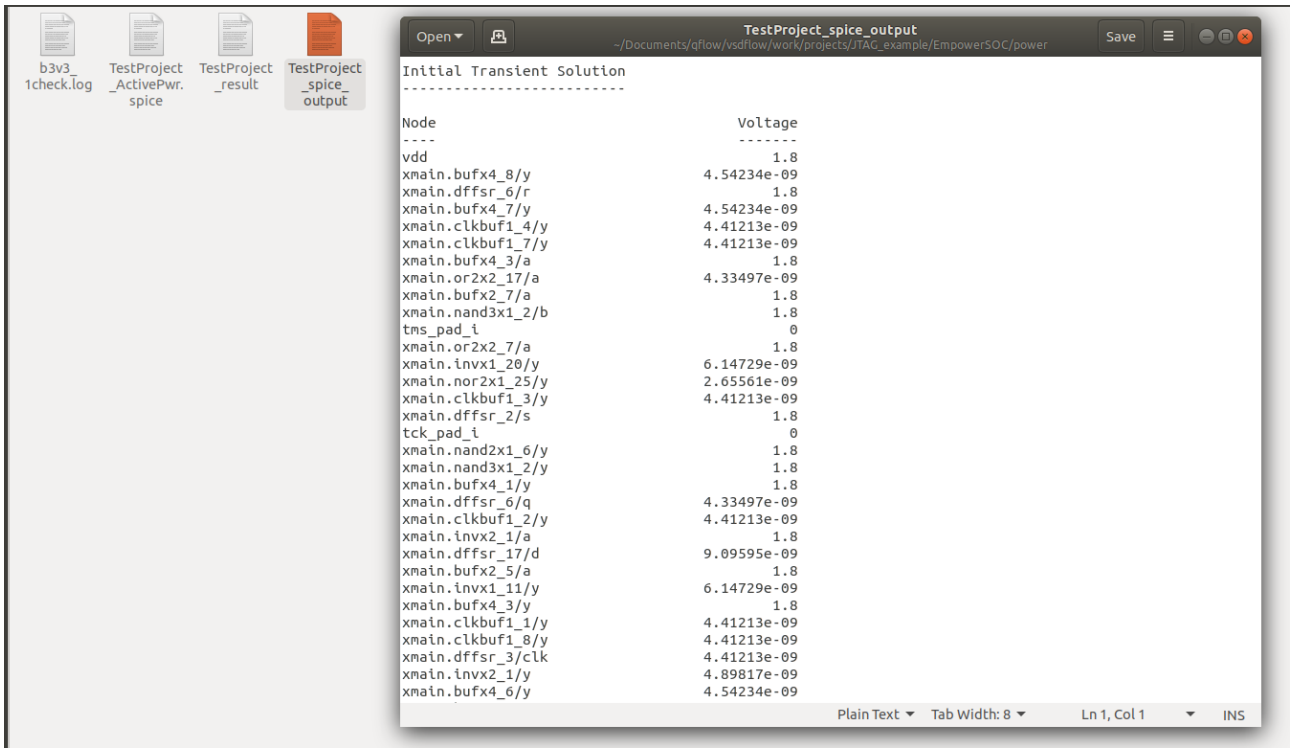
➔ Finally, run the simulaton. You will be asked to provide a name for your project in order to save it.



➔ The Estimated Power will be saved as a text file TestProject_result in the EmpowerSoc>Power directory.



➔ The complete ngspice output will also be saved.



➔ In future, you can load these parameters directly into the tool by going into File>Open, and then selecting the simulation parameters file for that project.