GSAS SEER TOOL v2.0

USER GUIDE 2017

www.gord.qa

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GORD
المنظمة الخليجية للبحث والتطوير
Gulf Organisation for Research & Development

GSAS
GLOBAL SUSTAINABILITY ASSESSMENT SYSTEM
2009

IMPORTANT NOTE:

For CD installation:

1. **Copy the contents of the CD to your Drive C - Local Disk(C:)**
2. **Click the "set-up" application to install the GSAS – SEER tool.**

For installation using downloaded link:

1. **Use the "Extract Files" option when extracting/unzipping the files.**
2. **Extracted files should be saved in a folder named, "SEER v2.0"**
3. **Copy the folder your Drive C - Local Disk(C:)**
4. **Click the "set-up" application from the folder to install the GSAS – SEER tool.**

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Registration Information

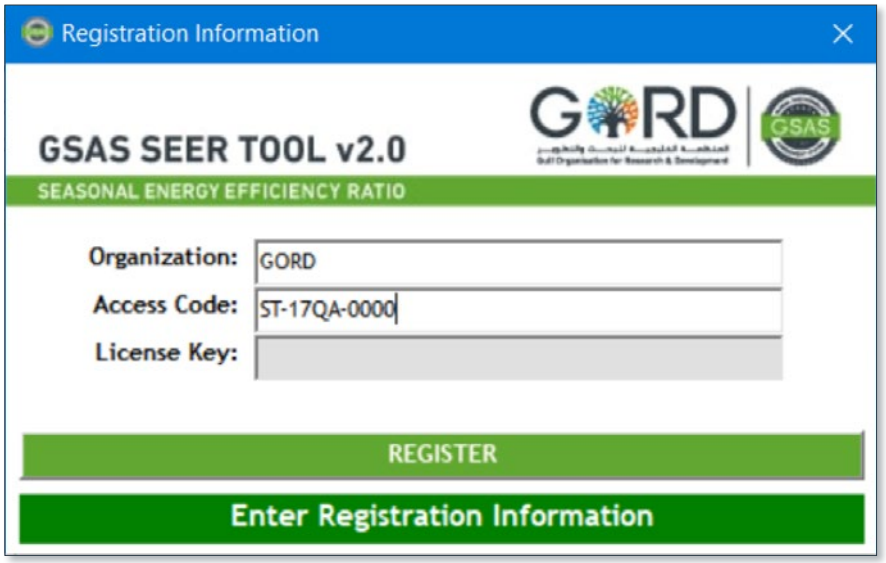
Organization: Provide GORD the exact name of the company/or preferred name (could be shortened or abbreviation) to create a profile in the system.

Access Code: GORD will provide the Service Provider Number to use in the SEER tool.

License Key: License Key will be generated internally based on the provided details above.

Notes:

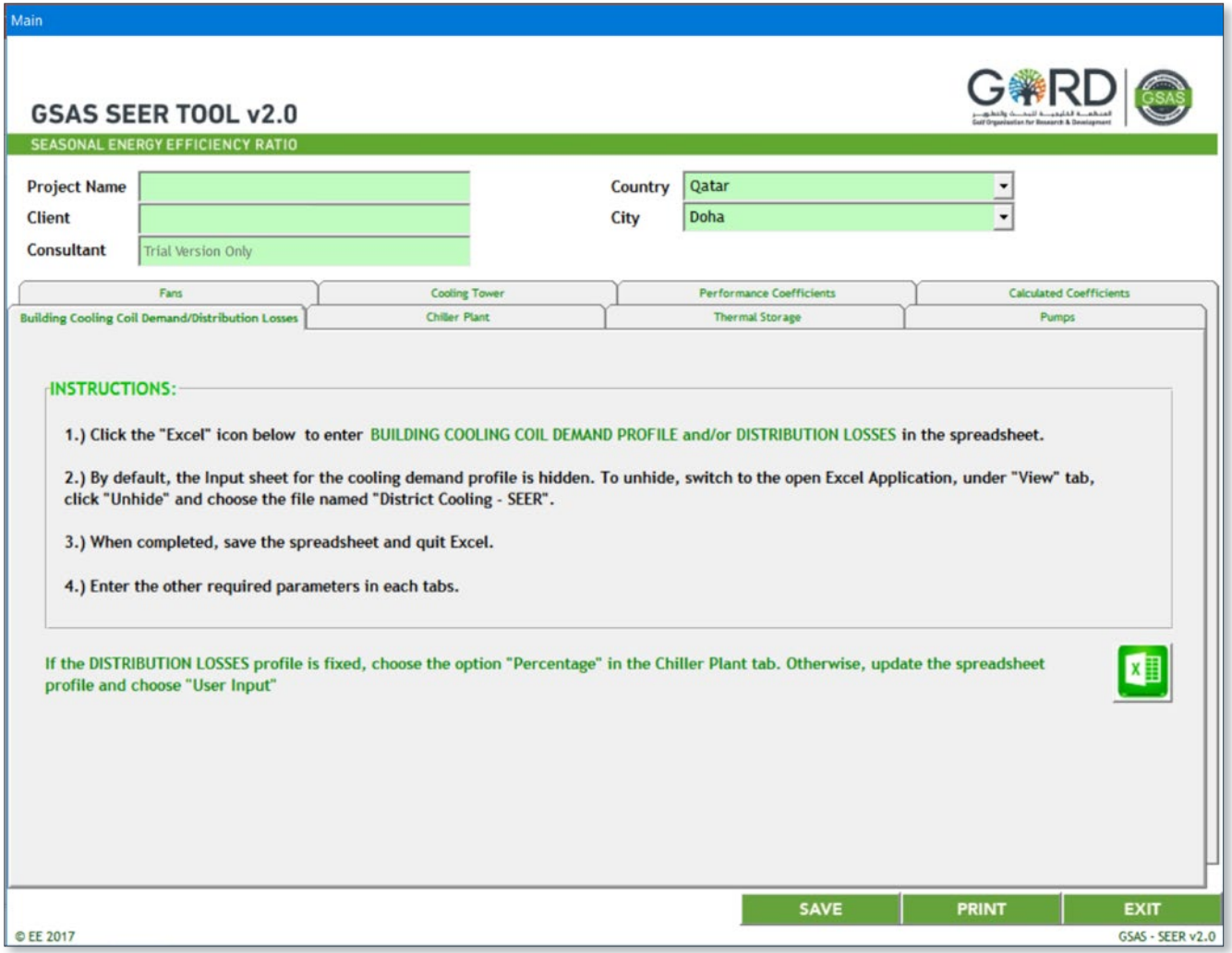
1. Both information has been provided to consultants based on the details provided. Simply click register to continue.



Project Information – Building Cooling Coil Demand & Distribution Losses

Notes:

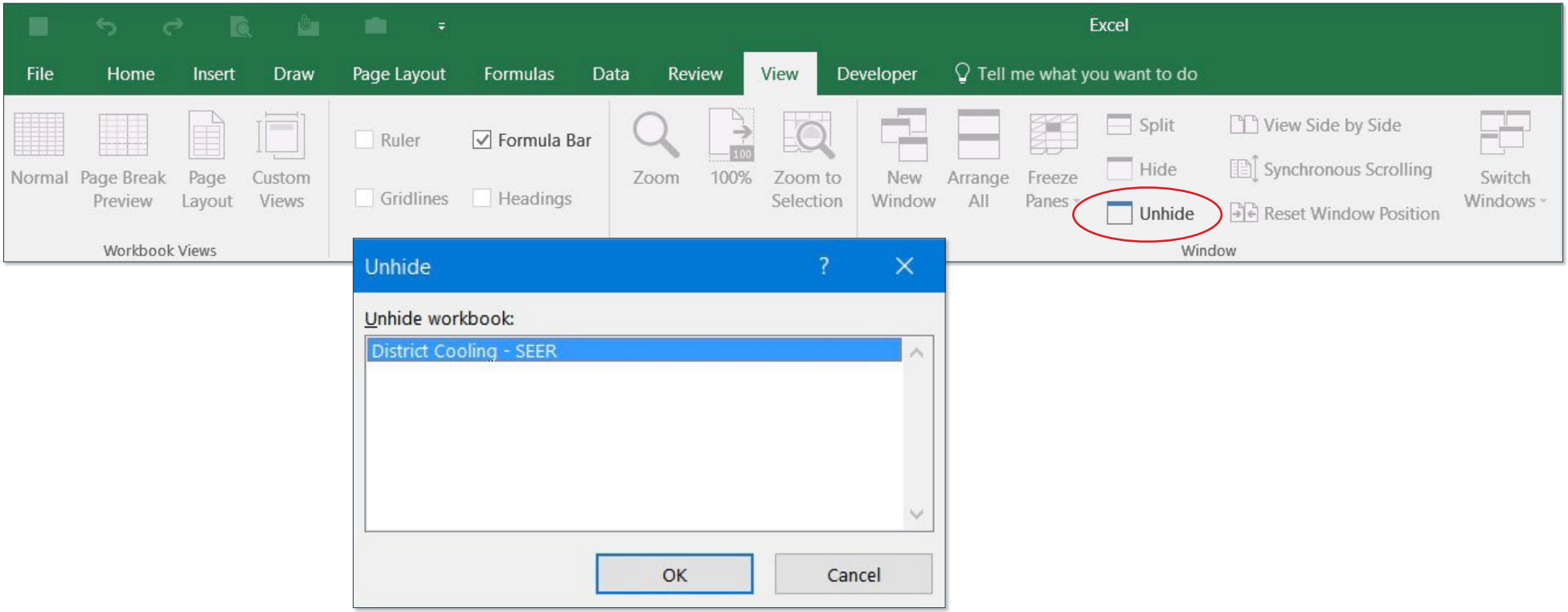
- **For Distribution Losses**
  - **Fixed:** For fixed profile, user shall:
    - Select the "**Chiller Plant**" tab
    - Enter the percentage of the maximum energy loss in distribution.
  - **User Input:**
    - If the Distribution losses is not a fixed value, then enter the data for **8760** hours along with the Cooling Coil Demand in the spreadsheet.



Building Cooling Coil Demand & Distribution Losses – Spreadsheet

Notes:

By default, the Input sheet for the cooling demand profile is hidden. To unhide:



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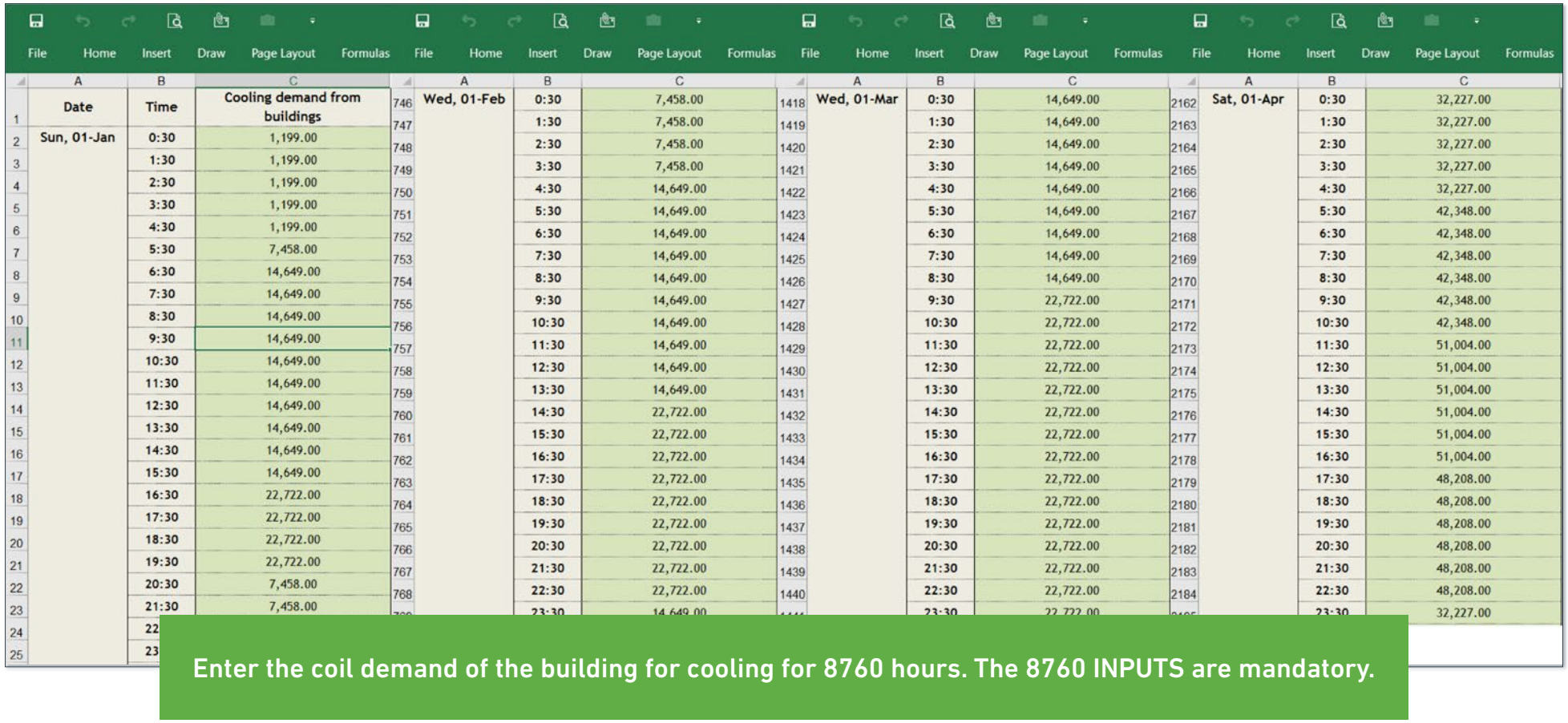
Building Cooling Coil Demand & Distribution Losses – Spreadsheet (Continued)



	A	B	C
1	Date	Time	Cooling demand from buildings
2	Sun, 01-Jan	0:30	1,199.00
3		1:30	1,199.00
4		2:30	1,199.00
5		3:30	1,199.00
6		4:30	1,199.00
7		5:30	7,458.00
8		6:30	14,649.00
9		7:30	14,649.00
10		8:30	14,649.00
11		9:30	14,649.00
12		10:30	14,649.00
13		11:30	14,649.00
14		12:30	14,649.00
15		13:30	14,649.00
16		14:30	14,649.00
17		15:30	14,649.00
18		16:30	22,722.00
19		17:30	22,722.00
20		18:30	22,722.00
21		19:30	22,722.00
22		20:30	7,458.00
23		21:30	7,458.00

	A	B	C
746	Wed, 01-Feb	0:30	7,458.00
747		1:30	7,458.00
748		2:30	7,458.00
749		3:30	7,458.00
750		4:30	14,649.00
751		5:30	14,649.00
752		6:30	14,649.00
753		7:30	14,649.00
754		8:30	14,649.00
755		9:30	14,649.00
756		10:30	14,649.00
757		11:30	14,649.00
758		12:30	14,649.00
759		13:30	14,649.00
760		14:30	22,722.00
761		15:30	22,722.00
762		16:30	22,722.00
763		17:30	22,722.00
764		18:30	22,722.00
765		19:30	22,722.00
766		20:30	22,722.00
767		21:30	22,722.00
768		22:30	22,722.00

	A	B	C
1418	Wed, 01-Mar	0:30	14,649.00
1419		1:30	14,649.00
1420		2:30	14,649.00
1421		3:30	14,649.00
1422		4:30	14,649.00
1423		5:30	14,649.00
1424		6:30	14,649.00
1425		7:30	14,649.00
1426		8:30	14,649.00
1427		9:30	22,722.00
1428		10:30	22,722.00
1429		11:30	22,722.00
1430		12:30	22,722.00
1431		13:30	22,722.00
1432		14:30	22,722.00
1433		15:30	22,722.00
1434		16:30	22,722.00
1435		17:30	22,722.00
1436		18:30	22,722.00
1437		19:30	22,722.00
1438		20:30	22,722.00
1439		21:30	22,722.00
1440		22:30	22,722.00

	A	B	C
2162	Sat, 01-Apr	0:30	32,227.00
2163		1:30	32,227.00
2164		2:30	32,227.00
2165		3:30	32,227.00
2166		4:30	32,227.00
2167		5:30	42,348.00
2168		6:30	42,348.00
2169		7:30	42,348.00
2170		8:30	42,348.00
2171		9:30	42,348.00
2172		10:30	42,348.00
2173		11:30	51,004.00
2174		12:30	51,004.00
2175		13:30	51,004.00
2176		14:30	51,004.00
2177		15:30	51,004.00
2178		16:30	51,004.00
2179		17:30	48,208.00
2180		18:30	48,208.00
2181		19:30	48,208.00
2182		20:30	48,208.00
2183		21:30	48,208.00
2184		22:30	48,208.00
		23:30	32,227.00

Enter the coil demand of the building for cooling for 8760 hours. The 8760 INPUTS are mandatory.

Notes:

- Save the spreadsheet and quit excel when done.

Chiller Plant

No. of Chillers: Choose the number of chillers as applicable to the project.

Capacity: Enter the capacity of **EACH** chiller at **specified condenser temperature.**

Minimum Start up Capacity: Enter the minimum start up capacity of the chiller as per manufacturers standards and design inputs.

Condenser Cooling Media: Select the type of condenser heat transfer medium:

- **Air cooled**
- **Water Cooled**

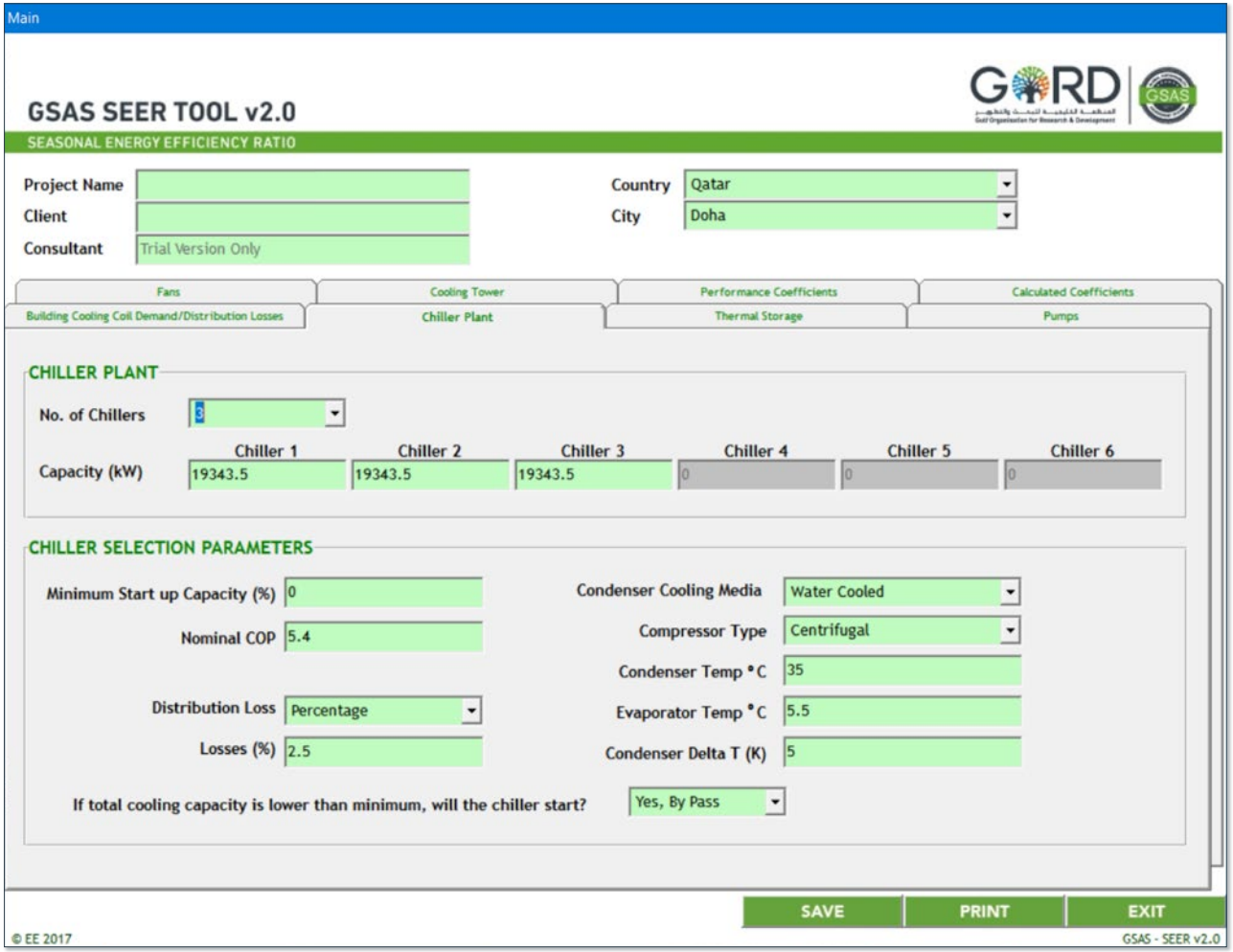
Compressor type: Enter the compressor type

Distribution Loss: Select between the two options:

- **Percentage:** Enter the percentage of maximum energy loss in distribution. This value will be used for the entire year
- **User Input:** Enter the data in the spreadsheet along with the Cooling Coil Demand

Nominal COP: Enter the COP at **specified condenser temperature.**

Condenser Temp: Enter the condenser entering air temperature.



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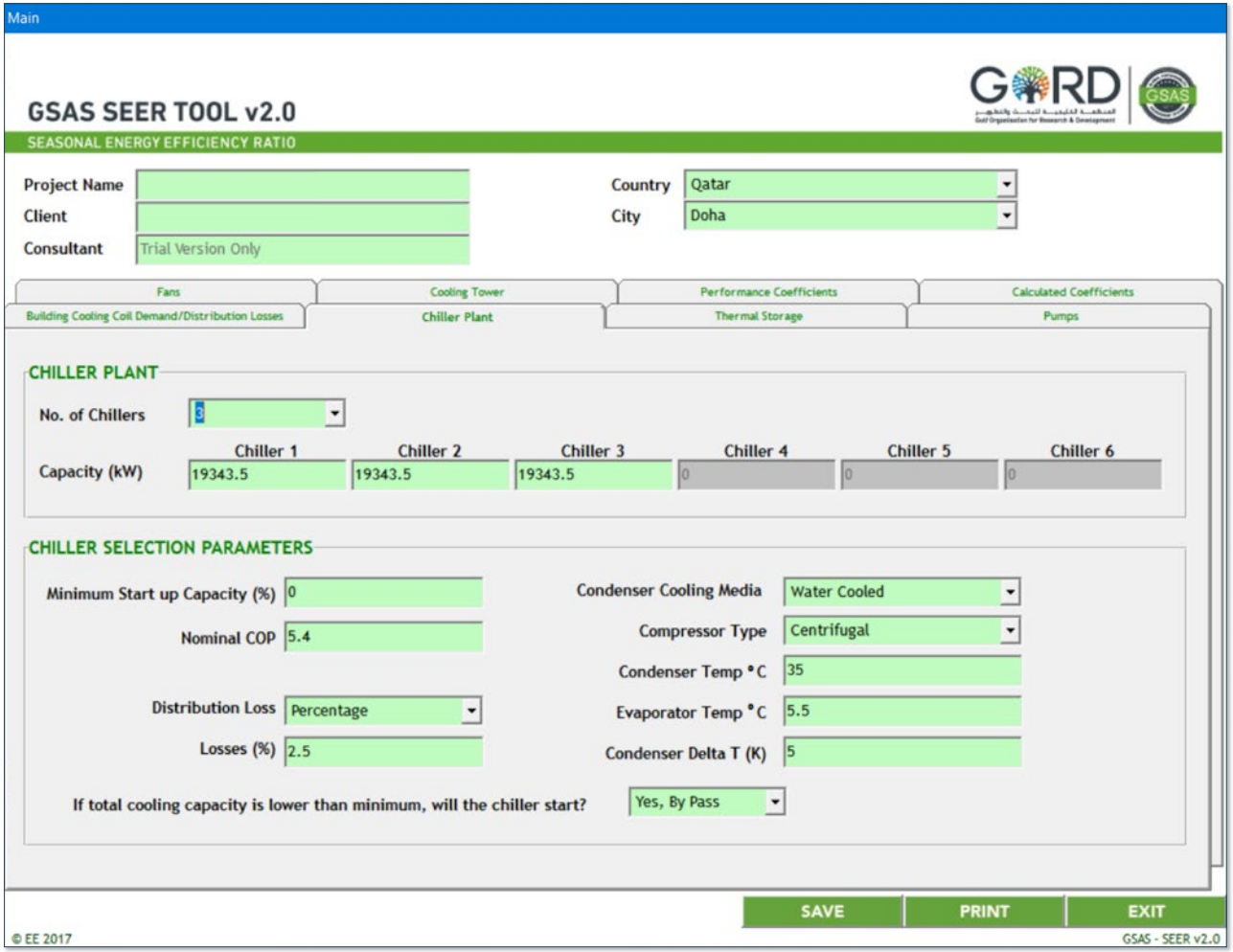
Chiller Plant (Continued)

Evaporator Temp: Enter the leaving water temperature.

Condenser Delta (T): Enter the temperature difference across the condenser media.

If total cooling capacity is lower than the minimum, will the chiller start? : Select the appropriate option based on the design considerations.

- **Yes, By pass:** Here the chiller will start when the sum of the thermal store charging and the coil load is less than the minimum capacity. The system will assume a by pass mode. (**Note:** based on the cooling coil profile, this may be energy intensive)
- **No, Shut down:** Here the chiller will NOT start when the sum of the thermal store charging and the coil load is less than the minimum capacity. (**Note:** This is crucial, there must be a proof how the cooling coil load will be met especially if the buildings' cooling load is lower than the thermal store minimum discharge operation capacity.



Thermal Store

Thermal Store: Select "Yes' if the project comprises a Thermal Storage. If "**Yes**", then:

Capacity: Enter the capacity of the Thermal Storage

Design TS Charging Capacity:

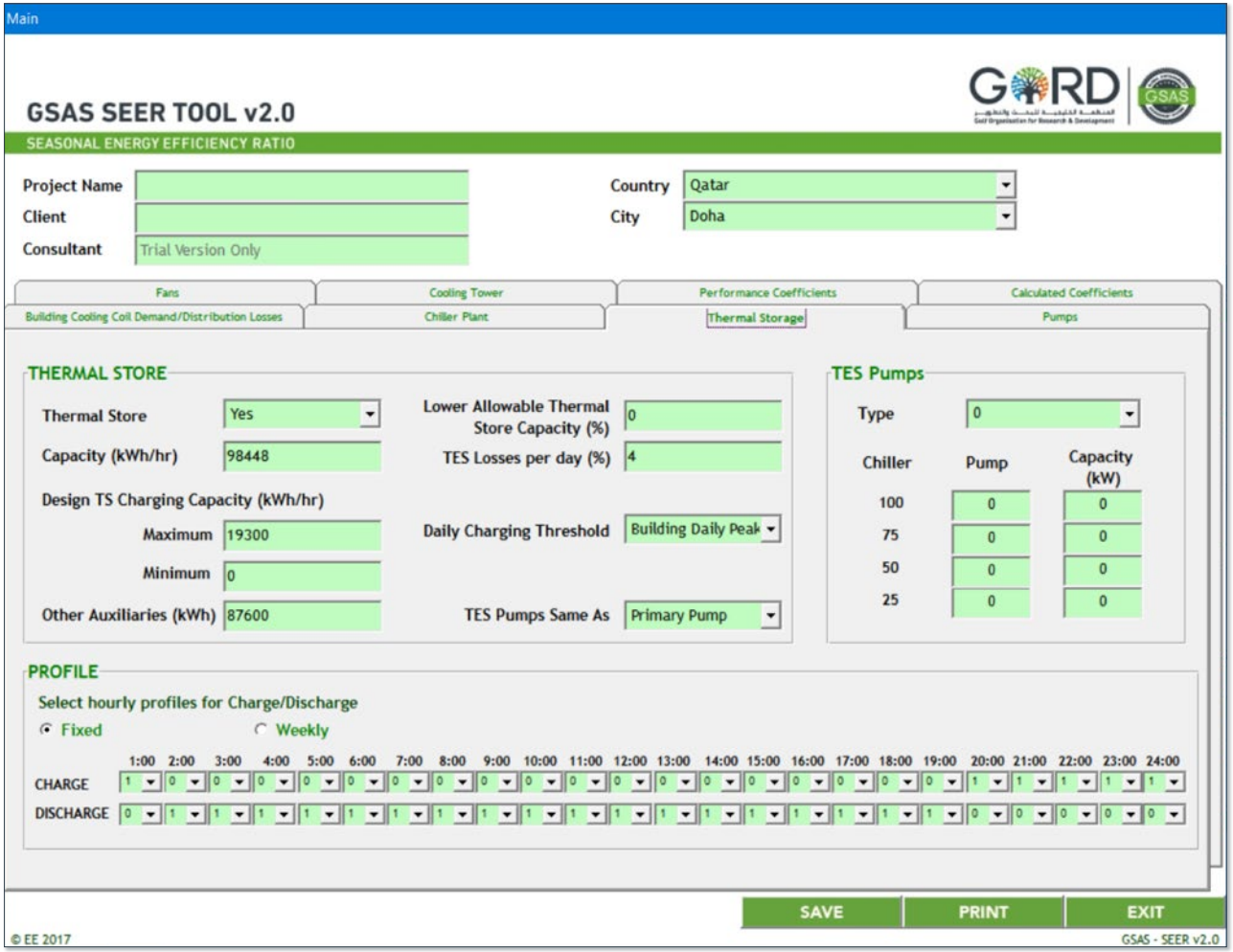
- **Maximum:** Enter the maximum design the thermal store can charge or discharge in kWh per hour.
- **Minimum:** Enter the minimum design the thermal store can charge or discharge in kWh per hour.

If "**No**", delete the Capacity and Design TS Charging Capacity default inputs.

Lower allowable Thermal Store Capacity: Enter the lowest allowable thermal store capacity in percentage.

Note: Thermal Store will be controlled in order that its capacity will not drop below the set limit. A command will be sent to the chiller to start charging the thermal store even if there is no coil load. This command will override the profile, if and only if, the capacity of the thermal store dropped below the controlled capacity.

If there is no minimum capacity then the percentage should equal to **0**.



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Thermal Store (Continued)

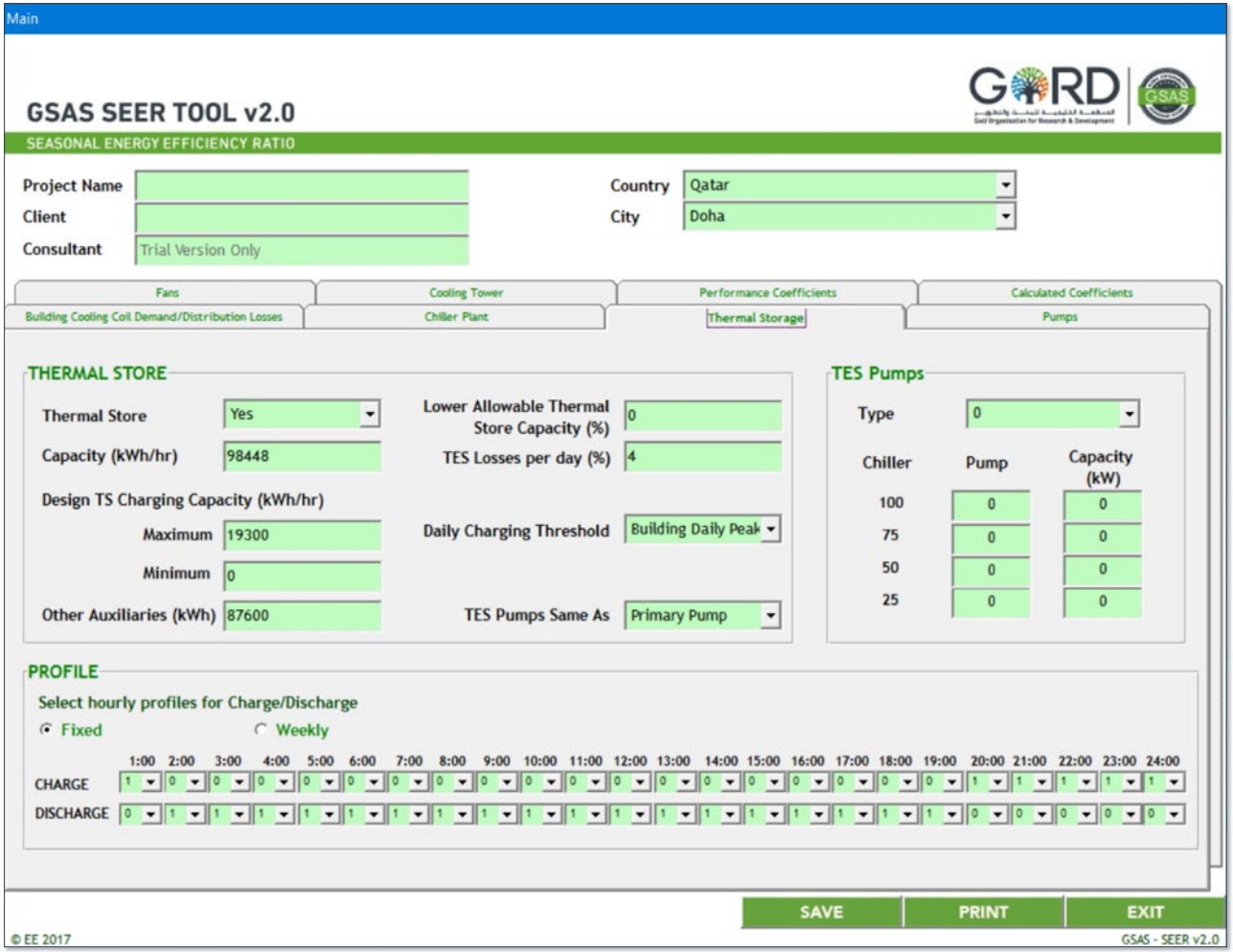
TES Loss per day: Enter the percentage of energy losses from the Thermal Store tank per day.

Daily Charging Threshold:

- **Building Daily Peak:** The user shall inform the software if the charging capacity will only meet the Daily Peak. This will override the charging profile when the TES meets the mentioned capacity.
- **Thermal Store Peak:** The user shall inform the software if the charging capacity will meet the TES Peak. This will override the charging profile when the TES meets the maximum capacity.

TES Pumps Same as:

- **Primary Pump:** Select this option if the project has no separate TES Pumps and considers Primary Pumps for TES Tank.
- **User Input:** Select this option if the project has a separate set of pumps for TES.
  - **TES PUMPS:** Enter the Pump Capacity and Power Input at various part-load value of Chiller.



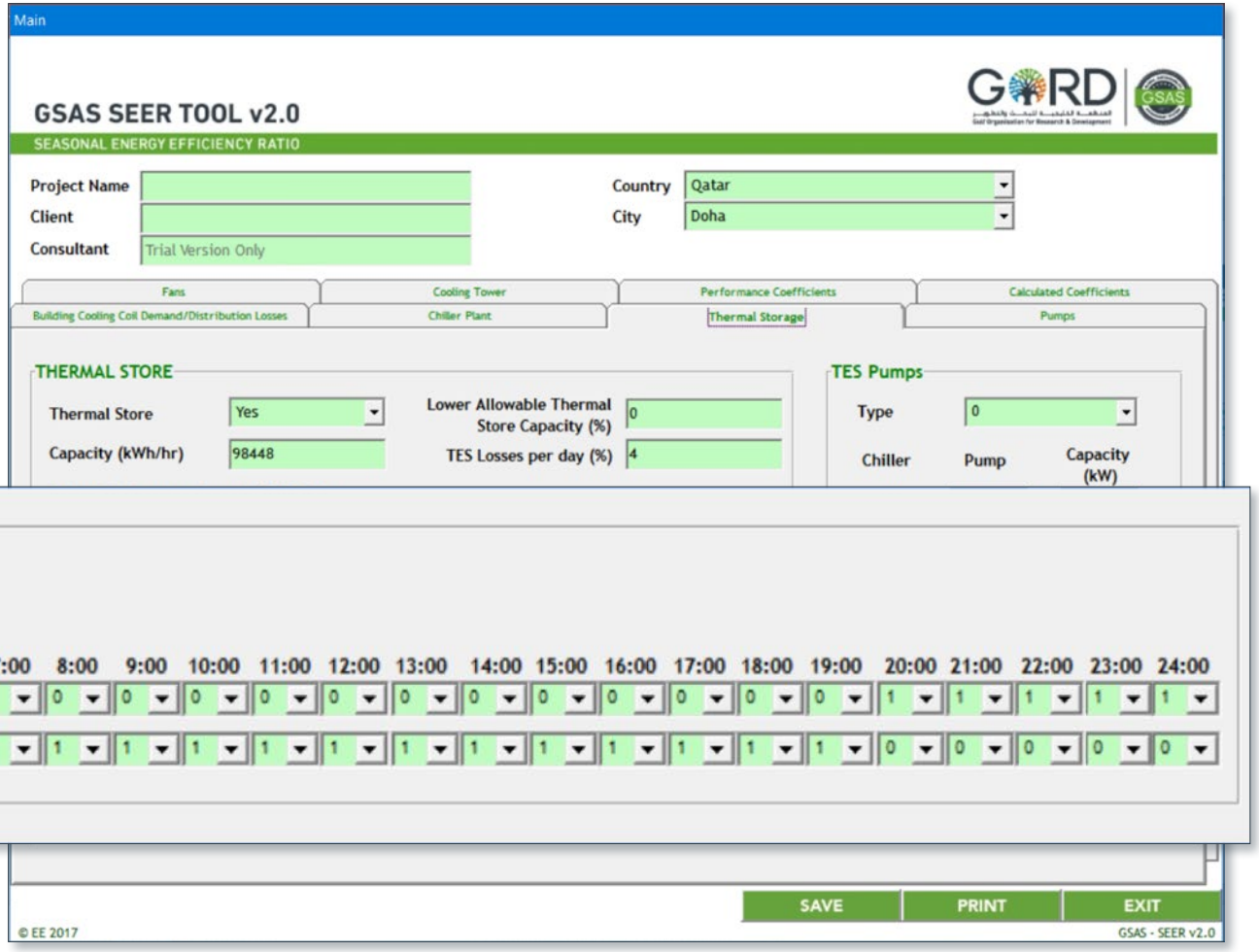
Thermal Store - Profile

If **"Thermal Storage"**, is applicable, then

Profile:

Fixed: Select this option if the profile of TES Tank is fixed for the entire year.

Weekly: Select this option if weekly profile is available. Update the spreadsheet and save the data.



Notes:

Provide the hourly profile for the "Charging"and "Discharging" of Thermal Storage Tank.

"**1**" corresponds to "applicable" and

"**0**" corresponds to "not-applicable"

Pumps

All Pumps:

Type: Select the type of pumps based on design considerations:

- **Fixed**
- **Variable**

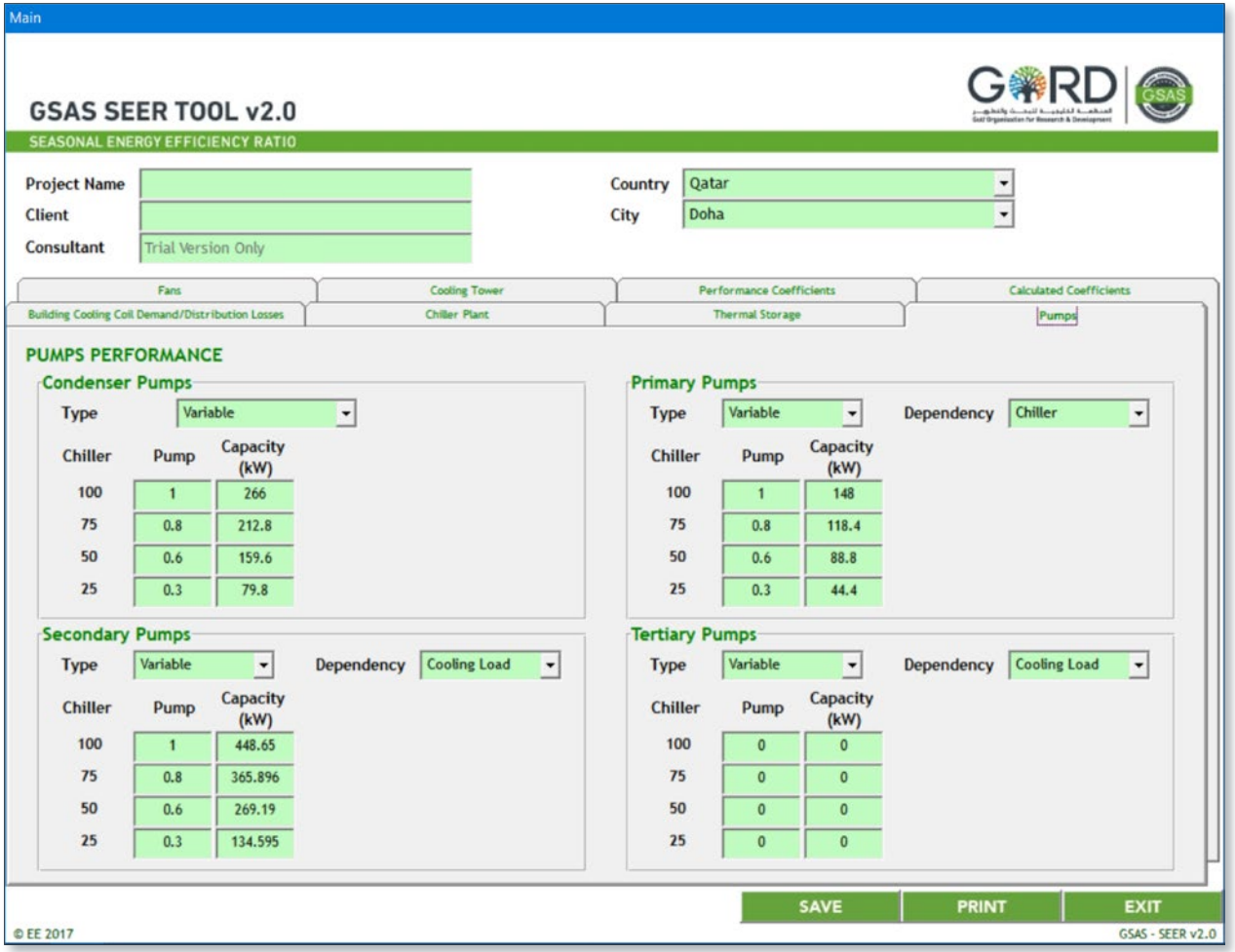
Enter the Pump capacity and Power input at various part-load values of Chiller

Dependency*: Select the appropriate option based on the design of the project.

- **Chiller**
- **Building's Cooling Coil**

Note: This is crucial to calculate the pump consumed power

** Applies to Primary, Secondary and Tertiary Pump*



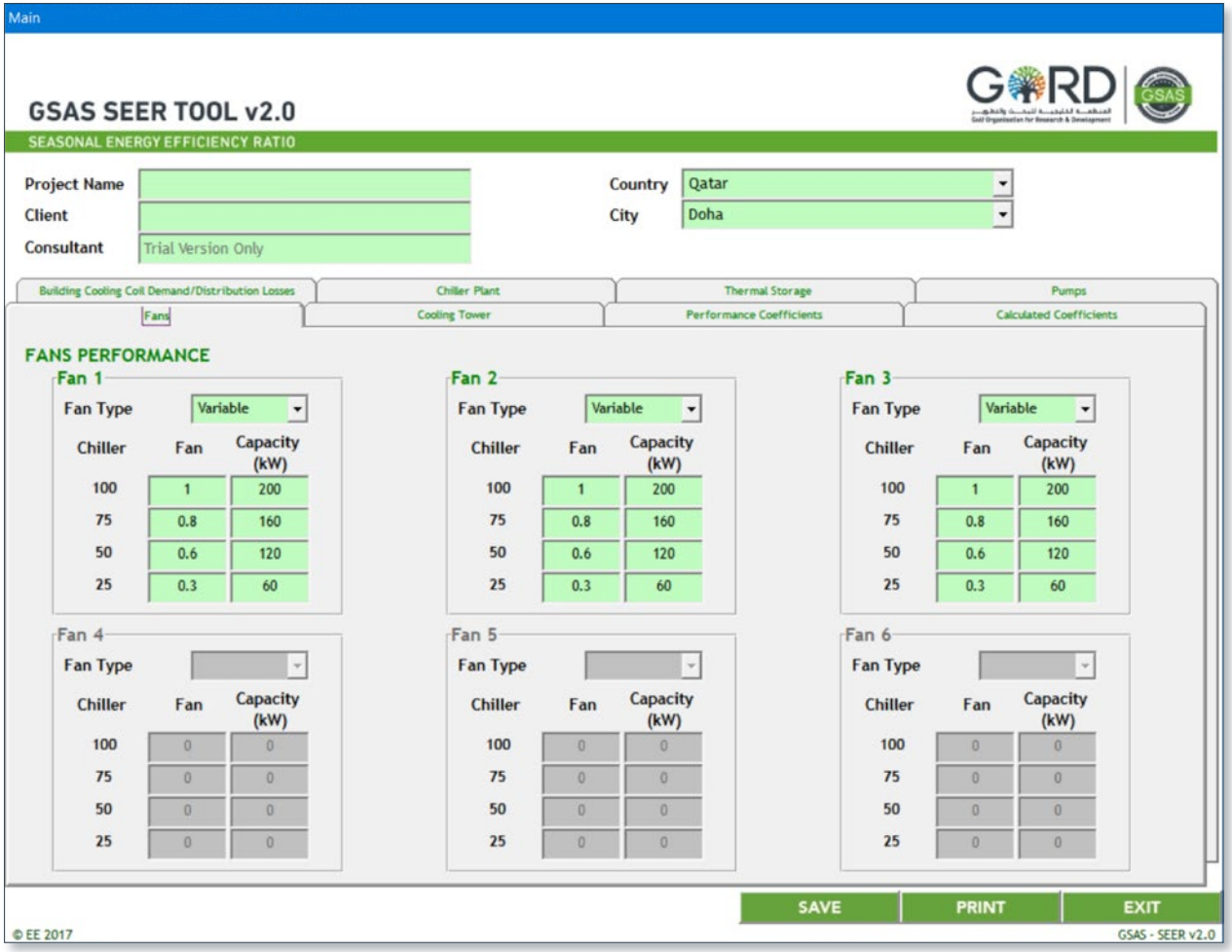
Fans

All Fans:

Type: Select the type of fans based on design considerations:

- ◉ **Fixed**
- ◉ **Variable**

Enter the Fan capacity and Power input at various part-load values of Chiller.

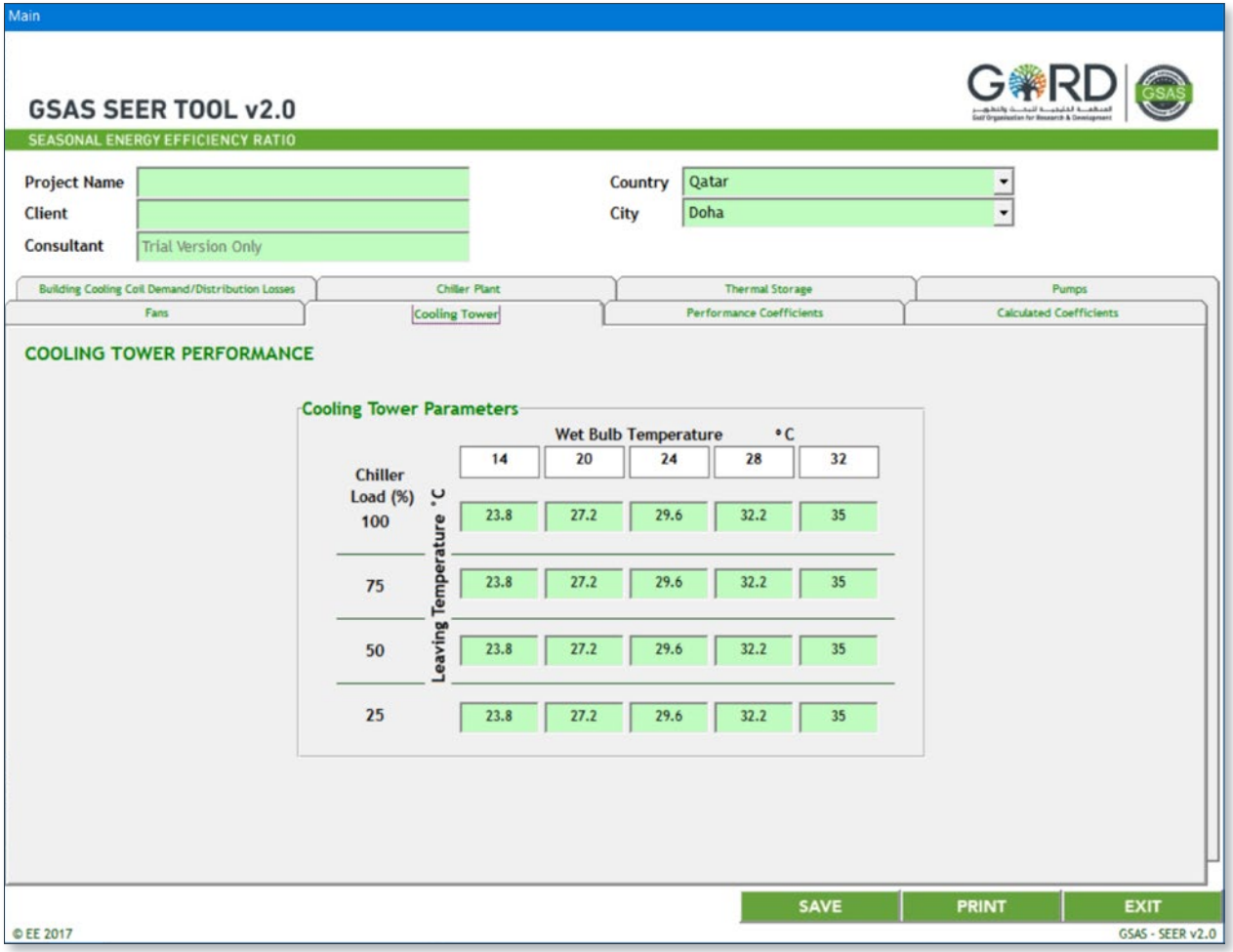


Cooling Tower

Wet Bulb Temperature: Wet Bulb Temperature: Enter the wet bulb temperature considering the maximum and minimum temperature ranges throughout the year and various steps between minimum and maximum.

Leaving Temperature: Enter the cooling tower leaving temperatures for the corresponding wet bulb temperatures at various part-load conditions of the chiller.

Note: Cooling tower performance shall be provided at full load and part loads (100%, 75%, 50% & 25%)



Chiller Performance Coefficient – Default Values

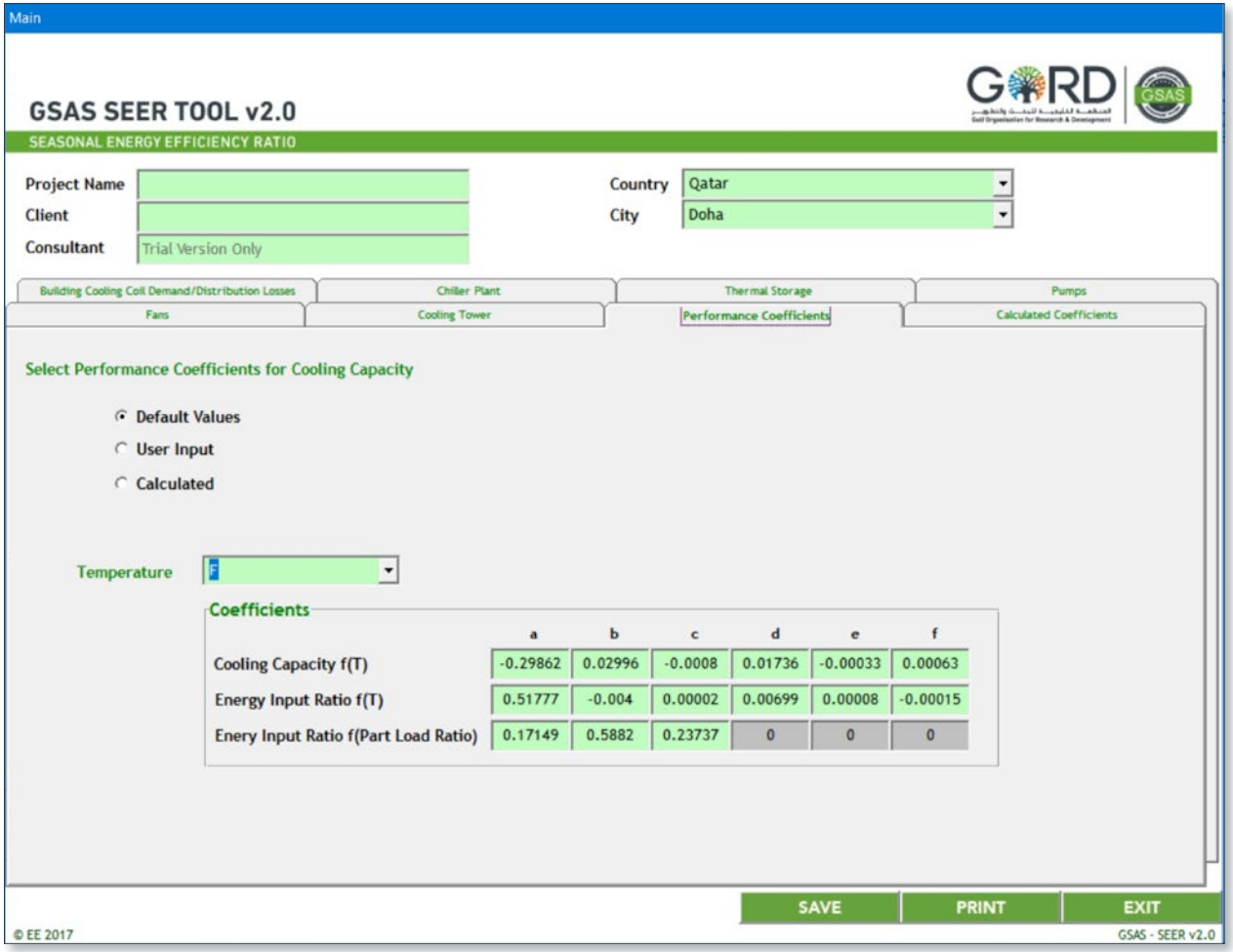
Default Values:

Default values of coefficients for different ratio based on the selected Condenser Cooling Medium and Compressor Type.

Temperature: Enter the unit of temperature used for design of the chillers.

Note:

Default values can only be used for **initial assessment**. For final submissions, the actual/ technical data sheet from the manufacturer has to be submitted.



Chiller Performance Coefficient – User Input

Default Values:

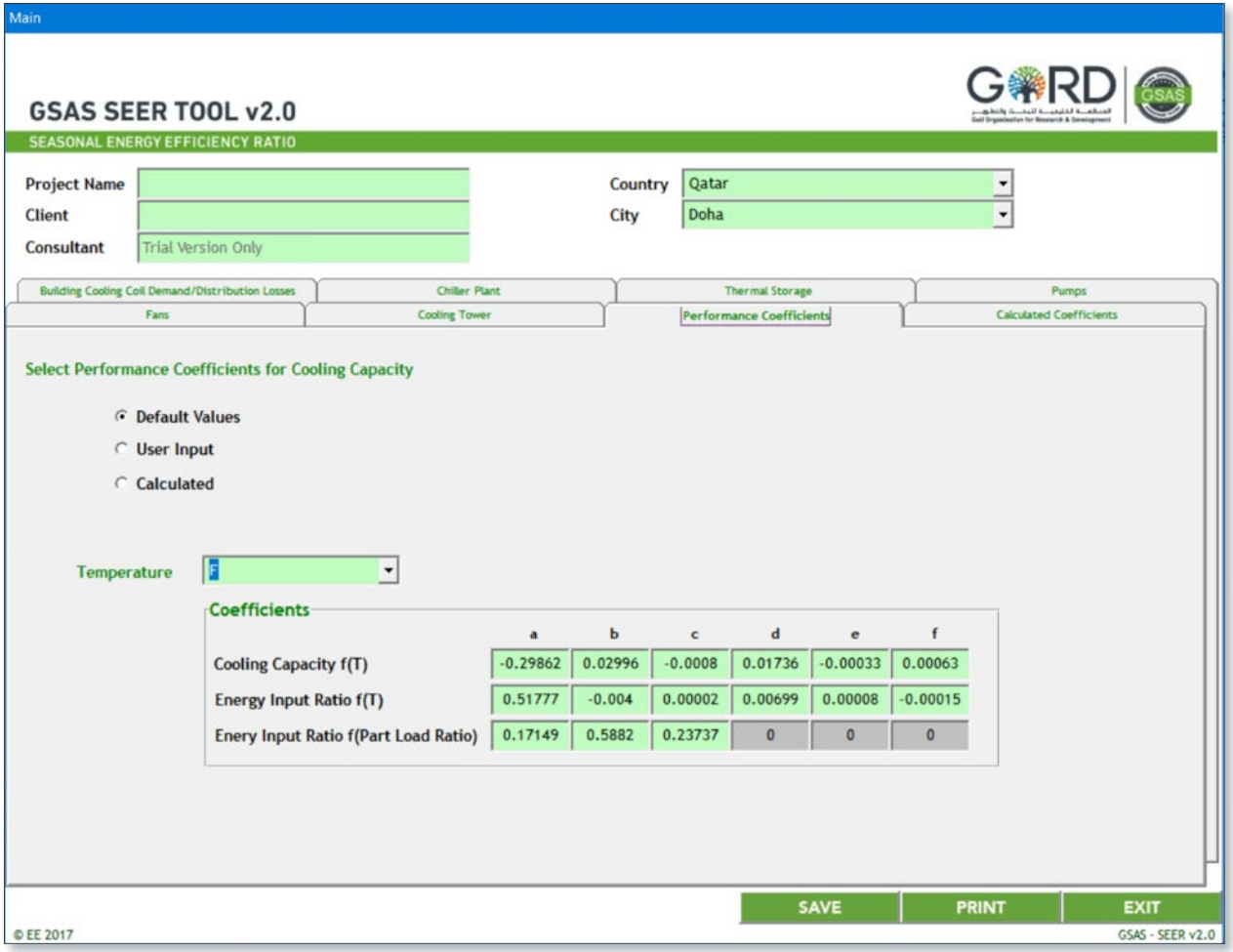
User Input: When selected, the input values will be available for editing. Enter the values of each type for 6 scenarios to create a curve.

- **Cooling Capacity f(T):** Capacity as a Function of Temperature. This curve adjusts the available capacity of the chiller as a function of evaporator and condenser temperatures (or lift).

- **Energy Input Ratio f(T):** Energy Input Ratio as a Function of Temperature. This curve adjusts the efficiency of the chiller as a function of evaporator and condenser temperatures (or lift)

- **Energy Input Ratio f(Part Load Ratio):** Energy Input Ratio as a Function of Part-Load Ratio. This curve adjusts the efficiency of the chiller as a function of part-load operation.

Temperature: Enter the unit of temperature used for design of the chillers.

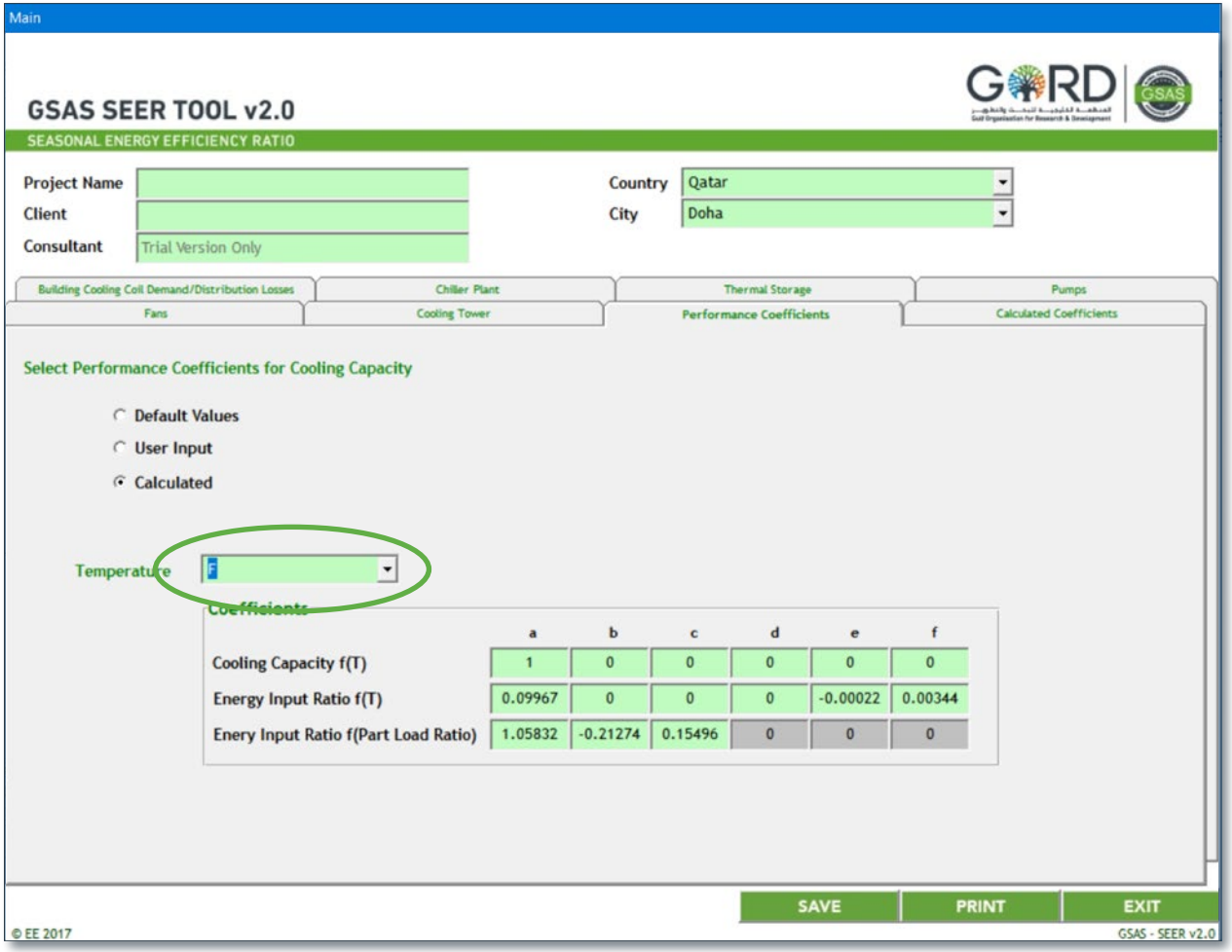


Chiller Performance Coefficient - Calculations

Important Note:

Before choosing "**Calculated**", make sure to change the unit of "**Temperature**" used for design of the chillers.

Calculated: If using this option, the tool will load a new window for the required inputs.



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Chiller Performance Coefficient - Calculations (Continued)

Condenser Inlet Air Temperature Or **Condenser Leaving Water Temperature:** Enter the different temperature scenarios for condenser temperature provided in the manufacturer's data sheets.

Evaporator Chiller Water Outlet: Enter the different temperature scenarios for evaporator temperature provided in the manufacturer's data sheets.

Capacity: Enter the capacity of chillers based on the selected condenser and evaporator temperature as provided in the manufacturer's data sheets.

Power: Enter the power of chillers based on the selected condenser and evaporator temperature as provided in the manufacturer's data sheets.

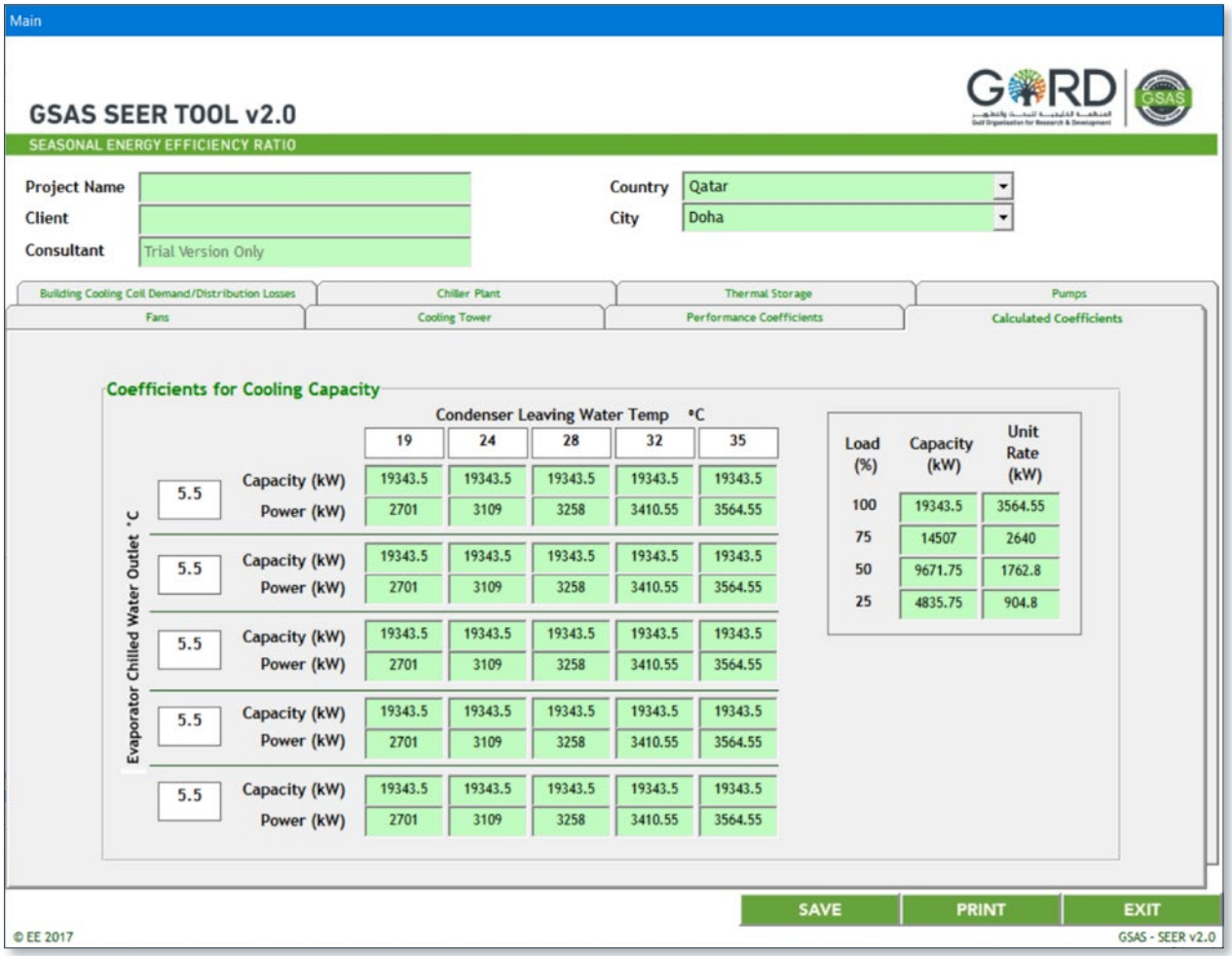
For Part-Load:

Capacity: Enter the capacity of chillers corresponding for each part load ratio as provided in the manufacturer's data sheets.

Unit Rate: Enter the power consumption of chillers corresponding for each part load ratio as provided in the manufacturer's data sheets.

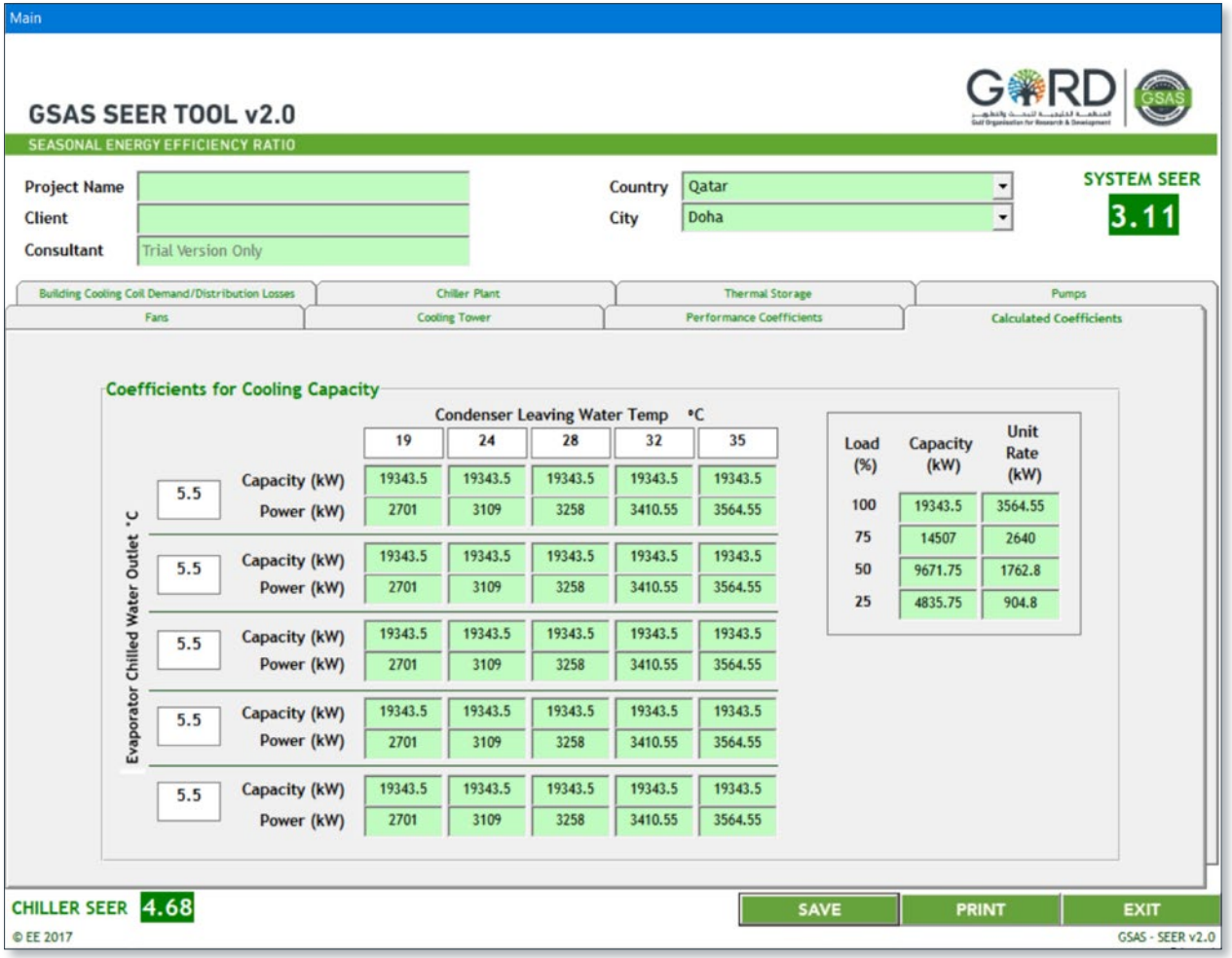
Note:

If only one set of data is provided by the manufacturer, the tool will calculate the other values based on the set provided, or based on the capacity of chiller provided in the "**Chiller Plant**" inputs.



Click "**Save**" to save the changes you made on the tool. When done saving, the system will show the "System SEER" results and the "Chiller SEER" values.

Print: The tool allows to print all the information provided in a report.



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