

Retrofitting Economic Support Tool (REST) Excel Application V 1-6 User Guide

September 2020

Department of Health Policy and Management
Robert Stempel College of Public Health and Social Work
Florida International University
Miami, FL, USA



Retrofitting Economic Support Tool (REST) User Guide

This document was developed as guide to use the Retrofitting Economic Support Tool (REST) application in Excel.

The REST is designed to provide a straightforward and easy-to-interpret cost-effectiveness analysis (CEA) to support decision-making and evaluation of retrofitting projects under SMART standards for healthcare facilities. A healthcare facility is considered SMART when it has structural and operational designs that improves safety and makes the facility more energy efficient and green compliant. The SMART initiative is broad and covers facility upgrades that make buildings and operations more safety resilient and environmental-friendly.

REST should be used to support decision making at the early stage of the retrofitting design process. Given the limitations of CEA and the preliminary information obtained, REST should not be the only tool used to make retrofitting decisions.

The REST Model

The REST model is a CEA model that estimates savings in dollars and quality adjusted life year (QALY) associated with retrofitting healthcare facilities to be safe and green according to SMART standards. The model incorporates safety and green (energy and water) savings independently. QALY is a utility measure of health status that combines quantity and quality of life over a period of a year. A QALY equal to 1 is equivalent to one year of life in perfect health. A QALY lower than 1 implies either a quantity of life lower than a year or a quality of life less than perfect health, or a combination of both.

For the safety component, REST considers the short-term surge of demand for health services caused by a disaster, and the mid-term impact of the disaster on the facility's capacity. Geographic location and characteristics of the facility are obtained to estimate the exposure of the facility to a hazard and its vulnerability based on potential structural and non-structural damages. Structural elements are part of the building's load-bearing system (e.g., columns, beams, walls, floors, slabs, etc.), and non-structural elements are those systems that are necessary for building operations (e.g., architectural components, equipment, etc.). Structural and non-structural damages reduce the facility's capacity. The surge in demand is modeled projecting injuries requiring medical attention.

The efficiency gains in water and energy consumption caused by the replacement or addition of green equipment are considered for the green component in REST. Other environmental benefits are happening due to waste management and air quality improvement, which are not considered.

Excel REST Application Tool

Excel Main Page

1. Open the excel file (RESTv1-6.xlsx)
2. In the main sheet (Results) of the excel file, there is an option to ‘Start a new REST’ form or ‘Continue with previous REST’ form.
3. If this is a new REST evaluation, then click on the ‘Start a new REST’ form
4. If this is a continuous evaluation, then click on the ‘Continue with previous REST’ form



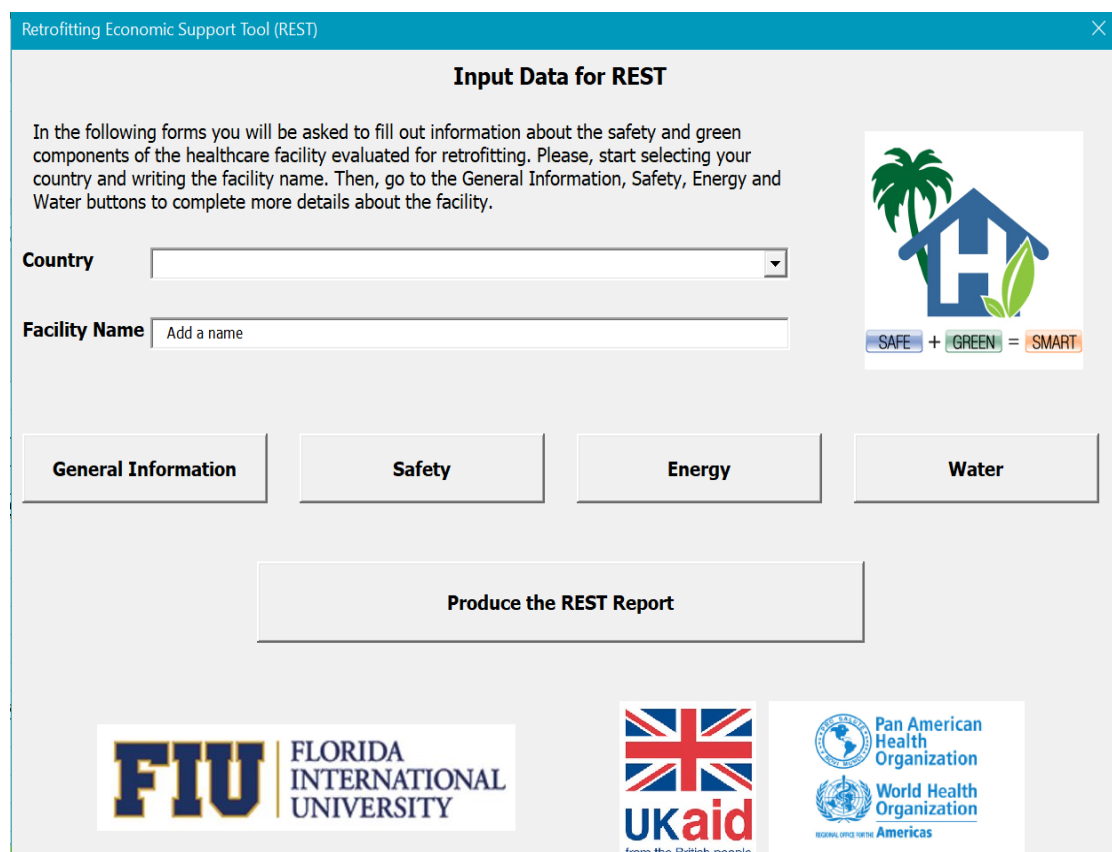
Figure 1

5. When one of the options is clicked, then it will open the REST input form where you can start putting information about the facility

REST Input Form

The REST input form is created to put basic information regarding the healthcare facility. The information will consist of safety and green (energy and water) consumptions and savings. The information will help in conducting cost-effective analysis.

1. The main page of the REST input form is opened
2. It will ask the user first to select a country and enter the facility name
3. On the page, there are also 5 options (buttons) for general information, safety, energy, water and produce the REST report
4. On clicking the '**General Information**' button, the users will be directed to complete information about the healthcare facility
5. On clicking the '**Safety**' button, the users will be directed to complete information about the safety component of the healthcare facility
6. On clicking the '**Energy**' button, the users will be directed to complete information about the energy component of the healthcare facility
7. On clicking the '**Water**' button, the users will be directed to complete information about the water component of the healthcare facility
8. After completing the information input process, click on '**Produce the REST Report**' button. REST report will be generated in the excel sheet (Results)



The screenshot shows the 'Retrofitting Economic Support Tool (REST)' application window. The title bar is blue with the text 'Retrofitting Economic Support Tool (REST)' and a close button. The main content area has a light gray background. At the top, it says 'Input Data for REST'. Below this, there is a paragraph of instructions: 'In the following forms you will be asked to fill out information about the safety and green components of the healthcare facility evaluated for retrofitting. Please, start selecting your country and writing the facility name. Then, go to the General Information, Safety, Energy and Water buttons to complete more details about the facility.' To the right of the instructions is a logo featuring a house, a palm tree, and a leaf, with the text 'SAFE + GREEN = SMART' below it. Below the instructions, there are two input fields: 'Country' with a dropdown arrow and 'Facility Name' with a text box containing the placeholder 'Add a name'. Below these fields are four buttons: 'General Information', 'Safety', 'Energy', and 'Water'. At the bottom of the main content area is a large button labeled 'Produce the REST Report'. At the very bottom of the window, there are three logos: 'FIU FLORIDA INTERNATIONAL UNIVERSITY', 'UKaid from the British people', and 'Pan American Health Organization World Health Organization Regional Office for the Americas'.

Figure 2

REST Excel Application – User Guide

General Information Input Form

The general information tabs will be opened once you click the ‘General Information’ button on the main page of the REST input form. This form requires basic information about the location of the facility along with staff, operating hours, and healthcare services provided by the facility.

Facility Information-1

- This tab asks to complete the following information:
 - Q1. Write down latitude and longitude of the location (decimal degree)
 - Q2. Write down the number of staff – full and part-time (3 or more days/week or 3 or less days/week)
 - Q3. Write down the operating hours of the facility for every day of the week

Facility Information-2

- The tab asks to complete the following information:
 - Q4. The question will ask about the type of health services provided. There are 3 options: outpatient or ambulatory services, emergency or urgent care services, and inpatient hospital services
 - Q4a. Two questions will pop up when you check ‘outpatient or ambulatory services’ box
 - Q5. The first question will ask to write down the average number of patient consultations per day on a slow, normal and busy days.
 - Q6. The second will ask about the number of exams/consulting rooms and
 - Q4b. Three questions will pop up when you check ‘inpatient hospital services’ box
 - Q7. First will ask to write down the number of beds
 - Q8. The second will ask to write down about how many patients are admitted to the health care facility on an average day
 - Q9. The third question is asking to write the average length of stay (in days) in the health care facility

REST Excel Application – User Guide

REST: General Information

Please answer these questions to the best of your ability.

Facility Information-1

Facility Information-2

Q1 Report the latitude and longitude where the facility is located.

Latitude

Longitude

Decimal degrees (as reported in Google maps, for example: 13.081581,-59.607610)

Q2 Number of Staff (Full and Part Time - including healthcare providers and all other workers working in the facility)

Full-time

Part time (3 or more days a week)

Part time (less than 3 days a week)

Q3 Operating Hours: How many hours a day does the health care facility operate? The total will reflect how many hours the facility is open per week. It refers to normal operations, not to emergency or urgent care services.

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday

Sunday

Figure 3

6

REST Excel Application – User Guide

REST: General Information

Please answer these questions to the best of your ability.

Facility Information-1 | Facility Information-2

☒ Outpatient or ambulatory services

☒ Emergency or urgent care services

☒ Inpatient hospital services

Q4 Healthcare services provided by the facility (check all that apply)

Q6 Number of Exam/Consulting Rooms:

Q7 Number of Beds:

Q5 Please provide the average number of patient consultations per day (given if the day is slow, normal, or busy)

Slow Day

Normal Day

Busy Day

Q8 On an average day, how many patients are admitted to the health care facility?

Q9 What is the average length of stay (in days) in the health care facility?

Figure 4

REST Excel Application – User Guide

Safety

The general information tabs will be opened once you click the ‘Safety’ button on the main page of the REST input form. This form requires basic information about the structure and material used in the building of the facility. Some questions are asking information about pre and post retrofitting.

Safety-1

- This tab asks to complete the following information:
 - Q1. Select the construction class/building material of the facility
 - Q2. Select the most prominent construction material for the facility
 - Q3. Write down the amount an entity would have to pay to replace the building to be retrofitted at present - (US Dollar)
 - Q4. Check if the building was constructed before or after 1980The following questions ask about pre and post retrofitting information:
 - Q5. Write down the number of floors
 - Q6. Write down the gross floor area of the facility to be retrofitted (sq. m.)
 - Q7. Write down the height between the ground (outside of the facility), and the floor of the first level (inside the facility) - (meters)

Safety-2

- The tab will ask to complete the following information (pre and post retrofitting)
 - Q8. Write down the size of the largest window (meters-squared/m²)
 - Q9. Select the type of material of the roof
 - a) Write down the distance between the roof supports (in meters), length of the roof (in meters), roof inclination angle (please give the answer in degrees) - pictures may be used to make the estimate
 - Q10. Write down the maximum distance between columns (in meters) [the distance should be the longest of the facility, considering columns or other walls] (brick walls, not drywalls) as supports, and height of the walls (in meters) - the highest wall's value should be used
 - Q11. Provide the resistance of the connection between the structure and the roof (nails, straps, etc.). The resistance of this elements is given in force (lbf). If the information is available in kilogram-force, please use this conversion 1 lbf = 0.45 kgf.

Safety-3

- The tab asks to complete the following information (pre and post retrofitting safety component and cost estimation of each retrofitting in US Dollars)
 - Q12a. Select the safety index of the sub-structural components is the first part.
 - Q12b. Select the safety index of the super-structural components; roof, walls, windows, floor, doors
 - Q12c. Select the safety index of the structures that protect sources of electricity in emergencies (e.g., generator room)

REST Excel Application – User Guide

Q12d. Select the safety index of the structures that protects water reserves in emergencies (e.g., storage tank room)

Write down cost estimation of the associated retrofitting work for all of the above (US Dollars)

Safety-4

- The tab asks to complete the following information
 - Q13. Write the potential total number of people served by this healthcare facility (Catchment Population).
 - Q14. Select the most commonly used construction class in the catchment area (the class that best represents the majority of the residential buildings).
 - Q15. Select the fraction of constructions that can be classified as this construction class (for example, 40% are class C1).
 - Q16. Select the most common number of stories/ floors for that specific construction class.
 - Q17. Select the second most commonly used construction class in the catchment area (the class that best represents the majority of the residential buildings).
 - Q18. Select the fraction of constructions that can be classified as this construction class (for example, 40% are class C1).
 - Q19. Select the most common number of stories/ floors for that specific construction class.
 - Q20. Select the third most commonly used construction class in the catchment area (the class that best represents the majority of the residential buildings).
 - Q21. Select the fraction of constructions that can be classified as this construction class (for example, 40% are class C1).
 - Q22. Select the most common number of stories/ floors for that specific construction class.

REST Excel Application – User Guide

REST: Safety Information

Safety-1

Safety-2

Safety-3

Safety-4

Information about the healthcare facility. Please answer these questions to the best of your ability.

Q1 Select the closest construction class/building material of the healthcare facility

Q2 What is the most prominent construction material for the healthcare facility?

Q3 Replacement Value (the amount an entity would have to pay to replace the building at the present time, without equipment, according to its current worth, in the event it is destroyed or demolished). Please provide your best estimated value in United States Dollars (USD).

For adequate analysis of the facility, the following architectural and structural data is required. When answering these questions, please use meters (m) to answer for size and distance and meters-squared to answer for area.

Q4 Was the building constructed after 1980?

☒ Yes ☐ No

Pre-Retrofitting**Post-Retrofitting**

Q5 Number of Stories/Floors

Q6 Gross Floor Area (sq. m.) of the facility to be retrofitted (the total area of your building - everything inside the walls. This means plazas, parking lots and other outside areas are not included).

Q7 Please consider the floor plan of the facility. What is the height (in meters) between the ground (outside the facility) and the floor of the first level (inside the facility).

Figure 5

REST Excel Application – User Guide

REST: Safety Information ×

Safety-1 | Safety-2 | **Safety-3** | Safety-4 |

	Pre-Retrofitting	Post-Retrofitting
Q8 Please consider the windows and/or glass doors in the facility. What is the size of largest window (in meters-squared/m2)	<input type="text"/>	<input type="text"/>
Q9 Please consider the roof of the facility.		
What is the type of material of the roof?	<input type="text"/>	<input type="text"/>
Distance between the roof supports (in meters)	<input type="text"/>	<input type="text"/>
Length of the roof (in meters)	<input type="text"/>	<input type="text"/>
Roof inclination angle (please give answer in degrees) - pictures may be used to make the estimate	<input type="text"/>	<input type="text"/>
Q10 Please consider the walls in the facility.		
Maximum distance between columns (in meters). The distance should be the longest of the facility, considering columns or other walls (brick walls, not drywalls) as supports.	<input type="text"/>	<input type="text"/>
Height of the exterior walls (in meters). The highest wall's value should be used.	<input type="text"/>	<input type="text"/>
Q11 Please, provide the current pressure resistance of the roof-wall connection (in pound-force, lbf) (conversion: 1 lbf = 0.45 kgf). Please estimate using the lowest resistance known.	<input type="text"/>	<input type="text"/>

Figure 6

REST Excel Application – User Guide

REST: Safety Information

Safety-1 | Safety-2 | Safety-3 | Safety-4 |

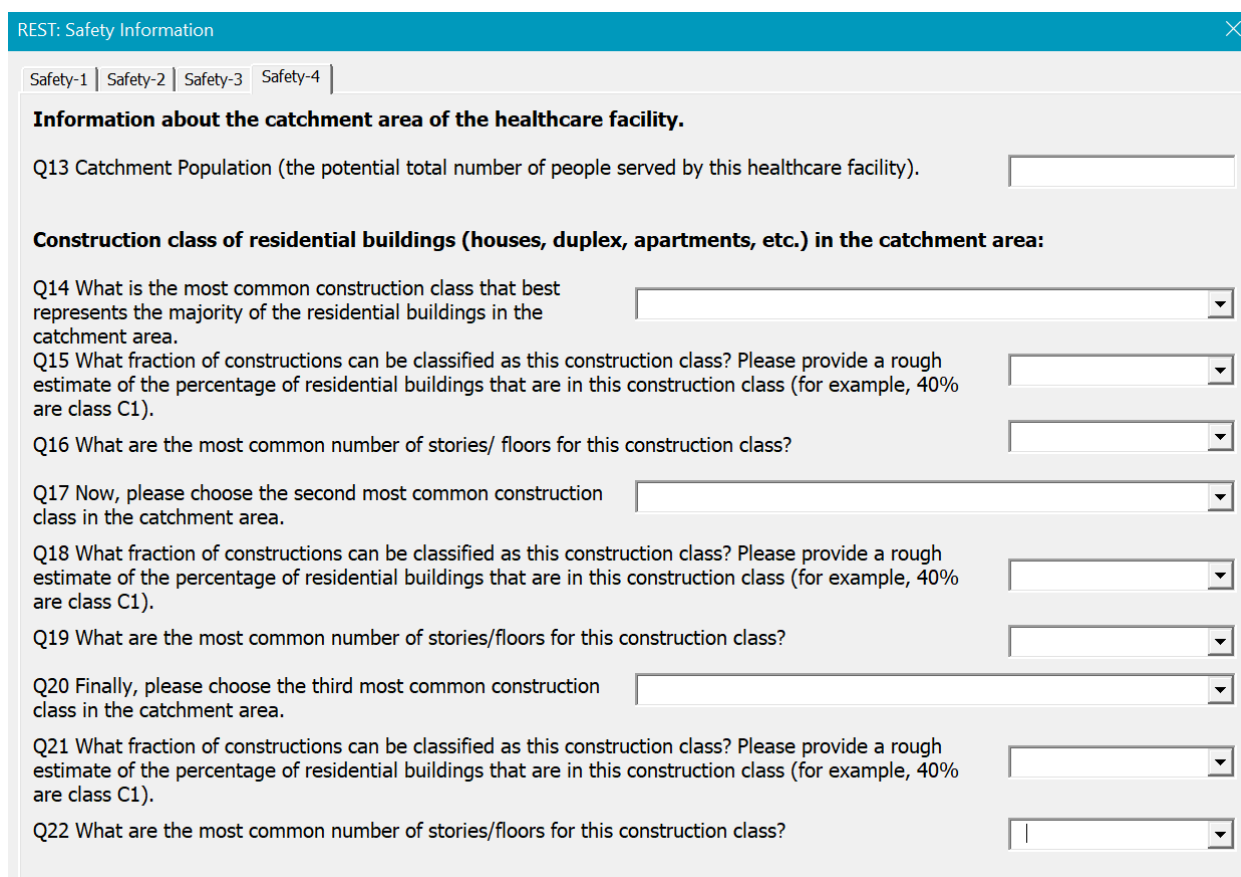
Based on the Hospital Safety Index (HSI) form you submitted before any retrofitting work (Pre-Retrofitting HSI), determine the current safety index of the following infrastructure components. Then, assess how safety will change for each component as a result of the retrofitting works (Post-Retrofitting HSI).

For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost. Please give value in United States Dollars (USD).

Q12 Projected retrofitting work to improve safety	Based on Pre-Retrofitting HSI determine the safety of each component	Based on projected retrofitting work (Post-Retrofitting) determine the safety of each	Provide an estimate of the associated retrofitting work in USD
Substructural components	<input type="text"/>	<input type="text"/>	<input type="text"/>
Superstructural components: Roof	<input type="text"/>	<input type="text"/>	<input type="text"/>
Superstructural components: Walls	<input type="text"/>	<input type="text"/>	<input type="text"/>
Superstructural components: Windows	<input type="text"/>	<input type="text"/>	<input type="text"/>
Superstructural components: Floor	<input type="text"/>	<input type="text"/>	<input type="text"/>
Superstructural components: Doors	<input type="text"/>	<input type="text"/>	<input type="text"/>
Structures that protect sources of electricity in emergency situations (e.g. generator room). Write 0 if non-existent.	<input type="text"/>	<input type="text"/>	<input type="text"/>
Structures that protects water reserves in emergency situations (e.g. storage tank room). Write 0 if non-existent.	<input type="text"/>	<input type="text"/>	<input type="text"/>

Figure 7

REST Excel Application – User Guide



The screenshot shows a window titled "REST: Safety Information" with a close button in the top right corner. Below the title bar is a tabbed interface with four tabs: "Safety-1", "Safety-2", "Safety-3", and "Safety-4". The "Safety-1" tab is selected. The main content area of the tab contains the following sections and questions:

Information about the catchment area of the healthcare facility.

Q13 Catchment Population (the potential total number of people served by this healthcare facility).

Construction class of residential buildings (houses, duplex, apartments, etc.) in the catchment area:

Q14 What is the most common construction class that best represents the majority of the residential buildings in the catchment area.

Q15 What fraction of constructions can be classified as this construction class? Please provide a rough estimate of the percentage of residential buildings that are in this construction class (for example, 40% are class C1).

Q16 What are the most common number of stories/ floors for this construction class?

Q17 Now, please choose the second most common construction class in the catchment area.

Q18 What fraction of constructions can be classified as this construction class? Please provide a rough estimate of the percentage of residential buildings that are in this construction class (for example, 40% are class C1).

Q19 What are the most common number of stories/floors for this construction class?

Q20 Finally, please choose the third most common construction class in the catchment area.

Q21 What fraction of constructions can be classified as this construction class? Please provide a rough estimate of the percentage of residential buildings that are in this construction class (for example, 40% are class C1).

Q22 What are the most common number of stories/floors for this construction class?

Figure 8

Energy

- This is a measurement of the green element of the REST model. This section requires various basic information regarding the energy utilization and saving features of the facility

Energy-1

- The tab asks to complete the following information
 - Q1. Write down the average annual consumption of electricity (kWh) and diesel (gallons) [previous 12 months]
 - Q2. Write down the average price of electricity (US Dollars/kWh) and diesel (US Dollars/gallons) [previous 12 months]

Energy-2 & 3

REST Excel Application – User Guide

- The tab asks to complete the following information for the facility's windows, roofs, HVAC, lighting, renewable energy, water heating, laundry equipment, medical equipment, and non-medical equipment:

Q3.

- Write the associated retrofitting investment cost of energy improvements (United States Dollars (USD)) - This cost of associated retrofitting work includes equipment, installation, and any other associated cost
- Write the estimated annual energy savings due to retrofitting (electricity, natural gas, diesel, and oil).
- Write the estimated annual savings (United States Dollars (USD))
- Write 0 if no investment was made for that item*

REST: Energy Information

Energy-1 | Energy-2 | Energy-3

Information about the healthcare facility. Please answer these questions to the best of your ability.

Q1 Report the average annual consumption of this facility (consider the previous 12 months)

Electricity (kWh)

Diesel (gallons)

Q2 Report the average price of energy per unit of energy in the last 12 months (in United States Dollars (USD)).

Electricity (USD/kWh)

Diesel (USD/gallons)

Figure 9

REST Excel Application – User Guide

REST: Energy Information

Energy-1
Energy-2
Energy-3

Q3 Complete the following based on estimations from technical specifications and other sources available during design stage 1. For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost.

	Associated Retrofitting Investment Cost of Energy Improvements in United States Dollars (USD). Write 0 if no investment is performed for this item.	Estimated Annual Energy Savings due to Retrofitting				Estimated Annual Savings in United States Dollars (USD)
		Electricit y (kWh)	Natural Gas (lbs)	Diesel (gallons)	Oil (gallons)	
Windows (Tinted windows reduce the amount of radiation transmitted through the glass keeping the room cooler)						ERROR - Check price
Roofs (New hip roof will provide a base for the solar panels to be mounted and will be significantly cooler than existing concrete)						
HVAC (air conditioning units will be replaced with R410a inverter units)						ERROR - Check price
Lighting (Existing lamps will be replaced with LED lamps - cost of fixtures are included)						ERROR - Check price
Renewable energy (Photovoltaic System)						ERROR - Check price

Table continues to next

Figure 10

REST Excel Application – User Guide

REST: Energy Information

Energy-1 | Energy-2 | **Energy-3**

Q3 Complete the following based on estimations from technical specifications and other sources available during design stage 1. For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost.

	Associated Retrofitting Investment Cost of Energy Improvements in United States Dollars (USD). Write 0 if no investment is performed for this item.	Estimated Annual Energy Savings due to Retrofitting				Estimated Annual Savings in United States Dollars (USD)
		Electricit y (kWh)	Natural Gas (lbs)	Diesel (gallons)	Oil (gallons)	
Water heating (Water heaters will be replaced with solar water heaters)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Laundry equipment (Washing machine will be replaced with a commercial grade energy star rated unit)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Other non-medical equipment	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	
Medical equipment (Sterilizer will be replaced with more energy and water efficient unit)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

Figure 11

REST Excel Application – User Guide

Water

- This is a measurement of the green element of the REST model. This section requires various basic information regarding the water utilization and saving features of the facility

Water-1

- The tab asks to complete the following information
 - Q1. Write down the average annual consumption of water (gallons) - previous 12 months
 - Q2. Write down the average price of water (US Dollars/gallon) - previous 12 months

Water-2 & 3

- The tab asks to complete the following information for facility's operations and medical equipment (installation of systems to medical equipment to reduce water use; repair leaks and unnecessary flows), bathrooms/restrooms (installation of systems, flow control fixtures, and other water-savings equipment in faucets, toilets, urinals, etc.; repair leaks and unnecessary flows), laundry (install wash water, rinse water or reclamation systems to reuse rinse water for wash cycle to reduce water use; repair leaks and unnecessary flows), building maintenance (install water-efficient boiler and cooling systems, cleaning systems and other building maintenance systems; repair leaks and unnecessary flows), cafeteria/food service (install water-efficient systems for pot washing, garbage disposal, etc.; repair leaks and unnecessary flows), and outdoor water use (install water-efficient hoses, irrigation/sprinkler systems, etc.; repair leaks and unnecessary flows):
 - Q3.
 - a) Write the associated retrofitting investment cost of energy improvements (United States Dollars (USD))
 - b) Write the estimated annual water savings due to retrofitting
 - c) Write the estimated annual savings (United States Dollars (USD))
 - d) *Write 0 if no investment was made for that item*

REST Excel Application – User Guide

REST: Water Information

Water-1 | Water-2 | Water-3 |

Information about the healthcare facility. Please answer these questions to the best of your ability.

Q1 Report the average annual consumption of this facility (consider the previous 12 months)

Water (gallons)

Q2 Report the average price of water per gallon in the last 12 months (in United States Dollars (USD))

Water (gallons)

Q3 Complete the following based on estimations from technical specifications and other sources available during design stage 1. Please, note that the investment cost of all water-efficient components must be included in the overall cost of facility retrofitting reported by each PAHO country supervisor. For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost.

	Associated Retrofitting Investment Cost of Water-Saving Improvements in United States Dollars (USD). Write 0 if no investment is performed for this	Estimated Annual Water Savings due to Retrofitting Water (gallons)	Estimated Annual Savings in United States Dollars (USD)
Operations and Medical Equipment (installation of systems to medical equipment to reduce water use; repair leaks and unnecessary flows)	<input type="text"/>	<input type="text"/>	

Table continues to next

Figure 12

REST Excel Application – User Guide

REST: Water Information

Water-1
Water-2
Water-3

Q3 Complete the following tables based on estimations from technical specifications and other sources available during design stage 1. Please, note that the investment cost of all water-efficient components must be included in the overall cost of facility retrofitting reported by each PAHO country supervisor. For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost.

	Associated Retrofitting Investment Cost of Water-Saving Improvements in United States Dollars (USD). Write 0 if no investment is performed for this	Estimated Annual Water Savings due to Retrofitting Water (gallons)	Estimated Annual Savings in United States Dollars (USD)
Bathrooms/Restrooms (installation of systems, flow control fixtures, and other water-savings equipment in faucets, toilets, urinals, etc.; repair leaks and unnecessary flows)	<input type="text"/>	<input type="text"/>	ERROR - Check price
Laundry (install washwater, rinsewater or reclamation systems to reuse rinsewater for wash cycle to reduce water use; repair leaks and unnecessary flows)	<input type="text"/>	<input type="text"/>	
Building Maintenance (cleaning systems and other building maintenance systems; repair leaks and unnecessary flows). Report an estimate, for example, a percentage of water savings of	<input type="text"/>	<input type="text"/>	

Table continues to next

Figure 13

REST Excel Application – User Guide

REST: Water Information

Water-1 | Water-2 | Water-3

Q3 Complete the following tables based on estimations from technical specifications and other sources available during design stage 1. Please, note that the investment cost of all water-efficient components must be included in the overall cost of facility retrofitting reported by each PAHO country supervisor. For all items that will be affected by the planned retrofitting work, please provide your best estimate of the cost. This cost of associated retrofitting work includes equipment, installation, and any other associated cost.

	Associated Retrofitting Investment Cost of Water-Saving Improvements in United States Dollars (USD). Write 0 if no investment is performed for this	Estimated Annual Water Savings due to Retrofitting Water (gallons)	Estimated Annual Savings in United States Dollars (USD)
Cafeteria/Food Service (install water-efficient systems for pot washing, garbage disposal, etc.; repair leaks and unnecessary flows)	<input type="text"/>	<input type="text"/>	
Outdoor Water Use (install water-efficient hoses, irrigation/sprinkler systems, etc.; repair leaks and	<input type="text"/>	<input type="text"/>	

Figure 14

REST Output Form

The basic information from the REST input form will be analyzed and presented in the REST output form. The results will include savings in dollars and quality-adjusted life years (QALYs) associated with retrofitting healthcare facilities. Kindly read REST Model (pg.1) for more details on CEA and QALY. It will allow for the determination of the best value for the investment.

After user completes a ‘new’ or ‘continuous’ REST input form, the user can generate REST report by clicking on ‘**Produce the REST Report**’ button. The REST report will be generated in the excel sheet (Results).

The screenshot shows the 'Retrofitting Economic Support Tool (REST)' window. The title bar is blue with the text 'Retrofitting Economic Support Tool (REST)' and a close button. The main content area has a light gray background. At the top, it says 'Input Data for REST'. Below this, there is a paragraph of instructions: 'In the following forms you will be asked to fill out information about the safety and green components of the healthcare facility evaluated for retrofitting. Please, start selecting your country and writing the facility name. Then, go to the General Information, Safety, Energy and Water buttons to complete more details about the facility.' To the right of the instructions is a logo featuring a blue house with a green roof, a palm tree, and a green leaf, with the text 'SAFE + GREEN = SMART' below it. Below the instructions, there are two input fields: 'Country' with a dropdown arrow and 'Facility Name' with a text box containing 'Add a name'. Below these fields are four buttons: 'General Information', 'Safety', 'Energy', and 'Water'. Below these buttons is a large button labeled 'Produce the REST Report'. At the bottom of the window, there are three logos: 'FIU FLORIDA INTERNATIONAL UNIVERSITY', 'UKaid from the British people', and 'Pan American Health Organization World Health Organization Americas'.

Figure 15

REST Excel Application – User Guide

Results

1. The first two lines indicate the names of the healthcare facility and country.
2. The first block shows the annual savings associated with reduced hazard-related damages in infrastructure and efficiencies in energy and water consumption due to SMART retrofitting of healthcare facility
3. The second block demonstrates the number of QALYs saved as a result of reduced injuries due to SMART retrofitting improvements in the healthcare facility.
4. The third block displays the annual cost estimation of SMART retrofitting improvements in healthcare facility
5. The last block exhibits the cost to benefit ratios

Name of Healthcare Facility	Add a name
Country	Dominica
BENEFITS measured by dollars (\$)	
Annual estimates	
Safety - Earthquake	\$43,086
Safety - Cyclone	\$149
Green - Energy	\$22,981
Green - Water	\$4,319
Total per year	\$70,534
TOTAL over 20 years (discount rate 3%)	\$1,049,373
BENEFITS measured by QALYs	
Annual estimates	
Safety - Earthquake	-261.7
Safety - Cyclone	
Total per year	-261.7
TOTAL over 20 years (discount rate 3%)	-3,894.1
COSTS measured by dollars (\$)	
Safety	\$205,300
Green - Energy	\$163,900
Green - Water	\$7,400
TOTAL costs	\$376,600
ECONOMIC EVALUATION	
ROI - Return on Investment	\$2.8
ICER - Incremental cost-effectiveness ratio	\$172.8

Interpretation of the results are represented in the following tables.

REST Excel Application – User Guide

BENEFITS measured by dollars (\$)		Description
Annual estimates		The following are estimates of the annual savings associated with reduced hazard-related damages in infrastructure and efficiencies in energy and water consumption due to SMART retrofitting improvements in the healthcare facility.
Safety - Earthquake	43086	This shows that 43,086 US dollars are expected to be saved in a year due to the SMART retrofitting, taking into consideration the likelihood of an earthquake in the geographic area where the healthcare facility is located.
Safety - Cyclone	149	This shows that 149 US dollars are expected to be saved in a year due to the SMART retrofitting, taking into consideration the likelihood of a hurricane in the geographic area where the healthcare facility is located.
Green - Energy	22981	This shows that 22,981 US dollars are expected to be saved in a year due to the SMART retrofitting, taking into consideration the gains in energy efficiency investments in the healthcare facility.
Green - Water	4319	This shows that 4319 US dollars are expected to be saved in a year due to the SMART retrofitting, taking into consideration the gains in water efficiency investments in the healthcare facility.
Total per year	70534	This shows the total amount of US dollars that are expected to be saved in a year.
TOTAL over 20 years (discount rate 3%)	1049373	This shows the total amount of US dollars that are expected to be saved over 20 years, using a discount rate of 3%.

Table 1

REST Excel Application – User Guide

BENEFITS measured by QALYs		Description
Annual estimates		The following are the number of QALYs saved as a result of reduced hazard-related injuries due to SMART retrofitting improvements in the healthcare facility.
Safety - Earthquake	-261.7	This shows that 261.7 QALYs are expected to be saved in a year due to the SMART retrofitting, taking into consideration the likelihood of an earthquake in the geographic area where the healthcare facility is located.
Safety - Cyclone		This shows that zzz.z QALYs are expected to be saved in a year due to the SMART retrofitting, taking into consideration the likelihood of a hurricane in the geographic area where the healthcare facility is located.
Total per year	-261.7	This shows the total number of QALYs that are expected to be saved in a year.
TOTAL over 20 years (discount rate 3%)	-3894.1	This shows the total number of QALYs that are expected to be saved over 20 years, using a discount rate of 3%.

Table 2

COSTS measured by dollars (\$)		Description
Safety - w/ impact	205300	This shows that \$205,300 US dollars are invested in safety retrofitting measures at the healthcare facility.
Safety - w/o impact		
Green - Energy	163900	This shows that \$163,900 US dollars are invested in energy efficiency measures at the healthcare facility.
Green - Water	7400	This shows that \$7,400 US dollars are invested in water efficiency measures at the healthcare facility.
TOTAL costs	376600	This shows the total amount of US dollars that are invested at the healthcare facility (are preferred investments)

Table 3

REST Excel Application – User Guide

COST-BENEFIT		
ROI - Return on Investment (Inc. \$Benefits/Inc. \$Cost)	3	This shows that a return of \$3 per \$1 invested in SMART retrofitting of the healthcare facility. The return on investment uses the net cost measured by US dollars, excluding QALYs associated with injuries avoided. Investments with a higher ROI have higher returns.
ICER - Incremental cost-effectiveness ratio (\$Cost - \$Benefit/QALY)	173	This shows that 1 QALY can be gained at a cost of 173 US dollars by investing in SMART retrofitting of the healthcare facility. The incremental cost-effectiveness ratio (ICER) shows the net costs paid for one QALY gained. Investments with lower ICER are more cost-effective (are preferred investments).

Table 4