SMART

Health Care Facilities Initiative

BASELINE ASSESSMENT TOOL
WORKBOOK

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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The BAT was deigned to collect information to guide the design making process for retrofitting small health care facilities in the Caribbean. It was developed as part of Phase I of the Smart Health Care Facilities in the Caribbean Project funded by UKAID and implemented by PAHO.

This workbook is designed to assist in the application of the BAT by providing a detailed explanation of all the aspects of the tool and how it should be administered.

PAHO wishes to acknowledge the team that worked to develop the content and layout for this workbook. These persons included:

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OVERVIEW

The **Baseline Assessment Tool (BAT)** is designed to collect baseline information to guide the facility's retrofitting decision-making process. It complements the Hospital Safety Index (HSI) and the Green Checklist. It also includes the compilation of detailed information needed to prepare the designs and Scope of Works for retrofitting and new construction. This process requires a level of skill and use of specialized equipment.

The elements for data collection includes the facility's energy consumption (audit), water consumption (audit), Indoor Environmental Quality (IEQ), Building Components, Occupant survey, and Land Use (local zoning regulations). The Baseline Assessment Tool consists of:

1.0 Building/Property Components (Audit)
2.0 Energy Conservation (Audit)
3.0 Water Conservation (Audit)
4.0 Indoor Environmental Quality (IEQ)
5.0 Occupant Survey
6.0 Land Use

Figure 1 SMART Process Flow Chart

Always refer to local guidelines for energy conservation, water conservation, Indoor Air Quality and Land Use. Also local regulation to guide how much solar energy can be use and traded to the local grid.

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WHEN AND HOW SHOULD THE BAT BE APPLIED?

The Baseline Assessment Tool (BAT) helps to estimate the costs and benefits of sustainable investments and determines where to focus these costs in providing the greatest "green" impact. The tool is used following the application of the Green Checklist as shown as follows:

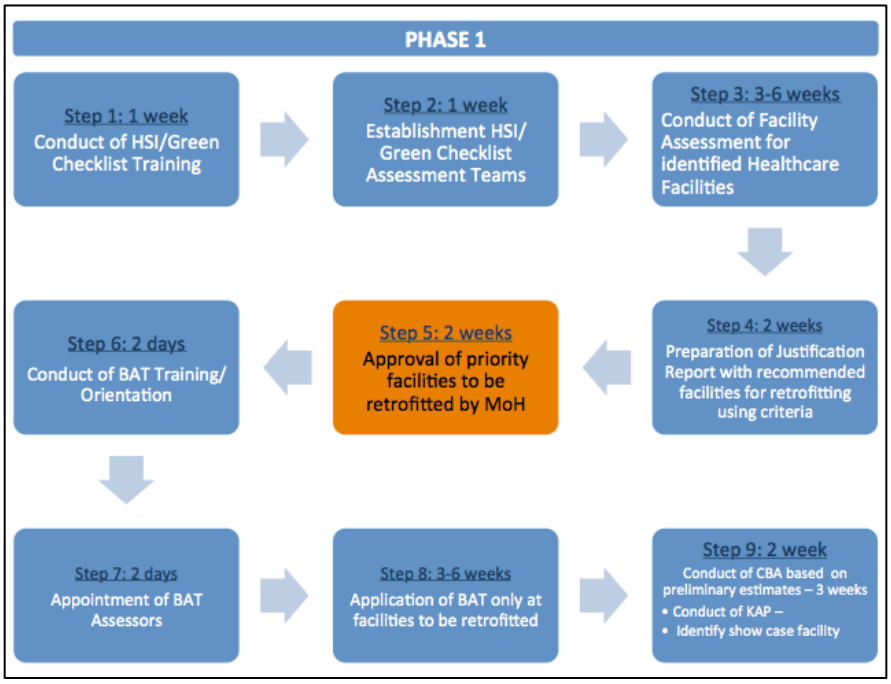


Figure 2 Baseline Assessment Tool Process Map Phase 1

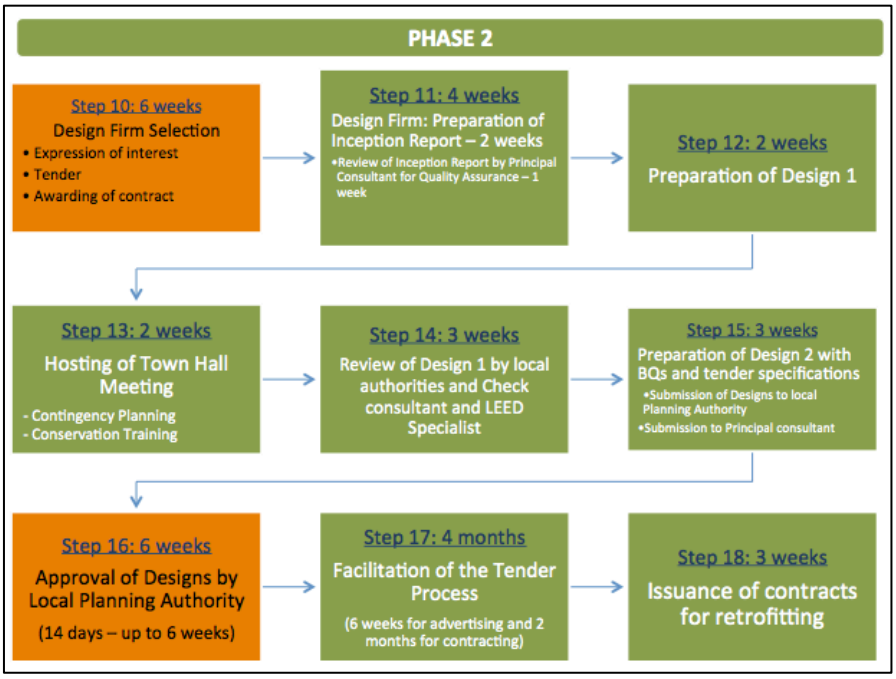


Figure 3 Baseline Assessment Tool Process Map Phase 2

The application of the BAT involves various aspects including:

- Site Visits – To observe the building during the walk-through and document the building physical characteristics, conduct interviews and collect records not previously provided during the HSI and green checklist assessments. If the HSI was not been applied, it should be noted that the BAT can also be applied without the HSI and can go along with the green checklist.

- Interviews – With the facility manager, operator, and/or key site personnel

- Records collection – Collect and compile the records necessary (energy and water consumption and costs, hours of operation, occupancy rates etc. over the previous two years (minimum. Facilities must be operating under an independent electricity and water meter

- Data capture – lighting and Carbon Dioxide levels as well as occupancy satisfaction levels etc.

- Records review and analysis – Review and analysis of records collected

- Report – Report on the findings related to building use and operating costs.

Who should apply the BAT?

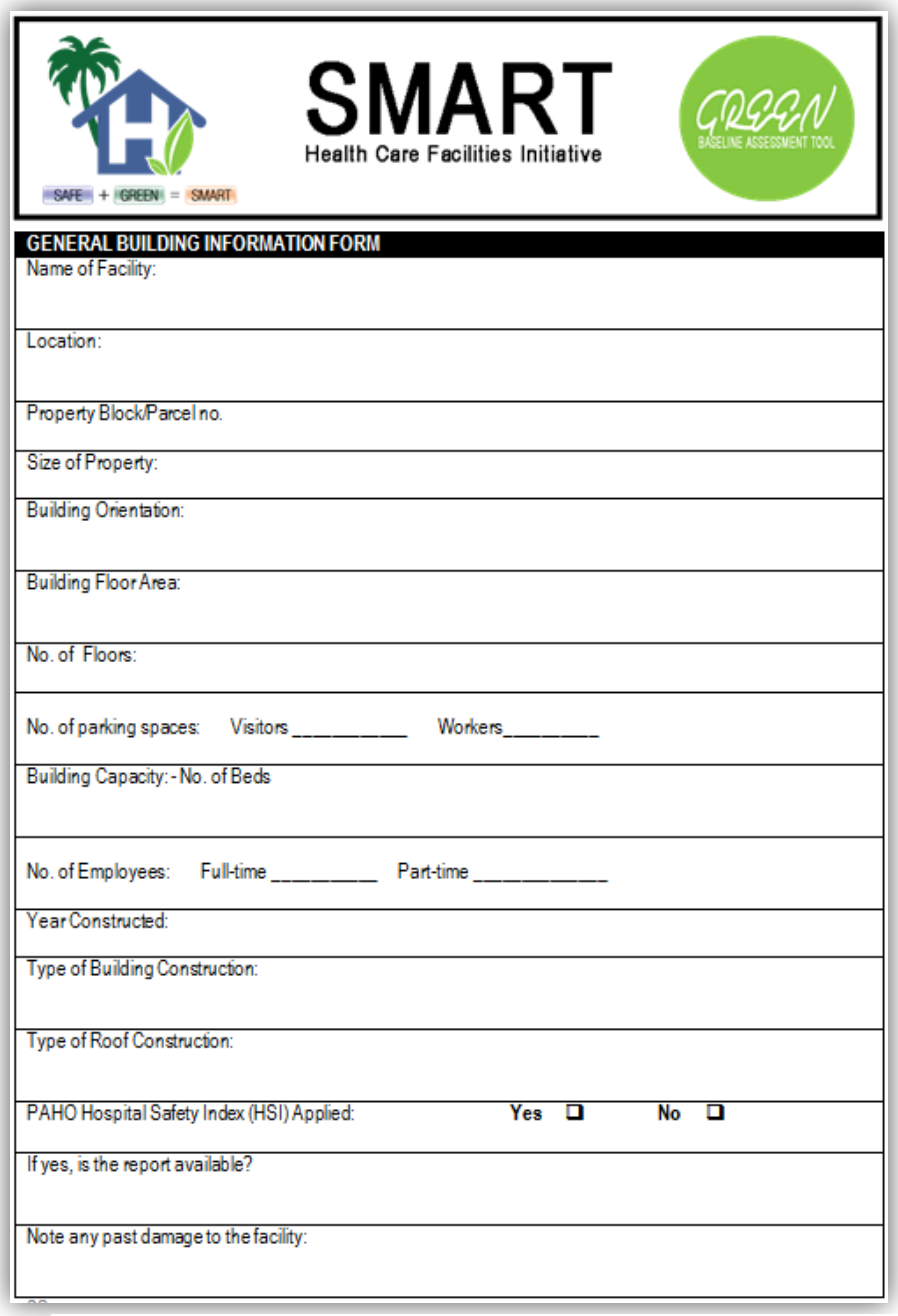
A team of experienced professionals including an electrical engineer, architect/building inspector or technician should apply the BAT and should be able to undertake appropriate calculations to determine energy and water performance assessments and savings recommendations. These individuals must able be able to capture indoor air quality data using basic tools and match the results against the standards defined in this workbook.

Section 1
BUILDING/PROPERTY COMPONENTS (AUDIT)

1.1 General Building Information

INSTRUCTIONAL NOTE: Consider examining Occupancy Certificate, Planning Approval documents, Construction designs etc. to obtain this evidence. This information is necessary in order to allow the user to undertake the calculations needed to determine:

1. Space Requirements.
2. Water Capacity using HSI Standards.
3. Compliance with local planning and building standards and codes.
4. Determine airflow, illumination, ventilation of the building.
5. What kind of use (parking, circulation, access, etc.)
6. Exterior land usage.
7. Aesthetic Requirements (more Governments are now setting standards for uniformity in state owned buildings – e.g. commonality in designs, colour, landscaping, signage).



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GENERAL BUILDING INFORMATION FORM

Name of Facility:
Location:
Property Block/Parcel no.
Size of Property:
Building Orientation:
Building Floor Area:
No. of Floors:
No. of parking spaces: Visitors _____ Workers_____
Building Capacity: - No. of Beds
No. of Employees: Full-time _____ Part-time _____
Year Constructed:
Type of Building Construction:
Type of Roof Construction:
PAHO Hospital Safety Index (HSI) Applied: Yes ❑ No ❑
If yes, is the report available?
Note any past damage to the facility:

Figure 4 - Table F1 General Building Information Form

1.2 Building/Property Component Audit

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BUILDING/PROPERTY COMPONENT AUDIT

NB. As built drawings are needed to complete this section of the BAT.
Particularly to provide information pertaining to the measurements of the foundation

Component	Systems	Quantity/ Square Area	Issues (Condition)	Additional Comments
1.0 Exterior Building Elements	1.1 Foundation/ Structure			
	1.2 Exterior Walls			
	1.3 Roof System/Drainage			
	1.4 No. of Windows			
	1.5 No. of Doors			
2.0 Interior Building Elements	2.1 Ceiling			
	2.2 Interior Walls			
	2.3 No. of Doors			
	2.4 Floors			
	2.5 Fixed Furniture/ Equipment (Built In, No. of Cupboards, No. of Cabinets)			
3.0 Safety Elements	3.1 Means of Exit			
	3.2 Fire Control			
	3.3 Fire Alarm			
	3.4 Emergency Lighting			
	3.5 Fire Resistance			
	3.6 Provisions for Handicap/ Accessibility			
	3.7 Perimeter Fencing/ Security			

INSTRUCTIONAL NOTE:
A component audit will be performed to capture critical data on various aspects of the building.

The Building Component Audit is used to produce a complete inventory of a building (including equipment) and is used to identify deficiencies and to determine the scope of works required for retrofitting. Areas to be examined include the structure, walls and roof, security and a review of safety issues.

Figure 5 - Table F2 Building /Property Component Audit

1.3 Building Assessment Guide

The purpose of this guide is to provide a set of detailed criteria to assist in the completion of the BAT and in understanding the type of information that needs to be collected. The Building/Property Component Audit is grouped into three (3) categories of building components; for example, exterior and interior building elements and safety/code compliance.

Exterior Building Elements

1.3.1 Foundation/ Structure

• Assess the foundation, columns, beams or structural walls for any signs of failure or distress such as settling, subsidence, severe cracking or crushing and document. Be sure to highlight the area of damage with photos for reference.

1.3.2 Exterior Walls

• Inspect the exterior wall surfaces (inside and outside) for any signs of water intrusion, surface cracks or separation issues. Be sure to highlight damaged areas with photos for reference.

Note: As built drawings are necessary to assess the foundation. Carefully consider colour requirement in conjunction with the owners of the facility to ensure conformity with Government local standards and or preferences.

1.3.3 Roof system /Drainage

• Inspect the roof system, flashing, downspouts, guttering and all its connections. Make note of any damage to the roofing membrane, displaced flashing, leaks and any visible cracks on any flat concrete roof sections. In addition, document the condition of all drains and culverts especially at invert locations where water enter from surface and roof run-offs.

1.3.4 Windows

• Make note of all window types, size (width x height), quantity, condition and any thermal characteristics and whether shutters or burglar bars are present. It is also important to document the existing window height from above the finish floor level. Also note if window shutters are available and if not, the quality of windows available, e.g. hurricane grade windows.

1.3.5 Doors

• Make note of all exterior door types, size (width x height), quantity, condition and direction of swing (Left Hand or Right Hand). Also document any issues affecting the operation of the doors including its hinges, jambs, locking devices and any failure of emergency devices (crash bar mechanisms).

Interior Building Elements

1.3.6 Ceiling

- Inspect the condition of the ceilings for any deficiencies or problems including soiling or discoloration by water damage or any cracks if it is an exposed concrete slab. It is important to document if the ceiling contains any hazardous materials (asbestos) or other unsafe conditions. Note if the ceiling is a drop/suspended ceiling and take its overall dimensions (Length X Width) for retrofitting purposes.

1.3.7 Interior Wall

- Document the condition of all interior walls (including any partitions) and their connections to each other. It is helpful to note that some countries have half a wall with glass in the partition walls etc.

Note: Carefully consider colour requirement in conjunction with the owners of the facility to ensure conformity with Government local standards and or preferences.

1.3.8 Interior Doors

- Make note of all exterior door types, size (width x height), quantity, condition and direction of swing (Left Hand or Right Hand). It is important to note if the doors provide any fire resistance and document any issues affecting the operation of the door including its hinges, jambs and locking mechanisms.

1.3.9 Flooring

- In addition to the HSI, it is important to document the condition of the buildings flooring and any issues relating to health and safety concerns including slipping or tripping hazards.

Note: Take note of the type of flooring, its location and corresponding square footage (length x width) for retrofitting purposes

1.3.10 Fixed Furniture /Equipment

- It is important to document fixed furniture such as countertop surfaces, and cabinets. All equipment being replaced should be well documented and categorised with recommendation for replacement (medical and non-medical type equipment).

Safety/ Code Compliance

1.3.11 Means of Exit

- Verify and document if all exit doors are easy to open and if equipped with panic bar locks and are visible with well-lighted exit signage above doors. Exit doors and exit access corridors should be well lighted with every area of the building providing at least two (2) means of exits. The width of the exit doors, staircases (two or more storey bldgs.) should be wide enough for evacuation and comply with local building codes.

1.3.12 Fire Control

- Be sure to document the availability, quantity and condition of all portable chemical fire extinguishers and any fire hoses and indicate their locations throughout the building. If

available, verify if they have been inspected by the local fire department authorities and whether they have been checked annually and certified. Verify if extinguishers are located in or close to kitchen areas. Also check to determine if fire separation walls exist for shafts and corridors. All Halon fire extinguishers in the facility should be replaced since Halon as an extinguishing agent is no longer recommended.

1.3.13 Fire Alarm

- Document the availability, quantity and condition of all smoke detectors and if any fire alarm system exists. It is ideal for the building to be equipped with a fire alarm system that is supplied with emergency backup power and smoke detectors that are connected to a permanent and visible central fire alarm panel. It is recommended for the system to be connected to the local fire department system (if applicable). A voice communication system should also be integrated in the system with a sound alarm. If a sprinkler system exists, a hydraulic operated alarm bell, actuated by the flow of sprinkler water should be present.

1.3.14 Emergency Lighting

- Verify and document the availability, quantity and condition of all emergency lighting. Be sure to test the units and verify if they meet local and international standards. The equipment should be free from dust, rust and provides adequate illumination in large areas such as corridors and exits.

1.3.15 Fire Resistance

- Concrete constructed buildings provide some level of fire resistance. If there are timber columns, walls and metal stud walls present, verify if the walls are covered with gypsum board (all sides). Also check stairs to determine if they are concrete or fire proofed steel. Note: one hour rated fire separation walls for one-storey buildings and two hour rated for two-storey buildings.

1.3.16 Provision for Accessibility

- Document if the facility has accessibility ramp requirements for the physically challenged. It is important that all levels of the building are accessible. All doorways and corridors should have adequate width and all bathrooms and showers should be equipped with grab bars and other physically challenged equipment. Also document whether there is sufficient accessibility for abulance as well as the condition of parking areas, access roadways to and from the facility as well as the existance of any platforms or sidewalks and their condition.

Note: Equipment certified by the Americans with Disabilities Act (ADA) or any other reputable Act is acceptable.

1.3.17 Perimeter Fencing/ Security

- Assess the condition and integrity of the perimeter fencing, gates and all its connections. It is essential that the facility provides some level of security and maintains control of all pedestrian and vehicular traffic entering the facility and compound. If security systems are present, document its condition and any improvements that can be made.

Note: Equipment certified by the Americans with Disabilities Act (ADA) or any other reputable Act is acceptable.

Section 2
AVAILABILITY OF GFA (GROSS FLOOR AREA)

Another key issue to be assessed is whether the allowable GFA on the particular site has increased since the building was first constructed. Zoning and density are often changed over time to allow for smart growth and to address socioeconomic trends. If more GFA is available, adding to an existing building could be explored in coordination with upgrading works. In some cases, if allowable GFA has increased significantly, there could even be a business case to tear down and rebuild rather than retrofit.

Always refer to local guidelines to determine GFA plot ratio requirements for development types.

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AVAILABILITY OF GFA (GROSS FLOOR AREA)

Description of Project	Results	Notes
No. of buildings on plot		
Maximum height of buildings:		
No. of plot(s):		
(A) Plot area:		
(B) Building area:		
(c) Total Floor area:		
Site Coverage (e.g. % of plots covered by building [B/A x 100]		
Plot ratio (divide total floor area expressed in ratio e.g. 1:07) [1:C/A]		

Figure 6 F-15 Charting Gross Floor Area

INSTRUCTIONAL NOTE:
When calculating GFA you will need a measuring tape and calculator.
S1 - Measure the length and width of the inside of the building's walls.

S2 - Multiply the length and width measurements in order to find the square footage.

S3 - Multiply the square footage times the number of floors in the building.

S4 - Subtract the square footage of any elevator shafts, lobbies (other than on the first floor), or rooms that house only equipment used for the building's operation. The result is the gross floor area. See adjacent diagram.

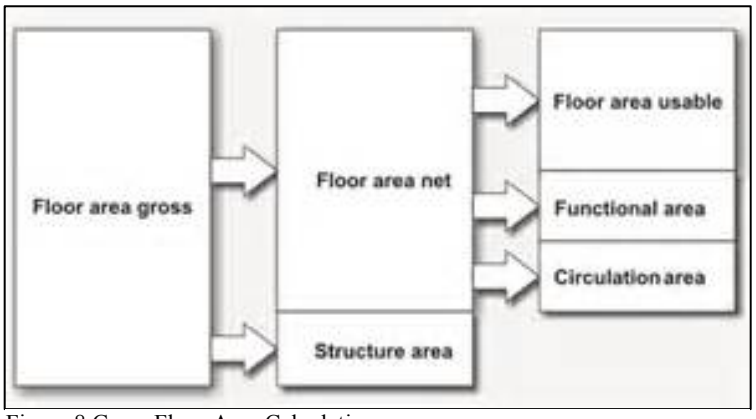
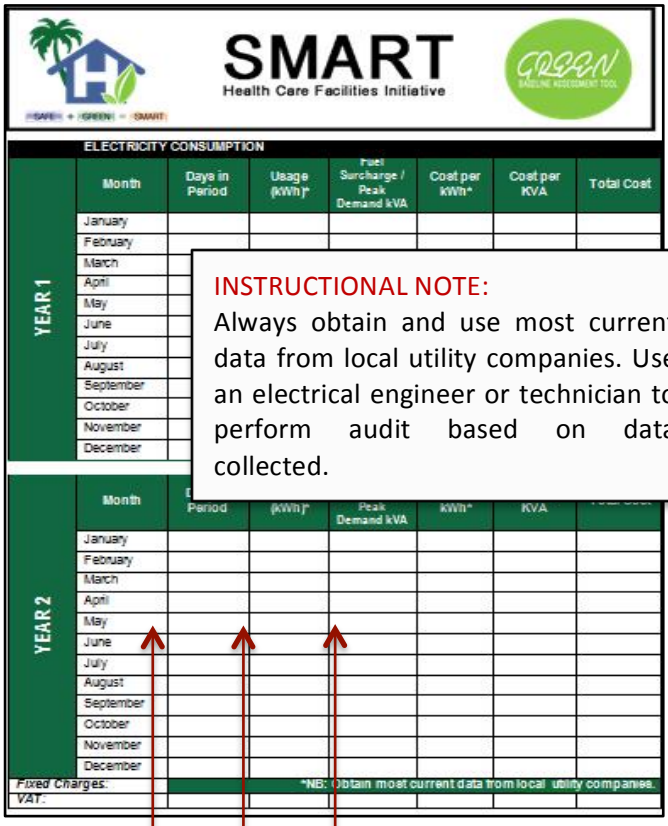


Figure 8 Gross Floor Area Calculation

Section 3
ENERGY CONSERVATION (AUDIT)

The healthcare sector is in need of cost effective solutions to address the rising cost of energy and the health implications of energy use. Once a facility has developed an energy baseline by tracking and measuring its energy use, it can begin to zero in on key areas of inefficiency and review potential energy reduction strategies with an eye for what will work given the financial resources of the organization. Improving the energy efficiency reduces energy cost, greenhouse gas emissions and pollution associated with the burning of fossil fuels. Data collected to be considered for energy audit are as follows:

a) Energy Consumption data (at least 2 years data taken from electrical bills):
b) Renewable Energy Generators, if applicable and their energy production.
c) Standby Generator specifications
d) Lighting data which includes categorization of lighting types and associated load. The forms on lighting, seen at Figures 9 and 10 identifies different lamps that are common in public buildings, if the lamp is covered by a frosted diffuser the auditor will be required to remove the cover to obtain the bulb count.
e) Air Conditioning cooling capacity, refrigerant type and energy efficiency ratios.
f) Refrigeration capacity, refrigerant type and energy consumption
g) Medical equipment energy consumption
h) Washer & Dryers capacity, consumption and energy efficient ratings
i) Water Heater type, capacity and energy efficiency
j) Miscellaneous Electric loads and phantom loads



INSTRUCTIONAL NOTE:
Always obtain and use most current data from local utility companies. Use an electrical engineer or technician to perform audit based on data collected.

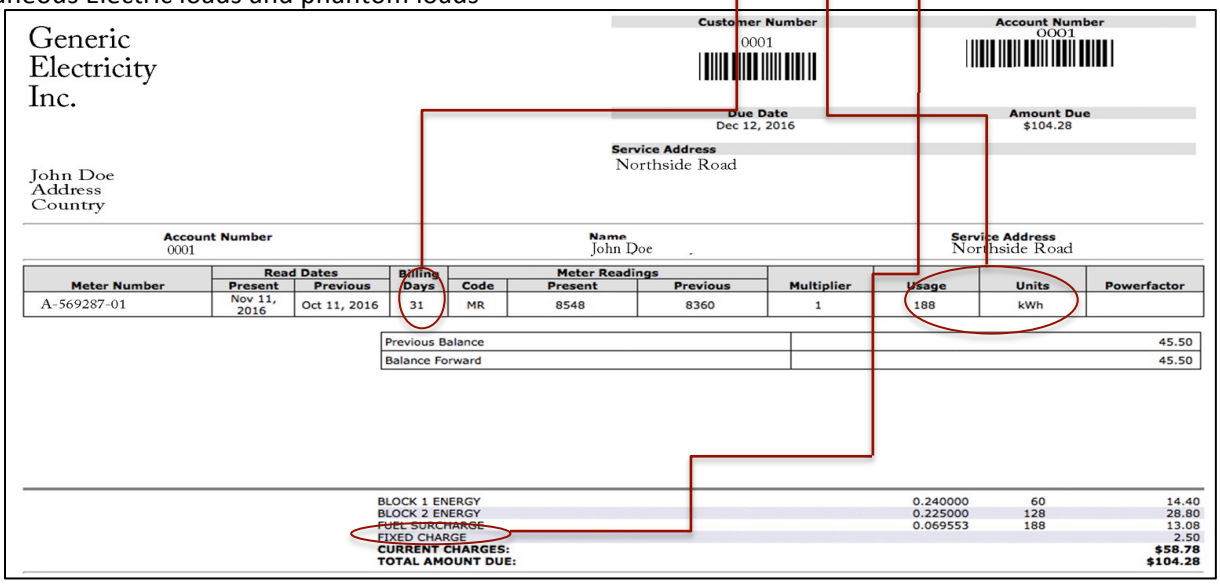


Figure 7 Sample Electrical Bill and F3 Electrical Consumption table

The utility bill can be used to determine the present consumption in Peak kVA or fuel surcharge and energy usage in kWh. Based on the Tariff structure the engineer will determine an approach to energy saving either in reduction of Peak kVA or reduction in consumption. After implementation of energy saving measures the electricity bill can be used as a tool to track how efficient the implementation process is by tracking energy usage over a period of time.

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RENEWABLE ENERGY				
Type of Technology	Grid-tied / Off Grid	Size of Battery Bank	Size of System (kW)	Annual Power Production (kWh)

INSTRUCTIONAL NOTE:
Examples of renewable energy systems include: Photovoltaic, System, wind turbines similar to Vader Piet Wind Farm Aruba seen in adjacent image.

Figure 8 Image of wind turbines and Table F4- Renewable Energy

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STANDBY GENERATOR			
Brand / Model	Power Rating (kW)	Power Rating (kVA)	Power Factor

INSTRUCTIONAL NOTE:
Fill in the information based on what presently exist, if any. Also note the size of any fuel storage. The fuel type can be determined from the model number. An example of a stand-by generator is seen in the adjacent image.

Figure 9 - F5- Standby Generator

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LIGHTING

Fluorescent Tubes

LOCATION	Number of Fixtures	Lamp Wattage	Ballast Type	Number of Lamps per Fixture	Fixture Wattage	Ballast Power	Total Power KW	Hours / Month	Energy Usage KWHr

LED Tubes

LOCATION	Number of Fixtures	Lamp Wattage	Number of Lamps / Fixture	Fixture Wattage	Total Power KW	Hours/ Month	Energy Usage kWh	Remarks

Figure 10 F6- Lighting (Fluorescent and Led Tubes)

INSTRUCTIONAL NOTE:
Information included in this form must be supported by 'As-Built' drawings. Consider the following formula for use *(No. of bulbs X wattage X hours per week). If the as build drawings con not be found then a floor plan should be completed)*

Examples of the lighting systems include fluorescent tubes seen in the adjacent image, and LED Tubes as seen below. Give specs

Ballast type can be determined using a ballast checker.

LIGHTING				
				Compact Fluorescent Lamp (CFL)
Location & Remarks	Base Type	Quantity	Wattage	Hours per Week
				LED Lamp
Location & Remarks	Base Type	Quantity	Wattage	Hours per Week
				Incandescent Bulb
Location & Remarks	Base Type	Quantity	Wattage	Hours per Week
				Halogen Lamp
Location & Remarks	Base Type	Quantity	Wattage	Hours per Week
				High Pressure Sodium (HPS) Lamp
Location & Remarks	Base Type	Quantity	Wattage	Hours per Week





Figure 11 F7- Lighting (other)

INSTRUCTIONAL NOTE: Information included in this form must be supported by 'As-Built' drawings. Consider the following formula for use *(No. of bulbs X wattage X hours per week).* Examples of the various bulbs are included in the adjacent table sections.

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AIR-CONDITIONING

Location & Remarks	Quantity	Type	Model	Thermostat Setting (Celsius / Fahrenheit)	Cooling Capacity		Electrical Power (W)	Refrigerant	Efficiency			Hours per Week
					WATTS	British Thermal Units (BTU)			EER	COP	SEER	

NOTES.
Model: AC Brand / Model - Can be used to determine Capacity & Power if it is not shown on the unit
EER: Energy Efficiency Ratio
SEER: Seasonal Energy Efficiency Ratio
COP: Coefficient of Performance

INSTRUCTIONAL NOTE:
Model: AC Brand / Model - Can be used to determine Capacity and Power if it is not shown on the unit

EER: Energy Efficiency Ratio

COP: Coefficient of Performance

Figure 12 F8- Air-conditioning

Note: The brand and the model number are printed on the unit. Some units carry consumption information on the indoor and outdoor unit e.g. Westinghouse, auditors are asked to note that information should therefore be collected from both units and note which units are inverter in the remarks section.

Indoor unit label

Figure 13 Examples of Inverter Air Conditioner

Note: Inverter units are usually labelled inverter on the indoor unit. The refrigerant type, consumption and energy consumption ratios can be seen on the label located on the side of the indoor unit.

REFRIGERATION									
Location & Remarks	Quantity	Model	Capacity Cu. ft	Voltage (V)	Amps (A)	Power (W)	Temperature Setting (Hi/Med/Lo)	Refrigerant	Year

Figure 14 F9- Refrigeration

MEDICAL EQUIPMENT					
Equipment Name	Model	Voltage (V)	Amps (A)	Power (W)	Hours per Week

Figure 15 F10- Medical Equipment Form and sample equipment information labels.

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WASHERS							
QTY	TYPE Front Load / Top Load / Washer	Manufacturer/ Model	Capacity/kgs	VOLTAGE	AMPERAGE	POWER	YEAR

Figure 16 F11 Form for washer/dryer appliance data

DRYERS							
QTY	TYPE Gas / Electrical	Manufacturer/ Model	Capacity/kgs	VOLTAGE	AMPERAGE	POWER	YEAR

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WATER HEATERS										
Location & Remarks	Quantity	Type	Tank / Tankless	Model	Capacity (Gal.)	Gallons Per Minute (GPM)	Voltage (V)	Amps (A)	Power (W)	Energy Factor (EF)

Figure 17 F12 Energy Consumption charts for Water Heaters

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MISCELLANEOUS ELECTRICAL LOADS							
Location & Remarks	Quantity	Name of Appliance	Model	Voltage (V)	Amps (A)	Power (W)	Hours Per Week

Figure 18 F13 Energy consumption chart for Miscellaneous Electrical Loads

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Section 4
WATER CONSERVATION (AUDIT)

The water conservation audit is designed to help analyze water use in the selected health facility. Some items may not apply to all facilities.

4.1 Background

Local water provider: _____ _____ ____
Where does your water come from? _____
Number of buildings at facility: _____ Size of buildings (area): _____
Area of grounds: _____ Number of employees per shift: _____
Number of shifts per day: _____
Average number of visitors/occupants per day (if applicable): _____
Water pressure at your facility: _____ (psi)

Conservation Note: Often reducing water pressure by merely 10 or 15 percent can reduce water consumption significantly without interfering in daily consumption activities. Water pressure that is too high can result in leaks.

4.2 Water Catchment/ Treatment

Are there any underground cisterns onsite? ❑ Yes ❑ No
If yes, what is the capacity? **(LxWxD) x 7.48** Gallons: _____ (Dimensions taken in feet,1cu ft = 7.48 galls)
Are there any water storage tanks onsite? ❑ Yes ❑ No
If yes, what is the capacity? Gallons: _____
How are the storage tanks/ cisterns filled? ❑ Rainwater ❑ Portable
Is the water being treated before use? ❑ Yes ❑ No
If yes, how is this being done? _____

4.3. Sewage Treatment

Type of sewage system: ❑ Underground septic tank ❑ Treatment Plant ❑ Public Sewer
What is the capacity? **(LxWxD) x 7.48** Gallons: _____ No. of buildings served? _____

4.4 Utility/Consumption Data

NOTE: Auditors are encouraged to note if a meter serves two (2) or more buildings.

Water meter/s (utility meters):

	Meter #	Size of Mains	Area serving	Annual water consumption
Meter	_____	_____	_____	_____
Meter	_____	_____	_____	_____

Monthly consumption (Year 1)

Jan _____ Feb _____ March _____ April _____ May _____ June _____
July _____ Aug _____ Sept _____ Oct _____ Nov _____ Dec _____

Monthly consumption (Year 2)

Jan _____ Feb _____ March _____ April _____ May _____ June _____
July _____Aug _____ Sept _____ Oct _____ Nov _____ Dec _____

4.5 Water Consumption

Number of restrooms: _____Number of Water Closets (total): _____
Type: Flush Tank /Flush Valve
Number of Water Closets Flush Tanks Type _____
Number of Water Closets Flush Valve Type _____
Number of Water Closets for disabled people _____
Are fixtures ADA Compliant? _____

Note: Many fixtures have the average flow rate printed on the fixture itself, along with the make and model. If you cannot find this printed information, consult your maintenance staff or facility manager.

4.5.1 Water Closets/Urinals

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WATER CLOSETS /URINALS				
Water Closet /Urinal type	Quantity	Flush Rate	Location	Condition

Are urinals equipped with automatic water-flushing systems? ❑ Yes ❑ No
If so, what is the timing cycle? _____
Are the sensors/timers coordinated with regular work hours? ❑ Yes ❑ No

Figure 19 - F 14 Charting water consumption for Water Closets and Urinals

CONSERVATION NOTE:
Most toilets are either gravity flush, flush valve/ flush-o-meter/ tank-less, or pressurized tank types. Older toilets, an average flush uses about 3.6 gallons (13.6 liters), and the daily use is 18.8 gallons (71.2 liters) per person per day. Ultra-low-flow (ULF) toilets, have an average flush volume of 1.6 gallons (6 liters), the daily use is 9.1 gallons (34.4 liters) per person per day.

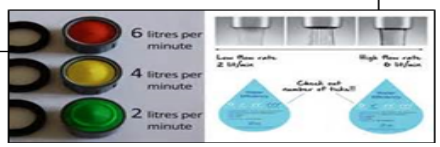

Figure 7 Demonstration of Flow rate data collection

4.5.2 Restroom Faucets (Lavatory Basins)

Number of restroom faucets (total): _____ Condition: _____
Are faucets equipped with aerators? ☐ Yes ☐ No
Are faucets equipped with automatic or metered shutoff mechanisms? ☐ Yes ☐ No

4.5.3 Showers

Number of showers (total): _____
Condition: _____

4.5.4 Fountains

Number of drinking fountains: _____ Condition: _____
Are fountains ❑ refrigerated or ❑ non refrigerated? ❑ wheel chair accessible?

4.5.5 Summary (Plumbing Fixture Count Form)

The listing of plumbing fixtures should be summarized in the attached "Fixture Count Form" '
The data collection should pay attention to the following:

- Types of Water Closets Flush Valve or Flush Tanks
- Peak periods of use
- Estimated number of hours per day fixtures are in use e.g. Number of clinics per week, estimated quantity of patients per week.

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4.5.5 Kitchens/Cafeterias

Number of kitchen/Cafeteria areas: _____
Number of meals prepared per day _____
Number of kitchen sinks/ faucets: _____ Condition: _____
Are kitchen faucets equipped with aerators? ❑ Yes ❑ No
Do refrigerators use water coolant systems? ❑ Yes ❑ No
Are refrigerators equipped with icemakers? ❑ Yes ❑ No
Do refrigerators provide drinking water? ❑ Yes ❑ No ***If YES***, is the water filtered ❑ Yes ❑ No
Do kitchens use: ❑ garbage disposals ❑ composting ❑ neither
Is there a dishwasher? ❑ Yes ❑ No
Number of dishwashers: _____ Make & Model: _____
Average number of loads per day: _____ Water consumption per load: _____ (gpm)
Are dishes pre-washed? ❑ Yes ❑ No
Is potable water used for pre-washing dishes? ❑ Yes ❑ No
Is dishwasher wastewater reused? ❑ Yes ❑ No

An example of Water Consump-tion per load available on fixtures
https://water.usgs.gov/edu/qa-home-percapita.html

Does the flow of water to the garbage disposal stop when the disposal motor stops? ❑ Yes ❑ No
(Many disposals have two water-supply lines, one to the bowl and one to the grinding chamber. Check both.)
Are there grease traps available at the facility? ❑ Yes ❑ No How often is it maintained _____
Make & Model: _____ Condition: _____
Are there any ice machines? ❑ Yes ❑ No ***If YES*** _____ # ❑ air-cooled or _____ # ❑ water-cooled?
Are kitchen floors hosed clean? ❑Yes ❑ No How often? _____
Are hoses equipped with high-pressure, water efficient nozzles? ❑ Yes ❑ No

4.5.6 Laundry Consumption

Are linens washed on-site? ❑ Yes ❑ No Number of days per week _____
Number of staff _____
Number of shifts _____
Number of washing machines _____
Types of washing machines
Front Load _____ Top Load _____ Washer Extractor _____
Number of pounds of laundry processed per day _____
Is hot water supplied to the Laundry? _____
Source of hot water: Boiler _____ Electric Water Heater _____, Gas Water Heater _____
Are there hot water storage tanks? _____
Hot water storage capacity _____ Galls
Where is the Laundry Wastewater sent to? _____

4.5.6 Laboratory Consumption

Number of Labs (total in facility): ____
Number of sinks/ faucets: _____ Condition: _____
Are faucets equipped with aerators? ❑ Yes ❑ No
List lab equipment that uses water in any way:

Equipment	Amount used	Closed-loop?	Potable? or Re-used?
_____	_____	❑ Y ❑ N	_____
_____	_____	❑ Y ❑ N	_____

Describe lab procedural/clean-up practices that consume water.

_____

_____

_____

Are procedures and clean-up practices posted in the lab? ❑ Yes ❑ No

4.5.7 Mechanical Consumption

Number of water heater(s): _____ Size: _____ Location:_____ Condition: _____

Are water softeners in use? ❑ Yes ❑ No Number: _____ Location:_____

Condition:_____

Is softener regeneration automated? _____❑ Yes ❑ No ___

If automatic regeneration, is it initiated by: time meter sensor

Are cooling towers in use at your facility? ❑ Yes ❑ No Number: _____

***Note**:* For each cooling tower, approximate how much make-up water is needed or used to replace water lost to evaporation, and losses from pump packing and other process inefficiencies.

Are boilers in use at your facility? ❑ Yes ❑ No Number: _____ Condition: _____

Note: For each boiler, approximate how much make-up water is needed or used to replace water lost to blow-down, evaporation, and other process inefficiencies. Check settings for level of total dissolved solids (TDS) at blow-down and frequency.

Are water-cooled air compressors in use? ❑ Yes ❑ No

Are water-cooled pumps in use? ❑ Yes ❑ No

List any other machines that use non-contact cooling water:_____

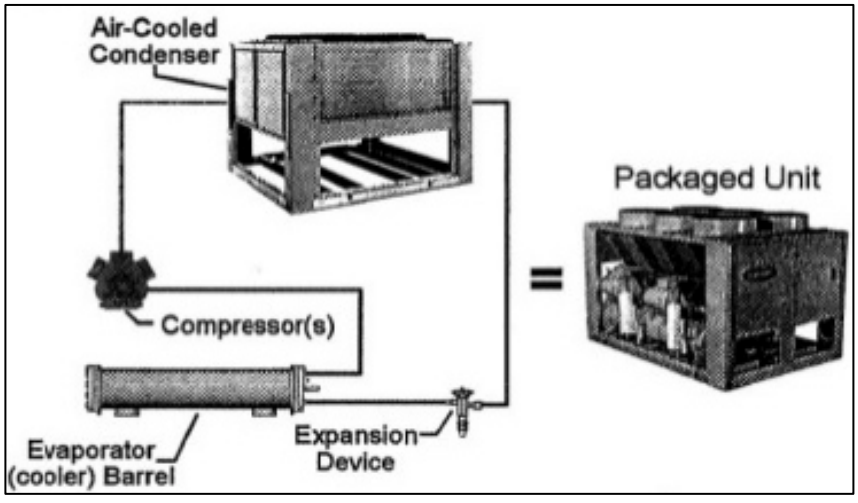
4.5.8 Heating, Ventilating and Air Conditioning (HVAC) Consumption

What type of HVAC system do you have? _____

Does your HVAC system have condensate collection and/or re-use? ❑ Yes ❑ No

Is your HVAC system always on? ❑ Yes ❑ No

Is your HVAC system ❑ air-cooled or ❑ water-cooled? If water-cooled, is your system ❑ open loop or ❑ closed-loop?



Note: There are several major heating, ventilating and air conditioning (HVAC) system types in use, for example Central Chilled water systems, Split AC systems, Packaged AC Systems and window units. The above image provides an illustration of an air-cooled chiller.

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4.5.9 Cleaning Use

Motor Pool: Number of vehicles: _____ where are they washed? _____ How frequently? _____
Number of watercraft: _____ Where are they washed? _____ How frequently? _____
Are hoses used? ❑ Yes ❑ No
Are hoses equipped with fine-spray/high-pressure/water-efficient nozzles? ❑ Yes ❑ No
Are dry-clean (rather than wet-clean) practices and procedures in place? (i.e. sweep instead of hosing, scrape before spraying, etc.) ❑ Yes ❑ No
Are windows washed on a regular basis? ❑ Yes ❑ No How often? _____
Are sidewalks and outside walls pressure-washed on a regular basis? ❑ Yes ❑ No
How often? _____

4.5.10 Janitorial Use

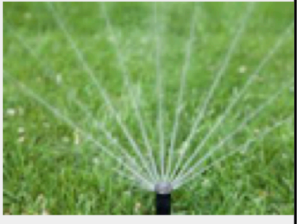
Are janitorial staff aware of water conservation efforts? ❑ Yes ❑ No
Are there areas that janitors mop? ❑ Yes ❑ No Where: _____
Area mopped (ft2): _____ How often? _____ Are hoses used? ❑ Yes ❑ No
Are dry-clean (rather than wet-clean) practices and procedures in place? (i.e. sweep instead of hosing, scrape before spraying, etc.) ❑ Yes ❑ No
List other janitorial practices that consume water.

Task	Where	How often	Average water used
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4.5.11 Landscaping Consumption

Does your landscape use mulch? ❑ Yes ❑ No
Does your facility have an irrigation system? ❑ Yes ❑ No Type: _____
Where does the system irrigate? _____ How often? _____
Is there a rain gauge incorporated in your system? ❑ Yes ❑ No
Are there manual override controls for your system? ❑ Yes No
Are hoses used for irrigation? ❑ Yes ❑ No
Are hoses equipped with fine-spray/high-pressure/water-efficient nozzles? ❑ Yes ❑ No
Does your facility have any pools or fountains? ❑ Yes ❑ No Number: ___ Capacity _____
When are fountains running? _____ Typical water consumption? _____
Do fountains use recycled water? ❑ Yes ❑ No
Are they part of a closed-loop system? ❑ Yes ❑ No
Are paved areas ❑ swept clean ❑ blown clean or ❑ hosed?

CONSERVATION NOTE: Monitor and record landscaping average consumption levels. For example, hoses and nozzles uses in sprinkler systems as seen below. Consider using rain harvesting and the use of water tanks to further conserve water.



4.5.12 Maintenance

Are faucets, pipes and plumbing checked regularly for leaks? ❑ Yes ❑ No How often? _____

Is there regularly scheduled preventive maintenance in your facility? ❑ Yes ❑ No

Is maintenance documented with standard records or inspection logs? ❑ Yes ❑ No

If you contract with a maintenance company: How quickly does maintenance staff respond and repair leaks?

_____

If you control your own maintenance program: How do you handle reporting and repair of leaks?

_____

How quickly are leaks usually repaired? _____

Section 5
INDOOR ENVIRONMENTAL QUALITY (AUDIT)

Indoor environmental quality (IEQ) refers to the quality of a building's interior environment in relation to the health and wellbeing of those who occupy space within it. IEQ is determined by many factors, including lighting, air quality, ventilation and humidity/damp conditions. Some existing health care facilities have a poor indoor environmental and/or air quality (IEQ/IAQ). IEQ encompasses thermal comfort, humidity, ventilation, lighting and noise levels. An ideal indoor environment in terms of occupants' health, comfort, safety and satisfaction is an important consideration when assessing indoor environmental quality.

5.1 Lighting Levels[1]

The outdoor light level is approximately 107,527 lux on brightest sunlight which may cause eye pain to about 400 lux at sunrise or sunset on a clear day. In the building, in the area closest to windows, the light level may be reduced to approximately 1,000 lux. In the middle area it may be as low as 25 - 50 lux. Additional lighting equipment is often necessary to compensate for the low levels.

Earlier, it was common with light levels in the range 500 - 1000 lux for normal activities. In recent years the National Renewable Energy Laboratory (US Department of Energy) in Association with the IESNA and ASHRAE has provided more stringent guidelines with respect to recommended lighting levels and Lighting Power densities for various types of buildings. Today the recommended lighting levels have been reduced in instances where environmental quality standards are not compromised, light level is more common in the range 400 - 750 lux - depending on activity. For precision and detailed works, the light level may even approach 1000 - 1500 lux.
The table below is guidance for recommended light level in different work spaces:

HOSPITALS

Area- Activities	**Type of Work**	**Recommended Lux – (Minimum)**
Doctors' offices	General lighting	500 (400)
Critical Care Examination	Working table	500
Waiting areas for reading		300
Bathrooms	General	200 – (100)
Examination Rooms	General	500
Library Reading Areas		500 – (400)
Treatment Cubicles	General	300
Outpatient Clinic	General	500
Corridors –Nursing Areas		150
Kitchen		500
Laboratory	Specimen Collection	500
Occupational Therapy	(Working table)	500
Operating room	(General)	500 – (500)
	Operating Table task lighting	10000 – (3000)
	(X-ray suite) adjustable lighting	0 – 100 – (0 – 50)
Dentistry	(General)	300
	(Chair)	10000 – (3000)
Maternity ward	Birthing Room	1000
	(Deliver area) general	10000 – (3000)

INSTRUCTIONAL NOTE: Equipment needed to test lighting levels include: LUX Meter, which measures light intensity. The lux (symbol: lx) is the SI unit of luminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square metre.

In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface.

Lux Metre is seen in the image below.

[1] Reference Illumination Engineering Society of North American, IES(NA) Lighting Handbook, Ninth Edition

Post Delivery		500
Patient rooms	(General)	150
(Localized lighting: beds)		500

5.2 Humidity and Temperature Levels

Correct humidity is essential to patient health, staff comfort and prevention of electrostatic damage to medical equipment. The medical industry goal is to treat the injured or ill in a safe and comfortable environment. Hospital staff must also have a comfortable environment, so they are at their best in order to perform proper diagnosis and treatment.

ASHRAE /ANSI Standard 170-2008 has published guidelines for environmental conditions in hospital areas. This includes the requirements to ensure that there is adequate fresh air supply to the area and also there are adequate air changes to ensure that the build-up of Carbon dioxide is prevented.

Hospitals also have various rooms with various purposes. They range from waiting rooms to intensive care units, x-ray facilities and surgery rooms. All of these types of rooms require a degree of air quality which includes specific requirements for humidity. Deviations from the mid-range of relative humidity (RH) of 40-60% can reduce air quality by causing an increased growth of bacteria, airborne infection, sore eyes, sore throat, increased static and dust, and premature coagulation. It is recommended that hospitals should be kept at temperature and humidity levels as per the following chart:

Hospital Areas	Temp (°F)	Humidity	OACH	TACH
Delivery Room	68-75 F	20-60 %	4	20
Treatment Rooms	70-75F	20-60 %	2	
6				
Triage	70-75F	Max 60 %	2	
12				
Radiology Waiting	70-75 F	Max 60 %	2	
12				
Toilet	NR	NR		
10				
Laboratory	70-75F	NR	2	
6				
Examination Room	70-75F	Max 60%	2	
6				

OACH- Outside Air Changes per Hour
TACH- Total Air Changes per Hour

INSTRUCTIONAL NOTE:
The air humidity meter can measure relative air humidity, temperature, and CO2 levels. If the humidity is too high, mould might occur on the walls or on the roof. This means a health risk for everyone in that environment.
Air Humidity Meter as seen below:

5.3 Carbon Dioxide (CO2 Levels)

Since Carbon Dioxide (CO2) is exhaled by people at predictable levels, its content in the air may be a significant indication of air quality. A measure of CO2 indicates the amount of fresh air supply; 15 cfm ventilation rate per occupant corresponds to 1000 ppm CO2 and 20 cfm ventilation rate per occupant corresponds to 800 ppm C02.

The Carbon Dioxide (CO2) standard levels (recommended in ASHRAE Standard 62-1 1989) Ventilation for Acceptable Indoor Air Quality is as follows:

- Classrooms and conference rooms 15 cfm per occupant
- Office space and restaurants 20 cfm per occupant

- Hospitals 25 cfm per occupant

The referenced CO2 levels are as follows:

- **350 – 450 ppm** : – Background (normal) outdoor air level
- **Less than 600 ppm** : - Acceptable levels
- **600 – 1,000 ppm**: - Complaints of stiffness and odors
  - **1,000 ppm** :- recommended ASHRAE[2] and OSHA[3] standards (CO2 concentration at this level should not exceed 1,000 ppm)
  - **1,000 – 2,000 ppm**: - Level associated with complaints of drowsiness and poo air.
  - **2,000 – 5,000 ppm**: - Level associated with headaches, sleepiness, and stagnant, stale and stuffy air. Adverse health effects expected.
  - **Greater than 5,000 ppm**: - Exposure may lead to serious oxygen deprivation resulting in permanent brain damage, coma and even death.

**ppm – Parts per million; cfm – cubic feet per minute*

INSTRUCTIONS: Use 'red' text colour if readings are below acceptable levels. Use 'Black' text colour if readings are acceptable.

Room Name/type	Light levels		Humidity levels		Carbon Dioxide	Issues /Condition
	Existing Lux	Recommended Lux	Temp. Deg. F	Relative Humidity	Levels (ppm)	
[BUILDING NAME]						
[Room/ specific area]	[insert reading in red or black]		[insert reading]	[insert reading]	[insert reading]	
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[BUILDING NAME]						
[Room/ specific area]	[insert reading in red or black]		[insert reading]	[insert reading]	[insert reading]	
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						
[Room/ specific area]						

Figure 20 - IEQ form sample

[2] ASHRAE, stands for the American Society of Heating, Refrigerating and Air-Conditioning Engineers

[3] OSHA is the United States Department of Labour Occupational Safety and Health Administration

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Section 6
OCCUPANT SURVEY

Occupant surveys are highly effective as a way to judge the current performance of a building. After all, the occupants are the people who spend the most time in the building. An occupant survey will highlight any day-to-day building performance that falls below tenants' expectations and can also highlight thermal comfort, noise, glare, transport and other operational issues.

6.1 PATIENT/STAFF OCCUPANCY SATISFACTION SURVEY

1. In which country do you live?
   Name of Country: _____

2. Please identify your relationship to the facility
   ☐ Employee ☐ Visitor ☐ Patient
   ☐ Other (please specify) _____

3. Do you understand the concept of "greening" buildings?
   ☐ Yes ☐ No ☐ Not sure

4. Which of the following renewable energy sources do you know about?
   ☐ Solar ☐ Wind Energy ☐ None
   ☐ Geothermal ☐ Bio Energy

5. Do you give consideration to energy and water conservation in your normal functions?

_____

_____

_____

6. On an average, how much time do you spend at the facility in one week?
   ☐ Less than 40 hours ☐ More than 40 hours ☐ Not sure

7. How do you get to the facility?
   ☐ Walk ☐ Private Vehicle ☐ Public Transport
   ☐ Other (please specify) _____

8. Approximately how many miles is the drive to the facility?

_____

_____

_____

9. If you use a vehicle or public transportation to get to the facility, please provide some details about the vehicle.
   ☐ Make of vehicle _____ ☐ Model of vehicle _____
   ☐ Year_____ ☐ Not sure_____

INSTRUCTIONAL NOTE:
To be effective, the audit will be carried out in a highly structured manner so that the results can allow comparison with a well-established, benchmarked database of criteria. In order to assess if the conditions at the facility is contributing to illness, absenteeism or a high turnover rate, the following information is required. These questions may be revisited once the project is complete and workers have had a chance to use the facility for some time to determine the changes made had any impact on work conditions and indoor environmental quality (lighting, air quality, damp conditions).

10. How satisfied are you with the lighting (in the facility)?

_____

_____

_____

11. Does the lighting affect your ability to function normally?

☐ Yes ☐ No ☐ Not sure

12. Can you point out specific problems with the lighting?

	No problem	Problems	Not sure
Glare	☐	☐	☐
Reflections	☐	☐	☐
Direct Sunlight	☐	☐	☐
Faulty fixtures	☐	☐	☐

Other (please specify) _____

13. Overall does the air quality enhance or interfere with your ability to function normally?

☐ Enhance ☐ Interfere ☐ Not Sure

14. How satisfied are you with the air quality (i.e. stuffy/stale air, odour) at the facility?

☐ Very satisfied ☐ Moderately satisfied ☐ Not satisfied

☐ Not sure/prefer not to answer

15. Does direct sunlight enter any of the windows and doors?

☐ Yes ☐ No ☐ Not sure

16. Does the **temperature** of the facility affect your ability to function normally?

☐ Yes ☐ No ☐ Not sure

17. Does the **ventilation (movement of air)** of the facility affect your ability to function normally?

☐ Yes ☐ No ☐ Not sure

18. In your opinion is the building (facility) strong/safe?

☐ Yes ☐ No ☐ Not sure

19. Would you feel comfortable in the building during a tropical storm or hurricane?

☐ Yes ☐ No ☐ Not sure

20. What improvements would you like to see to the building?

☐ Better lighting ☐ Operable windows ☐ Operable doors

☐ Air conditioning ☐ Reliable electricity ☐ Reliable water supply

Other (please specify) _____

Section 7
REFERENCES

American Society for Healthcare Engineering of the American Hospital Association, (2010). *Briefing for CMS on Reduction of Low-Level Humidity in Short-Term Patient Care Areas*, American Society for Healthcare Engineering of the American Hospital Association, Chicago, IL.

ASHRAE/ANSI Std 170-2008 Ventilation of Health Care Facilities 2008 Table 7-1 ASHRAR.org

Illuminance - Recommended Light Level, (n.d.). Viewed May 31, 2017 from Engineeringtoolbox.com: http://www.engineeringtoolbox.com/light-level-rooms-d_708.html#81743976

International Plumbing Code 2012 Table 103

Measuring Light Levels, (n.d.). Viewed May 31, 2017 from sustainabilityworkshop.autodesk.com:https://sustainabilityworkshop.autodesk.com/buildings/measuring-light-levels.

Nortec, (n.d.). *Why Humidify Hospitals and Care Facilities*. Viewed May 31, 2017, from Humidify.com: https://www.humidity.com/m/0/14-705-why-humidify-hospitals-brochure.pdf.

Outdoor Lighting Levels, (n.d.). Viewed May 30, 2017 from Engineering toolbox.com: www.engineeringtoolbox.com/light-level-room

Required Light Levels, (n.d.). Viewed May 31, 2017 from pilux-danpex.gr: http://pilux-danpex.gr/downloads/Required_Light_LevelsEN.pdf.

Richman, Eric E., (n.d.). *Requirements for Lighting Levels.* Viewed May 21, 2017 from usace.army.mil: http://www.usace.army.mil/Portals/2/docs/Safety/EM%20385-1-1,%202014%20Sections/EM%20385-1-1%202014%20Section%2007.pdf.

Scott Herr, D. (2011). *White Paper / Case Study MC 2000 Atomizing Humidifiers In Hospitals*. CARELUSA. Pennsylvania, USA.

Stanley Rea, M. (ed.) 2000. I*ESNA Lighting Handbook Reference and Application*, 9th edn, Illuminating Engineering Society of North America, USA

Annex 1

Resource Forms to be utilized during the application of the

Baseline Assessment Tool.

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GENERAL BUILDING INFORMATION FORM

Name of Facility:
Location:
Property Block/Parcel no.
Size of Property:
Building Orientation:
Building Floor Area:
No. of Floors:
No. of parking spaces: Visitors _____ Workers_____
Building Capacity: - No. of Beds
No. of Employees: Full-time _____ Part-time _____
Year Constructed:
Type of Building Construction:
Type of Roof Construction:
PAHO Hospital Safety Index (HSI) Applied: **Yes** ❑ **No** ❑
If yes, is the report available?
Note any past damage to the facility:

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BUILDING/PROPERTY COMPONENT AUDIT

As-0built drawings are needed to complete this section of the BAT, particularly to provide information pertaining to the measurements of the foundation

Component	Systems	Quantity/ Square Area	Issues (Condition)	Additional Comments
1.0 Exterior Building Elements	1.1 Foundation/ Structure			
	1.2 Exterior Walls			
	1.3 Roof System/Drainage			
	1.4 No. of Windows			
	1.5 No. of Doors			
2.0 Interior Building Elements	2.1 Ceiling			
	2.2 Interior Walls			
	2.3 No. of Doors			
	2.4 Floors			
	2.5 Fixed Furniture/ Equipment (Built In, No. of Cupboards, No. of Cabinets)			
3.0 Safety Elements	3.1 Means of Exit			
	3.2 Fire Control			
	3.3 Fire Alarm			
	3.4 Emergency Lighting			
	3.5 Fire Resistance			
	3.6 Provisions for Handicap/ Accessibility			
	3.7 Perimeter Fencing/ Security			

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ELECTRICITY CONSUMPTION							
	Month	Days in Period	Usage (kWh)*	Fuel Surcharge / Peak Demand kVA	Cost per kWh*	Cost per KVA	Total Cost
YEAR 1	January						
	February						
	March						
	April						
	May						
	June						
	July						
	August						
	September						
	October						
	November						
	December						

	Month	Days in Period	Usage (kWh)*	Fuel Surcharge / Peak Demand kVA	Cost per kWh*	Cost per KVA	Total Cost
YEAR 2	January						
	February						
	March						
	April						
	May						
	June						
	July						
	August						
	September						
	October						
	November						
	December						
Fixed Charges:		*NB: Obtain most current data from local utility companies.					
VAT:							

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RENEWABLE ENERGY

SOLAR POWER

Number of PV Panels	Total Area of PV Panels	Peak Watts (kW)	Size of Battery Bank	Grid Tied / Off Grid	Annual Power Production (kWh)

WIND POWER

Number of Turbines	Size of Battery Bank	Power Rating kW	Capacity Factor 30-40%	Grid Tied / OFF Grid	Annual Energy Rating kWh

NB: Photovoltaic, System, wind turbines etc.

STANDBY GENERATOR					
Brand / Model	Stand by Power Rating KW	Standby Power Rating (kVA)	Voltage	Phase	Power Factor

STANDBY GENERATOR DETAILS	
Does generator system provide full emergency power to the facility [Y / N]?	
If the generator does not provide full emergency power to facility, then list areas supplied by generator:	

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LIGHTING

Fluorescent Tubes

LOCATION	Number of Fixtures	Lamp Wattage	Ballast Type	Number of Lamps per Fixture	Fixture Wattage	Ballast Power	Total Power KW	Hours / Month	Energy Usage KWHr

LED Tubes

LOCATION	Number of Fixtures	Lamp Wattage	Number of Lamps / Fixture	Fixture Wattage	Total Power KW	Hours/ Month	Energy Usage kWh	Remarks

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LIGHTING (OTHER)

COMPACT FLUORESCENT LAMPS (CFL)

Location	Number of Fixtures	Lamp Wattage	Total Wattage kW	Hours per Month	Energy Usage kWh	COMMENTS

LED LAMPS

Location	Number of Fixtures	Lamp Wattage	Total Wattage kW	Hours per Month	Energy Usage kWh	COMMENTS

INCANDESCENT LAMPS

Location	Number of Fixtures	Lamp Wattage	Total Wattage kW	Hours per Month	Energy Usage kWh	COMMENTS

HALOGEN LAMPS

Location	Number of Fixtures	Lamp Wattage (W)	Total Wattage kW	Hours per Month	Energy Usage kWh	COMMENTS

High Intensity Discharge (HID) LAMPS

Location	LAMP TYPE MH/HPS/MV	Number of Fixtures	Lamp Wattage	Ballast Power	Total Power	Hours/ Month	Energy Usage kWh

OTHER LAMP TYPES

Location	LAMP TYPE	Number of Fixtures	Lamp Wattage	Ballast Power	Total Power	HOURS/ Month	Energy Usage kWh

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AIR-CONDITIONING

Location & Remarks	Quantity	Type	Model	Thermostat Setting (Celsius / Fahrenheit)	Cooling Capacity		Electrical Power (W)	Refrigerant	Efficiency			Hours per Week
					WATTS	British Thermal Units (BTU)			EER	COP	SEER	

NOTES.
Model: AC Brand / Model - Can be used to determine Capacity & Power if it is not shown on the unit
EER: Energy Efficiency Ratio
SEER: Seasonal Energy Efficiency Ratio
COP: Coefficient of Performance

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REFRIGERATION									
Location & Remarks	Quantity	Model	Capacity Cu. Ft	Voltage (V)	Amps (A)	Power (W)	Temperature Setting (Hi/Med/Lo)	Refrigerant	Year

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MEDICAL EQUIPMENT					
Equipment Name	Model	Voltage (V)	Amps (A)	Power (W)	Hours per Week

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WASHERS							
QTY	**TYPE Front Load / Top Load / Washer**	**Manufacturer/ Model**	**Capacity/kgs**	**VOLTAGE**	**AMPERAGE**	**POWER**	**YEAR**

DRYERS							
QTY	**TYPE Gas / Electrical**	**Manufacturer/ Model**	**Capacity/kgs**	**VOLTAGE**	**AMPERAGE**	**POWER**	**YEAR**

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WATER HEATERS

Location & Remarks	Quantity	Type Electric / Gas	Tank / Tankless	Model	Capacity (Gal.)	Voltage (V)	Amps (A)	Power (W)	Energy Factor (EF)

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MISCELLANEOUS ELECTRICAL LOADS

Location & Remarks	Quantity	Name of Appliance	Model	Voltage (V)	Amps (A)	Power (W)	Hours Per Week

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TOILETS/URINALS

Toilet /Urinal type	Quantity	Flush Rate	Location	Condition

Are toilets equipped with automatic water-flushing systems? ❑ Yes ❑ No
If so, what is the timing cycle? _____
Are the sensors/timers coordinated with regular work hours? ❑ Yes ❑ No

Note: Most toilets are either gravity flush, flush valve/flushometer/tankless, or pressurized tank types.

Flush rate, if unknown, may be determined by calculating the volume of water in the tank.

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GREEN BASELINE ASSESSMENT TOOL

PLUMBING FIXTURES
COMMERCIAL WATER FIXTURE COUNT FORM

Facility name:	
Address	**Building No.**
Date:	**Inspected by:**

Fixture	Occupancy	Type of Supply Control	Load Values	In Water Supply Fixtures	Units (wsfu)	# of units	Equal # of Water Supply Fixture units
			Cold	**Hot**	**Total**		
Bathroom Group	Private	Flush Tank	2.7	1.5	3.6		
Bathroom Group	Private	Flush Valve	6.0	3.0	8.0		
Bathtub	Private	Faucet	1.0	1.0	1.4		
Bathtub	Public	Faucet	3.0	3.0	4.0		
Bidet	Private	Faucet	1.5	1.5	2.0		
Combination Fixture	Private	Faucet	2.25	2.25	3.0		
Dishwashing machine	Private	Automatic	-	1.4	1.4		
Drinking Fountain	Offices, etc.	3/8"Valve	0.25	-	0.25		
House Bibb	-	-	-	-	2.5		
Kitchen Sink	Private	Faucet	1.0	1.0	1.4		
Kitchen Sink	Hotel, Restaurant	Faucet	3.0	3.0	4.0		
Laundry Trays (1-3)	Private	Faucet	1.0	1.0	1.4		
Lavatory	Private	Faucet	0.5	0.5	0.7		
Lavatory	Public	Faucet	1.5	1.5	2.0		
Service Sink	Offices, tec.	Faucet	2.25	2.25	3.0		
Shower Head	Public	Mixing Valve	3.0	3.0	4.0		
Shower head	Private	Mixing Valve	1.0	1.0	1.4		
Urinal	Public	1" Flush Valve	10.0	-	10.0		
Urinal	Public	¾" Flush valve	5.0	-	5.0		
Urinal	Public	Flush Tank	3.0	-	3.0		
Washing Machine (8lb)		Automatic	1.0	1.0	1.4		
Washing Machine (8lb)	Public	Automatic	2.25	2.25	3.0		
Washing Machine (15lb)	Public	Automatic	3.0	3.0	4.0		
Water Closet	Private	Flush Valve	6.0	-	6.0		
Water Closet	Private	Flush Valve	2.2	-	2.2		
Water Closet	Public	Flush Valve	10.0	-	10.0		
Water Closet	Public	Flush Valve	5.0	-	5.0		
Water Closet	Public or Private	Flushometer tank	2.0	-	2.0		

Total Fixture Units _____

Fixture Units Converted Into gpm_____

SMART
Health Care Facilities Initiative

TABLE FOR ESTIMATING DEMAND

SUPPLY SYSTEMS PREDOMINATELY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINATELY FOR FLUSH VALVES		
LOAD		DEMAND	LOAD		DEMAND
(Water Supply Fixture units)	(Gallons Per Minute)	(Cubic Feet Per Minute)	(Water Supply Fixture units)	(Gallons Per Minute)	(Cubic Feet Per Minute)
1	3.0	0.04101			
2	5.0	0.0684			
3	6.5	0.86892			
4	8.0	1.06944			
5	9.4	1.256592	5	15.0	2.0052
6	10.7	1.430376	6	17.4	2.326032
7	11.8	1.577424	7	19.8	2.646364
8	12.8	1.711104	8	22.2	2.967696
9	13.7	1.831416	9	24.6	3.288528
10	14.6	1.951728	10	27.0	3.60936
11	15.4	2.058672	11	27.8	3.716304
12	16.0	2.13888	12	28.6	3.823248
13	16.5	2.20572	13	29.4	3.930192
14	17.0	2.27256	14	30.2	4.037136
15	17.5	2.3394	15	31.0	4.14408
16	18.0	2.90624	16	31.8	4.241024
17	18.4	2.459712	17	32.6	4.357968
18	18.8	2.513184	18	33.4	4.464912
19	19.2	2.566656	19	34.2	4.571856
20	19.6	2.620128	20	35.0	4.6788
25	21.5	2.87412	25	38.0	5.07984
30	23.3	3.114744	30	42.0	5.61356
35	24.9	3.328632	35	44.0	5.88192
40	26.3	3.515784	40	46.0	6.14928
45	27.7	3.702936	45	48.0	6.41664
50	29.1	3.890088	50	50.0	6.684
60	32.0	4.27776	60	54.0	7.21872
70	35.0	4.66788	70	58.0	7.75344
80	38.0	5.07984	80	61.2	8.181216
90	41.0	5.48088	90	64.3	8.595624
100	43.5	5.81508	100	67.5	9.0234
120	48.0	6.41644	120	73.0	9.75864
140	52.5	7.0182	140	77.0	10.29336
160	57.0	7.61976	160	81.0	10.82808
180	61.0	8.15448	180	85.5	11.42964
200	65.0	8.6892	200	90.0	12.0312
225	70.0	9.3576	225	95.5	12.76644
250	75.0	10.0260	250	101.0	13.50168
275	80.0	10.6944	275	104.5	13.96956
300	85.0	11.3628	300	108.0	14.43744
400	105.0	14.0364	400	127.0	16.97736
500	124.0	16.57632	500	143.0	19.11624
750	170.0	22.7256	750	177.0	23.66136
1000	208.0	27.80544	1000	208.0	27.80544
1250	239.0	31.94952	1250	239.0	31.94952
1500	269.0	35.95992	1500	269.0	35.95992
1750	297.0	39.70296	1750	297.0	39.70296

AVAILABILITY OF GFA (GROSS FLOOR AREA)

Description of Project	Results	Notes
No. of buildings on plot:		
Maximum height of buildings:		
No. of plot(s):		
(A) Plot area:		
(B) Building area:		
(c) Total Floor area:		
Site Coverage (e.g. % of plots covered by building [B/A x 100]		
Plot ratio (divide total floor area expressed in ratio e.g. 1:07) [1:C/A]		

PAHO Baseline Assessment Tool
2017

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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