

## ENVIRONMENTAL EDUCATION & AWARENESS PROGRAMME PLANNER

**PROGRAMME TYPE (circle/cross):** community/adult education programme - ENERGY

### DETAILS

Name of school/ group			
No learners/ participants expected	No learners/participants actual	Programme length/duration	1 hour
Location (reserve/site)		Grade/age group	Adults/ teenagers
Date of event			
Is this part of the work plan?	YES/ NO	If no, motivate why the programme is needed	

### CONTENT

	Theme (circle/cross)	Energy
Know	Topics covered (e.g. water cycle/ importance of water)	What energy is Why saving energy is important How to do an energy audit
	Curriculum link (for curriculum aligned programmes only) – note subject/strand/topics (if not listed in topics above)	N/A
	Prior knowledge required (if applicable)	N/A
Do	Skills practiced (cross/circle)	Explain, Identify, Name, Analyse, Present, Read, Record, Report, Commit, Choose, Decide
Value	Key message (e.g. we must save water)	We need to conserve energy

### GENERAL LOGISTICS

	Responsible person	Done (tick)	Status
Invite *			
Venue			
Transport			
Booking confirmed			
WCED permission *			
Presentation equipment & camera			
Risk assessment done, confirmation and checklist sent			
Catering *			
Indemnity *			
Budget and cost centre			

**Other:**

Plan requested by: \_\_\_\_\_ (name)

\_\_\_\_\_ (date)

Plan approved by: \_\_\_\_\_ (name)

\_\_\_\_\_ (date)



	of energy audit or carbon emissions	Discuss the results and see how each can save energy/electricity/	Print copies for each person so they can fill in on the form  Calculator or two	
<b>CONSOLIDATION &amp; EVALUATION</b>				
10 min	Consolidation	<b>One thing we WILL do to save energy</b> Discuss one thing that each person will do moving forward to save energy. Ask each person to write their pledge down on a piece of paper, come up to the front, read it and paste it on the wall or flipchart.	Paper cut up, pens/cocis, flipchart board	

✓ **cause quality and sustainability problems** with the grid, as actual generation capacity and schedules are unknown to the City.

City Connect explains the PV registration process in detail and provides the necessary forms. Find the link under **"CONTACTS AND RESOURCES"**.

## EXERCISE: DOING AN ENERGY AUDIT OF YOUR HOME

This exercise will help you understand exactly where you use electricity in your home, and where you can save.

### STEP 1: COLLECT THE DATA

In column 1 of the table on the following page, list the appliances you have in your home.

In column 2, note the electricity power (W) of each appliance. Appliance power is usually measured in watts and written on the appliance itself. (Note, however, that this can indicate maximum power use, which could be higher than average power use.) The table 'Average electricity consumption of typical home appliances' on page 218 provides estimates for common appliances, which may be helpful.

If you have more than one of any appliance, such as lightbulbs, write down in column 3 how many of each appliance you have.

In column 4, record how long (for how many hours) each appliance is used per day. Consider differences in weekday and weekend use, as well as summer and winter use, and calculate an average.

Note that some appliances, such as fridges and hot-water cylinders, regulate themselves by constantly switching on and off. Consult the table on page 218 to estimate your consumption.

### STEP 2: DO THE CALCULATIONS

To determine your daily electricity consumption, use this simple formula:

$$\frac{(\text{Watts} \times \text{hours used per day} \times \text{number})}{1\,000} = \text{daily consumption in kilowatts}$$

In essence, therefore, you are multiplying column 2 by column 3, and then by column 4 (if there is more than one item). This final figure is then divided by 1 000 to convert from watt-hours to kilowatt-hours, because 1 kilowatt (kW) = 1 000 watts (W). Fill in the total in column 6 to get an estimate of your daily use per item.

Add up your total kilowatt-hours for all appliances to calculate your total electricity consumption. To get your monthly consumption figure, multiply your total daily figure by 30,4 days.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
APPLIANCE DESCRIPTION	POWER USE PER UNIT (WATTS)	HOURS/DAY IN USE (HOURS)	NUMBER OF UNITS	AVERAGE NUMBER OF WH PER DAY (WATT X APPLIANCES HOURS/1 000)	AVERAGE KWH PER DAY
e.g. LED lamp	5 W	6 hours	7 lights	$5 \times 7 \times 6 = 210 \text{ Wh/day}$ divide by 1 000 to get kWh/day	0,21 kWh



## AVERAGE ELECTRICITY CONSUMPTION OF TYPICAL HOME APPLIANCES

APPLIANCE DESCRIPTION	POWER USE (WATTS)	AVERAGE HRS/DAY IN USE	APPLIANCE DESCRIPTION	POWER USE (WATTS)	AVERAGE HRS/DAY IN USE
<b>LIGHTING</b>			<b>REFRIGERATION</b>		
LED downlight	5	5	Chest freezer	105	4
Halogen downlight	50	5	Fridge - with freezer	158	5
Incandescent bulb	60	5	Fridge - no freezer	250	5
Compact fluorescent light	18	5	<b>HOME MAINTENANCE</b>		
LED lamp	8	5	Dishwasher	2 500	0,9
LED security light	10	8	Vacuum cleaner	1 000	0,5
Halogen security light	150	8	<b>LAUNDRY</b>		
<b>COOKING</b>			Iron	980	0,4
Coffee machine	670	0,5	Steam iron	1 235	0,8
Electric stove	3 000	2	Washing machine	3 000	0,75 *
Frying pan	1 250	0,4	Tumble dryer	3 300	0,5 *
Kettle	1 900	0,3	* indicates per load		
Hotplate - large	2 400	0,3	<b>OTHER</b>		
Induction stove	2 000	0,3	Burglar alarm	10	24
Microwave oven	1 230	0,8	Cellphone charger	9	2
Toaster	1 010	0,3	CD player	9	0,4
Snackwich maker	1 200	0,3	Computer	134	1,5
Food processor	166	0,2	Cordless phone	2	15
<b>GEYSER</b>			Hair dryer	647	0,1
Electric geyser	2 600	4,4	Radio	12	3
Solar water heater, with electric backup	2 600	1,7	Pool pump - variable speed drive	200 to 1 200	winter 2 x 4 h
Heat pump	1 250	2,5			summer 2 x 6 h

## STEP 3: IDENTIFY PRIORITY ACTION AREAS AND POTENTIAL FOR SAVINGS

Examine your results and identify which areas of the home use the most electricity. By doing this, you can take simple, effective cost-saving actions to reduce your electricity consumption. A simple way to check the accuracy of your audit is to compare it to your actual electricity units used. Remember, it might change depending on the season and number of people in your home. Yet it remains a good yardstick.

## EXERCISE: DETERMINING THE COST OF ENERGY IN YOUR HOME

This exercise will look at the amount of money spent on energy, instead of total energy consumed. Understanding what uses most energy (and money) will help you identify where you can make savings.

## STEP 1: COLLECT THE DATA

In column 1 of the table on the following page, list the fuels you use, such as electricity, paraffin, gas, batteries, wood or candles.

In column 2, note the different purposes for which you use each fuel, such as cooking, lighting, entertainment, heating, refrigeration or ironing. You could even include transport fuel and costs if you want to get the full picture.

In column 3, write down how much of each fuel you use in a week.

In column 4, write down the price of the fuel for each unit, such as a litre or kilogram of fuel.

## STEP 2: DO THE CALCULATIONS

To determine the cost of each fuel per week, multiply the amount you use (column 3) by the cost per unit (column 4). Write down the result in column 5. If you wish to obtain a rough monthly figure, multiply this by 4,2.

FUEL DO YOU USE?	FUEL USED FOR?	FUEL DO YOU USE PER WEEK?	PRICE OF THE FUEL PER UNIT?	WEEK FOR FUEL?
ELECTRICITY				
PARAFFIN				
GAS				
BATTERIES				
WOOD				
TOTAL COST				

### STEP 3: IDENTIFY PRIORITY ACTION AREAS AND POTENTIAL FOR SAVINGS

Think about where you spend the most money on energy every week and use the tips in this chapter to make better energy choices. Also look at "A safe home" on page 222 to see whether you can improve on energy safety in your home.

# CALCULATING YOUR HOUSEHOLD'S CARBON EMISSIONS

Different fuels have different carbon dioxide (CO<sub>2</sub>) emissions levels. Electricity in South Africa emits substantial amounts of CO<sub>2</sub>, as it is derived from the burning of low-grade coal. For a quick estimate of your energy consumption and related carbon emissions, follow these steps:<sup>18</sup>

completed, or a record of your electricity and fuel bills, fill in the amount of fuel you use each month in column 1.

- ✓ **Step 2:** Multiply this by the value provided in column 2. For example, for electricity, this is 0,995. This will give you the kilograms of CO<sub>2</sub> you emit per month. Write this in column 3.
- ✓ **Step 3:** For your annual CO<sub>2</sub> emissions, multiply column 3 by 12 months, and add for all fuels.
- ✓ **Step 4:** If you want to calculate this per tonne, you will need to divide it by 1 000, as 1 tonne = 1 000 kg.

COLUMN 1: FUEL USAGE PER MONTH	COLUMN 2: EMISSIONS FACTOR	COLUMN 3: CARBON EMISSIONS - KG CO <sub>2</sub>
Electricity: _____ kWh	x 0,995 kg CO <sub>2</sub> per kWh	kg CO <sub>2</sub> /month
LPG: _____ kg	x 1,622 kg CO <sub>2</sub> per kg	kg CO <sub>2</sub> /month
Paraffin: _____ litres	x 2,577 kg CO <sub>2</sub> per litre	kg CO <sub>2</sub> /month
<b>Total household energy-related emissions per month</b>		kg CO <sub>2</sub> /month
<b>Total household energy-related emissions per annum</b>		kg CO <sub>2</sub> /annum

Compare your household's carbon emissions with typical annual CO<sub>2</sub> emissions from Cape Town homes, excluding transport.

HOUSEHOLD TYPE	KG CO <sub>2</sub> /MONTH
Average low-income non-electrified home in Cape Town	146
Average low-income electrified home in Cape Town	193
Average mid-income home in Cape Town	737