



ST STITHIANS COLLEGE

Sustainability Report

February 2015

Introduction

- Strategic Plan to be as carbon neutral as possible by 2020
- Create a learning opportunity for all students
- Accurately record all greening initiatives that have taken place, review current practices and plan new projects
- To be successful, we all need to play our part and get involved



St Stithians College

- 105 Hectares
- 5 Schools
- Over 2,500 Students
- 350 Staff Members, 68 of which live on the campus in staff housing
- 2 x Astro Turfs
- 5 x Swimming Pools
- 11 x Fields
- 14 x Tennis Courts
- 2 x Basketball Courts
- 6 x Squash Courts
- 1 x High Performance Centre
- 2 x Boarding Houses
- 2 x Dams, Boreholes, Irrigation Systems, Water Storage Tanks
- Libraries, Computer Labs, Science Labs, Boardrooms, Change Rooms, Classrooms, Offices, Halls, Theatres, Tuck-shops, Kitchens, Bathrooms, Store Rooms, etc.

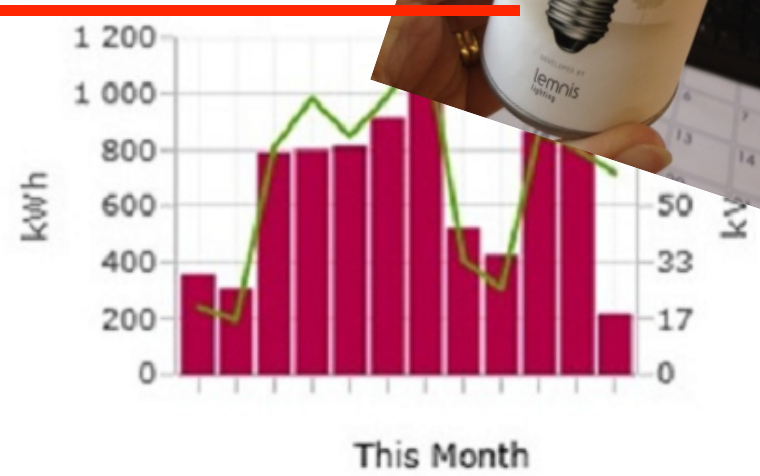
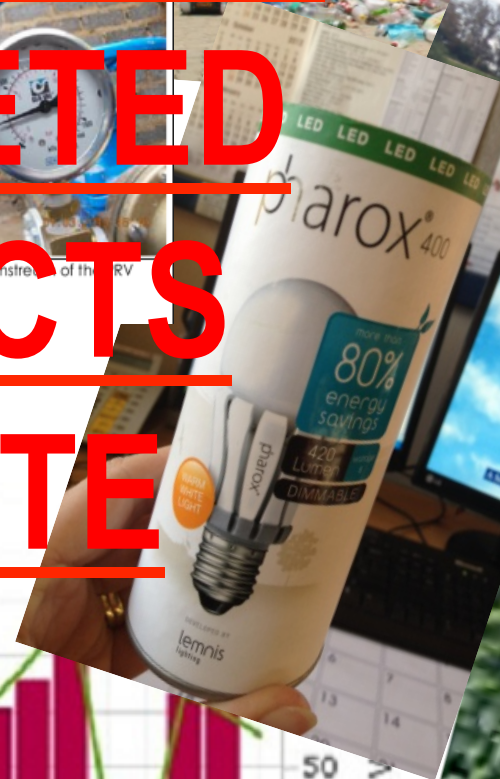




ST STITHIANS COLLEGE



SUMMARY OF COMPLETED PROJECTS TO DATE



VEGETATION:

- Audit of all trees on campus – over 4,000 trees (excluding residential properties)
- Of this, 718 fall into category 1, 2 or 3 (alien trees)
- Removed 99% of Syringa trees, in process of removing Poplars, Black Wattles and Blue Gums
- Ongoing removal of alien plants and trees. Team employed to remove alien trees and plants



- Over 2,500 indigenous trees planted between 2011 and 2014
- Labeling of trees – educational
- “Mother bed” of indigenous plants created



REHABILITATION OF PETER PLACE ENTRANCE

- Removal of alien trees and plants along the waterway
- Planting of over 200 indigenous trees and indigenous grasses
- Removal of litter from waterway on an ongoing basis
- Addressing erosion problems in the waterways
- Ensuring the bird sanctuary remains a natural wetland



BEFORE



AFTER

Bird Sanctuary

- Working together with some of the neighboring properties & City Parks / Johannesburg Zoo to reinstate the William Nicol Bird Sanctuary back into a safe, beautiful bird sanctuary to be used by birders, walkers, schools, etc.
- In September 2013, a major clean up was conducted and over 100 indigenous trees planted
- St Stithians to be the main custodians and to allow access to the bird sanctuary through their property at the Hurlingham entrance



Blue Crane



Some of the birds spotted on our campus recently



Honey Buzzard



Long Crested Eagle



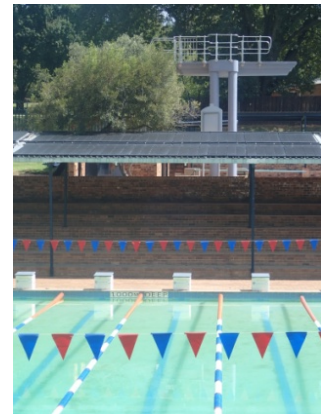
Rose Ringed Parakeet

WATERWAYS:

- Attenuation dams built to slow water down in waterways and reduce erosion:
 - Below Boys' tennis courts
 - Peter Place entrance
 - Higher Ground entrance

SOLAR HEATING / HEAT PUMPS:

- Installation of 16 solar water geysers to date
- Installation of 100 heat pumps to replace all conventional geysers on campus (2 large units at the Boys' boarding houses)
- Solar heating of the 25m swimming pool



Heat Pump Savings Calculator

Appliance Data:

Previous kW	290
Previous hours on / day	6.5
New watt kW	88.92
New hours on / day	6.5
Heat pump cost	1,448,861.76

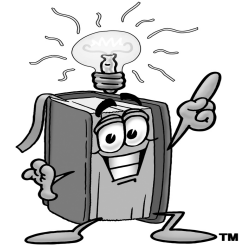
City Power Data:

kWh Tariff	0.6447
Peak demand tariff	198
Year 1 increase	8.00%
Year 2 increase	8.00%
Year 3 increase	8.00%
Year 4 increase	8.00%
Year 5 increase	8.00%

	Geyser Energy Use	Heat Pump Energy Use	Heat Pump Cost	Yearly Electrical Savings	Break Even	
Year 0			1,448,861.76		-1,448,861.76	
End of year 1	1,216,656.09	373,051.93	-	843,604.16	-605,257.60	Break even - approx 16 months
End of year 2	1,313,988.58	402,896.08	-	911,092.50	305,834.90	
End of year 3	1,419,107.67	435,127.77	-	983,979.90	1,289,814.80	
End of year 4	1,532,636.28	469,937.99	-	1,062,698.29	2,352,513.09	
End of year 5	1,655,247.18	507,533.03	-	1,147,714.15	3,500,227.24	
			Total	4,949,089.00		



LIGHTING / ELECTRICAL:



- Lighting audit of all light fittings on campus
- Know the type, quantity and location
- Replaced 742 out of 1232 down lighters and incandescent lights on campus so far. Will be replacing balance including fluorescents in 2014. Potential savings of approx. R400k per annum.
- Schneider electricity metering system installed in January 2013. We are monitoring our consumption and costs and comparing these figures against actual City Power accounts.
- We are in the process of changing our billing from Demand to Time of Use.
- Potential saving of R40 – R50k per month by doing this.

Savings on Globe Replacements

Old Light Fittings

Light Type	Qty	Wattage	Assumed Hrs per Year	Annual Usage (kWh)	Annual Emission (CO2) Kgs	Annual Energy Cost (R0.93 / kWh)
Candle	5	50	3120	780	409	725.40
Incandescent	44	40	3120	5,491	2881	5,106.82
Incandescent	685	72	3120	153,878	80727	143,106.91
MR16	4	35	3120	437	229	406.22
MR16	4	50	3120	624	327	580.32
	742			161,210	84,573	149,925.67

New Light Fittings

Light Type	Qty	Wattage	Assumed Hrs per Year	Annual Usage (kWh)	Annual Emission (CO2) Kgs	Annual Energy Cost (R0.93 / kWh)
Candle	5	3	3120	47	25	43.52
Incandescent	44	7	3120	961	504	893.69
Incandescent	685	7	3120	14,960	7,848	13,913.17
MR16	4	5	3120	62	33	58.03
MR16	4	7	3120	87	46	81.24
	742			16,118	8,456	14,989.67

Savings Per Annum:

Annual Usage (kWh) @ R0.93 / kWh	145,092		
Annual Emissions (CO2) (Kgs)		76,117	
Annual Energy Cost			134,936.01



Schneider Electricity Monitoring System

- Electricity monitoring system installed in January 2013.



WATER:

- Audit of our water consumption / billing
- Installation of advanced pressure management control system
- Installation of new PRV (pressure reducing valve)
- Installation of new ring main to balance water reticulation during peak demand



- Waterless urinals installed
- Installation of Aqua Trip leak detection system in all toilet blocks on campus



Rain Water Harvesting

We have installed a water tank at the ablution block on the Ridgeway Field.

The tank captures all the rain water, which is then pumped into the toilets and used for flushing of toilets.

We are in the process of installing the same system at the new JP Hall.



WASTE MANAGEMENT:

- Construction of on-site recycling depot
- Provision of recycling stations around campus



- Provision of recycling, paper and wet waste bins in all classrooms and offices
- Food recycling using Bokashi bins
- Ink cartridge recycling project
- Recycling of electronic equipment
- Recycling of polystyrene containers to make lap desk tops for under-privileged schools / students
- Training of cleaning staff – sorting, benefits of recycling, etc.



Composting, Recycling, Food Provision



By having our own recycling depot on campus, we have:

- Created a business opportunity
- Created jobs
- Reduced what we send to landfill
- Derive an income from the waste that was previously sent to landfill
- Reduced our carbon footprint
- Prevented tons of CO₂e from being emitted into the environment
- Provided an educational facility for students

Recycling Depot - Volume Report (kgs)

January 2013 - December 2013

	TISSUE	KRAFT	LOW GRADES		PLASTIC			STEEL	GLASS					
Date	HL1	K4	COMMON MW	NEWS PRINT	LDPE	HDPE	PLASTIC PET	CANS - STEEL	GLASS MIX	E-Waste (DESCO)	Scrap Metal	TOTAL KGS	RAND VALUE PAID (excl. VAT)	
Jan-13	1,860	2,270	2,100	640	820	1,280	1,400	1,300	11,380	-	-	23,050	13,010.50	
Feb-13	1,020	2,150	1,020	740	800	1,040	1,740	1,480	10,160	596	4,140	24,886	14,268.50	
Mar-13	840	1,340	1,060	480	540	680	1,140	1,000	8,840	1,136	-	17,056	8,347.00	
Apr-13	820	3,170	1,660	840	1,280	1,400	2,040	2,540	5,360	4,076	-	23,186	11,931.50	
May-13	860	-	1,000	480	860	840	1,200	1,100	10,940	-	-	17,280	8,906.00	
Jun-13	760	1,520	660	720	920	860	1,100	1,180	5,360	-	-	13,080	7,876.00	
Jul-13	720	1,520	820	540	800	1,200	1,340	920	9,800	-	-	17,660	9,670.00	
Aug-13	840	1,560	1,000	520	660	1,460	1,020	1,000	5,580	-	-	13,640	8,464.00	
Sep-13	680	1,440	620	520	460	820	960	900	6,760	-	-	13,160	7,270.00	
Oct-13	820	1,760	740	540	600	980	760	1,240	12,000	-	-	19,440	9,494.00	
Nov-13	1,120	-	460	520	260	660	940	1,400	5,620	-	-	10,980	6,574.00	
Dec-13	1,020	2,460	1,480	120	200	100	-	520	4,920	-	-	10,820	5,319.00	
TOTAL	11,360	19,190	12,620	6,660	8,200	11,320	13,640	14,580	96,720	5,808	4,140	204,238	111,130.50	

Carbon Calculator - 2012		
Material Recycled	Tonnes	Tonnes of CO2e Saved
Glass	49.18	16.9671
Cardboard	16.64	24.96
Plastic	14.22	28.44
Aluminium	8.44	84.4
Paper	36.76	48.5232
TOTAL	125.24	203.2903

Carbon Calculator - 2013		
Material Recycled	Tonnes	Tonnes of CO2e Saved
Glass	96.72	33.37
Cardboard	19.19	20.29
Plastic	33.16	66.32
Aluminium	14.58	145.80
Paper	30.64	40.44
TOTAL	194.29	306.22

Income Generated:
R111,130.50 ex VAT



Bokashi Bins: Jan - Dec 2014

Food Waste from Higher Ground and the Dining Hall

Month	Higher Ground Bins	Dining Hall Bins	Total No. of Bins	Total Amount of Food Waste (kgs)	Tonnes of Food Waste	CO2e (kgs)
				140kg / bin	1000	435kg CO2e/ tonne
Jan-14	6	9	15	2,100	2.1	913.5
Feb-14	9	12	21	2,940	2.9	1278.9
Mar-14	11	16	27	3,780	3.8	1644.3
Apr-14	12	28	40	5,600	5.6	2436
May-14	14	21	35	4,900	4.9	2131.5
Jun-14	10	11	21	2,940	2.9	1278.9
Jul-14	13	16	29	4,060	4.1	1766.1
Aug-14	9	5	14	1,960	2.0	852.6
Sep-14	9	11	20	2,800	2.8	1218
Oct-14	12	15	27	3,780	3.8	1644.3
Nov-14	11	14	25	3,500	3.5	1522.5
Dec-14	13	15	28	3,920	3.9	1705.2
TOTAL	129	173	302	42,280	42.3	18,392

Total of 18,392 kgs of CO2e prevented from being emitted into the environment in 2014





- With the food waste and grass / plant cuttings, we have been generating our own compost, so we no longer need to buy. Huge saving for a campus of this size.



- In the process, we have created our own vegetable garden, which provides fresh vegetables on a weekly basis for the lower income staff, ensuring that they are getting some nutritious food to take home.

CHEMICALS / CONTRACTORS / SUPPLIERS:

- Contractors such as Prestige and Supercare only using environmentally friendly products
- Bait stations – only affect the first consumer – as a result the owls and other bird life have started coming back to our campus

BUILDINGS:

- Installation of occupancy sensors
- Installation of solar / heat pumps
- Use of recycled products
- Heating and cooling options
- Low energy lighting



Projects Being Considered:

- Hard basing / planting of all waterways to prevent erosion
- Install Pay-As-U-Go electricity meters into staff houses and floodlights
- Installation of black water treatment plant
- Installation of photo voltaic power generating plant/s
- Reducing the amount of kikuyu grass on campus by planting indigenous plants / grasses – saving of over R150,000 pa for every 10,000 m² of kikuyu we reduce
- Investigate ways of cooling / heating buildings that have extreme hot and cold temperatures in the different seasons
- Document all that is done on our College website



Photo Voltaic Plant (power generation)

- Install PV panels onto roof tops of all buildings on campus or
- Install PV panels on the ground (cheaper)

Pros:

- Fantastic educational facility for students
- We wouldn't have to pay for the power we use during the day
- Almost completely off the grid during daylight hours
- Reduced electricity bill significantly
- Reduce our carbon footprint significantly

Cons:

- Have to use Eskom power at night
- If we wanted to be off the grid completely, we could install batteries to store excess power generated during the day (huge maintenance and costs involved)



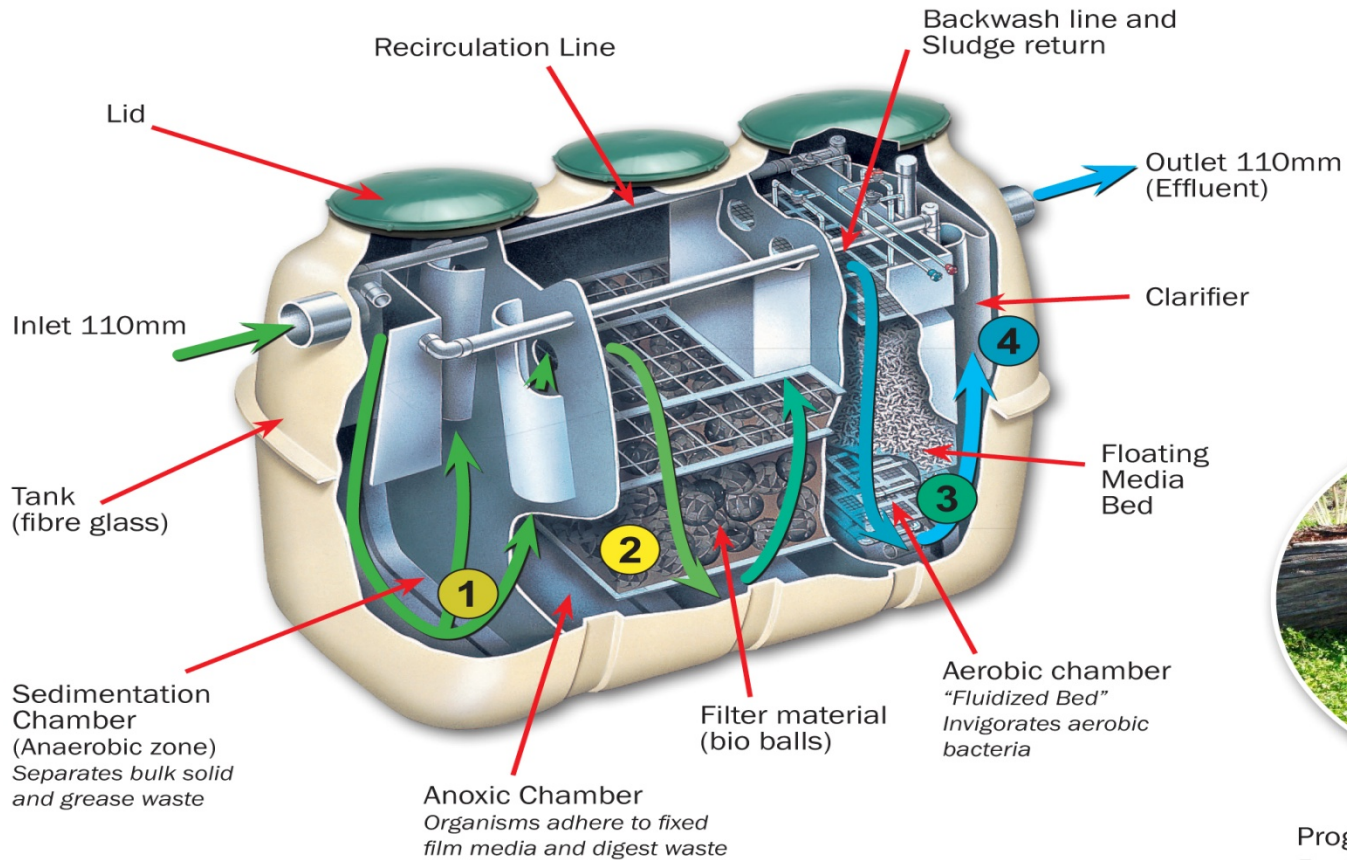
Black Water Treatment Plant

- Treat all black and grey water on site
- Re-use the treated water to water fields / gardens and flush toilets
- Educational facility for students for one of the world's most precious resources – WATER!
- Runs on either very little electricity or solar
- Savings on water bill as sewerage would no longer be sent through Joburg Water system. Sewerage accounts for approx. 60% of our water bill
- Savings would be instantaneous once system installed – costs of equipment to still be determined following a site inspection vs. ROI, but expected payback in less than 3 years.



Fusion Series Waste Water Treatment

The Fusion is a factory-built activated sludge sewer treatment plant.



Certified to ANSI-NSF40 Class I performance designation

Control Panel

- Monitors the system 24/7
- Warning light and siren will notify user if a problem occurs



Programmable Blower
Feeds oxygen to aeration chamber and powers recirculation/sludge return



Clarus Fusion ZF2400 final grade, Barloworld Maputo



- **Low power consumption**
- **Single tank construction**
- **Tank installed completely underground**
- **Low noise factor**
- **Easy installation**
- **Low maintenance**
 - **No downtime during service / maintenance**
 - **Alarm panel – self monitoring**
 - **Full nitrification / de-nitrification cycle**

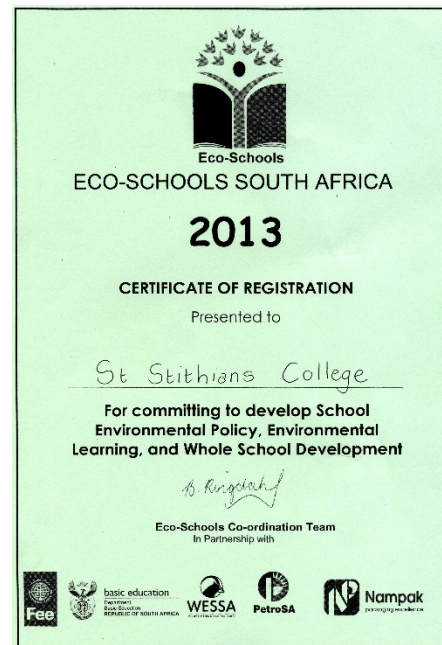
Bottle to Build Project:

- Change water & juice bottles from round to square
- 90,000 bottles builds a classroom
- Recycled computers ground and used for plaster
- Percentage of sales goes into building fund to fund the actual building and finishing process (flooring, roofing, doors, lighting, etc.)
- Classrooms warm in winter, cool in summer
- No plastic going to landfill, but being recycled and put to good use
- Students can get involved and help build the classrooms – great CSI project



Green Flag Status

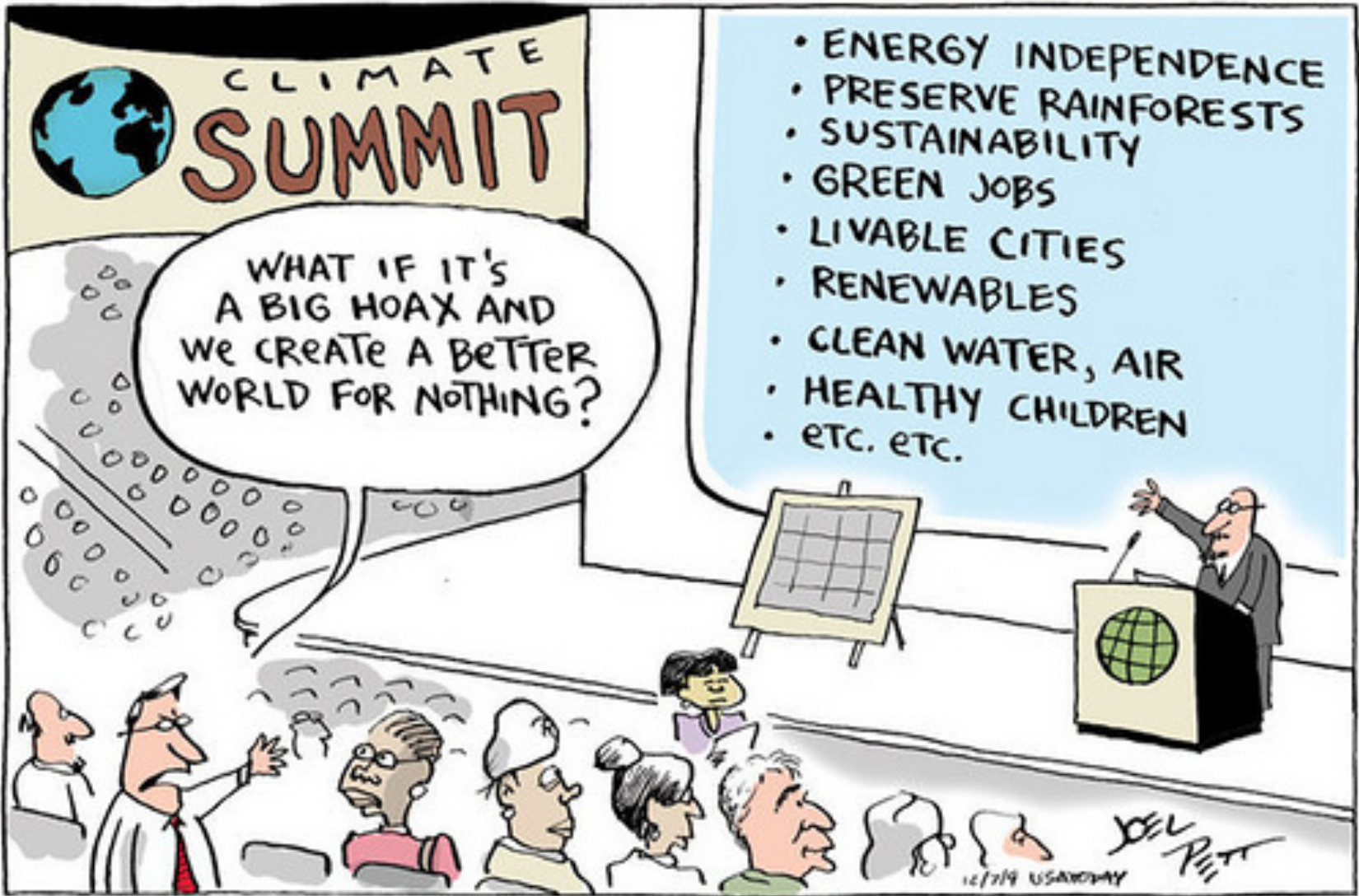
- St Stithians College has obtained their platinum green flag status, highlighting our involvement in greening initiatives not only within our own school, but also in the community.



Our Role Going Forward

Education, education, education – we have to keep teaching our students about the importance of all of what we are doing if we want the next generation to make a difference.





Thank You!
Any questions

