UNDER THE PATRONAGE OF HIS EXCELLENCY SHEIKH ABDULLAH BIN NASSER BIN KHALIFA AL THANI, PRIME MINISTER AND MINISTER OF INTERIOR

The Greener School Program

Santiago Bañales

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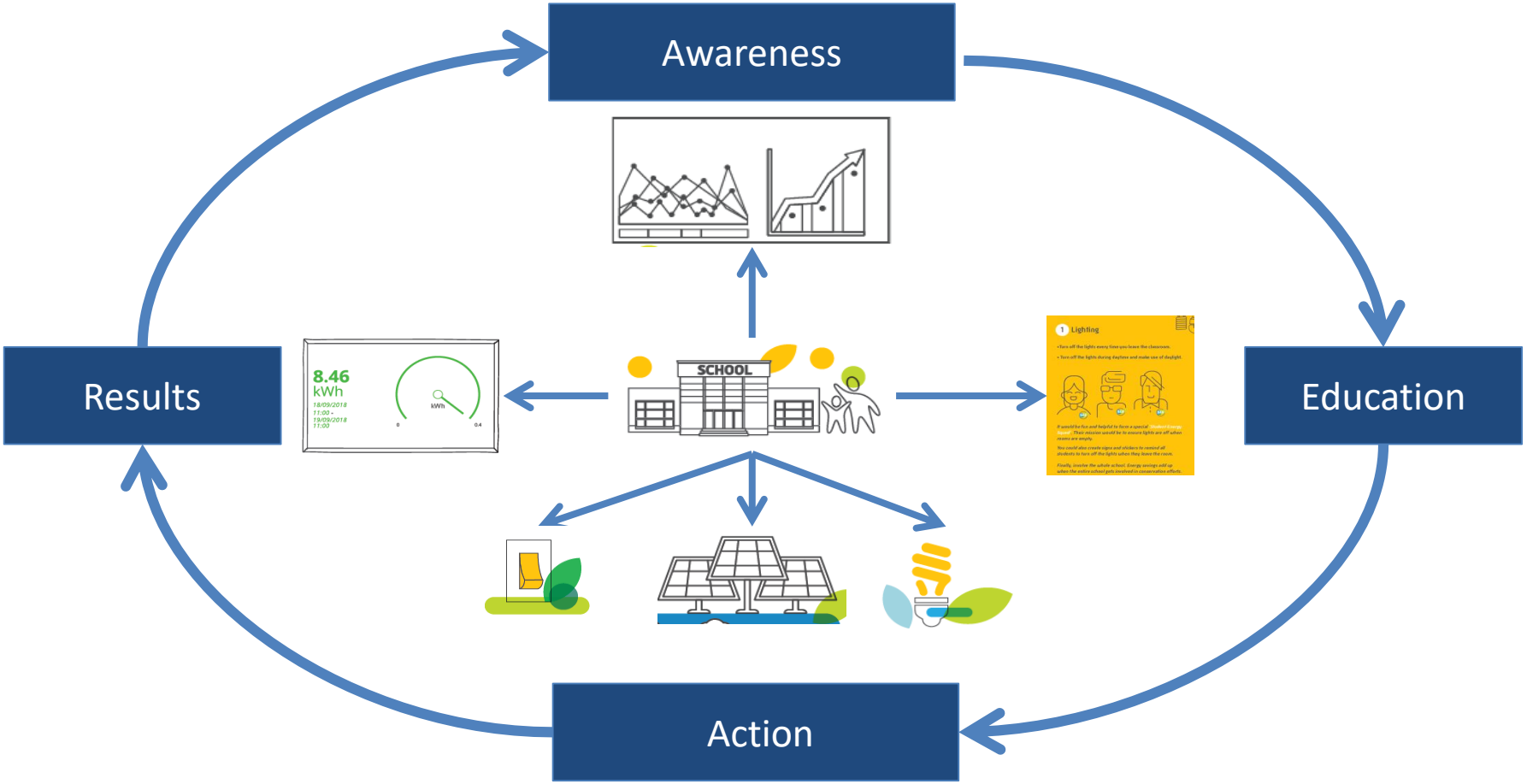
The Greener School: education and energy conservation

Implementing nearly zero energy buildings (nZEB) concept in primary schools

- T22 Education Awareness Project (T22) in an initiative by KAHRAMAA represented in Tarsheed and the Supreme Committee for Delivery & Legacy (SC) to educate children about electricity and water conservation and to contribute to achieve environmental goals of QNV 2030

The Greener School has 4 key elements



Awareness implies measuring …

Awareness

Energy Management System Dashboard example

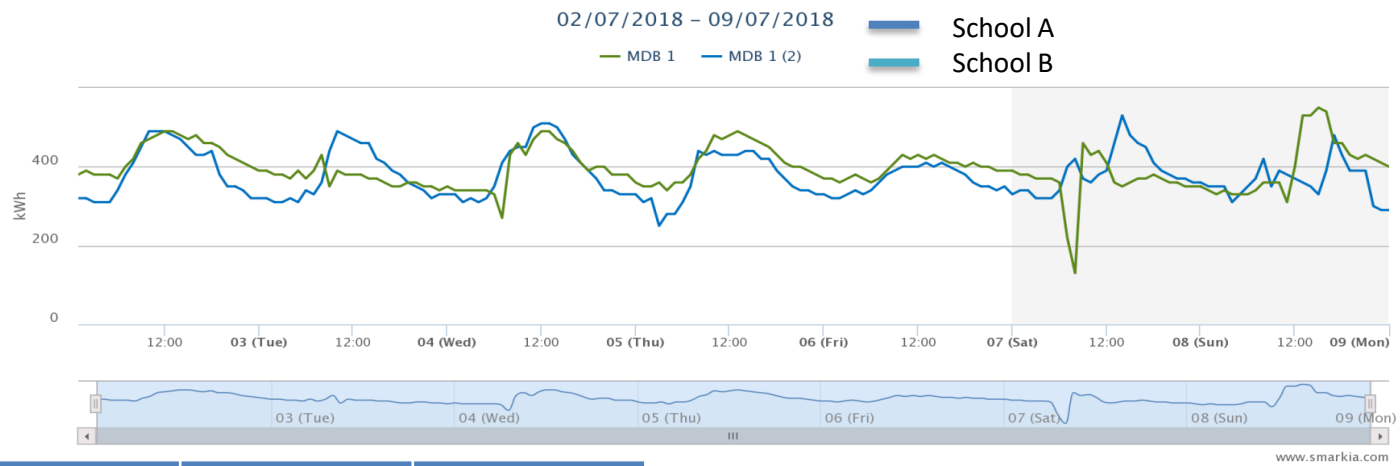
Learning to read your consumption!

… and knowing your potential!

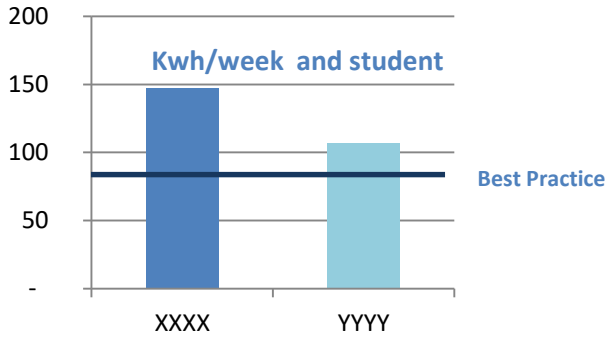
Awareness

Comparison of schools demand profile

ILLUSTRATIVE



	School A	School B
Students	432	543
Teacher	51	47
Total	483	590
Kwh/week	71.240	63.028
Kwh/week & person	147	107



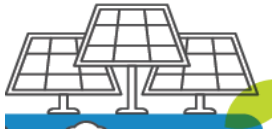
Learning to compare to others!

Education in sustainability goes beyond technology

Education

Renewables

Efficiency

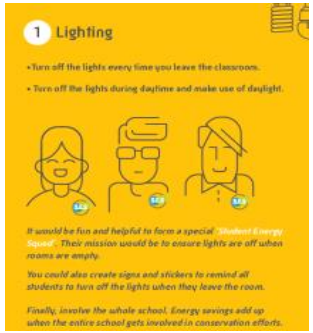


1st Phase

2nd Phase

Better Technology

Conservation



Better practices!

Technology choice based on performance and economics

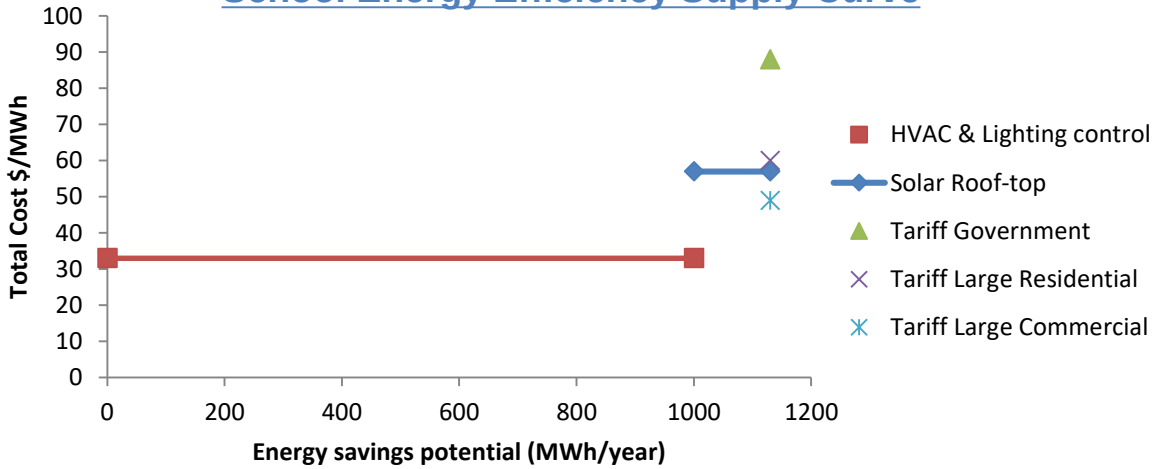
Action

ILLUSTRATIVE

Energy consumption assumptions:

- Surface 10,000 m2
- Consumption 500 kWh/m2/year
  5,000 MWh/year
- Energy Density ~ 60 W/m2

School Energy Efficiency Supply Curve



Technology	Investment cost assumptions	Savings potential assumptions	Comments
Building Automation System – BAS - (HVAC & Lighting control)	40 $/m2 (15$ to 70$ range) Duration: 12 years	20% (10% to 25%)	BAS may impact the totality of the consumption
Roof top solar	2,000 $/kw Duration: 20 years	Capacity Factor: 20% % of surface available: 50% Energy Density: 15W/m2	% of solar contribution limited for energy density considerations

Potential is relevant even at one single location…

Results

Current school energy use	~ 2,020,000 kwh/year
Per student	~ 3,725 kwh/year

In you reduce by 25% your consumption

Your save **energy**…	~ 505,000 kwh/year of electricity
… enough to power	5,550 LED Lamps for 1 year
You save your **country resources**	~ 1,530,000 kwh/year of natural gas
And reduce your **carbon footprint**!	~ 275,265 kg of CO_2 ~ **500 Kg of CO_2 per student**

…. and it scales up as they are nationally implemented

Results

	School Statistics Qatar 2014/2015		
	International Private	Arabic Private	Public
Kindergartens	279	38	66
Primary Schools	135	9	103
Preparatory Schools	86	7	58
Secondary Schools	70	6	55
Universities & Colleges	14		2
Total	584	60	284

In you reduce by 25% consumption in all Primary schools

~ 124 Gwh/year of electricity saved

~ 377 Gwh/year of natural gas saved

~ 68,000 tons/year of CO_2

Is this a significant impact?

Energy Conservation can make a sizable contribution

Results

Table ES 1: Summary carbon footprint for FIFA 2010 World Cup

Component	Emissions (tCO_2e)	Share (%)
International transport	1,856,589	67.4
Inter-city transport	484,961	17.6
Intra-city transport	39,577	1.4
Stadia constructions and materials	15,359	0.6
Stadia and precinct energy use	16,637	0.5
Energy use in accommodation	340,128	12.4
Total excluding international transport	**896,661**	
Total including international transport	**2,753,250**	**100**

Source: Department of Environmental Affairs– Republic of South Africa

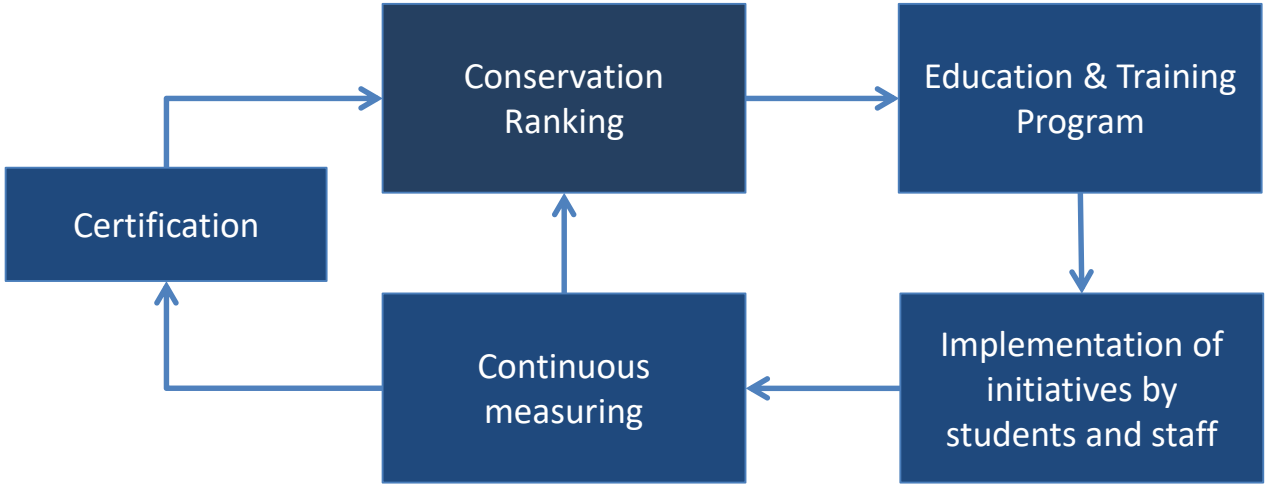
In you reduce by 25% consumption in all Primary schools

~ 68,000 tons/year of CO_2

What is energy conservation programs are implemented in all building sectors?

Technology, Education and Certification interact in a virtuous circle

Design of a large scale program for Energy Conservation in Schools



- **Technology** (i.e. measurement, monitoring) creates awareness and objective measurement of potential
- **Education** builds on awareness to generate short, medium and long term conservation impact
- **Certification** of savings, CO_2 reduction and energy management performance is the basis of credibility

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