



Modul 3 –Lena Wokbuk

Eneji Efisiensi Besik

BISLAMA LANWIS – VANUATU

Kampani we i givim mane from:

KOICA
Korea International
Cooperation Agency

Long patnasip wetem:







CONTENTS

Gloseri	5	5. ENEJI EFISIEN TEKNOLOJI..... 28
Ol sotfala toktok	6	5.1 Ol Oltenet Fuel..... 29
1. AES BREKA - INTRODAKSEN7		5.2 Eneji Efisiensi Teknologi – Ol Laet mo ol Fan.....29
Aktiviti 1..... 8		5.4 Aedentifikesen blong Eneji Efisien Ikwipmen 31
2. ENEJI EFISIENSI BESIK9		Aktiviti 5.....32
2.1 Eneji Besik..... 10		6. ENEJI EFISIENSI LEBOL..... 34
2.2 Praemeri mo Sekonderi Sos..... 10		Aktiviti 6.....36
2.3 Komesol mo non komesol sos blong eneji 11		7. ENEJI EFISIENSI KOMUNITI INISIETIV..... 37
2.4 Riniwabol mo non riniwabol sos blong eneji..... 11		7.1 Rol blong ol Woman, ol mama we oli nogat man, wido, (Ofan) ol pikinini we oli nogat papa o mama 38
Aktiviti 2.....13		Aktiviti 739
3. ENEJI EFISIENSI MO ENEJI KONSEVESEN 16		Rol Ple 1 40
3.1 Eneji Odit 18		
Aktiviti 3.....18		
4. ENEJI KONSEVESEN MESA..... 20		
4.1 Kuk 21		
4.2 Eneji Konsevesen Praktis – Hom Aplaens..... 23		
4.3 Eneji Konsevesen Praktis – Wota Pamp..... 24		
4.4 Eneji Konsevesen – Aotbod Moto Enjin 24		
Aktiviti 4.....25		

LIST OF FIGURES

FIKA 1: SDG 3 mo SDG 71	10	FIKA 16: Ol Taeb blong Pamp	24
FIKA 2: Ol Riniwabol Eneji Sos.....	11	FIKA 17: Petrol Enjin blong wan Bot.....	24
FIKA 3: Non- Riniwabol Eneji Sos.....	11	FIKA 18: Ol Biomas Pelet	29
FIKA 4: Sarakata Haedro-Santo, Vanuatu	12	FIKA 19: Biogas Plant Vanuatu Akrikolja Kolej.....	29
FIKA 5: Ol samting we oli kosem Polusen wetem ol Sos blong olgeta	12	FIKA 20: Ol Laetning Sos	30
FIKA 6: Ol Aktiviti blong man mo Polusen.....	12	FIKA 21: Komparesen blong ol Laet Sos.....	30
FIKA 7: Eneji Konsevesen- eksampol	17	FIKA 22: Eneji Efsient Ikwipmen.....	30
FIKA 8: Eneji Efsient Teknoloji- Nomol Vs LED	17	TEBOL 7: Komparesen blong Eneji efsient Fan mo Frij.....	31
FIKA 9: Ol man oli Karem Wud	21	FIKA 23: Mobael Jaja mo TV	31
FIKA 10: Eneji Konsevesen - Kuk	21	FIKA 24: Nem Plet – LED	31
FIKA 11: Kavremap suspen (pot) wetem lid	21	FIKA 25: Nem Plet Moto	32
FIKA 12: Eneji Efsient Kuk Stov	22	FIKA 26: MEPS Labol -Vanuatu	35
FIKA 13: Eneji Efsient Kuk Stov Demonstresen Vanuatu ...	22	FIKA 27: Ol Eneji Efsiensi Inisietiv	38
FIKA 14: Hom Aplaens.....	23	FIKA 28: Rol blong ol Woman	38
FIKA 15: Rong Waearing (Wiring).....	23	FIKA 29: Eneji Konsevesen	40

LIST OF TABLES

TEBOL 1: Lesen Plan.....	4	TEBOL 4: Komesol mo Non-Komesol Eneji	11
TEBOL 2: Lukluk bong Eneji	10	TEBOL 5: Eneji Konsevesen vs Eneji Efsiensi	17
TEBOL 3: Taeb mo ol Sos blong Eneji	11	TEBOL 6: Eneji Odit Gaedlaen.....	18

“Ol Eneji Efisiensi Besar” training modul hemi wan introdaksen long ol besar blong eneji efisiensi long komuniti. Hemia i kontinu long `Grin Ekonomi Prinsipol modul.

Taem yu komplitim kos, man we i lanem bambae hemi ajivim ol lening aotkam we i stap daon:

- A. Andastanem wanem hemi eneji efisiensi.
- B. Aedentifaem ol wei blong promotem Eneji Efisiensi long komuniti.

- C. Andastanem Eneji Efisiensi standad long kantri.
- D. Evaluesen mo Seleksen blong Hae eneji aplaens mo ikwipmen blong yus blong residens mo komuniti.
- E. Developem wan Eneji Efisiensi Inisietiv blong komuniti.

TEBOL 1: Lesen Plan

Japta	Lesen Taeb
Opening Sesen	
1. Aes Breka – Introdaksen	Teori mo aktiviti 1
2. Eneji Efisiensi Besar	Teori
	Aktiviti 2
3. Eneji Efisiensi mo Konsevesen	Teori
	Aktiviti 3
4. Eneji Konsevesen Mesa	Teori
	Aktiviti 4
5. Eneji Efisiensi Teknologi	Teori
	Aktiviti 5
6. Eneji Efisiensi Laboling	Teori
	Aktiviti 6
7. Eneji Efisiensi – Komuniti Inisietiv	Teori
	Aktiviti 7

Lena wokbuk ya (LW) i kamaot long koresponding Trena Gaed (TG). Ol kontent long LW ya oli mekem i kam isi mo samaraesem, wetem fokus long ol daekram, pija mo ol koresponding aktiviti we i save alaoem man we i lanem blong stap enkej wetem trena long taem blong training. Sipos yu

wantem kasem moa infomesen long eni seksen, plis lukluk i go long koresponding TG.

Pija long kava: Australian Energy Rating Label. Sos: <https://www.energy.gov.au/households/energy-rating>, Aksesem long 13/08/21.

Disklema: Global Green Growth Institute i no save mekem eni jenis/waranti, we maet long ekpres o implae, o asum long eni likol laeabilti o responsibiliti blong akuresi, kompliti, o eni namba 3 pati we i yusum, o risal blong eni kaen yus, blong infomesen, aparatus, prodak, o proses disklos long ol infomesen we i kontenem long plesia o ripresentem se yus blong hem bambae hemi no go ova long praevet raet blong hem wan.

GLOSERI

Seket Breka: Wan aplaens blong tripim elektrisiti taem i gat ovalod/sot seket.

Kompusen: Wan miks blong ea mo fuel long raet kwantiti, raet tempereja, mo raet miks blong fuel blong bon.

Komesol Sos blong Eneji – Hemi ples we yu pem sos blong eneji – col, petrol, gas, elekriksiti.

Eneji Odit - Wan jek long eneji konsamsen we man i ekspektem bes long ret paoa konsamsen olsem nem plet mo stret eneji konsamsen long mita/eneji bill.

Eneji Konsevesen: Avoedem yus blong eneji taem i no rikwae (e.g., Swijim of ol laet mo fan, wud stov taem i no rikwae, TV taem nogat man i wajem, aedil ran blong ol pamp).

Eneji Efisiensi: Yusum ol niufala teknoloji aplaens blong sevem eneji inlaen wetem yus blong ol advans sistem (e.g. – LEDs Eneji Eficient pamp, eneji eficient refrijereta.

Nem Plet: Ol ditel ikwipmen ditel – Ol Volt, Amps, watts.

Nonkomesol sos blong eneji – wea hemi avelebol fri – Wud we oli kolektem long fores, biogas.

Polusen – kes ya i kamaot taem smok i kamaot long ol fuel we i bon.

Paemeru Sos Eneji – Avelebol long graon -col, petroleum, gas, jakol

Sekonderi sos blong eneji – Kamaot long praemeru sos blong eneji – Elektriksiti, stim, hot wota.

OL SOTFALA TOKTOK

AC	Alternating Current
°C	Degrees Celsius
BHP	Brake Horsepower
CFL	Compact Fluorescent Lamp
CO ₂	Carbon Dioxide
CSR	Corporate Social Responsibility
DG	Diesel Generating
EC	Energy Conservation
EE	Energy Efficiency
GB	Green Business
GE	Green Economy
GGGI	Global Green Growth Institute
GLS	General Lighting Service Bulbs
HP	Horsepower
HSD	High Speed Diesel
HVAC	Heating Ventilation and Air Conditioning
KOICA	Korea International Corporation Agency
km	Kilometer
KVA	Kilo Volt Ampere
LED	Light Emitting Diode
LPG	Liquified Petroleum Gas
LPH	Liters per Hour
LW	Learner's workbook
MEPS	Minimum Energy Performance Standards
Mts	Minutes
MW	Mega Watts
PIDF	Pacific Islands Development Forum
PNG	Papua New Guinea
RE	Renewable Sources of Energy
RO	Reverse Osmosis
TG	Trainer's Guide
TOT	Training of Trainer
TV	Television
USA	United States of America
V	Volts
W	Watts



1

Aes Breka - Introdaksen

AKTIVITI 1

Ol man we oli lanem kos ya bambae oli introdusum olgeta stat wetem ol nem blong olgeta mo givim samfala toktok blong tokbaot olgeta bakegen – olsem wanem nao bambae bambae oli mekem long taem ya mo wanem nao oli hop blong karem aot long modul ya long en blong dei. O patisipen oli save go moa blong haelaetem ol save blong olgeta long grin bisnis, ol

eksperiens, ol isiu, ol hop mo disae. Mo tu, sipos taem hemi aloem ol patisipen bambae oli save talem wanem tingting blong olgeta long grin bisnis. Ino gat wan raet ansa mo gol blong aktiviti hemi blong mekem ol patisipen blong rilaks mo enkej long sesen.

A large, white, stylized number '2' is positioned on the left side of the page. The background consists of a blue-to-green gradient that transitions from left to right. The number '2' is set against the blue portion of the gradient.

Eneji Efisiensi Besik

Eneji efisiensi hemi wan long ol rod map blong go long “Go grin”. Modul ya hemi link i go long SDG 3- Gud helt mo welbing SDG 7 we hemi afodebol mo klin eneji.

Link i go long SDG Gol

FIKA 1: SDG 3 mo SDG 7¹



2.1 Eneji Besik

Eneji sinario blong kantri we i kavremap i stap daon:

TEBOL 2: Lukluk bong Eneji

Patikula	Fiji	PNG	Solomon Islands	Vanuatu
Praes blong Grid Paoa (USD long wan kWh)	0.07 to 0.15	0.21	0.79	NA
Praes blong paoa jaj we ol lokol oli mekem – mini /maekro-grid blong sola paoa (USD long wan kWh)	0.78 sola haebrid	NA	NA	NA
Praes blong Faeawud (USD long wan bandel)	4.34	NA	2.96 to 3.56 long wan	2.5
Praes blong kerosin (USD long wan lita)	0.69	0.85	0.93	Nogat yus
Praes blong HSD (USD long wan lita)	0.81	0.91	1.00	2.2

2.2 Praemer i mo Sekonderi Sos

Praemer i eneji hemi eneji we i havest daerek long sos blong hem, hemia i inkludum biomas, wind, sola, naturol gas, petroleum, sam moa.

Sekonderi eneji hemi eneji we kam long transfomem praemer i eneji, elektriksiti, biofuel.

1 Source: Adapted from Sustainable Development Goals Homepage, <https://spp.cmu.ac.th/category/sustainable-development-goals/>

Eneji hemi saplae long ol kaen fom ya:

TEBOL 3: Taeb mo ol Sos blong Eneji

Ol Taeb blong Eneji	Sos blong Eneji
Biomass/ wud blong kuk long rurol eria. Baeomas we oli yusum hemi wud mo doti blong akrikolja (skin blong kokonat mo sel).	Praemeru Sos
Samfala baeomas oli yusum long wud mo suka indastri blong jeneretem paoa.	Praemeru Sos
Impot Fosil Fuel men wan nao ol petroleum prodak blong yusum long transpot, paoa jeneresen tru long ol DG set.	Praemeru Sos
Elektriksiti jeneresen moa nao long haedro paoa wetem smol kontribusen long wind / sola eneji.	Sekonderu Sos

2.3 Komesol mo non komisol sos blong eneji

Ol difren samting bitwin komisol mo non – komisol sos i stap long tebol we i stap long tebol 4 daon.

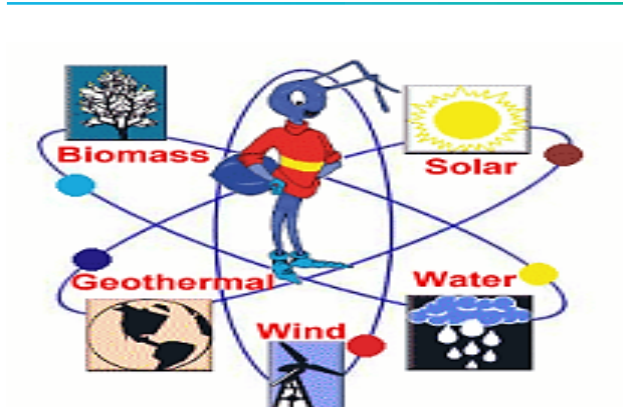
TEBOL 4: Komesol mo Non-Komesol Eneji

Taeb blong eneji	Maket Praes Avelebliti	Eksampol
Komesol eneji	Yes	Elektriksiti, col, wan sofsof braon col (lignite), oel mo natural gas
Non-Komesol Eneji	No	Faea, sisit blong buluk, doti blong akrikolja, sola eneji, wind eneji sam moa.

2.4 Riniwabol mo non riniwabol sos blong eneji

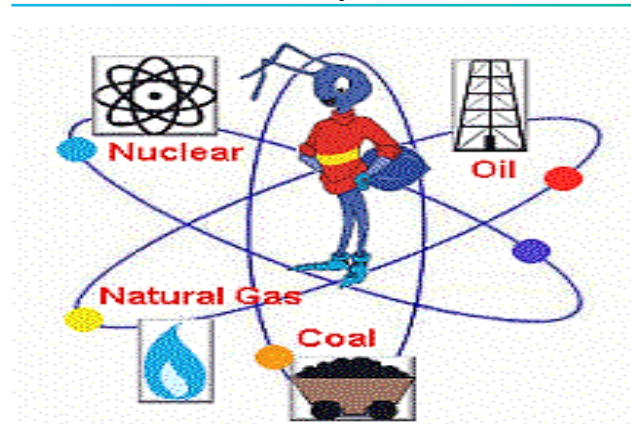
Non-Riniwabol Eneji (Fika 3) – hemi wan naturol risos we naturol ino save tekem ples blong hem long wan inaf kwik step blong kipim i antap wetem konsampsen olsem fosil fuel: Col, disel, petrol, naturol gas mo sam moa.

FIKA 2: Ol Riniwabol Eneji Sos²



Riniwabol Eneji (Fika 2) – hemi eneji we i kam long ol risos, we hemi naturolu tekem ples long taemskel blong ol man, olsem sanlaet, wind, ren, taed, ol wev, mo jiotemol hit. Riniwabol eneji oltaem hemi provaedem eneji long ol fofala impoten difren eria: elektriksiti jeneresen, hit/kolkol, transpot.

FIKA 3: Non- Riniwabol Eneji Sos³



² Adapted from Slideshare.net, "Renewable and Non-Renewable Sources of Energy", <https://www.slideshare.net/oneworld.abhiraj/renewable-and-non-renewable-sources-of-energy>

³ Adapted from Slideshare.net, "Renewable and Non-Renewable Sources of Energy", <https://www.slideshare.net/oneworld.abhiraj/renewable-and-non-renewable-sources-of-energy>

Sam long ol non-riniwabol sos blong eneji oli:

6. Nuklia Eneji.
7. Fosil Fuel (Naturol Gas, Oel, Col, Petrol sam mo.).

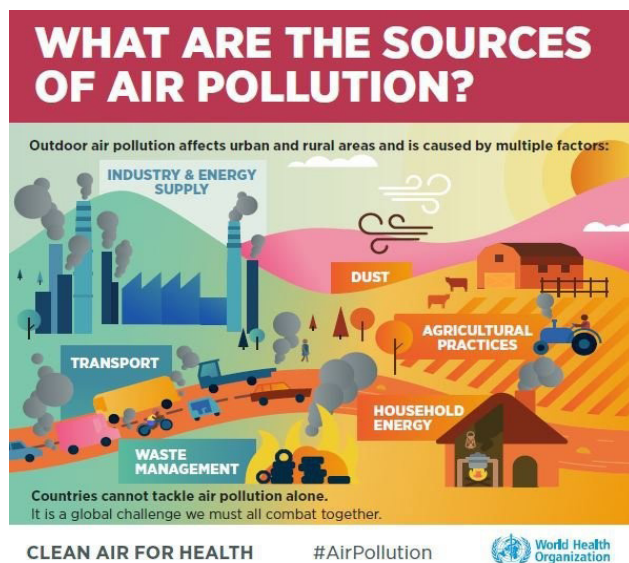
Elektriksiti we i jeneret long gas o disel-bes paoa plant hemi kosem polusen, be elektriksiti we i jeneret long sola, wind o Pico-haedro hemi fri long polusen.

FIKA 4: Sarakata Haedro-Santo, Vanuatu⁴



Konstraksen blong wan bigfala haedro dam we i stap long hil long ol men perenial reva. Konstraksen blong hem oltaem hemi risal long distraksen blong fores mo ol vilej blong flad we hemi lid i go blong gavman i spenem wan bigfala amaon blong mane blong riloketem ol man blong vilej.

FIKA 5: Ol samting we oli kosem Polusen wetem ol Sos blong olgeta⁵



⁴ Source: Catalogue of Rivers for Pacific Islands, Vanuatu, http://www.pacificwater.org/_resources/article/files/Vanuatu.pdf

⁵ Adapted from the Climate and Clean Air Coalition; World Health Organization Releases New Global Air Pollution Data; <https://www.ccacoalition.org/en/news/world-health-organization-releases-new-global-air-pollution-data>

⁶ Source: GGGI Vanuatu

FIKA 6: Ol Aktiviti blong man mo Polusen⁶



Fika 6 antap i soem fasin blong kliarem bus mo bonem bifo planem ol kakae. Hemia i fasin blong polusen. Mo tu smok long ol stov mo faeawud oli risal long polusen mo resparetori problem. Yumi mas tekem mesa blong katemdaon polusen.

Ol Not:

AKTIVITI 2

Taget: Lokol gavman ofisol, Provinsol Kaonsel, Ol Distrik Kaonsel, Ol Town Kaonsel, Aelan Kaonsel, samfala moa.

1. Wanem nao ol sos blong eneji we yu wantem blong promotem long lokol fasin long komuniti?

2. Wanem nao ol non-riniwabol sos blong eneji yu sud em blong katemdaon konsamsem?

3. From wanem nao oli kolem elektrik eneji olsem sekonderi sos blong eneji?

4. Olsem wanem nao bambae yu katemdaon polusen long komuniti blong yu?

Taget: Tredisonal komuniti/rilijes lida, ol woman, ol yut, mo valnarebol grup (mama we oli nogat man, ol olfala, sam moa).

1. Givim nem blong sam eneji sos we oli yusum long Fiji, Vanuatu, PNG, mo Solomon Aelan?

2. Lukluk long pija mo givim nem olsem riniwabol mo non riniwabol sos blong eneji.

Pija	Riniwabol / Non Riniwabol
 7	
 8	
 9	
 10	

3. From wanem oli kolem elektriksiti wan sekonderi sos blong eneji?

4. From wanem ol haedro elektrikol plant oli no fren blong envaeromen?

7 Source: Wikipedia, <https://en.wikipedia.org/wiki/Firewood>

8 Source: Smell of Petrol/gasoline Liquid Facebook page, <https://www.facebook.com/Smell-Of-Petrolgasoline-Liquid-112870246813830/>

9 Source: Hyperleap, Micro hydro, https://hyperleap.com/topic/Micro_hydro

10 Source: Power info Today, <https://www.powerinfotoday.com/wind-energy/dubai-to-build-uaes-first-wind-farm/>

Taget: Lokol man blong wokem elektrik, ol man we oli gat teknikol skil mo sam moa.

1. Wanem nao ol step we bambae yu tekem blong muv aot long konvensonal eneji sos?

Taget: Smol Bisnis

1. Wanem nao ol bisnis aktiviti we maet yu konsidarem, bes long japta?

2. Olsem wanem nao bambae yu mekem blong mekemsua se yu katemdaon polusen long bisnis aktiviti blong yu?

3

Eneji Efisiensi mo
Eneji Konsevesen

—————

Yumi nidim blong andastanem ol difren samting bitwin eneji konsevesen mo eneji efisiensi. **Eneji Konsevesen** hemi blong kamaot long ol doti yus blong eneji. Plis tingbaot mesej long Fika 7.

Livim faea i on from we yu nidim afta long wan aoa hemi no wan gud praktis Hemi rikomen blong putum aot faea mo laetem bakegen taem yu nidim. Hemi i help blong no mekem smok i kamaot mo polusen mo tu i sevem fuel.

FIKA 7: Eneji Konsevesen- eksampol¹¹



Hemi komon blong faenem ol laet mo fan oli stap on nating we ino nidim. Mekem i kam wan habit, blong swijim of ol laet mo ol fan we ino gat yus long hem!

FIKA 8: Eneji Efisien Teknologi- Nomol Vs LED



Nomol Bulb¹²



LED¹³

Eneji Efisiensi hemi fasin blong pem mo yusum eneji eficient ikwipmen mo aplaens. Fika 8 antap i soem wan nomol bulb mo wan eneji eficient LED bulb. Wan nomol wan hemi konsumem 60 W blong paoa blong elektrik be LED hemi konsumem 7W nomo blong givimaot semak amaon blong laet. Wan nomol bulb hemi kostem smol nomo long 100 vatu olsem. Mane blong blong gudfala kwaliti LED hemi kostem klosap 200 vatu olsem.

TEBOL 5: Eneji Konsevesen vs Eneji Efisiensi

Eneji Konsevesen	Eneji Efisiensi
Swijim of ol laet mo fan taem yu no no nidim.	Yusum LEDs mo Eneji Eficient fan.
Yusum stret taeb blong suspen/pot (vesel) blong kuk 1lita/0.5 lit mo kavremap wetem lid.	Eneji Eficient Wud stov blong kuk.
Swijim of TV taem yu no nidim.	Pem wan eneji eficient ret star TV.
No mas rlego pamp i ran taem yu no yusum.	Pem eneji eficient pamp.
No mas lego enjin i ran taem yu no yusum.	Pem eneji eficient enjin blong bot.

Praktisim wan eneji eficient mesa taem yumi stap develop hemi moa isi mo jip i winim we yumi stap pefom long wan develop

sistem we i stap finis. Hemia hemi wan bigfala opotuniti blong kantri blong yumi Vanuatu mo ol narafala Pasifik Aelan kantri.

11 Source: The Cure Inc., https://www.thecuresafety.com/NOTICE_Turn_Off_When_Not_In_Use_Large_p/nga23pb.htm

12 ANY-LAMP.COM, <https://www.any-lamp.com/standard-incandescent-low-volt-clear-a55-e27-60w-36v-8719157999748>

13 Source: Media-amazon, Led bulb, <https://m.media-amazon.com/images/I/31R-yJ3hstL.jpg>

3.1 Eneji Odit

Hemia oli yusum long ol bigfala indastri, bilding, mo risot blong ol turis. Hemia i minim nomo se yu andstanem gud wanwan ikwipmen we oli instolem, mo yu save gud hamas

eneji hemi konsumem dipen long aoa blong operesen. Hemia i kompea wetem bil blong eneji (elektrik, fuel, gas) mo mesarem long stat blong sevem eneji, mo tu plan blong pem eneji. Ripresentativ gaedlaen i stap daon:

TEBOL 6: Eneji Odit Gaedlaen

Aplaens	Namba blong unit	Paoa	Namba blong ol Aoa	Eneji
		w	yusum	kWh/dei
LED Balb	2	9	4	0.072
Fan	1	70	12	0.84
Frij	0	200	0	0
TV	1	100	6	0.6
Jajem batri				0.05
Totol (kWh/dei)				1.562
Totol (kWh/manis)				46.86

AKTIVIT 3

Taget: Lokol gavman ofisol, Provinsol Kaonsel, Distrik Kaonsel, Town Kaonsel, Aelan Kaonsel, samfala moa.

1. Wanem nao ol eneji konsevesen mo eneji efisiensi mesa we bambae yu tekem long ofis blong yu?

2. Olsem wanem nao bambae yu kondaktem eneji odit long ofis blong yu?

Taget: Tredisonal komuniti/rilijes lida, ol woman mo yut mo ol valnerebol grup (ol mama we oli nogat man, ol olfala), sam moa.

1. Wanem nao ol difren samting bitwin eneji efisiensi mo eneji konsevesen?

Taget: Lokol man blong mekem elektrik, ol man we oli gat plante teknikal skil, sam moa.

1. Olsem wanem nao bambae yu praktisim eneji efisiensi mo eneji konsevesen long wok blong yu evridei?

Taget: Smol Bisnis

1. Wanem nao ol mesa we bambae yu tekem blong eneji konsevesen mo eneji efisiensi?

Ol Not:

4

Eneji Konsevesen
Mesa

4.1 Kuk

FIKA 9: Ol man oli Karem Wud¹⁴



Faeawud hemi wan bigfala fuel blong yusum blong kuk. Kerosin hemi wan risos we i gat limit mo i gat limit yus blong gas nomo (LPG). Oli kolektem faeawud long ol fores akrikolja fil klosap. Ol man espeseli ol woman oli responsibol blong karem faeawud (Fika 9).

Faeawud ya man i katem long difdifren pis (Fika 10) mo mekem faea long hem long wan isi faeawud stov. Plante taem nao oli putum briks long trifala saed, wetem namba fo saed oli yusum blong kipim faeawud. Oli kipim pot long top blong faea we i laet.

FIKA 10: Eneji Konsevesen - Kuk¹⁵



FIKA 11: Kavremap suspen (pot) wetem lid¹⁶



Dipen long saes mo sep blong pot, ol flem i nid blong spred long botom. Eneji efisiensi blong kuk i dipen tu long saes blong ol pot. I nidim blong selektem folem kwantiti blong kuk. Sipos yu nidim blong boilem wan kap blong milk, jusum wan smol pot. Blong boilem wan lita blong wota yusum bigfala pot. Plis no mas yusum bigfala pot from smol kwantiti. Hemi impoten tu blong kipim lid long pot blong blokem hit blong ino kamaot (Fika 11).

14 Source: Vanuatu Images, <https://vanuatuimages.wordpress.com/2015/03/16/the-happy-people-of-vanuatu-2/>

15 Source, GGGI, Vanuatu.

16 Source: Wikipedia, "Clay pot cooking", https://en.wikipedia.org/wiki/Clay_pot_cooking

FIKA 12: Eneji Efisien Kuk Stov¹⁷**FIKA 13: Eneji Efisien Kuk Stov
Demonstresen Vanuatu¹⁸**

Fika 12 soem wan eneji ifisiensi kuk stov mo Fika 13 i soem wan demonstresen blong kuk long Vanuatu.

Eneji wok stov prinsipol i stap daon:

1.	Wan grill o fuel makasin blong putum fuel.	
2.	Kompasen Jemba we ea i go insaed long botom mo miks wetem fuel.	
3.	Top blong putum pot blong kuk mo ekshos gas.	

¹⁷ Source; GGGI Vanuatu

¹⁸ Rotary Club Vanuatu; "Vanuatu Smokeless Cook Stove Project", <https://portal.clubrunner.ca/3761/sitepage/vanuatu-project>

4.2 Eneji Konsevesen Praktis – Hom Aplaens

FIKA 14: Hom Aplaens¹⁹



Fika 14 Hemi soem ol yus blong hom aplaens. Hemia hemi wan lis blong ripresentativ we i save difdifren long wan komuniti mo nara komuniti. Ol oda blong konsevem eneji long domestik haoshol hemi:

1. Swijim of ol laet, fan mo TV taem yu no nidim.
2. Yusum deilaet taem i gat inaf san hemi avelebol – maet fasin ya oli praktisim gud long rurol eria i bitim urban eria.
3. Kipim ol windo i open blong alaoem fres ea.
4. Plis tingbaot blong tekemaot mobael jaja long soket, taem i jaj fulwan No mas mekem fasin blong konektem tumas kadjet (gadgets) long wan sinkel soket. (Fika 15)
5. Jekem mo riplesem eni waea we brok kwiktaem (Fika 15).

FIKA 15: Rong Waeing (Wiring)²⁰



19 Prime Reviews, How Many Watts Do Appliances use?, <https://primereviews.org/how-many-watts-do-appliances-use/>

20 iStock, "Overcrowded power board", <https://www.istockphoto.com/photo/overcrowded-power-board-gm497064074-78919287>

4.3 Eneji Konsevesen Praktis – Wota Pamp

Komuniti i yusum wota from domestik pepos (drink, was, kuk) mo from akrikolja.

A ²¹	B ²²	C ²³	D ²⁴	E ²⁵
				

FIKA 16: Ol Taeb blong Pamp

Fika 16 Hemi soem taeb blong pamp avelebol blong domestik/ akrikolja. Olgeta ya hemi:

1. Han Pamp Nogat elektrik paoa. Man paoa nomo we praes hemi samples VT5,000.
2. Horaesontol Pamp – 3HP klosap VT20,000.
3. Sabmesibol Pamp- 3HP klosap VT30,000.
4. Sola Pamp -VT150,000.
5. Disil Enjin Draev Pamp- VT50,000.

Samtaem oli yusum petrol enjin blong draevem olteneta (generator) blong jeneretem paoa.

Ol gaedlaen daon bambae oli helpem yu blong konsevem fuel mo katemdaon marin polusen.

1. Oltaem mas selektem petrol enjin blong majem nid blong yusum.
2. Petrol enjin i yusum wan blend blong petrol mo oel (zoom) olsem fuel. Hemia hemi 2 strok enjin. Fo (4) strok enjin i yusum petrol olsem fuel mo oel blong lubriketem. Enjin i save ran tu long biogas. Etanol mo blend fuel.
3. Hemi impoten blong pem wan gudfala kwaliti fuel long wan gudfala petrol pamp.
4. Ol enjin bambae oli gat wan tank we i joen long enjin mo tu petrol bambae i flo i go long enjin. Hemi gud blong taem yu konektem paplaen blong yusum bambae i mas wan metol olsem plastik mo raba paep oli isi blong damej mo disil i save lik.
5. Jekem blong ino givimaot smok blong talemaot pua kombusen (combustion).

4.4 Eneji Konsevesen – Aotbod Moto Enjin

FIKA 17: Petrol Enjin blong wan Bot²⁶



21 National Geographic, "Freshwater pump", <https://www.nationalgeographic.org/encyclopedia/freshwater-access/>

22 Amazon.in, "Kilroskar Aqua 50 Water pump", <https://www.amazon.in/Kilroskar-0-5hp-Aqua-Water-Pump/dp/B07DRJ5QXM/ref=>

23 India MART, "Agricultural Submersible Pump", <https://www.indiamart.com/proddetail/agricultural-submersible-pump-21280879233.html>

24 India MART, "Solar Water Pump", <https://dir.indiamart.com/udaipur/solar-water-pump.html>

25 Sunny Power, "Diesel Engine and Electric Self-Priming Centrifugal Pump", <https://wfsunny-machinery.en.made-in-china.com/product/nwxfgsFvRkO/China-Diesel-Engine-and-Electric-Self-Priming-Centrifugal-Sewage-Pump-Sh-24-Inches-Water-3170m3-H-Power-400kw.html>

26 Shutterstock.com, "Speed Boat's Engines", <https://www.shutterstock.com/image-photo/speed-boats-engines-full-drive-andaman-423324811>

AKTIVITI 4

Taget: Lokol gavman ofisol, Provinsol Kaonsel, Distrik Kaonsel, Town Kaonsel, Aelan Kaonsel, sam moa.

1. Wanem nao ol eneji efisien mesa long komuniti?

2. Olsem wanem nao bambae yu helpem komuniti blong kam eneji eficient?

Taget: Tradisonal komuniti/rilijes lida, ol woman, yut, mo valnerebol grup (ol mama we oli nogat man, ol olfala

1. Wanem nao ol denja ifek blong metod naoia blong kuk long komuniti?

2. Wanem nao ol besik prinispol blong eneji efisien stov?

3. Mekem lis blong samfala step blong eneji konsevesen?

4. Majem ol taeb blong Pamp blong lukluk long Pija?

Pija	
	
	
	
	

5. Wanem nao ol advaes blong eneji long ol pamp?

Taget: Lokol man blong elektrik, ol man wetem plante teknikal skil. Mo sam moa.

1. Mekem lis blong ol mesa we bambae yu praktisim long ples blong wok blong eneji efisiensi.

Taget: Smol Bisnis

1. Olsem wanem nao bambae yu mekemsua se bisnis aktiviti blong yu oli eneji efisient?

Ol Not:



5

Eneji Eficient
Teknoloji

5.1 Ol Oltenet Fuel.

Ol Biomass Pelets

FIKA 18: Ol Biomass Pelet²⁷



Oli mekem ol Biomass pellet aot long srabs (shrubs), faeawud mo doti blong loging blong yusum from fuel, mo gudfala samting hemi from fuel blong kuk hemi fri mo i gat siro valiu long saed blong mane, mo i produsum smol smok mo smol polusen.

Teknoloji ya oli no yusum long ol kantri we yumi kavremap. Yet hemia oli givim olsem eksampol blong developmen long fuja olsem gudfala grin bisnis inisietiv.

Biogas Plant

Oli yusum biogas plant blong rikavarem biogas blong kuk mo aotlet blong biogas plant olsem fetalaesa. Seperet long kuk, biogas i save yus long enjin mo ol gas laet.

FIKA 19: Biogas Plant Vanuatu Akrikolja Kolej²⁸



Grin Bisnis Besik modul i kavremap bisnis opsen blong biomass pelet.

5.2 Eneji Efisiensi Teknoloji – Ol Laet mo ol Fan

FIKA 20: Ol Laetning Sos

A ²⁹	B ³⁰	C ³¹	D ³²
			

27 India MART, "Biomass Pellets", <https://www.indiamart.com/utsav-biofuel-industries/biomass-wood-pellet.html>

28 Energy Focus Newsletter, "Official launching of the Vanuatu Agriculture College Biogas System", https://doe.gov.vu/images/docs/News-Events/ENERGY-Newsletter_-_One.pdf

29 Shutterstock Images, "Kerosene lamp", <https://www.shutterstock.com/image-photo/kerosene-lamp-lantern-on-wooden-background-560089849>

30 Source: ANY-LAMP.COM "Standard Incandescent Low volt Clear", <https://www.any-lamp.com/standard-incandescent-low-volt-clear-a55-e27-60w-36v-8719157999748>

31 Source: Amazon.in, "Philips Essential CFL (Cool Day Light, 14W)", <https://www.amazon.in/Philips-ESSENTIAL-14-00-Watts-Light/dp/B00K9096LK>

32 Source: Amazon.in, "Luker 3- Watt Led Bulb (Pack of 3, Cool Day Light)", <https://www.amazon.in/Luker-3-Watt-Bulb-Pack-Light/dp/B0756BMR35>

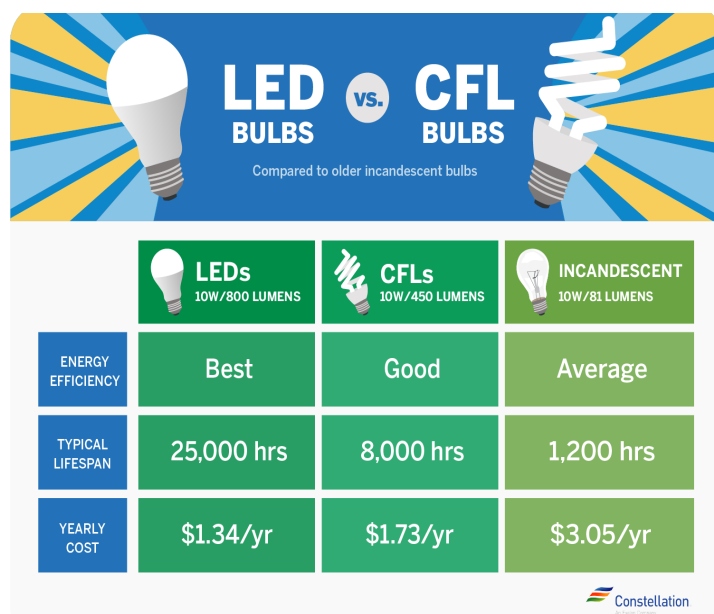
Moa long ol komuniti i stil yusum kerosin laet (Fika 20A) mo ol kandel blong laet. Kerosin laet i givimaot smok. Glas blong laet i nidim blong klin oltaem. Objektiv blong program hemi blong promotem fasin blong stopem kerosin long eneji efisient laet.

Fika 20B i soem jenerol braet (incandescent laet (balb). Hemia hemi fesfala vesen blong laet sos mo hemi jip. Fika 20C hemi kompak fluorescent lamp (CFL) mo niufala vesen hemi LED -Fika 20D (Laet Emitting Diode).

Nao seperet long bigala kuk eneji nod blong komuniti hemi eneji efisient Laet.

Komparesen blong LED balb mo wan CFL balb mo wan braet (Incandescent) balb i stap daon long Figa 21 (eneji cost long USD).

FIKA 21: Komparesen blong ol Laet Sos³³



FIKA 22: Eneji Efisient Ikwipmen³⁴



³³ LED Vs CFL Bulbs: Which is More Energy, <https://blog.constellation.com/wp-content/uploads/2016/03/CFL-vs-LED-bulbs.png>

³⁴ Red refrigerator, <https://www.spiele-schenken.top/ProductDetail.aspx?iid=191426532&pr=87.99>

Wan taeb blong eneji efisient fan mo refrijereta oli stap long Fika 22. Olsem wanem oli komperem hemi stap daon long Tebol 7.

TEBOL 7: Komparesen blong Eneji efisient Fan mo Frij.

Ikwipmen FAN	Konvensional	Eneji Efisient
Paoa Konsamsen – Siling (W)	70	30
Averej Eneji konsampsen blong 1000 Aoa (kWh)	70	30
Eneji konsampsen long lo spid	Nogat jenis	Loa from elektronik rekulesen
Cost (USD)	15	45
Ekwipmen Refrijereta	Konvensional	Eneji Efisient
Nomol Opereting Tempereja (°C)	Dip Frisa (-18) Frij 3 – Manuol Kontrol	Dip Frisa (-18) Frij 3 – Otomatik Kontrol
Aproksimet Eneji konsampsen (kWh) 250 lita	700	400
Cost (USD)	500	650

5.3 Eneji Efisient Teknologi-Entatenmen mo Komunikesen

FIKA 23: Mobael Jaja mo TV³⁵



Long ol dei blong moden komunikesen, mobael fon jaja (Fika 23) hemi moa wan nid. Voltej, kapasiti blong selfon jaja i mas stret long fon. Pua kwaliti jaja i yusumap moa paoa mo i tekem long taem blong jaj.

Hemi sevem eneji mo sev, yusum wan gudfala kwaliti jaja mo mekmsua se hemi konekt long wan stret soket wetem korekt voltej mo tingbaot blong tekemaot jaja blong mobael fon long soket.

5.4 Aedentifikesen blong Eneji Efisient Ikwipmen

Oltaem eni kadjet (Gadget) bambae i kam wetem nem plet. Jekem long Voltej blong yusum (230 V) mo paoa konsamsen (w). Ripresentativ nem plet oli givim daon:

FIKA 24: Nem Plet – LED³⁶



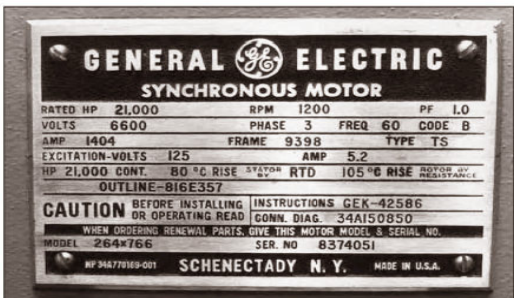
Nem plet hemi soem 10W we hemi paoa konsamsen, mo opereting voltej hemi 220 kasem 240V.

2. Evri eneji efisient ikwipmen i kam wetem karenti. (5 yia blong LEDs, 3 yia blong fan, 10 yia blong refrijereta kompres). Hemi ol eksampol mo i save difdifren long wan kantri i go long nara kantri. Tingbaot oltaem karenti.

³⁵ Energy Star "Television", <https://www.energystar.gov/products/televisions>

³⁶ Power Electronics talk; LED bulb with CE mark; <https://www.powerelectronicstalks.com/2018/10/ce-and-ce-mark-process.html>

FIKA 25: Nem Plet Moto

A ³⁷ Nomol Moto	B ³⁸ Eneji Efisien Moto (lukim IE4 and 86.5% efisien)
	 GE Motor Name Plate Details

AKTIVITI 5

1. Wanem nao ol difren samting bitwin biomas pelet mo biogas?

2. Stetem se ol stetmen daon oli tru /Nogat

Laet Sos	Tru o kiaman	
	Smol polusen	
	Jip laet sos	

37 Source: Electrical4 u, Nameplate, <https://www.google.com/search?q=https%3A%2F%2Fwww.electrical4u.net%2Fnameplate-details%2Fsynchronous-motor-nameplate-details-explanations%2F&rlz=>

38 Montana Resource Efficiency Project; <https://www.electrical4u.net/nameplate-details/synchronous-motor-nameplate-details-explanations/%20/www.mtefficiency.org/energy-efficient-motors-toolkit/>

	Jeneretem bigfala hit.	
	Moderet efisient	

3. Wanem nao eneji konsampsen blong eneji efisient fan mo eneji refrijereta?

4. Wanem nao ol nomol operating tempereja blong wan frij?

OI Not:

6

Eneji Efisiensi
Lebol

Wanem hemi eneji sta reting?

Eneji sta reting hemi abaot eneji efisiensi, hemi olsem wanem nao wan model hemi rilet long ol narafala model blong semak saes. Gavman hemi spesifaem ol Minimam Eneji Pefomens Standad (MEPS) we i sua long hem. Hemia Loa i setemap

blong samfala ikwipmen. Lebol blong eneji sta ikwipmen i talemaot klia eneji konsampsen long wan yia.

Program ya bambae hemi aplae feswan long ol refrijereta mo Frisa. (Fika 26).

FIKA 26: MEPS Labol -Vanuatu³⁹



Vanuatu i gat Enfosmen blong ol Elektrikol Aplaens mo Ikwipmen Laetning Prodak Akt. We aplaens i mas mitim standad blong Australia mo New Zealand.

OI Not:

39 Sustainability Victoria, "Energy rating labels," <https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/save-energy-in-the-home/energy-rating-labels>

AKTIVITI 6

Blong evri taget grup

Wanem hemi eneki sta reting?

7

Eneji Efisiensi
Komuniti Inisiativ —————

Evri memba blong komuniti i mas aprisietem nid blong konsevem eneji, pem eneji efisient ikwipmen mo yusum riniwabol sos blong eneji.

FIKA 27: Ol Eneji Efisiensi Inisietiv⁴⁰



Fika 27 hemi eksplenem konsept blong eneji Efisiensi. Long eneji efisiensi taem yu sevem wan watt blong paoa hemia ol narafala man oli save yusum. Hemia bambae i sevem mane blong inves long paoa plant, Komuniti lida tu i mas gat otoriti blong priventem ol man blong no adoptem eneji efisiensi praktis.

7.1 Rol blong ol Woman, ol mama we oli nogat man, wido, (Ofan) ol pikinini we oli nogat papa o mama

Olgeta nao oli wokbaot mael blong karem faeawud mo wota. Olgeta nao oli fesem smok taem oli stap kuk. Afta long ol hadwok blong dei, olgeta nao oli sidaon klosap long kerosin laet. Eneji efisient inisietiv bambae hemi impruvum kwaliti blong laef blong ol woman.

FIKA 28: Rol blong ol Woman⁴¹



So, ol woman, ol mama we oli nogat man, ofan (Figa 28) oli ol ki benefiseri blong eneji efisient advantej. Eneji efisient stov i mekem klin kuk mo katemdaon taem blong kuk. LED lamp mo

sola sistem i givim olgeta moa taem blong wok mo ol pikinini blong stadi mo katemdaon polusen long ol laet blong kerosin.

Ol woman, ol mama we oli nogat man, ofan mo ol valnerebol grup man i mas luksave se oli ikwel patna long inisietiv ya mo bambae i enkarejem olgeta blong patisipet long komuniti diskasen, blong bambae oli fil enkarej blong patisipet long ol komuniti diskasen, blong bambae oli karem opotuniti blong serem ol eksperiens blong olgeta mo kontribut long ol tingting blong implementesen blong eneji efisient inisietiv, mo no lego wan biae.

Ol Not:

⁴⁰ Source: Energy and Climate partnership of the Americas, <https://ecpamericas.org/news/today-is-the-world-energy-efficiency-day/>

⁴¹ World Bank Vanuatu Rural Electrification Project, <https://www.worldbank.org/en/news/feature/2017/05/22/vanuatu-rural-electrification-program-benefits-remote-communities>

AKTIVITI 7

Taget: Lokol gavman ofisol, Provinsol Kaonsel, Distrik Kaonsel, Town Kaonsel, Aelan Kaonsel, sam moa.

1. Olsem wanem nao yu promotem eneji efisiensi inisietiv long komuniti blong yu?

2. Olsem wanem nao yu mekemsua se patisipesen blong ol woman mo ol narafala valnerebol grup oli patisipet long ol aktiviti?

Taget: Tredisonal komuniti/relijas lida, ol woman, ol yut mo ol narafala valnerebol grup (ol mama we oli nogat man, ol olfala), sam moa. Lokol man blong elektrik, ol man we oli gat plante teknikal skil, plante moa.

1. Givim nem blong sam long ol eneji efisient blong komuniti?

2. Olsem wanem nao eneji efisiensi inisietiv?

Taget: Smol Bisnis

1. Olsem wanem nao japta ya i helpem yu long bisnis?

Blong konklud:

FIKA 29: Eneji Konsevesen⁴²



Gohed blong mekem edukesen mo awenes kampen blong ol komuniti blong aprisietem ifek blong eneji konsevesen. Muv blong go long eneji efisien ikwipmen mo riniwabol sos blong eneji bambae i risal long moa eneji efisien ekonomi, impruvum kwaliti blong laef blong yumi mo krietem wan sastenebol komuniti.

HEMIA I ROD BLONG GO LONG ENEJI EFISIEN SOSAETI.

Rol Ple 1

Memba blong komuniti bambae oli aktem wan rol ple. Blong mekem, ol lena bambae oli voluntia, o trena i save jusum ol lena blong aktemaot wanwan rol. Blong mekem ple ya, 5 man i nidim blong ple rol blong Kensie (Papa), Vivian (Mama), Paul (pikinini), Ana (tija) mo Moses (prinsipol).

Kensie mo Vivian tufala i liv long wan rurol komuniti. Kensie i wok olsem mekanik long town klosap. Hemi go long town evridei mo kambak let long tudak. Tufala i gat wan pikinini nem blong hem Pol mo hemi gat 10 yia. Hemi stap go long wan skul klosap. Vivian i girap long eli moning, kukum kakae fulumap lanj blong Kensie mo Pol. Taem tufala i aot long haos, Vivian i go blong kasem wota long wan strim klosap

2km longwe mo tu i kolektem faeawud long rod blong hem. Faeawud we oli kolektem long fores nao i mitim, nid blong olgeta long saed blong kuk mo oli gat smol kerosin laet. Smok blong faewud i mekem Vivian mo Pol tufala i kof. Pol i fosem ae blong hem blong rid.

Tija blong Kensie Ana hemi atendem wan trening program long riniwabol eneji. Manejmen blong skul i bin askem Ana blong tijim ol pikinini long samfala benefit blong riniwabol eneji. Hemi mekem wetem glad hat long tingting se maet samfala long olgeta bambae oli implementem long haos blong olgeta.

Taem san i go daon Vivian i stap kukum kakae. Kensie i stap rilaks afta long hadwok blong dei. Pol i stap stadi mo i tingbaot klas blong tija blong hem

Pol: Papa!!! Mami i stap kuk long faeawud stov, mo mi stap stadi long kerosin laet. Oltaem mi harem mami stap kof from smok long stov ya. Mi stap spolem ae blong mi from laet ino naf long kerosin laet ya. Tede tija blong mi i talem from stov ya we i nogat smok mo tu i gat sola paoa laet. Hemi talem long mi tu se mi save jajem mobael fon blong mi long hem.

Dad: Yes, boe blong mi!!!, Mi harem tu from ol sola laet ya. Mi bin luk long samfala haos taem mi stap go long wok. Ol laet ya oli laet.

42 India Mart; "Energy Conservation Building and Green building", <https://www.indiamart.com/protek-consult/power-conservation-products.html>

Paul: Papa, olsem wanem blong yumi pem wan.

Papa: Oli sas tumas mo wetem smol mane we mi kasem mi no save pem wan. Maet taem bambae mi kasem plante mane, yumi save sevem mane blong pem wan stov ya we ino gat smok mo sola laet.

Pol i filim ino stret wetem ansa blong papa blong hem mo i stat blong tingting. Biaen ino longtaem hemi slip.

Nekis dei taem hemi stap go insaed long skul, hemi mitim tija blong hem.

Paul: Gud Moning Tija.

Ana: Gud Moning, Pol. Yu bin talem long papa mo mama blong yu long wanem we yumi bin tokbaot long riniwabol eneji?

Paul: Yes Tija. Mi bin talem.

Ana: Wanem nao papa blong yu i talem?

Paul: Hemi talem se mifala i pua, mo mifala i no save pem wan.

Ana: O! Bambae mi luk olsem wanem blong helpem yu.

Paul: Tank yu Tija. Plis tingbaot mo letem mi save.

Afta samfala taem, prinsipol (Moses) blong skul i askem Ana long klas blong hem long riniwabol eneji. Ana i talem long prinsipol se ol student blong hem oli pua. Prinispol i talem long hem se ino gat wan problem. Ol bank klosap oli gat samfala skim blong givim loan from riniwabol eneji sistem. Investmen long tugeta eneji efisient stov, mo sola panel mo o laet bae i samples 200 USD. Hemia man i save pamaot long 36 Manis.

Nekis dei long skul

Pol: Gud Moning Tija.

Ana: Gud Moning, Pol. Mi toktok wetem prinsipol, mo hemi talem long mi se bambae hemi arenjem mane long bank from yu blong pem stov mo laet blong yu. Sipos Papa blong yu hemi intres, plis tekem i kam blong bambae mi talem ol ditel long hem.

Paul: Bambae mi talem long hem mo tekem hem i kam.

Long aftenun

Paul: Papa tija i talem long mi long skul se prinsipol hemi arenjem wan loan long bank mo talem blong mi tekem yu go long skul. Hemi talem se bambae hemi tokbaot long yu olsem wanem nao bambae yu mekem.

Kensie: OK. Bambae mi kam mitim tija.

Nekis Dei:

Pol mo Kensie oli go long skul.

Kensie: Gud moning tija. Pol i talem long mi from sola eneji mo tu loan long bank.

Ana: Yes. Yu gat wan smat boe. Sipos yu gat wan gudfala laet bambae hemi save stadi moa, bambae hemi groap mo kam wan gudfala profesonol.

Kensie: Madam! Mi luksave gudfala samting long gudfala laet mo katemdaon smok long wan gudfala stov. Mi no save pem from mi pua.

Semtaem tu prinsipol Moses i kam insaed

Ana: Gud Moning Bigman.

Moses: Gud Moning, Ana. Wanem i hapen?

Ana: Mitim Kensie- Papa blong Pol.

Moses: Halo Kensie. Olsem wanem?

Kensie: Pol i talem long mi from stov mo sola sistem. Nating we mi wantem yusum stov we i nogat smok mo sola sistem, be mi no save pem.

Moses: Yu no wari Kensie. Tumoro bambae yu tekem 1 dei blong no wok mo bambae mi tekem yu go long bank. Bambae mi arenjem wan loan blong yu.

Kensie: Tank yu tumas bigman bambae mi lukim yu tumoro.

Nekis dei prinsipol i tekem Kensie i go long bank mo rikwestem wan loan blong Kensie from sola sistem mo stov. Bank maneja i agri blong givim loan. Hemi talem long prinsipol se bambae oli givim mane stret i go long man we i saplae ikwipmen we bank i apruvum. Kensie bambae i pem bak smolsmol evri manis i go long bank. Kensie mo prinsipol tufala i gobak afta we tufala i komplitim ol rul blong bank.

Wan wik afta, ikwipmen saplae i kasem wetem ol samting ya:

1. Wan Eneji Eficient Stov we i yusum faeawud
2. Wan sola sistem wetem wan LED lamp, batri, wetem wan fan. Sistem ya i gat wan poen blong jajem mobael.

Oli instolem sistem. Vivian i glad tumas long stov we smok i lo. Nomo gat smok oltaem. Pol i glad tumas long braet laet blong hemi stadi.

Tu dei afta, Kensie i go long skul blong Pol blong talem tank yu long tija mo prinsipol from help. Hemi invaetem olgeta i kam long haos blong luk ol sistem.

Ana mo Moses tufala i kasem haos nekis dei long let aftenun.

Kensie: Welkam Vivian mo Moses. Hemia Vivian, waef blong mi mo yutufla i save Pol.

Moses: Gud aftenun. Gud blong lukim gudfala laet mo fasiliti blong kuk.

Ana i eksplenem mo komperem wetem ol materiel we hemi bin tren long hem.

Ana: Sola panel hemi wan we hemi givimaot paoa mo batri i storem paoa. Batri i save givim paoa blong klosap 4 aoa. Yus blong LED laet i katemdaon eneji konsampsen long klosap 60% kompea long nomol balb. Fan ya tu hemi eneji eficient. Olsem wanem long stov blong yu Vivian?

Vivian: I gud tumas i kuk hariap wetem smol fuel konsampsen. Taem blong kuk blong mi i godaon long haf. Tank yu tumas.

Moses: Gud! Tingbaot blong mentenem gud oltaem. Kensie, plis tingbaot blong pem loan evri manis. Sipos yu kliarem loan ya, yu save rikwestem maneja blong givim yu moa mane. Pol!! Naoia we yu gat moa laet stadi gud mo saen gud.

Kensie: Tank yu tumas from help. Bambae mi tekem kea blong pem loan long taem blong hem.

Pol: Tank yu bigman mo tija. Bambae mi stadi gud.

Vivian mo Moses tufala i livim haos mo tufala i glad tumas we tufala i helpem wan famle.









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