



GOVERNMENT OF MEGHALAYA  
INSPECTORATE OF ELECTRICITY  
AND  
STATE DESIGNATED AGENCY ON ENERGY CONSERVATION

## THERMAL POWER PLANT

**BIJOLINI BILKO BIKOTANI, BIJOLINI BILKO BIKOTANI  
SAMTANGTANGO DONGGIPARANGNA NANGCHAKANI,  
BIJOLINI BILKO RIPINGANI ARO UNI GIMIN U'IE RA'ANI.**



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**GOVERNMENT OF MEGHALAYA**  
**INSPECTORATE OF ELECTRICITY AND STATE DESIGNATED AGENCY: SHILLONG**

**BILKO RIPINGANI ARO UNI GIMIN U'IE RA'ANI**

**A'bachengani:**

Iano janapenggipa bilara “bijolini bil” ong’ a aro iako ramramari bil ine agana. Da’ororoni gitalgipa chasongo bijolini bil gimikni janggi tanganio mongsonggipa ong’ a. Iako ka’mao janapgimin biaprango ba bosturangna jakkala:

- i. Nokrango
- ii. Bading chiwalani biaprang
- iii. Bosturangko tariram karkanarang
- iv. Sagipa ding’giparangko sanani biddingo aro hospital-rango
- v. Sorkarini kam ka’ram biap ba nokrang
- vi. Komputar-rangna
- vii. Warachakanina
- viii. Bostu ba manderangko salruraanio
- ix. Bank-rango
- x. Dal’dalgipa aro chonchonggipa bading chiwalanirango
- xi. A’ba ge’ani aro gamanirango, aro uandake gipinrang...

Ia indake, bijoliara da’oni chasongni nangchongmotgipa bostu ong’ a. A’songni namroroani, silroroani aro tang’dorikrikanira bijolini bilo namen pangchaka. Uandake, bijolini bil dongjagenchimode a’songni pilak kamrangan bon’chongdikaona sokgenchim.

Aiao inmanani kattade, bijolini bilan a’ako, chiko aro balwako moila ong’atgipa ong’ a aro uandake a’gilsakni sin’ani ba ding’ani aro uandakgipako dingtangatgipa aro a’gilsakko ding’dapatgipa ong’ a. Uni gimin, samtangtango donggiparango iani nangchakniko komiatna gita bijoliko simsake jakkalanian da’omiting nangchongmotgipa ong’ a aro pilak mandean bijoliko ripingna gita bakko ra’pana nanga. Iani biddingo, India a’songni Sorkari bijolini bilko simsake jakale mikkangchi janggi tanganina ripingna gita ‘Energy Conservation Act, 2001’, ba Bijolini Bilko Ripingani Niam, 2001,-ko ra’gataha.

Bijolini bilko ripingani nangani gimin u’ie ba ma’sie ra’na gita, bijolini bilko banoniko man’ a ba bikotachim, uko u’ie ra’na nangchenga.

**BIJOLINI BILNI A’BACHENGANI**

Energy ba bijolini bilko banoniko man’ a, chanchianirang dongama? Michael Faraday bijoliko bilsi 1831-o bikotaha. Uni ja’manonin, bijoliko dingtangdingtang cholrangchi bikotaniko dakangaha. Iarangni bang’ a namgni aro namgijirang gnang, aro iapilakan an’chingni samtangtango donggiparangko nangchaka.

Bijolini bilni mingsonggipa ong’katram/bikotramrangko bakgni dakeseha, iarang-

- i.) Renewable Energy/Bon’changgija Jakkalna Man’gipa Bil- Iarang salni, balwani, chi-ni, a’ningni ding’ani aro uandakgiparangni biloniko bikotgipa bijolini bil ong’ a. Iarang an’ching samtangtango donggiparangko nangchakani komia. Da’o dipet Meghalaya a’doko chi-ni bilchi bikotgipa bijolini bil 367.5 Mega Watts (MW) ong’ a aro mikka wachi kario man’ a ama. Bijolini bilko salni bilchi bikotanira da’osa a’bachengeng aro baita bikotna man’gen, u’iani dongkuja. Indiba, sorkarini nokrang, jekai NEIGRIHMS, Shillong College, NEIAH, MeECL aro uandakgiparango salni bilko bijoliko bikotna gita jakkalenga.
- ii.) Non-Renewable Energy/Bon’changgija Jakkalna Man’gijagipa Bil- Iarang koela, to, a’ningoni ong’katgipa balwa aro uandakgiparang jekon ‘fossil fuel’ ine minga aro jean changsa jakkalni ja’man a’gilsako uarangni dongani ba ong’ani komiangachim, uarangoniko bikotgipa ba man’gipa bijolini bil

ong'a. Iarang bon'chongdikna amgipa ong'a aro chanchigija jakkalanichi changsao iarangko a'gilsako man'taijawaha. Fossil fuel-rangchi bijolini bilko bikotanichi balwa ko nosto ka'a ba moila ong'ata aro uandake a'gilsakko ding'dapata aro karirangko dingtangata. Meghalaya a'doko koela-chi bikotgipa bijolini bil 110.50 mega Watts (MW) ong'a aro iarangko Lumshnong, East Jaintia Hills, Riang, West Khasi Hills, aro Byrnihat, Ri-Bhoi District-rango nikna man'a. Diesel-oniko bikotgipa bijolini bil 10.50 Mega Watts (MW) ong'a.

**Samtangtango Donggiparangko Nangchakani:** Da'oni chasongo bilsi ritchagnina skangba 19<sup>th</sup> century-na bate 1.2°C ding'batha. Climate change ba biapni sal mikka aro ugita sin'a ding'ani dingtanganiara mikkachima wagija sal rakaniko, chi tipaniko, sagalni chini dal'aniko aro bolwa'a aro matburunrangni gimaaniko ra'baa. Koela ko so'anichi carbon monoxide, carbon dioxide, sulphur dioxide, nitrous oxide, methane aro uandakgipa balwarangko ong'katata aro iarang mandena aro biapni sal mikka aro ugita sin'a ding'anirangna namgijani ong'a. Koelako so'aniara jabol ong'katatde samtangtango moila dakata.

Aro uandake koela so'ani ding'ani balwa ba wal'ku bangbangona ong'katbae a'gilsakni balwako ding'dapata. Koela so'gipa biapni samtangtango a'a aro balwa moila ong'a.

Fossil fuel-rang jekai diesel ba petrol rangko jakkalanichi ba sal mikka aro ugita sin'a ding'anirangko nangchaka ba dingtangata. Iandakgipa torangko jakkalanichi maidakgipa namgijagipa balwarang ong'katachim, uko science-ni gita ka'mao on'gimin gita janapata:

Kame so'gipa engine-oni ongkatgipa balwa <i>Mesokgiminrang on'iisa bata bakomia, tiktakde ong'ja</i>	Chu'gimikni %	
Bostubabalwa	Petrol	Diesel
Nitrogen	71	67
Carbon dioxide	14	12
Water vapor	13	11
Oxygen	0	10
Trace elements	< 0.6	~ 0.3
Nitrogen oxides	< 0.25	< 0.15
Carbon monoxide	1 - 2	< 0.045
Particulate matter		< 0.045
Hydrocarbons	< 0.25	< 0.03
Sulphur dioxide	bilongenbang'ja	< 0.03

**Sample Case:** Lumshnong,, East Jaintia Hills, Meghalaya-o donggipa Cement Power Plant-rangochanchibewalenianigita, kantasao unit sabijolikobikotnagita 700-800 gram koelakoso'nananga. A'rarkario jakkalgipa bijoliko mongsongbate koelako so'e bikota maina ia kario dal'dalbegipa pokkirirango chi komia aro uandake chi-ni bilchi bijoliko bikotna amchakja, attamni 4 bajioni 10 bajionasan bijoliko bikotna amchakaia. A'rarkarirango gipin a'dokrangonikosa bijoli, jekon koela ba a'ningni balwako so'e bikotachim, uko bree transmission line gita ra'baa.

Shillong city-o manderangna jakkalna gita 75 MW (Mega Watts) or 75000 kW (kilo Watts) or 75000 kilowatt-hours bijoliko nanga. Uandake, kosako u'ie ra'giminrangko niate, Shillong city-na kantaprako 52, 500 kilogram ba 52.5 Metric Ton koelako nanga, jean kanta 24 ba salsao 1260 Metric Ton ong'a. Iani miksonganiara, Shillong city ge'sa mamangon 75 MW bijoliko bikotna gitan indita bang'a koelako nanga ong'ode, Meghalaya a'dokna, ba India a'songna, ba a'gilsak gimikna bijoliko bikotna gita mairongpile bang'en koelako nanggen. Ia bang'a koelako so'anichi mairongpile a'gilsakni a'a, chi aro balwako moila ong'atgen, aro ian a'gilsak gimikko ding'dapatgen.



## North to get hotter

IMD forecast of expected rise in maximum temperature across India between March and May

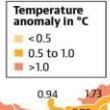
**Less than 0.5°C**

Kerala, Tamil Nadu, south interior Karnataka and Rayalaseema

**Warmer than normal by 1°C or more**

Jammu & Kashmir, Punjab, HCD (Haryana, Chandigarh & Delhi), Himachal Pradesh, west and east Rajasthan, Uttarakhand, north and east Uttar Pradesh, west and east Madhya Pradesh, Bihar, Jharkhand, Chattisgarh, Vidarbha, Gujarat and Arunachal Pradesh.

**Between 0.5°C and 1°C**  
Remaining subdivisions



*Kosako on'gimin noksarango a'gilsakni ding'roroani gimin songbatrango gatgiminrangko nikna man'enga.*

## FOSSIL FUEL-KO SO'ANI SAMTANTANGO DONGGIPARANGNA NANGCHAKANI



*Dal'dalgipa songjinmarango koelako industry-rango so'ani aro petrol ba diesel gari rangko jakkalani a'sel balwarang namen rongtalja.*



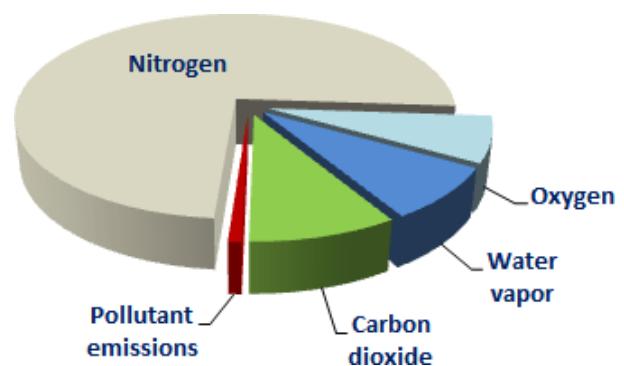
Nongdaju, West Khasi Hills-o koelako so'chakgipa biapni gisimgipa wal'ku kosakchi bangbangona watatako noksao nikna man'enga.



East Jaintia Hills-o koela so'chakgipa biapni wal'ku gisimgipako kosakchi bangbangona watatako noksao nikna man'enga. Ia biapni samtangtango donggipa manderang wal'ku aro balwa namgijako rang'site janggi tangna nangenga.



Dal'dalgipa aro jrimbegipa garirangoni wal'ku ong'katako ramarango nikna man'a. Wal'kurangko bangbangona watani niamrangko ja'rikjani a'selan balwarang moila ong'a.



Diesel ba petrol jeneretor-rangba balwa, wal'ku namgijarangko bangbangona wata. Bangbang balwa namgiparang baksa balwa namgijarang baita donga, uko gitchak rongchi noksao mesokenga.

## **BIJOLINI BILNI A'BACHENGANI ARO UNI AN'CHING SAMTANGTANGO DONGGIPARANGKO NANGCHAKANI**

### **i.) Thermal Power Plant:**

Thermal power plant-rang fossil jekai koela a'ningoni ong'katgipa balwarangko so'e, chiko ding'ate biba ba balwa ong'katgipachi turbine ko wilwilate bijoliko ong'katatani kamko ka'a.



*Lumshnong, East Jaintia Hills-o donggipa Thermal Power Plant babijolikobikotanibapkonoksaomesokangenga.*

**ii.) Gas Power Station:**



*Gas Power Station-ni noksa.*

Da'omiting Meghalaya-o gas power station dongja. Indiba, Assam-o ge'bri gas power station rang gnang jean 617.60 MW bijolini bilko bikotna man'a aro Tripura-o ge'gittam gas power station gnang jean 831.60 MW bijolini bilko bikotna man'a. Ia biaprangoni 370°C-420°C ong'pile ding'begipa biba ba balwako kosak bangbangchina wate gala.

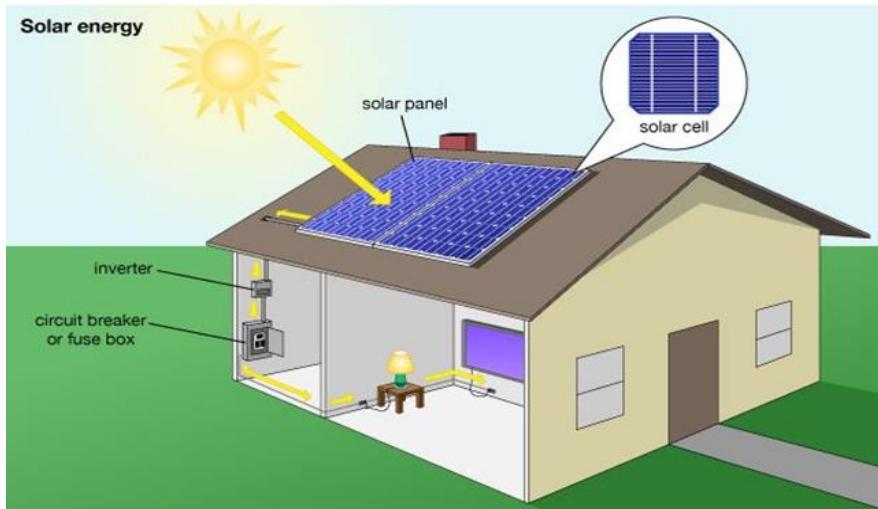
**iii.) Nuclear Power Plants:**



Nuclear Energy-ba ge'sa mongsonggipa bijoliko bikotani bil ong'a. Nuclear power plant-rango nuclear fission minggipa ge'sa niamchi mikron chi nikna man'gijagipa 'atom'-rangko pakrake bang'begipa bilko bikotaniko daka. Ia bilchi chi-ko ding'ate, ding'gipa wal'ku ong'katon, ua ding'begipa wal'kuchi dal'dalbegipa turbine ba chakka dakgipako wilwilate bijoliko bikota. Ia indakgipa bilara namen rong'talbegipa aro chu'sokgipa ong'a. Indiba iarangoni ong'katchapgipa bosturangara mandena aro matburungna namgijani ong'ani gimin kenani donga. Aro iarangko chalaina aro rikna gita bang'bee tangka paisarangko nangani a'sel iarangko rikna gita bang'e man'ja.

**iv.) Solar Energy:**

Solar energy-ara salni bil ong'a. Salni bilchi bijoliko bikotaniara da'ororo manderangni gisepo mingsingbatenga maina salni bilko jakkalna dakchakgipa solar panel-rangni dam komibatroroengaha. Solar panel-ko nokking kosako chatteke jakkalna man'a. Salara indin man'gipa bil ong'genchimoba mingsa chu'onggijaniara basakoba mikka waao ba aram pindape dongo bijoliko bikotani chol komia. Bijoliko bikotna salni bilko jakkalaniara samtangtango donggipana mamung namgijaniko ra'baja aro iakon namgipa bil ba green energy ineba minga.



*Noko solar panel-ko chate jakkalako noksao nikna man'a.*

#### v.) Wind Energy:

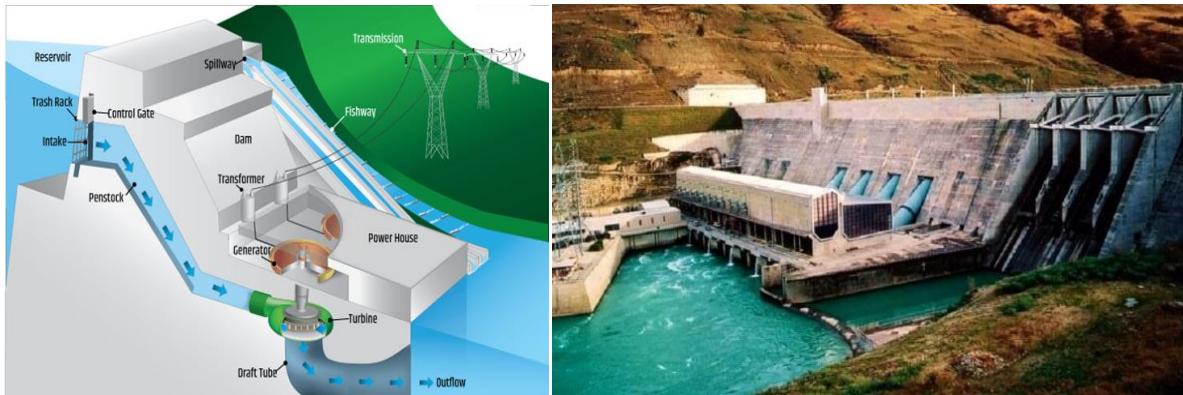
Wind energy ba balwani bilchiba bijoliko bikotna man'a. Balwara indin man'gipa bil ong'genchimoba basakobade bijoliko bikotna gita balwa bala chu'ongja. Indiba somoini batroroan baksana gital gital bosturangko bikotanichi ia chu'onggijanirangko chena amgen. Bijoliko bikotna balwani bilko jakkalaniara samtangtango donggipana mamungna mgijaniko ra'baja aro iakon namgipa bil ba green energy ineba minga.



*A'bri kosako songgimin windmill.*

#### vi.) Hydroelectric Power Plants:

Hydroelectric power ba chi-ni bilchi bijoliko bikotani ong'achim, ian mingsa nambegipa dakani ba ka'ani niam bewal ong'a. Dal'begipa chukala biap jeon chiko donchakachim, unoniko chiko bang'e wategalanichi dal'begipa generator-ko wilwilate bijoliko bikota. Hydroelectric power-ara rongtalbatsrangbegipa, ding'aniko bamoilako ra'bagijagipa ong'genchimoba mingsanamgijaniara ia chiko champenge dal'begipa chi donchakanirangko tarina gita a'ako aro biapko cho'anichi dingtangataniko dakna nanga aro chiko dim'pengengon mande songrang aro burung bolgrimrangkoba chi ripa, uandake mande aro matburungrang an'tangtangni nokrangko gimaataona soka.



*Noksa hydroelectric power station-ko mesokangenga.*

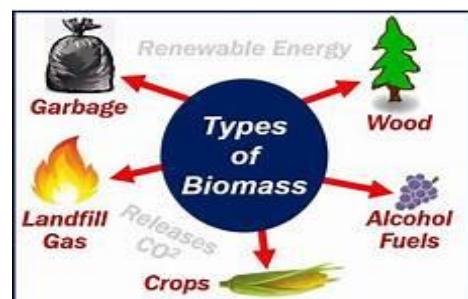
#### vii.) Geothermal Energy:

Geothermal energy-ara a'ningni ding'ani ong'a. Geothermal power plant-rango a'ningoni ong'katbagipa ding'begipa balwa ba wal'ukuk bijoliko bikotna gita jakkala. Geothermal energy-ko bijoliko bikotanio bang'e jakkalbreja.



#### viii.) Biomass energy-ara sigimin, ran'gimin bolbijakrang, matburungrangni ki'irang, ran'gimin bol wa'arang, me'su biterangko so'aba soatanichi bilko bikotani ong'a. Indiba iako dakanichi bilko man'aniara bilongan komibea.

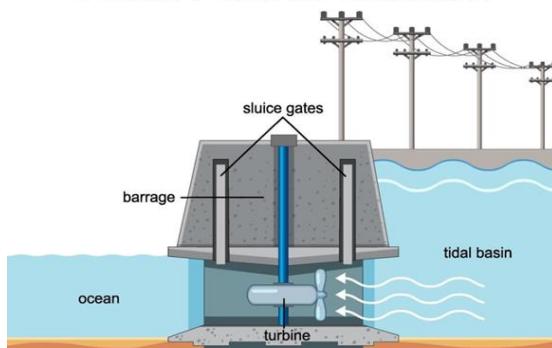
Biomass-ko mai mai  
bosturangoniko man'achim,  
uko noksao mesokangenga.



#### ix.) Ocean Energy:

Sagalni ba chibimani chipakkore satako bijolini bilko bikotna jakkala. Indiba ia indakgipa bilko sagal sepangrango donggipa a'songrangsas jakkalna ama. Ia indakgipa bilara namen rongtalgipta bil ong'a.

#### Tidal Power Station



*Sagalni chipakkore satgipachi bijoliko bikotani biapko noksao mesokangenga.*

## **SAMTANGTANGO DONGGIPARANGNA CHANCHICHAKANI, RONTALGIPA ARO TANGSEKGIPA BILKO MAN'NA MANGSONGANI:**

Manderang bang'rikrikan baksana nokrang aro building-rang bang'roroa aro uandake bijolini bilko jakkalaniba baririkrika. Bijolini bilko jakkalanibarion, bijoliko bikotaniba baria. Indiba koelako so'eba thermal power-ko jakkale bijoliko bikotaniara balwako aro a'a chi-na namen mitchianiko ba rongtalginaniko ra'baa.

India a'songo bak brioni bak gittamni gita bijoliko bikotaniara koelako so'e bikotgipa ong'a. Koelara pollution ba a'a aro chi-na rongtalginaniko ra'bagipa aro a'gilsakko ding'dapatgipa ong'a aro iani a'gilsako donganiara a'a cho'e kite bikotsimsimanichi bon'angengaha.

Da'ororoni chasongo, sal, mikka aro sin'ani, ding'anirang dingtangrikrikangengon, rontalgipa aro gital dake bikottainaina man'gipa bilrangko jakkalniara nangchongmotgipa mangsongani ong'a. Rontalgipa aro gital dake bikottainaina man'gipa bilrangko jakkalniara mikkangchini janggi tanganinaba nangchongmotgipa ong'a.

Mikkangchini manderangni janggi tanganina chanchichake a'gilsako donggipa dingtang dingtang manderang rongtalgipa bilrangko nambate jakkalanina tarienga. Jekai chi-ni, balwani aro salni bilrangko jakkalniara koelako jakkalana bate samtangtango donggiparangna nambatani ong'a aro balwa, chi aro a'ako nisiani komibata. Bilko nambate chimonge donna tarisamsoanichi aro gital dake bikottainaina man'gipa bilrangko (renewable energy) nambate jakkalna gita niam dakbewalrangko tarianichi mikkang chasongrangna nambatani ong'gen.

Sorkarirang aro karkaranarang bijoliko maikai nambate, rongtale bikotna man'gen, uni gimin name u'ie ra'na gita sandie nina tangka paisarang-ko bang'be-en jakkalaniko dakenga.

### **RONTALGIPA BILARA MAINA NANGCHONGMOTGIPA ONG'A?**

Batrikrikengipa bijolina nangnikaniko chu'ongatna gita rongtalgipa bilchi bijoliko bikotaniara nangchongmotgipa ong'a maina iachi a'gilsakna, a'a, chi aro balwana mamung namgijani dongja. Iarang sal, mikka aro sina'ni, ding'a'ni dingtangatniko komiata.

### **RONTALGIPA BILNI NAMGNIRANG:**

Iarangko jakkalani bang'a namgnirang gnang. Iarang namgija balwarangko bangbangona watja, uni gimin koelako jakkalana bate balwarang rongtalbata, samtangtango donggiparangna namgni ong'a aro fossil fuel ba a'ningoni torangni bon'anganiba komia. Uandake ia rongtalgipa bilrangko bijoliko bikotna jakkalroroanichi manderangnaba bang'bee kamrang nakatgen aro uamangna janggi tangna gita tangka paisarangko kamaina cholko on'gen.

### **BILKO RIPINGANIARA MAI ONG'A?**

Bilko ripinganiara apsan ka'ang bewal kamrangko ka'na bijolini bilko komie jakkalani ong'a. Iako chu'sokatna gita bijoliko simsake jakkalna nanga ba bijoliko komie jakkalgipa bosturangko noko jakkalna nanga. Iarangan ramrambegipa dakbewalrang ong'oba nambatsranggipa ong'a.

- i. Room-o manderang darangba dongjaode, light, fan ba air conditioner-rangko kimita ba off ka'e donna nanga.
- ii. Energy Conservation Building Code ba niamo pangchake nokrangko rikode sin'kario room-rangko ding'bome ba ding'kario ka'sine rakkina man'a.
- iii. Bijoliko jinma jakkalmiting somoirango, jekai pringni 6-9-o aro attamni 4:30-9-o, bijoliko jakkalani dakbewalko dingtangatna nanga. Iarangko dakanichi sub-station-rango load komiata aro bijoliko jakkalanina tangka paisa gamna nanganiba komibata.
- iv. Star-rating ba askiko noksa sale mesokani donggipa appliance ba bijolini bilchi chalaigipa bosturangko jakkalna nanga maina iarang bijoliko komie jakkala.

Ia ramram begipa dakbewalrangko dakanichi tangka paisa rangko ripingna man'gen aro samtangtango donggiparangnaba namgni ong'a maina bijoliko bikotani komibatgen aro koela ba fossil fuel-rangko jakkalanai komibatgen.

### **BIJOLINI BILKO SIMSAKE JAKKALANI NANGCHONGMOTANI**

Bijoliko jakkalanai ba nanganai batroroengon koelako so'e bijoliko bikotaniba batrora aro ian a'gilsakna namgijaniko ra'baenga. Koelako so'e bijoliko bikotani batroroan baksana koelako a'ningniko kite bikotaniba namen bariroroengaha. A'ningko koela komirikrikangon aro koelako man'na neng'batangahaon uni dam ba baririkrikgnok aro uandake bijolini dam ba baririkrikgen.

Uni gimin bijoliko simsake jakkalanira mikkangchi janggi tanganina nangchongmota. Mongsongbate iako dakanichi koela ba 'fossil fuel' rango pangchakani komigen aro bangbangona ding'gipa balwarangko wate galaniba komigen.

### **BIJOLIKO RIPINGNA GITA NOKO JAKKALANI BOSTURANG**

Bijoliko agre salgijagipa bosturangko bree jakkalanai bang'a namgnirang gnang. Iarangko jakkalon bijolini bilna tangka paisa gamna nanganirang komibata. Manderang star rating ba askiko noksa sale mesokani donggipa bosturangko dam rakkalbata ine brena sikja aro uandake ramram bosturang, jean bijoliko agre jakklachim, uarangkosa dam nom'bata ine brea. Indiba ia star rating ba askiko noksa sale mesokani donggipa bosturangara alamila dam batoba, bijoliko komie jakkaani gimin, bijoliko jakkalanina tangka gamna nanga komia aro uandake jaantian tangka paisarangko ripingna man'skaa. Light emitting diode ba LED bulb-rangara bang'a bang'ja dam batgenchimoba bijoliko jakkalanai namen komia, teng'bataniko on'a aro baibata. Jekai, 12-watt LED bulb-ni teng'aniara 100-watt incandescent bulb ba ramram bulb-ni teng'animung apsana, indiba 88-watt bijoliko komie jakkalbata.

*Ka'mao on'gimin bijoliko jakkalgipa bosturang (jekai fridge) jean star rating ba askiko noksa sale mesokani donga ba dongja aro baita bilsirangni gisepo bostuna tangka gamgiminko man'pilgen, uaragko tosusae mesokenga-*

Star Rating ba baita ge askiko noksa sale mesoka	Bilsio baita bijolini bilko jakkala	Unit prak-o baita tangka gamna nanga	Bilsi gimiko tangka gamna nangani	Bilsio baita tangkako ripingna man'a	Fridge-ni dam	Star ba aski donggijagipa fridge-na bate baita dam bata	Baita bisini ja'man tangka paisako man'pilgen
	Unit (kWh)	Rupees	Rupees	Rupees	Rupees	Rupees	Bilsi
Star ba Aski Dongja	1100	5.00	5500.00	Nil	20000.00	Nil	Somoi ni kri batroronaba donga
1	977	5.00	4885.00	615.00	22000.00	2000.00	3.25
2	782	5.00	3910.00	1590.00	26000.00	6000.00	3.77
3	626	5.00	3130.00	2370.00	28000.00	8000.00	3.37
4	501	5.00	2505.00	2995.00	31000.00	11000.00	3.67
5	400	5.00	2000.00	3500.00	34000.00	14000.00	4.00

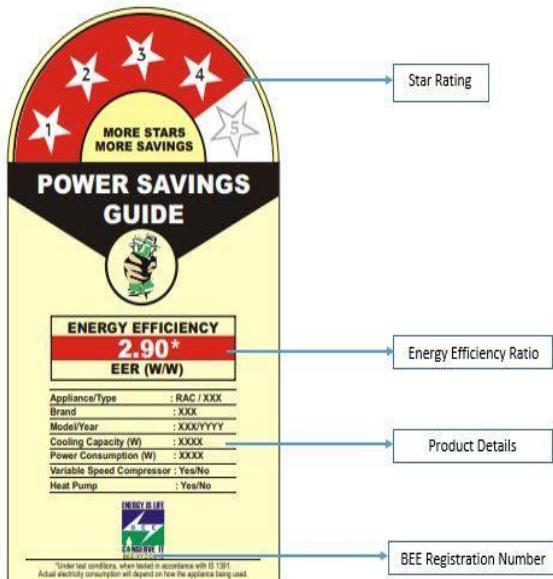
\*\*Kosako on'giminko Bureau of Energy Efficiency-niko man'aha. 250 Litre fridge-ni dam.

Star rating ba askiko noksa sale mesokani donggipa bosturangko jakkalanichi tangka man'pilaniara bilsi gittam ata oni bilsi bri ong'a. Star rating ba askiko noksa sale mesokani donggijagipa bosturangni bijoliko jakkalanai apsane dongaigen aro bilsi re'angroro, tangka paisa gamna nanganai batrorogen. Uni gimin, bijoliko name, simsake jakkalgipa bosutrangko jakalskaanichi mikkangchina tangka paisako ripingani biddingoba nambatani ong'a.

## Nambata janggi tangani

Bijolini bilko simsake jakkalgipa bosturang gam'ani komian baksana kamrangko nambate dake chu'sokate, mandeni janggi tanganiko nambata gadangona ra'baa. Ia bosturangni janggi tanganiba ro'bata aro ramram bosturangna bate somoini kri tarina nanganirangba komibata. Ia star rating namgipa bosturangko agre nirok-sandina nangjae gisikni gitaba an'senganiko aro suk ong'aniko mandena ra'baa. Bang'bata star rating namgipa bosturangkora gipin a'songni namnamgipa company-rangsa taria aro uandake ramram company-rangni tarigipa ramram bosturangna bate iarango ka'dongna man'bata.

### ENERGY LABEL-RANGNI GIMIN U'IE RA'ANI



Energy label-rang bosturang bijolini bilko baita simsake jakkala, uni gimini u'ianiko on'a. Iachi manderang badia bostu nama ba namja, uko name u'ie ra'e, nambata, bijolini bilko komie jakkalgipa bosturangko kange ra'na gita cholko man'a.

India a'songo ia niamrangko tarie on'gipara Bureau of Energy Efficiency (BEE) ong'a. uamangni niam dongiminko ja'rikgipa company-rangni bosturangna BEE star rating ba askirangko on'a. Bajaro tol'e, cha'boke star rating ba askiko on'e palgipa bosturangko rim'a man'ode, uarangna BEE sastikoba on'a.

Kosako mesokgimin noksao 4-star rating baa ski ge'briko man'gimin bostuko nikna man'enga. Baita aski bang'e mesoka, inditan bostu bijolini bilko nambate aro simsakbate jakkala.



### India-ni BEE ge'gni dingtang dingtang label ba certificate-rangko on'a:

- Star rating label ba askiko sale mesokgipa label*

BEE-ni star label ba askiko sale mesokgipa label-ara bosturang baita bijoliko jakkalanio nama, uko mesoka. Bosturangna ge'saoni ge'bongaona askirangko sale on'a. Askiko baita bang'e sale mesoka inditana bosturang nambata ine mesoka.

- Endorsement label*

Ia label ba certificate-ara badiaba bostu nama ine mesokaniko on'a ba advertise ka'a.

## **INDIA A'SONGO MAN'GIPA BIJOLIKO SIMSAKE JAKKALAGIPA BOSTURANG**

Ka'mao on'giminrang Bureau of Energy Efficiency (BEE)-ni gita on'gimin namgipa bosturang ong'a:

- Teng'aniko on'giparang jekai LED bul, TFL (tubular fluorescent lamp) aro LED streetlight-rang.
- Fridge-rang
- Geyser ba chik ding'atani
- Air-conditioner (nok ba kutturiko ka'sinatgipa ba ding'atgipa bostu)
- Fan-rang
- Washing machine-rang (chola ba'ra su'ani bostu)
- Smart thermostat-rang (nokko ding'atgipa bostu)
- Microwave oven
- Television (colour) ba TV
- Distribution transformer-rang

\*BEE-ni website-ko nina man'gen @ <https://beeindia.gov.in/en/star-label>

## **BOSTURANGKO BREMITINGO U'IE RA'ANIRANG**

Bijolini bilko jakkalgipa bosturangko brena am'engon ka'mao on'giminrangni gimin chanchisengesa breaniko dakna nanga:

- ❖ Gital bosturangko donna gita nokningo biap dongama dongja, uko nie ra'chengna nanga.
- ❖ Nangchongmotjaskalde agre dal'a bosturangko brena nangja, maina dal'bata bosturang bijoliko bang'bate jakkalbata.
- ❖ Badia company-ni bostuko bregen, uko chanchion, dam aro bijoliko baita jakkala, uko gisiko rakkina nanga. Dam rakbata aro bijoliko simsakbate jakkalgipa bosturangara mikkangchi tangka paisako ripingna gita dakchakani ong'a.
- ❖ Energy label ba star rating label-rangko nigrike bosturangko tosusana nanga.
- ❖ Baita aski bang'bate donga, inditana bostu nambata.

## **BIJOLINI BILKO RIPINGANINA ARO NOKO BA OFFICE-RANGO DAKNA NANGANIRANGNA**

### **MONGSONGGIPA U'IATANI:**

Ka'mao on'giminrangko ja'rikanichi bijolini bilko komie jakkalna man'a dakchakani ong'gen:

- ➔ Noko bijolini bilko jakkalgipa gitcham bosturangko gale gital, bijoliko simsake jakkalgipa bosturangko ra'skaani ba breaniko chanchina nanga. Gital tarigipa bosturang jean star rating baa ski bang'achim aro ru'utbate janggi tangachim, iarangko jakkalanichi tangka paisako ripingna cholko man'a.
- ➔ Nokrango bijolichi chalaigipa bosturangko nangai nangjai jakkalrimrimaniko komiatna nanga. Jekai, dishwasher ba washing machine-rang bijoliko jakkalanina tangka paisa gamaniko 10% ni gita bariata.
- ➔ Jakkaljamiting somoirango bosturangko kimite ba off ka'e donna nanga.
- ➔ Smart plug ba power strip-rangko jakkalani gimin chanchiako dakna nanga. Iarang bijolichi chalaigipa bosturangko jakkaljamitingo an'tangarin nanga nangjako nigrike kimitata ba off ka'a.
- ➔ Kutturio mande dongjao fan, light, air conditioner-rangko kimite ba off ka'e donaniara bijoliko ripingna gita dakchaka.
- ➔ Bijolichi chalaigipa bosturangko main switch-oni kimite donode 5-10% ni gita bijoliko ripingna man'gen.
- ➔ Bijolichi chalaigipa bosturang pring 8 bajioni attam 4 bajiona aro wal 9 bajioni pring 5 bajiona bijoliko komibate jakkala, maina ia somoirango manderang bijoliko komie jakkalbatani a'sel.

- ➔ Gitcham light bulb-rang jekai incandescent/fluorescent bulb-rang ni pal LED bul-rangko jakkalskana nanga, maina iarang teng'bataniko on'genchimoba bijolini bilko komibate jakkala.
- ➔ Salni teng'aniko jakkalna nanga. Salni teng'ani dongengon bulb-rangko jakkalna nangja. Nokrango name kelkirangko donna nanga, je dakode salni teng'ani nokningona napbae bulb-rangko jakkalna nanggija nokgimikko teng'atna man'gen. nokningo sal agre teng'chakani ong'engode pordarangko jakkalanichi teng'chakani komigen indiba andalani ong'jawa. Sin'kario kutturio heater ba kutturi ding'atgipako jakkalon chatgipa pordarangko jakkalna nanga maina iarang ding'aniko nokningon chipchanga.
- ➔ Office-rango kam ka'giparangko gisikra'atna gita notice-rang jekai "Kutturio mande dongjaode light-ko kimit donbo" ingiparangko donna nanga. Computer-rangkoba jakkaljamitingo kimit donna nanga ine kam ka'giparangko gisik ra'atna nanga.
- ➔ Nokni pakmarango, kelki sambarango, do'ga sambarango a'kilok donggiparangko mitipe donna nanga.
- ➔ Building ba dal'dalgipa nokrango mande re'jipjipgipa bang'ronga ong'ode automatic ba an'tangari kulia-chipa dakgipa do'garangko jakkalna nanga.
- ➔ Bosturangko name nirok sandie aro rongtalate donna nanga. Iakode dakanichi bosturang ru'utbate janggi tangbanga.
- ➔ Office a'palrango bol wa'arangko ge'na nanga. Bol wa'arang ding'kario salakkimko on'a aro sin'kario sin'gipa balwako ra'chaka.
- ➔ Nokningni pakmarango dimelgijagipa rongrangko nongna nanga maina iarang kutturiko jasengbate nikata.
- ➔ Nokning air conditioner-rangko 25°C-o jakkalo bijoliko jakkalanani komibata. Gari gora rangko jakkalgpiparangna indake u'ianiko dakna sika, a'palni sin'ani ba ding'ani 25°C-na bate komiode, gari ning'ao air conditioner-ko jakkalgija, garini kelkirangko kulie re'anichi a'palni ka'sinbegipa balwa nape dongtoata. Iako dakanichi garini to-ko komie jakkalgen aro samtangtangna ba namgni ong'gen maina garini air conditioner-ko jakkalanichi garioni ding'ani bewalan ong'kata aro samtangtangkoba ding'ata.
- ➔ Solar panel-rangko nokkingo chattekode salni bilko noktango bijoliko bikotna gita jakkalna man'gen. A'bachengo tangka paisa bang'kale nangnaba donga indiba mikkangchi bijolina tangka paisa gamna nangani komiskagen.
- ➔ Solar water heater ba salni bilchi chi-ko ding'atgipako jakkalani gimin chanchianiko dakna nanga. Solar water heater rangko chiko man'a dipet ding'ate uni ja'man ramram bijolichi 75°C-80°C ona din'atdapna man'gen. Iako dakanichi bijolini bilko jakkalanani komidapgen arouandake tangka paisa gamna nanganirangba komigen.
- ➔ Bari bagan ba sa'ra nokkrarango aro nokni nokkingrango solar light ba salni bilchi teng'atna jakkalgiparangko chattekaniko chanchina nanga. Ia solar light-rangko bazaar-rango man'a altua aro iarangko sorokrango, bari baganrango, sa'ra nokkrarango, pakmarango ba nokni nokkingrango chatteknna man'a aro iarangko jakkalna gita ramram bijolini bilko nangja.
- ➔ Bari bagan dakanio ba a'ba gamanio solar water pump-rangko ba salni bilchi chiko salopani ba saldoani kolrangko jakkalani gimin chanchianiko dakna nanga.
- ➔ Salni bilko bang'e man'gipa biaprango solar cooker-rangko ba salni bilchi cha'anirangko song'chakanirangko jakkalaniko dakna nanga.
- ➔ Solar lantern-rangko ba salni bilchi teng'atgipa chakkirangko walo kam ka'giparang bree jakkalaniko chanchina nanga. Ia solar lantern-rangko phone-rangko charge ka'anioba jakkalna man'a.
- ➔ ***Sorokrango chattekgipa chakkirangko an'tangari somoi gita teng'atna ba kimitatna gita Timer Switch-ko jakkalna nanga.***
- ➔ ***To-ko komie jakkalgipa gari ba to aro bijoli ge'gnichi chalaina man'gipa gari ba bijolichi chalaigipa gariko jakkalna nanga jedakode an'ching samtangtango donggiparangko nangchakani komigen.***

## **BIJOLIKO RIPINGANI GIPIN CHOLRANG:**

### **➔ Chi ka'sinko auna-miksuna man'a dipet jakkalna nanga.**

Ba'ra su'na, me'dik sam'dik su'galna ba auna miksuna chi ding'ako jakkalaniko komiatanichi bilko ripingna man'a. Chi ka'sinchi auaniara be'ennaba namgni ong'a.

### **➔ Ba'ra chola, kni aro me'dik sam'dikrangko ran'atna man'a dipet bijoliko jakkalnabe.**

Man'a dipet ba'ra sosiako fan ka'mao ramgija ba ba'ra sosiako ran'atna gita bijoliko jakkalgija, salo ramna nanga. Kni sosiako ran'atna gita towel ba ba'ra gamchachi name dake ripakchengesa hair dryer ba bijolichi chalaigipa kniko ran'atna jakkalgipako komibebatgipao jakkalna nanga, ong'jaode ramram balwachi ran'atna nanga. Me'dik sam'dikko ran'atna gita electric dryer ba bijolichi chalaigipa ran'atna jakkalgipako jakkalgija ramram balwachi ran'atna gita donna nanga.

### **➔ Nokkingo ba ceiling-o chattekgipa fan-ko teknananga**

Air conditioner-ko jakkalgija ceiling fan-ko jakkalanichi kutturiko ka'sinate rakkina man'a. Ding'kario air conditioner-ko komibatgipao done fan-ko jakkalanichi kutturi namen ka'sina.

### **➔ Freezer ba bosturangko tin'kaate dongipa bostuko jaantian changsa kimit, ice ba tin'kagimin suriko jrongatna nanga.**

Jaantian changsa freezer-ko kimit, ice ba tin'kagimin suriko jrongatanichi bijolini bilko jakkalani komidapa. Freezer ning'o ice agre bang'on ua freezer-ko chalaina gita bijolini bilko bang'bate nanga.

Tin'kagimin suriba ice-ko jrongate galna gita freezer-o dongimin cha'ani ringani bosturangko bikote donenba freezer-ko kimitate, freezer-ni do'gako kulie donna nanga. Tin'kagimin suriba ice gimik jrongani ja'man, freezer-ko rong'talate, ran'atani ja'mansa freezer-ko chalaitaipilna nanga, aro jensalo freezer chikoktaipilaha, unon cha'ani ringani bosturangko donpilna man'taigen. Bosturangko freezer ning'ao name biaptangtango donna nanga, jedakode freezer-ni balwa name freezer gimik gipe balna man'gen, aro uandakanichi bijolini bilko jakkalani komibatgen. Nokgimiko chonchona fridge ge'gni ge'gittamko jakkalana bate ge'sa dal'kalako jakkalanichi bijolini bilko jakkalanina tangka paisako komibate gamna nanggen.

### **➔ Bijoliko ripingna gita bijolichi chalaigipa bosturangko name nirok sandie donna nanga.**

Bijolichi chalaigipa bosturang-ni maintenance ba nirok sandianiko somoi gita dakrongode bosturang nambate kam ka'gen aro uandake tangka paisakoba ripingani chol ong'gen. Filter ba moilarangko chekgipako jaanti bodolanichi ka'singipa balwarangko bosturangna chu'onga gita man'e bijoliko jakkalani komidape tangka paisarangko komie gamna nanggen.

## BIJOLIKO RIPINGNA GITA ARO GIPIN CHOLRANG:

**SOLAR STREETLIGHT**-rangara gital dake bikottaina man'gipa bilko ba salni bilko jakkalani gimin ramramgipa streetlight-rangna bate nambata. Iarangko biapni kri silni krongba PVC-ni krongrango chatteke songna man'a aro iarang an'tangarin teng'aigipa ong'a. Iarangko je bijolini kamko ka'gipa contractor-rang nokni sa'ra rango ba a'palchiko nigame ronatari gimin nokni biaprango, jeon chu'onga gita salni bilko man'achim, uno songe donna man'a. Badiaba solar streetlight-rangode an'tangarin somoi gita teng'atani ba kimitani sensor ba cholrang gnang.



*Solar streetlight-rang baksana chel'aoni teng'atna ba kimitatanagita remote control baman'chapa.*



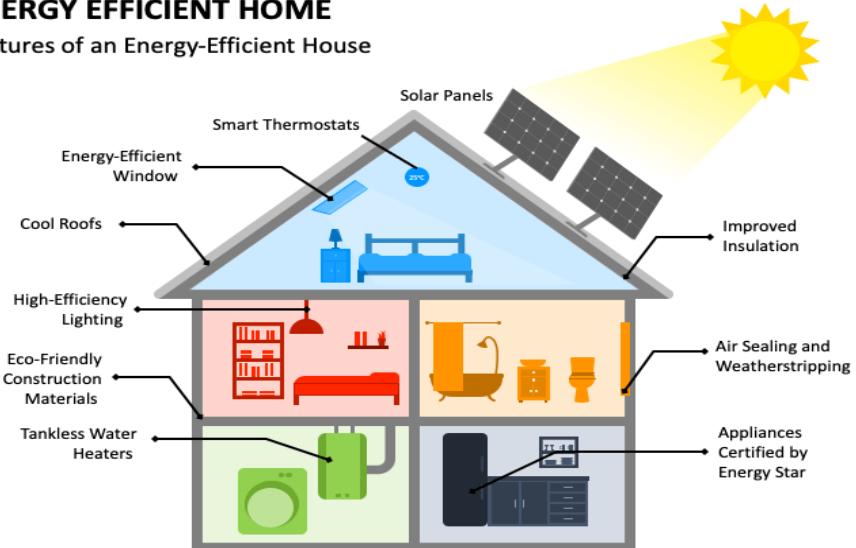
*Noksa solar water heater-ko nokkingo chatteke donako nikna man'enga.*

**SOLAR WATER HEATER**-ara bikottaina man'gipa bilko ba salni bilko jakkala aro iarangko nokrangoba office-rango jakkalna man'gen. Ia solar water heater-rangchi a'bachengo chi ka'sinko ding'bo matchengna gita jakkale uni ja'man bijolichi chalaigipa water heater-chi din'bomgipa chiko nanga gita ding'dapat naman'gen.

**SMART HOME:** Ian ua nok ong'a jeon bijolini bilko ripingani niamrangko ja'rikachim. Noksa ge'sa nok jeon Energy Conservation Building Code (ECBC) Rules ba niamrangko ja'rikachim, uko mesokangenga. Smart Home-o bijoliko simsake jakkalgipa bosturangkosan jakkala aro gital dake bikottaitaina man'gipa bilrangko man'a dipet bijoliko bikotna gita jakkala. Ia nook salni teng'aniko kutturirangko teng'atna gita name jakkala aro pakmarang gita sin'kario nokni ding'bomani jokna man'jana gita a'palchini ka'singipa balwarang napna man'jana gita name taria. Kelki do'garangko ding'kario balwa name jokrurana man'na gitaba name taria.

## ENERGY EFFICIENT HOME

Features of an Energy-Efficient House



*Noksa 'Smart Home' jean Energy Conservation Builing Code-ni niamrangko ja 'rikachim, uko nikangna man'enga.*

**SOLAR WATER PUMP-** jakasio on'gimin noksa mesoka gita a'barango, bagan barirango me'su samjakrangna chi runa gita jakkalna man'a. Bebean a'bachengmitingo tangka paisa bang'kale jakkalna nangnaba donga indiba bijoliko jakkalgija salni bilkosa jakkalani gimin gittam ata bilsa ba bilsa brirangni ja'man ua tangkako man'pilskaigen.



### SOLAR WATER PUMP-rangko

chikong ba pokrirangoniko nokrango jakkalna gita chiko salopdonaba jakkala. Iarangko a'a aro a'ba gamma gita chi salopdonaba jakkala.

**ELECTRIC VEHICLE BA BIJOLICHI CHALAIGIPA GARI:** A'gilsak gimikni ding'batroroani gimin chanchichake, bang'bata gari tarigipa company-rang bijolichi chalaigipa garirangko tarina gita gital niamrang aro dakbewalrangko bikotaha. Ia garirang on'titi bijoliko jakkalanichin chel'a biaprangona re'na man'a. Sorkarini dakchakanichi ia garirangni dam kombatahanai gimin manderangni ia indakgipa bijolichi chalaigipa garirangko brena gita chanchianirangko nikna man'engaha. Garirangko ta'rakbate charge ka'na gita nambata cholrangko tariangengahani gimin mikkangchi janggi tanganio ia garirangkosa manderang brebatgnok. Ia indakgipa bijolichi chalaigipa garirangko charge ka'na gita bikottaitaina man'gipa bilrangko jakkalode a'ana, china aro balwana mamung namgijani dongja. Indiba, charge ka'na gita bikottaitaina man'gijagipa bilrangko jakkalode mamung namgni dongja.



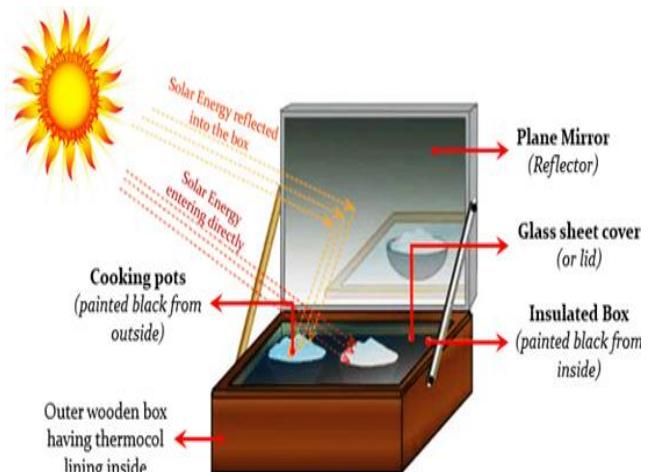
**SMART HYBRID VEHICLES**-ko electric vehicle ba bijolichi chalaigipa garirangni palo jakkalna man'a maina ia smart hybrid garirangara petrol ba diesel chi chalaian baksana bijolichiba chalaina man'a. A'bachengo, petrol ba diesel-chi gariko chalaichenga aro unomiting battery-koba charge ka'jola. Jensalo battery chu'onga gita charge ong'aha, unon gariko re'atna gita battery kamko ka'angskaa. Jensalo battery komiangtaiaha, unon gari petrol ba diesel-ko jakkaltaiaha. Ia garirangko jakkalanichi petrol ba diesel-ko jakkalani komia aro tangka paisakoba ripingna man'a.



**SMART HYBRID VEHICLE**-rang to-ko jakkalan baksana bijoliko jakkalani gimin to-ko jakkalani kombata. Badiaba smart hybrid garirangde liter sa-o 35 km-rang re'na man'a.

### SOLAR COOKER BA SALNI BILKO

**SONG'NA JAKKALGIPA BOSTU**-ba ge'sa nambegipa song'na channa jakkalgipa bostu ong'a. Iako salni bilko bang'e man'gipa biaprango jakkalna bilongen nambea. Ia indakgipa dakbewalrangko ja'rikanichi bilko ripingna namen dakchakani ong'a.



### SOLAR LANTERN BA SOLAR TABLE LAMP:



Solar lamp ba salni bilchi chalaigipa chakkirangko walo ba andalao jakkalna man'a, mongsongbate songrango jeon bijoliko name man'jachim, uarango jakkalna man'gen.

### MANDENI DAKRONGBEWAL BA KAM CHOLONKO DINGTANGATANICHI BIJOLINI BILKO

#### RIPINGANIKO CHU'SOKATANI:

Mandeni dakrongbewal ba kam cholonko dingtangatanian Net Zero Emissions-ko bils 2050-o ra'bana cholko on'gen ba namgija balwarangko bangbangona wataniko bils 2050-o dontongatani ong'gen. Iandakanichi carbon dioxide ingipa namgijagipa balwa bangbangko komigen aro bijolini bilko nangnikani komigen. Mandeni dakrongbewal ba kam cholon dingtanganiara manderangni be'enna namgni ong'a aro a'gilsako carbon-ko komiatani neng'nikanirangkoba dakgrikna

man'a. Bijoliko nangjaoba jakkale roe ba indin wate galaniko komiatna ba gimaatna gita bijolini bilko jakkalenggipa pilak mandean an'tangtangni dakrongbewalko dingtangatna nanga. Jekai heater ba air conditioner-rangko jakkalaniko komiatani; incandescent ba rimit bulb-ni palo LED bulb-ko tekskaani, aro ka'sinatna ba ding'atna bijoliko jakkalgija ba'ra ka'sinako ding'kario aro ba'ra ding'ako sin'kario gane dongskaani. Jakchi dakna ba ka'na man'gnigipa kamrangko ka'na bijolichi chalaigipa bosturangko jakkalaniko komiatani. To-ko simsake aro komie jakkalgipa gari-gorarangko jakkalskaaniba an'chingni samtangtangna namgni ong'a.

## BON'CHOTE

Fossil fuel jekai koela, petrol aro diesel-rangko jakkalanian a'gilsakko ding'atenga aro a'a, chi aro balwako moila ong'atenga ine u'ina man'a. National Oceanic and Atmospheric Administration (NOAA)-ni gita, 2016 aro 2020 bilsirangan ding'batgipa bilsirang ong'a aro 1981 bilsak dipetan a'gilsak bilsak chikung prak  $0.18^{\circ}\text{C}$  ding'batororoenga. Bikottaitaina man'gijagipa bil ba bosturangoniko bikotgipa bijoliko jakkalaniko komiatanichi balwarangko moila ong'atani komigen aro uandake a'gilsakni ding'batororoaniba komianggen. Sakprakni bijolini bilko jakkalani dingtangatani mamungba ong'gija nikgenchimoba, pilak Mandeni dingtangataniko apsan chandimatode namen bang'genchim. Uni gimin a'gilsakni ding'ani ba sin'aniko nangchakaniko komiatna gita bilko ripingani niamrang dongiminrangko ja'rikna nanga. Load shedding-ban mingsa a'rankario chi chu'ongjamitingo bilko ripinani ong'a.

*Bon'kame, "Bilko ripinganian bilko bikotani ong'a".*



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