

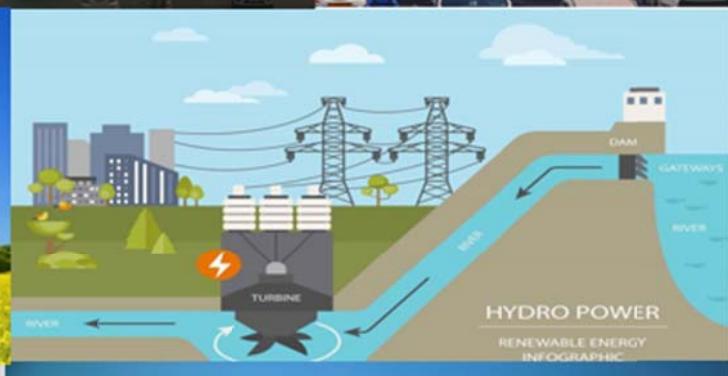


GOVERNMENT OF MEGHALAYA  
INSPECTORATE OF ELECTRICITY  
AND  
STATE DESIGNATED AGENCY ON ENERGY CONSERVATION

## THERMAL POWER PLANT



KA BORDING, KA JINJABOH KA MARIANG NÀ KA JINGPYNMIH BORDING,  
KA JINGTYNGKAI BORDING BAD KA JINGHIKAI BAN TYNGKAI BORDING



#

SENIOR ELECTRICAL INSPECTOR  
INSPECTORATE OF ELECTRICITY, SHILLONG#

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

**KA BORDING, KA JINGKTAH IA KA MARIANG NA KA JINGPYNMIIH BORDING, KA  
JINGTYNGKAI IA KA BORDING BAD KUMNO BAN PYNDONKAM IA KA.**

**JINGLAMKHMAT:**

Ha kane ka jingthoh ka kyntien energy (Bording) ka mut shaphang ka bording elektrik lane ka Bor jong ka elektrik (Electrical Power). Ha kane ka pythei mynta, ka bording ka long ka ba donkam bha ha ka jingim ba manla ka sngi. La pyndonkam khamtam ban ai jingshai bad ban pyndonkam bording ia;

- i. Ki Ling,
- ii. Ki dukan bad ophis trei kam ki riew shimet,
- iii. Ban sain nar bad shna tiar ha ki karkhana,
- iv. Ki jaka ai jingsumar bad ki aspatal (hospitals),
- v. Ki ophis Sorkar,
- vi. Ki tiar kompiwtar (Computer systems) bad internet,
- vii. Ki jaka ban iada ia ka Ri,
- viii. Ki jaka shalan mar,
- ix. Ha ki Bank,
- x. Ki jaka trei kam ki nongkhaii barit bad bakhraw,
- xi. Ki jaka ri jingri, etc,

Ha kane ka juk, khlem ka bording elektrik, ki kor bording kinnym trei kam bad kinnym iaid. Kane kan ktah shibun ia ka rukom trei kam bad kannym lah ban iaid ka kam. Ka jingroi ha ka kamai kajih bad ka jingstad saian jong ka Ri ka donkam ia ka jingdon ka bording elektrik. Namarkata, khlem ka bording elektrik, baroh ki kam ha ka Ri kin shu sahteng bad nym lah ban pyniaid kam. Dei na kane ka daw ia ka bording elektrik la niew kum ka mar ba donkam bha (essential commodity) ha kane ka juk.

Ka ba sngewphylla pat ban tip, ba kane ka bording elektrik ka dei ka thymmei jong ka jingjakhlia ka mariang bad ka jingkylla ka jingshit ha ka pyrthei. Ban pynduna ia ka jingktah ia ka mariang, ka jingnang ban pyndonkam ia ka bording ka long kaba donkam bha na ki nongshong shnong ka jylla ban tyngkai ia ka bording lelktrik. Ha kaba iadei bad kane ka Sorkar India ka la pynmih ia ka ain kaba kyrteng ka “Energy Conservation Act ha u snem 2001” ban wad ki lad khnang ban nang pyndonkam ryntih ia ka bording bad ban tyngkai ia ka, khnang ba ka lawei ban ioh bording kan biang bad ban ioh ia ka mariang kaba khlem jaboh.

Ban kham ioh jingshai kumno ban tyngkai ia ka bording bad ban bud ryntih (awareness), ka long kaba donkam tip ban kumno la pynmih ia kane ka bording bad kumno ka ktah ia ka mariang.

**KI JINGPYNMIIH BORDING ELEKTRIK**

Hato phi la ju mutdur, kumno ka mih kane ka bording elektrik? U Micheal Faraday uba la khot kum u kpa ka bording elektrik uba la lap ia ka ha u snem 1831. Naduh kata ka por, kane ka bording ha kaba la pynmih da ki rukom bapher bha ka la wanrah ki jingmyntoi ia ki paibah bad kumjuh ka la wanrah ruh ia ki jingeh na ki jingjakhlia ki jaka pynmih bording kaba la ktah ia ka mariang ha ka pyrthei baroh kawei ba ka dei ka daw kaba wanrah ki jingkiew ha ka jingshit jong ka mariang (global warming).

Ki rukom pynmih bording ki don arbynta, kumne harum:

- i. ***Renewable Energy.*** Ka bording ba pynmih da ka Renewable energy ka dei ka bording kaba pynmih lyngba ka bor jong ***ka sngi (solar), ka lyer (wind), ka bor jong ka um (hydroelectric), umshit napoh ka khydew (geothermal) bad na ki dieng bad ki niut (biomass).*** Ka bording kaba mih na kine ka dei kaba ioh na ka mariang bad kaba lah ban ioh biang kat kum ki por bad kane ka bording ka long kaba khuid bad ka duna bha ban pynjaboh ia ka mariang. Haduh mynta ka jylla Meghalaya ka don ka bording na ka um (hydroelectric) kumba 367.5 Mega Watts (MW) bad ka pahuh bha ha ki por slap. Ka bording kaba pynmih na ka sngi (Solar energy) ka dang shu sdang bad um pat lah ban ioh jingkhein katno ka la don ha ka jylla. Ia mynta ki iing kiba kham paw jong ka Sorkar kiba la buh ki tiar ban tan ia kane ka bording na ka sngi ki long ka

- ii. ***Non-renewable Energy.*** Ka bording ka dei ka bym lah ioh biang ne ka Non-renewable energy, la pynmih ia kane da kaba thang ia ki marpoh khyndew (fossil fuel) kum u dewiong, ka lyer napoh ramew (natural gas), ka umphniang bad ba bor niwkliar (nuclear energy) kaba ki khot fossil fuels lane ki marpoh khyndew ba pynmih bording. Ka jingpynmih bording na kine ki marpoh khyndew ka wanrah ia shibun ki jingeh ia ka mariang kum ka lyer jakhlia bad ka jingkylla ka mariang (climate change) bad ha kajuh ka rukom kine ki marpoh khyndew kin sa lut noh shen namar ka jingtih bad jingjur ha ka rukom pyndonkam ia ki bad kan sa poi ka por ba ka lawei kan iakynduh jingeh ynda kine ki marpoh khyndew kin lut noh. Kine ki marpoh khyndew (Fossil fuels) khamtam eh u dewiong u kham jur ban pyntsnew ia ka mariang ha kaba pynmih ia ki lyer jakhlia (carbon dioxide, greenhouse gas emission) bad ka jingkiew ka jingshit jong ka pyrthei. Ka jingdon baroh ka bording ba pynmih na u dewiong ha ka jylla Meghalaya na ki karkhana haduh mynta ka long kumba 110.50 Mega Watts (MW), bad la pyndonkam da ki karkhana kiba don ha Lumshnong East Jaintia Hills, Rwiang hajan Nongstoin hapoh West Khasi Hills bad Byrnihat hapoh Ri Bhoi District. Nalor kata ka bording baroh kaba pynmih lyngba ka umphniang diesel (na ki diesel generators) ha ka jylla Meghalaya ka long kumba 10.50 Mega Watts (MW) ei ei.

### **KA JINGPYNMIIH BORDING ELEKTRIK KABA KTAH IA KA MARIANG**

Kat haduh mynta kane ka pythei baroh kawei ka la kiew ka jingshit kumba  $1.2^{\circ}\text{C}$  haba ia nujor bad ka spah snem kaba khatkhyndai (19<sup>th</sup> century). Ka jingmih jong kane ka jingkylla ha ka mariang ka la pynjur ia ka jingrangtyrkong ha ki jaka bapher bapher jong ka ri India bad jong ka pyrthei, ka jingkiew ka um na duriaw sha ryngkew (nang jylliew) bad bun ki jait jingthung bad ki jait khniang bapher ki la nang duh jait na ka pyrthei. Ha ka jingwad bniah la lap ba ka jingpynmih bording ka dei ka daw kaba kongsan tam kaba wanrah ia ki lyer pynjaboh mariang bad ka lyer kaba ktah ia ka koit ka khiah ha ka mariang. U dewiong haba la thang, u pynmih ia ka lyer ***carbon dioxide, carbon monoxide, sulphur dioxide, nitrous oxide, methane bad kiwei ki lyer jaboh kiba ktah ia ka koit ka khiah ia ki briew bad kumjuh ruh ban wanrah ia ka jingshit jong ka mariang.*** Nangta ki jaka pynmih bording na u dewiong ki pynmih ruh shibun u dpei bad la ju pynlang harud ki jaka pynmih bording. Kane ka jinglum ia u dpei ha ka khyndew ka wanrah ia ka jingjakhlia ia ki sawdong sawkun jong ki jaka pynmih bording bad ka pynjaboh ia ki wah ba marjan na ka jingtuid jong u dpei.

Kine ki jaka pynmih bording na u dewiong, ki pynmih ruh ia ka jynhaw kaba khluit na ki kor pynmih bording (steam turbine) bad kane ka pynkhluit ia ka lyer sawdong jong kine ki karkhana. Kane ka jynhaw khluit (steam) bad lyer jakhlia kaba mih na ki karkhana pynmih bording ka wanrah ia ka jingpynsniew ia ki dieng ki siej bad ia ki mar rep. Kane ka jynhaw khuit ryngkat ki lyer jaboh kiba mih na ki karkhana ki pynlong ia ka daw jong ka jingkiew ka jingshit jong ka pyrthei.

Ha ka jingwad bniah ha kaba iadei bad ki marpoh khyndew kum ka **diesel bad petrol** ruh ynda la thang, ki pynmih ia ki lyer jaboh kiba ktah ia ka mariang ki long kumne harum:

Combustion-engine exhaust gases <small>All figures are approximate</small>	% of total	
	Petrol	Diesel
Compound		
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	possible traces	< 0.03

**Ka Nuksa katkum ka jingwad bniyah (Case study) na kaba thang ia u dewiong:** Kumba 700 gram haduh 800 gram u dewiong donkam ban thang ban pynmih shi unit ka bording ha ka shi kynta (one kilowatt hour) kane ka dei katkum ka jingwad bniyah na ki jaka pynmih bording elektrik na ki karkhana dewbilat kiba don ha East Jaintia Hills District, Meghalaya.

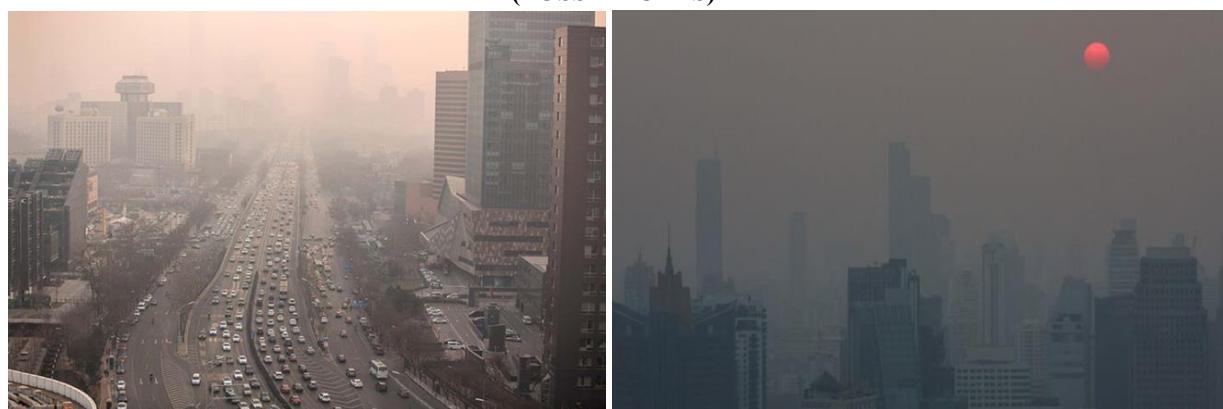
Ngi tip ba kaba ka Jylla Meghalaya ka thied bording ha ka por tlang bad ha ki por bym don slap na shabar ka jong ka jylla. Ka daw ka long namar ki wah ki la hiar ka jingdon jong ka um, bad ki jaka pynlang um (dams) ruh ki duna um bha dei na kata ka daw, ym lah ban pyndap bording tang na ki jaka pynmih bording jong ka jylla. Ha kum kine ki por rkhiang, ki jaka pynmih bording na ka jylla ki iaid duna bha bad ki pynmih duna ka bording bad bunsien kine ki hydroelectric power station ki ju iaid tang ha ki por janmiet kata naduh 4 pm haduh 10 pm (Peak hours) tang ban pyndap ia ka bording kaba dun ana ka bynta ki jingdonkam jong ki nongtan bording jong ka jylla nalar kaba thied na shabar ka jylla.

Ban sngewthuh kumno ki nongtan bording ki don bynta ban pynjaboh ia ka mariang, kane ka dei ka nuksa ban tip, ba katno hap thang dewiong ban pynmih bording ban pyndap ia ka nongbah Shillong. **“Ka nongbah Shillong ka donkam ka bording la kumba 75MW (Mega Watts) ha ka jingkhein pdeng (average) lane 75000 kW (kilo Watts) ne 75000 kilowatt-hours man ka kynta ban pynbiang ia baroh ki nongtan bording. Kumta ka jingdonkam u dewiong ha ki karkhana ban pynmih bording 75 MW na ka bynta ka nongbah Shillong ka long  $75000 \times 0.80 \text{ Kg} = 52,500 \text{ Kgs}$  ne 52.50 Metric Tons man ka kynta. Namarkata ha ki 24 kynta ne shisngi ban pynmih ka bording na ka bynta ki paidbah ka nongbah Shillong kan long kumba  $24 \times 52.50 \text{ Metric Tons}$  i.e. 1260 Metric Tons.** Kane ka jingkhein ka dei thik tang na ka bynta ka jingdonkam bording jong ka nongbah Shillong. Kaba katno tam kan long lada pynbiang bording na u dewiong ban pyndap ia ka Jylla baroh kawei ne ia ka Ri India bad khamtam lei lei ia ka pyrthei baroh kawei bad katno ka lyer jakhlia kan mih na kaba thang dewiong ha ka pyrthei baroh kawei bad katno ka lyer khluit na kine ki karkhana kan pynmih ka long kaba khraw haduh katta katta. Dei na kane ka daw ba ka jingjaboh jong ka mariang ka la nang jur bad ka la nang wanrah ruh ia ka jingkylla ha ka jingkiew ka jingshit ka pyrthei.



*Ka dur haneng bad ki khubor shaphang ka jingkiew jong ka jingshit ha ka pyrthei.*

### KA JINGJAKHLIA KA MARIANG NA KA JINGTHANG IA KI MARPOH KHYNDEW BA ING (FOSSIL FUELS)



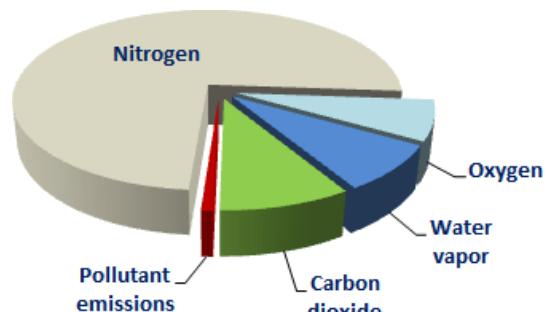
*Ka tdem kaba mih na ki karkhana bad na ki kali ha ki nongbah.*



Ka tdem kaba mih na kaba thang dewiong na ki Karkhana thang dewiong (coke plant) ha Nongdaju West Khasi Hills bad ha East Jaintia Hills Meghalaya



Ka jingjakhlia jong ka mariang na ka tdem ba mih na ki kali. Bunsien ki kali barim bad bym biang ki jingmaramot ki wanrah shibun ka jingmih tdem ban pynjaboh ia ka mariang.



Ki jait lyer jakhlia ba mih na kaba thang ia ka generator diesel ne petrol generator kumba la pyni ha kane ka dur

## KI RUKOM PYNMIH BORDING

**1. Ki Jaka Pynmih Bording da kaba pyndonkam da ki marpoh khydew (Thermal Power Plants):**  
Ki Thermal power plants ki pyndonkam da kaba thang ia ki marpoh khyndew ba ing kum ka umphniang, u dewiong bad ka lyer napoh khyndew (natural gas) ban pynkhuit ia ka um bad ka jingdonkamkam ka long da ki hajar liter. Kane ka um ynda la thnam ka pynmih ia ka jynhaw khluit (steam) bad ka bor kaba khlain bha kane ka kynjat ban pyntyllun ia ki mashin shalyntem (turbine) nangta ka sa pynmih ia ka bording elektrik.



*Ki dur na ki karkhana pynmih bording elektrik na ki marpoh khyndew kiba don ha Lumshnong East Jaintia Hills District.*

## **2. Ka jingpynmih bording na ka lyer poh khyndew (Gas Power Station):**

Ka jylla Meghalaya kam don ki jaka pynmih bording na ka lyer poh khyndew ia mynta. Katba ha kiwei ki jylla jong ka shatei lam mihngi jong ka Ri India kata, ka Assam ka don kumba saw tylli ki jaka pynmih bording elektrik na ka lyer poh khyndew kumba 617.60 MW bad ka jylla Tripura ka don lai tylli kumba 831.60 MW. Ha kine ki jaka pynmih bording ka jynhaw khluit (steam) kumba  $370^{\circ}\text{C}$  haduh  $420^{\circ}\text{C}$  ka mih shabar na ki turbine bad ka pynkhuit ruh ia ka mariang kiba don ha syndah jongka jaka pynmih bording



*Ka jaka pynmih bording na ka lyer pohkhyndew*

## **3. Ka jingpynmih Bording na ki bor Niwkliar (Nuclear Power Plants):**

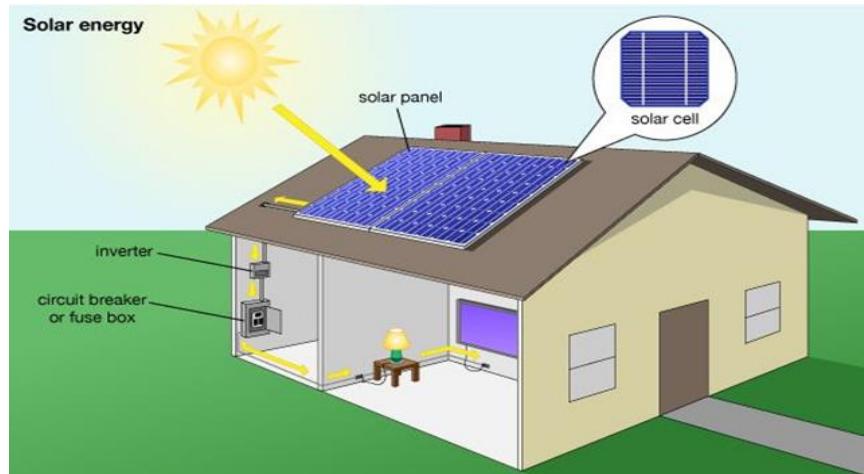


Ka bording niwkliar ba pynmih na ki marpoh khyndew niwkliar (Nuclear energy) ka dei kawei na ki jingpynmih bording kaba bun bha. Hynrei ka dor ban shna ia ki jaka pynmih bording na u niwkliar pat ki rem dor bha. Ka bording na u niwkliar ka long kaba biang bha bad hangne ka pynmih duna ki lyer jakhia kum ka carbon dioxide haba ia nujor bad kiwei ki marpoh khyndew. Hynrei ka long kaba shitom bha ban shna ia ki jaka bret ia ki jaboh kiba mih na kaba thang ia u niwkliar. Nalor kata kine ki jaboh ba mih na u niwkliar ki pyntsnew ia ka mariang khamtam ia ka koit ka khiah jong ki briew bad ki mrad.

## **4. Ka Bording na Ka Sngi (Solar Energy):**

Napdeng ki bording ba lah ban iai ioh biang (renewable), ka bording ba ioh na ka sngi ka la nang bun ha kine ki sngi khamtam eh na ka jinghiar ka dor ki tiar ba tan bording (solar panel). Ka bording ba tan na ka sngi ka la nang roi stet ha ki shnong namar ka jingbiang ka sngi. Kine ki tiar ba tan bording na ka sngi

lah ban pyndait ha tnum iing ne ha kano kano ka jaka kaba shat bha ka sngi, wat ha ki lyngkha rep, ki jaka ri jingri ne wat ha ki jaka kiba la shna khnang ban tan bording na ka sngi ban ioh ban die ia ka bording sha ki nongtan bording. Kawei ka daw ba don jingeh na kane ka bording ka dei ba hap ban shaniah ha ka jingshat jong ka sngi bad ka suinbneng kaba khlem kah dum bad kumjuh ruh lah ban ioh tang mynsngi. Hynrei kaba sngewtynnad ka long namar ba ka juk stad saian mynta ka la nang lap ki buit thymmai kumno ban tang bording na ka sngi wat lada ka duna jingshai jong ka suinbneng. Ka bording kaba ioh na ka sngi ka duna ban wanrah jakhlia ha ka mariang.



*Ka uksa ba ka iing ka pyndonkam ban tan bording na ka sngi bad ki tiar tang bording ba la pyndait ha tnum iing.*

### 5. Ka Bording na ka Lyer (Wind Energy):

Ka bording kaba ioh na ka lyer, ka long kawei na ki bording ba lah ban iai ioh biang bad ka dei kaba ioh na ka mariang. Ka lyer kaba kham sted ka pyntyllun ia ka shalyntem jong ka kor bording (wind turbine) bad lyngba ka generator ka pynmih bording elektrik. Kawei na ki daw bym lah ban pyniaid bha ia kane ka rukom tan bording ka dei namar ka jingbeh lyer ka long ka bym thikna bha, la katta ruh ki kor trei kam mynta ki la nang lap kumno ban pynmih bording kaba biang watla ka lyer kam da khlain. Ka bording kaba ioh na ka lyer ka long kaba khuid bad ka duna ban wanrah ia ka jingjaboh ha ka mariang.

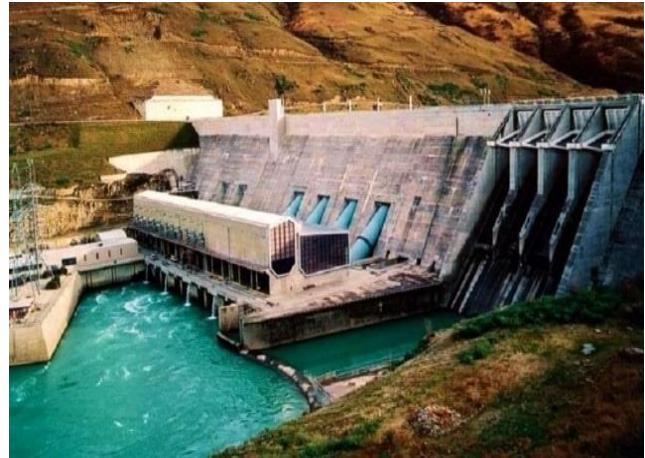
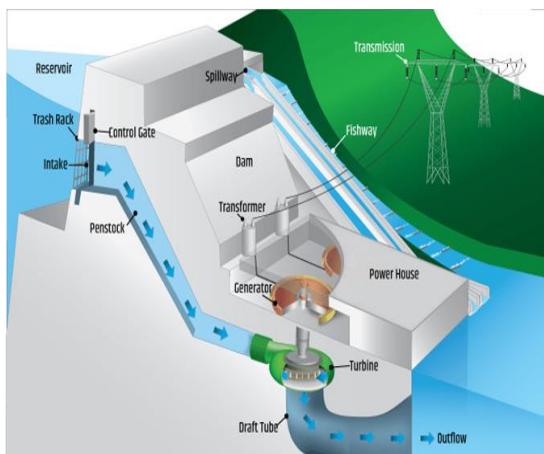


*Ka dur jong ka jaka pynmih bording elektrik na ka lyer da kaba pyndait ia ki kor ha jrong u lum.*

### 6. Ka Bording na ka Um (Hydroelectric Power Plants):

Ki jaka pynmih bording na ka um (Hydroelectric Power Station) ka dei kawei na ki rukom pynmih bording ba lah ban iai ioh biang namar ka wan na ka um ka wan na ka mariang. La pynmih ia kane ka bording da kaba pyndonkam ia ka um ban pyntuid najrong lum sha them ne na ki jaka ba kham kynjang shapoh ki jaka ba kham sha them. Lah ruh ban shna ki jaka pynlang um halor ki jak aba kham kynjang khnang ban ioh pyntuid sha them lyngba ki tyndong um (tunnel bad penstock) ban pynshad ia ki shalyntem ba la

pyndait lang bad ka kor generator ban pynmih bording elektrik. Ka bording kaba pynmih na ka um ka long kaba khuid bad ka duna ban pynjakhlia ia ka mariang namar ka lyer khluit ruh ka pynmih duna bha. Ka bording ba pynmih na ka um ka wanrah ia ka jingeh lada hap pynkynriah shnong ia ki biew ne ki mrad na ki jaka pynlang um (reservoir).



*Ki dur ba pyni nuksa kumno la pynmih bording da ka um bad ka jaka pynlang um (reservoir/dam)*

## 7. Ka Bording lyngba ka um shit na ram-ew (Geothermal Energy):

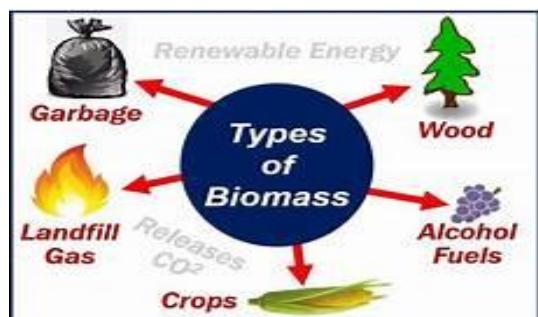
Ka umshit na ka mei ram-ew kaba pynmih ia ka jynhaw ba khluit ka lah ban pyndonkam ha kaba pynmih ia ka bording elektrik. Kane ka jynhaw khluit kaba khlain bor ka pynkhih ia ka shalyntem jong ka kor bording bad lyngba ka generator ka pynmih ia ka bording elektrik. Hynrei ka jingpynmih bording kaba kum na kine ka duna bha namar ba ki don tang khyndiat eh kum ine ki jaka ha baroh kawei ka pyrthei.



## 8. Ka Bording na ki kynja niut (Biomass energy):

Ia ka bording kaba kum kane lah ban ioh da kaba thang ia ki kynja sla dieng, ki niut bad kino kino ki kynja dieng, ki jingthung kiba lah ban iai ioh biang (renewable energy). Tangba ka bording kaba ioh na kum kine ka duna bha.

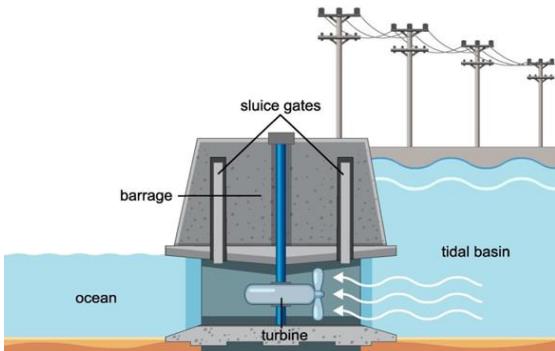
Ka dur ka ba pyni ia ki jait niut ba pynmih bording (Biomass) kum ki na ki niut ba pynlang na ki iing, ki dieng, ki jaka pynlang jaboh, ki jingthung. →



## 9. Ka Bording na duriaw (Ocean Energy):

Ka bording kaba ioh na duriaw ka dei lyngba ki jingatphyllung kiba pynshad ia ki kor ba la pyndaitlang bad ka generator ban pynmih bording. Kane ka bording lah ban ioh tang na ki jaka kiba don harud duriaw. Ka bording kaba pynmih ka bor jong ka duriaw ka long kaba khuid bad ka duna ban pynjaboh ia ka mariang. Kane ka bording lah ban ioh tang na ki ri kiba don harud duriaw.

## Tidal Power Station



*Ka dur jong ka jaka pynmih bording na ki jingkiew jinghiar ka um (tide) ha rud duriaw.*

### KA JINGTHMU SHA KA THONG JONG KA BORDING BAKHUID BAD BA JYRNGAM NA KA BYNTA KA MARIANG BABHA:

Ka jingdawa jong ka bording ka dei katkum ka jingroi jong ki iing ki sem, ki karkhana, ki iing khaii pateng etc. Katba nangkiew ka jingbun ki iing bad ki karkhana, ka jingdawa ban pynbiang ia ka bording elektrik ruh ka la nang bun. Kumta ban pyndap ia kane ka jingdonkam (demand) jong ka bording, ka jingpynmih bording ruh kan nang kiew. Namarkata, haba ka jingpynmih bording na ki jaka ba pyndonkam da ki marpoh khyndew (fossil fuels) ka nang kiew ka jingjakhlia ha ka mariang ruh kan nang bun.

Ha Ri India ka jingpynmih bording na u dewiong ka long kumba lai powa na ka jingpynmih bording jong ka Ri baroh kawei. Katba ka pyrthei salonsar ka dang iakhun ban pynneh pynsah ia ka mariang lyngba ka bording kaba ioh na ka mariang (renewable energy) ka la nang donkam bha bad ki lad ban tan ia kane ka bording ki la nang kiew sted. Ka jingwanrah ban pynduna ia ka jingpynjakhlia ha ka mariang bad ban pynneh pynsah ia ka, ka dei ruh ka lynti na ka bynta ka lawei ban ioh pyndap pynbiang ia ka jingdonkam da kane ka bording.

Ban pyndap pynbiang ia ka bording na ka bynta ka lawei, ki stad saian ki la pyrshang ban wad ki lad ki lynti ban ioh ia ki tiar kiba biang ban kham lah ban tan ia ka bording na ka na ka mariang namar ka long kaba kham khuid bad kaba duna ban pynjaboh ia ka mariang. Ka bording kaba lah ban ioh na ka um, ka lyer bad na ka sngi ki duna shikatdei eh ban pynjaboh ha kaba ianujor bad ka bording kaba pynmih na ki marpoh khyndew kum u dewiong bad ka umphniang. Ka jingdon ki tiar ba kham bha ban tan bording na ka mariang kiba katkum ka juk kaba mynta ki la nang plie lad kham bha ban tan bording na ka mariang na ka bynta ka jingbha ban ban pyndap bording ia ka lawei. Ka sorkar bad ki nongwad bniah ki la nang ioh ki buit ban kham pynbha ia kane ka rukom tan bording na ka mariang bad kumno ban pyniasoh lang ia kine bad ban pyniasoh lang bad ki bording nonrenewable kiba la don lypa khnang ban ioh ia ka bording kaba biang bad kaba iaidbeit.

### KA JINGDONKAM IA KA BORDING KABA KHUID.

Ka jingdonkam ia ka bording kaba khuid ka long ban pyndap pynbiang ia ka jingdawa bording na ki nongtan bording da ki renewable energy kiba duna ban pynmih ia ki lyer jakhlia kum ka lyer carbon dioxide khnang ban pynneh pynsah mariang haba nujor ia ka bording kaba pynmih na ki marpoh khyndew (fossil fuels). Dei na kane ka daw, kane kan iarap ban pynduna ia ka jingkylla ka mariang bad ka pynduna ha ka jingkiew jong ka jingshit ha ka pyrthei.

### KA JINGIOHNONG NA KA BORDING KABA KHUID.

Don shibun bha ki jingiohnong na ka bording kaba ioh na ka mariang namar (renewable enrrgy) ia kane donkam ban thied tang ia ki tiar ban tan bording ha kaba sdang ban tei ne shna ia ka bad hynrei hadien kata ia ka bording la shu ioh na ka mariang khlem da hap ban siew pisa. Kane kan iarap ban pynneh pynsah mariang bad ban pynduna ia ka jinglut noh ki marpoh khyndew. Nangta shuh shuh, ki karkhana

shna tiar ban tan boarding na ka mariang kin nang roi bad kane kan plie lad ha ka ioh kam ioh jam jong ki brieuw.

## KAEI KA JINGTYNGKAI IA KA BORDING (ENERGY CONSERVATION)?

Ka jingtyngkai ia ka boarding ka mut ban ka jingpynduna ha ka rukom thang ia ka boarding khlem pynduna ia ka jingtreyikam bad ia ka jingpynmih ne ka jingpyndep ia ki kam. Lah ban leh ia kane lyngba ka jingnang pyndonkam ia ka boarding lyngba ki tiar elektrik kiba bam kham duna ka bor hynrei kiba trei kam kumjuh kum ki tiar ba bam boarding hynrei ka jingmih ia ki jingthmu ka long kumjuh ne kham bha. Ka jingpynduna ia ka rukom pyndonkam ia ki tiar elektrik lada lah ban pyntrei kam ne pynmih ia ka thong da kiwei pat ki rukom khlem da pyndonkam da ka boarding elektrik ruh ki ong ka dei ka jingtyngkai ia ka boarding. Ka jingbym pyndonkam khlem nongrim ia ki tiar elektrik ka pynsepei ia ka boarding bad kaba nang ban tyngkai kan iarap ia ka mariang ban pynneh pynsah ia ka boarding bad kumjuh ia ka mariang:

Kine harum ki dei ki nuksa ban tyngkai ia ka boarding;

- i. Pynlip ia ki tiar elektrik ne light, ne pangkha ne ki tiar jingpynkhriat ne pynsyaid kamra haba um don brieuw ha kamra.
- ii. Shna ia ki iing katkum ki kyndon ka Energy Conservation Building Code ban iarap ban ioh ia ki kamra kiba pyngngad ha ki por ba shit bad ban pynsyaid ha ki por khriat.
- iii. Ka jingpynkylla ia ka rukom im kaba ju mlien, kata wat pyntreikam ia ki tiar elektrik ha ki por mynstep 6 haduh 9 baje ne janmiet ha ki por 4:30 haduh 9 baje kaba ki ong peak hours, namar kane kan iarap ban pynduna ia ka jingbam boarding ki tiar elektrik. Lada ha ki ‘peak hours’ ki brieuw ki pyndonkam ban thang ia ki light na ka bynta ka jingshai bad kumjuh ruh ban pyniaid ruh ia ki tiar elektrik, kane ka wanrah ia ka jingkhia ka bor (overload) u transformer bad kumjuh ki sainar tan boarding, nangta kan pynhiar ruh ia ka jingmeh ka bor light (voltage). Lada hiar ka voltage (voltage drop) ka kiew ka current bad kane ka wanrah ia ka jingkiew ka bai light (electric bill). Ka rukom pyntreikam ia ki washing machine ne kino kino ki tiar light ha ki por bym dei ki peak hours kumba la kdew haneng kan iarap ban pynduna ia ka jingkhia u transformer namar ki nongthang elektrik pynshai (lighting) ki duna ha kum kane ka por. Da kaba kiar ban pyndonkam ia ki kor elektrik ha ki peak hours kan iarap ruh ban ioh ia ka voltage kaba biang bad ka current ruh kannym kiew ha kum kane ka por. Lada duna ka voltage, ka current ka kiew bad dei na kata ka daw ka bill light ka kiew. [Peak hours ka dei ka por ha kaba baroh ki nongtan light ki donkam ban pynmeh ia ki tiar ai jingshai (bulb light) bad ha kajuh ka por ki pyndonkam ia ki kor elektrik, dei na kata ka daw ka kiew ka jingkhia (load) ki transformer. Off Peak pat ka dei ka por ba ki katto katne ki brieuw ki pyndonkam tang ban pyniaid ia ki kor elektrik.]
- iv. Pyndonkam da ki tiar elektrik kiba duna tan boarding kum ki star-rated bad smart appliances kiba bam duna ka boarding hyntrei kiba khlain ban trei kumjuh kum ki tiar elektrik ki bym dei ki star rated.

Watla kine ki dei ki rukom jingmlien kiba rit, hynrei ka wanrah ia ka jingiohnong da kaba kunai ia ka jinglutksan jong ka boarding bad kan wanrah ka jingiada ia ka mariang ban lait na ka jingmih ka carbon dioxide na ki jaka thang dewiong ba pynmih boarding. Namarkata lada ka duna ka jingpyndonkam ia boarding ha ki iing ne dukan, ka jingpynmih ia ka boarding na ki karkhana ruh kan duna.

## KA JINGDONKAM BAN IOH IA KA BORDING KABA BIANG.

Ka jingkiew ha ka jingpyndonkam ia ka boarding kan pynlong ban tih pathar ia ki marpoh khyndew (fossil fuels) bad kane kan wanrah ia ka jingjaboh ka lyer bad ka khyndew jong ka mariang. Katba nangkiew ka jingdawa ban pynbiang ia ka boarding, ka jingtih marpoh khyndew ruh ka nang jur namar hap ban pynbiang ia ka jingdawa ki nongthang boarding. Kan sa poi ruh ka por ba namar ba ka jingdonkam ia ka boarding ka la bun bha bad ka jingpynmih ka duna, ka bai thang boarding kan kiew bad bun ki ban shem jingeh ban thied.

Namarkata, ka donkam ban pynneh pynsah ia ka boarding na ka bynta ki por ki ban wan, ka donkam ruh ban pynduna ia ka jingkiew syndet ha kaba pyndonkam ia ka khnang ban lah ban pynbiang ia ka boarding na ka bynta ka lawei. Kane kan iarap ruh ban nym shaniah tang ha ki marpoh khyndew fossil fuels na ka

bynta ban pynmih bording hynrei ban plie lad ia ki rukom pynmih bording na ki renewable energy khnang ban iada ruh ia ka mariang na ki jingjaboh na ki lyer carbon dioxide bad ka jingpynmih lyer khluit.

### KI TIAR ELEKTRIK KIBA DUNA BAM BORDING.

Ki tiar kiba duna ban tan ka bording ki wanrah ka jingjohnong bad ka long kaba ban thied ia ki. Ka jingthied kum ia kine ki tiar elektrik ba duna tan bording (energy efficient appliances) ka iarap ban pynduna ia ki bill elektrik ne bill light. Lada ka jingtan ia ka bording ka duna kane kan pynlong ia ki karkhana pynmih bording ban pynmih duna ka bording, te ka jingthang ia u dewiong ne fossil fuels kan duna bda kane hi kan iarap ia ka mariang.

Ki tiar elektrik kiba kham tan bun ka bording ki kham duna dor haba ia nujor bad ki tiar elektrik kiba duna tan bording. Hynrei haba ngi khein pat ia ka bill light da kaba thied ia kine ki tiar duna tan bording ne ki star rated ki kham tan duna bording ban ia ki tiar bym dei ki star rated. Dei hangne lada phi khein na ka bai thang bording (electric bill) phin shem ba hadien lai snem shiteng ne saw snem ka bai thied rem ia kine ki tiar tan duna bording ne star rated ka la kham iohnong haba nujor bad ki tiar bym dei star rated (ordinary) wat lada ki kham duna dor ha ka por ba dang thied. Ki tiar bym dei ki star rated ki tan bha ka bording bad katba nang kham rim katta ki nang kham bam bun ka bording. Kum ka nuksa, ki tiar thang bording kum u light-emitting diode (LED) bulbs ki ai kajuh ka jingshai bad ki thang kham duna ka bording haba ianujor bad ki bulb light barim (incandescent bulb). U 12-watt LED bulb u ai kajuh ka jingshai haba ianujor bad u 100-watt bulb barim (incandescent bulb) hynrei ha ka bor tan elektrik pat u duna haduh 88 watts ka bording i.e., (100 – 12 watts i.e., 88 watts). Kumta lada phi khein u LED bulb u duna bam bording kumba 88 na u 100 watts incandescent bulb. Hangne phin lap ba da kaba thang bording da u LED bulb kan iarap ban duna jinglut ban siew bai thang light ban ia u incandescent bulb light barim (ordinary bulb) bad ha kajuh ka por u kham neh slem.

*Hangne harum ka dei ka jingianujor jong ki tiar fridge kiba khlem don khlur (no star) bad kiba don khlur (star rated) bad ka por ba lah ban pynmih pat ia ka bai thied kaba kham rem dor ban ia ki ba khlem khlur(no star):*

Star Rating	Ka jingtan bording ha ka shisnem	Ka dor shi unit jong ki iiing (Domestic)	Ka bai light ha ka shi snem	Ka total Kai oh pynlang w.r.t No Star /shi snem	Ka dor jong ka Refrigerator (Approx)	Ka jingiapher ka bai thied	Ka jinglah ban pynmih bai thied tam (Payback Period)
	Units (kWh)	Rupees	Rupees	Rupees	Rupees	Rupees	Years
No Star	1100	5.00	5500.00	Nil	20000.00	Nil	Ka lah ban kham kiew katkum ki por
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

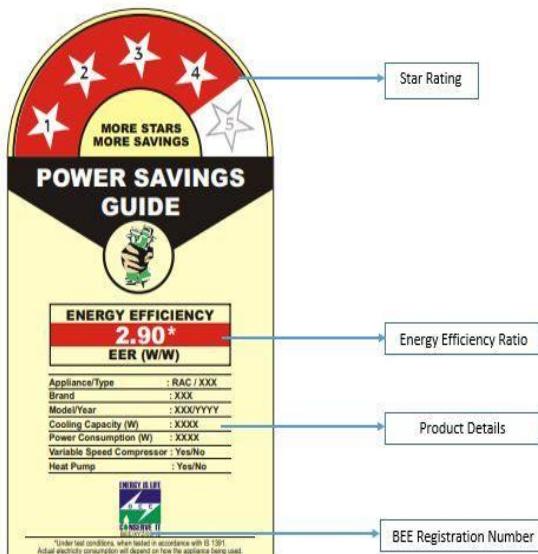
*\*\*Lah ban peit na ka Bureau of Energy Efficiency (BEE). Ka dor (Approximate cost) jong ka 250 Litres Refrigerator. Don ki tiar star-rated kiba ai ka jingpynmih ia ka dor thied tam kham kloj ban ia ki jingkhein haneng.*

Namarkata, ban thied da ki tiar kiba kham duna ka jingtan bording ne ki star-rated ka long kaba biang namar kan don ka jingjohnong na ka jingduna ban siew bill light bad lah ban pynmih pat ia ka dor ba la thied kham rem ynda la palat ia ka lai snem shiteng haba nujor bad ki tiar bym don shap khlur.

## Ka rukom im kaba kham paka

Ki tiar elektrik kiba tan duna ka boarding ki dei ki tiar kiba la shna da ki kompany ba pawnam (branded), ki kham bha ha ka rukom shna, kiba lah ban shaniah, khamtam eh ki trei kam bha katkum ka jingkwah bad kane ka wanrah ia ka jingsuk ka mynsiem. La shem ba kine ki tiar ki kham neh slem bad la ban ioh ka jingmaramot kaba kham thikna haba ia nujor bad ki tiar kiba kham tan boarding ne ki bym don shap khlur (no star rated).

## BAN SNGEWTUH IA KA RUKOM TAH MUHOR NE SHAP (LABELS) JONG KI TIAR ‘STAR RATED’ NE SHAP BA DON KHLUR.



*Na katei ka shap haneng, kane ka tiar kadei kaba don saw tylli ki khlur (4-star rated) bad ka rukom tan boarding ka don ha ka ratio of 2.90. La shna ia kine ki tiar da kaba ai shap naduh shi khlur haduh san khlur. Kat nang bun ki khlur ka bai light ka kham duna*

Ki tiar kiba duna tan boarding ki don ka shap khlur ne muhor khlur kiba ai jingtip ia ki nongthied ba kin sngewthuh ia ki rukom tan boarding. Kane kan iarap ia ki nongthied ban sngewthuh bha shaphang ka jingtan duna boarding na kine ki tiar. Lyngba ki shap khlur bad ki jingthoh ha ka shap kan iarap ia ki nongthied ban sngewthuh haduh katno lah ban pynlang ka pisa na ka bai thang elektrik.

Ka Bureau of Energy Efficiency (BEE) ka dei kaba buh beit buh ryntih ia ki shap jong ki rukom tan boarding ia ki tiar elektrik ha ka Ri India. Ka BEE ka pynkhamti ia kine ki jingai khlur ne star rating ia ki tiar elektrik jong ki jait tiar bapher bapher haba la bishar (test) ia ki katkum ki kyndon ka jingtan boarding. Ka BEE ka pynshitom bad dain kuna ruh lada ka lap ha ki jaka die jingdie kiba buh shap thok bad kiba



*Ki tiar kiba kham bun ki khlur ki kham duna ban tan boarding.*

**KI TIAR ELEKTRIK KIBA DUNA TAN BORDING BA LA PYNBNA DA KA SORKAR INDIA.**  
Kine harum ki dei ki tiar tan duna boarding ba la pynmih ha ki kaiphod jong ka Bureau of Energy Efficiency (BEE).

- Ki tiar thang jingshai kum ki LED bulbs, TFL (tubular fluorescent lamp) and LED Streetlights
- Refrigerators (fridge)
- Ki tiar pynkhuit um (Geysers)

- Ki mashin pynmih lyer khriat ne syaid (Central Air Conditioners)
- Pangkha ba pyndait ha ka sad (Ceiling fans)
- Ki kor saitjain (Washing machines)
- Smart thermostats
- Microwave oven (Cooking Appliances)
- Ki kolor telebishon (Television (colour))
- Ki mashin sam bording (Distribution Transformers)

\*Sngewbha ban peit na ka website @ <https://beeindia.gov.in/en/star-label>.

### **KI BYNTA KIBA NGI HAP BAN KHMIIH SHUWA BAN THIED IA KINE KI TIAR ELEKTRIK**

Ki tiar duna tan bording ki iapher kawei na kawei pat ha ka rukom tan bording bad kumjuh ruh ha ka dor. Ka bording ka kham tan duna lada ki kham bun tylli ki shap khlur ha ki muhor ba la tah ha ki mashin elektrik. Ia kane hap ban pynshong nongrim shuwa ban thied da kaba peit bniah na ki jingthoh kiba don hapoh ka shap (label) bad haba thied ia kum kine ki tiar donkam ban pynshong nongrim ne bishar kumne harum:

- ❖ Pynthikna ba ki kamra ki long ki ba biang bad ban ngiam ki tiar ban thied thymmai. Ki kamra ki dei ban don jaka kiba kham kylluid khnang ban lah ban plied wang ia ki jingkhang jong ki tiar ki ban buh.
- ❖ Kiar ban thied ki tiar bording kiba kham heh lait satang lada i donkam bha, namar ki tiar ba kham heh ki tan kham bun ka bording bad ka dor ruh ka kham rem.
- ❖ Haba thmu ban thied ia ki tiar katkum na ki kompeni, kynmaw ban da peit ia ka shap ne muhor ba la tah katno ka jingthoh ka don bad katno ka baithang bording kan wan ha ka shisnem. Ka tiar kaba kham bun ki khlur ka kham duna bai light hynrei ka dor ka lah ban kham rem tangba kan iohnong pat naduh ki lai snem shiteng shaneng na ka daw ka jingduna tan bording haba ianujor bad ki tiar ba khlem khlur.
- ❖ Ia ki shap ne muhor (star-rated label) jong ki jait tiar lah ban ianujor bad kiwei ki jait kompeni (brand) bad ia ka jingthoh kaba pyni katno ka tan bording ha ka shisnem dei ban sngewthuh bad ban rai thikna shuwa ban thied ia ka tiar.
- ❖ Katba nang bun ki shap khlur katta ka nang duna ka bai elektrik te ka jingkynshew pisa ha ki por ki ban wan ka kham bun.

### **KI 26 TYLLI KI MAT BAN TYNGKAI IA KA BORDING BAD KI BA LAH BAN PYNTREIKAM:**

Ki don shibun ki rukom ban kunai ia ka bai thang bording bad kine harum ki dei kiba lah ban bud nuksa kumno ban pyntreikam:

- ➔ Thied da ki tiar bording elektrik kiba katkum ka juk mynta lane bujli ia ki tiar elektrik ba la rim ki bym ai ka jingshakri kaba biang lane ki bym trei kam thikna shuh. Ban bujli da ki tiar ba kham thymmai (newer model) bad ba ioh bah khala (warranty) bad kiba biang ka rukom tan bording katkum ka juk mynta ki dei ki buit kiba biang bha ban pynlang pisa bad bai thang bording. Ki tiar elektrik kiba la kham rim ki dei ki juk saian ba la kham rim bad ki tan shibun ka bording bad kim ai ruh ia ka rukom trei kam kaba paka. Ki bulb light ne tiar ai jingshai ba la rim lah ban bujli noh da ki tiar aijingshai ba kham duna tan bording kata da ki LED light kiba ai kajuh ka jingshai ha ka bor barit haba ianujor bad ki tiar ai jingshai ka juk barim bad kine ki LED ki neh kumba 25 shah ban ia ki light ka juk barim (ordinary incandescent bulbs).
- ➔ Pynduna ia ka rukom trei kam da ki tiar bording lada lah ban kiar khnang ban kunai ia ka bording. Kum ka nuksa, ia ka kor sait jingkhlieng (dishwashers) bad ka kor saitjain (washing machine) kan iarap ban pynduna kumba 10 percent ia ka bai thang elektrik lada sait ha ka um ba kham duna jingkhliut bad ha ka bor ba dap pura (full loads) kan iarap ban tyngkai ia ka bording.
- ➔ Pynlip ia ki tiar pynmeh bording lane sei shabar ia ki plug haba khlem pyntreikam ia ki. Haba iehnloh pynmehsah (standby mode) ia ki tiar bording baroh shisngi kin tan bun bha ka bai bording. Katkum ki nongpeit pyrman ia ki jingthoh halor ka baithang bording, lah ban pynlang (save)

kumba 5 haduh 10% na ka baithang boarding da kaba pynlip ia ka elektrik na u jingpynlip boarding (switch) ban ia kaba shu pynlip *standby mode* tang na ka kor ne tiar boarding.

- ➔ Bujli ia ki jaka pynmeh boarding da ki smart plugs bad ki power strips na ka bynta ban kham biang ka jingmeh ka boarding. Kine ki tiar ki iarap ban pynlip hi ia ka boarding lada khlem pyndonkam bad lah ban buh ban kin treikam ia ki tiar elektrik tang ha ki por off peak. Kane kan iarap ia ki trai iing ban sngewthuh bha ia kino ki tiar ba biang ban pyndonkam khnang ban duna ka bai thnag boarding.
- ➔ Pynlip ia ki Air Conditioners (ki kor ai lyer shit ne pjah), ki light, ki pangkha etc., haba um don briew ha kamra, ka long kawei ka nuksa ba rit ban tyngkai ia ka boarding.
- ➔ Ki tiar boarding ki tan duna ka bai thang elektrik lada pyndonkam ha ki por naduh 8 am haduh 4 pm bad 9 pm haduh 5 am, ia kine la khot ki off-peak periods; ka daw ka long ba ka jinghang jingshai bad ki tiar boarding kim pynmeh ha kajuh ka por.
- ➔ Pyndonkam da ka jingshai kaba ioh na ka mariang kaba wan na ki jingkhang bad jingkhangiit ha ka por mysngi ban lait na kaba thang da ki tiar jingshai boarding. Ia ka boarding ai jingshai lah ban pyndonkam tang ha ka por ba dum bad mynmiet. Pyndonkam da ki pyrda kiba stang ha ka por mynsngi lada thaba palat bad pyndonkam da ki pyrda kiba rbben ha ka por mynmiet ne por khriat ban iada ia ka jingmih ne jingrung ka lyer na shabar khamtam lada pynmeh ia ka tiar pynsyaid ding (room heater).
- ➔ Ban hukum ia ki nongtrei ophis ba “kinnym pynmeh sah ia ki light haba um don briew ha kamra” bad ban pynkynmaw ia baroh ki nongtrei ophis ba kin pynlip ia ki light ne pangkha haba kim don hapoh kamra trei kam. Lah ruh ban pyndonkam da ki tiar ba lah ban pynmeh ne pynlip hi ia ka light lada um don briew hapoh kamra. Kane kan iarap ban pynduna bai thang boarding kumba 30 percent na ka bai thang boarding. Kumjuh ruh dei ban ai jingthoh ba ki nongtrei ki dei ban pynlip ia ki tiar computer bad kiwei ki tiar tan boarding haba khlem pyndonkam.
- ➔ Da kaba buh ia ka jingkhriat jingshit (air conditioner) na ka 23° C sha ka 24° C kata kumba 1°C kan pynduna ia ka jinglут ka bai thang boarding kumba 8%.
- ➔ Ia ki jaka pei thliew ha ki jingkhangiit bad ia ki kynroh iing ne ki jaka pyllait lyer (skylights/ventilations) dei ban maramot khnang ban nym ailad ia ka lyer nabar ba kan rung sha kamra ne ka lyer na kamra ba kan mih shabar khnang ba ka boarding kan nym sepei ia ka ban pynkhriat ne pynsyaid ia ka kamra.
- ➔ Pyndait ia ka tnum da ki tiar ba la shna khnang ban iada ia ka jingshit jingkhriat ka ban rung ne ban mih shabar ka kamra lyngba ka tnum iing.
- ➔ Pyndonkam da ki tiar baje ban pynlip hi ia ka boarding ha ka por ba wan ka jingdum bad pdiang ia ka rukom shna iing ba duna tan boarding (smart building) ne kata ka Energy Conservation Building Code jong ka sorkar khnang ba kan iarap ban tyngkai ia ka boarding.
- ➔ Lada bun ki nongrung nongmih ha ki kamra, lah ban shna da ki jingkhang ba lah ban plie bad khang hi ban iada ia ka jingmih jingrung ka lyer nabar iing ban nym ailad ba kan mih ne rung ka lyer nabar haba pyniaid ia ki air conditioner.
- ➔ Ka jingmaramot ia ki tiar kum ki refrigerator, air conditioner ha ka por kaba biang kan iarap ban pynduna ia ka jingtan boarding bad ki tiar ruh ki kham neh slem. Buh ia ki tiar boarding ha ki jaka ba kham kylluid bad pynkhuid bha ia ki pangkha bad ki filter ban iada na ka jingkhuit palat bad kan tan bun ka boarding.
- ➔ Ka jingthung dieng ha phyllaw iing ne ophis kan iarap ban ioh ia ka lyer kaba pyngngad ha ka por lyur bad ban kah na ka jingbeh jong ka lyer khriat sha ka iing ha ka por tlang. Kane kan iarap ban lait na ka jingpyndonkam ia ki tiar pynsyaid ne pynkhriat ban tyngkai ia ka boarding.
- ➔ Niad da ki rong kiba shai ia ki kamra bad kane kan iarap ban lait na ka jinghang ki tiar ai jingshai ha ki por mynsngi bad ban lait na ka jingkiew ka bai thang boarding.
- ➔ Ka jingpyniaid ia ki air conditioner ha ka jingshit kaba 25 °C kaba dei kaba pyngngad kan pynduna shibun ia ka jingtan boarding. Ki kali ruh ki lah ban pyndonkam ban pyniaid ia ki air conditioner tang haduh 25 °C bad kan iarap ban kunai (save) ia ka umphniang petrol ne diesel. Haba ka bneng ka pyngngad bad ka duna ia ka 25 °C ka bha ban nym pyndonkam air conditioner ha kamra ne ha kali ba kan iarap ia ka mariang.

- ➔ Pyndait da ki tiar tan bording na ka sngi (solar panels) ha ki tnum iing ban ioh bording na ka bynta ki jingdonkam ha iing. Ka dor thied ia ki tiar (solar panel) ka lah ban kham rem hynrei namarba ka bording la shu ioh ei na ka sngi kan iarap ban pynmih ia ka bai thied tiar ynda la kham bun snem kata hadien saw snem ei ei.
- ➔ Pyndait da ki tiar ban pynkhuit um ba tan na ka sngi (solar water heater) ban iarap pynduna ia ki bai thang bording. Da kine ki tiar lah ban pynsyaid ia ka um ha kaba sdang bad sa pynkhuit pat da ka bording kaba ioh na ka MeECL katkum ka jingkhuit kaba sngewdonkam. Kane kan iarap ban kunai ia ka jingtan bording bad kan iarap ban pynduna ka bai thang bording.
- ➔ Lah ban pyndait da ki tiar ai jingshai ba tan bording na ka sngi mynmiet (solar streetlights) ha surok, phyllaw, barenda ne kper khang ban iarap ban tan bording na ka MeECL. Phi lah ban ioh ia kine ki tiar na iew katkum ka jingkwah ki nongthied.
- ➔ Lah ban pyndait da ki pump um ba tan bording na ka sngi ha ki pynthor, lynkha, kper na ka bynta ban tan um ia ki jingthung ne ban tan um ha ki iing ban lait na ka jingtan bording na ka MeECL.
- ➔ Lah ban pyndonkam da ki tiar shet jingshet (solar cooker) ha ki jaka ba shat sngi bha khnang ban iarap pynduna ka bai thang bording.
- ➔ Lah ban thied da ki tiar ai jingshai ba tan bording na ka sngi (solar lanterns) na ka bynta ki briew kiba trei jingtrei mynmiet ne ha ki jaka ba dum khang ban lait ka jingpyndonkam da ka bording jong ka MeECL. Lah ruh ban pynkhain bor (charge) ia ki mobile da kine ki solar lantern haba um don bording.
- ➔ Ban phong ne tap da ki jain syaid ha ka por tlang bad phong da ki ki jain stang ha ka por syaid ban lait ka jingpyndonkam ia ki tiar bording pynsyaid ne pynpyngngad.
- ➔ Dei ban pynlip ia ki streetlight ne ki tiar ai jingshai ha ki surok shnong ne phyllaw ha ka por ba la shai ne mynsngi khnang ban tyngkai ia ka bording.
- ➔ Ka jingpyndonkam da ki kali kiba duna bam ka umphniang (better mileage) kan iarap ban tyngkai ia ka umphniang marpoh khyndew (fossil fuels) bad ka dei ka jingtyngkai ia ka bording.

### KIWEI KI LYNTI BAN TYNGKAI IA KA BORDING:

➔ **Sait jain ne jingkhlieng da ka umkhriat bad sum da ka umpjah lada long kaba lah.**  
 Pyndonkam da ka um syaid tang lada donkam bha bad bym lah kiar. Kaba kiar ban pynkhuit um khah khah haba lah ban sait da ka um pjah ka long kwei na ki lad ban kunai ia ka bording. Kaba sum da ka umsyaid blem blem lane da ka umpjah ruh ka long kaba bha lada lah na ka bynta ka jingkoit jingkhiah.

➔ **Pynrkhiang ia ki jain, shniuh bad jingkhlieng da ka bor mariang.**

Ka bat had ia ki jain ha ka sngi ha ka jaka ban pynrkhiang da ka pangha ne ka kor pynrkhiang ka dei kwei na ki jingiarap ban tyngkai bording. Niad ia u shniuh da ka towel bad ieh ba un rkhiang hi ha ka jaka ban pynrkhiang da ka kor bording. Hynrei lada um lah ban kiar, pynkhuit ia ki kor pynrkhiang shniuh da ka bor ba kham rit (lower setting) watla kan kham shimpot ban pynrkhiang. Ia ki jingkhlieng ruh lah ban ieh kumto ba kin rkhiang hi ha ka jaka ban pynrkhiang da ka kor bording bad kane kan kham iarap ia ka jingkhuid bad jingkoit jingkhiah.

➔ **Pyndait da ki pangha ha ka jaka ka kor pynkhriat lyer.**

Ka pangha ka iarap ban pyniaid sawdong ia ka lyer ha ka kamra bad kane kan wanrah ka jingpyngngad ia ka met khlem da pyndonkam ia ki kor pynkhriat air ne conditioner kiba tan bun ka bording. Lah ban pyndonkam ia ki kor lyer khriat tang ha ki jaka kiba shit bha bad buh ia kine ki kor elektrik buh ha ka jingthew kaba  $25^{\circ}\text{C}$  ban lait na ka jingtan palat ka bording.

➔ **Kaba pynum ia u thah na ka refrigerator manla u bnai.**

Kaba pynum ia u thah na ka refrigerator shisien shi bnai kan iarap ban pynduna ia ka jingtan bording. Haba u thah u la lang palat, ka pynlong ia ka refrigerator ban pyndonkam ia ka bor kaba kham khlain bad dei hangne kan tan shibun ka bording ban pynneh ia u thah. Ban pynum ia u thah, pynlip ia ka bording nangta sei lut ki tiar jingbam na ka refrigerator bad plie ia ka jingkhang jong ka refrigerator bad pynrkhiang ia ka freezer. Hadien ba la dep, pynmeh biang bad ynda ka la kham pjah sa thep pat ia ki tiar

jingbam hapoh ka refrigerator. Da kaba leh kumne kan iarap ban pynduna ia ka jing tan bun ka bording. Lada don ki iing kiba pyndonkam bun tylli ki refrigerator ki barit, lah ban bujli noh tang kawei ka refrigerator kaba kham heh kaba ngiam khambun ki tiar jingbam bad kane kan iarap ban kunai ia ka bording.

➔ **SOLAR STREETLIGHTS** ne ki jingshai ba tan bording na ka sngi (renewable source of energy), lah ban pyndonkam ban pynshai mynmiet ha phyllaw, tnum iing, kynroh iing ne surok shnong ban lait tan bording na ka MeECL ne ha ki jaka bym pat don bording na ka MeECL. Lah ban pynieng hi da ki kynja nar kum ka dur ba la pyni hangne bad um donkam ban shim bording na ka MeECL. Lada donkam ki don ki contraktor shna bording kiba nang ban pyndait ia kine ki tiar solar streetlight. Kine ki tiar aijingshai ki lip bad meh hi mynmiet ne mynstep (auto setting) katkum ki rukom ba la buh da kompeni ban suk pynmeh ne pynlip.



*Ki solar streetlight ha lynti shnong.*



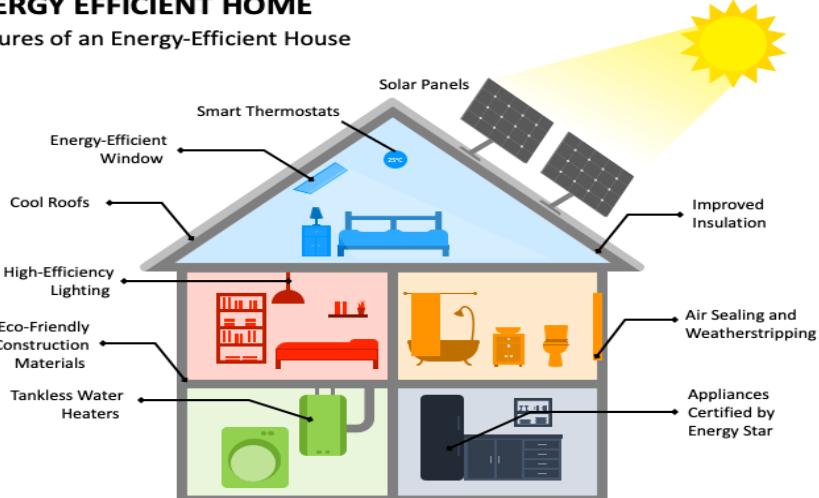
*Ka dur jong ka kor pykhuit um na ka sngi.*

➔ **SOLAR WATER HEATER:** Kane ka dei ka renewable bording bad lah ban pyndonkam kum kawei na ki lad ban pynkhuit um ha ki iing ne ki ophis. Kum kine ki tiar pynkhuit um lah ban pyndonkam ban pynsyaid ia ka um haduh ka jingshit kaba  $40^{\circ}\text{C}$  haduh  $50^{\circ}\text{C}$  da ka bording jong ka sngi nangta lada kam lah shuh ban pynkhuit, pyndonkam pat da ka bording na ka MeECL bad kane kan iarap ban pynduna tan bording na ka MeECL bad kumjuh ruh ban tyngkai ia ka.

➔ **SMART HOME:** Ka dei ka iing kaba shna katkum ki kyndon ban kunai ia ka bording. Ka dur harum ka dei ka iing kaba la pynwandur katkum ki kyndon ba la bthah da ka Energy Conservation Building Code (ECBC) Rules. Hapoh ka Smart Home, ki briew ki thied ia ki tiar bording kiba tan duna bad ha kajuh ka por ki pyndait da ki tiar tan bording na ka sngi khnang ban pynduna ia ka bording ka ba wan na ka MeECL kaba dei kawei na ki lad ban ban tyngkai ia ka bording. Ka rukom shna ia kane ka iing la shna kyrpang ruh ban ioh ia ka jingshai na ka mariang. Nangta ia ki kynroh jong ka iing la shna kyrpang da ki tiar iada na ka jingshit ne jingkhriat jong ka mariang bad ban nym lait lyer khriat nabar sha iing ha ka por tlang ne ki por khriat. Kumjuh ruh ia ki jingkhang bad jingkhangiit la shna kyrpang ban pynneh jingsyaid ha ka por khriat bad ban pyngngad ha ki por shit. Ka nuksa ban shna ia ka Smart Home ka long kum ka dur harum;

## ENERGY EFFICIENT HOME

Features of an Energy-Efficient House



*Ka dur nuksa jong ka Smart Home*

➔ **SOLAR WATER PUMP** lane ka kor tan um kaba ioh bording na ka sngi lah ban pyndait ban tan um na ka bynta ki kper, pynthor bad ban tan um sha ki iing khlem da pyndonkam da ka bording na MeECL. Kane solar water pump lah ban pyndonkam ha ki jaka kaba ioh bha ka sngi lane jngai na ki jak aba lah ban ioh bording na ka MeECL. Da kane ka rukom tan bording na ka sngi kan iarap shibun ban iada ia ka mariang.



*Ka dur jong ka Solar Water Pump*

➔ **ELECTRIC VEHICLE**: Kine ki dei ki kali ba pyniaid da ka bording. Kumban shu kdew hangne, ka jingjaboh jong ka mariang ka wan bun bha na ki kali lait noh na ki karkhana. Ki daw jong ka jingkylla ha ka jingshit jong ka mariang bad ki lyer jaboh ka dei ka jingpyndonkam ia ki kali diesel ne petrol kiba ioh na ka mei mariang. Na ki jingkylla ka mariang, ka la pynlong ia ki karkhana shna kali ban wad ki lad kumno ban iada ia ka. Kumta ka jinglap ia ki kali kiba lah ban iaid na ka bording elektrik lyngba ki batteri ka la long ka lad ban iada ia ka mariang bad ban iarap ban pynduna ban lut klo ka umphniang na ram-ew. Ka sorkar India ka la pynshlur ia ki briew ban pyndonkam ia kine ki kali elektrik da kaba ai jingiarap (subsidy) ha kiba bun ki liang bad kumjuh ruh ban pynduna bai khajna. Da kaba lap ia ki buit saian kumno ban stet ai bording (charge) ia ki batteri ka la nang kham pynshlur ia ki briew ban thied kali elektrik.

Donkam ban tip ba ia kine ki batteri dei ban ai bording (charge) da ki renewable energy khnang ba kan long shisha ka jingiarap ia ka mariang. Namar lada ia kine ki batteri jong ki kali elektrik la ai bording (charge) da ki non-renewable energy te kan dang pynjaboh hi ia ka mariang.

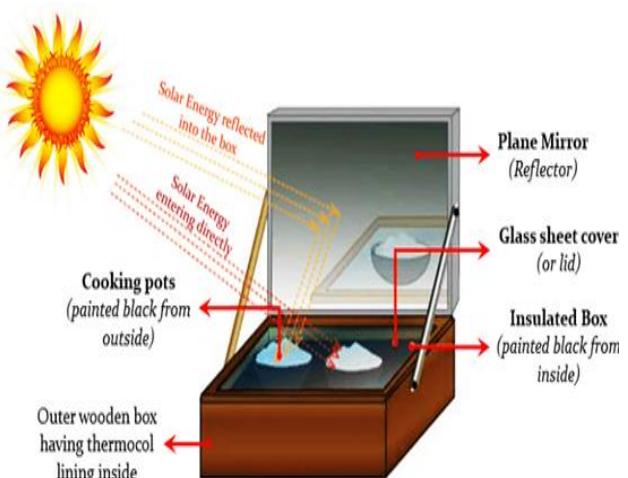


*Ka dur ba kumno la ai bording ia ki batteri jong ki kali*



→ **SMART HYBRID VEHICLES:** Kine ki kali la shna kypang ba lah ban pyndonkam da ka petrol ne diesel bad kumjuh ruh da ki bor batteri ba la ai bor da ka bording ban pyniad ia ki. Kane ka mut ba ha ka por ba ka kali ka iaid ka ai bording (charge) ia ki batteri ba la pyndait hapoh kali bad ynda ka bor ka la biang na ki batteri lah pat ban pyniad ia ki kali da ka bording lyngba ki batteri (battery mode). Kane kan iarap ban tyngkai ia ka umphniang bad kumjuh ban iada ia ka mariang.

→ **SOLAR COOKER:** Kine ki dei ki tiar shet ba lah ban pyndonkam da ka bor jong ka sngi, khamtam ha jaka ba biang ka shat bha ka sngi. Kane kan iarap ban lait nak aba pyndonkam da ka bording na MeECL. Kane ka dei kawei na ki lad ban iada ia ka mariang bad tyngkai ia ka bording.



*Ka dur jong ka solar cooker*

## ➔ SOLAR LANTERN NE LENLEN NA KA BORDING JONG KA SNGI:



Ka dur jong ki solar Lenten ne lenlen ba ioh bording na ka sngi pynieng lah ban pyndonkam ha ki shnong bym pat ioh bording elektrik bad katkum ka jingkwah ki nongthied.

## KA RUKOM IM KABA PDIANG IA KI JINGAIJINGMUT KIBA THYMMAI KHNANG BAN POI SHA KA THONG JONG KA JINGTYNGKAI IA KA BORDING ELEKTRIK:

Ka jingkylla ha ka rukom im bad rukom trei kam ka dei kaba donkam tam ban iarap ia ka ban pynduna ia ka jingkiew ka lyer carbon dioxide ha ka mariang. Ka jinghiar ka carbon dioxide ha ka mariang ka dei ka jingpynduna jong ka jingpynmih bording da kaba thang na u dewiong, ka umphniang diesel ne petrol. Ka jingpynduna ban thang ia kine ki marpoh khyndew ba meh ding (fossil fuel) kan iarap ruh ba kin lut suki suki na ki par bad ka jingduna ban tih ia kine ka long ban pynneh ruh na ka bynta ka lawei ka ban wan. Ka jingmyntoi ba kongsan tam na ka jingkylla ka rukom im ban tyngkai ia ka bording ka dei ban ioh ia ka mariang kaba khuid na ka bynta ka jingkoit jingkhiah jong ki biew. Ka rukom im da kaba trei kam ia kaba lah ban trei khlem da pyndonkam da ka bording ruh kan iarap ban pynneh pynsah ia ka mariang. Ka jingthied ne pyndonkam da ki kali kiba bam duna ka umphniang (more mileage) ruh ki long kawei ka rukom im kaba thymmai ki ba iarap ban pynbha ia ka mariang.

## KA JINGPYNKUT BAD JINGAIJINGMUT:

La sngewthuh ba ka jingthang ia ki marpoh khyndew (fossil fuels) kum u dewiong, ka petrol bad diesel ki dei kiba wanrah ia ka jingjaboh ha ka mariang bad kumjuh ka jingkiew jong ka jingshit jong ka pyrthei. Katkum ki jingwad jingtip lyngba ka National Oceanic and Atmospheric Administration (NOAA), la shem ba ha u snem 2016 bad u snem 2020 ki dei ki snem kiba ka kiew bha ka jingshit bad katkum ki jingthew pdeng ba la ioh lum buh, ka pyrthei ka la kiew ka jingshit la kumba  $0.18^{\circ}\text{C}$  ha man ki shiphew snem kata naduh ka snem 1981. Ka jingthmu jong kane ka jingpynsaphriang ia kane ka rukom tyngkai ia ka bording ka long ban sngewthuh ba lada pyndonkam duna ia ka bording ka mut ka jingdawa ban pynmih bording ruh kanihar. Kane ka don ka jingiadei hapdeng ka jingpyndonkam ia ka bording elektrik bad ka jinglong jong ka mariang. Lada iwei pa iwei na ki riew shimet ki don ka jingthmu ban sdang bud nuksa ban tyngkai ia ka bording kan long ka jingmyntoi kaba khraw ia ka pyrthei, kumba ka ktien ka ong “i jingjaw slap i barit, i pynlong ia ka duriaw bah”. Kumta ki jingbud ryntih ia ki jinghikai kumno ban tyngkai ia ka bording kan iarap ym tang ia ka mariang hynrei kan iarap ia ki nongthang bording bad ka lawei jong ka pateng ban wan namar ka jingthang ia ki marpoh khyndew ba meh ding (fossil fuels) kan duna, ka jingmih ka lyer pynjaboh mariang ruh kan duna, ka jingtih bad tan umphniang na khyndew ruh kanihar bad kaba

kham kongsan ka long ba ka jingkiew ha ka jingshit jong ka pyrthei kannym kiew stet. Lah ban pyni hangne ba ki jingot boarding khah khah jong ka MeECL ka long kaba pyndik ia ki paidbah nongtan boarding, hynrei kane ka long pynban kawei na ki jingtyngkai boarding khamtam ha ki aiom rkhiang namar ba hap thied boarding nabar jylla ka ba dei na ki karkhana pynmih boarding na ki marpoh khyndew.

***Kaba khatduh eh dei ban kynmaw ba “ka boarding ka ba tyngkai (saved) ka dei ka boarding kaba pynmih (energy generated)”.***



(M. F. Mawlieh)  
Senior Electrical Inspector  
Inspectorate of Electricity, Shillong

*La pynmih na ka bynta ka bha ka miat jong ki paidbah da ka office jong ka Inspectorate of Electricity and Meghalaya State Designated Agency on Energy Conservation, Lachumiere Shillong, Meghalaya.*