

# 6GDJ C9 H8DI A6C9

¥`H]gdi V]W]cb`Wb]U]bgcb`m667`Wdnf][\ha Uhf]U.`]hg`Wb]U]bgcb`a UmVYWd]YXcf`fYdfcXi WXZf`  
i gY]b`gWcc`gUbXW`Y] Ygk ]hci hZ fh Y`dYfa ]gg]cb"



# Sustainability — renewable energy

## ici gdYj Xi ^dc

### I ] Z'egd\gMb b Zh

H\Ylk c'dfc[ fUa a Yg]b'h ]gi b]ždfYgYbhX'Vni; fUhcN'ci f\_YZUFYXYgl[ bYX'ic'dfcj ]XY Ugh]a i 'i gZcf'h Ygi XmcZfYbYk UYUbx'bcbl'fYbYk UY'YbYf[ mgci fWg'

; fUbj ]glgVch fYbYk UYUbx'bcbl'fYbYk UY'dck Yf'gU]cbgUbX]g]blfcXi WX'ic' fYbYk UYUbx'bcbl'fYbYk UY'Z' Y'gci fWgVni ]Yk ]b[ 'Y Ua d'YgcZYUW'UbX`]g]b]b[ 'ic' h'cgYk cf\_]b[ ']b'h YUYX'Y d'U]b]b[ 'ck 'h Ymk cf\_"

8i f]b[ 'h YWi fgYcZVch 'dfc[ fUa a Yg'di d]'gUFYbWi fU YX'ic k Y] \ i d'h YdfcgUbX' WbgcZYUW'UFUY d'cfYX'ic U'ck 'h Ya 'ic a U\_Y]bZ'fa YX'i X] Ya YblgZ'cf'h Ya gY'j Yg'

### I ] Z' i ZVX] Zg]hcdi Zh

H\YhUWYf]g'bc]gUW'a dUbn]b[ 'h ]g'dfc[ fUa a Y]bW XYUg] a a UmcZYUW' dfc[ fUa a YZ'UbX'g [ ] Yg]cbgZ'cf'dfY]a ]bUfniUbX'Z'ck li d'UMj ]hYg"

K cf\_g YlgUFYUgc'dfcj ]XYZ'UbX'h YgYWb VYdf]bhX'ci h]b'a i 'hd'YWd]Ygcf' d\c'icWd]YXZ'cf'WUg'i gY"

H\YZ'fk UFX'd'Ub'ci h]bYg'gfUbXg'UbX'U]ba YbhiUf[ YlgZ'cf'h Ya UM]U"

### AZVgc^c\`dj i Xdb Zh

5ZM'k cf\_]b[ 'h fci [ \ h Ya UM]Uždi d]'gk ]''i bXf'gUbX'h Uh

*Energy*

Í 'YbYf[ m]ghYUW]'m]ic B cf\_Ñ

Í 'YbYf[ m]Wa Yg]bX]Z'fYbZ'fa g'Y YWf]WZ' YUz'] [ \ h'gci bXZ'WYa ]WZ\_]bY]W]W

Í k Yi gY'YWf]W' YbYf[ m]ic \ Ydi gk ]h U' "

³ spZ' P À @ ð 0° W I ° g SF € ð 0 <# ° À ð ` 0 À ` 0 # K D À ð ³ s0 P 0 G S A

V ³ ³ g S 0 "LÐ°Z LOP V ² HV

³ Ä F S X S A U P S H 0 P 1

SWR Q P

0 ;,Í Õ ¥ ³ EKLF WR WULHV 0 P 1

K ° Z Q

³ € 0 p 5cG0 5 0` HU

³ % P U

0 ;,Í Õ ` 0 8 Õ ` 0 8 Ò S P "LÝ P Q P L F P L F ` 6

³ € 0 0 P À À p 0 • 0 K F p 0` H O Q 1

° Z 0 K F p 0 K L p L @ U L E P € ð

S \ L Q W K F p 0

U L € • € 0 0 Ý 0 A X " I P

€ ^ 0 K

,



*Demand for Energy*

Í ci f bYXZcf YbYf[ mlf[ "WgZYWf]Vhã\YUjb[ YW]g\U ]b[ UgYf]ci g]a dUMcb hY  
k cf XUfci bXi ghfci [ \ hY\Ufa Z `[ UgYgdfcXi WX"H\YgY[ UgYg\Uj YUby[ Uj Y  
YZWcb hYVUUbWcZ9Ufh\Ua cgd\Yf

Í k YbYXlc fYXi WYa ]gg]cbg'cZ[ fYb\ci gY[ UgYgVYa cfYbYf[ mYZU]VbhUbXi gY  
UhfUj Ygci fWgcZYbYf[ ni]Zk YUfYlc fYXi WhY]a dUMcZ[ `cVU k Ufa ]b[ "

*What is Being Done*

Í Yj YfncbY\UgUfYg]cbg]V] ]hmc lfmc gJ YbYf[ mUbXlfmc dfYj Ybh h YZZWg'cZ  
[ `cVU k Ufa ]b[ "





# I ] Z`ZcZg\`n`Ve

Ê I g\`cb t`hc`YMZ`+`DX`dVZg` %%

## Egd\`gVb b Z`XdcI Zci

H\`g\`dfc[ fUa a Y]b\`fcXi Wg\`di d]`g\`rc`h`YWbWd\`hcZ\`h`YD\`bYf[ m] Ud\`N\`UbX`]g\`ja dUW\`  
]b`fYU\`h]cb`lc`ci`f`Yj`Yfn\`XUm`]j`Yg\`k`]h`g\`dYU\`WY\`ZY\`fYbW\`rc`YYM\`f]V\`m]`YbYfU\`h]cb`"=:h`  
YbW\`i`fU\`Yg\`h]b\_]b[ `U\`Cci`hYbYf[ m]W\`bg`a`d\`h]cb\`z\`UbX`\`ck`YbYf[ m]g\`dfcXi`WX\`UbX`  
g`dd`]YX`]b`Uf\`Ub[ YcZk`Ung\`z\`rc`a`Yh\`ci`f`XYa`UbXg`

5`f\`Ub[ YcZ\`cb\`fYbYk`UWY\`YbYf[ m]g\`ci`fW\`g\`fbi`WU\`f`UbX\`WU\`U\`fYX\`d\`ck`Yf\`L\`UbX\`fYbYk`UWY`  
YbYf[ m]g\`ci`fW\`g\`fk`]bX\`Zg\`U\`f\`z`\`n\`X\`fc`UbX\`k`Uj`Y\`#h\`XU\`d\`ck`Yf\`L\`U\`fY\`Y\`d`\`c\`fYX\`Z\`X\`YU\`]b[ `U\`  
Xj`Ub\`h]`Yg\`UbX\`X]g\`Uj`Ub\`h]`Yg\`cZYUW`"

## @Zn`kdXWj`d\`gn

K`cfXg\`]b`Vc`X\`m\`dYU\`FYi`gYX\`]b`h`Ydfc[ fUa a Y]gYZ`  
H\`Ych`Yf\`k`cfXg\`U\`FYi`gYZ` `Z\`f`Y\`d`Uj\`b]b[ `h`YWbWd\`lgVY]b[ `HU` [ `H`

- energy` power stations` energy shortage`
- electricity generation` g`dd`m\`UbX\`XYa`UbX` nuclear energy`
- fossil fuels` turbines` pollution`
- greenhouse gases` global warming` renewable energy sources`
- wind power` wind turbine` non-renewable energy sources`
- solar power` hydro power` wave power`
- tidal power` sustainable` advantages`
- disadvantages`
- .....

## 7Z[dgZ`i] Z`egd\`gVb b Z

### Energy discussion

- Í 8]gWgg\`k`]h`di`d]`g\`k`\`Uh\`h`Ym\`h]b\_`D\`bYf[ m]Ña`YUbg\`UbX\`Yg\`hU\`]g\`h`UhYbYf[ m]`]j`Ygi`g`  
h`YU\`]h\`m\`rc`Xc`k`cf`\_"`
- Í HU\_`U\`Cci`h\`ck`d\`Ycd`Y[`Yh\`h`YbYf[ m]h`YmbYX\`rc`W\`f\`m\`ci`h\`Ug`g\`f\`k`Y[`Yh]h\`Z\`ca`ci`f`  
ZcX\`L`
- Í 8]gWgg\`ck`]b`h`Yd\`Ug\`h`Yg\`ci`fW\`g\`cZYbYf[ m]h`Ud\`Ycd`YX\`fYk`cb\`k`YfYi`g`U`m`  
a`YW\`Ub]W`Vi`h\`h`Uh\`rc`X\`Um`Y\`M\`f]W`YbYf[ m]g\`a`Uj\`b`m\`i`gYX`
- Í 8]gWgg\`ck`Y\`M\`f]W`YbYf[ n\`z\`cbW\`]h\`Ug\`VYb[`YbYfU\`h\`Z\`Wb`VY\`Wb]`Yf\`h\`X\`]b\`lc`ch`Yf`  
Z\`fa`g\`cZYbYf[ m]g`W\`Ug\`YUz`]]\`h\`z\`g\`ci`bX\`UbX\`a`YW\`Ub]W`YbYf[ n\`z\`rc`\`Yd`i`g\`Xc`h`Y`  
k`cf`\_`k`YbYX\`rc`Xc`"

### The Electricity Game

*Note that you may wish to split this activity over two sessions, completing 'electricity use' in session one and 'reducing consumption' in session two*

- Í H\`h`Ydi`d]`g\`h`Uh\`h`Ym\`U\`FY[`c]b[ `rc`d`U\`h\`h`Y`Electricity Game`H\`g[`Ua`Yk`]`g\`ck`  
h`Ya`h`Y\`h\`h\`h\`rc`k`\`]W\`k`Yi`gY\`Y\`M\`f]W\`h\`m\`b\`ck`U\`X\`Ung\`]b`ci`f`Yj`Yfn\`XUm`]Z\`UbX`\`ck`  
k`YW\`b`fYXi`W\`ci`f`Y\`M\`f]W\`h\`m\`W\`bg`a`d\`h]cb`"
- Í H\`YW\`Ug\`g\`ci`X\`W\`Y\`gd\`]h]b\`lc[`fci`dg\`cZ\`Zci`f`I`g]b[`K`cf`\_`g\`Yh\`C\`b\`Y\`h`Ymk`]`h\`m\`rc`\`]g\`h`  
%\$`k`Ung\`]b`k`\`]W\`h`Ym\`i`gY\`Y\`M\`f]W`YbYf[ m]b`h`Yf`XU`m]j`Yg\`UbX`%\$`k`Ung\`cZ\`g\`]b[ `Y\`  
Y\`M\`f]W`YbYf[ m]b`h`Yf`XU`m]j`Yg`



Name

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**I ] Z: aXi gXf n' < Vb Z**

Kp"vjg"t









# Dc i ] Z ] dg bdc

Ê 1 g/cb t t t c Y M Z & ( ' D X d M Z g ' ) % %

## Egd \ g Mb b Z X dci Zci

H ] g d f c [ f U a Y Z f h Y f Y l d c f Y g h Y W b W d h c Z h Y D b Y f [ m ] U d N U b X ] g ] a d U M ] b f Y U ] c b t c i f Y Y f n X U i ] j Y g z V i h h ] g ] h a Y z k ] h g d Y W U W Y Z f Y b W t c Z Y g " h Y b W i f U Y g d i d ] g t c h ] b \_ U v c i h h Y Z Y g i g X ] b h Y d U g h t c [ Y b Y U h \ Y U h U b X Y W f ] W h m U b X t c d e k Y f c i f j Y ] W g z U b X U g c t c W b g ] X Y f k \ m U h f b U h j Y Z Y g U F Y V Y ] b [ X Y Y c d Y X t c a Y h c i f X Y a U b X g'

5 f U b [ Y c Z b c b ! f Y b Y k U W Y Z Y g f K ] Y g y z d Y f c ` U b X W U U b X f Y b Y k U W Y Z Y g f M c X ] Y g Y z V ] c a U g g U b X \ n X f c [ Y b Z Y W g U F Y Y l d c f Y X z U b X h Y U X j U b H j Y g U b X X ] g U X j U b H j Y g c Z Y U W U F Y X ] g W g g Y X'

## @Zn kdXWj a/gn

K c f X g ] b V c X l m d Y U F Y i g X ] b h Y d f c [ f U a a Y ] g Y Z ' H Y c h Y f k c f X g U F Y i g Y Z ` z f Y l d U b ] b [ h Y W b W d h g V Y ] b [ H U [ \ H'

energy	energy gap	energy shortage
power stations	generating	fuels
fossil fuels	pollution	atmosphere
[ f Y b \ c i g Y ] U g Y g'	[ ` c V U ` k U f a ] b [	renewable energy
alternative	g g U ] b U V Y	bc b Í f Y b Y k U V Y Y b Y f [ m g c i f W g
advantages	disadvantages	bio diesel
biomass	sewage	hydrogen

## 7 Z [ d g z i ] Z e g d \ g Mb b Z

'Alternatives' discussion

Í 9 l d U b t c d i d ] g h U h h Y d f c [ f U a a Y h Y m U F Y [ c ] b [ t c g Y Y ] g U v c i h U h f b U h j Y z c f a g c Z Y b Y f [ m

Í 8 ] g W g g k ] h d i d ] g h Y a Y U b ] b [ c Z h Y k c f X U h f b U h j Y N h c i a U n i k ] g ` d i d ] g t c ` c c \_ h ] g k c f X i d ] b h Y f X ] W c b U f ] Y g U b X U g \_ h Y a ` k \ U h h Y m h ] b \_ ] h a Y U b g'

Í 9 g U V ] g ` h U h h Y a Y U b ] b [ c Z h ] g k c f X ] g t c a Y h ] b [ i g X c f X c b Y ] b d U W c Z g c a Y h ] b [ Y g Y N U b X f Y W d c b h Y z c f a g c Z U h f b U h j Y b Y f [ m g c i f W g Y l d c f Y X ] b D f c [ f U a Y C b Y f j W U g k ] b X d e k Y f U b X k U h f d e k Y f U b X \ c k ` h Y m U F Y V ] b [ i g X ] b d U W c Z c g g ] z Y g'

Í 8 ] g W g g h Y a Y U b ] b [ c Z h Y k c f X U h f b U h j Y N h c i a U n i k U b h i d i d ] g t c ` c c \_ h ] g k c f X i d ] b h Y f X ] W c b U f ] Y g U b X U g \_ d i d ] g k \ U h h Y m h ] b \_ ] h a Y U b g'

Í 9 g U V ] g ` k ] h d i d ] g h U h h Y a Y U b ] b [ c Z h ] g k c f X ] g t c a U h f ] U ` k \ ] W ] g W b g a Y X t c W Y U h Y b Y f [ n 5 g \_ h Y d i d ] g t c h ] b \_ c Z U g a U b m z Y g U g h Y m W b f j W U g d Y f c z X ] Y g Y z [ U g W U z c ] ` U b X g c b E'

Í 5 g ` k \ Y h Y f d i d ] g ` U Y g Y b z Y ] h Y f c b H j z ] b b Y k g d U d Y f g c f ] b a U U h ] b Y g z U b m U h ] W g U v c i h j Y ] W g i g ] b [ U h f b U h j Y Z Y g " M e i a ] [ \ h h ` h Y a U v c i h Y Y M f ] W W f g " M e i W b U b X U g t c f m U v c i h h g h X f j ] b [ U b Y Y M f ] W W f z k ] h d ] W f Y g z U h'

\ H d . # # b Y k g ' W W W ' i \_ # % # \ ] # i \_ # % ' ) , ' % g a



