



Photovoltaic power generation as solar energy

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Solar radiation may be converted directly into solar power (electricity) by solar cells, or photovoltaic cells. In such cells, a ...

Solar energy can be harnessed two primary ways: photovoltaics (PVs) are semiconductors that generate electricity directly from sunlight, while solar ...

Photovoltaic Cells Convert Sunlight Into ElectricityThe Flow of Electricity in A Solar CellPV Cells, Panels, and ArraysPV System EfficiencyPV System ApplicationsHistory of PV SystemsA photovoltaic (PV) cell, commonly called a solar cell, is a nonmechanical device that converts sunlight directly into electricity. Some PV cells can convert artificial light into electricity. Sunlight is composed of photons, or particles of solar energy. These photons contain varying amounts of energy that correspond to the different wavelengths o...See more on eia.govPublished: Oct 1, 2024.iacfm .iacf_head{display:flex;align-items:center;gap:var(--smtc-gap-between-content-small);text-decoration-color:var(--smtc-foreground-content-neutral-primary);box-sizing:border-box;margin-bottom:var(--smtc-gap-between-content-x-small)}.iacfm .iacf_head span{flex:1 1 0;white-space:nowrap;text-overflow:ellipsis;overflow:hidden;color:var(--smtc-foreground-content-neutral-primary);font:var(--bing-smtc-text-global-body3-strong)}.iacfm .iacf_head div{display:flex;height:22px;width:22px;justify-content:center;align-items:center;transition:background 300ms ease-out;margin-right:-3px;border-radius:var(--mai-smtc-corner-list-card-default);overflow:hidden}.iacfm .iacf_head .iacf_chv{color:var(--smtc-foreground-content-neutral-primary)}[dir="rtl"] .iacfm .iacf_head svg{transform:scaleX(-1)}.rel_ent_w{margin:4px 0 9px}.rel_ent_w:focus-visible{outline-offset:-6px}.rel_ent_w.rel_ent_crs{margin:6px 0 16px}.b_top .rel_ent_w{margin-top:-4px}.b_top .rel_ent_w.rel_ent_crs{margin-top:0}.b_mm_swipable .rel_ent_w{margin:4px 0 20px}.b_rich .rel_ent_w{margin:-3px -16px 8px}.rel_ent_w.rel_ent_scr:not(.rel_ent_crs){height:50px;overflow:hidden}.rel_ent_c{white-space:nowrap;overflow:hidden;padding-left:1px;height:50px}.aqptmt:not(.rel_ent_crs) .rel_ent_c{display:flex}.rel_ent_wp

```
.rel_ent_c{white-space:initial}.rel_ent_scr
.rel_ent_c{overflow-y:hidden;-webkit-overflow-scrolling:touch;overflow-x:auto}.rel_ent_scr:not(.rel_ent_crs)
.rel_ent_c{padding-bottom:12px}.b_mm_swipable
.rel_ent_c{padding-left:10px;margin-top:-2px;margin-bottom:4px}.b_rich
.rel_ent_c{padding-left:15px}.rel_ent_w.rel_ent_crs
.slide,.rel_ent_w.rel_ent_crs
.slide:hover{width:auto;height:42px;border-radius:20px!important;box-shadow:none!important;overflow:visible}a.rel_ent{display:inline-block;padding:0 16px 0 12px;margin:4px 8px 4px 0;border-radius:20px;border:1px solid #ddd;text-decoration:none;overflow:hidden;height:40px;max-width:80vw}:not(#lgVidAnsContainer)>.aqptmt
.rel_ent_c a.rel_ent{overflow:initial;display:flex}.slide a.rel_ent{margin:0;box-shadow:none}.b_slidebar
.slide .rel_ent .cico,.rel_ent .cico,.rel_ent>img{display:inline-block;vertical-align:middle;margin:2px 8px 2px -10px;border-radius:50%;background:#f7f7f7;flex-shrink:0}.rel_ent_tw{vertical-align:middle;font-size:12px;color:var(--smtc-foreground-content-neutral-primary);line-height:16px;height:100%;float:right;display:table}.rel_ent_t{display:table-cell;vertical-align:middle;align-content:center}.aqptmt:not(.splt2)
.rel_ent_tw,.aqptmt:not(.splt2)
.rel_ent_t{overflow:hidden;text-overflow:ellipsis;white-space:nowrap}.aqptmt:not(.splt2)
.rel_ent_tw{display:flex;overflow:hidden;text-overflow:ellipsis;align-items:center;white-space:nowrap}.rel_ent_w:not(.splt2)
.rel_ent_t strong{display:inline-block;font-weight:normal}#b_results phead
.b_attribution{padding-bottom:8px}.iaplanner
.b_moreLink{margin-top:11px}.iaplanner.iarnd
.b_moreLink{margin-top:3px}.b_ans .b_rich pserp.b_mBMargin{padding:0;border-top:0}.b_ans #vidans2
.b_rich .rel_ent_w{margin:6px 0 16px}.aqptmt a.rel_ent{border-color:#106ebe}.aqptmt:not(.splt2)
.rel_ent_tw,.aqptmt:not(.splt2)
.rel_ent_tw .rel_ent_t{font-size:16px}#b_content .acfImgAns
.salink,#b_content .acfImgAns
.iasalink{text-align:center;display:block;padding-bottom:var(--smtc-gap-between-content-medium)}#b_content .acfImgAns .salink:hover .iasabt,#b_content .acfImgAns .iasalink:hover
.iasabt{background:var(--smtc-background-ctrl-neutral-hover)}#b_content .acfImgAns .salink:active
.iasabt,#b_content .acfImgAns .iasalink:active
.iasabt{background:var(--smtc-background-ctrl-neutral-pressed)}#b_content .acfImgAns .iasabt,#b_content .acfImgAns
.iaExp_chevron{height:initial;border-radius:var(--smtc-corner-circular);background:var(--bing-smtc-background-ctrl-neutral-rest);display:inline-block;position:relative;top:0;box-shadow:initial}#b_content .acfImgAns
.iasatxt{font:var(--bing-smtc-text-global-caption1-strong);color:var(--bing-smtc-foreground-content-brand-rest);padding:var(--smtc-gap-between-content-x-small)
var(--smtc-gap-between-content-small);display:flex;gap:var(--smtc-gap-between-content-x-small);justify-content:center;align-items:center}#b_content .acfImgAns .salink::before,#b_content .acfImgAns
.iasalink::before{border-bottom:1px solid
var(--smtc-stroke-ctrl-on-neutral-rest);width:100%;display:block;content:"";top:18px;position:relative}#b_content .acfImgAns .svg{vertical-align:top}#b_content .acfImgAns
.svgpath{fill:var(--bing-smtc-foreground-content-brand-rest)}#b_content .acfImgAns .iachevron,#b_content .acfImgAns .svgicon{width:12px;height:12px;margin-left:0;position:relative;top:0}html[dir=rtl] #b_content .acfImgAns .iachevron,html[dir=rtl] #b_content .acfImgAns .svgicon{transform:scaleX(-1)}#b_content
```

```
.acfImgAns .rel_ent_w a.rel_ent{border:1px solid var(--smtc-stroke-ctrl-on-neutral-rest)}#b_content
.acfImgAns .iaheader
.iacf_head{text-decoration-color:var(--smtc-foreground-ctrl-neutral-primary-hover)}#b_content .acfImgAns
.iaheader .iacf_head span,#b_content .acfImgAns .iaheader .iacf_head
svg{color:var(--smtc-foreground-content-neutral-primary);forced-color-adjust:auto}#b_content
.iacfic.mmkiaacf .iacf_plan .cico{border-radius:var(--mai-smtc-corner-card-default)}#b_content
.iacfic.mmkiaacf .iacf_plan .cico img{border-radius:var(--mai-smtc-corner-card-default)}#b_content
.iacfic.mmkiaacf{overflow:visible;padding:0}#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel]{margin:0;padding-bottom:var(--smtc-gap-between-content-medium)}#b_content
ent .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
[data-wptds-carousel-controls]{--wptds-carousel-control-opacity:1}#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel]>div{padding:0}#b_content .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
[data-direction="end"]{margin-right:-22px}#b_content .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
[data-direction="end"] svg{transform:scaleX(-1)}#b_content .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
[data-direction="start"]{margin-left:-22px}#b_content .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
[data-direction="start"] svg{transform:scaleX(1)}#b_content .iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
button{background:var(--smtc-background-card-on-primary-default-rest);box-shadow:var(--bing-smtc-shadows-card-hover-3);width:36px;border-radius:var(--smtc-corner-ctrl-lg-rest)}#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel]
button: hover{background:var(--smtc-background-card-on-primary-default-hover)}#b_content
.iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel]
button: active{background:var(--smtc-background-card-on-primary-default-pressed)}#b_content
.iacfic.mmkiaacf .iacf_crsI[data-wptds-carousel] button svg{transition:initial}#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel] button svg
path{fill:var(--smtc-foreground-content-neutral-secondary);forced-color-adjust:auto}#b_content
.iacfic.mmkiaacf .iacfmit{position:absolute}#b_content .iacfic.mmkiaacf .iacfimgc{margin:auto}#b_content
.b_ans.b_imgansacf{padding:0!important}#b_content
.b_ans.b_top.b_imgansacf{background-color:initial!important}#b_content .acfImgAns .iaheader
.iacf_head{gap:0;padding:var(--smtc-gap-between-content-medium)
0;display:flex;align-items:center;box-sizing:border-box}#b_content .acfImgAns .iaheader
.iacf_head: hover{text-decoration:none}#b_content .acfImgAns .iaheader .iacf_head: hover
span{text-decoration:underline}#b_content .acfImgAns .iaheader .iacf_head: hover
.iacf_chv{background:initial}#b_content .acfImgAns .iaheader .iacf_head
div{display:flex;align-items:center;transition:background 300ms
ease-out;margin-right:-3px;border-radius:var(--smtc-corner-ctrl-rest);overflow:hidden;color:var(--bing-smtc-foreground-content-neutral-secondary-alt)}#b_content .acfImgAns .iaheader .iacf_head
span{width:initial;flex:none;font:var(--bing-smtc-text-global-subtitle1-strong);padding-inline-start:0;max-width:90%;text-overflow:ellipsis;white-space:nowrap;overflow:hidden}#b_content .acfImgAns .iaheader
.iacf_head .iacf_chv{width:22px;justify-content:center;height:22px}#b_content .acfImgAns
.rel_ent_w{margin-top:0}#b_content .acfImgAns .rel_ent_w .b_slideexp{margin:0}#b_content .acfImgAns
.rel_ent_w .btn.rounded{top:initial;margin-top:1px}#b_content .acfImgAns .rel_ent_w
```

```
.btn.next{right:-14px}#b_content .acfImgAns .rel_ent_w
.cr>div{width:36px;height:38px;border-radius:var(--smtc-corner-ctrl-lg-rest);background:var(--bing-smtc-background-container);box-shadow:var(--bing-smtc-shadows-card-hover-3);border:initial}#b_content
.acfImgAns .rel_ent_w .cr>div:after{margin-inline-start:2px;top:0}#b_content .acfImgAns .rel_ent_w
.b_viewport{padding-top:0;margin-left:0;padding-left:0}#b_content .acfImgAns .rel_ent_w .b_viewport
.slide{height:38px;margin-left:0;margin-inline-end:var(--smtc-gap-between-content-x-small)}#b_content
.acfImgAns .rel_ent_w
a.rel_ent{border-radius:var(--smtc-corner-circular);background:var(--smtc-background-card-on-primary-default-rest);padding-left:0;height:38px}#b_content .acfImgAns .rel_ent_w
a.rel_ent:hover{background:var(--smtc-background-ctrl-outline-hover)}#b_content .acfImgAns .rel_ent_w
a.rel_ent:active{background:var(--smtc-background-ctrl-outline-pressed)}#b_content .acfImgAns .rel_ent_w
.cico{margin:var(--smtc-gap-between-content-xx-small) var(--smtc-gap-between-content-x-small)
var(--smtc-gap-between-content-xx-small) var(--smtc-gap-between-content-xx-small)}#b_content .acfImgAns
.rel_ent_w .rel_ent_tw{font:var(--bing-smtc-text-global-caption1-strong)}#b_content .acfImgAns .rel_ent_w
.rel_ent_c{padding-left:0}#b_content .acfImgAns .rel_ent_w .b_sidebar{padding-inline-start:0}#b_content
.acfImgAns .rel_ent_w .rel_ent_c
.rel_ent:first-child{margin-inline-start:var(--mai-smtc-padding-card-default);align-items:center}html[dir=rtl]
#b_content .acfImgAns .iaheader .iacf_head svg{transform:scaleX(-1)}html[dir=rtl] #b_content .acfImgAns
.iacf_crs[ data-wptds-carousel] [data-direction="end"]{transform:scaleX(-1)}html[dir=rtl] #b_content
.acfImgAns .iacf_crs[ data-wptds-carousel]
[data-direction="start"]{transform:scaleX(-1)}[data-vs-icon-template]{display:none!important}.iacf_vsicon{position:absolute;top:12px;right:12px;width:28px;height:28px;background-color:var(--mai-smtc-background-ctrl-on-image-rest);border-radius:var(--smtc-corner-circular);display:none;align-items:center;justify-content:center;border:1px solid
var(--smtc-stroke-ctrl-on-neutral-rest);cursor:pointer;opacity:0;z-index:1000;box-sizing:border-box;pointer-events:none}.iacf_vsicon
acf-icon{color:var(--mai-smtc-foreground-ctrl-on-image-rest)}.iacf_vsicon.iacf_vsicon_show{display:flex;opacity:1}acf-icon{display:block;inline-size:fit-content;max-inline-size:100%;pointer-events:none}acf-icon,acf-icon::before,acf-icon::after,acf-icon
*,acf-icon
*::before,acf-icon
*::after{box-sizing:border-box;margin:0;padding:0}acf-icon[hidden],acf-icon
*[hidden]{display:none}acf-icon[data-visually-hidden],acf-icon
*[data-visually-hidden]{block-size:1px;inline-size:1px;margin:unset;padding:unset;border:0;clip:rect(0 0 0 0);clip-path:inset(50%);overflow:clip;position:absolute;white-space:nowrap}.acf-icon__def{display:none}.acf-icon__icon{display:block;inline-size:auto;color:inherit}[dir="rtl"]
.acf-icon__icon{transform:scaleX(-1)}@media(forced-colors:active){acf-icon{color:ButtonText!important}}acf-icon[data-size="M"] .acf-icon__icon{block-size:16px}.iacfm .iacfmit a:focus .isp_imgcont img,.iacfm
.iacfmit a:focus .iacfimgc img,.iacfm .iacfmit a:focus .iacf_smol{outline:3px dotted
#1aebff;outline-offset:-5px}.iacfm .iacfmit .cico{position:relative}.iacfm .iacfmit
.cico::after{content:"";position:absolute;left:0;top:0;width:100%;height:100%;background:rgba(0,0,0,.03)}.gs_card .iacfmit img,.b_wpt_container .iacfmit img,.b_acf_card .iacfmit img{transition:transform .3s ease-out}.gs_card .iacfmit:hover .iacfimgc img,.b_wpt_container .iacfmit:hover .iacfimgc img,.b_acf_card
```

```
.iacfmit:hover .iacfimgc
img{transform:scale(1.1)}.iacfic{position:relative;height:100%;width:100%;background:#fff;overflow:hidden;
;border-radius:inherit}.iacf_plan{position:relative}.iacfmit
.mimg{width:100%;height:100%;position:relative}.iacfic .iacfmit{position:absolute}.iacfic .iacfmit
.cico{border-radius:0}.iacfca{padding:var(--mai-smtc-padding-card-default);box-sizing:border-box;overflow:
hidden;border-radius:var(--mai-smtc-corner-card-default)}.iacfca .iacf_crsf
.iacfmit{overflow:hidden;position:relative}.iacfca .iacf_crsf .iacfmit
.cico{overflow:hidden;border-radius:var(--mai-smtc-corner-list-card-default)}.iacfca .iacf_crsf .iacfmit .cico
img{border-radius:inherit;transition:transform 300ms ease-out}.iacfca .iacf_crsf .iacfmit:hover .cico
img{transform:scale(1.1)}.iacfca .iacfmit a:focus,.iacfca .iacfmit a:focus img{outline:0}.iacfca .iacfmit
a:focus .cico::after{border-radius:inherit;box-shadow:inset 0 0 0 3px
var(--bing-smtc-background-card-on-primary-alt-rest);outline:2px solid
var(--smtc-foreground-content-neutral-secondary);outline-offset:-2px}.iacfca
[data-wptds-carousel][data-default][data-variant="Normal"]{margin:0
calc(-1*var(--mai-smtc-padding-card-default));height:auto}.iacfca
[data-wptds-carousel][data-default][data-variant="Normal"] [data-wptds-carousel-scroll-container]{padding:0
var(--mai-smtc-padding-card-default)}.iacfca [data-wptds-carousel][data-default][data-variant="Normal"]
[data-wptds-carousel-scroll-container] ol{width:fit-content;align-items:center}.iacfca
[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="end"]{margin-right:24px}.iacfca
[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="start"]{margin-left:24px}.iacfca
.iacf_pag{position:absolute;bottom:8px;left:50%;transform:translate(-50%,0)}.cards.large
.iacfca{height:200px}[dir="rtl"] .iacfca .iacf_pag{transform:translate(50%,0)}.iacfm.iacfca
.iacf_crsf[data-wptds-carousel]
[data-wptds-carousel-control]{background:var(--bing-smtc-background-ctrl-neutral-rest);border:0;height:56px;
width:16px;transition:width .3s;background
.3s;color:var(--smtc-foreground-ctrl-neutral-primary-hover)}.iacfm.iacfca .iacf_crsf[data-wptds-carousel]
[data-wptds-carousel-control] svg{transition:transform .3s}.iacfm.iacfca .iacf_crsf[data-wptds-carousel]
[data-wptds-carousel-control]:hover{width:24px;background:var(--smtc-background-ctrl-neutral-hover)}.iacf
m.iacfca .iacf_crsf[data-wptds-carousel] [data-wptds-carousel-control] path{fill:currentColor}.iacfm.iacfca
.iacf_crsf[data-wptds-carousel] ol [data-direction="start"]{border-radius:0 8px 8px
0;margin-left:16px}.iacfm.iacfca .iacf_crsf[data-wptds-carousel] ol [data-direction="start"]
svg{transform:scale(.7)}.iacfm.iacfca .iacf_crsf[data-wptds-carousel] ol [data-direction="start"]:hover
svg{transform:scale(1)}.iacfm.iacfca .iacf_crsf[data-wptds-carousel] ol
[data-direction="end"]{border-radius:8px 0 0 8px;margin-right:16px}.iacfm.iacfca
.iacf_crsf[data-wptds-carousel] ol [data-direction="end"] svg{transform:scale(-.7)}.iacfm.iacfca
.iacf_crsf[data-wptds-carousel] ol [data-direction="end"]:hover svg{transform:scale(-1)}.iacfm.iacfca.iacf_fb
.iacf_crsf[data-wptds-carousel] [data-wptds-carousel-control],.iacfm.iacfca.iacf_ss
.iacf_crsf[data-wptds-carousel]
[data-wptds-carousel-control]{background:var(--mai-smtc-background-ctrl-on-image-rest);color:var(--mai-sm
```

```

tc-foreground-ctrl-on-image-rest)}.iacfm.iacfca.iacf_fb .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control] path,.iacfm.iacfca.iacf_ss .iacf_crs1[data-wptds-carousel]
[data-wptds-carousel-control] path{fill:currentColor}.iacfca .iacf_colg_crs1
[data-wptds-carousel-list]{width:fit-content}.iacfca .iacf_colg_crs1 .iacfmit{position:absolute}.iacfca
.iacf_colg_crs1
.cico{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crs1){height:100%;width:100%;padding:0;overflow:
hidden;border-radius:inherit}.iacfca:not(.iacfh):has(>.iacf_colg_crs1)
.iacfmit{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crs1) [data-wptds-carousel][data-default]
[data-wptds-carousel-controls]{inline-size:calc(100% + var(--wptds-carousel-control-size) -
var(--mai-smtc-padding-card-default)*2);transform:translateX(calc(0rem +
var(--mai-smtc-padding-card-default) - (var(--wptds-carousel-control-size)/2)))
translateY(-50%)}[data-wptds-carousel][data-default],[data-wptds-carousel][data-default]::before,[data-wptds-
carousel][data-default]::after,[data-wptds-carousel][data-default] *,[data-wptds-carousel][data-default]
*::before,[data-wptds-carousel][data-default]
*::after{box-sizing:border-box;margin:0;padding:0}[data-wptds-carousel][data-default][hidden],[data-wptds-c
arousel][data-default]
[hidden]{display:none}[data-wptds-carousel][data-default][data-visually-hidden],[data-wptds-carousel][data-d
efault] [data-visually-hidden]{block-size:.0625rem;border:0;clip:rect(0 0 0
0);inline-size:.0625rem;margin:-.0625rem;overflow:hidden;padding:0;position:absolute}[data-wptds-carousel]
[data-default]{--wptds-carousel-control-bg-color:#fff;--wptds-carousel-control-border-color:#ddd;--wptds-car
ousel-control-box-shadow:0rem .125rem .1875rem
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#767676;--wptds-carousel-control-size:2rem;display:block;po
sition:relative;block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]{overflow-x:auto;overflow-y:clip;scroll-behavior:smooth;block-size:10
0%;-ms-overflow-style:none;scrollbar-width:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]::-webkit-scrollbar{display:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-scroll-container]:focus-visible{outline-color:Highlight;outline-color:-webkit-focus-ring-
color;outline-offset:.0625rem;outline-style:auto;outline-width:.0625rem}[data-wptds-carousel][data-default]
[data-wptds-carousel-list]{display:flex;gap:.5rem;list-style:none;block-size:100%}[data-wptds-carousel][data-
default] [data-wptds-carousel-list]>{*{flex-grow:0;flex-shrink:0}[data-wptds-carousel][data-default]
[data-wptds-carousel-list]>:not([data-wptds-carousel-item])}{display:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]{block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]>{*{block-size:100%}[data-wptds-carousel][data-default]
[data-wptds-carousel-item]>img{display:block;inline-size:auto}[data-wptds-carousel][data-default]
[data-wptds-carousel-controls]{list-style:none;position:absolute;inline-size:calc(100% +
var(--wptds-carousel-control-size));inset-block-start:50%;transform:translateX(calc(0rem -
(var(--wptds-carousel-control-size)/2)))
translateY(-50%);display:flex;align-items:center;justify-content:space-between;pointer-events:none}[data-wpt
ds-carousel][data-default]
[data-wptds-carousel-controls]>{*{flex-grow:0;flex-shrink:0}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]{cursor:pointer;inline-size:var(--wptds-carousel-control-size);aspect-ratio:1;displ

```

```

ay:grid;place-content:center;border-radius:50%;background-color:var(--wptds-carousel-control-bg-color);border:
er:.0625rem solid
var(--wptds-carousel-control-border-color);box-shadow:var(--wptds-carousel-control-box-shadow);color:var(-
-wptds-carousel-control-fg-color);opacity:var(--wptds-carousel-control-opacity);pointer-events:all}[data-wptd
s-carousel][data-default]
[data-wptds-carousel-control]:active{--wptds-carousel-control-bg-color:#fff;--wptds-carousel-control-border-c
olor:#ddd;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#767676}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]:focus-visible{outline-color:Highlight;outline-color:-webkit-focus-ring-color;out
line-offset:.0625rem;outline-style:auto;outline-width:.0625rem}[data-wptds-carousel][data-default]
[data-wptds-carousel-control] *{pointer-events:none}[data-wptds-carousel][data-default]
[data-wptds-carousel-control]>svg{display:block}[data-wptds-carousel][data-default]
[data-wptds-carousel-control][data-direction="start"]>svg{transform:scaleX(1)}[data-wptds-carousel][data-de
fault]
[data-wptds-carousel-control][data-direction="end"]>svg{transform:scaleX(-1)}[data-wptds-carousel][data-de
fault]
[data-wptds-carousel-control][aria-disabled="true"]{visibility:hidden;cursor:not-allowed}[data-wptds-carousel
][data-default] [data-wptds-carousel-announce]{block-size:.0625rem;border:0;clip:rect(0 0 0
0);inline-size:.0625rem;margin:-.0625rem;overflow:hidden;padding:0;position:absolute}[data-wptds-carousel]
[data-default][data-variant="Normal"],[data-wptds-carousel][data-default][data-variant="FullWidth"]{--wptds
-carousel-control-opacity:0}[data-wptds-carousel][data-default][data-variant="Normal"]:has([data-wptds-caro
usel-scroll-container]:focus-visible),[data-wptds-carousel][data-default][data-variant="Normal"]:has([data-wpt
ds-carousel-control]:focus-visible),[data-wptds-carousel][data-default][data-variant="FullWidth"]:has([data-w
ptds-carousel-scroll-container]:focus-visible),[data-wptds-carousel][data-default][data-variant="FullWidth"]:h
as([data-wptds-carousel-control]:focus-visible){--wptds-carousel-control-opacity:1}[data-wptds-carousel][dat
a-default][data-variant="Normal"] [data-wptds-carousel-scroll-container]{scroll-snap-type:x
proximity}[data-wptds-carousel][data-default][data-variant="Normal"] [data-snap]
[data-wptds-carousel-item]{scroll-snap-align:center;scroll-snap-stop:always}[data-wptds-carousel][data-defau
lt][data-variant="Normal"] [data-snap]
[data-wptds-carousel-item]:first-of-type{scroll-snap-align:start}[data-wptds-carousel][data-default][data-variant="Normal"] [data-snap]
[data-wptds-carousel-item]:last-of-type{scroll-snap-align:end}[data-wptds-carousel][data-default][data-variant="FullWidth"] [data-wptds-carousel-scroll-container]{scroll-snap-type:x
mandatory}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]{inline-size:100%;scroll-snap-align:center;scroll-snap-stop:always}[data-wptds-car
ousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]:first-of-type{scroll-snap-align:start}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]:last-of-type{scroll-snap-align:end}[data-wptds-carousel][data-default][data-variant="FullWidth"]
[data-wptds-carousel-item]> *{inline-size:100%}[data-wptds-carousel][data-default][data-bleed-inline]

```

```
[data-wptds-carousel-controls]{--control-side-gap:.25rem;inline-size:calc(100%  
(var(--control-side-gap)*2));transform:translateX(calc(0rem + var(--control-side-gap)))  
translateY(-50%)}[data-wptds-carousel][data-desktop]  
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active){--wptds-carousel-control-bg-color  
:#fff;--wptds-carousel-control-border-color:#ddd;--wptds-carousel-control-box-shadow:0rem .125rem  
.3125rem  
rgba(0,0,0,.14);--wptds-carousel-control-fg-color:#111}[data-wptds-carousel][data-desktop][data-variant="No  
rmal"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="N  
ormal"]:has([data-wptds-carousel-control]:hover),[data-wptds-carousel][data-desktop][data-variant="FullWidt  
h"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="Full  
Width"]:has([data-wptds-carousel-control]:hover){--wptds-carousel-control-opacity:1}[dir="rtl"]  
[data-wptds-carousel][data-default] [data-wptds-carousel-controls]{transform:translateX(calc(0rem +  
(var(--wptds-carousel-control-size)/2))) translateY(-50%)}[dir="rtl"] [data-wptds-carousel][data-default]  
[data-wptds-carousel-control][data-direction="start"]>svg{transform:scaleX(-1)}[dir="rtl"]  
[data-wptds-carousel][data-default]  
[data-wptds-carousel-control][data-direction="end"]>svg{transform:scaleX(1)}[dir="rtl"]  
[data-wptds-carousel][data-default][data-bleed-inline]  
[data-wptds-carousel-controls]{transform:translateX(calc(0rem - var(--control-side-gap)))  
translateY(-50%)).b_dark [data-wptds-carousel][data-default],.b_drk  
[data-wptds-carousel][data-default]{--wptds-carousel-control-bg-color:#484644;--wptds-carousel-control-bord  
er-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem  
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#d2d0ce}.b_dark [data-wptds-carousel][data-default]  
[data-wptds-carousel-control]:active,.b_drk [data-wptds-carousel][data-default]  
[data-wptds-carousel-control]:active{--wptds-carousel-control-bg-color:#484644;--wptds-carousel-control-bor  
der-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem .1875rem  
rgba(0,0,0,.1);--wptds-carousel-control-fg-color:#d2d0ce}.b_dark [data-wptds-carousel][data-desktop]  
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active),.b_drk  
[data-wptds-carousel][data-desktop]  
[data-wptds-carousel-control]:hover:not([aria-disabled="true"]):not(:active){--wptds-carousel-control-bg-color  
:#605e5c;--wptds-carousel-control-border-color:#545250;--wptds-carousel-control-box-shadow:0rem .125rem  
.3125rem rgba(0,0,0,.14);--wptds-carousel-control-fg-color:#faf9f8}.gs_card .iacfic .iacfmit  
.iacfimgc,.gs_card .iacfic .iacfmit .cico,.b_wpt_container .iacfic .iacfmit .iacfimgc,.b_wpt_container .iacfic  
.iacfmit .cico{width:100%!important;height:100%!important;border-radius:0}.gs_card .iacfic .iacfmit.iacfstc  
img,.gs_card .iacfic .iacfmit .iacfimgc img,.b_wpt_container .iacfic .iacfmit.iacfstc img,.b_wpt_container  
.iacfic .iacfmit .iacfimgc img{width:100%;height:100%;object-fit:cover}#slideexp1_DEC740 .slide {  
margin-right: 8px; }#slideexp1_DEC740c .b_slidebar .slide { border-radius: 6px; }#slideexp1_DEC740  
.slide:last-child { margin-right: 1px; }#slideexp1_DEC740c { margin: -4px; } #slideexp1_DEC740c  
.b_viewport { padding: 4px 1px 4px 1px; margin: 0 3px; } #slideexp1_DEC740c .b_slidebar .slide {  
box-shadow: 0 0 0 1px rgba(0, 0, 0, 0.05); -webkit-box-shadow: 0 0 0 1px rgba(0, 0, 0, 0.05); }  
#slideexp1_DEC740c .b_slidebar .slide.see_more { box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00);  
-webkit-box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00); } #slideexp1_DEC740c .b_slidebar .slide.see_more
```

Photovoltaic power generation as solar energy

.carousel_seemore { border: 0px; }#slideexp1_DEC740c .b_slidebar .slide.see_more:hover { box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00); -webkit-box-shadow: 0 0 0 0px rgba(0, 0, 0, 0.00); }Images of photovoltaic power Generation As Solar energyPhotovoltaic Solar Power SystemEnergizer Portable Power StationSolar Power Generation System1500 Watt Solar Power GeneratorMobile Solar Power GeneratorPortable Solar Inverter GeneratorHomemade Solar Power GeneratorTypes of Solar PanelsSolar Electric Power GenerationSee all.b_wikiRichcard_noHeroSection{content-visibility:auto;contain-intrinsic-size:1px 218px}#b_results .b_wikiRichcard p{display:inline}.b_wikiRichcard .b_promoteText{font-weight:bold}.b_wikiRichcard .tab-head{margin-bottom:var(--smtc-gap-between-content-x-small)}#b_results>li .b_wikiRichcard .wikiRichcard_heroSection{padding-bottom:var(--smtc-gap-between-content-small)}#b_results>li .b_wikiRichcard .wikiRichcard_heroSection p{color:var(--bing-smtc-foreground-content-neutral-secondary-alt)}#b_results>li .b_wikiRichcard .tab-content p,#b_results>li .b_wikiRichcard .tab-content a{color:var(--smtc-ctrl-rating-icon-foreground-filled)}#b_results>li .b_wikiRichcard .tab-container a{border-bottom:1px dashed var(--smtc-stroke-ctrl-on-neutral-rest)}#b_results>li .b_wikiRichcard a.b_mopexpref{border-bottom:0}#b_results>li .b_wikiRichcard line>a:hover{background-color:transparent;text-decoration:none}#b_results>li .b_wikiRichcard a[href*="wikipedia "],#b_results>li .b_wikiRichcard a[href*="wikipedia "]:hover,#b_results .b_wikiRichcard .wiki_attr a,#b_results .b_wikiRichcard .wiki_attr a:hover{border-bottom:0}#b_results>li .b_wikiRichcard a[href*="wikipedia "]:hover,#b_results .b_wikiRichcard .wiki_attr a:hover{text-decoration:underline;background-color:var(--smtc-background-card-on-primary-default-rest)}#b_results>li .b_wikiRichcard_noHeroSection .b_wikiRichcard p{color:var(--bing-smtc-foreground-content-neutral-secondary-alt);display:-webkit-box;-webkit-line-clamp:5;-webkit-box-orient:vertical;overflow:hidden;padding-bottom:0}.b_wikiRichcard_noHeroSection .b_imagePair .b_wikiRichcard_image{float:right;margin-top:var(--smtc-padding-ctrl-text-side)}.b_wikiRichcard_noHeroSection .b_wikiRichcard .b_clearfix.b_overflow{line-height:var(--mai-smtc-padding-card-default)}.b_wikiRichcard_noHeroSection .b_imagePair .b_wikiRichcard_image_caption{margin-right:110px}.b_wikiRichcard_noHeroSection .b_imagePair .sml{display:none}#b_results li.b_algoBigWiki:hover h2 a{text-decoration:underline}.b_wikiRichcard_noHeroSection .b_floatR_img{padding:0 0 var(--smtc-gap-between-content-x-small) var(--smtc-gap-between-content-x-small)}.b_wikiRichcard_noHeroSection{margin-top:var(--smtc-gap-between-content-x-small);margin-bottom:var(--smtc-gap-between-content-xx-small);box-sizing:border-box}#b_content #b_results .b_algo .b_wikiRichcard .tab-head .tab-menu li.tab-active{box-shadow:none;background:var(--bing-smtc-background-ctrl-subtle-rest);border-radius:var(--mai-smtc-corner-list-card-default);color:var(--bing-smtc-foreground-content-brand-rest)}#b_content #b_results .b_algo .b_wikiRichcard:not(:has(.tab-navr)) .tab-head .tab-menu li:hover{background:var(--smtc-background-ctrl-neutral-hover);color:var(--bing-smtc-foreground-content-brand-rest);border-radius:var(--mai-smtc-corner-list-card-default)}.b_wikiRichcard .tab-head .tab-menu ul{gap:var(--smtc-gap-between-content-small)}#b_results .tab-menu li:hover{box-shadow:none}#b_content #b_results .b_wikiRichcard .tab-active:focus-visible{outline:0}#b_results .b_wikiRichcard .tab-menu,#b_results .b_wikiRichcard .tab-menu li,#b_results .b_wikiRichcard .tab-menu

ul{height:auto;line-height:var(--AC_LineHeight)}#b_results .b_wikiRichcard
.tab-head{display:flex;justify-content:center;align-items:center}#b_results .b_wikiRichcard
.tab-head:has(tab-navr){width:fit-content}#b_results .b_wikiRichcard .tab-head
li{padding-top:var(--smtc-gap-between-content-x-small);padding-bottom:var(--smtc-gap-between-content-x-small)}#b_results .b_wikiRichcard .tab-container{padding-bottom:0}.b_wikiRichcard_noHeroSection
span{color:var(--bing-smtc-foreground-content-neutral-secondary-alt)}#b_results .b_wikiRichcard,#b_results
.b_wikiRichcard span{font:var(--bing-smtc-text-global-body3)}#b_content #b_results .b_algo
.b_wikiRichcard .tab-head .tab-menu li
.tab-active{color:var(--smtc-foreground-content-neutral-primary)}#b_content #b_results .b_algo
.b_wikiRichcard .tab-head .tab-menu
li:not(.tab-active){color:var(--bing-smtc-foreground-content-neutral-tertiary)}#b_content #b_results .b_algo
.b_wikiRichcard:not(:has(.tab-navr)) .tab-head .tab-menu
li:not(.tab-active):hover{color:var(--bing-smtc-foreground-content-brand-rest)}.b_wikiRichcard
.b_vList>li{padding-bottom:var(--smtc-gap-between-content-xx-small)}#b_results>li .b_wikiRichcard
a{color:var(--smtc-ctrl-link-foreground-brand-rest)}.mc_fh{height:100%;border-radius:6px}.mc_tc_bs{overflow:hidden}.pvc_title_with_frows{padding-bottom:10px}.paratitle
.actionmenu{float:right;margin-top:-26px}.paratitle .actionmenu::after{float:none}.b_paractl,#b_results
.b_paractl{line-height:1.5em;padding-bottom:10px}#tabcontrol_18_DC4C75 .tab-head { height: 40px; }
#tabcontrol_18_DC4C75 .tab-menu { height: 40px; } #tabcontrol_18_DC4C75_menu { height: 40px; }
#tabcontrol_18_DC4C75_menu>li { background-color: #ffffff; margin-right: 0px; height: 40px;
line-height:40px; font-weight: 700; color: #767676; } #tabcontrol_18_DC4C75_menu>li:hover { color: #111;
position:relative; } #tabcontrol_18_DC4C75_menu .tab-active { box-shadow: inset 0 -3px 0 0 #111;
background-color: #ffffff; line-height: 40px; color: #111; } #tabcontrol_18_DC4C75_menu .tab-active:hover
{ color: #111; } #tabcontrol_18_DC4C75_nav, #tabcontrol_18_DC4C75_navl { height: 40px; width: 32px;
background-color: #ffffff; } #tabcontrol_18_DC4C75_navr .sv_ch, #tabcontrol_18_DC4C75_navl .sv_ch {
fill: #444; } #tabcontrol_18_DC4C75_navr:hover .sv_ch, #tabcontrol_18_DC4C75_navl:hover .sv_ch { fill:
#111; } #tabcontrol_18_DC4C75_navr.tab-disable .sv_ch, #tabcontrol_18_DC4C75_navl.tab-disable .sv_ch {
fill: #444; opacity:.2; }WikipediaPhotovoltaics - WikipediaOverviewEtymologyHistorySolar
cellsPerformance and degradationManufacturing of PV systemsEconomicsGrowthPhotovoltaics (PV) is the
conversion of light into electricity using semiconducting materials that exhibit the photovoltaic effect, a
phenomenon studied in physics, photochemistry, and electrochemistry. The photovoltaic effect is
commercially used for electricity generation and as photosensors. A photovoltaic system employs solar
modules, each comprising a number of solar cells, ...

Explore how the photovoltaic effect and solar energy physics convert sunlight into renewable electricity, powering a sustainable future with ...

At a high level, solar panels are made up of solar cells, which ...

This review examines the evolution, current advancements, and future prospects of PV systems, highlighting the development of various photovoltaic cell technologies, including crystalline ...

Photovoltaic power generation as solar energy

This article provides a comprehensive overview of solar power generation, emphasizing its critical role in phasing out fossil fuels to combat climate change ...

Solar photovoltaic (PV) power generation is the process of converting energy from the sun into electricity using solar panels. Solar panels, also called ...

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