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Title: Performance characteristics of photovoltaic panels

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PV Cell Current-Voltage (I-V) Curves PV Cell Output Power Energy Conversion Efficiency Factors That Effect Conversion Efficiency PV Cell Fill Factor Several factors determine the efficiency of a PV cell: the type of cell, the reflectance efficiency of the cell's surface, the thermodynamic efficiency limit, the quantum efficiency, the maximum power point, and internal resistances. When light photons strike the PV cell, some are reflected and some are absorbed. The non-reflective cell coating min... See more on electricala2z .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:1.6px;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_tw
.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_e
nt_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_slideexp{margin-bottom:20px;position:relative}.b_ans>.b_slideexp>.slide:last-c
hild,.b_ans>.b_slideexp:last-child,.b_vPanel
.b_slideexp:last-child{margin-bottom:0;padding-bottom:0}.b_slidebar
.slide{display:inline-block;vertical-align:top}.b_slidebar .slide,.b_slideexp
.b_viewport{overflow:hidden}.b_slideexp
.b_viewport{margin:auto}.b_slidebar{white-space:nowrap}.b_slidebar
.slide{white-space:normal;position:relative}.b_cards .cico,.b_slidebar .slide
.cico{border-radius:0}.b_slidebar,.b_slidebar .slide{width:100%}.b_slidebar.anim{transition:margin-left .35s
cubic-bezier(.15,.85,.35,1)}.slide>.spinner{position:absolute;left:50%}.slide>.spinner>
ner{position:relative;left:-50%;width:40px;height:40px;background:url(/rp/OJWYLxkTdSOmE7-V53KpAdO
j-xY.gif) no-repeat;margin:40px auto
30px;z-index:1000}.slide_mask.hideSlideMask{visibility:hidden}.b_slidebar.b_autoslidingfade
.slide.slide_fading{opacity:1}.slide_mask,.b_slidebar.b_autoslidingfade .slide{transition:opacity .3s
linear}.slide_mask.slide_fading,.b_slidebar.b_autoslidingfade
.slide{opacity:0}.slide_mask{position:absolute;width:100%;height:100%;opacity:.7;top:0}.carousel_seemore{
text-align:center}.carousel_seemore.dark a{color:#fff}.b_slidebar.enable_selecting
.slide.selected::after,.b_slidebar.enable_selecting .slide:hover::after{box-shadow:inset 0 0 0 2px
#fff}.b_slidebar .slide.selected::after,.b_slidebar .slide:focus::after{box-shadow:inset 0 0 0 2px
#0099bc}.b_slidebar.enable_selecting .slide.selected::after,.b_slidebar.enable_selecting
.slide:hover::after,.b_slidebar .slide.selected::after,.b_slidebar
.slide:focus::after{content:"";height:100%;width:100%;position:absolute;left:0;top:0}.b_slideexp
.b_antiSideBleed{display:inline-block}.carousel_seemore>.b_moreLink.rndChev{vertical-align:middle;height
:92px;text-decoration-color:#444;display:inline-block}.carousel_seemore
.seeAll_txt{display:block;color:#444;line-height:1.7px}.carousel_seemore
.seeAll_chev{display:block;height:48px;padding-bottom:12px;margin-top:15px}html[dir="rtl"]
.carousel_seemore .seeAll_chev{transform:scaleX(-1)}.b_slideexp

```

```
.b_viewport.scrollbar{ overflow-x:auto;-ms-overflow-style:none;scrollbar-width:none }.b_slideexp
.b_viewport.scrollbar::-webkit-scrollbar{ display:none }.b_slideexp
.b_viewport{-webkit-overflow-scrolling:touch }.b_overlay
.btn.rounded{ position:absolute;cursor:pointer;z-index:1;-moz-user-select:none;-khtml-user-select:none;-webki
t-user-select:none;-o-user-select:none;-ms-user-select:none;user-select:none }.b_overlay
.btn.rounded,.b_overlay .btn.rounded .bg,.b_overlay .btn.rounded .cr,.b_overlay .btn.rounded
.cr>div,.b_overlay .btn.rounded .vcac>div{ border-radius:50% }.b_overlay .btn.rounded
.vcac{ height:0 }.b_overlay .btn.rounded{ height:32px;width:32px;top:50%;margin-top:-16px }.b_overlay
.btn.rounded .bg,.b_overlay .btn.rounded:hover .bg{ opacity:0 }.b_overlay .btn.rtl.rounded
.cr{ direction:ltr }.b_overlay .btn.hidden.rounded .cr,.b_overlay .btn.disabled.rounded
.cr{ visibility:hidden }.b_overlay .btn.rounded .cr>div{ border:1px solid #ecec;box-shadow:0 2px 3px 0
rgba(0,0,0,.1);height:30px;width:30px;overflow:hidden;background-image:none;background-color:#fff }.b_ov
erlay .btn.rounded .cr>div:hover{ box-shadow:0 2px 4px 1px rgba(0,0,0,.14) }.b_overlay .btn.rounded
.cr>div:after{ bottom:5px;background-color:#fff;transform-origin:-430px
0;display:inline-block;transform:scale(.5);position:relative }.b_overlay .btn.rounded
.cr>div:hover:after{ transform-origin:-514px 0 }.b_overlay .btn.ltr.rounded .cr>div:after{ right:5px }.b_overlay
.btn.rtl.rounded .cr>div:after{ left:5px }.b_overlay .btn.prev.ltr.rounded .cr,.b_overlay .btn.next.rtl.rounded
.cr{ transform:scaleX(-1) }body .b_overlay .btn.rounded.next{ right:-12px }body .b_overlay
.btn.rounded.prev{ left:-13px }.ra_car_container .b_overlay .btn.prev.ltr.rounded .cr>div,.ra_car_container
.b_overlay .btn.next.rtl.rounded .cr>div{ transform:unset }.ra_car_container .b_overlay .btn.rounded
.cr>div{ background-position:0;border:unset }.ra_car_container .b_overlay .btn.rounded
.cr>div:after{ content:unset }@media screen and (forced-colors:active){ .b_overlay .btn.rounded.hidden
*,.b_overlay .btn.rounded.disabled *{ background:none }.b_overlay .btn.rounded.hidden,.b_overlay
.btn.rounded.disabled{ background:none } }.b_overlay .btn.rounded
.cr>div:after{ content:url(/rp/EX_mgILPdYtFnI-37m1pZn5YKII.png) }.b_overlay{ position:relative }.vcac{ posi
tion:absolute;width:100%;top:50% }.vcac>div{ position:relative;width:100% }#b_content .iacfic.mmkiaacf
.iacfmit .imgInfo{ color:var(--smtc-ctrl-link-foreground-brand-rest) }#b_content .iacfic.mmkiaacf .iacfmit
a{ text-decoration-color:var(--smtc-ctrl-link-foreground-brand-hover) }#b_content .iacfic.mmkiaacf .iacfmit
.imgInfo{ font:var(--bing-smtc-text-global-body3) }#b_content .iacfic.mmkiaacf
.iacf_crsI[data-wptds-carousel]>div[data-wptds-carousel-scroll-container]{ padding-bottom:52px }#b_content
.iacfic.mmkiaacf .iacfmit{ box-sizing:initial;padding-bottom:52px }#b_content .iacfic.mmkiaacf .iacfmit
.imgInfo{ text-overflow:ellipsis;display:-webkit-box;-webkit-line-clamp:2;-webkit-box-orient:vertical;align-sel
f:stretch;padding:0 var(--smtc-gap-between-content-xx-small);overflow:hidden }#b_content .iacfic.mmkiaacf
.iacfimgc{ padding-bottom:var(--smtc-gap-between-content-x-small) }#b_content .acfImgAns
.salink,#b_content .acfImgAns
.iasalink{ text-align:center;display:block;padding-bottom:var(--smtc-gap-between-content-medium) }#b_conte
nt .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-backgrou
nd-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-res
t);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-cont
ent: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_con
tent .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_crsl[data-wptds-carousel]{margin:0;padding-bottom:var(--smtc-gap-between-content-medium)}#b_cont
ent .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
[data-wptds-carousel-controls]{--wptds-carousel-control-opacity:1}#b_content .iacfic.mmkiaacf
.iacf_crsl[data-wptds-carousel]>div{padding:0}#b_content .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
[data-direction="end"]{margin-right:-22px}#b_content .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
[data-direction="end"] svg{transform:scaleX(-1)}#b_content .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
[data-direction="start"]{margin-left:-22px}#b_content .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
[data-direction="start"] svg{transform:scaleX(1)}#b_content .iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
button{background:var(--smtc-background-card-on-primary-default-rest);box-shadow:var(--bing-smtc-shado
ws-card-hover-3);width:36px;border-radius:var(--smtc-corner-ctrl-lg-rest)}#b_content .iacfic.mmkiaacf
.iacf_crsl[data-wptds-carousel]
button:hover{background:var(--smtc-background-card-on-primary-default-hover)}#b_content
.iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel]
button:active{background:var(--smtc-background-card-on-primary-default-pressed)}#b_content
.iacfic.mmkiaacf .iacf_crsl[data-wptds-carousel] button svg{transition:initial}#b_content .iacfic.mmkiaacf
.iacf_crsl[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)}
```

# Performance characteristics of photovoltaic panels

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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-f
oreground-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-widt
h: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-bac
kground-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-defau
lt-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_slidebar{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_crsl[data-wptds-carousel] [data-direction="end"]{transform:scaleX(-1)}html[dir=rtl] #b_content
.acfImgAns .iacf_crsl[data-wptds-carousel]
[data-direction="start"]{transform:scaleX(-1)}[data-vs-icon-template]{display:none!important}.iacf_vsicon{p
osition:absolute;top:12px;right:12px;width:28px;height:28px;background-color:var(--mai-smtc-background-ct
rl-on-image-rest);border-radius:var(--smtc-corner-circular);display:none;align-items:center;justify-content:cen
ter;border:1px solid
var(--smtc-stroke-ctrl-on-neutral-rest);cursor:pointer;opacity:0;z-index:1000;box-sizing:border-box;pointer-ev
ents:none}.iacf_vsicon
acf-icon{color:var(--mai-smtc-foreground-ctrl-on-image-rest)}.iacf_vsicon.iacf_vsicon_show{display:flex;op
acity:1}acf-icon{display:block;inline-size:fit-content;max-inline-size:100%;pointer-events:none}acf-i
con::before,acf-icon::after,acf-icon
*,acf-icon
*::before,acf-icon

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*::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 } } a
cf-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_crsl
.iacfmit{ overflow: hidden; position: relative } .iacfca .iacf_crsl .iacfmit
.cico{ overflow: hidden; border-radius: var(--mai-smtc-corner-list-card-default) } .iacfca .iacf_crsl .iacfmit .cico
img{ border-radius: inherit; transition: transform 300ms ease-out } .iacfca .iacf_crsl .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
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_crsl[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_crsl[data-wptds-carousel]
[data-wptds-carousel-control] svg{ transition: transform .3s } .iacfm .iacfca .iacf_crsl[data-wptds-carousel]

```

```

[data-wptds-carousel-control]:hover{ width:24px;background:var(--smtc-background-ctrl-neutral-hover)}.iacf
m.iacfca .iacf_crsl[data-wptds-carousel] [data-wptds-carousel-control] path{fill:currentColor}.iacfm.iacfca
.iacf_crsl[data-wptds-carousel] ol [data-direction="start"]{border-radius:0 8px 8px
0;margin-left:16px}.iacfm.iacfca .iacf_crsl[data-wptds-carousel] ol [data-direction="start"]
svg{transform:scale(.7)}.iacfm.iacfca .iacf_crsl[data-wptds-carousel] ol [data-direction="start"]:hover
svg{transform:scale(1)}.iacfm.iacfca .iacf_crsl[data-wptds-carousel] ol
[data-direction="end"]{border-radius:8px 0 0 8px;margin-right:16px}.iacfm.iacfca
.iacf_crsl[data-wptds-carousel] ol [data-direction="end"] svg{transform:scale(-.7)}.iacfm.iacfca
.iacf_crsl[data-wptds-carousel] ol [data-direction="end"]:hover svg{transform:scale(-1)}.iacfm.iacfca.iacf_fb
.iacf_crsl[data-wptds-carousel] [data-wptds-carousel-control],.iacfm.iacfca.iacf_ss
.iacf_crsl[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_crsl[data-wptds-carousel]
[data-wptds-carousel-control] path,.iacfm.iacfca.iacf_ss .iacf_crsl[data-wptds-carousel]
[data-wptds-carousel-control] path{fill:currentColor}.iacfca .iacf_colg_crsl
[data-wptds-carousel-list]{width:fit-content}.iacfca .iacf_colg_crsl .iacfmit{position:absolute}.iacfca
.iacf_colg_crsl
.cico{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crsl){height:100%;width:100%;padding:0;overflow:
hidden;border-radius:inherit}.iacfca:not(.iacfh):has(>.iacf_colg_crsl)
.iacfmit{border-radius:0}.iacfca:not(.iacfh):has(>.iacf_colg_crsl) [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%)}.iacfm.iacfca[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-

```

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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);bord
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-snap] [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-carousel][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="Normal"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="Normal"]:has([data-wptds-carousel-control]:hover),[data-wptds-carousel][data-desktop][data-variant="FullWidth"]:has([data-wptds-carousel-scroll-container]:hover),[data-wptds-carousel][data-desktop][data-variant="FullWidth"]: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-border-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-border-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
```

# Performance characteristics of photovoltaic panels

:#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}#slideexp0\_ECF53A .slide { margin-right: 8px; }#slideexp0\_ECF53Ac .b\_slidebar .slide { border-radius: 6px; }#slideexp0\_ECF53A .slide:last-child { margin-right: 1px; }#slideexp0\_ECF53Ac { margin: -4px; } #slideexp0\_ECF53Ac .b\_viewport { padding: 4px 1px 4px 1px; margin: 0 3px; } #slideexp0\_ECF53Ac .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); } #slideexp0\_ECF53Ac .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); } #slideexp0\_ECF53Ac .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 Performance characteristics of photovoltaic PanelsSolar Panel CharacteristicsSolar Panel Performance ChartPhotovoltaic EfficiencyPv Panel EfficiencySolar Panel PerformanceSolar Panel EfficiencyEfficiency Of Solar PanelsCharacteristics Of Solar PanelSolar Pv CharacteristicsFull article: Performance characteristics of a photovoltaic panel ...Energies | Free Full-Text | Advances in Solar PV Systems; A ...Photovoltaic (PV) characteristics of the solar panel at different .. aracteristics of the photovoltaic panel. | Download Scientific DiagramTypes of PV Panels - What are the differences - BibLusFull article: Performance characteristics of a photovoltaic panel ...Parameters of a Solar Cell and Characteristics of a PV PanelSolar panel characteristics [75]. | Download Scientific DiagramSee all.wr\_hlic,.wr\_hli{margin-top:4px;color:#767676;display:block}.wr\_hlic>.wr\_hli,.wr\_hli>\*,.wr\_hli li{display:inline}.wr\_hli+.wr\_hli::before{content:" | "}.wr\_strike{text-decoration:line-through}Electrical TechnologyParameters of a Solar Cell and Characteristics of a PV PanelSee MoreThe factors affecting the power generated by the cell were also studied including power conversion efficiency, amount of input light, cell area, etc. that affects the performance and helps us understand ...

In this section, we will revisit some of these performance characteristics, such as I-V, P-V, FF, and efficiency, at the module level. Before we start, let us define some of the commonly used ...

This article examines the performance characteristics of PV modules, emphasizing key measurements, factors influencing efficiency, and the importance of maximum power point tracking ...

The authors have created a database of one-sided PVPs from 100 to 450 W power range, which includes PVPs from 72 manufacturing companies around the world. The paper analyzes 1300 ...

In this paper, solar photovoltaic (PV) modules are modelled and simulated, and their performance characteristics are examined.

It also outlines the electrical modeling, key operating characteristics, and performance curves of PV cells

under varying environmental conditions. ...

This report summarizes a draft methodology for an Energy Performance Evaluation Method, the philosophy behind the draft method, and the lessons that were learned by implementing the method.

It gives a detailed description of its solar energy conversion ability and efficiency. Knowing the electrical I-V characteristics (more importantly P ...

This report presents a performance analysis of 75 solar photovoltaic (PV) systems installed at federal sites, conducted by the Federal Energy Management Program (FEMP) with support from National ...

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