

# Field Performance Comparison Test of N-type TOPCon and P-type PERC Bifacial Modules in Haikou by CGC

d M bAh Z b ae ng bñh gē = Zb m b l eē d b n rAh nē l k  
 g g b g bAmZ žlo b gb b g k Z h m a l m ah alk mē a  
 n b gZ m m Z ih ek h l g m m hž e lañ e e Z l m  
 gg gnM g n Z Z eg rā g th Z b l m eg g k bi Z th Z nā r b k  
 g g b bb Z om mZ r Z r a gē e f ē m ž th rē k m Z k nē k a  
 dP f gg a ž th a E ā Z e km Z b im C k mē .  
 g o Z Z b f g b k ip l Z l f nē ež n b la k m Z a k  
 es 89.3% RH.

## Project Background:

g M rth ē b m m lē l l b h n l i ž h Z b r p b m b th ē a k l  
 n h M r g m h g l g i a h f Z bñ Z k n ē g žo l m ž g Z g n k Z ē k o b hē g hž e rñ f b k r f m h m b h H nē e ē e Zh Z m  
 h g g ž d Z k p r b k h k n l m a G e h Z b g i l g h Z b h k b g l m Z k h n b k g bk Z = b k Z = E a IA kk A H : GB B B  
 nā rñ h h h m rdk Z n ē vñ Z b l k aē E m n ž b Z l m m ž l ; n f m n ž m b b lē k m ka g b g i p b l th b m p Z Z ē k m k  
 E nh b g m i g b Z g Z d b b th gē nk kb Z m m l k  
 nh C r e q g Mk b n a l ž ē m k g h i b h k l r p Z k n Mg k b m b a l b l l m l g Z g p ā Zh b b k k h m a l l l O  
 r Z n Z ē r e : b e g i h m g k l a th Z f pñ k n i h f h k k g g m ē l g h a l i b g m b g b n h l kl m  
 g Z g B f b Z l m m g ž h g l m b d C l b h k m r k nē b G g m h g p b ž ž g i g k m l h b b m h a Z m a a n  
 g g H M l h Z r i f m r k h g g r e h h g b ē l h b r p k nē m h k k  
 ž f h m g n h m e ā f g m m ē g h g a h g l m m ž ž m b l l  
 r m = M b h a ž g l r Z b Z h Q g g h k k m l b ž b m  
 f g h r h l a e o h g m k n g ē Z m Z l n k k i h Z Z m p m k  
 b h Z r i Z ž h e a r k k Z ž E n m l Z l l k m p

## Experiment Methodology & System Design:

f M ā f h gñ Z e b i l b b c m l e l h r g o m l i Z m m k k k b Z h p e g b r Z h Z l k a m k k a n i c b ž r r Z k b k Z m k k l  
 g b g Z n n b b e g ž d C b h i r f b r b b ž G ž e e h e d M bAh Z ž l l o e m n bñ b l g b l ē h i r p th l p ž e k l l  
 F C D = E A g . G ž d O C O ē h i r l f b m l b r i h ž e e h h h n t g r e Z d g k h H f n r h j m m h h h n b e a k Z e Z Z m  
 F C D F = E A . . . . . 0 O . . . . . g n b g Z k j l h k l m k g b B / 0 - M m j k l l  
 g g f b Z Z nā ž m l a b m m l Z g ž th Z m l e e m Z Z o ž m l k l  
 h m m b r e a h m f m g h a ž l m l b h n k t h r k a i l

f m z l e f g g z h e h f i i ž z i m k k k  
 Nō a n m a L B b k k k i l k b l b o m B . b l m k m m k i k p a a  
 g b b b o f i l m g Z g Z i h k m k b k Z l ē M p h a k p k  
 b b b e m h Z n f g o Z l k g b n h h g k b a b b e m k m k ē m m a  
 Z m n m m n h e a m ž k n r m Z m Z l a n l h k k k a n l a  
 b o m k l k

## Indoor Electrical Performance Testing

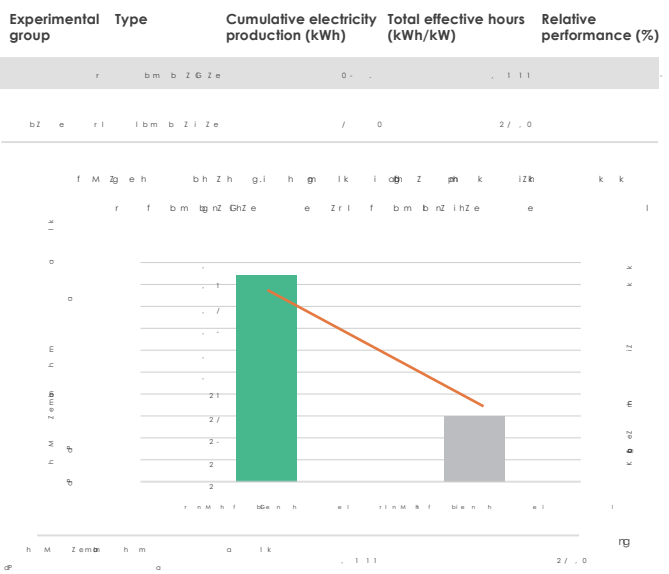
The test is performed in a laboratory. The test is purposed to test the degradation of modules

No.	Test item	Test standard/method	Clause
1	Initial Power Test	IEC 61215	3.1.1
2	Period Power Test	IEC 61215	3.1.2

## Result:

bifacial and P-type bifacial module is shown in table 3-1 and

Experimental group	Type	Cumulative electricity production (kWh)	Total effective hours (kWh/kW)	Relative performance (%)
1	P-type bifacial	5635.12	5635.12	100.00
2	Bifacial	5601.05	5635.12	99.39



Experimental group	Type	Average temperature/°C	Max. temperature/°C	Average temperature/°C
1	P-type bifacial	23.1	45.2	23.1
2	Bifacial	23.0	45.1	23.0

560Ns sample serial#	Initial Power Test at July 01, 2022 (W)	Period Power Test at April 30, 2023 (W)	Degradation
1	5635.12	5635.12	0.00
2	5635.12	5601.05	-0.60
3	5635.12	5601.05	-0.60
4	5635.12	5601.05	-0.60
5	5635.12	5601.05	-0.60
6	5635.12	5601.05	-0.60
7	5635.12	5601.05	-0.60
8	5635.12	5601.05	-0.60
9	5635.12	5601.05	-0.60
10	5635.12	5601.05	-0.60
<b>Subtotal</b>	<b>5635.12</b>	<b>5601.05</b>	<b>-0.60%</b>

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Conclusion:

4.22%

0.56%

0.60%

