

A photograph of two men in a greenhouse. The man on the left is wearing a green polo shirt and holding a green crate filled with red cherry tomatoes. The man on the right is wearing a dark blue sweater and holding a bunch of red cherry tomatoes. The background is filled with green tomato plants and some red lights. In the top left corner, there is a white box with the Philips logo and a green box with the text 'Horticulture LED Solutions'. In the top right corner, there is a circular LED logo. The main text is overlaid on the image.

PHILIPS

Horticulture
LED Solutions



Your recipe
for growth.
Better control.
Higher yield.

Boost quality and production with
a year round summer-tasting crop

“

Evolution in lighting leads to **a revolution in growing**”

After years of development and research by Philips in the use of LEDs in high-wire vegetable and fruit production, more and more growers are experiencing the wide-ranging benefits of growing under Philips GreenPower LEDs:

- Improved yield
- Higher fruit weight
- Balanced growth
- Faster flowering speed
- Winter crop production
- More flexibility with planting schedule

Use light to gain maximum value and return from your growing

Improve your growing operations with not just light but the right light. The right light—Philips LED interlighting and LED toplighting—allows you to grow and harvest fresh and flavorful tomatoes, cucumbers, and peppers year round regardless of your location.



“

It is not somewhere in the future but already today that when it comes to greenhouse lighting, **both in terms of its energy savings and crop-related benefits, LED technology rules!**”

Edgars Romanovskis
Mežvidi Greenhouses

“Plant growth, fruit yield, and fruit quality are **not only affected by light quantity but also by light quality (spectrum composition)**”

Source:

Dr. Xiuming Hao, Lead Research Scientist
Greenhouse Lighting, Agriculture and Agri-Food Canada
Harrow, Ontario
Greenhouse Lighting: Bright Lights, Big Produce
www.agr.gc.ca

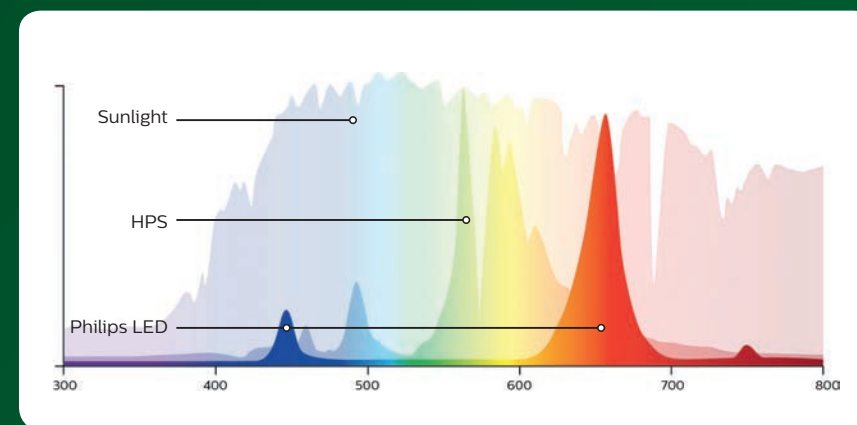
When **natural light** is not enough

Natural light often falls short on delivering what high-wire fruits and vegetables need for optimal growth and fruiting. Never is that more evident than the short, cloudy or foggy days of winter. Without supplemental lighting, a run of low light days can cause problems and delays.

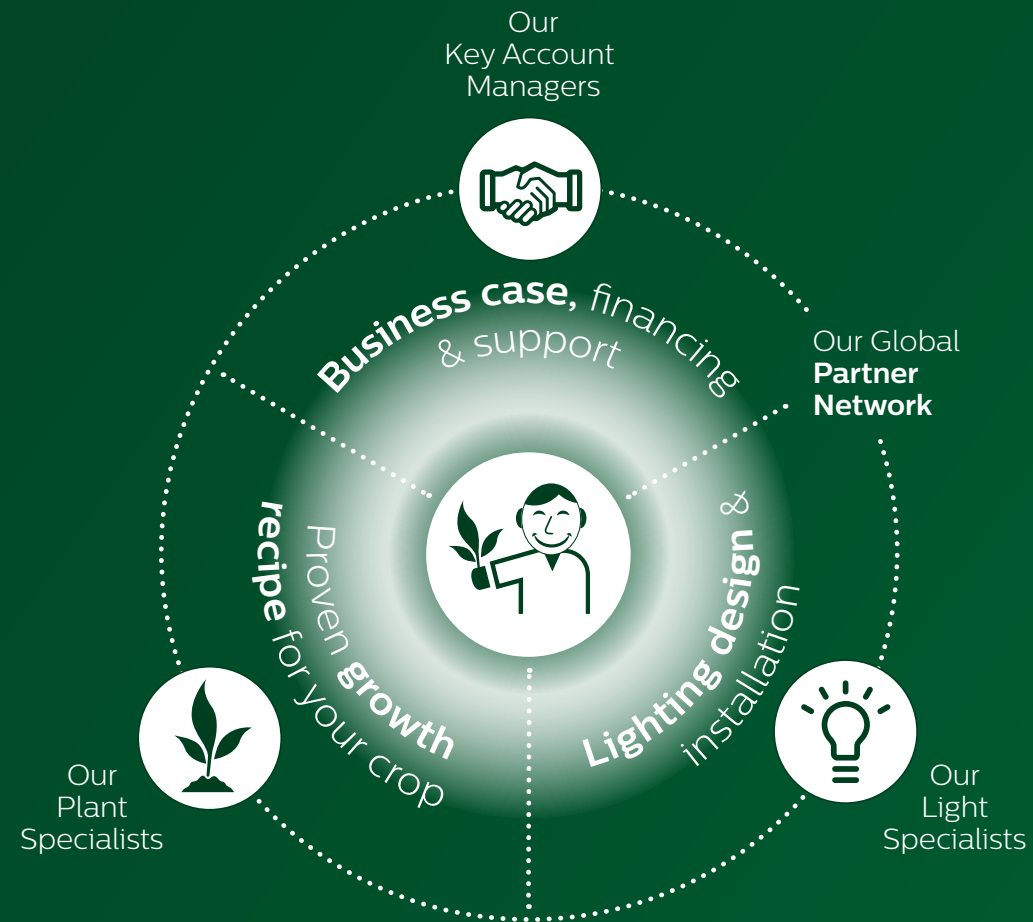
In addition, high-wire crops have an added challenge in that an abundant crop canopy limits overhead light—natural or supplemental—from reaching the part of the crop that needs light most. In fact, overhead lighting usually penetrates to approximately 75 cm below the crop canopy. With LED interlighting, leaves closer to the bottom of the crop remain active for a longer period of time.

Not all light is equal

Light is energy that stimulates plant growth. The right light, called photosynthetic active radiation (PAR), is the light that powers plant growth. Unlike the PAR light of sunlight and HPS fixtures, Philips GreenPower LEDs deliver targeted PAR light—blue and red—with higher photosynthetic efficiency than HPS.



Helping your business to grow



For **growth**
like never before

Our approach

Let Philips help you use the right light to gain maximum value and return:

- Close collaboration with your Philips representative and Philips certified Horti Partner to understand your situation and devise a lighting plan that fits not only your growing needs but also your financial situation and long-term strategy
- Guidance and support of Philips Plant Specialists to ensure a crop-specific light solution
- Accurate calculations and detailed lighting plans from our Light Specialists to support the most desirable outcomes



Light recipes:
the right ingredients
for every crop
and growing phase

Philips knowledge of lighting includes almost a decade of dedicated experience developing light recipes that maximize light in a greenhouse environment

As the horticulture lighting leader, Philips continues to collaborate with leading growers and research institutes around the world. The knowledge that is gained through these relationships is used to fine-tune our GreenPower LED products to ensure we continue bringing the greatest value to growers.

Recognizing that not all growers and crops are alike, the support you receive from Philips horticulture team includes developing a dedicated light recipe that takes into account your situation: crop and variety, greenhouse location, growing strategy and greenhouse structure. Our custom light recipes combine light spectrum and intensity, lighting hours, light uniformity and light positioning.



“What we’re finding is that (with interlighting) **we can leave leaves on the plant longer because it’s still working**, it’s still photosynthesizing, so it’s still productive.”

Roly Holt
Sandylands Nursery

Philips GreenPower LEDs – because there's more to light

Value of natural and supplemental light sources:

Spectrum: wavelength exclusively focused on photosynthesis

Control of winter lighting hours

Control light and heat separately

Uniform illumination: light reaches entire crop canopy

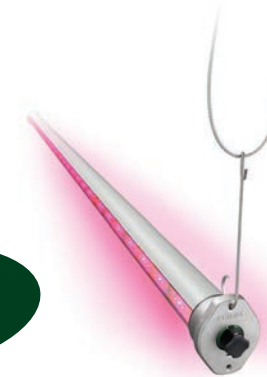
Easy cleaning and minimal maintenance

Reliable and consistent operational intensity



Philips GreenPower LED Solutions: Your recipe for growth

New and Improved



Interlighting

- Bi-directional LED lighting
- Inter-canopy placement directs and focuses growth-stimulating light on the most vital part of crop
- Spectrum: deep red/blue
- **Now available with high-output (240 – 300 $\mu\text{mol/s}$)**
- 64 – 100 watt
- 200 V – 400 V input voltage
- 175 – 300 $\mu\text{mol/s}$ photon flux
- 2.7 – 3.0 $\mu\text{mol/Joule}$
- UL/CSA approved
- IP66 rated¹

	2.0 m	2.5 m
Length	1.95 m / 76.7 in	2.42 m / 95.3 in
Width	6.5 cm / 2.6 in	6.5 cm / 2.6 in
Height	7.6 cm / 3.0 in	7.6 cm / 3.0 in
Weight	2.2 kg / 4.9 lb	2.5 kg / 5.5 lb

Toplighting

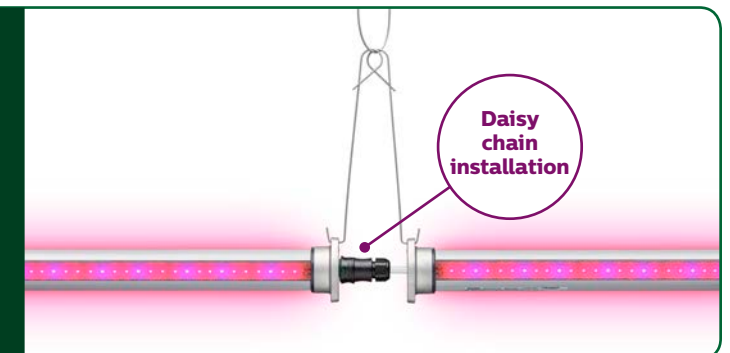
- Energy-efficient overhead LED lighting
- Slim profile of module doesn't block natural light during high-light growing seasons
- Recommended spectra: deep red/blue low blue (215 W) and deep red/white low blue (200 W)
- 200 V – 400 V input voltage
- 520 – 550 $\mu\text{mol/s}$ photon flux²
- 2.6 $\mu\text{mol/Joule}$
- UL/CSA approved
- IP66 rated¹
- Length: 1.26 m / 49.8 in
- Width: 5.5 cm / 2.2 in
- Weight: 3.2 kg / 7.1 lb

¹ IP66 Ingress Protection rating: classifies the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, and water in electrical enclosures. Visit www.dsm.com for more information on IP rating system.

² Photon flux rating for toplighting in spectrum deep red/blue low blue and deep red/white low blue.

New and Improved

- Easy installation
- High-output option
- 2 lengths for greater installation options





APS Salads

“

We switched on the LED lights on the 21st of October and had our first crop in the shops before Christmas.”

Phil Pearson
APS Salads

www.philips.com/APSsalads

Grower
APS Salads
Isle of Wight, United Kingdom

Opportunity
High demand for locally-grown winter tomatoes

Solution
100% LED Solution: a combination of Philips LED toplighting and LED interlighting to produce a total of 220 $\mu\text{mol/s/m}^2$

Results of superior hybrid lighting strategy

- Yield increase to one flower per day and more than one truss per week
- Saved one-third power consumption when compared to greenhouse with HPS

Complete LED light solution drives winter production of tomatoes and cucumbers

Grower
Warsaw University of Life Sciences
Warsaw, Poland

Opportunity
Investigate feasibility of cost-effective winter production of cucumbers

Solution
100% LED Solution: a combination of PhilipsLED toplighting and double-line LED interlighting to produce a total of 320 $\mu\text{mol/s/m}^2$

Results of superior hybrid lighting strategy

- More than 24% higher yield using 100% LED toplighting and interlighting
- 60% lower electricity use
- Decrease of 1.4 liters of water per kg of cucumbers

“

The 100% LED compartment used 60% less electricity and 1.4 less liters of water per kilogram, **and produced a 24.8% higher yield.**”

Professor Janina Gajc-Wolska and Dr. Katarzyna Kowalczyk
Department of Vegetables and Medicinal Plants
Warsaw University of Life Sciences

www.philips.com/Warsaw



Warsaw University of Life Sciences

High-wire vegetable and fruit crops



Harvesting fresh tomatoes through the winter months

The fresh tomatoes and lettuce grown at Gull Valley Greenhouses in Blackfalds, Alberta, are a favorite of shoppers at local farmers markets in the Edmonton area. Which is why Phil Tiemstra and his son, Levi, decided to capitalize on the demand for Gull Valley's product with winter production. With the installation a full LED solution (toplighting and interlighting), the Tiemstra's are now able to offer a plentiful supply of freshly harvested tomatoes through the dark months of winter.

“

The interlights lower in the crop canopy... **a big bang for your buck.**”

Phil Tiemstra
Gull Valley Greenhouses

Grower
Gull Valley Greenhouses
Blackfalds, Alberta, Canada

Philips Horti Partner
Paul Boers, Inc.

Situation
Gull Valley Greenhouses identified a market opportunity to supply local farmers markets with locally grown tomatoes through winter months

Lighting Solution
100% LED solution: a combination of Philips LED double-line interlighting and LED toplighting to produce total light of 204 $\mu\text{mol/s/m}^2$

Benefit
Increased winter production of Beefsteak, Cherry, and TOVs



Mini Cucumbers



“ **A 19% increase in average production of mini-cucumbers** ”

Grower
Glenwood Valley Farms
British Columbia, Canada

Situation
Compare mini-cucumber production using two lighting scenarios: LED interlighting and HPS on one crop group; natural light and HPS on a second crop group

Lighting Solution
Philips LED interlighting and HPS

Results

- 19% average increase (kg/m²) in production after adding only 8% extra light
- Faster maturing, darker fruit
- Improved size and positioning of leaves



www.philips.com/Glenwood

Tomatoes



“ **Harvest weeks 41 through 29 to take advantage of low winter supply** ”

Grower
Mežvidi Greenhouse
Mežvidi, Latvia

Situation
Capitalize on premium tomato prices in the darkest period of harsh Latvian winters

Lighting Solution
Philips LED interlighting and HPS

Results

- 10% larger fruit size
- 30% reduction in energy consumption
- More plants per square meter



www.philips.com/Mezvidi



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Document order number: 3222 635 70432
01/2018
Data subject to change

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Or tweet us:
[@PhilipsHorti](https://twitter.com/PhilipsHorti)