

## Titanium Bulletin – Twilight

### What is Twilight?

As the earth rotates, the sun appears and disappears in the horizon. Sunset (sunrise) is when the sun is no longer visible in the horizon. Twilight is the period before sunrise or after sunset when the sun is behind the Earth and the atmosphere reflects sunlight and illuminates the lower atmosphere. Before morning twilight or after evening twilight, the sky is dark.

### Stages of Twilight

The types of dawn and dusk are defined by the position of the sun below the horizon:

- **Civil:** Six degrees
- **Nautical:** 12 degrees
- **Astronomical:** 18 degrees

The three stages of twilight are when the sun is moving from one dawn (dusk) to another:

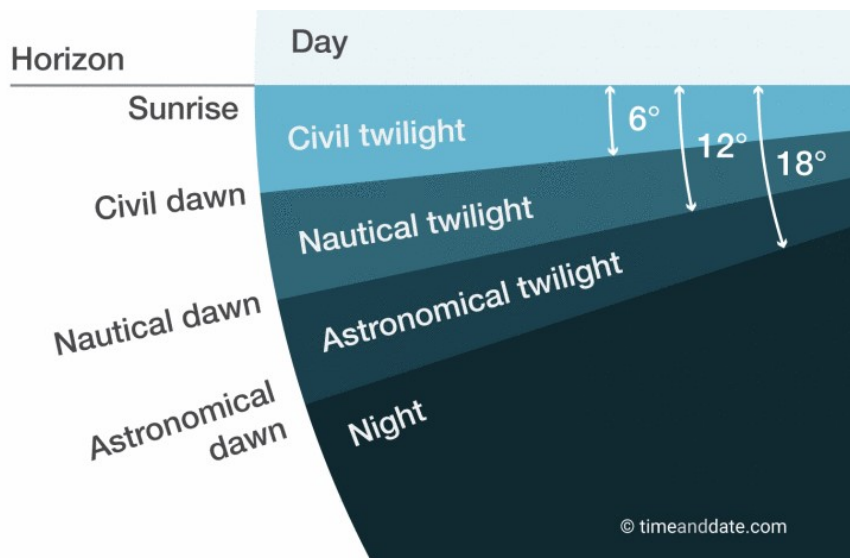
Civil Twilight: enough light for objects to be distinguishable and for outdoor activities. Most widely used definition of Twilight.

Nautical Twilight: enough light to see vague outlines of objects. If the sky is clear, the brightest stars can be seen making it possible in the old days for sailing ships to navigate.

Astronomical Twilight: light gives the sky a faint glow.

### Hardware (\$\$\$) for Outdoor Lighting Control

To save on energy costs, hardware has been used to turn on or off outdoor lights as needed for illumination such as time clocks, light sensors, and GPS twilight timers. Hardware solutions can also include costly control panels, bridges, receivers, and repeaters. Sometimes hardware is installed for each luminaire. Hardware is costly to install and maintain.



### The Power of Titanium

The simplicity of setting twilight rules allows customers to enter the address in the user interface and Titanium's software automatically calculates the associated coordinates.

### Titanium Savings

Using twilight rules, customers may save an additional 7 - 10% in energy savings over other traditional control methods. Additionally, the twilight rules include the adjustment of the daylight savings time which results in more operational savings.

Further savings come from significantly reduced hardware which reduces installation costs, project costs, and on-going maintenance costs.

### Titanium Platform

Titanium is the ideal platform to monitor outdoor lights from anywhere with any internet enabled device. Titanium is an enterprise management platform with advanced capabilities for monitoring, control, analytics, and savings.