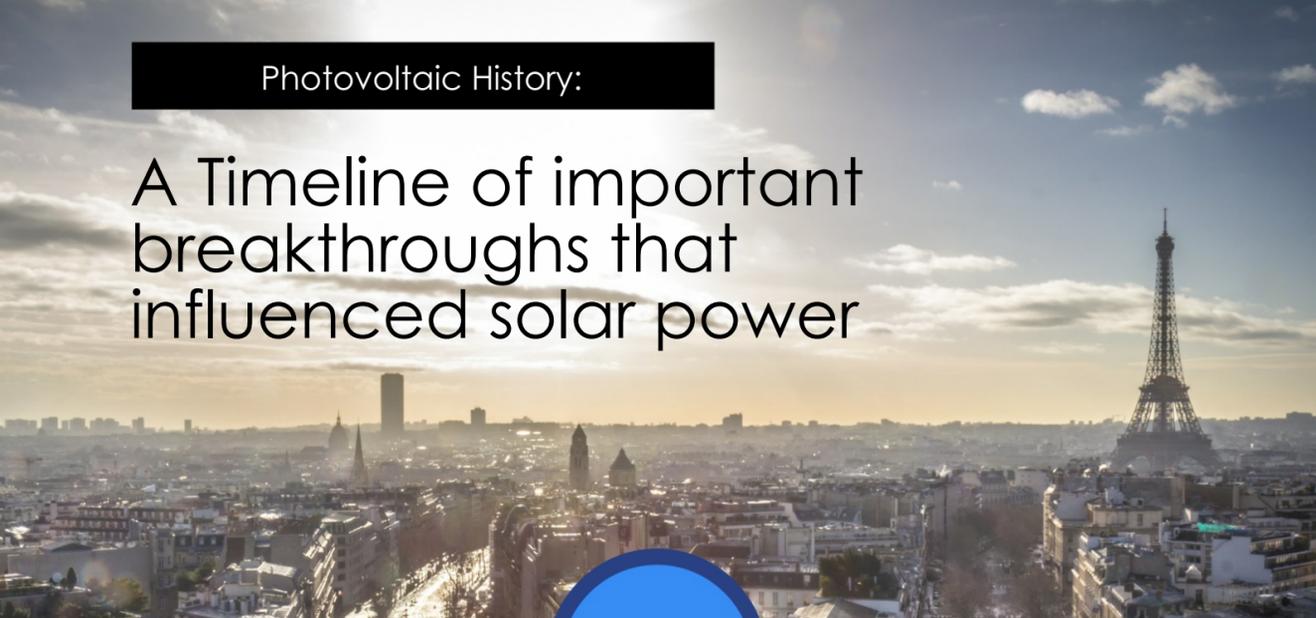


# A Timeline of important breakthroughs that influenced solar power



## 1800's:

The discovery of Photovoltaic (PV) cells, the cells that power solar power, dates as far as the 1800s.

It all began when a nineteen-year old French scientist, Edmond Becquerel was experimenting with an electrolytic cell composed of two metal electrodes.



1901 – Nikola Tesla receives two patents for his radiant energy studies

(1) Method of utilizing radiant energy;

(2) Apparatus for the utilization of radiant energy.

1904 – Wilhelm Hallwachs develops a semiconductor-junction solar cell.

1905 – Albert Einstein's theory of "photoelectric effect."

1916 – Robert Millikan supports Einstein's theory by providing proof.

1922 – Einstein receives Nobel Prize for his photoelectric effect theory.

1932 – Stora and Audobert discovers a photovoltaic material, Cadmium Selenide.

1839 – Edmond Becquerel discovers PV effect.

1883 – An American inventor, Charles Fritts develops the first PV cell by putting selenium on a metal plate.

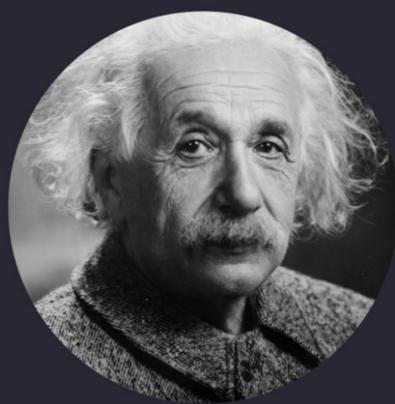
1877 – William Adams and Richard Day, both American scientists, publish "The action of light on selenium."

1888 – An American chemist, Edward Weston receives the first US Patent for Solar Cell.

1888 to 1891 – Aleksandr Stoletov develops the first solar cell using the outer photoelectric effect.



## 1900's:



## 1950's:



1954 – An American research company, Bell Labs, showcases first high-power silicon PV cell that has about 6 percent of efficiency.

1955 – Western Electric begins commercialization of silicon PV system design technologies.

1958 – US Vanguard I, the first solar-driven space satellite was launched; The U.S. Signal Corps Laboratories develops a radiation resistant solar cell; Hoffman Electronics' nine percent efficient solar cell.

## 1960's:

1960 – Hoffman Electronics forges a new solar cell with fourteen percent efficiency.

1963 – Sharp Corporation manufactures a feasible photovoltaic module of silicon solar cells; Japan enters the scene, installing a 242-watt PV array on a lighthouse.

1966 – NASA commences Orbiting Astronomical Observatory with a PV array.

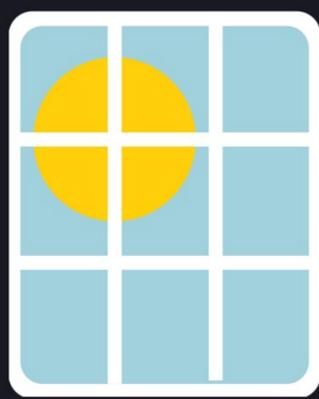
1967 – Soyuz 1, the first solar-powered manned spacecraft, was introduced.



## 1970's:

1974 – Japan launches "Project Sunshine" to propel PV studies and progress.

1977 – The Department of Energy founded US Solar Energy Research Institute in Golden, Colorado; Solar panels were installed on the White House.



## 1980's:

1980 – The first thin film solar cell was developed by the Institute of Energy Conversion at University of Delaware. It exceeded 10 percent efficiency.

1985 – The Centre for Photovoltaic Engineering develops a 20 percent efficient silicon cell.

1989 – Reflective solar concentrators are first applied with solar cells.



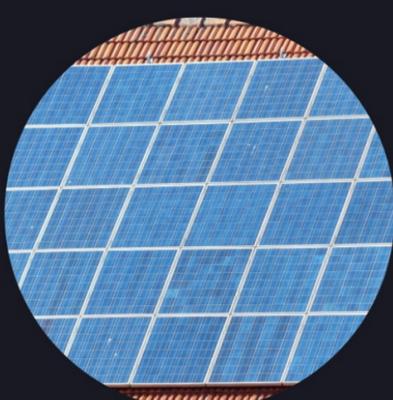
## 1990's:

1991 – Development of the first Efficient Photo electrochemical cell and the Dye-sensitized solar cell.

1992 – A 15.89 percent efficient thin-film cell was created by the University of South Florida.

1994 – Japan starts "70,000 Solar Roofs" PV subsidy program.

1999 – 1000 megawatts of installed PV power



## 2000's:

2006 – Solar cell advances, surpassing the 40 percent efficiency.

2007 – Google's Project Sunroof was launched

2008 – The birth of the inverted metamorphic triple-junction solar cell.

2013 – Modern solar panels installed on the White House

