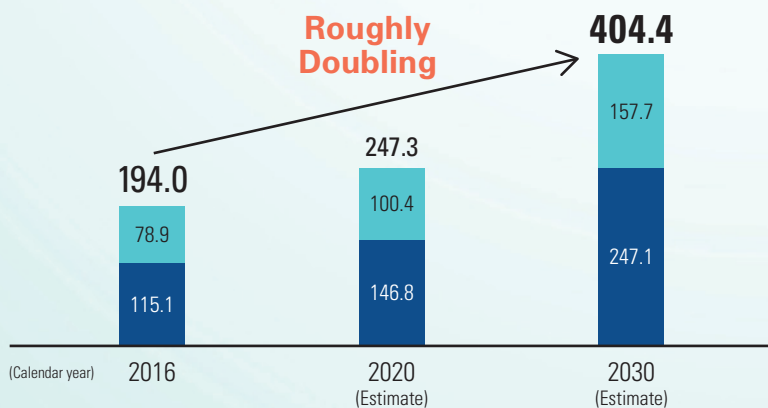




Growth Strategies for the IoT Era

The IoT era, in which almost everything is connected to the Internet, is nearly upon us. We expect to see a sharp increase in demand for our products in this era and accordingly remain focused on adapting to related trends.

■ Forecast for global demand in the CPS*/IoT market
(unit: ¥ trillion)



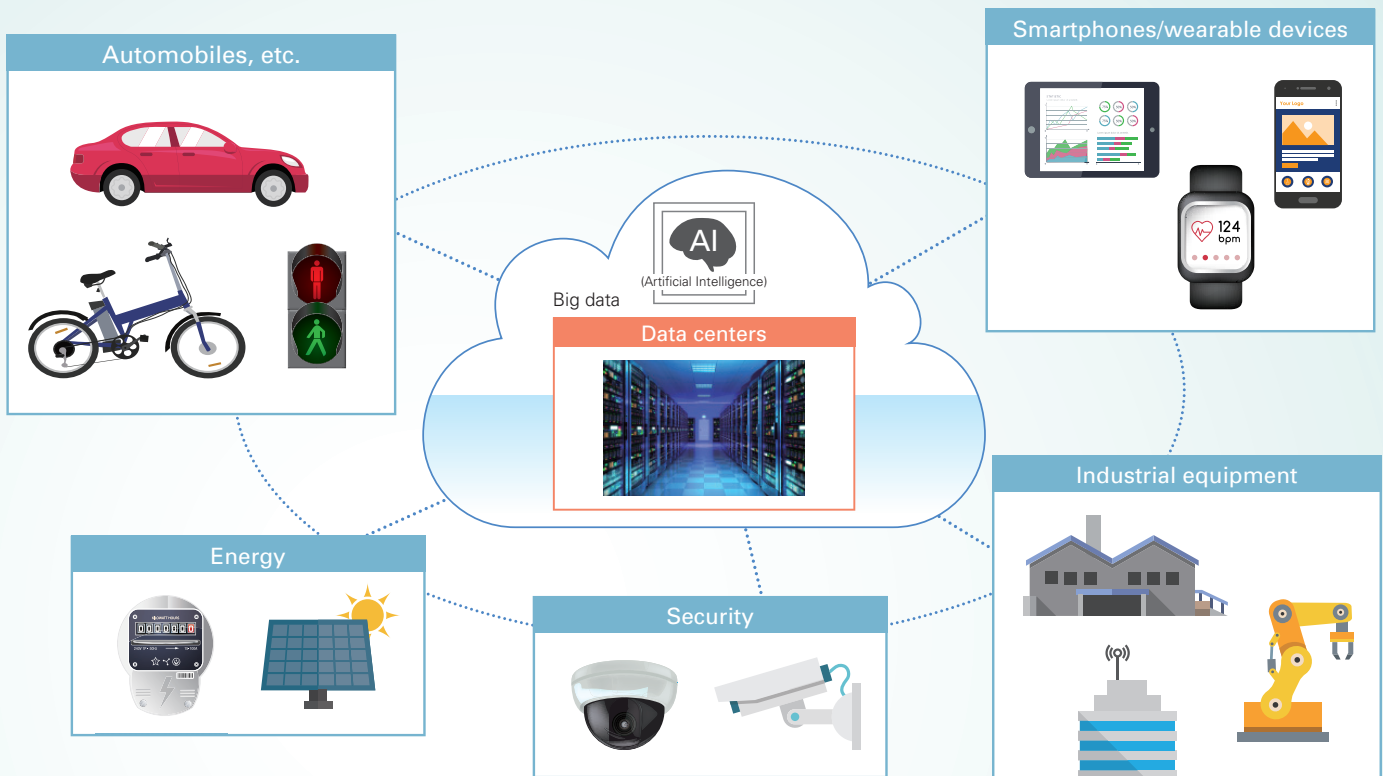
■ Solutions services
■ IoT equipment

*CPS is an abbreviation for cyber physical systems. CPS provides services and systems that collect a wide variety of data, including through sensor networks, and then analyze and use that data to contribute to an increasingly efficient and advanced society.

Source for forecasts:
Production Forecasts for the Global Electronics and Information Industries from the Japan Electronics and Information Technology Industries Association (JEITA)

Special feature

—Growth Strategies for the IoT Era—



As Demand for IoT Equipment Increases, So Too Does the Market for Related Services

The IoT era does not mean simply that a number of devices will be connected to a network. It also means that data collected via networked equipment is likely to be used to create new services and provide solutions that could contribute to the resolution of many of the issues confronting societies around the world.

Annual growth in the market for IoT equipment tops 5%

The IoT era entails electronics devices that were previously operating in isolation now being connected to a network and exchanging huge amounts of data. The Japan Electronics and Information Technology Industries Association (JEITA) estimates the ratio of equipment compatible with IoT rising from about 66% in 2016 to 86% in 2030. The JEITA also estimates that, as a result of the ongoing shift in standalone products to IoT products the market for IoT equipment would expand by an annual average of 5.6% through 2030. Moreover, demand for electronic components appears likely to expand at a pace exceeding that of IoT equipment, thanks in part to the synergistic effects stemming from an expansion in product demand and an increase in the number of components used in each product.

IoT market valued at about ¥400 trillion in 2030

In the IoT era, not only is there likely to be an expansion in demand for IoT devices, but there could also be an increase in solutions services using these devices. One example of this can be seen in the aging of Japanese society, with IoT being used in services providing nursing care, including monitoring and emergency communication services for the nation's elderly. The IoT era is also likely to bring services that have never existed before, including the unmanned delivery services currently being tested in the distribution and logistics sector. As a result of the creation of new services, we estimate the global IoT market expanding from about ¥194 trillion in 2016 to about ¥404 trillion in 2030.

1 A Business Strategy for the IoT Era

TAIYO YUDEN has to date been focused on product development in the information and communications sector, including smartphones that can make the best use of our mainstay and highly advanced multilayer ceramic capacitor (MLCC) products. Recent technological advancements have allowed improved voltage resistance and enhanced capacity, meaning that MLCC products can be used in a broader range of fields. Coupled with an increase in demand brought about by the arrival of the IoT era, this offers the promise of new growth.

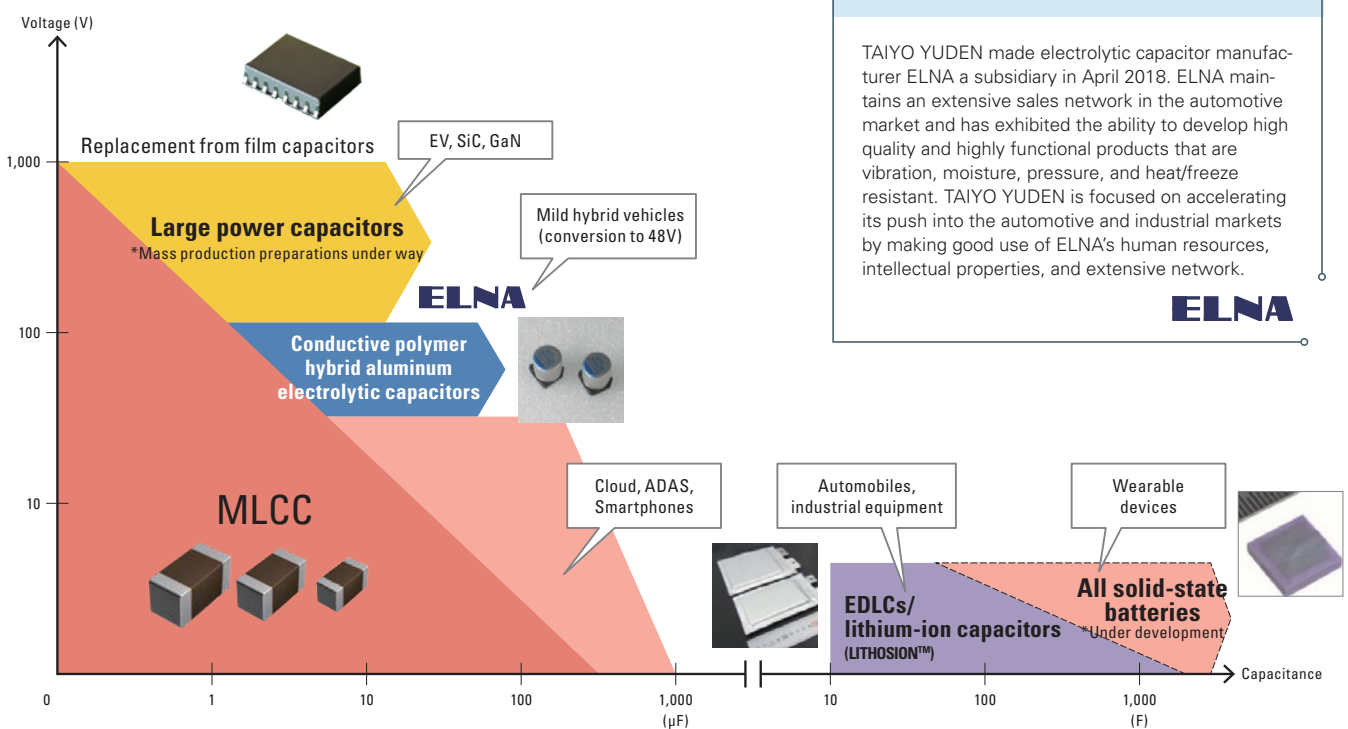
Expanding our business portfolio

With our strength in MLCC, TAIYO YUDEN has been a consistent leader in advancing technology aimed at thinning and downsizing electronic components, which has earned for the Company a solid position in the market for information and communication devices such as tablets and smartphones. With the goal of diversifying revenue and keeping up with an expanding market, we have also focused on leveraging our strengths in advanced MLCCs to develop markets other than the information and communication devices markets. We aim to expand into a number of different markets, including those where the shift to IoT continues to advance and where MLCC utilization is not yet mainstream. We believe these include the automobile and industrial equipment markets, which could benefit from our large capacity MLCC and large power capacitor proposals.

Promoting the stabilization of earnings by broadening our business portfolio

By expanding business in the automotive and industrial equipment markets, we aim not only to expand, but also stabilize revenue. The automotive and industrial equipment markets are less impacted by seasonal equipment demand cycles and an expansion in sales in each of these markets could serve to further stabilize capacity utilization at the Company. Moreover, fluctuations in demand in these markets are smaller than in the information and communications equipment markets, which could ensure for the Company a certain level of earnings even in years characterized by a deterioration in the external environment.

Capacitor Business Trends



2 Growth Strategies and Products in Key Areas of Focus

TAIYO YUDEN is advancing its growth strategies in the following key areas amid expectations for a sharp increase in demand for electronic components as the IoT era brings with it a surge in demand for electronic devices.

Source for forecasts: Production Forecasts for the Global Electronics and Information Industries from the Japan Electronics and Information Technology Industries Association (JEITA)



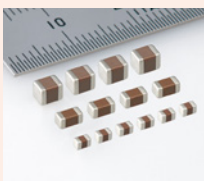
Automotive market

Product requirements

The ongoing electrification of vehicles brought on by increased use of xEVs* and electronic control equipment, with advanced driver assistance systems (ADAS) being the clearest example, has contributed to an increase in the number of automotive onboard electronic circuits. Particularly, the increase in electric control units (ECUs) housed in the engine room means that electronic components used in these devices need to be resistant to higher temperatures. They also need to be highly vibration and shock resistant.

*xEV refers collectively to electric vehicles (EV), hybrid electric vehicles (HEV), and plug-in hybrid electric vehicles (PHEV).

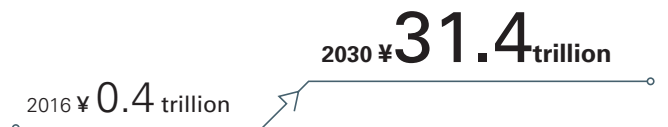
Leading TAIYO YUDEN automotive components



High reliability products (MLCC/Inductors)

TAIYO YUDEN's automotive components qualify for AEC-Q200 (Automobile Electronics Council testing standard for reliability in passive onboard components).

Outlook (Autonomous driving vehicles)



Growth strategies

TAIYO YUDEN is working to increase the sales ratio for automotive products from 9% at present to 15%. By refining the structural designs and material technologies we have developed, we are now commercializing high temperature and vibration resistant MLCC and inductor products. We are also promoting visualization of the production process to further improve product quality assurance, and as part of this effort assign unique data matrix codes to some products, which allows a process trace for a single unit.

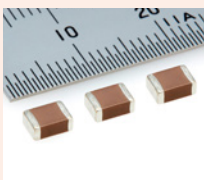


Industrial equipment market

Product requirements

Demand for ICT infrastructure, including servers and base station communications equipment, is rapidly increasing. A substantial number of MLCC and electrolytic capacitors are needed in order for power circuits within this equipment to work in a stable manner. Given the emphasis on reliability in the industrial equipment market, we believe there is a growing potential for small, high-quality MLCCs with good frequency characteristics.

Leading TAIYO YUDEN industrial equipment components



MLCC/Inductors

High pressure-resistant, high capacity, high current

Outlook (Broadcasting, communications CPS/IoT markets)



Growth strategies

TAIYO YUDEN is a leading manufacturer of high-capacitance MLCCs with a track record of commercializing the world's first MLCC with 1,000µF capacitance. Taking advantage of our strength in this field, we will make proposals that enable customers to use MLCC in place for electrolytic capacitors. In making these proposals, we will offer an expanded lineup of MLCC products that have a smaller mounting area than comparable models of electrolytic capacitors, thus promoting the shift to power circuits using only MLCCs.

Energy market



Product requirements

Demand is expected to expand for capacitors in xEVs and electric-assist bicycles, as well as in renewable energy, including solar power generation. Given the need for long and continuous operations, it is essential that these capacitors exhibit stable operation without error or failure.

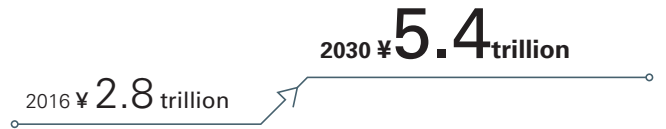
Leading TAIYO YUDEN components used in the energy market



LITHOSION™ (Lithium ion capacitors)

- High safety and reliability even at high temperatures
- Long life and high energy density

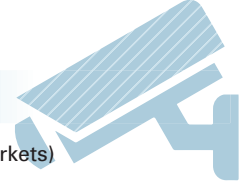
Outlook (Environment, energy)



Growth strategies

TAIYO YUDEN targets market development through proposing solutions that combine the elemental technologies and software that we have developed over the years, including in energy recovery systems for electric-assist bicycles and solar power monitoring systems. We are engaged in application development for the LITHOSION™ lithium ion capacitor and the commercialization of highly safe all-solid state lithium ion secondary batteries.

Security market



Product requirements

There is an increased focus on safety in society, with security being tightened through the installation of monitoring and security cameras throughout urban and residential areas. These security cameras require a stable communications environment, free from any concern over signal interception or a breakdown in communications.

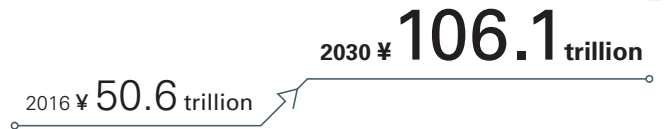
Leading TAIYO YUDEN components in the security market



Optical wireless communication equipment

- Easy to install, even in places where wired communications equipment might be problematic
- No radio wave interference, no effect from electromagnetic noise

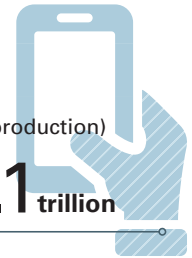
Outlook (Home, individual CPS/IoT markets)



Growth strategies

TAIYO YUDEN's optical wireless communication provides point-to-point wireless communication with stable (100Mbps) speed. Since radio waves are not employed, interference or noise is not an issue, allowing wireless communications in areas where it is difficult to establish radio wave communications. This technology is best suitable for wireless communications for security cameras.

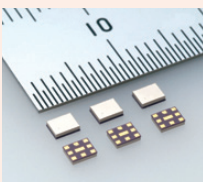
Smartphone and wearable device markets



Product requirements

Smartphones and wearable devices are becoming thinner and multifunctional, and as the trend toward larger batteries contributes to an ongoing reduction in the mounting area for components, there is a pressing need for smaller components offering higher performance that will allow higher component density.

Leading TAIYO YUDEN components for smartphones and wearable devices



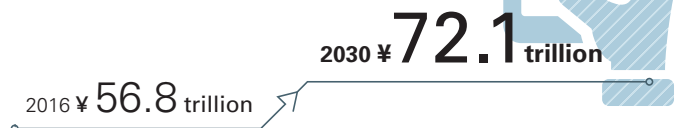
MLCC/Inductors

- Small and thin, with high capacitance and current

Communication devices

- Optimum proposals combining three filter technologies (SAW, FBAR, multilayer ceramic)

Outlook (Global communication equipment production)



Growth strategies

With the goal of meeting demand for improved density, we are improving our material technologies to advance development of ever smaller and thinner products, the effort of which led to the development of the world's thinnest MLCC at 0.09mm. In preparation for the 5G era, we are developing hybrid filters combining three filter technologies (SAW filters, FBAR filters, and multilayer ceramic filters).