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Market Reviews

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Four French musketeers are embossing the off-grid market: EDF, Engie, Schneider, Total

In Alexandre Dumas' novel, first three, later four musketeers fight for justice in the world. They are not revolutionaries, they are rather part of the system, but as individualists they are willing to stand up against traditional views.

Similarly, today the large energy companies of France ride through the energy worlds of Africa and Asia as four energy musketeers:

- The second largest power generator in the world: Électricité de France (EDF)
  69.6 billion Euro turnover / 3.4 billion Euro profit before taxes
- The world's largest liquefied natural gas (LNG) company: Engie
  65.0 billion / 1.1 billion
- One of the world's leading electrical engineering groups: Schneider Electric
  24.7 billion / 2.8 billion
- The fourth largest petroleum company in the world: Total
  132.2 billion / 8.3 billion

The four energy giants are an important part of the old, central and fossil energy supply but they also recognise that decentralised, regenerative energy technologies are a technology of the future and not only in developing and emerging countries. And unlike many energy companies in the USA, Great Britain or Germany, they got involved in the off-grid sector of developing countries at an early stage and not only through their charitable foundations, as they also see there a business area for the future.

Although the strategies of the four are very different, they all have a decisive influence on the off-grid sector today. Reason enough to present a portrait of the four off-grid giants.

The following information does not claim to be exhaustive, but it does claim to trace the most important activities of the four companies.

1. Électricité de France (EDF)

The first of the musketeers in the off-grid market was clearly EDF: back in 1999, with the support of ADEME (French Agency for Environment and Energy Management), EDF developed the concept of decentralised service companies (SSD): a SSD is a company under local law, run by local managers, which sells a wide range of energy services. The strength of the SSDs lies clearly in their integration into the local socio-economic fabric: they install, operate, maintain and renew the power generation infrastructure.

Mali - 1999
The first SSD service company was founded in Mali in 1999: Korayé Kurumba. In 2001, a second SSD followed in Mali, which generates its electricity almost exclusively from solar energy and operates in the cotton-growing region of Koutiala, in southern Mali. Access to electricity was already provided by PV kits, but also by low and medium voltage micro grids operated by small power plants. In line with the strategy of transferring the SSD to local partners, EDF sold its 50% stake at the end of 2008.

South Africa - 2002
Together with Total, EDF founded Kukhanya Energy Services (KES) in South Africa in 2002. EDF also holds 50% of this SSD company (Total S.A. = 35%). It electrifies households in rural regions with solar home systems (SHS). From today's perspective, the business model is as innovative as it is ambitious: KES sees itself as a fully-fledged supply company with a maintenance contract for SHS for 20 (!) years.

Morocco - 2002
EDF and Total join forces again in 2002: Total Energy (Maroc) becomes the joint venture Temasol. The new company offers photovoltaic systems (albeit with maintenance contracts for only 10 years). EDF withdrew from Temasol between 2008 and 2011.

This is followed by an eight-year break, the reason for which is unknown to the public.

Botswana - 2010
In 2010, and following a call for tender, EDF will be selected by the Botswana Power Corporation to implement a decentralised rural electrification programme for a joint venture: among other things, individual solar solutions will be distributed via a franchise network.

Senegal - 2011
EDF has a 70% stake in Energie Rurale Africaine (ERA) - a majority stake that had previously been rather untypical for EDF. The company was founded in 2011 together with the Senegalese partner Matforce and continues the concept of a SSD designed back in 1999. The special thing about it: ERA is the concessionaire for 25 years for the rural electrification in two Senegalese regions, which together comprise 25% of Senegal.

In the following years, the off-grid market developed rapidly: new manufacturers, new financing models, new technologies. Apparently also a time of (re-)orientation for EDF. This is accompanied by a change in the office of the "Directeur Afrique et accès à l'énergie" (March 2016). From 2016, EDF will be active again with an obviously changed strategy - very active:

Ivory Coast - 2016
In 2016, EDF formed an alliance with one of at the time the most promising companies in the young off-grid industry: Off-Grid Electric, active in Africa under the brand Zola. Zola EDF Côte d'Ivoire (ZECI) was founded with equal shares. ZECI's product strategy followed what was already the standard in the off-grid market in 2016: standardized solar kits distributed via a pay-as-you-go financing model.

With the help of EDF, ZECI also received financial support in 2018, the first of its kind: a loan (USD 28 million) from Société Générale de Banque Côte d'Ivoire (SGBCI) and Crédit Agricole Corporate and Investment Bank (Crédit Agricole CIB) enables ZECI to grant loans in local currency. This was made possible because the African Development Bank (AfDB) provides a partial loan guarantee. An important step forward, also in competition with other off-grid companies!

For EDF, this first joint venture should actually have been the start of a large-scale and rapidly growing partnership with Off-Grid Electric in Africa. In fact, however, this did not happen for the time being. One can only speculate about the reasons for the sluggish expansion of the cooperation between Off-Grid Electric and EDF: but these are probably related to the economic difficulties into which Off-Grid-Electic repeatedly finds itself and which jeopardize the growth and stability of the EDF partner. Perhaps this is one of the reasons why EDF is deviating decisively from its previous strategy for the first time and joining the partner itself as a shareholder:

Off-Grid Electric - 2018

In January 2018, EDF became a shareholder in Off-Grid Electric. Another musketeer, Total S.A., was also involved in this capital increase of USD 55 million. But more about that later.

Ghana - 2018

Immediately after EDF's entry into Off-Grid Electric, both companies finally founded their second joint venture with the Ghanaian CH Group (20%): Zola EDF Ghana (ZEGHA). ZEGHA's business model is the same as ZECI's: distribution of solar kits and energy-efficient equipment such as radios, televisions and fans via Pay-as-you-go financing over 2.5 to 3 years. The monthly rates of 20-27 Euro (!) are supposed to correspond to the current electricity consumption of Ghanaian households for similar purposes.

Togo - 2018

In order not to be tied to just one partner in its own expansion, EDF now also turned to new partners. This was initially the British manufacturer Bboxx, in whose one-year-old company in Togo EDF holds a 50% stake. The joint venture continues to bear the name Bboxx Togo, without any external reference to EDF.

At the same time, the new partners confirmed in a press release exactly what EDF had previously planned with Off-Grid Electric: "Binding Bboxx to EDF is the first step towards a broader partnership, with plans to expand the joint venture to other countries in Africa".

From a product portfolio perspective, Bboxx should not pose any difficulties for EDF: essentially, Bboxx trades in very similar products to Off-Grid Electric and also sells them via its own pay-as-you-go platform. However, the monthly price for customers in Togo is significantly lower than in Ghana: households only have to pay 8-12 USD per month.

One difference between Off-Grid Electric and Bboxx is worth mentioning: Bboxx sees itself not only as a distribution company, but also as a new-style energy supplier: "next generation utility platform".

The explicit mention of a technical cooperation that goes beyond the cooperation in Togo is also interesting: EDF's research and development department is to help improve the performance of the partner's battery storage solution.

NEoT Offgrid Africa - 2017

But new partnerships for new joint ventures in Africa are no longer enough for EDF. In 2017, EDF, NEoT Capital and Meridiam founded the NEoT Offgrid Africa investment platform to broaden its presence in the increasingly diversified off-grid market. In 2018, the Mitsubishi Corporation joins the group. It is planned to invest hundreds of millions of euros in African energy projects.

In 2018 NEOT invests as majority shareholder in Sabon Gari Energy Ltd.: a project of Lagos-based Rensource Energy. Sabon Gari offers clean electricity to consumers, small businesses and industrial customers through its subscription-based Power-as-a-Service (PaaS) model with solar hybrid systems installed on the user's land - for EDF a very attractive addition to the pay-as-you-go sales concept pursued with Bboxx and Off-Grid Electric.

SunCulture - 2018

EDF is also making another investment in 2018, underscoring its strategy in the off-grid sector, which is clearly broad-based compared to its beginnings: for the first time, the company is participating in a manufacturer without its own distribution network in Africa: SunCulture (20-30%). Founded in 2013, the manufacturer of a solar water pump for small farmers has so far been primarily active in East

Africa. EDF wants to support SunCulture in its expansion throughout Africa - and in the longer term even take over the majority of the company. The way there has already been paved by the issue of convertible bonds.

EDF's new strategic orientation since 2016 and its significantly increased involvement in the off-grid sector is remarkable, as it is a clear commitment to the possibilities of decentralised solar power supply. Looking back at recent years, it is also clear that EDF wants to expand its position amongst the other energy musketeers. It will be exciting to see what new investments, takeovers and joint ventures EDF will announce in 2019.

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2. ENGIE

GDF Suez (from 2015: ENGIE) was created in 2008 by the merger of Gaz de France (GDF), a gas supplier in which the state holds a majority stake, and the Suez conglomerate. The new company soon changed its corporate strategy: it withdrew completely from oil and gas production, stopped investing in coal-fired power plants in 2015 and is gradually divesting its shareholdings in these plants.

Instead, ENGIE is now concentrating on renewable energies and associated services - and confirmed this very early with the decision to invest USD 25 billion in renewable energies, energy services and decentralised energy technology. Today ENGIE is growing strongly in all new business areas. With an electricity generation capacity of 115.3 GW, ENGIE is currently probably the largest independent electricity producer in the world.

To date, the central strategic instrument in the Energy Access area is the company's own investment fund "ENGIE Rassembleurs d'Energies", founded in 2011 and initially endowed with 10 million euros. The fund invests in economically viable projects by committed entrepreneurs in order to reduce the spread of fossil energy technologies and promote renewable ones.

“ENGIE Rassembleurs d'Energies" took a significant step forward again in 2016: under the new CEO Isabelle Kocher, the capital of the company's own investment fund was quintupled from EUR 10 million to EUR 50 million.

The investment strategy clearly follows ENGIE's strategic focus in the decentralised solar sector:

- Solar home systems for off-grid regions (manufacturers and distributors)
- Microgrid solutions (installation and operation)
- Provider of energy services, in particular solutions for monitoring, energy management and PAYG solutions

It is interesting to note that since 2017 ENGIE has increasingly not only been looking for minority shareholdings but has also taken over the lead management of companies as majority shareholders: Fenix (100%), Simpa Networks (90%) and Electric Power Systems (50+%) are probably only the beginning.

ENGIE's clear target for the entire group is to implement the energy transition from the old central, fossil energy technology to a decentralized, renewable energy supply - worldwide. The economic dissociation from the fossil energy roots and the associated corporate restructuring are impressive in their rigor and certainly unique in the industry. Imagine if Total were to withdraw completely from the oil business and concentrate only on decentralised, renewable energy!

ENGIE is therefore probably the one of the four French "energy musketeers" who is implementing the change to a modern energy supply most energetically and with all its consequences.

Here are the most important investments of ENGIE in the off-grid sector since 2012 in chronological order (The annual figures of the investment are given quite differently even within the documents of ENGIE. Therefore, there may be small deviations):

2012: EGG-Energy, Tanzania
The minority stake (250k Euro) enabled EGG-Energy to establish a sales organisation for solar home systems (SHS) with PAYG financing for end customers. (From 2016 this investment will no longer be mentioned in the documents of the ENGIE Fund. It is not clear whether and when an exit might have taken place.)

2013: Rural Spark, India
The decentralized products developed by Rural Spark are positioned between Solar Home System and Micro-Grid.

2014 / 2017: Fenix, US
The company designs, manufactures, markets, finances and supports PAYG solar home systems in Uganda. In 2017 Fenix becomes a 100% subsidiary of ENGIE and moves its headquarters to Uganda.

2014: Green Village Venture, India
Founded in 2008, the company sells decentralised solar systems and energy services in India.

2014 / 2016 / 2018, Simpa Networks, India
... and another PAYG company that sells solar home systems in India. In 2018, Simpa will also be the second company in the off-grid sector in which ENGIE will acquire the majority of the shares (90%) in a second step.

2015: Ilumexico, Mexico
Produces and distributes solar home systems in off-grid regions of Mexico since 2010.

2015: Mera Gao Power, Indien

Founded in 2013, the company builds, owns and operates solar micro grids in off-grid regions of northern India.

2015 / 2016 / 2017: PEG, Ghana
Founded one year before ENGIE's first investment, the company distributes solar home systems through PAYG financing in Ghana and Côte d'Ivoire. ENGIE seems to have a particularly close partnership with PEG: it has already been involved in three investment rounds.

2015: Ausar Energy, France
This is a joint venture founded in 2015 by ENGIE Rassembleurs d'Energies, Cofely Ineo and Adetel. The company designs and manufactures two technical solutions for the market in Morocco, Senegal, Côte d'Ivoire and Cameroon: one for off-grid sites and one to ensure energy autonomy for on-grid customers.

2016: Bboxx, UK
The British manufacturer of solar home systems with integrated PAYG technology was mainly active in East Africa at the time of ENGIE's investment. In the meantime, Bboxx has spread to other African countries thanks to the financial support of various investors (including EDF).

2016: CDS, Mauretanien
Founded already in 1980, CDS supplies solar home systems, but specializes primarily in the installation and operation of renewable microgrids in remote regions of Mauritania.

2017: Kingo Energy, Guatemala
Kingo sells solar home systems through PAYG credit solutions for rural households in Guatemala.

2018: Electro Power Systems (EPS), Frankreich
Electro Power Systems (EPS) is a developer of storage solutions for distributed power solutions. In addition to Europe, EPS is primarily active in Africa and Asia. ENGIE describes its entry into EPS as a clear sign of ENGIE's goal to become a global leader in the decentralised energy sector.

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3. Schneider Electric

In its efforts to offer off-grid regions access to clean, renewable energy, the electrical engineering group Schneider Electric is pursuing a dual strategy - and thus differs substantially from the two "energy musketeers" EDF and ENGIE presented so far: also Schneider is investing in companies in the energy access sector, but is also involved in the development, production and distribution of off-grid products for households, municipalities and companies. The background for the second pillar naturally lies in the company's own profile: control and automation technology, energy distribution in low and medium voltage technology and installation technology are at the core of Schneider's product portfolio. It makes sense to also use this competence in the off-grid area.

A. Products for off-grid regions

Schneider is extremely seriously involved in product development - and differs positively from many other manufacturers in this respect. For example, the German company SMA Solar, one of the world's leading specialists for photovoltaic system technology, still sees off-grid technology merely as a nice by-product - and is missing out on this market.

Schneider, on the other hand, began developing its own product portfolio for off-grid regions in 2010 as part of its corporate strategy. Existing subsidiaries were also integrated into this strategy:

Take Conlog in South Africa, for example, one of the world's leading companies for prepaid power supply solutions. Conlog's prepayment meters in South Africa are connected to the national grid; they work with a reloading system similar to the prepaid mobile phone system. The customer buys a prepaid card with his energy credits from a retailer. After entering the code indicated in the meter, the electricity is ready for operation. In line with the wishes of its main shareholder Schneider Electric, the company undertook to extend its technical solutions to low-income population groups and later to deploy them in Sudan, Rwanda, Kenya, Nigeria and Swaziland.

Schneider Electric now offers a wide range of product solutions:

Homes and Micro-businesses

- Mobiya solar lanterns
- Homaya SHS (Solar Home System)
- Homaya SHyS (Solar Hybrid System)
- Homaya USB charging station

Essential public services: education, healthcare...

- Villaya microgrids
- Villaya solar streetlights
- Homaya SHyS (Solar Hybrid System)
- Homaya USB charging stations
- Mobiya solar lanterns

Micro-entreprises, agriculture, villages and communities

- Villaya microgrids
- Villaya solar water pumping system
- Villaya solar streetlights
- Mobiya solar lanterns

Emergency relief

- Villaya Emergency microgrids

B. Investments

Schneider has divided its financial involvement in companies in the off-grid sector into two different investment funds:

1. Schneider Electric Energy Access Fund (SEEA)

Founded in 2009, the fund invests equity primarily in small and young companies with innovative ideas for supplying energy to off-grid regions. The fund, which is endowed with 4.2 million euros, allows investments between 100k and 400k euros with an expected return of 5-10%.

Since its foundation, SEEA has been involved in these companies in the off-grid sector:

2010

- Simpa Networks, India: Pay-as-you-go solar systems for households and small businesses.

2011

- Kayer, Senegal: Solar irrigation and products for rural population.
- NICE International, Gambia: NICE International builds a network of franchises providing access to energy services in Gambia and soon in Eastern Africa.

2013

- Fenix, US: Pay-as-you-go solar energy solution for households and small businesses distributed through mobile operators. At this time mainly active in Uganda.
  Exit: Shares of SEEA in this company were sold to ENGIE in 2017.
- One Degree Solar, Kenya: Plug-and-play solar systems for households and small businesses.
- Lumos Global, Netherlands: Pay-as-you-go solar home systems for households and small businesses. At this time mainly active in Nigeria and Cote d'Ivoire.
  Exit: Shares of SEEA in this company were sold to its majority shareholder during 2015.

2014

- SunFunder, US: financing company that specializes in companies seeking to increase energy access in emerging countries.
  SEEA is involved here in an unusual way, as the fund explicitly points out: This was an investment of EUR1,900,000 as part of the SEEA international portfolio, or about 80% of the allocation. SEEA is not planning any further investment in this portfolio.

2017

- Amped Innovation, US: Design of affordable and scalable products addressing energy needs.

2018

- Okra Solar, Australia: Okra offers the Okra Pod - a system controller that creates modular microgrids by networking and balancing rooftop solar PV and battery energy storage with electricity loads. The Okra Pod serves households, businesses and community facilities.

2. Energy Access Ventures Fund (EAV)

In 2015, Schneider added another fund to SEEA, which the company no longer set up alone, but with potent partners: CDC Group, DFID, European Investment Bank, FISEA - PROPARCO, OFID and AFD-FFEM.

With EUR 54.5 million, the fund, which has a much stronger capital base than SEEA, is intended to serve smaller companies in the off-grid sector in Africa. In addition to solar companies, it also includes companies in the hydropower, biomass, wind power and geothermal energy sectors.

The fund's previous investments in companies relevant to the off-grid sector are as follows:

2015

- Off-Grid-Electric (Zola), US: Designs, manufactures, deploys, finances and serves solar home systems on a fee-for-service business model in Tanzania and Rwanda.

2016

- PEGAfrica, Ghana: Finance and distribution company specialising in solar home systems on a lease to own model.
- d.light, US: Manufacturer of solar lighting and home systems. Worldwide active.

2017 (+ 2018)

- Inspirafarms UK: Designs, manufactures, supplies and finances solar powered cold storage solutions and food processing technology to growing agribusinesses throughout East Africa and Central America. EAV also joined another investment round in 2018.

- Sunculture, Kenya: Designs, manufactures, finances and distributes solar-powered irrigation systems and provides agronomy support services.
- PayGo Energy, Kenya: Technology and distribution service company that uses pay-as-you-go-technology to unlock clean energy.

2018

- Solarise Africa, Kenya: Pan African energy leasing company for solar and other energy assets focusing on Commercial and Industrial (C&I) clients.
- Zonful Energy, Zimbabwe: Founded by William Ponela, Zonful Energy (Zonful) promotes energy access in Zimbabwe by distributing PAYG-Solar-Home-Systems.
- Port It Global, US: FinTech platform providing Point of Sale Installment Services through a mobile application for smartphones and a USSD solution for smartphones.

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4. TOTAL

Total, as the fourth French "energy musketeer", is shifting the focus of its activities from a pure investment activity (EDF / ENGIE) via a balance between investment and product manufacturing (Schneider) to an almost exclusive focus on the manufacture and distribution of off-grid products. Total also occasionally invests in off-grid companies, but this is clearly of secondary importance and is only intended as a complement.

Total's solar commitment dates back to 1983: with the joint venture Tenesol (today France's leading solar module manufacturer) and Photovoltech, the company gained early experience in the then still in its infancy (grid-connected) photovoltaic sector.

Total continues to expand in this sector: in 2011, for example, it acquired a majority stake in the US company SunPower. SunPower supplies complete solar solutions for households, companies and utilities - right up to megawatt systems.

In the off-grid solar market, Total benefits from its traditionally strong presence in Africa: the company is the largest oil producer on this continent and has nearly 4,300 service stations in 36 African countries.

Its distribution in Asia is much smaller by comparison: only the Philippines stands out with 430 service stations (compared with 120 in Cambodia, 245 in China and 18 in Indonesia).

Distribution of solar products via the company's own filling station network

Total's off-grid commitment begins in 2010 with the launch of the "Total Access to Energy" programme. The basic idea is to sell plug-and-play solar products through the global distribution network of Total filling stations.

The idea may sound plausible at first glance, but it does conceal some serious challenges: This is because filling stations normally only sell products that are intended for immediate consumption. They are not prepared for customers who reappear after some time and complain about a non-functioning solar lamp. This simply doesn't happen when selling petrol, soft drinks or food.

In order to solve this challenge, Total focused extremely on two topics from the very beginning - until today:

Sourcing: Over the years, Total has steadily improved its ability to source products and suppliers that meet quality requirements.

Quality: Suppliers must undergo a qualification process in order to be accepted. This qualification process includes regular audits. Only high product quality reduces both the risk of frequent customer complaints and possible damage to the Total brand.

The Total Access to Energy program launched in 2010 was designed to test and develop profitable business models on a large scale. In 2011, sales of solar lamps initially began in four pilot regions: Kenya, Cameroon, Indonesia and Congo. As early as 2012, Total introduced the "Awango by Total" name, which is still in use today, to market the solar products sold by Total from various suppliers under a common umbrella brand.

At the same time, marketing efforts were intensified. In order to raise awareness of solar energy in general and the sale of its own products in particular and at the same time promote the "Awango by Total" brand, numerous instruments were developed, such as training tools and manuals, digital product catalogues, customer databases, advertising material, press kits and communication campaigns.

The number of countries where Awango brand products are available grew rapidly: by the end of 2013 to six, by 2014 already 23 countries, and by 2017 Awango by Total was marketed in over 40 countries. Total's self-set goal: to have 25 million Awango customers in Africa alone by 2020.

The product range, which initially consisted of mobile solar lamps, also developed rapidly: today, Total sells more than 40 different off-grid products, ranging from mobile lamps for supplying electricity to an entire household to minigrids for communities of 200 to 500 households and small businesses.

The now more than 4,000 Total filling stations that sell solar products worldwide in 2017 still account for 60% of sales. The remaining 40 percent is generated through business and distribution partners. Thus, Total can reach regions not covered by the filling station network as well as sell products that cannot be sold at a filling station.

Own product line Sunshine

For a long time, Total has relied on products from other manufacturers - until in 2018 it was decided to launch its own product line on the market.

In 2018 the "Sunshine" product brand was launched. Total is now developing its own product line, which is only available from them.

Sunshine initially starts with a solar lamp and a solar kit. Larger solar systems and applications (fans, refrigerators) are to follow.

Investments

Total Energy Ventures is Total's general venture capital fund for investments in start-ups to promote innovation. Total still does not have a special energy access fund such as EDF, ENGIE and Schneider. Founded in 2008, the "Energy Ventures Fund" has a strategic mission: to identify, promote and exploit innovation.

The aim is to monitor potential business areas that could become growth drivers for the Group in the long term in good time. Therefore, the most important selection criterion for the fund's commitment is the potential learning value for the Group. A clearly different approach than the Energy Access Funds of the other energy musketeers!

In the off-grid sector, only three US companies have so far been assessed as increasing the learning value for Total and thus justifying an investment:

- Sunverge Energy, US (2014): Solar Solutions for Decentralized Generation and Storage
- Off-Grid Electric, US (2016): PAYG solar home systems
- PowerHive, US (2016): Modular Mini-grid Systems

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A brief overview of the activities of the four French "energy musketeers"

	EDF	ENGIE	Schneider	Total
Information on the group				
Group sales 2017 (billion euros)	69,6	65,0	24,7	132,2
Consolidated net profit (Mrd. Euro)	3,4	1,1	2,8	8,3
Off-Grid activities				
Start	1999	2011	2010	2010
Membership in off-grid associations	GOGLA	ARE GOGLA	ARE GOGLA	GOGLA
• Equity Investments:	+++	+++	+++	+
Own off-grid investment fund	yes	yes	yes	no
Number of equity investments	11	13	18	3
Investment in local companies in Africa / Asia	yes	yes	yes	no
• Product manufacturing / sales:	–	–	+++	+++
Own off-grid product line	–	–	since 2010: Mobiya, Homaya, Villaya	since 2018: Sunshine

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