

	Title:	The Solar Nation of Tokelau
	Director:	Ulli Weissbach
	Duration:	43'30
T/C	visual, sound, effects	Text
00:08	Vaka crashing through waves	They were the greatest seafarers of all times...
		The Polynesians conquered the Pacific thousands of years ago... in simple wooden sailing boats like these and settled thousands of islands: Polynesia
00:37		We are on board of a modern replica vaka, as the Polynesians called their boats on route to Tokelau, three lonesome atolls in the middle of the Pacific who have become pioneers in power generation. Tokelau is the first nation on earth that has switched its power generation to 100% solar. We want to see how that has changed their lives.
01:10	TITLE	
01:31	Google Earth Animation	Our first destination is Atafu, the northernmost atoll. Its lagoon is surrounded by small islets, called <i>motus</i> , which offer very limited space to live.
01:48	aerial Atafu	While the surf pounds the reef a turquoise lagoon fills the inside. Only the flat motus offer some space to live.
02:04		The water world of atolls the narrow space between ocean and lagoon, is unique amongst the landscapes of this world.
02:18		We sail through the lagoon with local fishermen. Nowadays aluminium boats have replaced the vakas.
02:30		In the shallow waters of the reef fishermen cast their lines for the small reef fish.
		Fish are the staple diet for atoll dwellers. And they are still aplenty.
02:47	aerial	The fishermen have dispersed themselves widely over the reef. A bird eye's view reveals the reef as the crater rim of a volcano which separates the lagoon from the ocean.
03:02	women at beach	Collective fishing is part of a social system called <i>Inati</i> in which all work and all resources are shared.
03:19		The women prepare the men's catch right on the beach. Coconut flesh is the most important ingredient.
03:33	Earth oven	The fish are wrapped in aluminium foil and cooked in an earth oven. Another old Polynesian tradition. Coconuts are grated and their milk squeezed out.
03:51	interview	"We call that <i>Vainu</i> , the coconut juice." "For you it probably tastes like yoghurt."
04:05	distribution of meals	Rice is added and the shared meal is ready. Aluminium foil is indispensable in modern South Seas cuisine. Before it used to be banana leaves.

04:41	village council	The Taupulega, the council of grey hairs rules everything in the Inati system - some sort of ancient communism - The old men decide, which work needs to be done and how the resources are shared.
05:00	earth works	There is a basic wage for everybody financed by aid from New Zealand. For that every adult has to do communal work, like road works, fishing or nursing.
05:16	meal distribution at night	The women arrange sumptuous food parcels the fish is supplemented with starchy crops like taro or bananas.
05:28		Especially the old and fragile... who can't go out fishing anymore get their share - their "Inati".
05:40	Group dancing	Rehearsals in the community hall... songs and dances of Atafu to be performed at a church festival.
06:02		Electric light in the community hall for the whole evening would have been unthinkable a short while ago.
06:12	aerial village & solar plant	At the far end of the motu is the solar power plant that has supplied power for the whole island since 2013. Here, close to the equator the sun gives away its energy very generously.
06:37	generator, oil drums,	The diesel generators that used to produce power at certain times of day are nowadays only used as a backup.
		Every single drum had to be shipped 500 kilometres by ferry from Samoa. Instead of the rattling of generators now only the rustle of palm leaves is heard.
07:00	girls in golf carts	Solar power gives Tokelauans a whole new mobility with solar charged electric golf carts.
07:18	wooden boat	Our Vaka is visited by a fisherman in a traditional wooden boat. It is a hand-crafted vaka.
07:29	Vaka on land	Atafu is the island of boat builders it always had the right trees from which one could carve a hull. The old Polynesian art of boatbuilding has survived here til today.
07:45		These men are carving parts for a boat a paddle for instance or a water container.
07:56		Models serve as a gift or a toy ancient Polynesian craftsmanship.
08:09	sailing	We sail to the next atoll... In the open ocean we get a feeling for what it meant for the Polynesian seafarers to venture out into the boundless expanse of the Pacific without knowing if there were islands at all. Thousands of years ago, without a compass or GPS.
08:34	Google Earth Animation	From Atafu to the middle atoll of Nukunonu it's about 90 kilometres. From this perspective it becomes clear that atolls actually are underwater volcanoes whose rims are sticking out of the ocean
08:51	sailors on board	Our vaka is called "Rangi" which means "heaven". It was built following traditional Polynesian design, right down to the cut of the sail by the German ocean foundation "Okeanos".
09:09	Solar cells on deck	However, the modern features, these solar panels... drive two electric motors and propellers in case there is no wind.
09:21		The hulls are made of fibre glass instead of wood.
09:29	Cockpit	And the cockpit has everything that is needed nowadays for

	work on deck	navigation. But it's only for emergencies. The crew, young Polynesians from Tahiti, Cook Islands and Samoa are here to learn classic Polynesian navigation following stars and natural phenomena at sea. Rangi is one of seven training boats built by Okeanos for this purpose. The descendants of the early Polynesian navigators are reviving this ancient art and passing it on to others.
10:18		Jamal is from the Cook Islands. He's our First Officer. Can he navigate the vaka without GPS?
10:30	<i>Jamal Pakoti, Cook Islands</i>	<i>"For the short courses we are doing on this trip? Easy!"</i>
10:36		And how does he know that islands are near?
10:44	<i>Jamal Pakoti, Cook Islands</i>	<i>"Whether there is daylight or not, the signs are, for example, the swell, reflecting off an island ... Other signs would be birds that are flying from an island - certain birds. During daylight, in the right conditions, the colour of clouds, reflecting off a lagoon or turquoise water, if any. If the island is high enough, clouds would be stopped by the mountains."</i>
11:18		Arrival in Nukunonu. We have to drop anchor at the outer reef because the mouth of the lagoon is too narrow.
11:34	Google Earth Animation	Nukunonu is the largest Atoll of Tokelau with a 100 square km lagoon.
11:46	aerial	The inhabitable land area however is only 5 square kilometres.
11:55	aerial	Here the solar plant is outside the village in the same place the diesel generators once were.
12:12	solar plant	Here we meet a technician from the New Zealand solar company which installed the facility. With the help of a local technician he checks the functioning of the plant. It doesn't need much maintenance.
12:30	<i>Shane Robinson Powersmart, New Zealand</i>	<i>"Currently it's almost nine o'clock in the morning. The batteries are about 75 percent, which is good for the morning. They would have been 100 percent charged as of yesterday. So they have lost 25 percent over night. We are currently charging the batteries to 83 Kilowatt and their loads are around 31 Kilowatt, which is a fairly standard day for this island."</i>
12:58		Hundreds of inverters, a German product convert the solar energy into household power.
13:06		More than a 1000 lead-acid batteries store the power...
13:18	<i>Shane Robinson Powersmart, New Zealand</i>	<i>"So we have the ability to completely control this computer from overseas. So if there is ever a fault or a problem or they have a question, we can dial into the computer and help diagnose the problem. And eventually change some settings in the system to rectify the problem and keep it going."</i>
13:33		The old generators still serve as a backup in case the solar power fails because of a long period of bad weather or a rat chewing on a cable.
13:45		The old, empty oil drums have found a new use. In general the

		capacity of the batteries can supply enough power even through a fairly long rainy period. With a total output of 1 Megawatt for all 3 islands Tokelau has the largest off-grid power plant in the world.
14:20		Towards evening the backup generator is started - for night-time maintenance of the batteries. They are basically like car batteries reliable, robust and cheap. There are more than 1300 on all three atolls.
14:53		There is a surprise the next morning a hole in one of the solar panels.
14:58		The whole module has to be exchanged. An opportunity for Shane, the technician from NZ to show his apprentice how it's done.
15:11		How could that have happened? The apprentice overcomes his embarrassment.
15:22		<i>“It's just a hole ... There were... a couple of guys playing around with their hammers ... maybe they thought it was a screwdriver.”</i>
15:36		Solar power has drastically improved the living standard of the close to 1500 Tokelauans. Tokelau's energy chief has witnessed it.
15:52	<i>Robin Pene Director of Energy, Tokelau</i>	<i>“It's had a quite significant change of culture, the way people have taken on board the availability of 24/7 power. I remember when I first came here in 1987 there was only about six hours of power a day, if you were fortunate. Since the 11,000 Volt energy has been provided, they sort of have become quite accustomed to the use of energy.”</i>
16:27	household with kids in front of TV	One definite effect: People watch more TV, not only kids. Whilst before the generators were switched off at night, the box is now on round-the-clock.
16:40	Girl computer	But 24-hour power also means the internet is on all the time. This young girl for instance is doing an online language course. Before, she would have had to travel 36 hours by ferry to Samoa. Education over the internet is important for small islands to keep their young people on the island.
17:06		For her mother, Lomelata, solar power has also changed everything.
17:12	<i>Lomelata</i>	<i>“Yeah it has. Because now we have full access to 24-hour power, which we never had before. It's actually quite strong as well.”</i>
17:23		What is the most important for her?
17:25	<i>Lomelata</i>	<i>“Oh yes, washing machine, TV, the kids' TV, the internet. It's good having communication to the outside world.”</i>
17:35	generators	Diesel generator maintenance required a lot of time and personnel and even then, power was only sporadic. Not to mention the consumption of diesel. 2000 oil drums had to be shipped by ferry over 500 km from Samoa every year. Yearly cost – one million New Zealand dollars.
18:00	<i>Shane Robinson Powersmart, New Zealand</i>	<i>“Particularly for ourselves and our company ... this is what we do it for, we love it. It's great to see a community like this reducing their reliance on fossil fuels. And the amount of time it frees up. They used to have someone sitting here and watching the diesel generators all the time. Now they're out fishing.”</i>

18:15		Long gone are the days when the freshly caught fish were rotting in the freezers because of another power cut.
18:26	E-car	The few cars in Nukunonu have also been replaced by electric vehicles. Golf carts have proven to be very practical all-purpose vehicles. This one is on its way to pick up freight from the ferry.
18:41	Ferry	The ferry from Samoa only comes every two weeks. It, too, cannot anchor or dock. And so, everything, passengers and freight, has to be off-loaded into small shuttle boats with engines running. A cumbersome and risky process.
19:01		The ferry only stops at each atoll for a short time and then carries on to the next atoll which means, you may need to wait two weeks to get to the next atoll, only 50km away. That has saved Tokelau from tourism but also increased its isolation. There is hardly any family or trade exchange between the atolls.
19:32		More and more freezers and fridges are brought in thanks to solar power, no household has to go without them.
19:39		A cow from Samoa, cut up and frozen for transport. If you haven't felt queasy on the journey <i>this</i> might just do the trick.
19:53		The tiresome ferry, as the only connection to the outside world, dictates the rhythm of life in Tokelau. And when the ferry fails to come... important things become scarce. Like fishing lines, petrol for the outboards, rice and not least: beer from Samoa.
20:14	Vaka and ferry	A Vaka could be an alternative at least for transport between islands. The islands could help each other out to visit friends and family or challenge the neighbouring island to a rugby match. That is exactly what the OKEANOS foundation is hoping to achieve not only reviving the old Polynesian art of sailing but also offering the islands an adequate and sustainable means of transport.
20:44		More than 200 visitors arrive on that ferry. Tokelauans from their diaspora all over the world... wishing to participate in a church festival. For a few weeks the island population will double, from 500 to 1000.
21:00		Many are old and want to see their home one more time. Everybody gets a fresh coconut drink. Then their accommodation is allocated. No problem in Polynesia, hospitality is deeply rooted in this culture.
21:21	Church	The Catholic Church of Nukunonu is the centre of all celebrations. 150 years ago the first Catholic missionaries arrived here. Since then Nukunonu has been 100% Catholic as opposed to the other islands where the Protestants were quicker.
21:42		Lomelata is hosting guests as well and shows us what she has cooked for them. Fried fish and taro roots - a simple traditional dish and pure delight for the guests.
21:55	Lomelata	<i>"Oh yes. They definitely look forward to island food. Because they hardly have fish in New Zealand and Australia and it's really expensive anyway. Here in Tokelau it's freely available. We just go out and get it."</i>
22:14		In Nukunonu we meet the Ulu the spokesperson for all three islands and something like a Head of State. We ask him to explain the "Inati" - the Tokelau way of sharing.
22:30	Siopili Perez, Head of	<i>"For example, when I go out fishing and I get 40 odd bonitos, I'm</i>

	<i>State, Tokelau</i>	<i>liable to put it on the table for Inati. If somebody goes out in the ocean or lagoon and gets fish so much he is bound to share it. When I grew up here, the elders, my ancestors have been here for a long time, sharing catches. Doesn't have to be the catches, can be the coconuts, fruits, veggies and all that stuff."</i>
23:06	Church inside	From brotherly sharing to Christian charity it's only a short jump. 150 years ago, the first missionaries must have been impressed by their Tokelauan lambs and their Inati. In any case, their mission work succeeded 100%. Hostilities against missionaries are not known
23:35		Their multi-voiced chorals are based on old Polynesian hymns with new lyrics from the missionaries.
24:31		Our Vaka is moored off the reef. The anchor is holding, thanks to a relatively calm sea.
24:40	Video hurricane	In February 2005 the same place looked quite different. This video was shot by a local during hurricane "Percy". Storm waves rolled towards the island and the village. Irresistible, like a tsunami, the flood surged through this passage between 2 motus.
25:04		The worst cyclone in 50 years flooded large parts of Nukunonu destroying the school and 80% of houses. A heavy blow to such a small community especially if you can't run away.
25:24		The Ulu are in no doubt climate changed has arrived in Tokelau.
25:31	<i>Siopili Perez, Head of State, Tokelau</i>	<i>"Especially in the hurricane season coming through. The waves are getting bigger, coming into the island. Make erosions. It's an issue. I hope the bigger countries have more focus on this issue. It's affecting us here in Tokelau."</i>
25:54	Aerials	From Nukunonu it's about 55 km to Fakaofu, the third atoll. Takes us about half a day in best sailing conditions.
26:06	Catching fish	Action at the stern. Senio, our quiet Samoan, suddenly turns hectic. He hooked something a handsome yellow fin tuna. About 10 kg, worth hundreds of dollars on the Tokyo fish market.
26:23		Tauraua from Tahiti filets it and bites into the raw flesh. His Polynesian forebears only survived their long voyages if they were good fishermen. What does it mean for him to be on a vaka?
26:48	<i>Tauraua Deratine, Tahiti</i>	<i>"To be on the Vaka is something ... atavistic. Even if you don't know how, you feel you must do it. And it's also like a kind of stage you go through to become another man in the adult world."</i>
27:21	Google Earth Animation	Fakaofu is the southernmost atoll of Tokelau. 62 motus surround the 50 sqkm lagoon, that has many sand banks.
27:33	aerials	About 500 people live on Fakaofu most of them huddled densely on a small speck of land. Fakaofu has the biggest population density in Tokelau. Hospital, school and solar power plant have been relocated to another motu high on the horizon.
28:00	Aerial school boat	Every morning at 7:30 the school boat departs for the neighbouring motu. On board a gang of noisy kids.

28:13		Where in the world could you imagine a better school trip than here in Fakaofu?
29:13		9 o'clock the bell calls for prayers.
29:30		No peeking...
29:43	class	Class starts, casually at first, with homework correction. With a camera around making faces is unavoidable.
29:55	classroom	Then it gets serious, with English class, the most important subject. Bilingual education is the top goal of the curriculum. Most Tokelauans go overseas at some stage in their lives... mainly to New Zealand or Australia. But they shouldn't forget their mother tongue.
30:28	Aerials	For only 500 people, Fakaofu has quite a big school. Because it also offers further education all the way up to courses from the regional University of the South Pacific.
30:46	<i>Ake Peleni, School Principal</i>	<i>"We teach all the subjects. Science, Maths, Social Science, Tokelau, English, Home Economics, Industrial Arts, Technology."</i>
31:00		When the kids return to the village the village police marches along Today the Council of Elders, the Taupulega, is meeting. The flag must be raised.
31:24	policemen	Tokelau has its own flag with a sail and the Southern Cross - a reference to their Polynesian heritage. It's not an independent country, though but a protectorate of New Zealand. But law and order are enforced as well. Village police officer Tavita takes us on patrol and explains the most important rules.
32:05	<i>Tavita Pue, Fakaofu police</i>	<i>"We enforce both laws: bylaws, which are made by the Taupulega, which is the council of the village elders. And the government laws, which is passed by the general fonu (parliament). There is a 6 o'clock curfew in the afternoon and it's for everybody to get home and ready for prayer time. And another one at 7 o'clock and it means: no noise. Nobody is allowed to roam the village or make any noise. And that starts when the church bell rings. When everybody's supposed to be in the house, saying prayer. And after that, we ring another bell and that means everybody is allowed to roam the village and make noise. Until 11 o'clock, sorry 9 o'clock, that's the curfew for all the kids, the school kids. They have to go to bed. 11 o'clock there's a curfew for the whole village, you can still roam around, but no noise."</i>
33:07	Old men with e-cars	The old men of Tokelau have everything under control. They make the rules and enforce them with due strictness. The enviable, low crime rate of Tokelau proves them right. The last murder was recorded more than 100 years ago. Theft or burglary makes no sense anyway.
33:32	<i>Tavita Pue, Fakaofu police</i>	<i>"You can't really run away on an island. Offences on these islands is mostly underage drinking. The age limit for drinking here is 20. Usually kids start drinking when they are 16. The other problem we face is the young adults coming from outside, from New Zealand and Australia. There the drinking age is 18, but once they get here, the drinking age is 20. And that's one of the problems we face."</i>
34:10	shop	The beer in the village shop is rationed. Wine and spirits are not sold at all. Every island has a cooperative shop offering tinned food and

		other household goods.
34:26		The currency is the NZ dollar. If someone can't manage with the basic salary that every adult Tokelauan receives he's granted credit at the shop.
34:37	<i>Sales woman shop</i>	<i>"Sometimes ... it's trust."</i>
34:46	Fishing boats	Sun rise. The men of the island go out to sea for game fishing. In contrast to the sheltered inner lagoon... it can get quite uncomfortable off the reef.
35:03		A baiting secret a la Tokelau: Cut a fish in pieces wrap a leaf around it and weight it with a coral stone. After all, it's about game fishing, not small fry.
35:22		And it works. A substantial barracuda is on the line. Late morning the boats return to the island. Everybody proudly shows their catch. At the boat ramp, all fish are collected, weighed and measured. Everything is recorded meticulously because the catch has to be fairly divided.
36:03		One boat after another lands its catch, even sharks. Yet, the village mayor is not satisfied.
36:15	<i>Tinielu Tumuli, Mayor of Fakaofu</i>	<i>"We're not complaining. But it is not a good catch."</i>
36:20		Is it enough for everybody?
36:26	<i>Tinielu Tumuli, Mayor of Fakaofu</i>	<i>"It's enough for everybody. We would have loved to have more to distribute.. That is the Inati-System. We will distribute it according to the size of the family, the number of people in the family. So if you have a higher number, you get a bigger portion"</i>
36:45		But why was it not a good catch?
36:51	<i>Tinielu Tumuli, Mayor of Fakaofu</i>	<i>We're not catching as much as we used to have before. There are illegal fishing activities within our EEZ. But that is something beyond our control."</i>
37:12		<i>"But with the work we're doing with our neighbouring islands in the Pacific region we're trying to stop those illegal fishing activities. Especially within our 12 mile zone we're trying to stop those activities. Leave the stock that comes into the territorial sea, leave it for us. For our food security."</i>
37:42		Sunday afternoon in Fakaofu. The girls of the village play Kilekiti... a Tokelauan version of cricket. Lots of fun - but sweaty.
38:31	Aerials	Fakaofu is the island in Tokelau that is most affected by climate change and the resulting storm floods. That's why seawalls had to be built round the village.
38:44		IClimate scientists are still disputing whether the sea level really is rising. But it is clear that the frequency of storm floods is increasing. This is a threat to the very existence of flat atolls says one of the administrators of the island,
39:01	<i>Afega Gaualofa, Administrator</i>	<i>"Definitely. We are so glad that we have built the seawalls. If we</i>

		<i>wouldn't have the seawalls, I think most of the land would have been eroded. And most, part of our island wouldn't be here today. If we wouldn't have the seawalls."</i>
39:28		Last year the people of Fakaofu had a strange experience.
39:35	<i>Hina Kele, Administrator</i>	<i>"There is absolutely no wind. The weather is calm as and there is this sea surge that nobody seems to know where it's coming from. Strong sea surges have always been associated with cyclonic seasons, you know? But weather patterns have changed, changed tremendously. And I think, I truly believe, it has to do with climate change."</i>
40:10		Tokelauans therefore have a message to the world.
40:17	<i>Afega Gauwalofa, Administrator</i>	<i>"My message is: You know, we know what is causing all these problems. And why do not the right thing and try and cut down on all these causes. Because, as you can see, we, the small island groups, are most affected from this climate change."</i>
40:56	aerials	Three small atolls in the middle of the Pacific have set an example. They are making a humble contribution to stopping climate change. The solar project has been driven by the visionary island chief Foua Toloa who emphasises its symbolism.
41:19	<i>Foua Toloa, Chief of Fakaofu</i>	<i>"If a small country like Tokelau can actually succeed in actively meeting it's obligations in terms of green house gas emissions per person, you know, it's very small, it's too small to make any significant contribution to the greenhouse gas emission of the world. But see, little by little, if everyone contributes, makes an effort to contribute to the decreasing terms of greenhouse gas emissions - what a world would that be."</i>
42:12	Singing women	Farewell from Tokelau three small islands at the end of the world. Ancient tradition, still being lived today yet open to the newest technology.
42:40	Summary	Our Vaka voyage to Tokelau has opened our eyes in many ways.
43:16	Vaka sails off	<ul style="list-style-type: none"> • to the nearly infinite expanse of the Pacific • to the nautical achievements of the Polynesians • to their exposure to natural forces • to the courage to change direction in spite of all traditions • and to a culture of sharing, that is almost modern again today.