



Minister di **Labor, Energia
& Integracion**

VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

E maneho riba tereno di energia ta enfoca riba durabilidad, sostenibilidad, accesibilidad y calidad.

VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

- Energia pagabel, sostenibel, duradero y limpi pa compania- y hogarnan na Aruba.
- Reduccion di emision di CO² cu 45% na aña 2030 pa un medio ambiente sostenibel pa cumpli cu e meta di Nacionnan Uni pa combati efectonan di calentamiento global cu 1.5° C.
- Logra cumpli cu e tratado di Paris pa aña 2050 unda Aruba tambe ta contribui na un medio ambiente sostenibel.



VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

Cu e mehoracion di eficiencia den nos companianan di Utilidad cu proyectonan manera RECIP4/SWRO3, lo logra reduci uzo di combustible (HFO) pa produccion di electricidad di 3.679 Bbl/dia, na mas o menos 2.800 Bbl/dia.

Y despues di logra un transicion di mas o menos 50% pa energia renobabel, reduci e uzo di combustibel ainda mas te cu menos di 2.000Bbl/dia pa 2030.



Comienso di Projecto Vader Piet
Mei 2008

VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

- Aumento di energia solar y di biento di 20% na 2020 pa 35% pa 2024 cu un minimo di 50% pa 2030.
- Aumento uzo di vehiculonan electrico pa 15% na 2030.
- Aumento eficiencia di energia den residencianan y companianan cu 15% na 2030.

VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

- Reduci nos dependencia y consumo di petroleo crudo den un transicion pa energia alternativa solar y di biento rumbo introduccion di energia hydrogen.
- *E maneho nacional riba tereno energetico tin como meta diversifica fuentenan di energia.*



VISION DI MINISTER DI ENERGIA Y GABINETE WEVER CROES 2

- Introduccion di gas lo trece hopi beneficio pa nos Pais: pa produccion di energia, pa refineria, riba tereno industrial y eventualmente hasta transporte automobilistico y casnan na Aruba.
- E proyecto di un instalacion di gas LNG , lo haci cu Aruba por bira e hub pa almacena dicho producto den Caribe.



Distribution of CO₂-eq Emissions



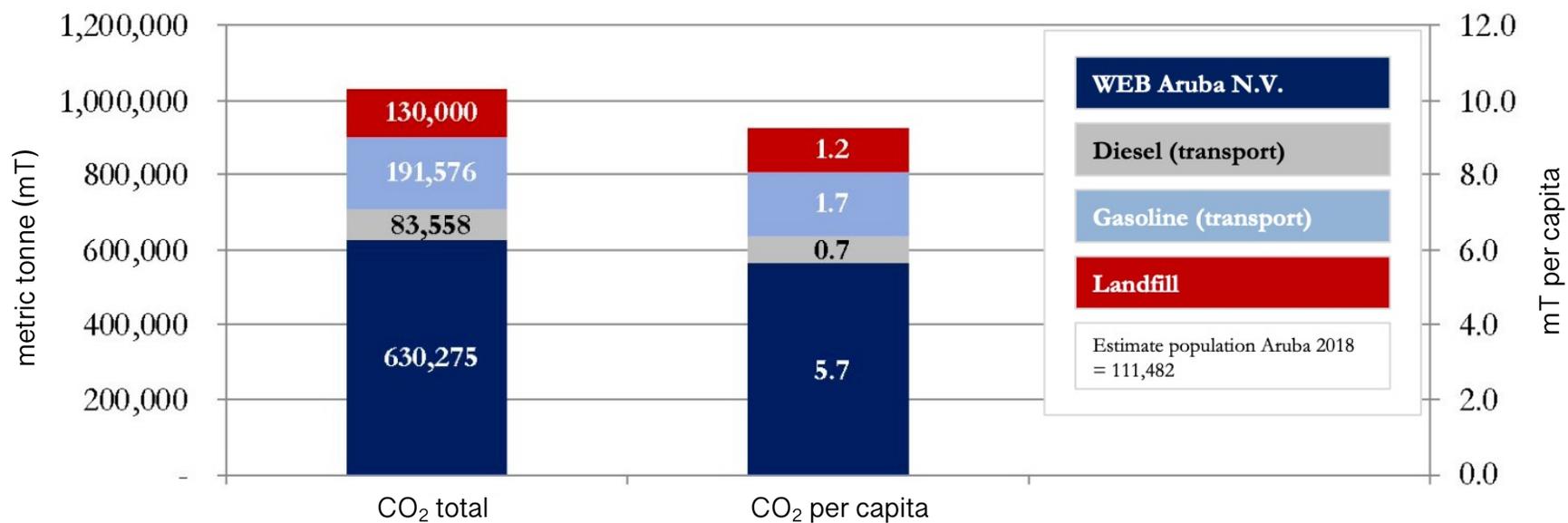
Distribution of CO₂-eq Emissions



Distribution of CO₂-eq Emissions

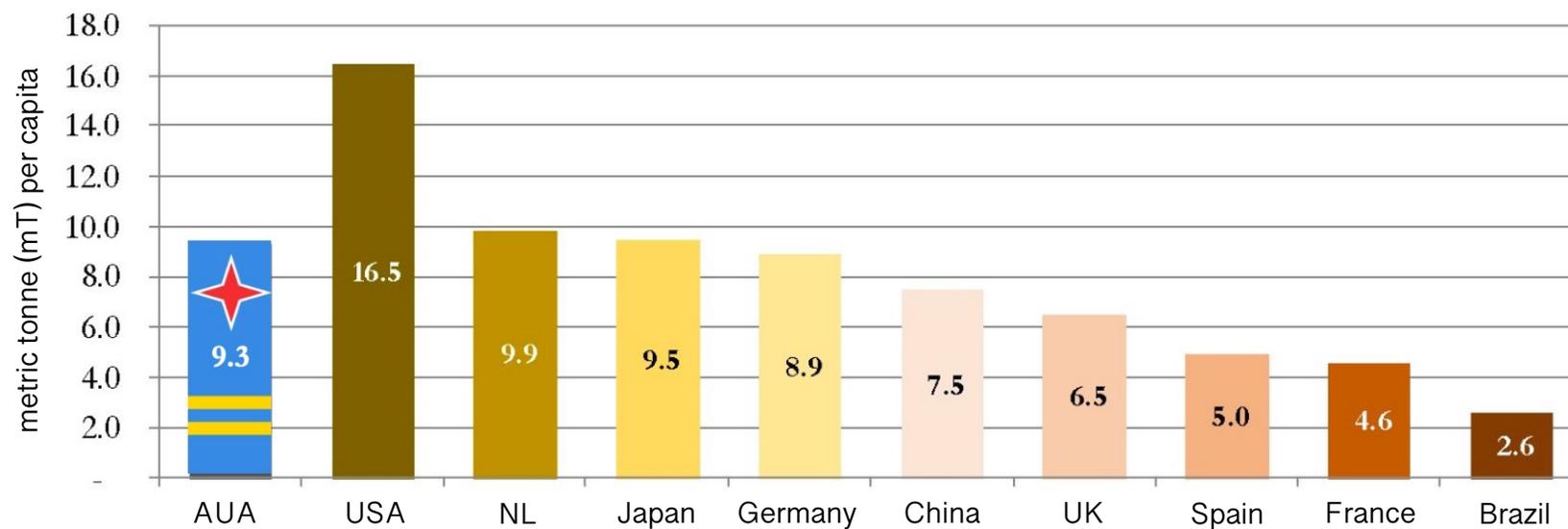


Aruba's CO₂-eq Emissions: 2018



This indicator is highly dependent on the amount of industrial activities in the country.

Aruba vs. other countries CO₂-eq: 2018



This indicator is highly dependent on the amount of industrial activities in the country.

- Maximum Wind Installed Capacity 65MW
- New Renewable Energy Mix
- Emission Reduction 64%

65MW



15MW



20MW



Request for Expression of Interest (EOI)

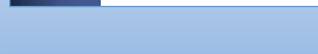
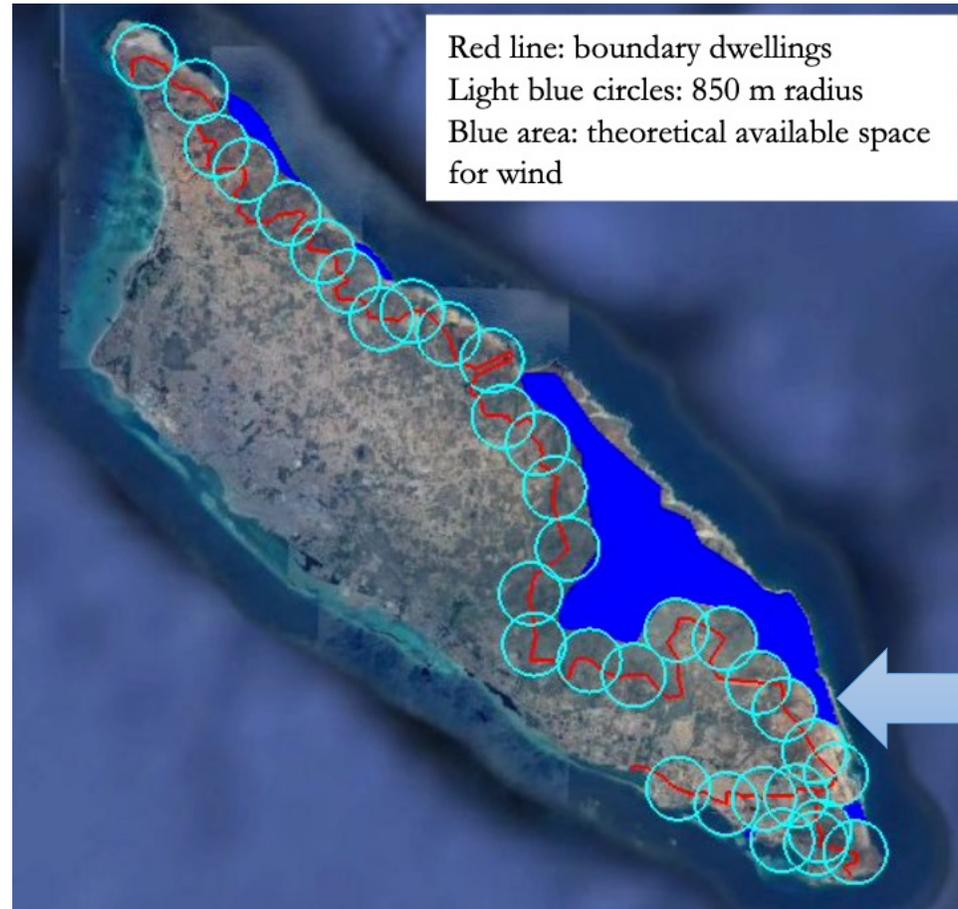
Utilities Aruba N.V. invites experts in the energy generation sector to express interest for Power Purchase Agreement (PPA) for Wind Power in Aruba.



Registration

Please visit www.utilitiesarubanv.com/main/future-challenges for more information on how to participate in this EOI process. New Leaf Notary will be registering all participants.

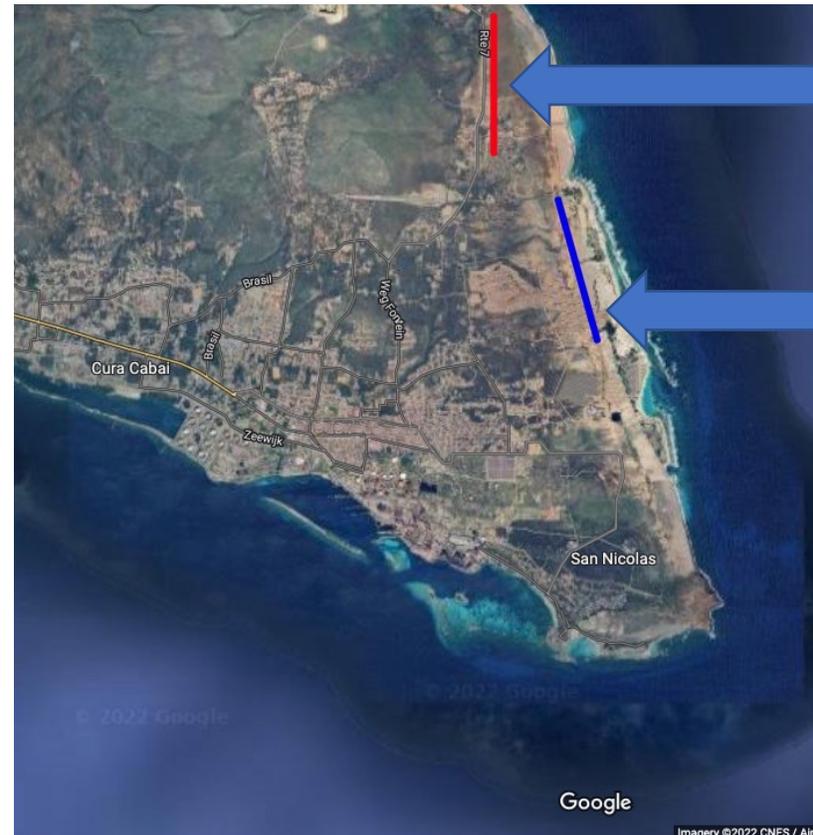
Deadline for proposals submission is October 1st, 2022 at 8:00am (UTC-4)



Wind Park Rincon

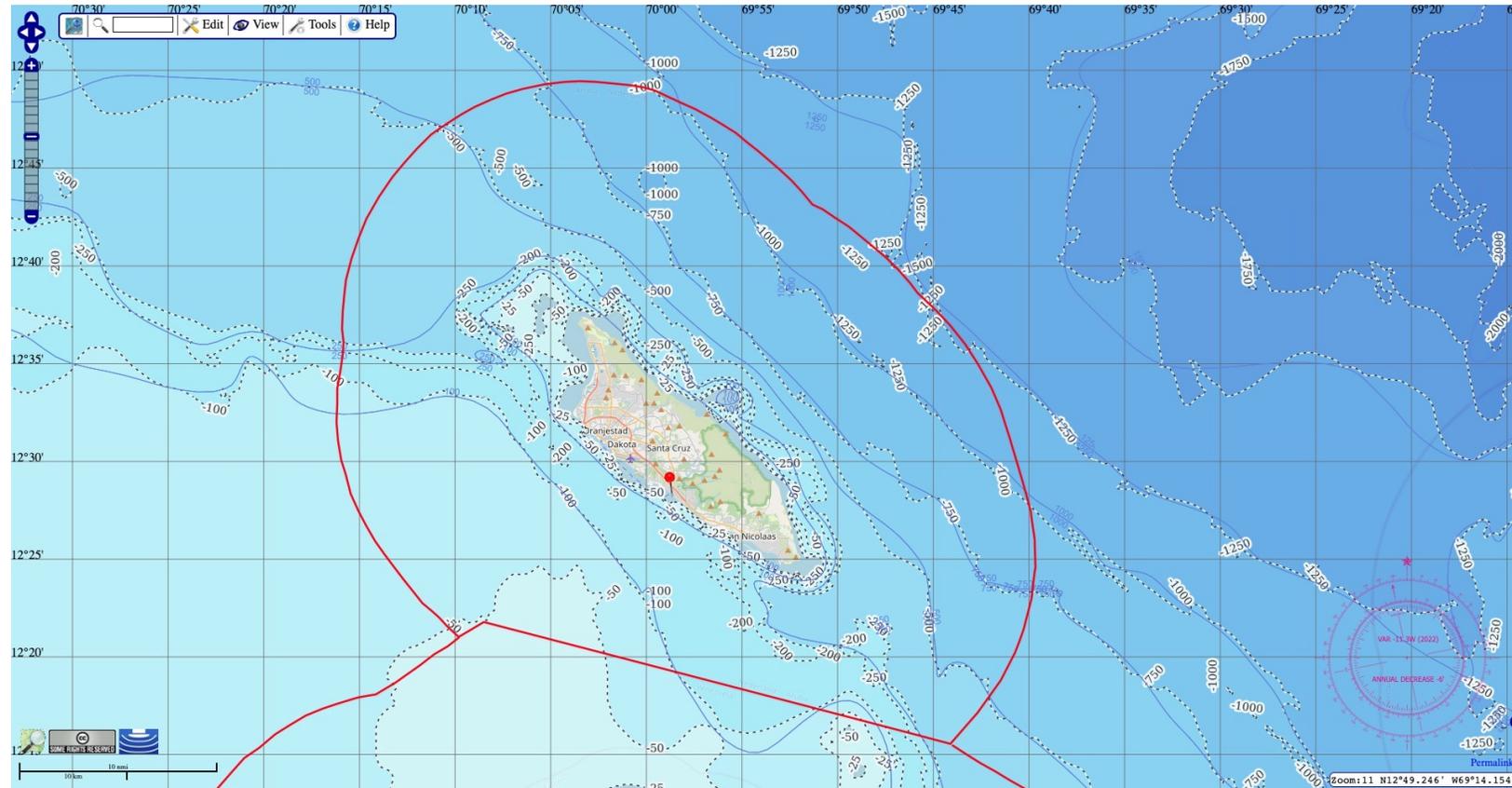
Location based on:

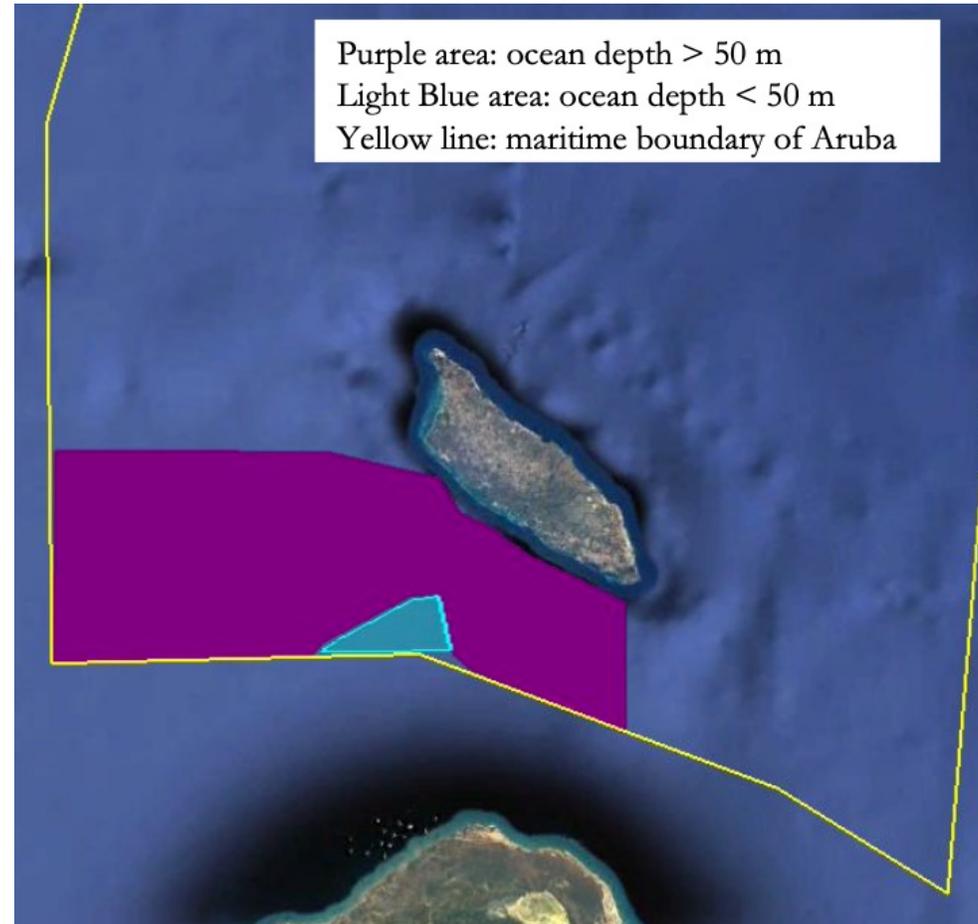
- Optimized production
- Visual impact
- Appropriate distance from coastal zone

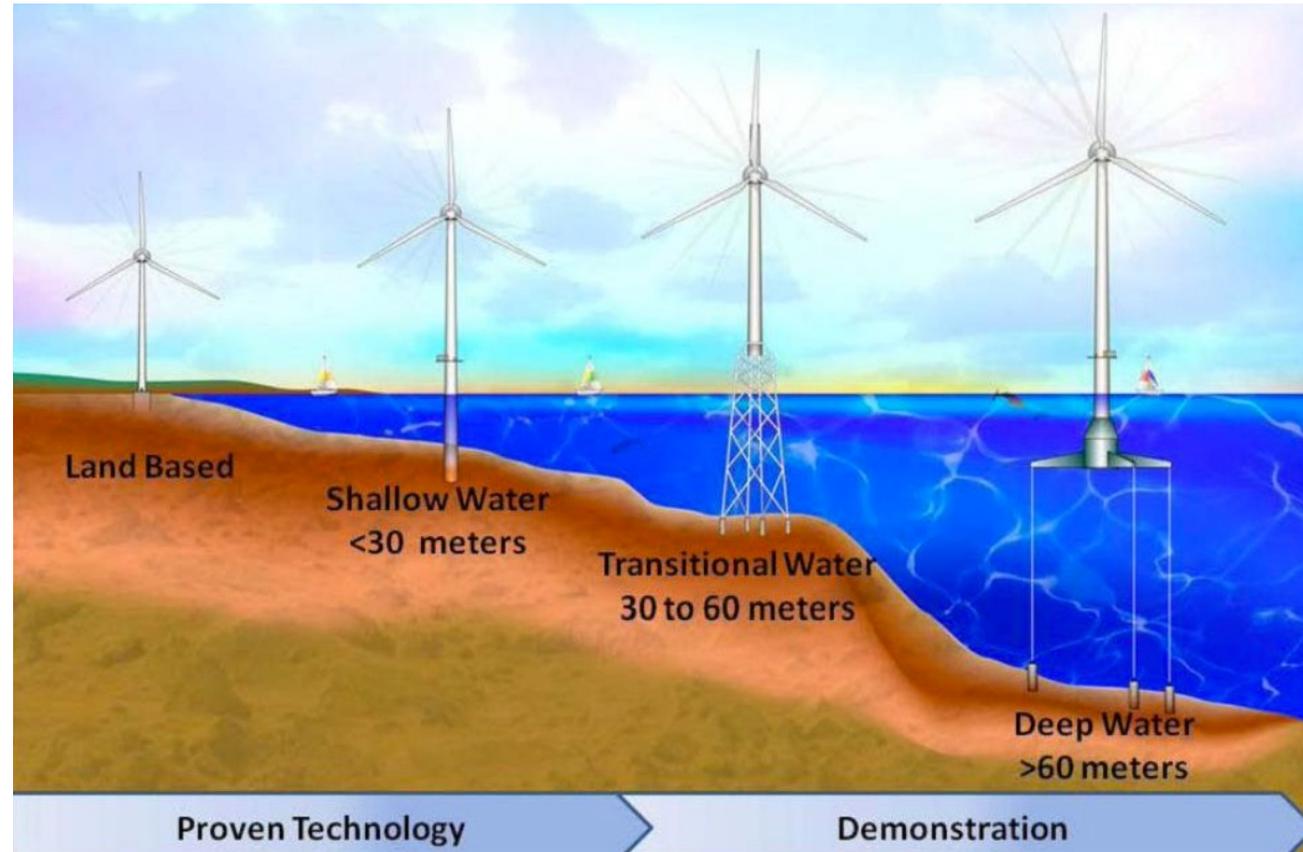


Wind Park Vader Piet

Wind Park Rincon



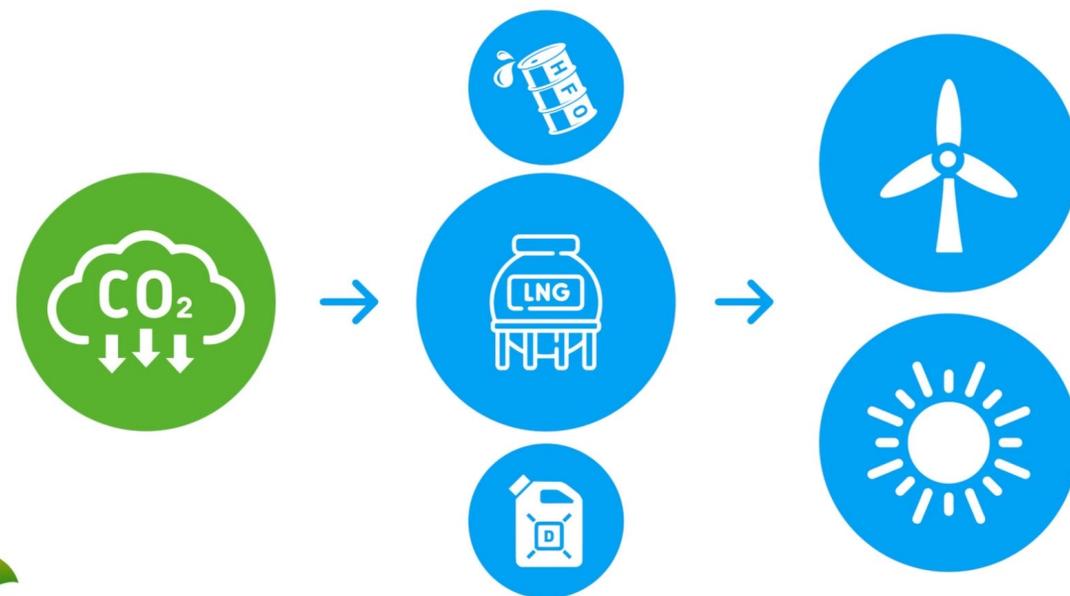




Source: https://upload.wikimedia.org/wikipedia/commons/1/12/Foundations_NREL.jpg

- **HFO** ta emiti un cantidad di **CO₂ desproporcional**.
- Te awor WEB a logra **baha uzo di HFO** cu introduccion di motornan RECIP y planta di awa SWRO. E ultimo 15 añanan a bay di 6200 bari di HFO pa 4100 bari
- Si realmente nos kier limita CO₂, nos lo mester **deshaci di HFO** door di **reemplasa HFO cu gas natural** y asina reduci emision di CO₂ cu 30 pa 60%.
- Aunke gas natural ta un combustibel fosil, **hunto cu motornan RECIP fase IV e lo yuda baha emision di CO₂ drasticamente** y cumpli cu acuerdonan internacional pa combati calentamento global.

Baha dependencia HFO / Baha emision CO₂



- Cu transicion di HFO pa gas natural **so**, nos lo **no** logra. P'esey lo introduci **mas energia renovabel**. Un parke di molina di biento na Rincon ta forma parti di esaki.
- Ta e intencion pa na **2030** mitar di e energia cu WEB ta uza, consisti di energia renovabel. **Lo ta un reto grandi, paso lo mester tin tereno disponibel** pa parkenan di molina di biento y panelnan solar y esey toch ta scars.

Baha dependencia HFO / Baha emision CO₂



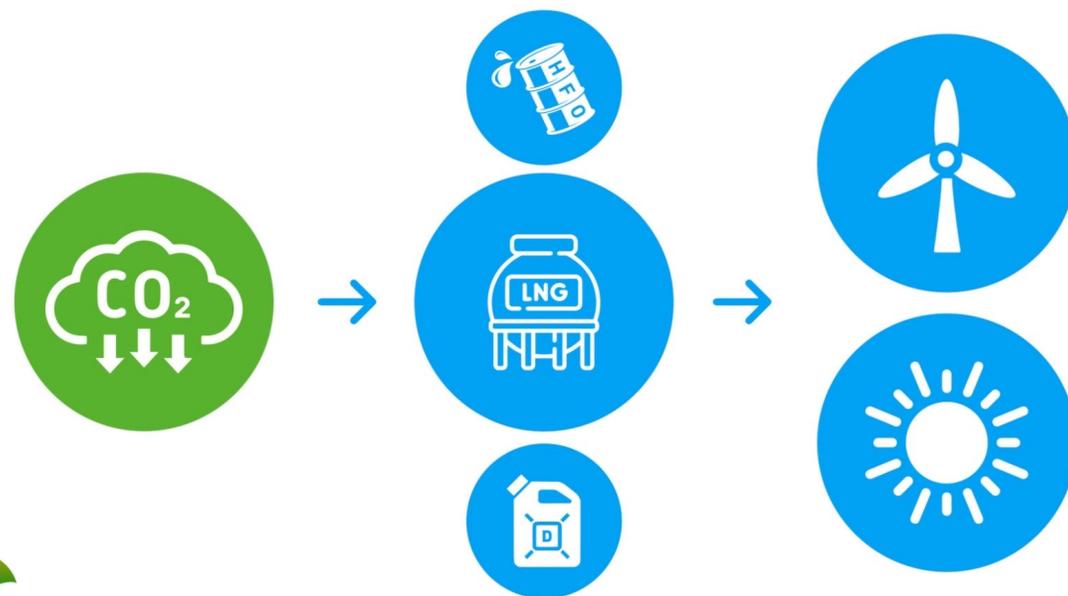
- **Sigui** cu plan di inversion pa bira **menos dependiente di HFO** cu introduccion di **gas natural** y ampliacion di **energia renovabel**

Periodo	Energia Fossil (HFO)	Energia Renovabel (Biento/Solo)
Actual	85%	15%
2025	65%	35%
2030	50%	50%

Energia	MW pa turbina	MW Total
Rincon (10 Molina)	5	45-50
Repower Vader Piet	5	45-50
Total		90-100
Solar adicional		10-15
Bateria adicional		10-20

- Apesar di nos proyectonan di energia renovabel, nos lo tin cu **keda explora tecnicanan nobo constantemente**; Cada tecnica of proyecto cu nos kier introduci na Aruba mester cumpli cu e criterianan di ta **confiabel, pagabel, safe y sostenibel**
- WEB ta sigui rumbo pa un transision di energia mas suave posibel. Pa un futuro di energia **pagabel y limpi**.

Baha dependencia HFO / Baha emision CO₂



Solar Policy

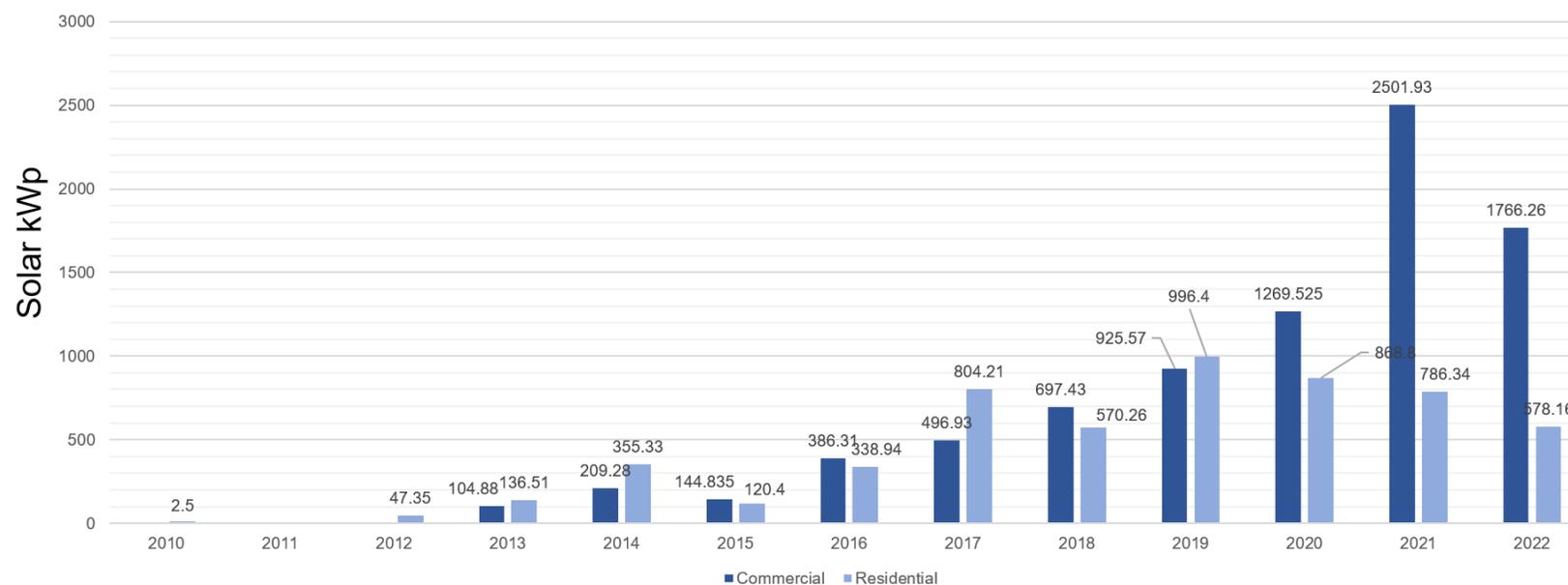
- DG Policy Introduced 2012
- Residential allowed up to 10kWp (This can generate +/- 1.500 kWh per month)
- Commercial allowed up to 100kWp (This can generate +/- 15.000 kWh per month)
- Grid Usage Fee Afl15.-- per kWp
- Net-Metering, the produced power and the power consumed are valued at the same price. Possibility for the customer to deduct his solar power "1 on 1".
- Net Metering makes it possible that the meter calculates what is overproduced and what is used of the grid.
- Production Surplus Buy Back
 - Residential 85% of Tier 1
 - Commercial 50% of Rate

Rooftops in Aruba

- **Solar Rooftops**
- Residential 8,430 kW
- Commercial 5,345 kW
- Non Commercial 176 kW
- Total 13,951 kW



Yearly Distributed Generation Development



Rooftop solar panels (residential & commercial) kWp installed

ROOFTOPS in ARUBA

- **Solar power contributes to cheaper energy but brings also some critical concerns !**

ROOFTOPS in ARUBA

WHAT ARE THE RISK THAT WE WANTS TO MITIGATE ?

- **PRELIMINARY APPROVAL PROCES FOR:**

-

1. Grid instability
2. Compliance with the “aansluitvoorwaarde wat betreft spanning niveau” (127/220 tolerantie 4%)
3. Damaging Infrastructure (Transformer / Cables capacity)

What are the Grid Stability Problems with Renewable Energy Sources?

1. Frequency and voltage anomalies

- Power inverters are supposed to adjust system fluctuations in solar power generation. However, they have proved to be weak in effectively carrying this out. In addition, the time of the day and the weather conditions continuously affect the production of power.

What are the Compliance issues with Renewable Energy Sources?

2. Demand and supply mismatch

As much as many homes, offices, and buildings need the power to run their operations, it cannot be at a time. The production of renewable energy can be very high at some points in time. But, also, it can be low under other conditions. Therefore, the power generated when it is needed may not be sufficient or may not match the demand.

What are the Cable Issues with Renewable Energy Sources?

3. Overloading of existing transmission lines

Due to increased loads during peak hours, the existing transmission lines face a challenge of capacities matching the inflow and outflow of power. A surge can occur when producers generate too much power without warning, and the entire system would shut down. A transmission line has its specified capacity, and if this limit gets passed, thermal loads will build up, leading to damage.

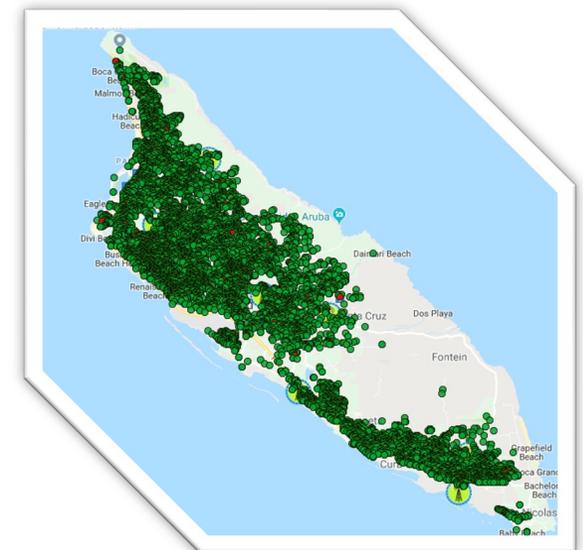
Elmar's Smart Grid

This smart grid is an electrical grid that uses computer-based remote control and automation to deliver electrical power from where it is generated to customers.



Smart Metering Project

- 50% of residential meters “SMART”
- 12,000 residential smart meters yearly
- Next 3 years
- Based on Supply Chain efficiency



Energy Security

continuous and uninterrupted availability of energy

The concept of energy security is now increasingly synonymous with resilience: **responding to problems quickly and avoiding power outages.**



Solar Parks

- 2 - 4 different locations
- Closer to the greater demand
- Less grid loss
- Battery storage
- Production 15 - 20 MW

- 2022/2025 > Solar Panels will be placed on all 3 office buildings plus all Sub-Stations and Elmar parking lots



Electric Vehicles N.V. Elmar

- New charging stations at all 3 office buildings
- 8 company car is already electric
- 2022> new infrastructure for charging stations at head office of N.V. Elmar
- 2023 > charging stations at all Sub-Station for the EV company fleet
- 2023-2025 > more charging stations will be placed at more strategic locations around Aruba

- **All trucks will be using LPG as transition for the future !**

