U.S. DEPARTMENT OF STATE
BUREAU OF OVERSEAS BUILDINGS OPERATIONS

Net Zero Embassies

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09/15/2022

OBO Overview – Serving the U.S. Diplomatic Community

290	$71B	70,000	$70M	$50M
LOCATIONS	PORTFOLIO REPLACEMENT VALUE	DIPLOMATIC STAFF SUPPORTED	INSTALLED PV	PLANNED PV

25,465+ ASSETS

970+	16,575+	9,385+	16,080
Office Buildings	Residences	Government Owned	Leased

114+ MAJOR PROJECTS
$19.2B+ WORKLOAD

50+	40+	50+
Capital Security Construction	Active Major Renovations	Compound Security Upgrades
$18,000M WORKLOAD	$850M WORKLOAD	$365M WORKLOAD

52	12,500	35+	18,300
LEED Certifications	Art Partners	Secretary's Register Properties	Cultural Objects

AREAS OF FOCUS

Embassy After Next
Building Program
Security, Resilience, & Stewardship

Facility Maintenance & Upkeep
Asset Value Preservation
Improve functionality and value of overseas assets

Diplomatic Residential Program
Housing Investment
Improve diplomatic housing & quality of life

Data Management & Analytics
Data-Driven Decision-Making
Improve data quality, availability, and usability

Talent Management
Recruit and Retain
Diversify & professionally develop our workforce

OBO CONSTRUCTION PROJECTS
Global Status Map

- NEC, NCC, NOX, & NOB
- LFO, MAJOR REHAB, & RENOVATIONS
- CSU & FE/BR
- MSGR
- OTHER

65 ACTIVE PROJECTS

OVERSEAS REGIONAL SUPPORT CENTERS (ORSC)

- Ft. Lauderdale, Florida
- Cape Town, South Africa
- Abidjan, Ivory Coast
- Frankfurt, Germany
- Guam, Micronesia

Last Updated June 09, 2022

U.S. State Department's first Net Zero Embassy

Map of Palau

Koror is **home to about 2/3 of the country's population**

Office densification is under consideration

CITY AREA
3 Sq Mi

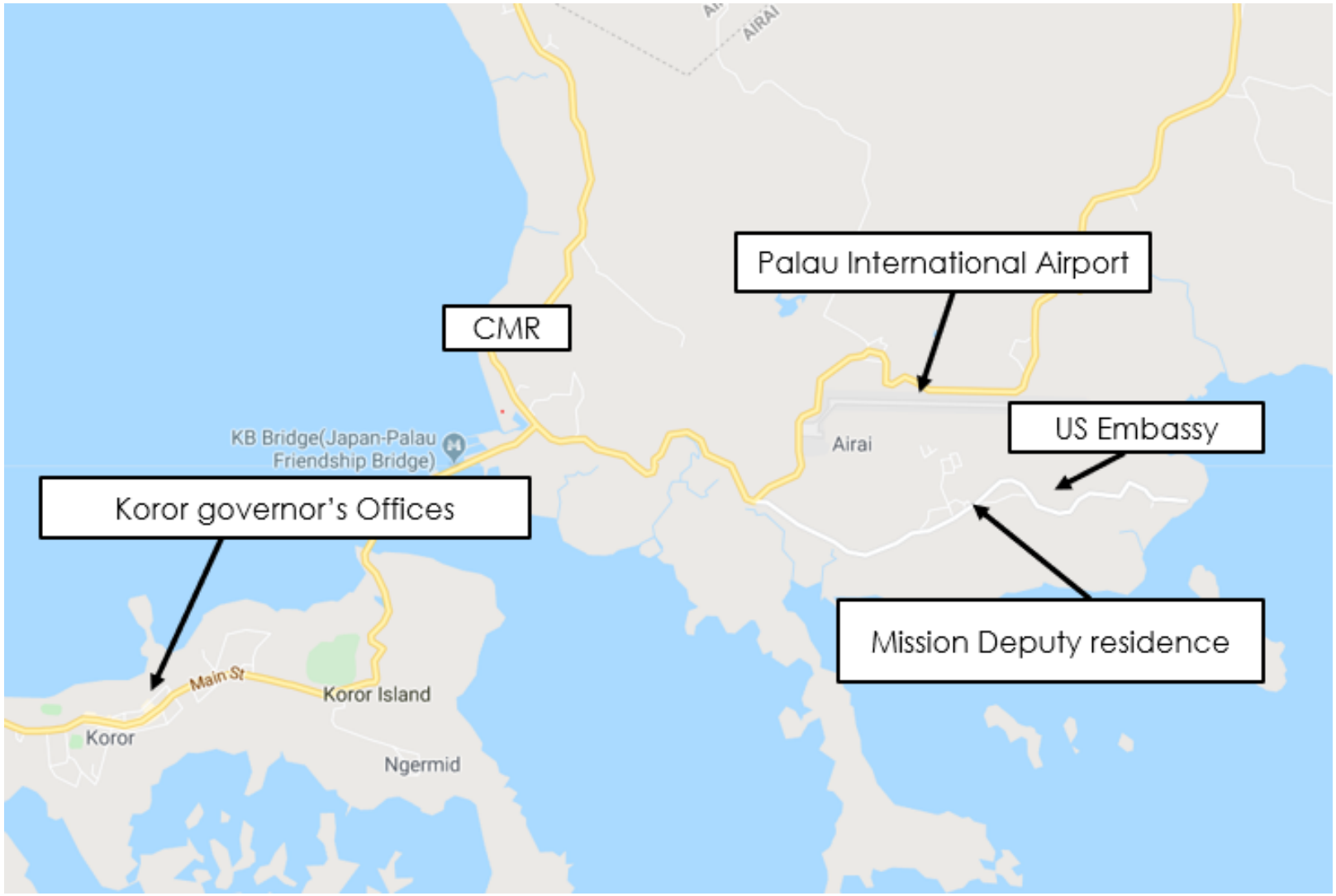
ANNUAL POPULATION GROWTH
+ 0.56%

METRO AREA POPULATION
~ 14,000

CLIMATE
Tropical Climate, with constant humidity
Year-round daytime temperature range is 86 to 88 F and average nighttime temperature 73 to 75 F.

PRECIPITATION
Rainy throughout the year. No true dry season.

Map of City


Palau International Airport
CMR
US Embassy
KB Bridge(Japan-Palau Friendship Bridge)
Airai
Koror governor's Offices
Mission Deputy residence
Main St
Koror Island
Koror
Ngermid

Satellite of Chancery

Interior Photos

Office Area

Consular Area

Energy Conservation Project: Completed May 2022

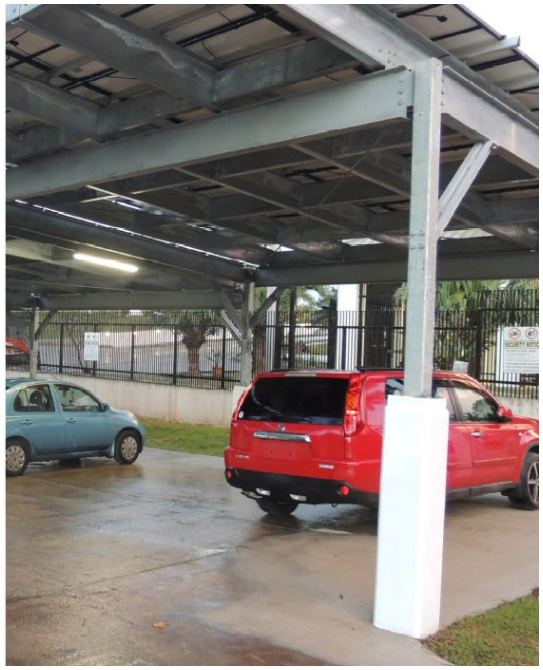
SCOPE: New rooftop and parking canopy solar system, new interior lighting, new site lighting. Koror is now the first U.S. Embassy campus that is 100% solar powered

FINANCES:

- Koror has some of the most expensive electricity rates in the world at $.46 per kilowatt-hour
- PV Installation Cost: $1.5M
- After maintenance costs, system was forecast to generate $101K of energy savings annually, payback in 14th year of operations, and generate a total of $1.6M in lifetime savings.
- System has generated $12k in savings in first month of operation, exceeding expectations.
- Life expectancy: 25 years

KOROR, PALAU
LED Lighting and PV Installation

PV QUICK FACTS	
PV Initial Investment	$ 1,527,226
System Size	162kW
$/w Installed	$12.62
Production Since Completion (04/20/22-9/08/22)	36.9MWh
2021-2022 Local Electricity Cost	$77,982.56
Production Value Since Completion (04/20/22-9/08/22)	$40,895
PV Payback	14.7 < years
Lifetime Savings (after payback)	$1,607,968



Intention for Net-Zero:

- Pre-COVID usage per year – 260MWh
- Usage after Lighting and Efficiency Measures - 217MWh
- Electricity cost calculation based on May 2021-April 2022 utility bills in EnergyCAP
- LED Lighting and PV Installation total cost = $1,992,890

Koror's Monitoring Controls

Energy Totals listed are for the time period of 5am – 7pm on 08/26/2022

Koror's Monitoring Controls

Energy Totals listed are for the time period of 05/20/2022 – 09/15/2022

Future Net Zero Embassies: Pacific Islands

APIA, SAMOA
LED Lighting, PV Installation, and Battery Storage

PV & BESS QUICK FACTS	
PV Initial Investment	$1,462,121
System Size	77 kW
$/w Installed	$20.31
Estimated Annual Production	90,544 kWh
2020-2021 Local Electricity Cost	$33,922.48
2022 Estimated Production Value (after O&M)	$34,407
PV Payback	34 < years
Lifetime Savings (after payback)	-$484,660

- LED Lighting, HVAC upgrade and air sealing, PV Installation, and Battery Storage total cost = $2,486,095
- Electricity cost calculation based on Oct 2020-Sept 2021 utility bills in EnergyCAP

KOLONIA, FEDERATED STATES OF MICRONESIA
LED Lighting, PV Installation, and Battery Storage

PV & BESS QUICK FACTS	
PV Initial Investment	$2,983,864
System Size	227.9 kW
$/w Installed	$13.20
Estimated Annual Production	302,597 kWh
2021-2022 Local Electricity Cost	N/A
Estimated Production Value (After O&M)	$127,212
Payback	22 < years
Lifetime Savings (after payback)	$683,663

- LED Lighting, PV Installation, and Battery Storage total cost = $3,550,517

MAJURO, MARSHALL ISLANDS
LED Lighting, PV Installation, and Battery Storage

PV & BESS QUICK FACTS	
PV Initial Investment	$ 2,527,421
System Size	169 kW
$/w Installed	$14.96
Estimated Annual Production	239,229 kWh
2021-2022 Local Electricity Cost	N/A
Estimated Production Value (After O&M)	$75,675
PV Payback	26 < years
Lifetime Savings (after payback)	-$170,300

- LED Lighting, PV Installation, and Battery Storage total cost = $2,759,734

Pacific Islands Contract Totals

SUMMARY	
Initial Investment	$ 8,500,632
Total PV Capacity	588 kW
$/w Installed	$14.46
Estimated Annual Production	862,075 kWh*
2021-2022 Local Electricity Cost	N/A
Estimated Production Value (After O&M)	$321,513
PV Payback	22< years
Lifetime PV Savings (after payback)	$1,516,666

NIAMEY, NIGER
PV Installation and Battery Storage

PV & BESS* QUICK FACTS	
Initial Investment	$2,412,929
System Size	750 kW
$/w Installed	$3.45
Estimated Annual Production	1.06 MWh
Estimated Electricity Cost (2021-2022)	$480,715
Estimated Diesel Cost (2021-2022)	$1.2M
Estimated Production Value (After O&M)	$125k
PV Payback	17 < years
PV Lifetime Savings	$1.35M
PV+BESS Annual Savings	$1M

*Battery Energy Storage System (BESS)

- LEED Platinum certified building
- No option for net-metering with local electric company
- High reliance on diesel generators because of grid-instability (poor quality and frequent outages)
- BESS allows for $1M in annual savings by not running diesel generators

Niamey's Battery Storage

- 1.5MWh of Lithium Nickel Manganese Cobalt (LiNMC) battery capacity
- Battery containers were painted to match aesthetic of NEC, however are typically white

Niamey's Battery Controls

Energy Totals listed are for the time period of 6am – 8pm on 09/05/2022

Q&A

Map Legend:

3 Installed Wind at 88 kW

46 Installed Solar at 10 MW

30 Planned Solar at 12.4 MW