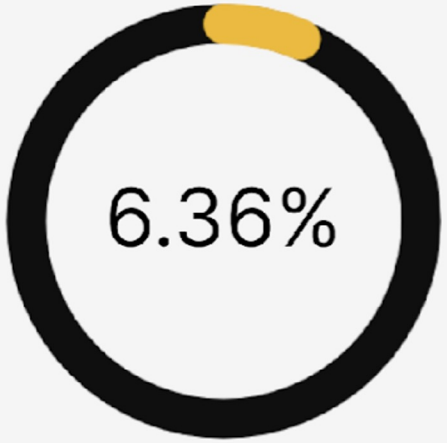
Clean Energy in Cambodia

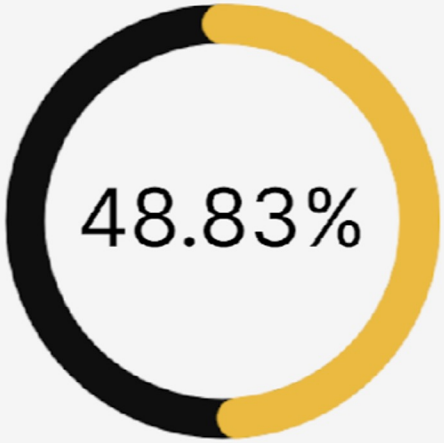
Natharoun Ngo Son
Country Director
EnergyLab Cambodia
11 Oct. 2022
4th webinar on Renewable Energies
Delegation of German Industry and Commerce in Myanmar

Status of Clean Electricity in Cambodia

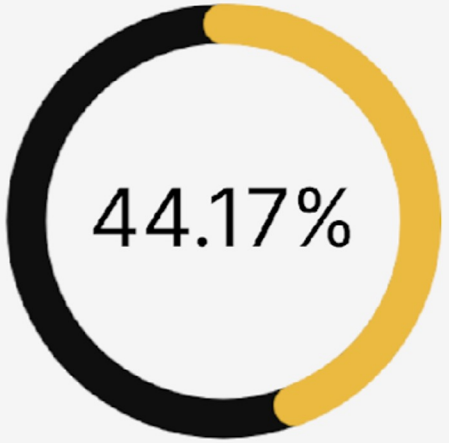
Electricity production in Cambodia 2021



Electricity from the grid generated by solar in 2021



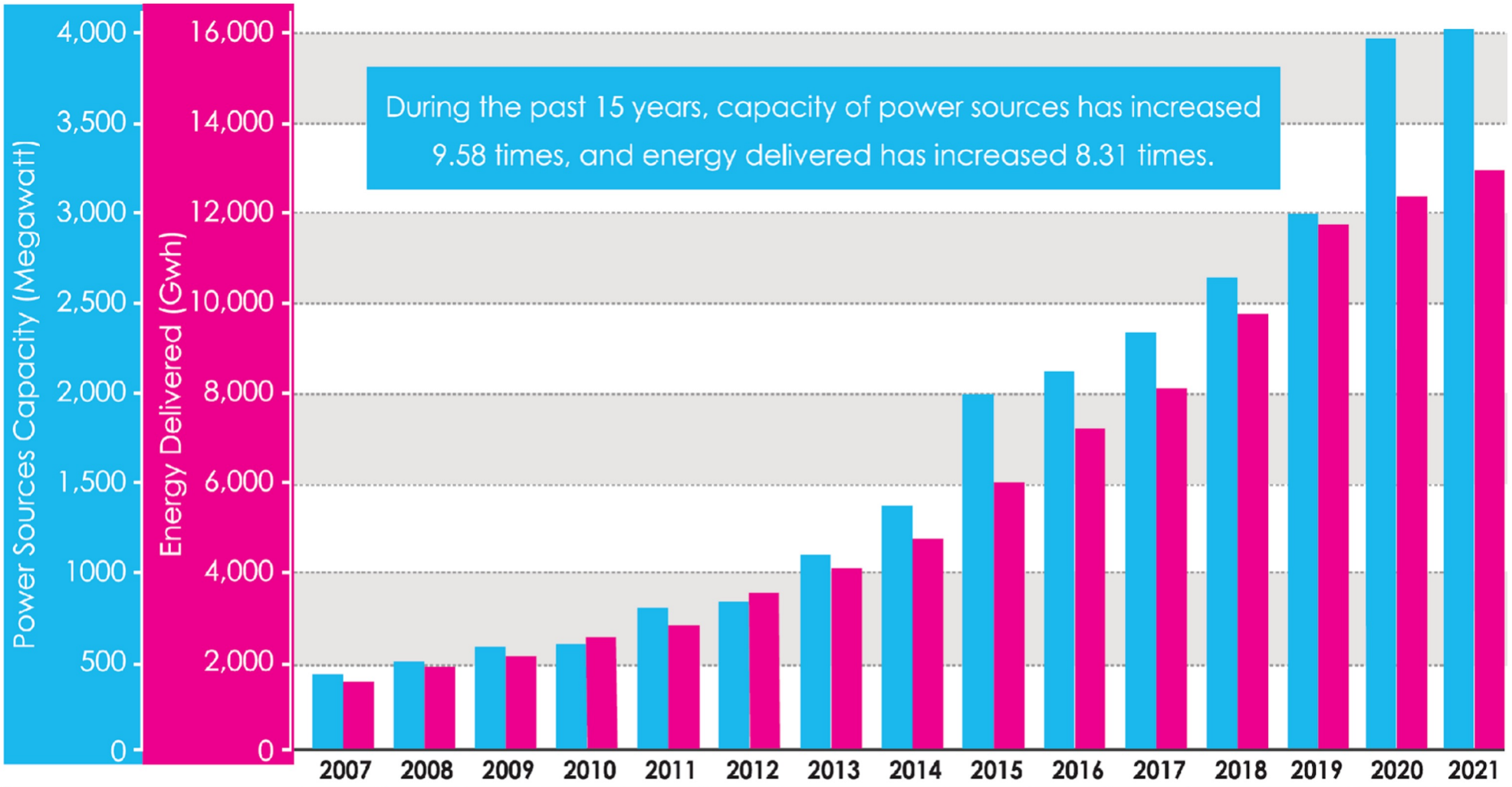
Electricity from the grid generated by coal and oil in 2021



Electricity from the grid generated by hydropower in 2021

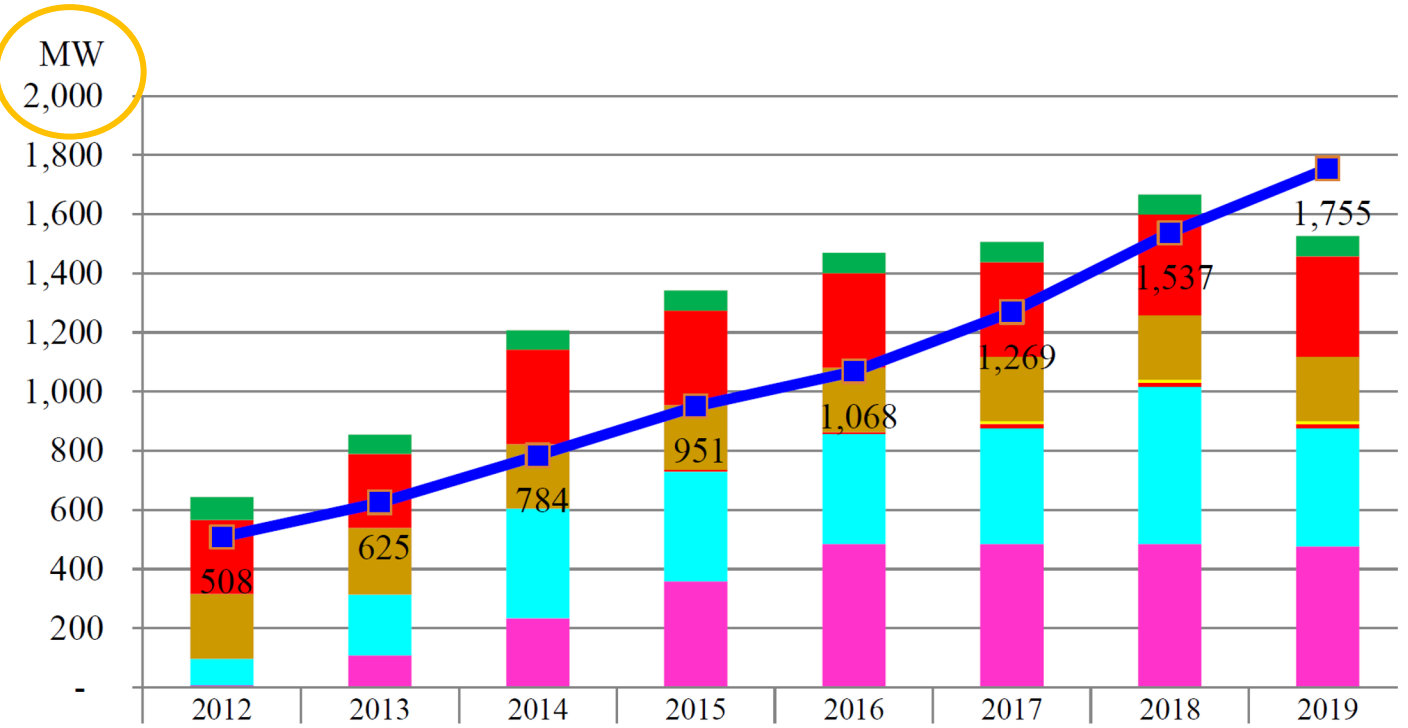
Cambodia is hungry for energy…

(Energy)Lab



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Power Sources Capacity (MW)	419	490	579	584	793	825	1,088	1,359	1,986	2,115	2,322	2,635	2,999	3,972	4,014
Energy Delivered (GWh)	1,517	1,858	2,077	2,515	2,788	3,527	4,051	4,713	5,990	7,175	8,073	9,739	11,738	12,401	12,601
Energy Increase by year(%)	26.73	22.52	11.76	21.08	13.26	23.84	14.83	16.35	27.09	19.79	14.78	20.64	20.53	5.65	1.61

…COVID has slowed rapid growth to 6% 2020 1.6% 2021

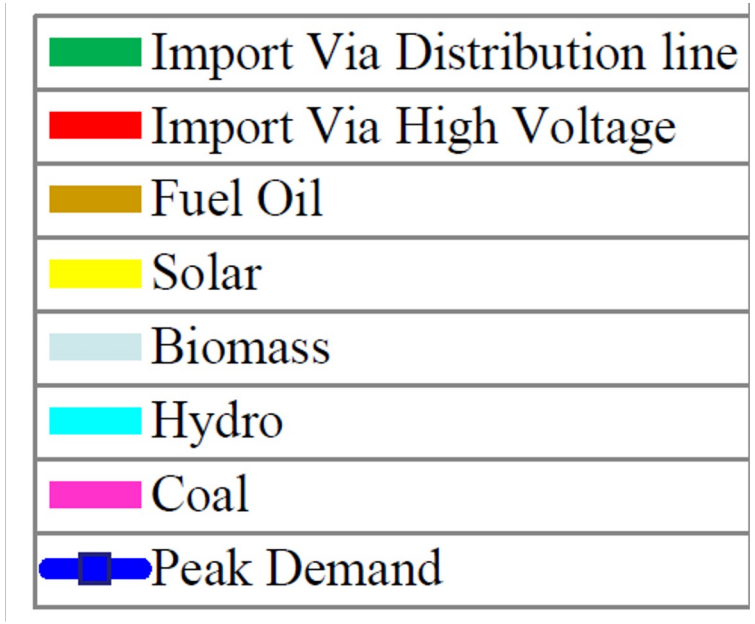


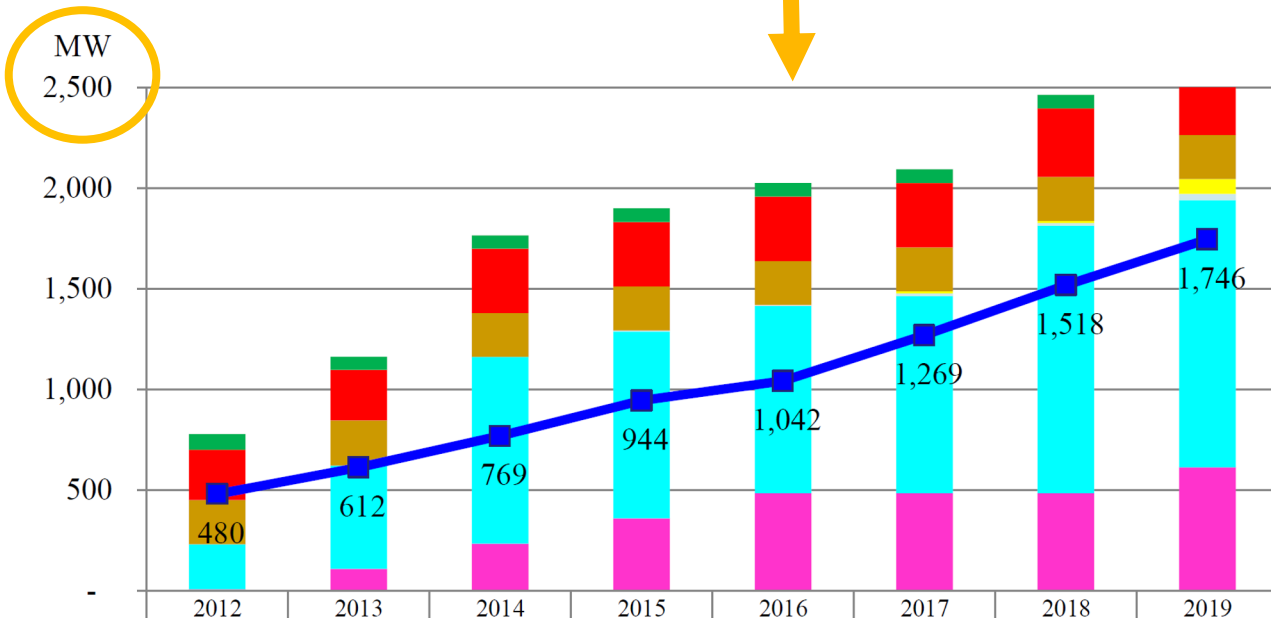
Oversupply of power in wet season. 80% take or pay contracts coal + hydro

(Energy)Lab

Dry season

Wet Season





Powershortages in 2019 = Boom of New Power Projects

(Energy)Lab

Coal & Oil Projects	
Han Seng – Odor Meanchey	270MW
CIIDG Coal 2 – Sihanoukville	700MW
Royal Group – Koh Kong	700MW
Sekong Coal – **Laos**	600MW
Xekong Coal - **Laos**	1,400MW
Kandal Fuel Oil EDC	400MW
TOTAL	**4,070MW**

Solar Projects	
Scneitec Solar Pursat, K. Chhnang, K Speu	230MW 60+30+60+80
Risen Solar Battambang	60MW
B Grimm Banteay Meanchey	30MW
Green Sustainable Ventures Bavet	20MW
ADB EDC Auction K Chhnang	60MW
TOTAL	**400MW**

Hydro Projects	
Upper Tatay Hydro	150MW

3,100MW not financed or built. Financing issues may cause delays.

Difficulty Financing Coal Projects

(Energy)Lab

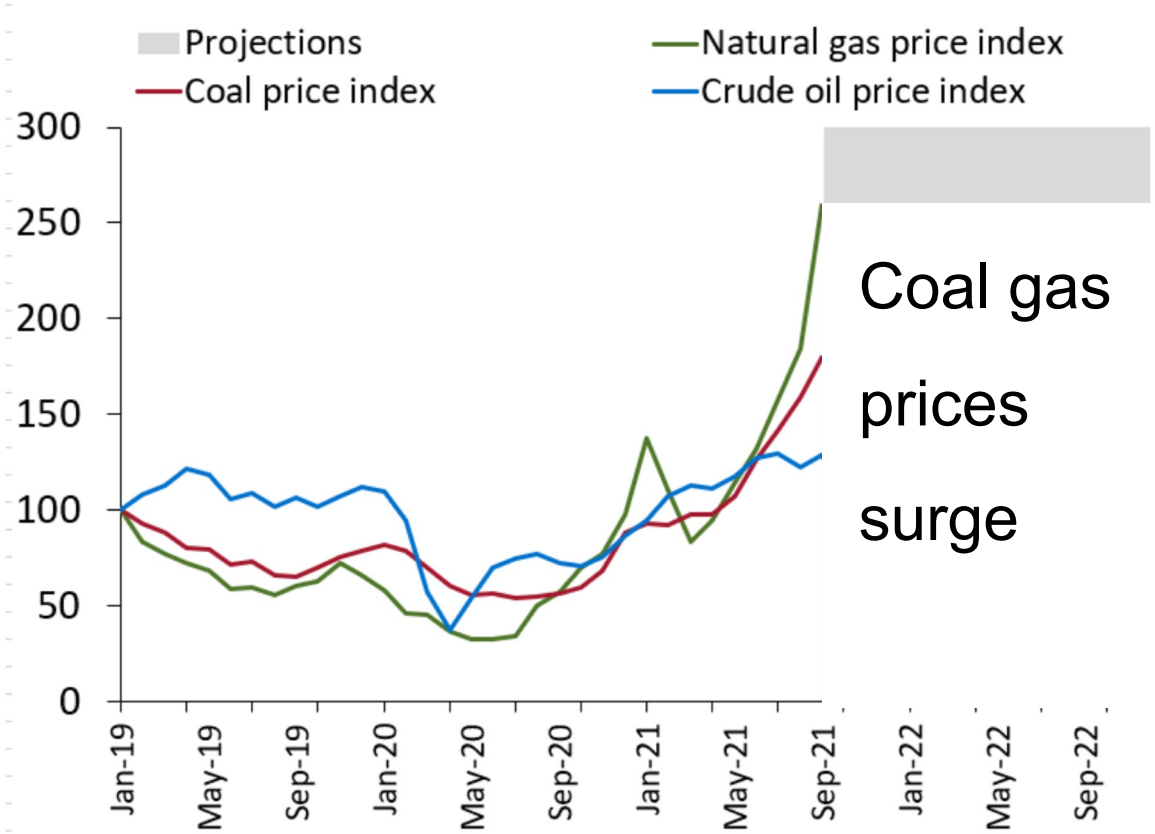
September 23, 2021
12:20 AM +07
Last Updated 3 months ago

China

In climate pledge, Xi says China will not build new coal-fired power projects abroad

5 minute read

By Valerie Volcovici and David Brunnstrom, Michelle Nichols



Coal gas prices surge

Sources: IMF Primary Commodity Price System Database; and IMF staff calculations.

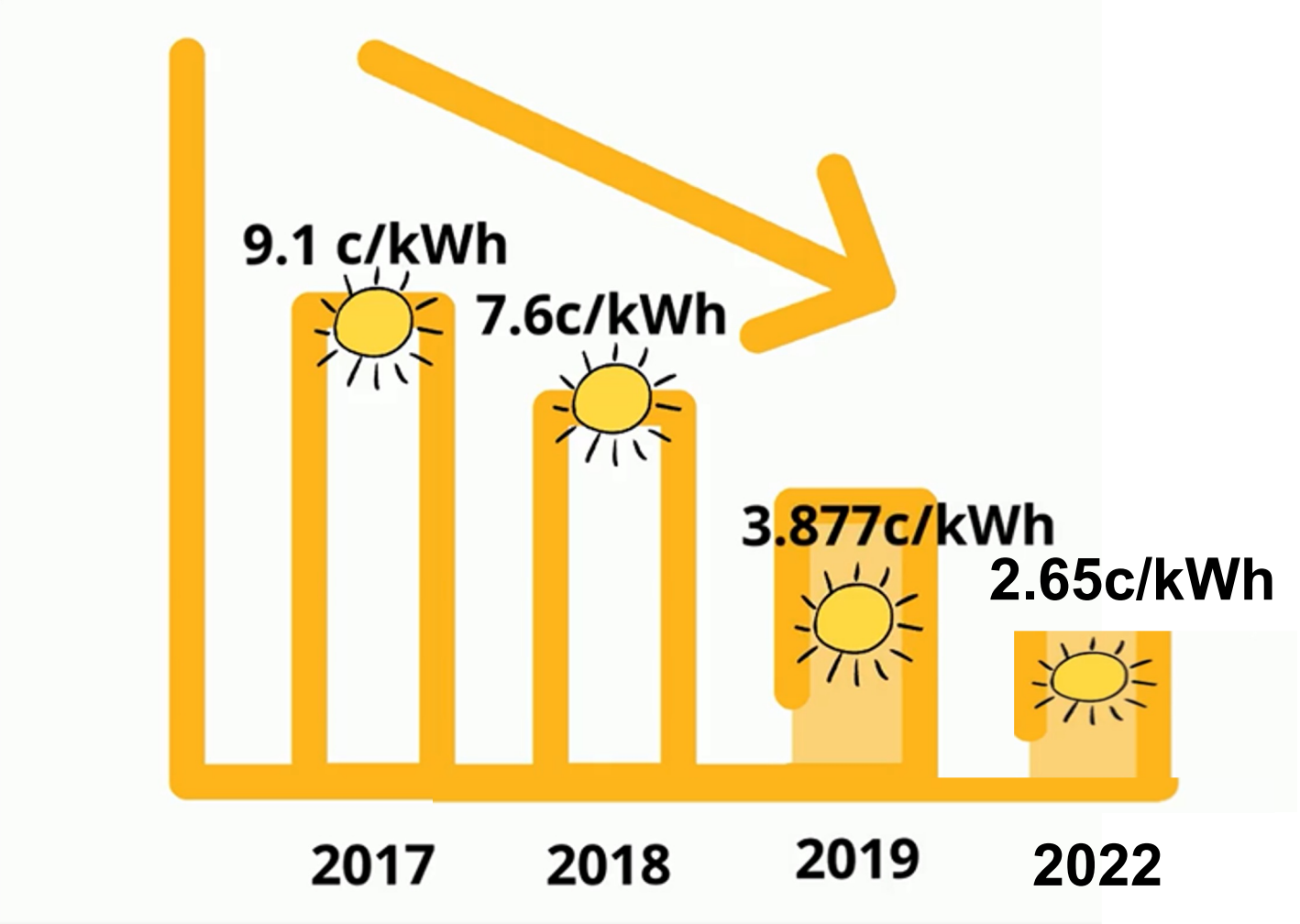
IMF

Solar supply prices in Cambodia

average cost of EDC electricity supply from coal, oil, hydro, imports

9.5 c/kWh in 2016

there was no solar



30MW Solar Power Plant

60MW Solar Power Plant

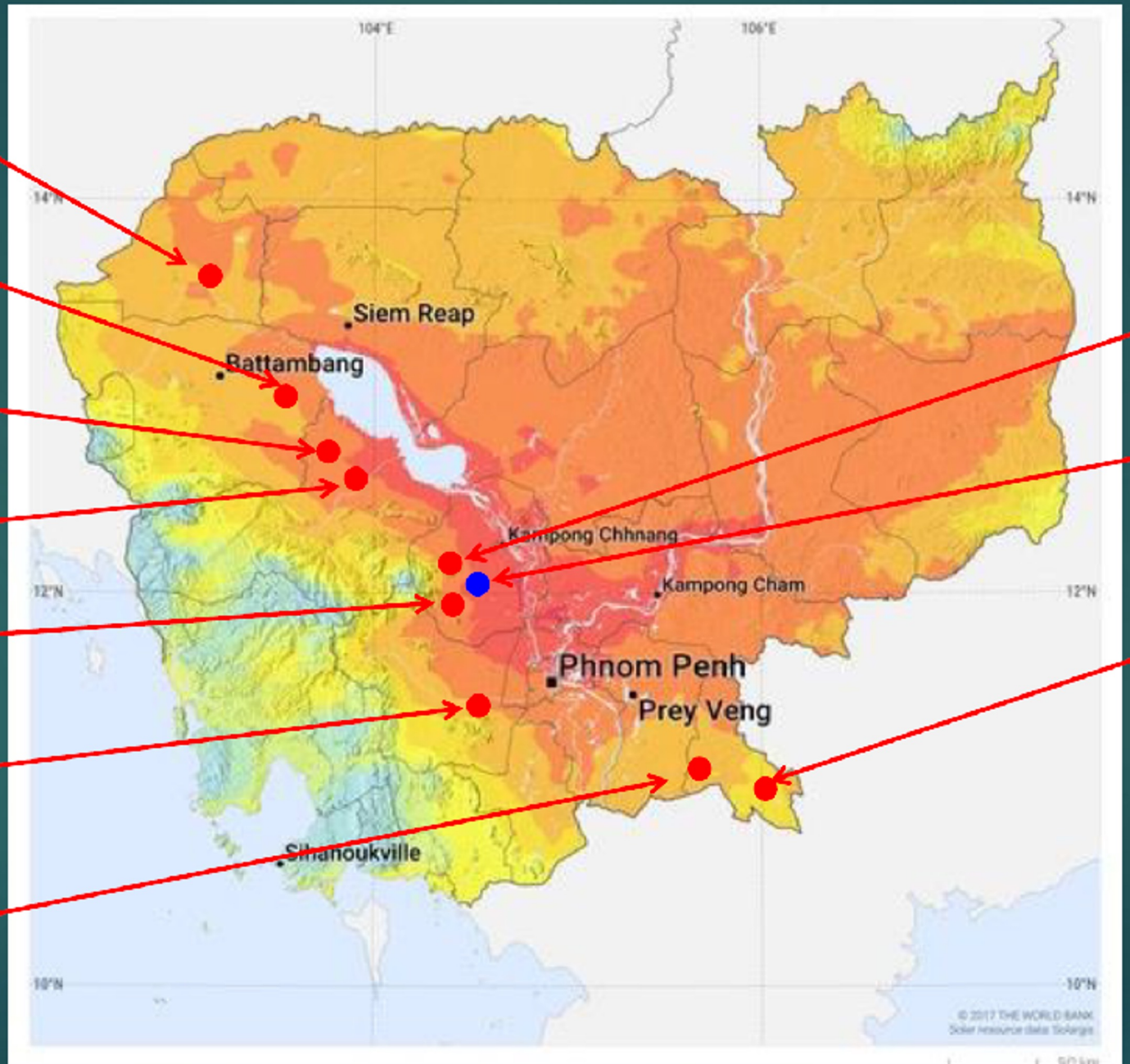
30MW Solar Power Plant

60MW Solar Power Plant

60MW Solar Power Plant

60MW + 20MWSolar Power Plant

20MW Solar Power Plant



60MW Solar Power Plant

40MW Solar Powe Plant

10MW Solar Power Plant

Existing project

Propose project

Source: MME

Solar Energy in Cambodia

Rooftop Solar (700kW MPWT Ministry Transport)

Rooftop Solar Regulation

Solar regulation released in 2018; (Pricing updated 2021):

- Monthly capacity charge
- No access to offpeak night time tariff
- Prohibited from export – self consumption only
- Solar capacity limited to 50% of connection
- Solar PPAs ‘not encouraged’
  - although used in practice

Wind Energy (pending implementation)

Energy and System Balancing

Policy to be approved in 2023

(Energy)Lab

Royal Government of Cambodia

Will include Min E Perfs, Standards & Labels, starting with cooling & refrigeration

National Energy Efficiency Policy

(2021-2030)

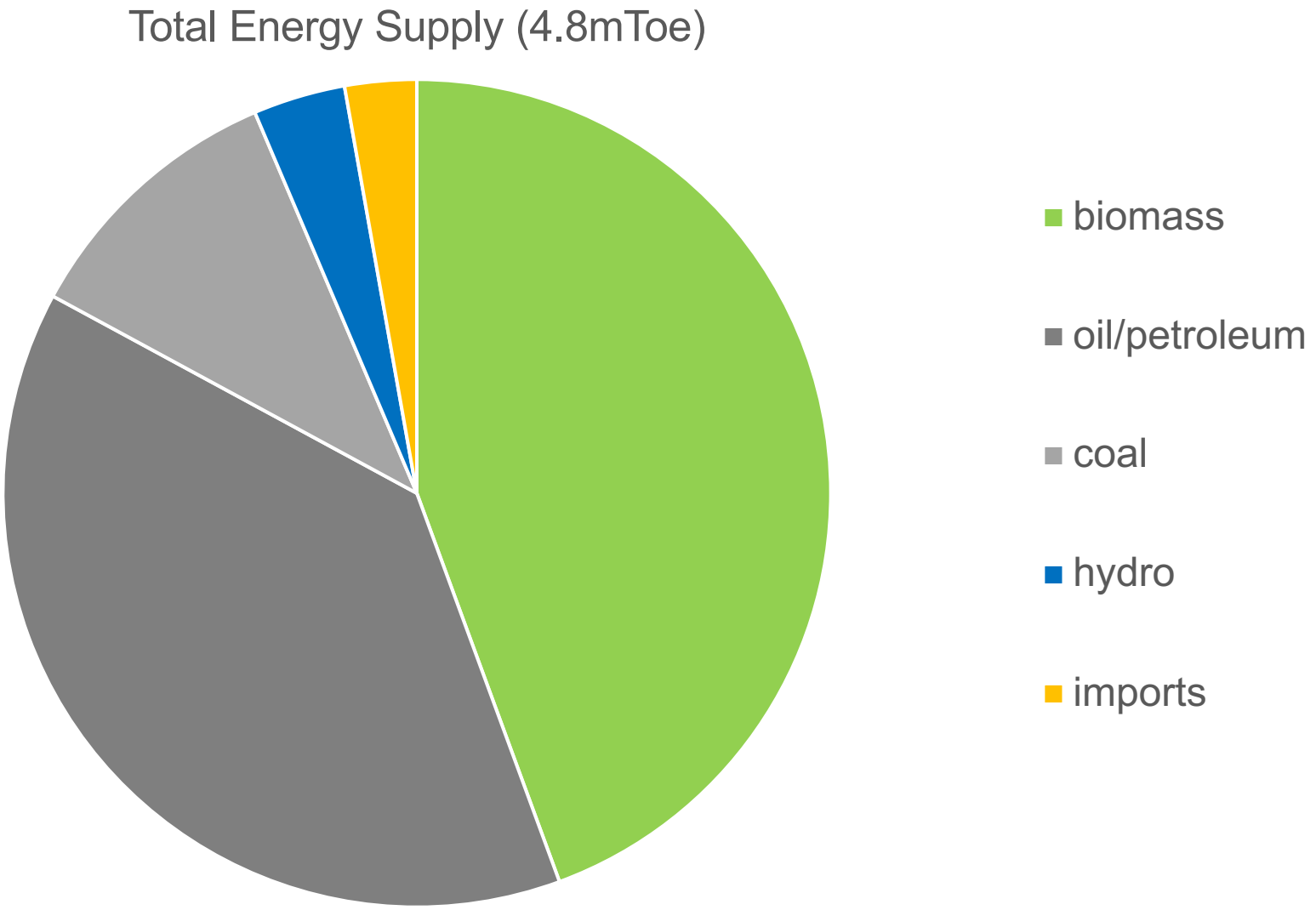
Energy Efficiency

(Energy)Lab

- Buildings
- Cooling
- Transport
- Industry

It’s not all about electricity…

Total Energy in Cambodia



Status of Clean Thermal and Waste to Energy in Cambodia

Health

Livelihoods

Environment

- 79% rural HHs in Cambodia use wood for cooking
- 14,000 people die in Cambodia each year from household air population
- Traditional stoves emit ~2.5tCO2e/year

Contact Bastiaan Teune bteune@snv.org Philipp Waigel philipp.waigel@giz.de
Website: https://snv.org/country/cambodia
Facebook: @SNVCambodia and @SmokeFreeVillage

SNV

Electric Cooking

Household Biogas

Modern twin gas stove

Rice cooker

Paygo box

Biodigester tank

3 year warranty

Flexi hose

Thermal Energy Use

- Cooking
- Brick kilns
- Garment factories
- Cement kilns

Industrial Biogas & Biomass

Khmer Times, Manoj Mathew, 23 Sept. 2022

Cement Waste to Energy

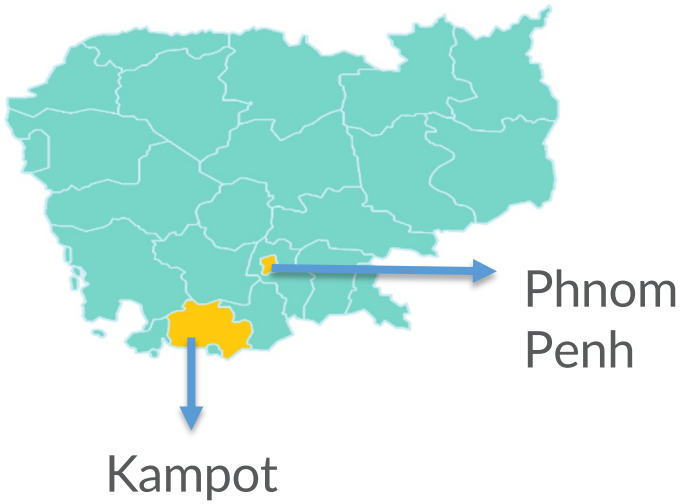
- Serve 100 companies
- $4m industrial facility
- 25% saving on coal.
- Co-processing waste in kiln
- Better return using existing kiln, air pollution control equipment

RDF - Cambodia Mechanical and Biological Treatment Facility in Phnom Penh

Program overview

Facilitate investment into a MBT facility to process municipal waste into refuse derived fuel (RDF) and biogas.

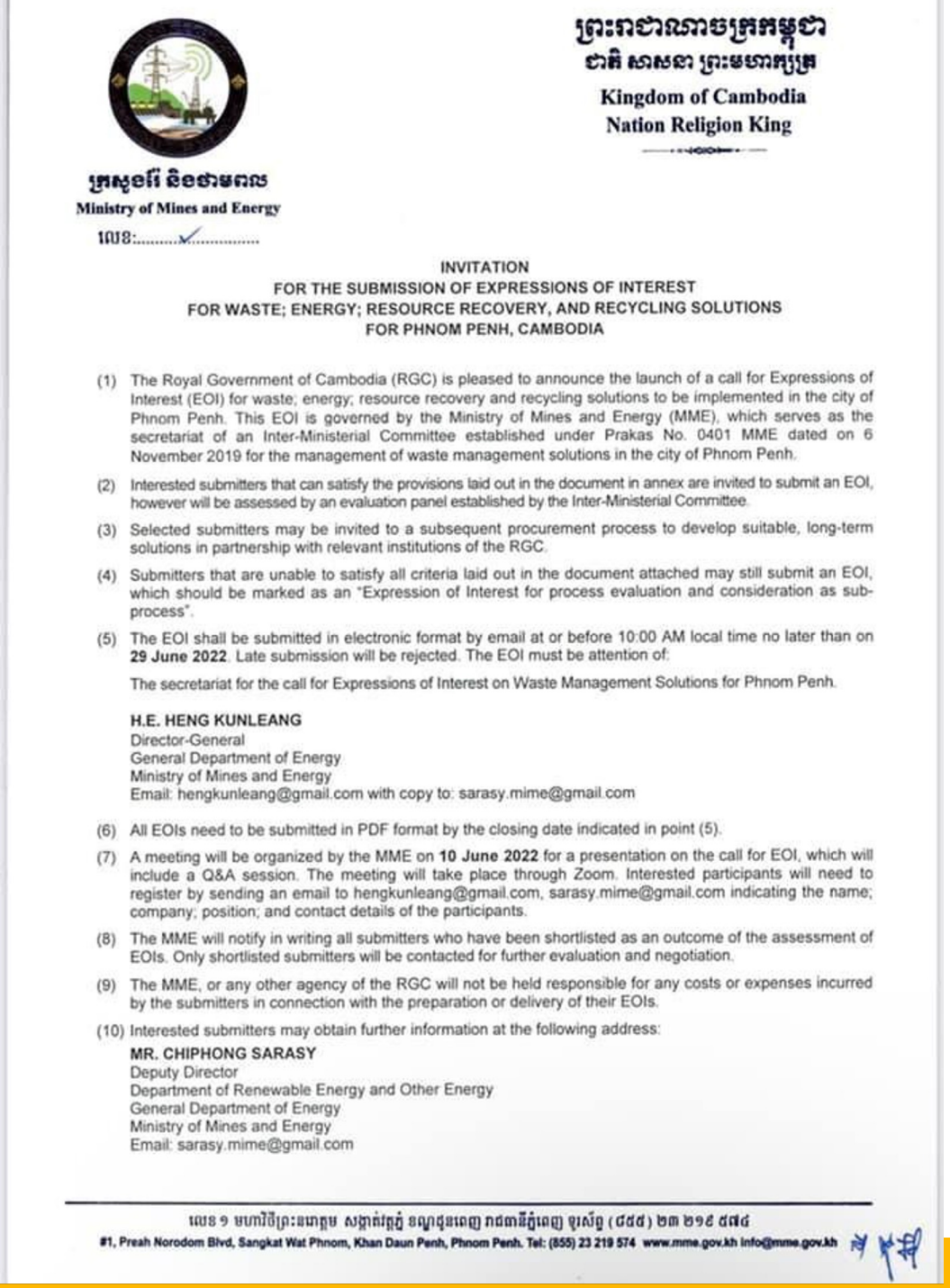
- Provide a large scale treatment option for waste management in Phnom Penh
- Save space at the existing landfill and minimize long distance travel to the future regional landfill
- Improve environmental footprint of cement kilns in Kampot province by replacing coal imported from Indonesia by RDF
- Reduce GHG emissions and air pollution, particularly at the landfill



Investment opportunity

Conducted a pre-feasibility study which demonstrated technical and financial potential to build an MBT facility processing 1,100 tons of municipal waste per day – commercially viable

- Plant located at the existing Dangkor landfill in Phnom Penh
- Offtake by cement industry in Kampot province
- Investment size c. USD 20 million, with IRR in the 12-19% range
- Project endorsed by the Government,
- Chip Mong taking forward full feasibility study, to be finalized by September 2022, after which an investment decision will be made



ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ

Kingdom of Cambodia
Nation Religion King

ក្រសួងរ៉ែ និងថាមពល
Ministry of Mines and Energy

លេខ:.....✓.....

INVITATION
FOR THE SUBMISSION OF EXPRESSIONS OF INTEREST
FOR WASTE; ENERGY; RESOURCE RECOVERY, AND RECYCLING SOLUTIONS
FOR PHNOM PENH, CAMBODIA

(1) The Royal Government of Cambodia (RGC) is pleased to announce the launch of a call for Expressions of Interest (EOI) for waste; energy; resource recovery and recycling solutions to be implemented in the city of Phnom Penh. This EOI is governed by the Ministry of Mines and Energy (MME), which serves as the secretariat of an Inter-Ministerial Committee established under Prakas No. 0401 MME dated on 6 November 2019 for the management of waste management solutions in the city of Phnom Penh.

(2) Interested submitters that can satisfy the provisions laid out in the document in annex are invited to submit an EOI, however will be assessed by an evaluation panel established by the Inter-Ministerial Committee.

(3) Selected submitters may be invited to a subsequent procurement process to develop suitable, long-term solutions in partnership with relevant institutions of the RGC.

(4) Submitters that are unable to satisfy all criteria laid out in the document attached may still submit an EOI, which should be marked as an "Expression of Interest for process evaluation and consideration as sub-process".

(5) The EOI shall be submitted in electronic format by email at or before 10:00 AM local time no later than on **29 June 2022**. Late submission will be rejected. The EOI must be attention of:

The secretariat for the call for Expressions of Interest on Waste Management Solutions for Phnom Penh.

H.E. HENG KUNLEANG
Director-General
General Department of Energy
Ministry of Mines and Energy
Email: hengkunleang@gmail.com with copy to: sarasy.mime@gmail.com

(6) All EOIs need to be submitted in PDF format by the closing date indicated in point (5).

(7) A meeting will be organized by the MME on **10 June 2022** for a presentation on the call for EOI, which will include a Q&A session. The meeting will take place through Zoom. Interested participants will need to register by sending an email to hengkunleang@gmail.com, sarasy.mime@gmail.com indicating the name; company; position; and contact details of the participants.

(8) The MME will notify in writing all submitters who have been shortlisted as an outcome of the assessment of EOIs. Only shortlisted submitters will be contacted for further evaluation and negotiation.

(9) The MME, or any other agency of the RGC will not be held responsible for any costs or expenses incurred by the submitters in connection with the preparation or delivery of their EOIs.

(10) Interested submitters may obtain further information at the following address:

MR. CHIPHONG SARASY
Deputy Director
Department of Renewable Energy and Other Energy
General Department of Energy
Ministry of Mines and Energy
Email: sarasy.mime@gmail.com

លេខ ១ មហាវិថីព្រះនរោត្តម សង្កាត់វត្តភ្នំ ខណ្ឌដូនពេញ រាជធានីភ្នំពេញ ទូរស័ព្ទ (៨៥៥) ២៣ ២១៩ ៥៧៤
#1, Preah Norodom Blvd, Sangkat Wat Phnom, Khan Daun Penh, Phnom Penh. Tel: (855) 23 219 574 www.mme.gov.kh info@mme.gov.kh

(Energy)Lab

EoI W2E, Resource Recovery, Recycling

June 2022

Transport and Energy in Cambodia


អគ្គិសនីភាវូបនីយកម្មនៃយានយន្តដើម្បីអនាគតបៃតងសម្រាប់កម្ពុជា
Electrification of Vehicles for a Cleaner Cambodia
សណ្ឋាគារ៉ាហ្វិលឡឺរ៉ូយ៉ាល់
ភ្នំពេញ ថ្ងៃព្រហស្បតិ៍ ត្រូវនឹងថ្ងៃទី ០៤ ខែវិច្ឆិកា ឆ្នាំ២០២១
វេលាម៉ោង ១១:៥០ ~ ១២:៣០
Raffles Hotel Le Royal,
Phnom Penh, Thursday, 4th November 2021
11:50AM ~ 12:30PM
In Partnership:
British Embassy Phnom Penh
Supported by:
Funded by:

Key Mitigation Actions to 2050

Transportation

- **More use of public transportation – 30 percent modal share in urban areas by 2050**
- **Moderate penetration of electric vehicles – 70 percent for motorcycles and 40 percent for cars and urban buses by 2050**
- **Increased fuel efficiency for internal combustion engine vehicles**
- **Rail for freight and passengers**
- **CNG penetration of 80 percent for interregional buses and 80 percent for trucks until 2050**

Policy work in e-mobility

- World Bank e-mobility Study and Roadmap
- UNDP EV charging station roadmap
- GTCK e-mobility high level roadmap
- GGGI e-bus
- Elab E-mobility Showcase 2023

Net zero by 2050

Energy Sector emissions increase
Launched 2022

KINGDOM OF CAMBODIA
NATION-RELIGION-KING

Long-Term Strategy for Carbon Neutrality

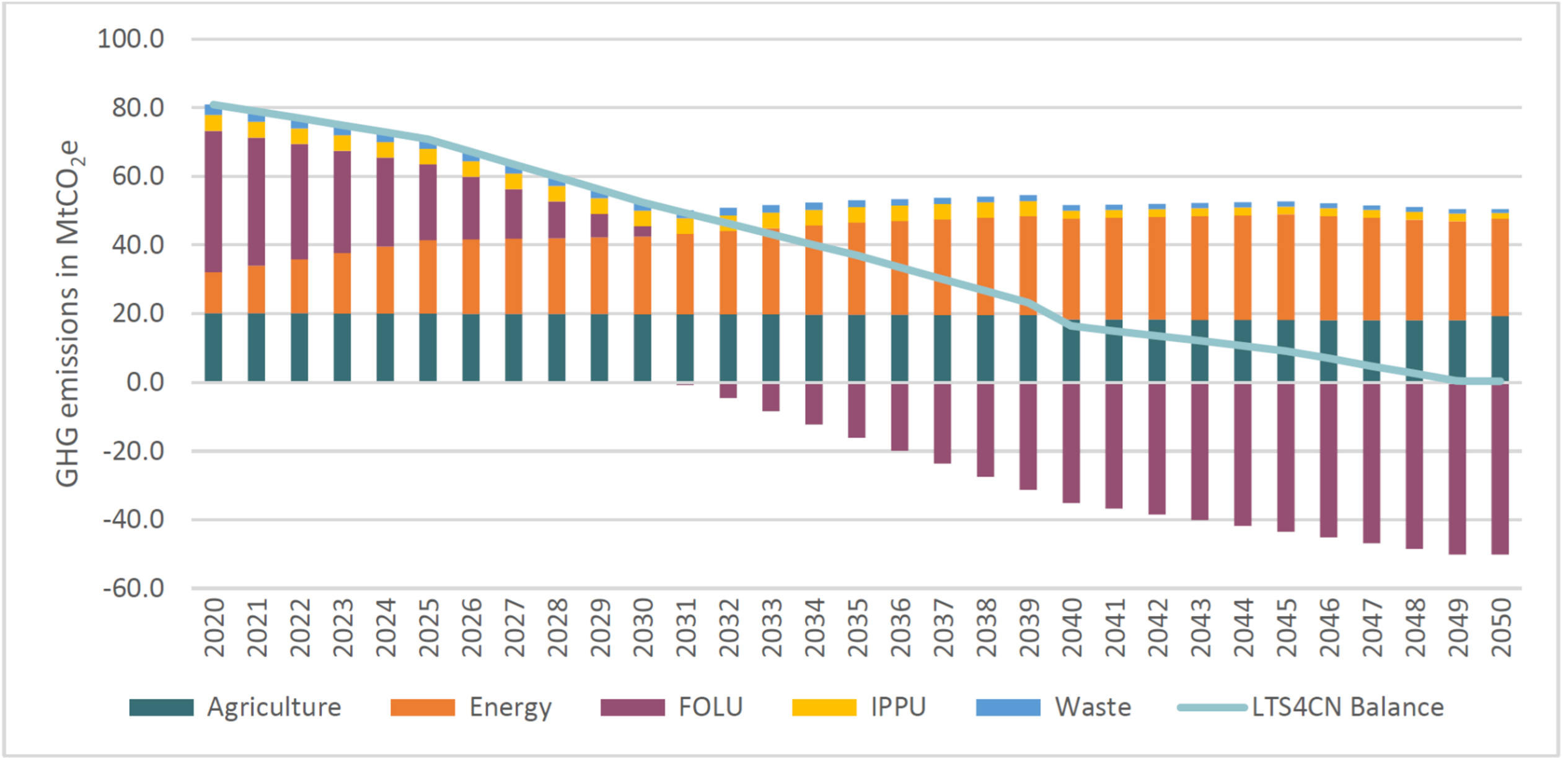


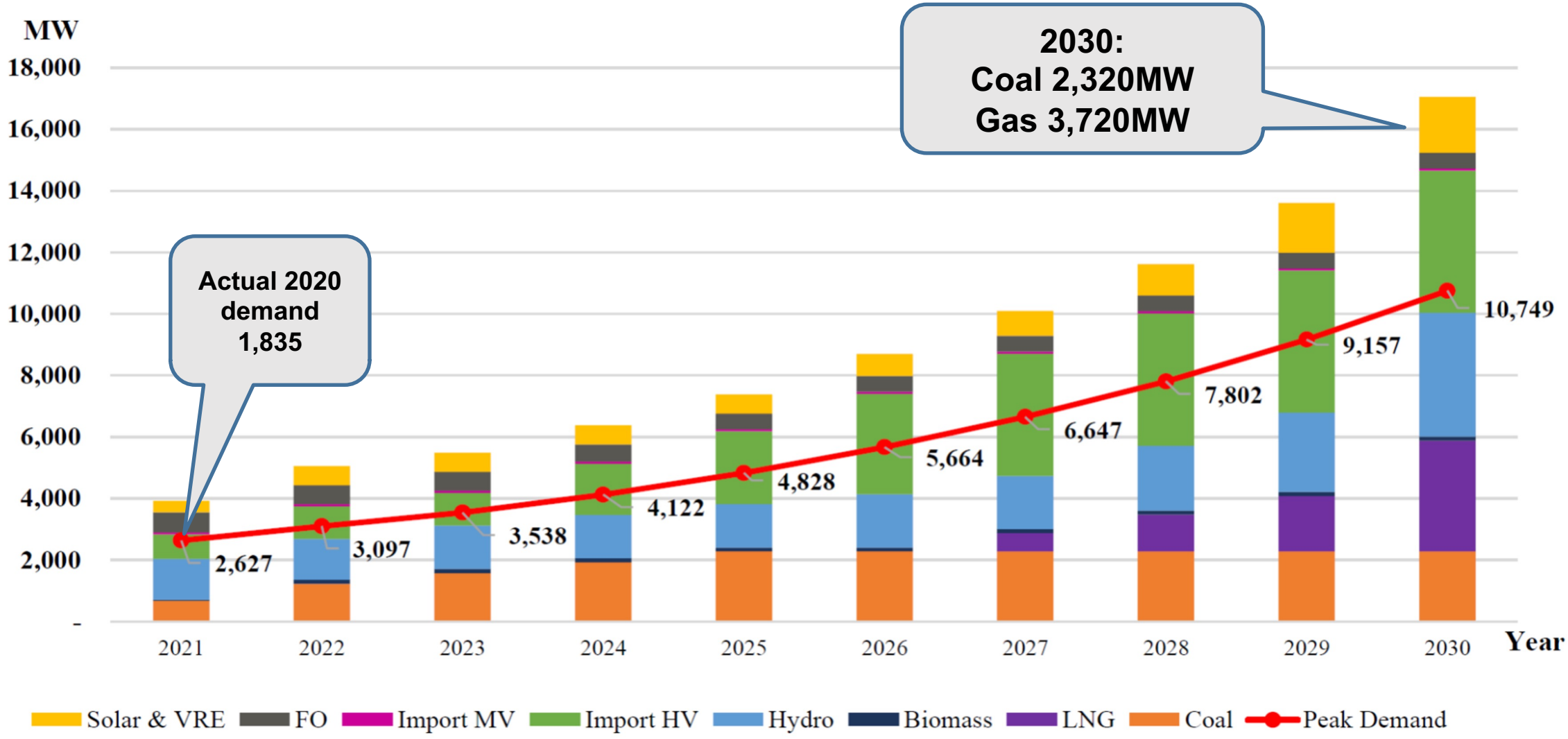
Figure 7: GHG emissions projections in the LTS4CN scenario with sectoral shares

Electricity Power Planning in Cambodia

Power Development Master Plan to 2030

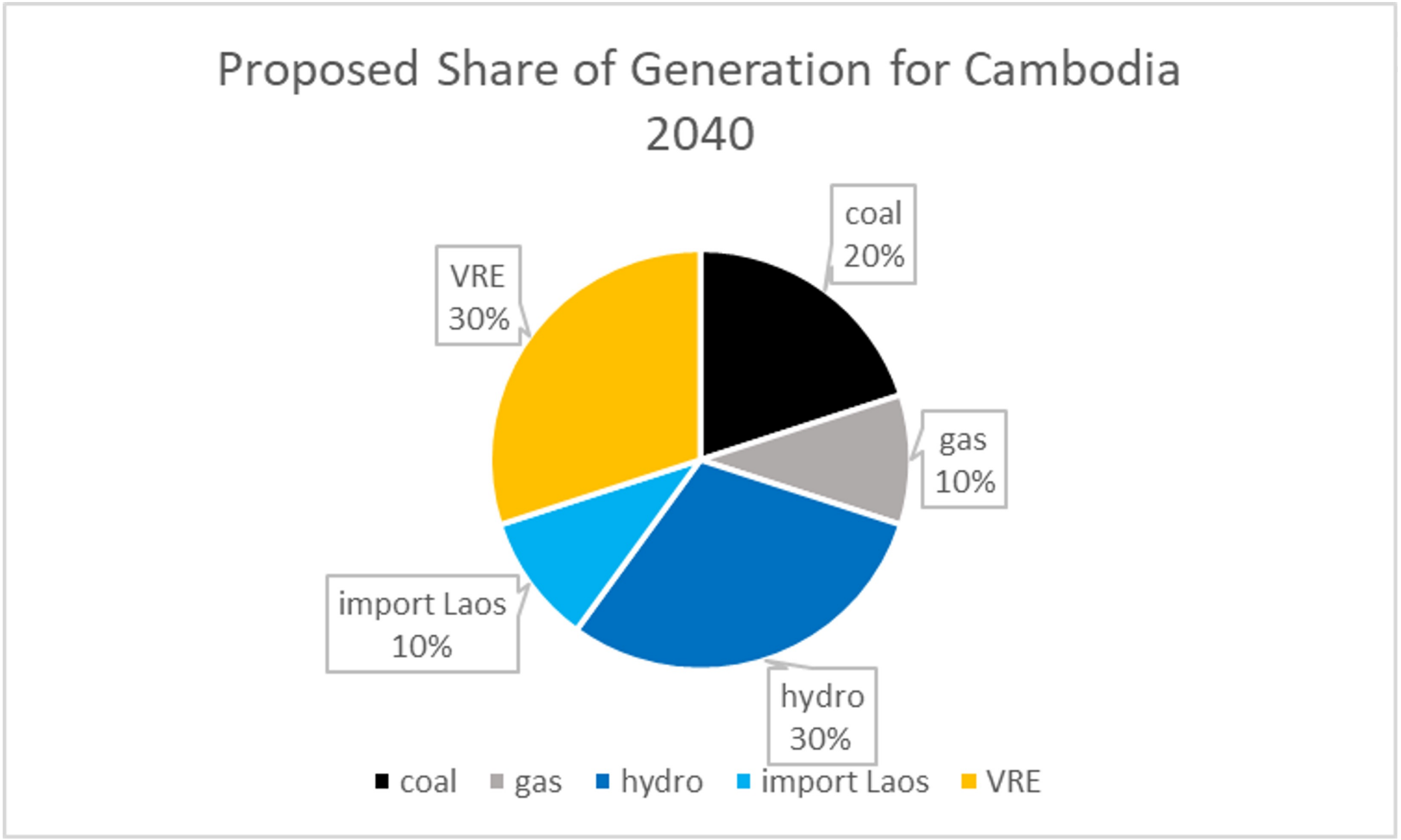
(Energy)Lab

Released Feb 2020, pre COVID very high demand projection



Cambodia Power Development Plan (2021-2040)

April 2022



EnergyLab Proposed vision for Cambodia's Energy Future

Partners Mapping – Energy Portfolio in Cambodia

Grid Reinforcement

- Grid Modernisation (EdC-AFD)
- Grid Expansion (EdC-AFD/ADB/JICA/KfW/ EDCF (Korea Eximbank))
- Enhancement of O&M of Power Network (EdC-JICA)
- Energy Efficiency in Rural Power Supply (EdC-KFW)

Sust. Cities

- Smart City Strategy - SHV (MLMUPC – DFAT/3i)
- E-Mobility (MOE/MPWT - GGGI)

Power Development Planning

- Power Development Plan 2030 (MME-Chugoku)
- Power Development Master Plan 2040 (MME-ADB)
- Cambodia energy sector assessment strategy roadmap (MME - ADB)
- Modelisation of the Energy Sector by 2050 (MEF-AFD)
- Rural Electricity Enterprises (REEs) access to Finance (REEs-AFD)
- Establishment of Energy Unit/Energy Mix Scenario Modelling/TOU and Capacity Tariff Assessment (MEF-UNDP)

Energy Access

- Mini-grids (MME, EDC, EAC - UNDP)
- Off-grid Electrification (MME, EDC, EAC – DFAT/3i)
- Energy Access Multi-tier Approach (MME – World Bank)

Renewable Energy

- Variable Renewable Energy Assessment and Integration Strategy (RAIS) (MME, EDC, EAC- DFAT/3i)
- Cambodia De-risking RE Investment (NCSD-UNDP)
- Greening the industrial Sector in Cambodia (NCSD-GGGI)
- Renewable Energy Assessment in Cambodia (ASEAN)

Solar and Wind Energy

- Economic Appraisal of Solar PV in Cambodia (MOE/NCSD - UNDP)
- Utility Scale Solar (EdC, MME – ADB)
- Solar Farm Energy Potential Assessment (MME, EDC, EAC – DFAT/3i)
- Wind Energy Potential Assessment (MME, EDC, EAC- DFAT/3i)
- Rooftop Solar (BTM) (MME, EDC, EAC- DFAT/3i, UNDP)
- Solar Water Pumping (NCDDS – UNDP/ SWITCH TO SOLAR)

Waste-to-Energy

- Refuse Derived Fuel plant (PPCA/MOE – GGGI)

Energy Efficiency

- Switch Garment (MISTI/MOE/GMAC/factories-GGGI)
- National Energy Efficiency Policy (MME, ADB)
- Energy Efficiency Market Assessment (MME-ADB)
- Building Regulations/Codes (MLMUPC, MME - JICA, UNDP)
- Standards & Labelling (MME – JEEP, ADB, ACE, UNDP)
- Minimum Performance Standards (MME-ADB, ACE)

Regional Projects

- Facilitate investments in environmentally friendly, grid-connected renewable energy sources (USAID Clean Power Asia)

CLEAN ENERGY WEEK CAMBODIA

Securing Our Economic Future

20 - 27 October 2022

Presentation Summary

- National context and transition trends towards solar and wind
- Current plans - Cambodia heavy on fossil fuels (>~70%)
- Some focus on industrial W2E, MSW challenging
- Variable Ren. Energy in Cambodia's offers several investment opportunities

(Energy)Lab

Contact

Mr. Natharoun NGO SON
Country Director, EnergyLab Cambodia
natharoun@energylab.asia

https://energylab.asia