

10th International OTEC Symposium

Program

December 4-5, 2024
Rio de Janeiro, Brazil

Hosted by:
SOCIEDADE BRASILEIRA DE ENGENHARIA NAVAL – SOBENA
UNIVERSIDADE FEDERAL DO RIO DE JANEIRO - UFRJ

Sponsored by:
CNPQ



Wednesday, December 4, 2024

8:00 – 9:00

REGISTRATION

Networking

9:00 – 9:15

WELCOME

- | | |
|------------------------------------|---------------|
| 1-1) Welcome from OTEA | S. Thirugnana |
| 1-2) Welcome and Host Introduction | J. Sales |
| 1-3) Greetings from SOBENA | TBD |

9:20 – 9:50

KEYNOTE 1

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| K1) A New Stage of OTEC: Leading Carbon Neutrality | Y. Ikegami |
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9:50 – 10:00

BREAK

10:00 – 11:20

SESSION 1 – OTEC POTENTIAL

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|---|---------------------|
| 1-4) Brazilian Ocean Thermal Energy Park and its Sites | R. Valente de Souza |
| 1-5) Spatial and Temporal Variability of Ocean Thermal Energy Resource of the Pacific Islands | J. Posterari |
| 1-6) OTEC and Offshore Wind Complementarity along the Brazilian Coastline | S. Estefen |
| 1-7) A Multi-Use OTEC Platform: Power, Cooling, Freshwater, and More | A. Copping |

11:20 – 11:30

BREAK

11:30– 12:30

SESSION 2 – OTEC in BRAZIL

2-1) Brazil-Japan Cooperation for Sustainable Development
of Fernando de Noronha Island by the OTEC-DOW
Technology Implementation A. Shinohara

2-2) Possible Ways to Install OTEC and SWAC in Fernando de
Noronha Island F. Neto

2-3) Potential for OTEC/LTTD Technology on the Remote
Island of Fernando de Noronha L. Magri

12:30 – 13:30

LUNCH

13:30 – 13:50

KEYNOTE 2

K2) OTEC for Decarbonization of Oil Platforms D. Fonseca, Petrobras

13:50 – 14:20

PANEL 1

Theme: OTEC for Fernando de Noronha
Moderator: Prof. A. Shinohara

14:20 – 14:30

BREAK

14:30 – 15:10

SESSION 3 – ECONOMICS

3-1) The good, the bad and the ugly: five years of OTEC fundraising D. Grech

3-2) Assessment of Techno-Economic Barriers for Commercialization of OTEC C. Panchal

15:10 – 15:30

BREAK

15:30 – 16:50

SESSION 4 – OUTREACH and RESEARCH

4-1) Communicating OTEC: Demystifying Technical Language
to Drive Public Interest K. Sgarbi

4-2) Efficiency and Power in Energy Conversion for OTEC T. Yasunaga

4-3) A Century in the Making: OTEC Technology
and the Precipice of Commercialization B. Strogon

4-4) Development of Turbines in Indian OTEC Programme P. Dudhgaonkar

16:50 – 17:00

BREAK

17:00 – 17:30

PANEL 2

Theme: OTEC for Oil Industry Decarbonization

Moderator: Professor AC Fernandes, Laboratory of Waves and Currents, LOC?COPPE/UFRJ

17:30 – 17:40

DAY 1 CLOSING

18:00 – 20:00

RECEPTION

Thursday, December 5, 2024

8:30 – 9:30

REGISTRATION

9:30 – 9:35

WELCOME

Day 2 Welcome from the Ocean Thermal Energy Association

Y. Ikegami

9:35 – 10:00

KEYNOTE 3

K3) OTEC Economics: Takeaways from the OES Technical Report

B. Martin

10:00 – 10:20

BREAK

10:20 – 11:20

SESSION 5 – PROJECTS

5-1) Ocean Thermal Energy-Driven Activities in Malaysia

S. Thirugnana

5-2) MOL's Support of OTEC in Japan and Abroad

B. Martin

5-3) Design and Development Status of the Open Cycle
OTEC Plant at Kavaratti Island

V. Samson Packiaraj

11:20 – 11:30

BREAK

11:30– 12:10

PANEL 3

Theme: Technological Advances in OTEC

Moderator: Benjamin Martin, Xenosys Inc.

12:10 – 13:30

LUNCH

13:30 – 13:55

KEYNOTE 4

K4) Cold Water Pipe (CWP) Joint Industry Project (JIP)-
Advancing the Technology Readiness Level of
Larger Diameter Seawater Intake and Discharge Pipes

M. Brown

13:55 – 15:35

SESSION 6 – TECHNOLOGY

6-1) Deep OTEC

V. Fachina

6-2) Combined Cycle for Offshore OTEC Installation

A. Byah

6-3) 100KW OTEC Pilot Plant using CO₂ as Working Fluid in a Novel Triple Phase
Thermodynamic Cycle (3F OTEC CO₂) in Salina Cruz, Oaxaca, Mexico

E. Pérez

6-4) An Economical 20 MW OTEC plant Can be Built Today

J. Anderson

6-5) Structural Evaluation of Process Components for
Kavaratti's Ocean Thermal Energy Conversion Plant

A. Majumdar

15:35 – 15:45

BREAK

15:45 – 16:45

SESSION 7 – OFFSHORE RESEARCH

7-1) OTEC powered Green Energy Hub for Cost Effective Long Subsea Tie Back P. Guerin

7-2) Results of the Proof of Concept Study for Enhanced
Ocean Thermal Energy Conversion (E-OTEC)

R. Robinson

7-3) Vibration Analysis of Two-material Cold Water Pipe for OTEC Systems

X. Wang

16:45 – 17:15

CLOSING DISCUSSION | OTEA General Meeting

17:15 – 17:20

CLOSING

Friday, December 6, 2024

Time TBD

VISIT to OTEC DEMONSTRATION SITE

LABOCEANO

LENO at UFRJ

Day 1



Dr. IKEGAMI Yasuyuki –Director/Professor, Institute of Ocean Energy, Saga University

Topic: A New Stage of OTEC: Leading Carbon Neutrality

Professor IKEGAMI Yasuyuki is director of the Institute of Ocean Energy, Saga University. He has led a distinguished career having joined the University in 1991, leading the research and development of OTEC and other ocean energy technologies there. He is the delegate from Japan on Executive Committee of IEA-Ocean Energy Systems, Delegate from Japan of IEC/TC114 on OTEC, and chair of the Ocean Thermal Energy Association's Executive Committee.



Dr. Daniel Fonseca de Carvalho– Senior Consultant, Petrobras

Topic: OTEC for Decarbonization of Oil Platforms

Daniel Carvalho, Mechanical Engineer, PhD in Computational Mechanics from COPPE, Senior Advisor at Petrobras Research Center, has been working at the company for 20 years, coordinating research projects in ocean engineering, ocean basin model tests, and computational fluid dynamics simulations. Currently, he is part of the conceptual technological design of production systems, with a focus on low-carbon energy supply for offshore assets decarbonization.

Day 2



Benjamin Martin – Xenesys Inc. / OTEA

Topic: OTEC Economics: Takeaways from the OES Technical Report

Benjamin Martin is a project manager at Xenesys Inc., which is focused on research and development to realize and commercialize ocean thermal energy conversion (OTEC). Xenesys' core capabilities include the design and construction management of power generation systems utilizing small thermal differences and the manufacture of heat exchangers, the most important component of such systems. It contributed to the construction of the Okinawa OTEC Demonstration Facility, and continues operation and management of the facility on behalf of the Okinawa Prefectural Government. In 2020, Mr. Martin founded the Ocean Thermal Energy Association with other members of the OTEC industry and academia where he serves as Secretary General.



Martin Brown – Ocean Energy Systems Ltd.

Topic: Cold Water Pipe (CWP) Joint Industry Project (JIP)-
Advancing the Technology Readiness Level of Larger Diameter
Seawater Intake and Discharge Pipes

Martin is a Chartered Naval Architect/Project Manager and has spent most of his 30+ year professional career in the oil industry working for Micoperi/Saipem, McDermott, DNV GL/Noble Denton and Aqualis-Braemar. He has also had a parallel interest in OTEC since undertaking an undergraduate and post graduate dissertations on the subject, as well as working as an OTEC Research Associate at the University of Newcastle-upon-Tyne.

Martin was Chairman of the Group tasked with developing IEC's standard "Part 20: Design and analysis of an Ocean Thermal Energy Conversion (OTEC) plant – General guidance" and is presently convenor for an ad hoc group to maintain and improve Pt 20. He was the main author of IEA-OES's "White Paper on OTEC" and was of the key figures involved in the establishment of the Ocean Thermal Energy Association (OTEA).

Today Martin runs Ocean Energy Systems Limited (OESL), his own consultancy company based in Aberdeen, Scotland. Aberdeen is the heart of the UK's offshore oil and increasingly marine renewables industry.

SPEAKER LIST

Speaker	Affiliation/Title
Greetings	
Dr. Sathiabama T. Thirugnana	UTM Ocean Thermal Energy Centre, Universiti Teknologi Malaysia, Director/ Senior Lecturer
Dr. Joel Sena Sales Junior	Universidade Federal do Rio de Janeiro, Instituto Alberto Luiz Coimbra de Pós Graduação e Pesquisa em Engenharia(COPPE), Laboratório de Ondas e Corrente (LOC), Professor Adjunto
Dr. IKEGAMI Yasuyuki	Institute of Ocean Energy Saga University, Director/ Professor
Session 1 – OTEC Potential	
Dr. Roberto Valente de Souza	Universidade Federal do Rio de Janeiro, Instituto Alberto Luiz Coimbra de Pós Graduação e Pesquisa em Engenharia(COPPE) , Laboratório de Ondas e Corrente (LOC), Researcher
Dr. Jessica Borges Posterari	Institute of Ocean Energy Saga University, Researcher
Segen Estefen	Universidade Federal do Rio de Janeiro, Instituto Alberto Luiz Coimbra de Pós Graduação e Pesquisa em Engenharia(COPPE), Offshore Renewable Energy Group (GERO), Professor
Dr. Andrea Copping	Pacific Northwest National Laboratory & University of Washington, Senior Advisor and Researcher
Session 2 – OTEC in Brazil	
Dr. Armando Hideki Shinohara	Federal University of Pernambuco, Professor
Flaminio Levy Neto	University of Brasília, Department of Mechanical Engineering
Luiz Alberto Magri	Toyo Setal Engineering, Mechanical Engineer
Session 3 - Economics	
Dan Grech	Global OTEC, Founder/CEO
Dr. C. B. Panchal	E3Tec Service, LLC, President & Chem Engineer

Speaker	Affiliation/Title
Session 4 – Outreach and Research	
Karina Sgarbi	Global OTEC, Communications Manager
Dr. YASUNAGA Takeshi	Osaka Electro-Communication University, Associate Professor
Bret Strogon	Ocean Thermal Energy Corporation, Director of Defense and Commercial Partnerships
Prasad Dudhgaonkar	National Institute of Ocean Technology, India, Energy and Fresh Water Group, Scientist
Session 5 – Projects	
Dr. Sathiabama T. Thirugnana	UTM Ocean Thermal Energy Centre, Universiti Teknologi Malaysia, Director/Senior Lecturer
Benjamin Martin	Xenesys Inc., Kumejima Project Department, Assistant Manager on behalf of Mitsui OSK Lines, Wellbeing & Lifestyle Business Division
V. Samson Packiaraj Raphael	National Institute of Ocean Technology, India, Energy and Fresh Water Group, Scientist
Session 6 – Technology	
Vicente Fachina	Petrobras, Engineer
Ahmed Byah	Moroccan Agency for Energy Efficiency, Engineer
Edgardo Pérez	ANCEGRI's Cooperative, President
Jim Anderson	Sea Solar Power, President
Anulekha Majumdar	National Institute of Ocean Technology, India, Energy and Fresh Water Group, Scientist
Session 7 – Offshore Research	
Pierre Guerin	2H Offshore
Roy Robinson	Excipio Energy, Inc. CTO and Head of Innovation
Xiao Wang	Universidade Federal do Rio de Janeiro, Instituto Alberto Luiz Coimbra de Pós Graduação e Pesquisa em Engenharia(COPPE), Nuclear Engineering Department

LOCAL ORGANIZING COMMITTEE



Prof. Joel Sena Sales Junior - Professor, POLI/UFRJ and COPPE/UFRJ

D.Sc. in Ocean Engineering (Universidade Federal do Rio de Janeiro), Master in Science in Ocean Engineering, Bachelor in Naval Architecture at Universidade Federal do Rio de Janeiro. Director at LOC - Laboratory for Waves and Currents - COPPE, at Federal University of Rio de Janeiro. Member of the Quality Systems Group of the International Towing Tank Conference, as specialist in Uncertainty Analysis. Member of the International Ship Structures Conference (ISSC). Adjunct Director of the Brazilian Society of Naval Architects (SOBENA).



Prof. ARMANDO HIDEKI SHINOHARA - Professor, Federal University of Pernambuco

Graduate at Engenharia Mecânica from Universidade Estadual de Campinas (1986), master's at Mechanical Engineering from Universidade Estadual de Campinas (1990) and ph.d. at Engenharia e Ciência dos Materiais from University Of Tohoku (1994). Has experience in Material and Metallurgical Engineering, focusing on Ceramics, acting on the following subjects: synthetic and natural quartz, saxs, x-ray topography and digital radiography.



Prof. SEGEN FARID ESTEFEN - General Director, National Institute for Ocean Research (INPO)

Graduation at Engenharia Civil from Universidade Federal de Juiz de Fora (1973), master's at Naval and Oceanic Engineering from Universidade Federal do Rio de Janeiro (1976) and doctorate at Engenharia Civil from Imperial College London - South Kensington Campus (1984). He is currently member advisory committee ooae division- asme at Ocean Offshore And Arctic Engineering Division. Has experience in Naval and Oceanic Engineering, focusing on Naval and Oceanic Structures, acting on the following subjects: dutos submarinos, pipelines, sandwich pipes, risers and ocean renewable energy devices.



Prof. KAZUO NISHIMOTO - Professor, POLI/USP

Holds an undergraduate degree in Naval and Ocean Engineering from the University of São Paulo (1979), a master's degree in Naval and Ocean Engineering from Yokohama National University (1982), and a doctorate in Naval and Ocean Engineering from the University of Tokyo (1985). Currently, he is a full professor at the University of São Paulo. His specialization is in Naval and Ocean Engineering, with an emphasis on Hydrodynamics and the Design of Ships and Ocean Systems. However, his work has increasingly focused on integrating various engineering knowledge and basic sciences as the founder of the Numerical Test Tank (TPN), primarily in the areas of Numerical Simulation of Ocean Systems Dynamics and the Development of New Ocean Systems. Recently, he established a new research center under the FAPESP/CPA program—the Offshore Technology Innovation Centre (OTIC) in collaboration with Shell, with a primary focus on developing future ocean systems, emphasizing decarbonization and digital transformation.

