Carbon Dioxide Enhanced Oil Recovery Road Map (CERM)

Collaboration for Efficiency, Resourcefulness, and Maximisation

The CERM Project is the innovative collaboration between academic institutions, The University of the West Indies (UWI) and The University of Trinidad and Tobago (UTT), and Government Energy Institutions- the Ministry of Energy and Energy Industries (MEEI), PETROTRIN and the National Gas Company (NGC)- toward sustainable development of known oil reserves using the technology Carbon Dioxide Enhanced Oil Recovery (CO_2EOR)

DEVELOPING 1 BILLION BARRELS OF OIL RESERVES

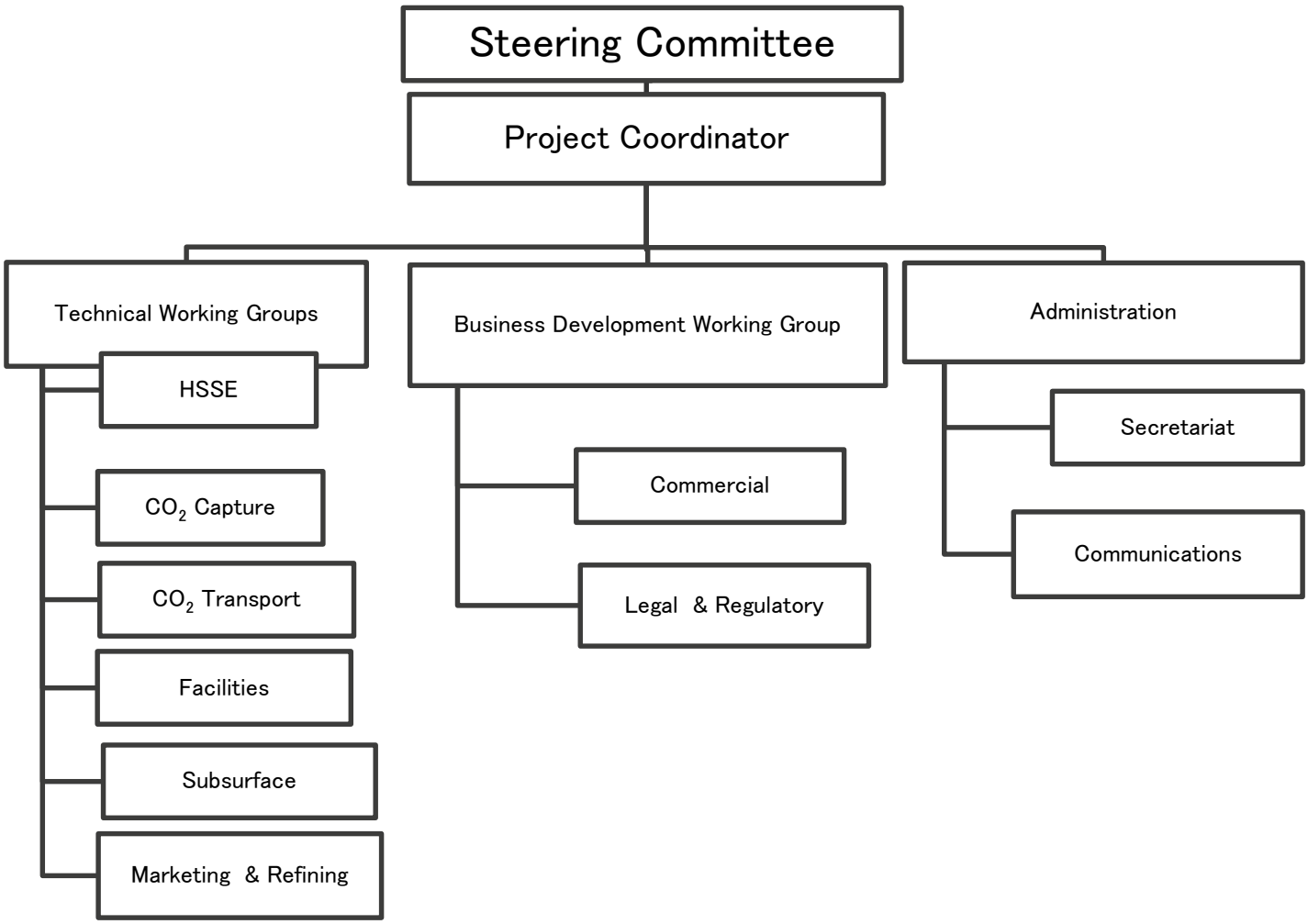
The CERM Project is a major step toward Trinidad and Tobago developing 1 billion barrels of oil reserves. The CERM Project puts the local energy sector in a position to be ***proactive*** in developing ***known oil reserves*** using carbon dioxide enhanced oil recovery (CO_2EOR) and here is why,

1. Enhanced Oil Recovery (EOR) is the only way to increase production of remaining oil reserves after primary production.
2. The CERM Project will support timely and strategic deployment of Carbon Dioxide Enhanced Oil Recovery (CO_2EOR).
3. Trinidad and Tobago missed the opportunity to use CO_2EOR to increase oil production when the price of oil was over USD100 per barrel.
4. Now is the time to gather information and put together a plan of action for timely implementation of CO_2EOR.
5. The work of the CERM Project gives technically sound estimates of the increase in oil production using CO_2EOR, and the volume of CO_2 needed based on reservoir simulation.
6. The work of CERM Project gives technically sound estimates of costs and the rate of return on investments.
7. Ongoing research being conducted by UTT (upstream and downstream) and UWI (upstream) will ensure that customized solutions are put forward to meet technical challenges.
8. With the CERM Project we are building local expertise in CO_2EOR with a new generation of geoscientists and engineers, some with training in both upstream and downstream operations.
9. The approach of CERM-using local expertise-reduces the reliance on foreign consultants and ensures that institutional knowledge is retained within several local institutions.
10. In time Trinidad and Tobago can become an exporter of this technology with local service providers providing consulting and operation services.
11. The CERM Project will prepare Trinidad and Tobago for geological CO_2 sequestration. This is in keeping with low carbon development and the National Climate Change Policy.

CERM = Increased Oil Production

CERM |TEAM

The CERM Team - Steering Committee, Technical Working Groups, Business Development Groups and Administration- consists of staff from the Ministry of Energy and Energy Industries, PETROTRIN, the National Gas Company, the National Energy Corporation, UWI and UTT. Over 25 professionals are working together to create a sustainable and prosperous future for Trinidad and Tobago. The Working Groups and Administration are managed by the Project Coordinator to achieve the directives provided by the Steering Committee (see Operational Structure below). In the next issue we will profile the Working Group Leaders. There are eight Working Group Leaders who oversee the activities of their individual Working Groups and report progress to the Project Coordinator, Dr. Lorraine Sobers. They are responsible for preparing the work plan for their respective working groups, allocating responsibilities, organizing meetings and ensuring that deadlines are met.



CERM = Collaboration, Coordination, Cooperation

CERM | Progress Report

Technical Progress

Over the next three months the Subsurface, Capture, Transport, Facilities and Commercial Working Groups will be kicking into high gear. So far the Subsurface Working Group, led by Dr. Mohammad Soroush, (see page 4) has been leading the way in identifying the pilot project site and building the static geological model. Reservoir simulation work will be conducted in October and November. Early estimates of CO_2 injection volumes, rates and pressure are passed on to the CO_2 Capture, Transport and Facilities Groups to include in their designs and analysis.

Working out Logistics

There have also been early discussions with regulatory bodies to ensure that timely actions are taken to fulfill regulatory requirements. The CO_2 Capture, Transport and Facilities Groups have been meeting with potential service providers to evaluate the cost of CO_2 delivered to the field and determine preliminary design specifications of facilities.

Legal and Financial Nuts and Bolts

There are a few exciting things happening in the background to complete formal arrangements for the CERM Project. Within the next two months, the Memorandum of Understanding will be signed by all parties making way for the final stage in formalizing the project. Also during that time funding arrangements are expected to be finalized.

TOGETHER WE ASPIRE, TOGETHER WE ACHIEVE

CERM| 2nd Workshop

On September 28th, 2017 CERM Team Members met at the Petrotrin Learning Centre for the 2nd CERM Workshop. PETROTRIN sponsored the half day programme which was facilitated by the CERM Project Coordinator, Dr. Lorraine Sobers. The purpose of the Workshop was three-fold: 1) To share updates from Working Groups, 2) To map activities in greater detail and 3) To identify work to be completed within the next three months. The Workshop was very interactive and participants gained a better understanding of their role within the CERM Project.

Participants:

(Top photo L to R: Wayne Bertrand, Candace Subero-Bailey, Shivani Rambarack, Shivan Sitahal, Richard McCarthy, Tricia Nelson-Thomas, Ramesh Chansingh (partially hidden)

Bottom photo L to R: Reiann Jones, Dr. Mohammad, Soroush, Tanuja Balkeran, Renelle Bascombe, Shakola Mc Lean

Not pictured: Jasmine Medina, Steffan Ramlogan, Terrance Ali, Dr. Lorraine Sobers, Kavita Mahabir

CERM SPOTLIGHT | Subsurface Working Group

The Subsurface Working Group has played a very active role in the last six months in achieving the objectives of the CERM Project. Dr. Mohammad Soroush and his team have worked closely with PETROTRIN Technical Data Centre supported by UTT Research Assistants to compile reservoir data. In the upcoming months MSc. students from UWI will be joining the team to evaluate various scenarios using reservoir simulation. The members of this Group comprise the following:

Leader

Dr, Mohammad Soroush	Assistant Professor, UTT

Members

Richard McCarthy	Senior Reservoir Engineer, PETROTRIN
Tricia Nelson	Senior Geologists, PETROTRIN
Shivani Maharaj	Geophysicist, Service Provider, MEEI
Tanuja Balkeran	Geoscientist, Service Provider, MEEI
Reiann Jones	Petroleum Engineer, Service Provider, MEEI
Dr. Lorraine Sobers	Lecturer, UWI

CERM = SYNERGY

Dr. Mohammad Soroush

Subsurface Working Group Leader Dr. Mohammad Soroush is an Assistant Professor at the University of Trinidad and Tobago. He earned his Bachelor of Science (B.Sc.) and Master of Science (M.Sc.) in petroleum engineering from the Petroleum University of Technology in Iran. Dr. Soroush then pursued his postgraduate studies, including a MEng and Ph.D., both in petroleum engineering, from the University of Calgary in Canada.

The main area of his research involves working on reservoir engineering and production optimisation, analytical and numerical (simulation) modelling, integrated reservoir characterisation, geostatistics, and enhanced oil recovery of conventional, heavy oil, and tight/shale gas reservoirs. Dr. Soroush has more than (10) ten years of teaching/research and professional experiences in petroleum engineering. He received a number of awards and scholarships and has published over (20) twenty papers in peer reviewed journals and for international conferences.

Currently, he is teaching petroleum and reservoir engineering courses at the MEng and M.Sc. level, including but not limited to courses such as Advanced Reservoir Simulation, Reservoir Characterisation, Basic Well Logging and Petrophysics. Additionally, he is supervising MEng, M.Sc., and MPhil (Ph.D.) students' research projects.

Editor in Chief: Dr. Lorraine Sobers