

Energy Caribbean

*Energy from a different perspective.*

# Geominex

Canada 1998 | Trinidad and Tobago 2004 | England and Wales 2015  
Energy & Mining Exploitation from concepts to cashflow

Unconventional Energy (Oil Sands & Shales)  
Minerals Resources Consultants and Developers

Geominex

Energy Caribbean

A Presentation to the 16<sup>th</sup> Energy Caribbean Conference

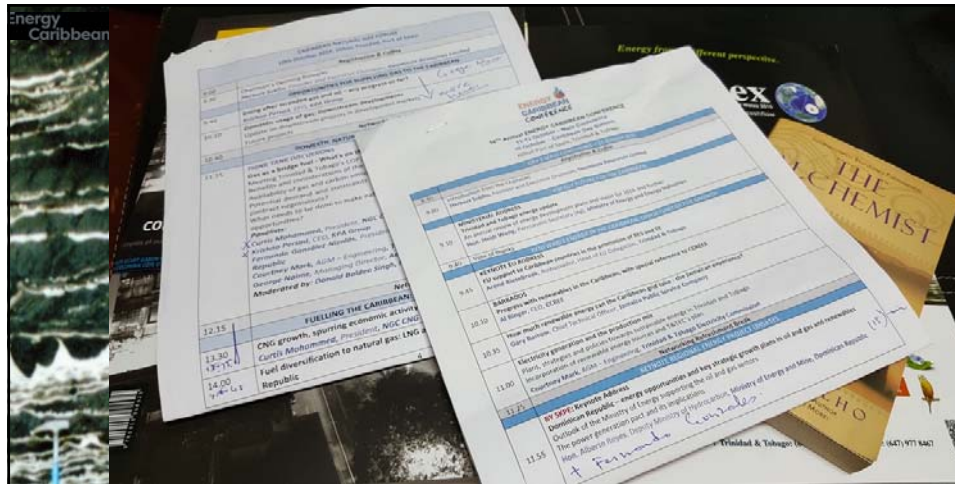
## Update on the Trinidad Oil/Tar Sands Deposits “The Third Wave of Energy Development”

Focus on Parrylands, Guapo, Antilles-Vessigny Fields South Western Peninsula

Herbert Sukhu, CEng PEng FIMMM FGS FIQ (UK), MSc BSc  
Process Utilities and Petroleum Engineer and Mining Geologist,  
CO-FOUNDER, DIRECTOR AND PRESIDENT, GEOMINEX GROUP (ENGLAND AND WALES)  
TRINIDAD & TOBAGO,  
[HTTP://WWW.GEOMINEX-RESOURCES.COM](http://www.geominex-resources.com)  
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Country: Trinidad & Tobago | Investor: Geominex Resources Limited

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...Beneath the novels compelling story and the shimmering elegance with which it was told lies a bedrock of wisdom...

Country: Trinidad & Tobago      Investor: Geominex Resources Limited



.....Attendance on Days 1 and 2...

Country: Trinidad & Tobago      Investor: Geominex Resources Limited



energy Caribbean

**Unconventional Oil Resources, Developing Trinidad's Tar Sands**

Proven Future Energy in Small Island Developing States

An Environmentally Friendly

**THE ALCHEMIST**

Umberto Eco

Herbert McD M Sukhu

Process Utilities & Petroleum Engineers and Mining Engineers

Thornhill, Ontario, Canada

Port of Spain, Trinidad & Tobago

London, England, UK

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...Beneath the novels compelling story and the shimmering elegance with which it was told lies a bedrock of wisdom...

Country: Trinidad & Tobago

Investor: Geominex Resources Limited

Geominex

RESOURCES

HOUSING

MEDIA

## The Trinidad Energy and Mining Project

**So where are we in 2016**

Exploration Support Scoping Studies

Economic Evaluation, Financial Modelling

Pre Feasibility Studies

**Feasibility Studies**

**Design and Engineering Management**

**Construction management**

**Project management**

Geominex



## The Trinidad Energy and Mining Project

**So where are we in 2016**

We are a local and international Oil Sands and Oil Shales environmentally friendly developers working towards producing the first barrel of indigenous Synthetic Crude Oil from our 2.9 Billion Barrels of untapped Unconventional Bituminous Tar Sands Reserves located in the La Brea Constituency of the South-Western Peninsula.

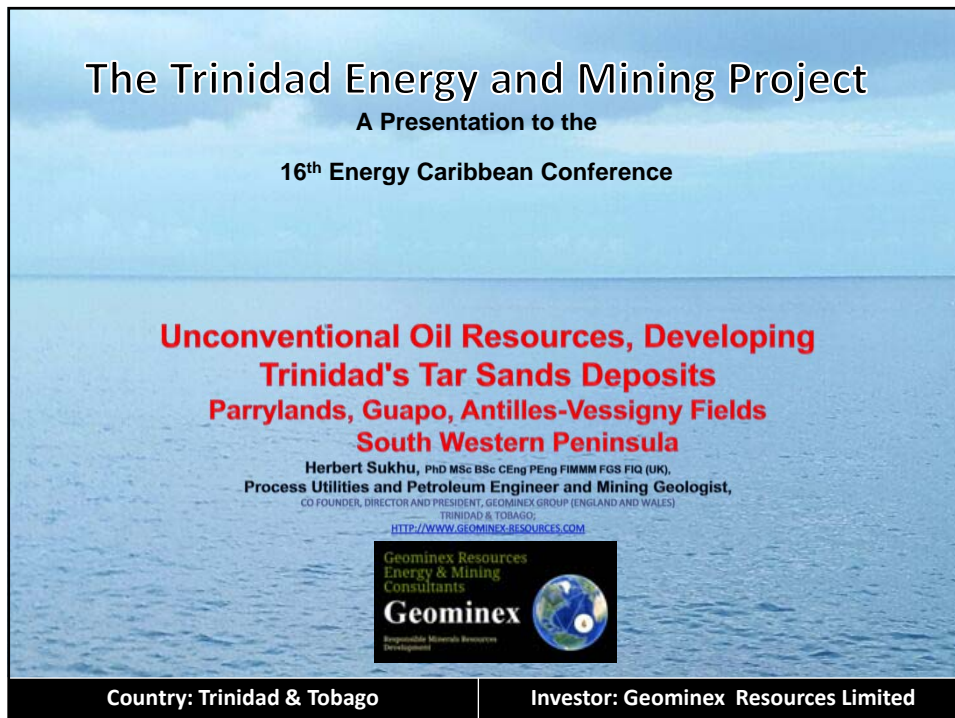
We confidently seek the support of the Government of the Republic of Trinidad and Tobago and all Stakeholders in this exciting private/public sector partnership.

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For Further Information Go To <http://www.geominex-resources.com>

Investor: Geominex Resources Limited

Geominex Resources Energy & Mining Consultants



## The Trinidad Energy and Mining Project

A Presentation to the  
16<sup>th</sup> Energy Caribbean Conference

**Unconventional Oil Resources, Developing  
Trinidad's Tar Sands Deposits  
Parrylands, Guapo, Antilles-Vessigny Fields  
South Western Peninsula**

Herbert Sukhu, PhD MSc BSc CEng PEng FIMMM FGS FIQ (UK),  
Process Utilities and Petroleum Engineer and Mining Geologist,  
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**Geominex Resources  
Energy & Mining  
Consultants**  
**Geominex**  
Responsible Mineral Resources  
Development

Country: Trinidad & Tobago

Investor: Geominex Resources Limited

## Highlights: Recognition of Research Work on Trinidad Oilsands

Item	Name	BSc	MSc	Phd	Post Phd	Profession (Disciplines)	Nationality	Years Exp
1	Clarke Professor	X	x	Geo Chem		Chemist (Developed the CHWP) (Ch)	British/Canadian	40
2	Suter	X		Geo		Geologist (Geo)	British	40
3	Higgins	X				Geologist	British	40
4	Kugler	X		Geo		Geologist	Swedish	40
5	Bower	X		Geo		Geologist	British	40
6	Bains	X		Geo		Geologist	British/American	40
7	Persad	X		Geo		Geologist	Trinidadian	40
8	Bertrand Distinguished Fellow	X	MBA			Geologist	Trinidadian	40
9	Rambaran	X				Geologist	Trinidadian	40
10	Elliot	X				Geologist	Trinidadian	35
11	Beard	X				Geologist	Trinidadian	40
12	Alexander	X				Geologist	Trinidadian	40
13	Sukhu (1980)	X	x	Techno Econ		MinGeo/Process-PetEngineer	Trinidadian/Canadian	37
14	Speight Professor	X	x	Geo/PE/Process	x	MinGeo/Process-PetEngineer	British/American	45
15	Kunar Professor	X	x	PE	x	Pet Engineer	Guyanese/American	40
16	Rajpaulsingh	X	x			Geologist/PetEngineer	Trinidadian	40
17	Kuarsingh	X		Geo		Geologist/Stratigrapher (ST)	Trinidadian	40
18	Maharaj	X	x	Chem		Chemist	Trinidadian	20
19	Sumadh	X				Geologist	Trinidadian	35
20	Russell	X	x			PetEngineer (PE)	Trinidadian	35
21	Baldeo	X				Process Engineer (PRE)	Trinidadian	35
22	Morely	X	MBA			Mining Geologist (MG)	American	40
23	Massingill	X	x	Geo		Geologist	American	40
24	Okita	X	x	Environ		Environmental Engineer	Canadian	40
25	Jeff Stibbard	X	MBA			Mining Engineer (ME)	Canadian	25
26	Barry Davis	x	MBA			Mining Geologist	Canadian	40
Totals		26	13	13	2	15 Geo /2Ch/5PE/3PRE/1ST/ 1ME/4MG		987


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Highlights: Work Done within Recent Times	
1.	Sukhu, H. (1992). The Syncrude Canada Limited tar sand/oil sand model, Alberta Oil Sands Research Authority, Alberta Research Council- Alberta Geological Survey, Nov. 1992. Unpublished Report. No 1240-6, pp 116, Edmonton: AOSTRA-AGS.
2.	Sukhu, H. (1993). Surface geology of the Lower Morne L'Enfer outcrop, Parrylands/ Forest Reserve Area and review of surface infrastructure. Penal: Trintoc/Petrotrin. Production Research Report No. 46. Unpublished.
3.	Maharaj, U., Sukhu, H. (1995). Technologies for the development of Trinidad and Tobago tar sands. 6th UNITAR International Conference of Heavy Crude and Tar sands February 12-17, 1995, Houston, Texas: UNITAR.
4.	Sukhu, H. Speight, J. (2008). Techno-development of Trinidad tar sand deposit for Synthetic crude oil production. Presentation to the Tobago Gas Technology Conference 2008 "Next Generation Energy Technologies" October 7-10, 2008 VHL Tobago Golf and Spa Resort. Retrieved from <a href="https://u.tt/tgtc/2008/presentations/regular/techno_evaluation.pdf">https://u.tt/tgtc/2008/presentations/regular/techno_evaluation.pdf</a>
5.	Sukhu, H. (2011). The way forward for developing Trinidad Tar Sands Resources. Presentation to the 11th Caribbean Energy Conference, September 27, 2011, Trinidad Hilton, Port of Spain: Informa Energy.
6.	Sukhu, H. (2012). Unconventional Oil Resources in the Caribbean. Presentation to the 12th Caribbean Energy Conference Workshop, October 2, 2012, Trinidad Hilton, Port of Spain: Informa Energy.
7.	Morley, R., Sukhu, H. (2012). Developing Trinidad tar sand resources, Presentation to the Ministry of Energy and Energy Affairs. September 13, 2012: Geominex Teos Limited, Unpublished.
8.	Sukhu, H., Morley, R. (2013). Developing Trinidad's Tar Sands for the production of Synthetic crude oil (37.5oAPI Gravity). Presentation to the 13th Caribbean Energy Conference, October 1, 2013, Trinidad Hilton, Port of Spain: Informa Energy.
9.	Sukhu, H. (2014). A Future Energy Techno-Economic Investment Opportunity that Cannot be Ignored in the Parrylands, Guapo, Antilles-Vessigny Fields, South Western Peninsula. Presentation to the 14th Caribbean Energy Conference October 02, 2014 Trinidad Hilton, Port of Spain: Informa Energy.
10.	Sukhu, H. (2015). A Future Energy Techno-Economic Investment Opportunity, Cost Effective Solutions in the Parrylands, Guapo, Antilles-Vessigny Fields, South Western Peninsula. Presentation to the 14th Caribbean Energy Conference October, 2015 Trinidad Hilton, Port of Spain: Informa Energy.



## The Geominex Resources Trinidad and Tobago Energy and Mining Project



**Highlights: Recognition of Research Work on Trinidad Oilsands : Where it all began.**

**25420**

**TECHNOLOGIES FOR THE DEVELOPMENT OF  
TRINIDAD'S TAR SANDS**

Uttam S. Mahapatra and Herbert Sukha  
Petroleum Company of Trinidad and Tobago Limited, Administration Building, Pointe-à-Pierre, Trinidad, West Indies

**ABSTRACT**

The Petroleum Company of Trinidad and Tobago possesses a tar sand deposit containing an estimated 500 million barrels of bitumen within its lease. The resource is a sandstone reservoir, the Lower Marine I. Eocene formation which is of Pliocene age. It spans 12.84 square kilometers (3.179 acres) and occurs as a surface and near surface deposit, of which a substantial portion may be exploitable by a surface mining/reconstruction type process.

done for a 25-year process producing 30,000 barrels/day, related underground supply costs for a depth of 50-100 feet for a combined cost of \$14-20 US/cubic foot.

**INTRODUCTION**

The country of Trinidad and Tobago possesses approximately two billion barrels of bitumen contained in surface and near surface deposits [1]. The largest deposit, containing about one half of the known in-country oil



### Definition of Tar Sand

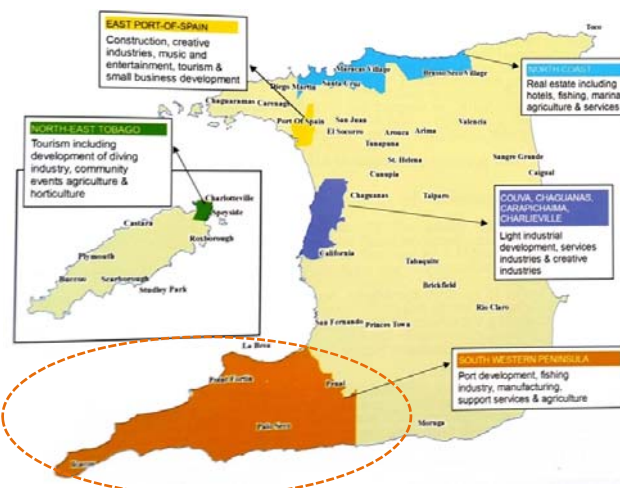
Trinidad's tar sands reserves possess an °API gravity of 4.0° to 7.0°, and, therefore, a definition by the Government of United States of America (USA) patent (FE-76-4) is relevant:

**"Tar sand refers to the several rock types that contain an extremely viscous hydrocarbon which is not recoverable in its natural state by conventional oil well production methods including currently used enhanced recovery techniques. The hydrocarbon-bearing rocks are variously known as bitumen-rocks, oil-impregnated rocks, tar sand, and rock asphalt."**

By inference, heavy oil is a resource that can be recovered in its natural state by conventional oil well production methods including currently used enhanced recovery techniques.

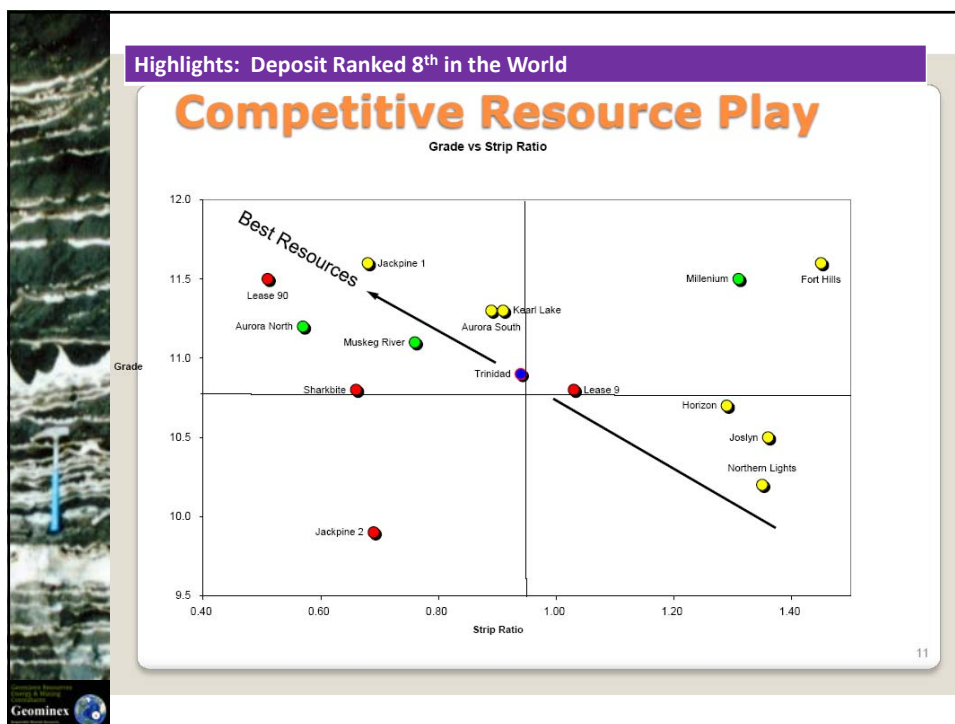


### Will Tar Sands Production Ever Be a Reality? Location?



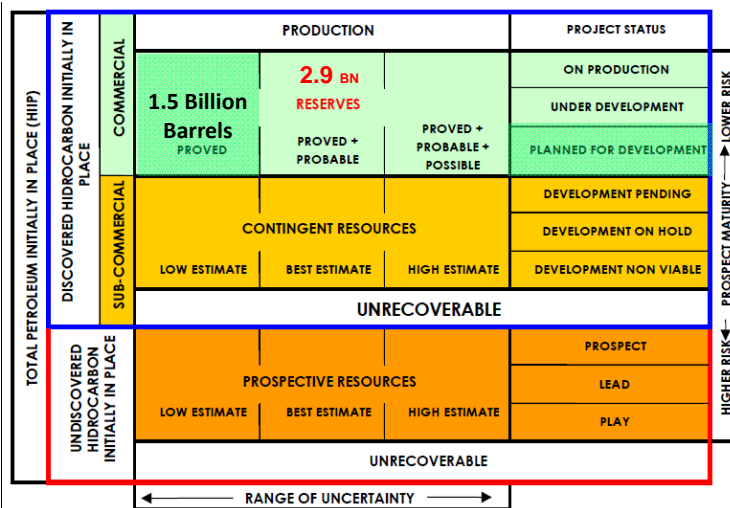
**South Western Peninsula of Trinidad & Tobago  
Live, Work, Invest, Recreate**

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## September 2015, SPE/WPC/AAPG/SPEE Reserves and Resources Classification System. Proved Unconventional Oil Sands Reserves today 2015



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## Highlights: Interest in Tar Sands?

**TAR SANDS**

**TT may be warming to the idea**

Minister of Natural Resources, Jody Wilson-Raybould, said today that the federal government is "warming to the idea" of a tar sands project in the Northwest Territories. She said the government is "open to the idea" and is "looking at the potential" of the project. She said the government is "not yet ready to make a decision" but is "open to the idea" and is "looking at the potential" of the project.

**Setbacks for tar sands project**

The federal government is facing setbacks in its efforts to approve a tar sands project in the Northwest Territories. The project has been delayed by a number of factors, including a lack of funding and a lack of support from the local community. The government is currently reviewing the project and is expected to make a decision in the near future.

**FUTURE INVESTMENT OPPORTUNITY THAT CAN'T BE IGNORED: TAR SANDS**

The federal government is considering a future investment opportunity in the tar sands industry. The investment would be in the form of a new tar sands project in the Northwest Territories. The government is currently reviewing the project and is expected to make a decision in the near future.

**Drilling in late 2014**

The federal government is planning to start drilling for oil in the tar sands industry in late 2014. The drilling is expected to be a significant step in the development of the industry and is expected to create a number of jobs.

**Tar sand mining plan at standstill**

The federal government's plan to mine tar sands is currently at a standstill. The plan has been delayed by a number of factors, including a lack of funding and a lack of support from the local community. The government is currently reviewing the plan and is expected to make a decision in the near future.

**2014: Sukhu's Trinidad Energy & Mining Project in the News**

Sukhu's Trinidad Energy & Mining Project has been featured in the news in 2014. The project has been described as a "major investment" and is expected to create a number of jobs. The project has also been described as a "significant step" in the development of the industry.

**Trinidad Tar Sands - A Deranged Oil Man's Dream**

The Trinidad Tar Sands project has been described as a "deranged oil man's dream" by some critics. The project has been delayed by a number of factors, including a lack of funding and a lack of support from the local community. The government is currently reviewing the project and is expected to make a decision in the near future.

**Business**

**Bharath sees benefits in tar sand mining**

Bharath, a prominent figure in the tar sands industry, sees significant benefits in tar sand mining. He believes that the industry has the potential to create a number of jobs and to contribute significantly to the economy. He is currently working with the government to develop the industry.

**Trinidad Tar Sands - A Deranged Oil Man's Dream**

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<https://www.facebook.com/LovelyTrinidadandTobago>

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## Highlights: Interest in Tar Sands?

## ARE WE SO DESPERATE FOR MORE OIL?

Originally printed at <http://www.trinidadexpress.com/business-magazine/ARE-WE-SO-DESPERATE-FOR-MORE-OIL-256280491.html>

April 22, 2014

As the quest for increased oil production and additional oil reserves intensifies, inevitably, focus shifts to this country's tar sands (oil sands) potential that are estimated to hold up to two billion barrels of oil. With daily crude and condensate production stuck at around 80,000 barrels per day (bpd), and proved reserves hardly moving from 800 million barrels, there are ~~stident~~ calls for Government to give the green light to companies that are poised to exploit tar sands deposits in southern Trinidad.

Two weeks ago, in this publication, one such company, Geominex Resources Ltd, claimed to have signed a memorandum of understanding (MOU) with InvestTT, the investment arm of the Ministry of Trade, Industry and Investment, to initiate feasibility studies on mining tar sands.

Geominex

## Highlights: Interest in Tar Sands?

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### Trinidad X-Heavy – Synthetic Oil Project Outlook

Proved Reserves (MMBbls):	800
XHeavy Oil Production Rate (MBD):	114
Synthetic Crude Prod. Rate (MBD):	100
Total CAPEX (MM\$):	4,100
Upstream (MMUS\$):	1,000
Downstream (MMUS\$):	3,100
Loan (% Total CAPEX):	90
Loan Interest (%):	10
XHO Production Costs (US\$/B):	10
Upgrader Operation Costs (US\$/B):	8
Operation (Days / Yr):	360
Tourarounds (Days/ Interval Yrs):	40 / 4
Price of SCO for Eval (US\$/B):	60
Duration (Years):	22

Tax Regime Considered:	
Royalty + Production Levy (%):	2.0
Petroleum Profit Tax (%):	35.0
Supp Petroleum Tax (%):	0.0
Unemployment + Green Fund Levy (%):	5.1

IRR (%):	
NPV @ 15% DR (MM\$):	211
Pay-Out Time (Years):	<7
Profitability Index (%):	5.1

Notes:

- Current Tax Regime is being revised for XHeavy Oil Production
- Project economics doesn't consider possible integration with PaP Refinery for processing BoB streams and the sub-products (Coke and Sulphur) were valued @ \$

Source:: A collaboration between Vesi Trinidad Limited 2015 (Venezuela Data) and Imtiaz Ali – Petrotrin Vice President,(Trinidad Data) ,Private Proposal.- Presentation to Geominex Resources - December 02, 2015

Geominex



**Highlights: Interest in Tar Sands?**

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### Highlights: Interest in Tar Sands?

THIS MEMORANDUM OF UNDERSTANDING (hereinafter referred to as the "MoU") by and between:

INVESTTT LIMITED

Companies Act No. 19 of 2000

and Tobago and has its registered office at

Road Extension, Port Antonio, Trinidad and Tobago

(hereinafter called "InvestTT")

GEOMINEX RESOURCES LIMITED

under the Companies Act No. 19 of 2000

31 Alfredo Street, Port Antonio, Trinidad and Tobago

(hereinafter called "Geominex")

investTT and Geominex


individually as a "Party"

IN WITNESS WHEREOF, the Parties have through their duly authorized representatives signed on the date and year first hereinabove written.

For InvestTT Limited

For Geominex Resources Limited

By:   
Authorized Signature

By:   
Authorized Signature

Name: Raula Moses  
Type or Print

Name: Herbert McDm Sukhu  
Type or Print

Title: PRESIDENT

Title: Executive Chairman

Date: 12/2/14

Date: February 08, 2014

Witness

Witness:

Mol

InvestTT & Geominex Resources Limited

Page 7 of 7

### Highlights: Interest in Tar Sands-Recent Developments?

MEMORANDUM OF UNDERSTANDING (hereinafter referred to as the "MoU") and EXPRESSION OF INTEREST by and between: FERROSTAAL-TOPSOE GmbH, and GEOMINEX RESOURCES LIMITED,

FERROSTAAL TOPSOE  
PROJECTS

FERROSTAAL TOPSOE  
PROJECTS

Ferrosstaal Topsoe GmbH (Fertopsoe) (hereinafter referred to as "Fertopsoe")

Dr. Herbert Sukhu  
Executive Chairman  
Geominex Resources Ltd  
Port of Spain  
Trinidad & Tobago

InvestTT Limited  
Phone: +1 868 612 1100  
Fax: +1 868 612 1100  
Email: info@investtt.com  
Date: 08 December 2014

Subject: Expression of interest to develop the Trinidad & Tobago Energy and Mining Project

Dear Dr. Sukhu,

We once again would like to thank you for your time and the fruitful meeting in Port of Spain on 18<sup>th</sup> November 2014, in which we discussed the above referenced project.

We as Ferrosstaal Topsoe Projects GmbH (FTP), wish to confirm through this letter our keen interest to enter into serious discussions with your company, Geominex Resources Ltd, about our possible role and participation in the integrated development and execution of this challenging integrated Mining, Extraction, Processing, and Hydrofracturing complex, and to support you through the whole development and execution process. As explained, a key part of this equation will be the ability of Geominex to obtain all the necessary government approvals for the project to proceed.

We as a joint venture between Haber Topsoe and Ferrosstaal, are in position to combine the core competencies of both ventures, the project development and execution competencies of Ferrosstaal in Trinidad as well as Haber Topsoe's Refining technology. Since the personnel of FTP is experienced in large scale projects and various business segments like petrochemicals, refining, fertilizer and power as both contractor and investor / shareholder, we know very well the needs and requirements of possible investor, contractors and clients. Ferrosstaal FTP can and will evaluate and implement such deep insight during the planning and execution phases, by taking the owner and entrepreneurial view.

Especially for this project, we are in position to provide services based on an extensive track record especially for:

- Integrative approach based on Haber Topsoe technology;
- Project studies, economic evaluation, financial modelling;
- Project development activities, structuring or projects and integration of partners;
- Acquiring equity and debt financing;
- Export Credit Assurance (ECA) coverage for selected projects or packages;

- Procurement services for tailored and proprietary equipment, in line with the requirements for global procurement or to meet German ECA requirements;
- Transport arrangements via our German Transport partner, Integrated Project Services;
- Insurance services, such as EAP, third party liability, transport etc. via our sister company Ferrosstaal Risk & Insurance Services.

All these competencies are aligned and can, on demand, be focused to maximise German content in favour of a German ECA coverage of the project.

To assure you that we treat relevant project information on a strictly confidential basis we have exchanged a bilateral NDA which allows us also to exchange relevant information.

We believe that this project is providing an exceptional opportunity to establish an excellent cooperation between our companies with the target to develop into a fruitful long-term partnership.

We are looking forward to your valuable feedback.

Sincerely yours,  
Ferrosstaal Topsoe Projects GmbH

  
Stefan Kruiz  
Managing Director

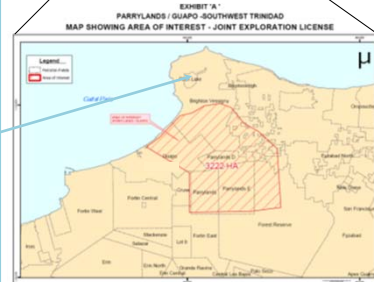
  
Lars Marling  
Managing Director

Ferrosstaal Topsoe Projects GmbH  
Haberstraße 141 | 42699 Solingen, NRW | Germany  
Phone: +49 212 6500-1100 | Fax: +49 212 6500-1101  
Email: info@ferrosstaal-topsoe.com  
Website: www.ferrosstaal-topsoe.com  
Registered Office: Solingen, Germany  
Company Number: HRB 15000  
VAT Number: DE 253 650 000

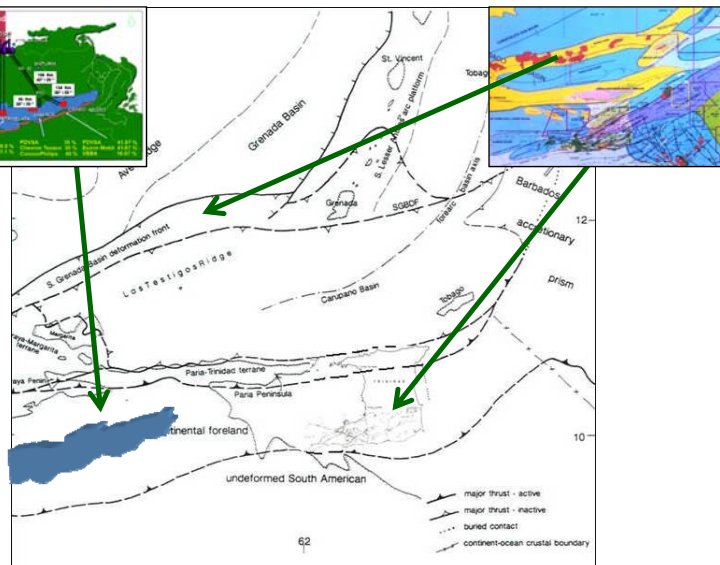
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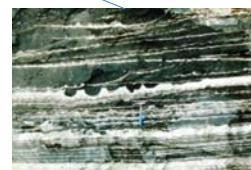
### Highlights: Are there any other locations for Oil Sand Mining Opportunities?



Homogenous Oilsands in Land Outcrop 12



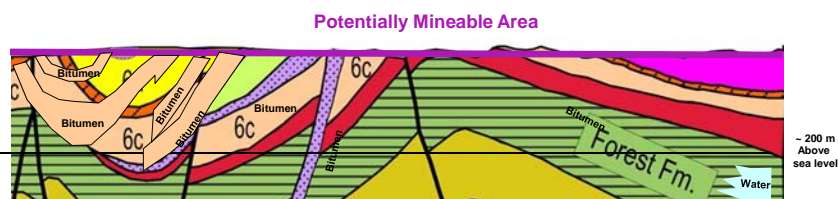
Homogenous Oilsands in Marine Outcrop 21



Homogenous Oilsands in Land Outcrop 6

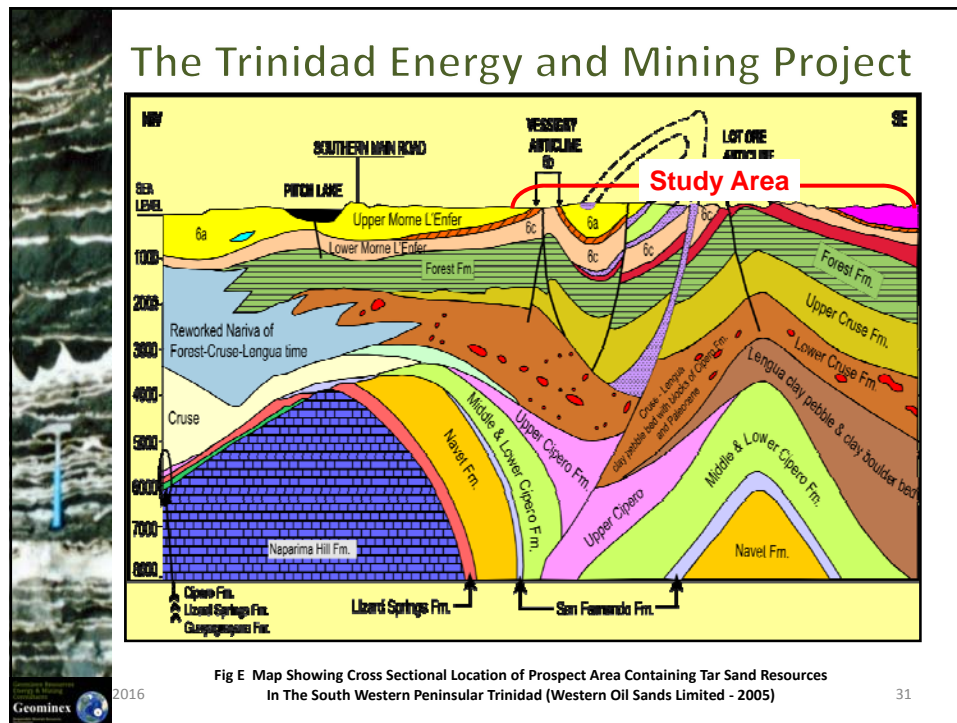
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### Highlights: Cross Section



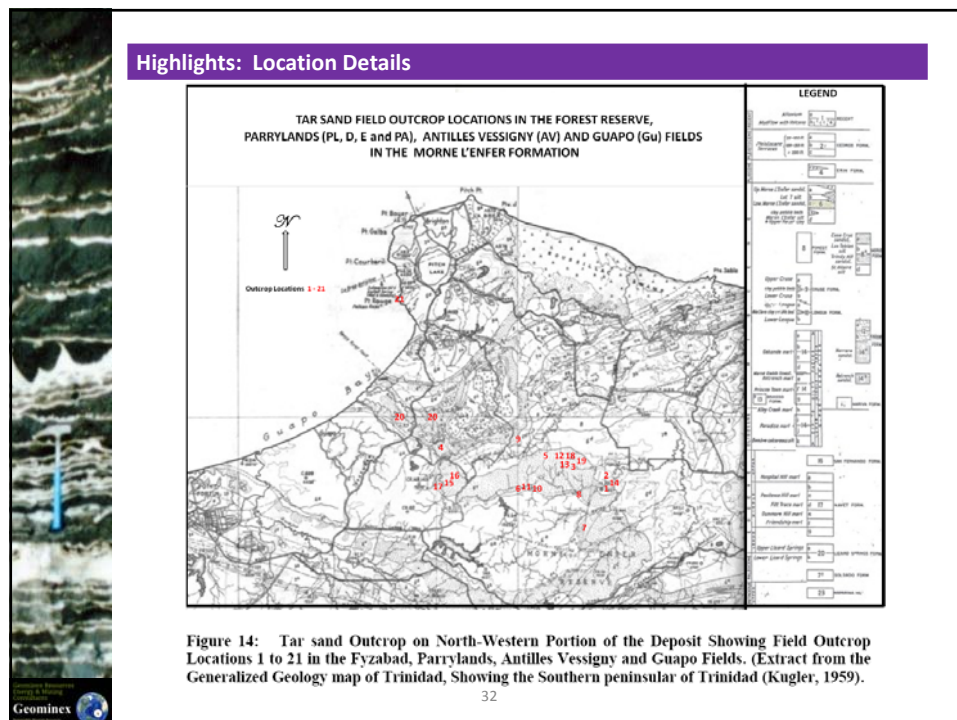
- Pliocene, Morne L'Enfer (Unit 6c) Formation is primary host for bitumen resource
- Significant component of resource in southern limb of anticline
- Northern component is more complex geologically, not as well understood and with upside exploration potential
- Additional Drilling required to understand geologic distribution, grade, thickness and fluid characteristics

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2016

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## The Trinidad Energy and Mining Project Resources Available



2016

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## The Trinidad Energy and Mining Project Resources Available



2016

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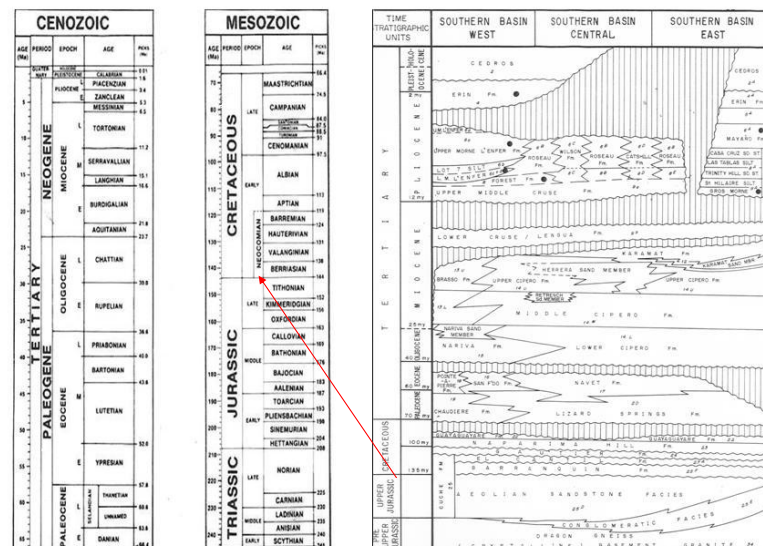


*In correlation with the overall geology of the Southern Basin of Trinidad,*



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Geological & Mining  
Engineering & Technology  
www.geominex.com



Trinidad Time Scale

## The Trinidad Energy and Mining Project

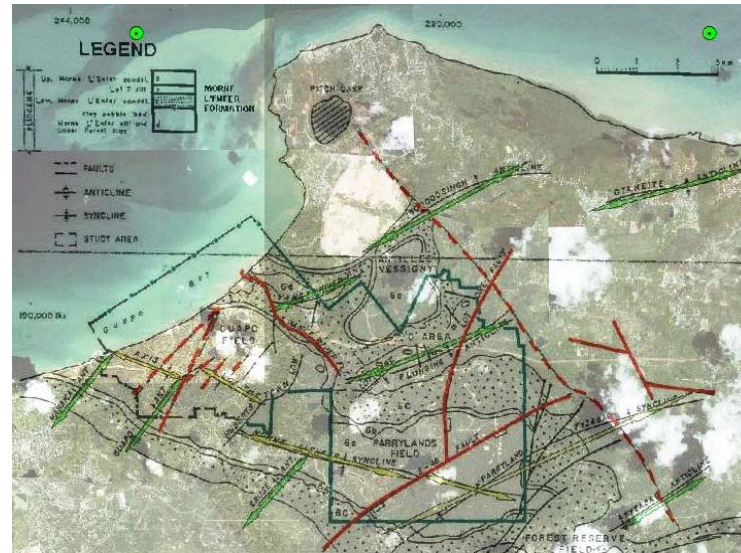


Fig B Map Structural Elements in Prospect Area In The South Western Peninsular Trinidad

### Highlights: 2005 Core Program



2005 WOSI Drilling Caravan Forming at Point Lisas

- Truck mounted Drill Rig, Service Truck, Core Handling Van, Equipment Van, Logging Truck and Refrigerated Van
- Police Escort











**Highlights: 2005 Core Program**

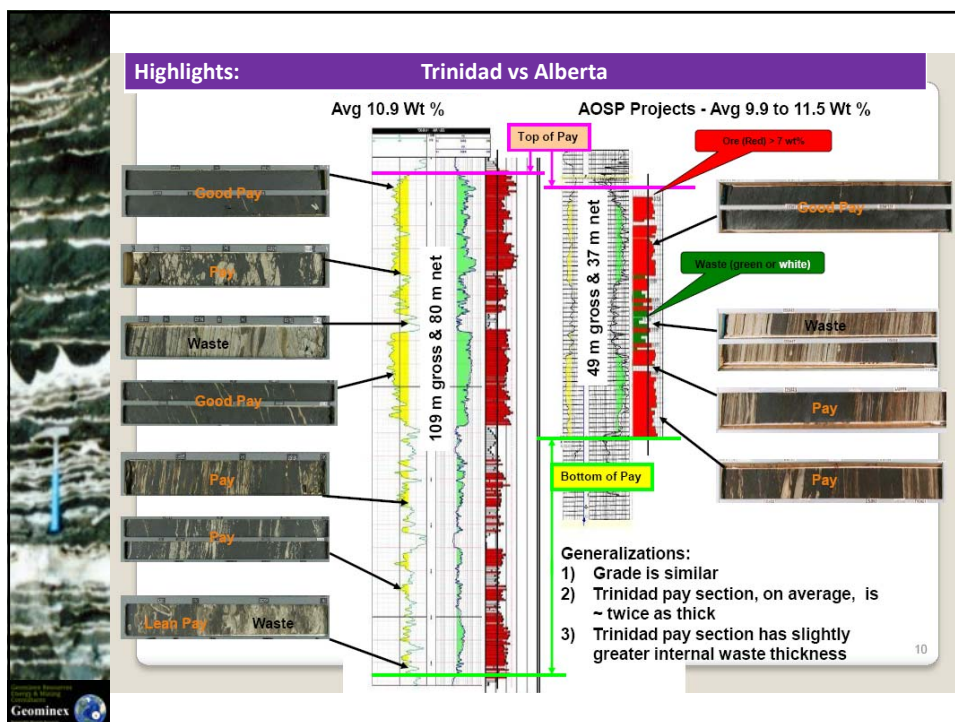
- We drilled and recovered cores from 19 holes
- When Compared to a typical Alberta Mine, Trinidad's Oil Sand Resource is thicker and of better Grade Wt. %

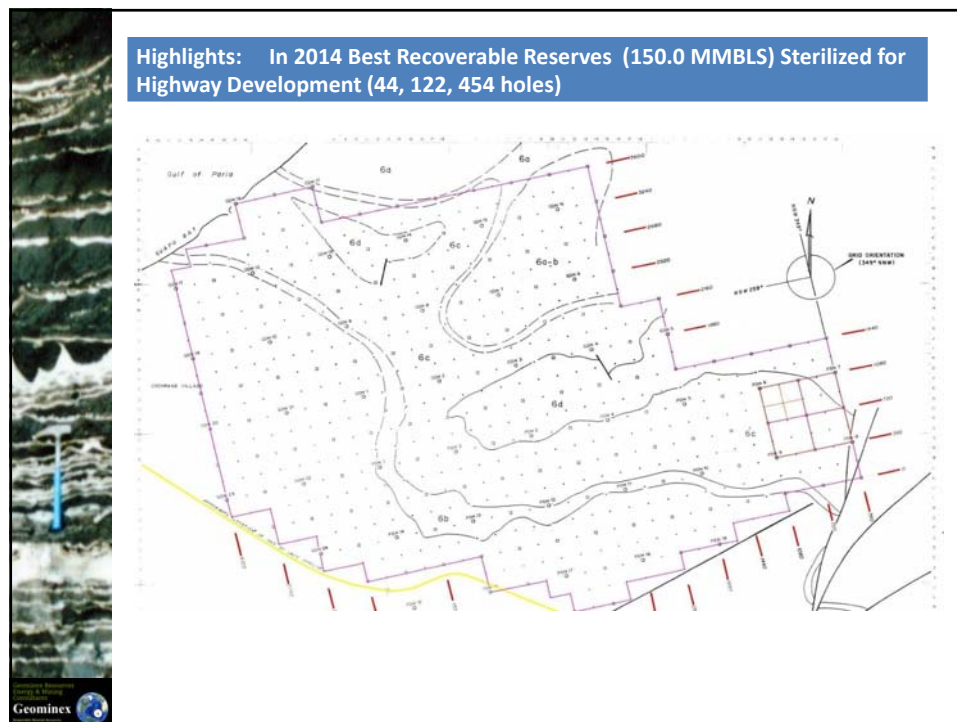
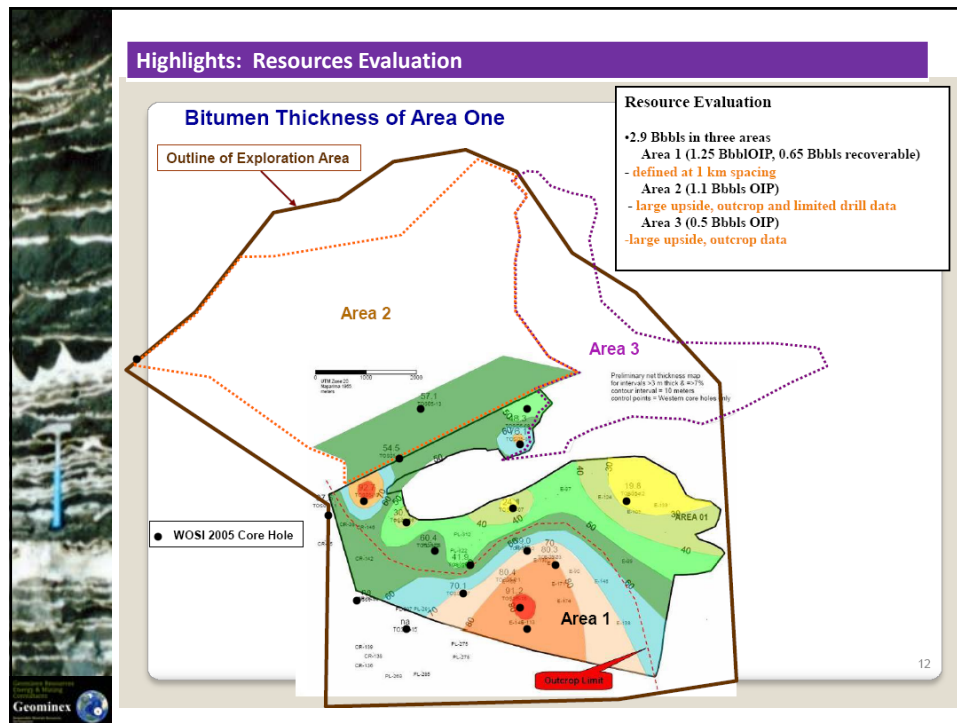


Typical Dean Stark Lab Setup

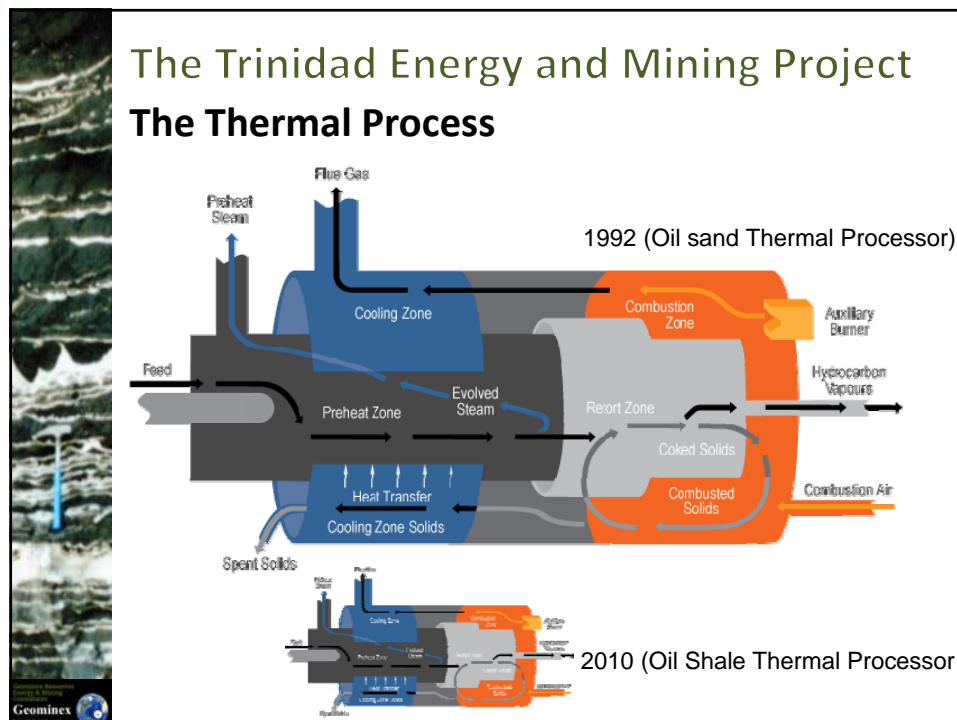
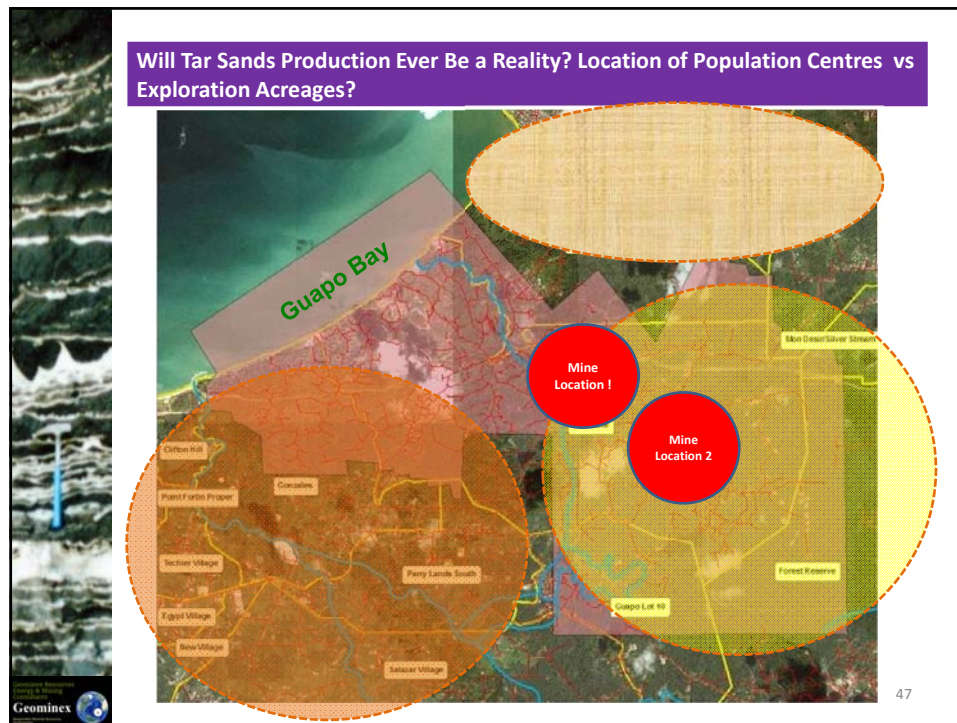


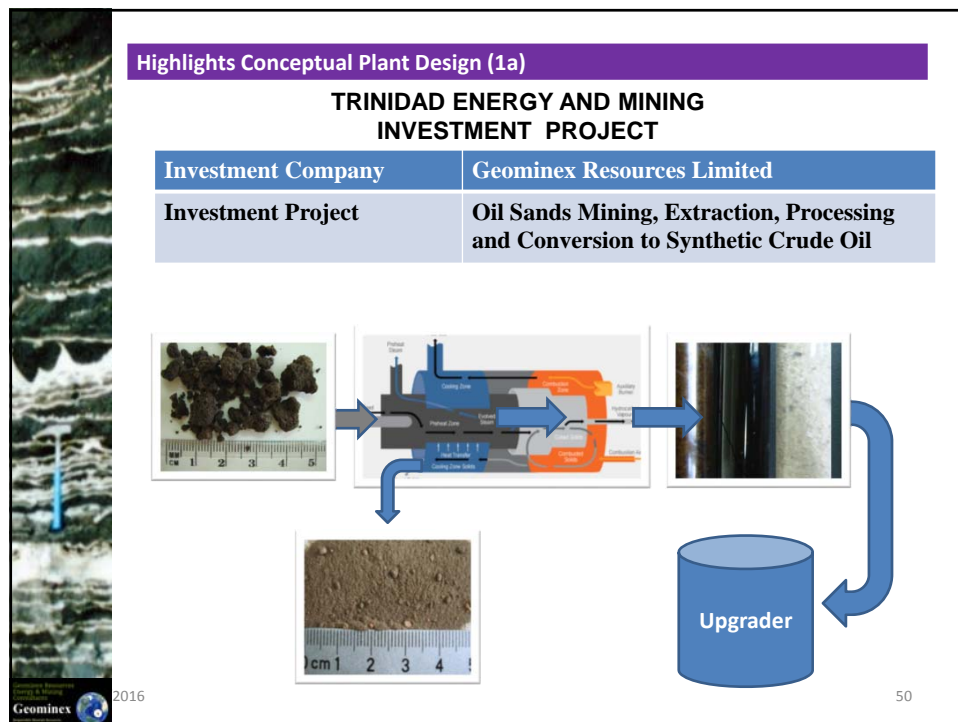
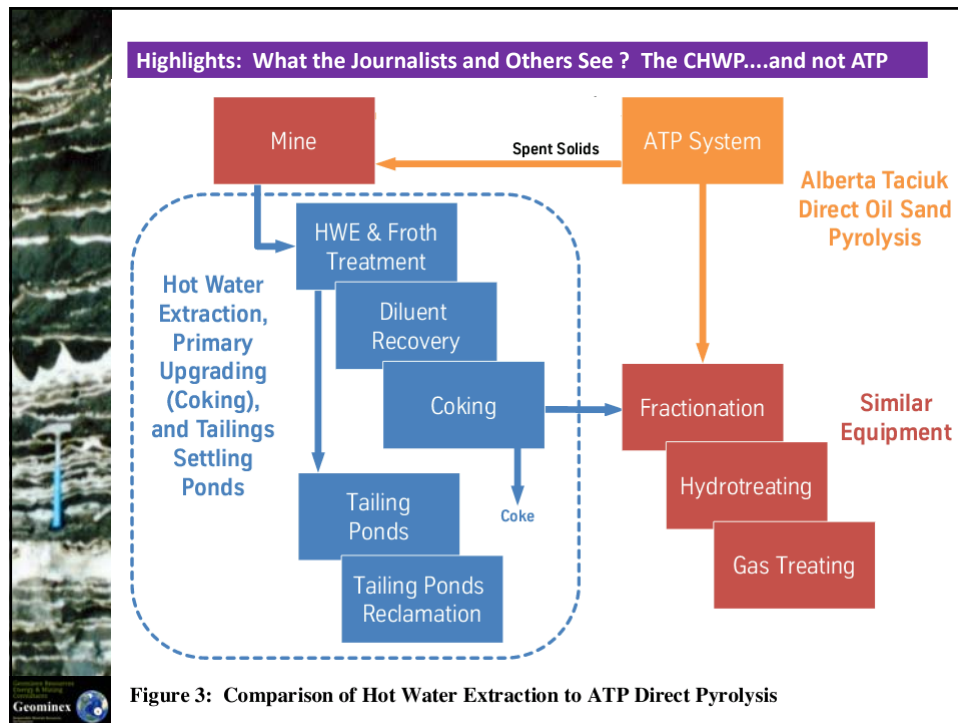
"Committed to Environmental Best Practices and Working Together for Jobs and the Environment"

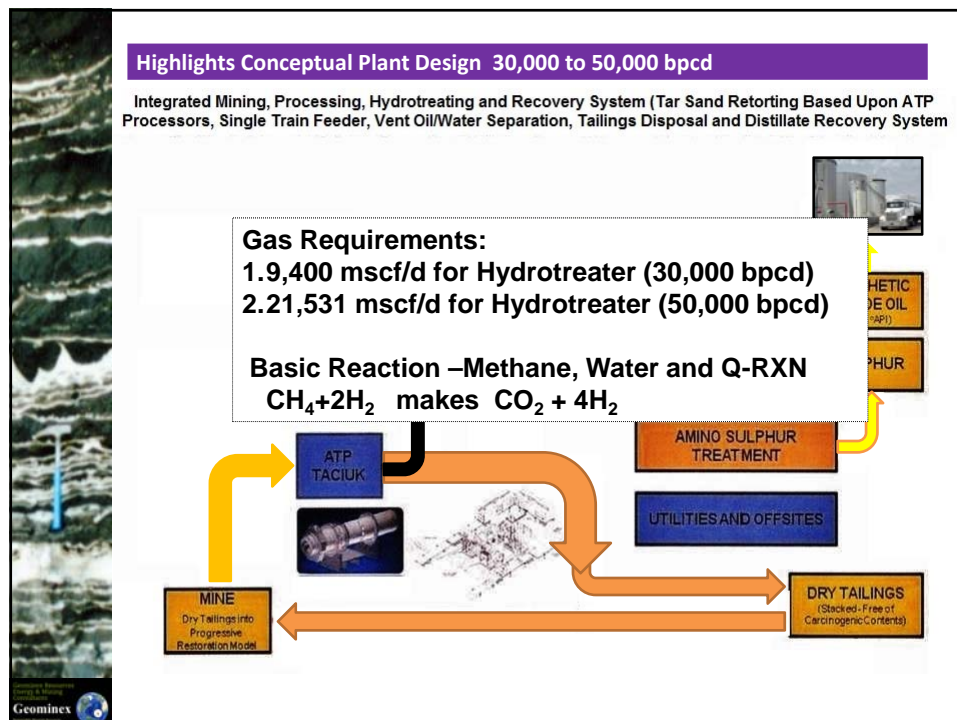
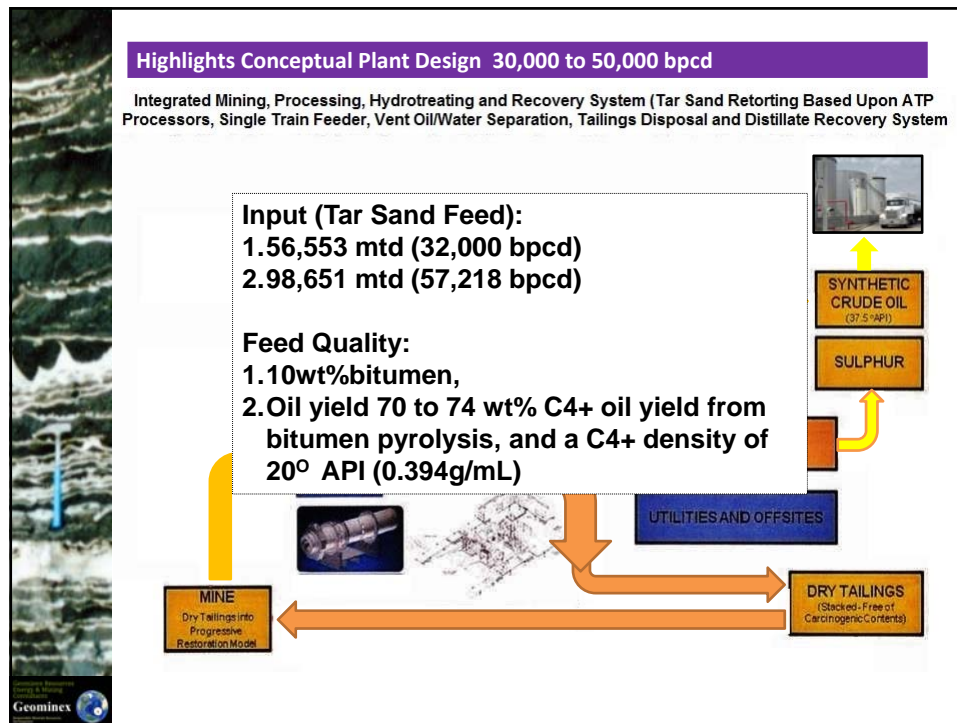




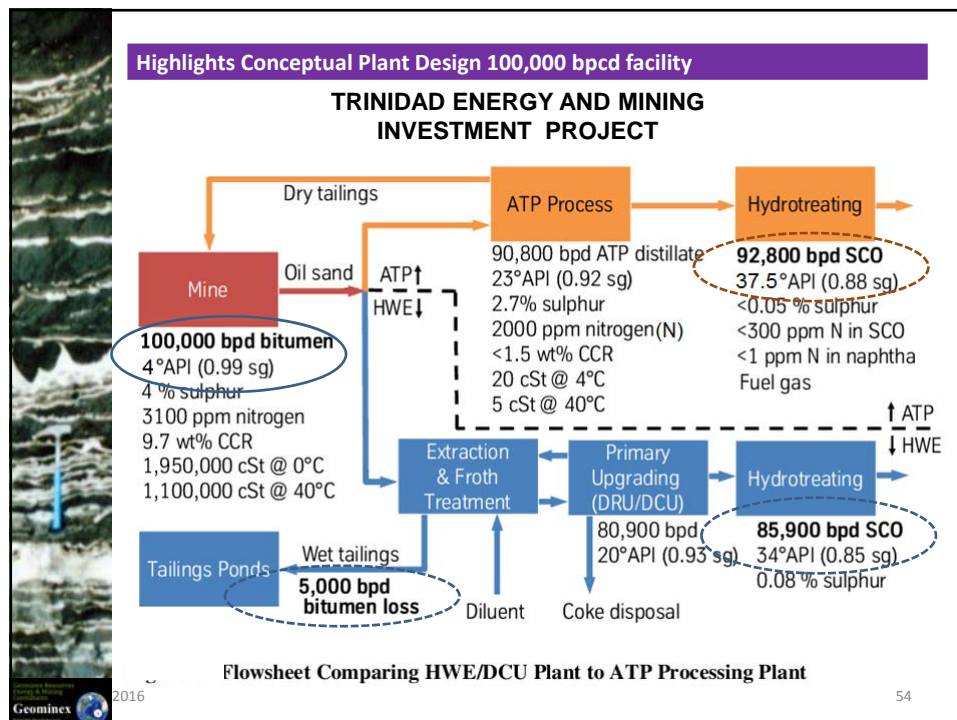
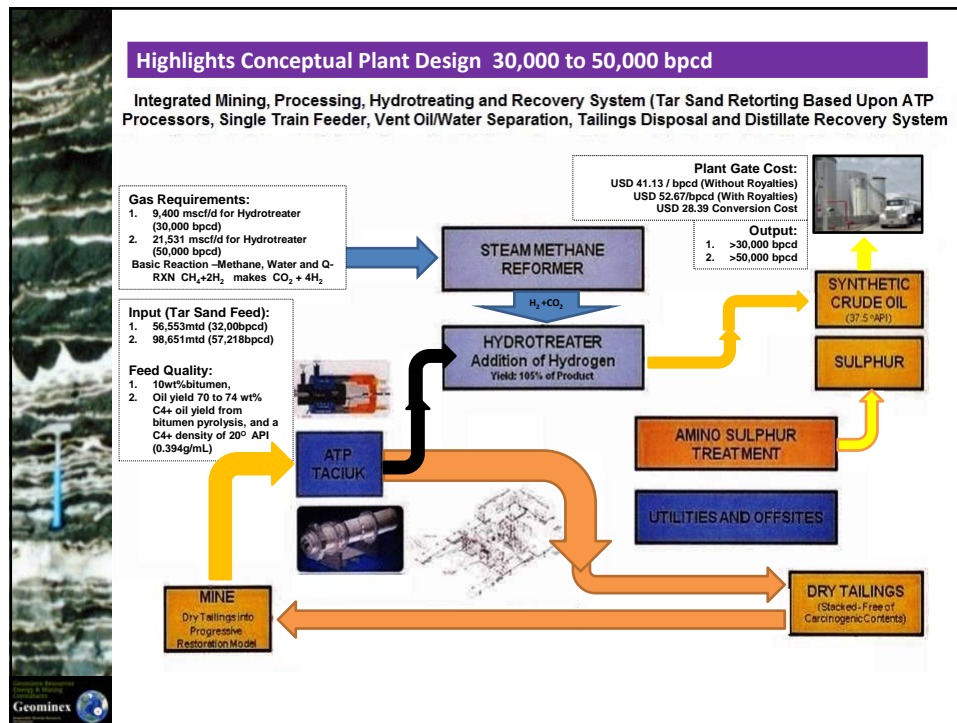













**The Trinidad Energy and Mining Project**  
**The Thermal Process**

Australia	Stuart Plant 4,500 bpcd/211tph/250 tph
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Subject To Non-Disclosure Agreements

Geominex

**The Trinidad Energy and Mining Project**  
**The Thermal Process**

China	Processor
-------	-----------



Geominex

## The Trinidad Energy and Mining Project

### The Thermal Process

China	Processor
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The image shows a large industrial facility, likely a thermal processor, with a prominent blue and white cylindrical structure and a blue building. The facility is surrounded by scaffolding and piping, indicating a complex industrial process.

Geominex

## The Trinidad Energy and Mining Project

### The Thermal Process

ATP Processor and Flue Gas System	HC Vapour Handling System
-----------------------------------	---------------------------



The left image shows the ATP Processor and Flue Gas System, featuring a large cylindrical reactor and associated piping. The right image shows the HC Vapour Handling System, featuring a large cylindrical reactor and associated piping, with a red roof structure visible in the foreground.

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## The Trinidad Energy and Mining Project

### The Thermal Process

Jordan	ATP Plant 18,000 bpcd/500tph (Oil Shales)/ 800tph (Oil Sands)
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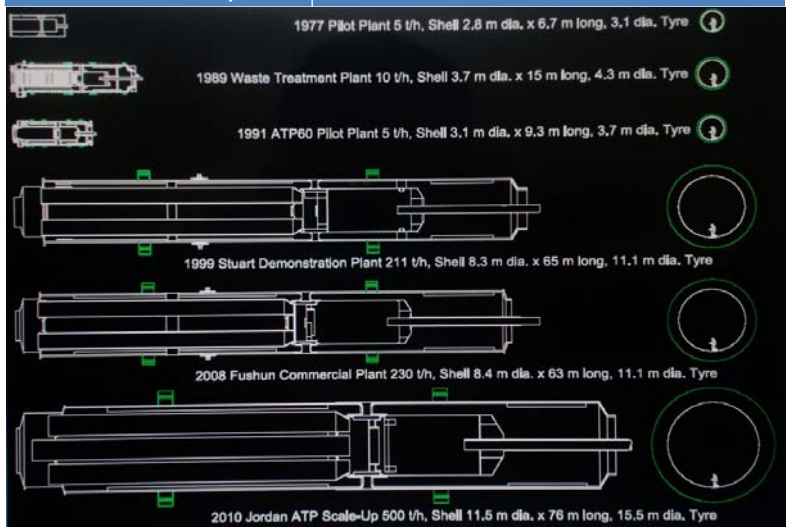


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## The Trinidad Energy and Mining Project

### The Thermal Process

ATP Processor Development	1977 to 2015
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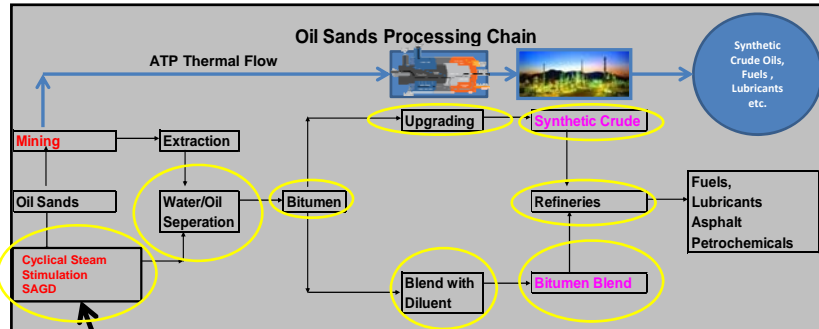
**Geominex**

- 1977 Pilot Plant 5 t/h, Shell 2.8 m dia. x 6.7 m long, 3.1 m dia. Tyre
- 1989 Waste Treatment Plant 10 t/h, Shell 3.7 m dia. x 15 m long, 4.3 m dia. Tyre
- 1991 ATP60 Pilot Plant 5 t/h, Shell 3.1 m dia. x 9.3 m long, 3.7 m dia. Tyre
- 1999 Stuart Demonstration Plant 211 t/h, Shell 8.3 m dia. x 65 m long, 11.1 m dia. Tyre
- 2008 Fushun Commercial Plant 230 t/h, Shell 8.4 m dia. x 63 m long, 11.1 m dia. Tyre
- 2010 Jordan ATP Scale-Up 500 t/h, Shell 11.5 m dia. x 76 m long, 15.5 m dia. Tyre

# The Trinidad Energy and Mining Project

## The Thermal Process

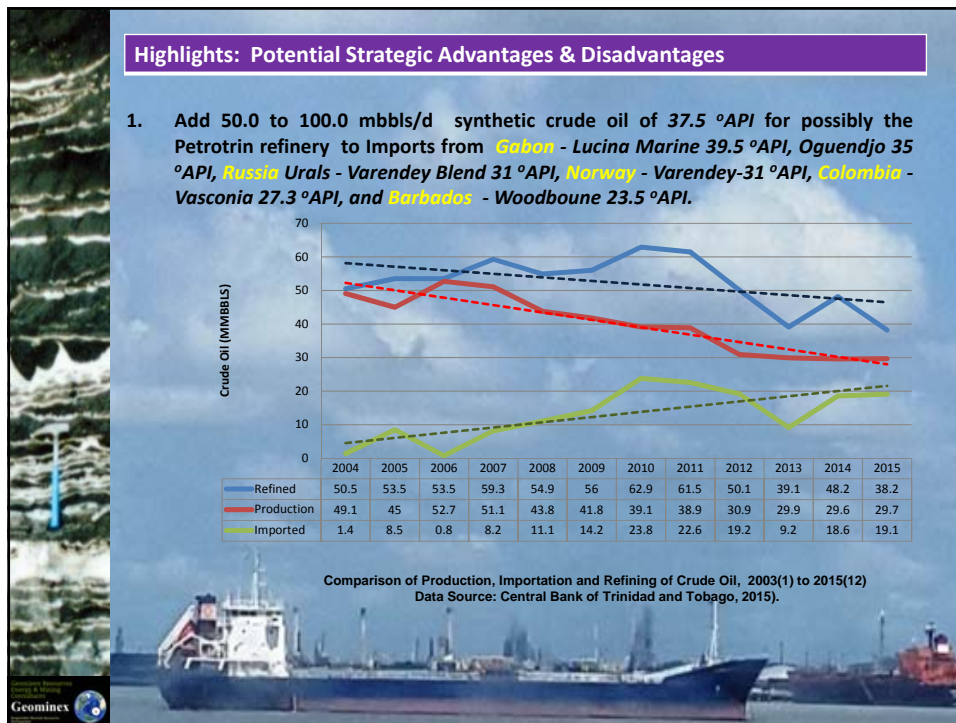
ATP | ATP Overview Vs Petrotrin PUE  
General Information



Environmental Problems – Complex Expensive System (Petrotrin – Black Flow lines)  
Failed in Trinidad -New Horizon 2008 to 2012

### Highlights: Potential Strategic Advantages & Disadvantages

1. Import substitution of 50.0 to 100.0 m bbls/day crude oil of 37.5 °API for possibly the Petrotrin refinery rather than from *Gabon-Lucina Marine* 39.5 °API, *Oguendjo* 35 °API, *Russia Urals-Varendey Blend* 31 °API, *Norway-Varendey*-31 °API, *Colombia-Vasconia* 27.3 °API, and *Barbados-Woodbounne* 23 .5°API.
2. Possible Joint upgrader with Petrotrin or Stand Alone Upgrader
3. Significant capital infusion during construction phase
4. Large workforce needed – circa 2,500 employees
5. Meaningful opportunities for technology and training
6. Operational timeframe +30 yrs
7. Significant Resource/Reserve Additions
8. Economically rewarding to all parties
9. Highway through best recoverable reserves




**Highlights: What the GORTT – International Financial Centre Saw?**

**Environmental Challenges**


“...The Minister of Finance of the GORTT, referred a study of a Tar Sands project to the Trinidad and Tobago International Financial Centre (TTIFC). This was a proposed environment friendly investment project which had the potential of yielding between 30,000 to 50,000 barrels of oil per day, a worthwhile project without any substantial outlay by the GORTT”.

- Trinidad & Tobago International Financial Centre, May 2012




**Trinidad &  
Tobago IFC**

<http://www.ttifc.co.tt/new/>



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**Highlights: What the GORTT – International Financial Centre See?**


**Environmental Challenges**

**“Geominex presented their study to the TTIFC for consideration, justified their numbers and assumptions and defended their conclusions.**

**Key to this was securing a new technological process that would enable the viable extraction of the oil, bitumen. The Company gained the full support of the TTIFC and the TTIFC signed a facilitative arrangement (Letter of Intent) with his company “...**

- Trinidad & Tobago International Financial Centre, May 2012


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**Highlights: What Certain Stakeholders See?**


1. Outside of natural gas and crude oil reserves assessments, it appears that very little attention is paid to developing unconventional heavy oil reserves for production of synthetic crude oils.
2. Energy conferences and professional societies have focused, and quite rightly so, on the development of conventional hydrocarbon reserves - natural gas, heavy oil and the new trust in renewable sources of energy, due to possible barriers.
3. During the 1980's and 1990's, the United Nation's Technology and Research Conference, reviewed scholarly offerings from countries around the Globe that contained reserves of heavy oil sands and oil shales and promoted research and development of new technologies for its extraction, exploitation and processing and hence manufacture of new oil. New Research produced in 2012, 2013, and 2015.

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**Highlights: What the Journalists and Others See ?**

5. Public pronouncements of the **Clarke Hot Water Process** cloud the principal issues involved in scientific bench marking through geological surveys of our natural resources, rather than illuminate these unconventional heavy oil deposits.
6. Colleagues, I humbly submit that recently in Canada and Trinidad press concerning the development of Trinidad Tar Sands have suffered from a rather narrow orientation, driven by many proponents of negativism, based upon poor information gathering.
7. While active research on these Trinidadian deposits began in 1935 to the present time 2014, professional, academic and technical expertise totals 1,000 man years of experience.



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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination, Comments by Gordon Taciuk, UMATAC**


**What are the Imperatives for an Environmental Impact Assessment of the Plant?**

1. Undertaking a staged approach is prudent and we see the preliminary project study stage as necessary to defining the basic parameters so that a project concept can be developed and then subjected to a thorough and broad assessment.
2. From our perspective as an extraction technology and equipment provider, our role would be to work with project developers to perform the necessary evaluations and testing so that we can properly understand the particular characteristics of this oil sand ore and to assess the projected performance of the ATP Technology.

Umatac Industrial Processes Inc.  
6835 Railway Street SE  
T2H2V6 Calgary, Alberta  
Canada



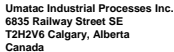

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination, Comments by Gordon Taciuk, UMATAC**


**What are the Imperatives for an Environmental Impact Assessment of the Plant?**

3. In our assessment, the ATP Technology provides operators with the capability to materially lessen the overall project impacts when compared to hot water extraction technologies.
4. The ATP is a direct retorting system which simultaneously extracts and primary upgrades the bitumen. A key feature of the ATP Technology is that it produces a dry, hydrocarbon free spent solids which is typically suitable for direct backfill in to the mine.
5. This eliminates wet tailings ponds entirely and reduces the project water consumption.
6. It also enables the mine reclamation and reforestation activities to begin early in the development with the result that the active mine area footprint can be significantly minimized.

Umatac Industrial Processes Inc.  
6835 Railway Street SE  
T2H2V6 Calgary, Alberta  
Canada

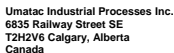

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination, Comments by Gordon Taciuk, UMATAC**

**What are the Imperatives for an Environmental Impact Assessment of the Plant?**


7. However, the overall project would involve numerous other activities and operations (examples: mining, product oil upgrading, gas sweetening, project infrastructure) each with their attendant impacts.
8. UMATAC can provide general information in some of these areas but specific projections would need to be sourced from other companies with expertise in these technical fields.

Umatac Industrial Processes Inc.  
6835 Railway Street SE  
T2H2V6 Calgary, Alberta  
Canada

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination, Comments by Gordon Taciuk, UMATAC**

**What are the Imperatives for an Environmental Impact Assessment of the Plant?**

9. In Trinidad and Tobago the rise and treatment of different forms of cancer is well documented at the Radiology Centre in St. James. No research had been done to determine the sources and impact of the energy industries on its population of cancer patients.
10. Such a study as part of the Geominex Fatal Flaw Study for the south western peninsula will provide a basis for capturing and benchmarking the prevalence and types of cancers in a newly created national database for future intervention.
11. Establishing an **Oncology Testing and Research Facility** in the south western peninsula to undertake baseline studies on the prevalence of cancer in residents.

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination**

**Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination and Possible Solutions**

1. Geominex, upon finalization of a negotiated exploration license with the GORTT, will engage in formal consultation and dialogue with the EMA and other relevant statutory bodies to undertake a fatal flaw EIA in the proposed project area).
2. Wherever practicable, all relevant comments made during this process at Public Meetings and Community Exhibitions will gauge stakeholders' (eg. the South West Development Stakeholders' Committee) opinion of the proposals in written form.
3. Dialogue with the community will be an ongoing activity during the study period. Comments obtained will assist in the fine tuning of the proposed development

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## 2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination

As previously noted, Geominex Limited proposes to implement Phase One of this project in three (3) sub phases:

1. Firstly, a comprehensive social, economic and environmental study.
2. Secondly, drilling to define the resource, and
3. Thirdly, demonstration of the extraction process in a pilot plant.

Underpinning the environmental impact assessment phase will be the compilation of data on a history of rainfall, wind direction, the location of existing dwellings, maps showing existing oil spills, as well as the identification of an environmentally benign extraction process predicated on the early return of spent tar sands to the location from which it was extracted and re-vegetation.

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## 2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination

It is estimated that the first phase of this project will involve broad consultation with stakeholders in the public and private sectors and civil society. The specific list of activities to be conducted in the first phase of this project will be:

1. Define and Negotiate Heads of Agreement and work commitments.
2. Define an Environmental Impact Assessment Scope of Works and execute on a continuing basis detailed environmental and socio economic studies.
3. Further geologic mapping to identify other mineable oil sands prospects in the Southern Basin as per the map provided to the GOTT .
4. Undertake additional 50 holes drilling, core recovery and testing program based upon a new permit..

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination**

It is estimated that the first phase of this project will involve broad consultation with stakeholders in the public and private sectors and civil society. The specific list of activities to be conducted in the first phase of this project will be:

6. Conduct geophysical surveys over the main oil sand areas and other prospects in the Southern Basin.
7. Provide Feasibility Reports on Socio Economic Planning and Project Advocacy, Environmental Baseline Study and Data acquisition.
8. Initiate extraction and upgrading test work program.
9. Complete supplementary Drilling Program as required.
10. Assess information from socio-economic and environmental studies.

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**2. Examining and Implementing a Socio-Economic Environmental Study for Fatal Flaw Determination**

In principle to a project by Geominex Limited for the execution of a feasibility project for the extraction of bitumen from tar/oil sand deposits in the south-western peninsula of Trinidad for conversion into synthetic crude oil that, conversations should be specific;

1. Geominex Limited be allowed to conduct the first phase of this project as detailed above subject to the relevant regulatory approvals.
2. The results from this phase of the project will be submitted to the GORTT for its consideration before Phase II of project is allowed to commence; and
3. Geominex Limited and the relevant public sector agencies consult extensively with the relevant stakeholders throughout the project.

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### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

Using the **Sukhu 2014 Model for Stakeholder Engagement** for conducting this study we now have buy in from 5 Civil Society and 1 Regional Council and Corporation, south western peninsula stake holder groups and 1 International North American Company as follows:

1. [The South Western Stakeholders Committee comprising representatives of every village and community \(August 15, 2014\)](#)
2. [The South Western Business Chamber of Industry and Commerce \(September 19, 2014\)](#)
3. [The Point Fortin Borough Council and Corporation \(September 25, 2014\)](#)
4. [The Quarry Association of Trinidad & Tobago \(November 15, 2014\)](#)
5. [The Trinidad & Tobago Chamber of Industry and Commerce \(February 6, 2015\)](#)

Walker, Terrence. (2014), Board of Directors, InvesTT

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### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

1. [The South Western Stakeholders Committee comprising representatives of every village and community \(August 15, 2014\)](#)

As a newly constituted Stakeholders Group representing communities, in which the business is to be located, with an ability to evaluate your proposal, we believe we can add value to the way your group conducts its business here in the peninsula. We are interested in engaging you in formal stakeholder sessions, to enable one-on-one conversations with our people who understand the points of intersection your company has, and will have, with our society and ecosystems. At the same time we must let you know that as stakeholders during the process, we may not agree with your group's view and may offer information that is hard to act on. Knowing this early will lead to the undertaking of stringent adherence to codes and practices, where applicable, and the use of best practice.

It is with this understanding, we are supporting your company conducting a fatal flaw environmental and socio economic study, that will serve to guide us in determining whether your proposal is an environmentally safe and friendly one that can move forward.

Again thank you for your presentation to our group.

Yours Respectfully,

*Surina London*

SURINA LONDON (Ms.)



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### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

##### 2. [The South Western Business Chamber](#) of Industry and Commerce (September 19, 2014)

The results from this phase of the project should be submitted to the Government of Trinidad & Tobago and ourselves for consideration, to determine if any fatal flaws are found before Phase 2 of project is allowed to commence.

We expect Geominex Resources and TCOS Limited and the relevant public sector agencies will consult extensively with all relevant stake holders in the South Western Peninsular throughout the project.

We hereby grant our consent and support for conducting this important socio economic environmental fatal flaw study.

Yours faithfully  
POINT FORTIN / SOUTH WESTERN CHAMBER OF INDUSTRY & COMMERCE

  
Ricardo Joseph  
PRESIDENT



100 Fortin Street, Mahaiqa, Point Fortin,  
Trinidad & Tobago  
Tel/Fax: (868) 648-4861 E-mail: [info@sfwc.com](mailto:info@sfwc.com) Website: [www.sfwc.com](http://www.sfwc.com)

September 19, 2014

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### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

##### 3. [The Point Fortin Borough Council](#) and Corporation (September 25, 2014)

In this regard, we fully endorse and support your company undertaking a full socio - economic and fatal flaw environmental impact assessments of such an important opportunity to seek a way forward for its commercialization.

Once again thank you for your timely presentation to us.

Very Kind Regards



Clyde Paul  
Mayor



ALDERMAN CLYDE PAUL  
MAYOR

**MAYOR'S OFFICE**

26-30 GEORGE ROAD, MAHAICA, POINT FORTIN, 700225 TRINIDAD & TOBAGO, W.I.

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[www.pointfortinborough.com](http://www.pointfortinborough.com)

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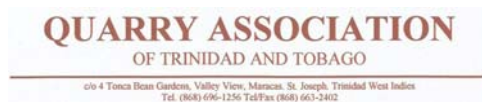
### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

4. [The Quarry Association of Trinidad and Tobago](#) (November 15, 2014)

....We must not forget the possible use of oil sands of the south western peninsula, by one of our Association's members, that submitted a full proposal to the GORTT comprising of environmentally friendly mineral exploitation and extraction technologies to produce much needed synthetic crude oils. This would require a staged, socio economic and environmental study using a fatal flaw approach, for all stakeholders in the government and private sectors to determine its suitability...

Extract of Address by Mr. Ramdeo (Dan) Persad, President of the Quarry Association of Trinidad and Tobago at its Annual Dinner and Awards Ceremony on Saturday 15th November 2014 at Andre Kamperveen Hall, Centre of Excellence, Macoya



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### 3. Economic Development for the South Western Peninsula Stakeholder Requirements and Participation

#### Economic Development for the South Western Peninsula, Stakeholder Requirements and Participation

5. [The Trinidad and Tobago Chamber of Industry and Commerce](#) (February 05, 2015)

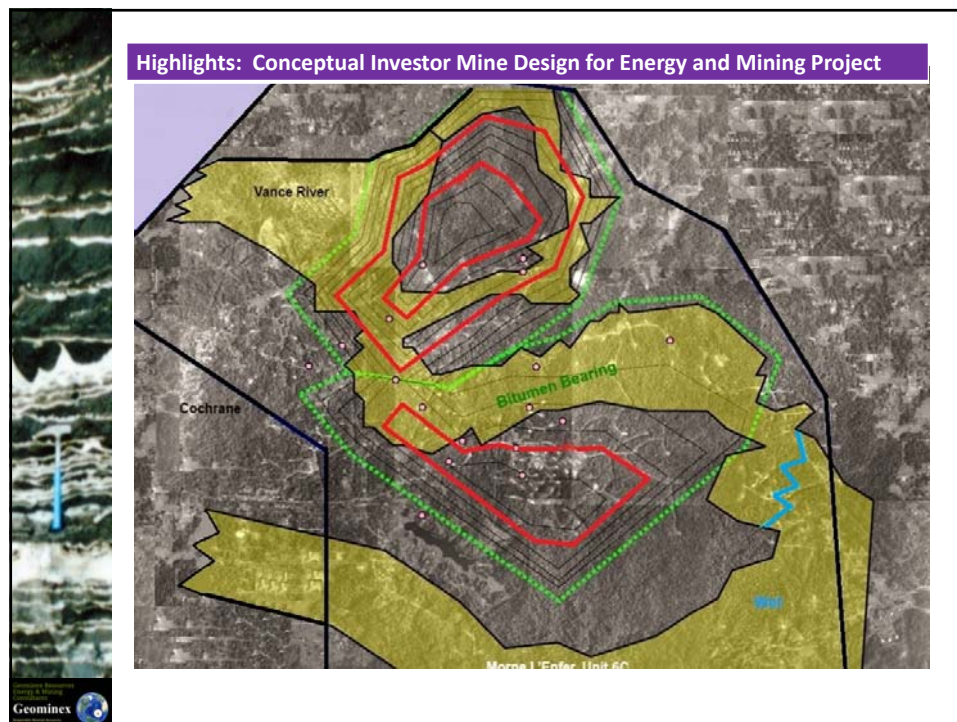
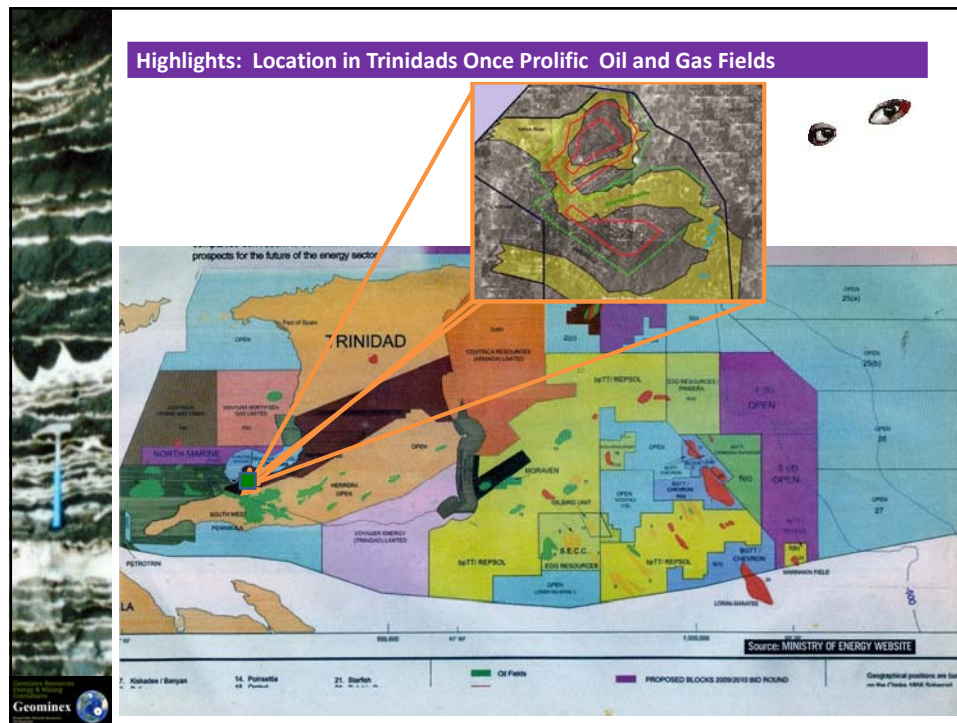
.... The Chairman and his executive of the TTCIC fully supported the venture and the need to benchmark the status of the environmental impacts going forward and will assist in every way that the Chamber can to achieve these objectives. (Sabga, Andrew, 2015, personal communication, February 5, 2015)

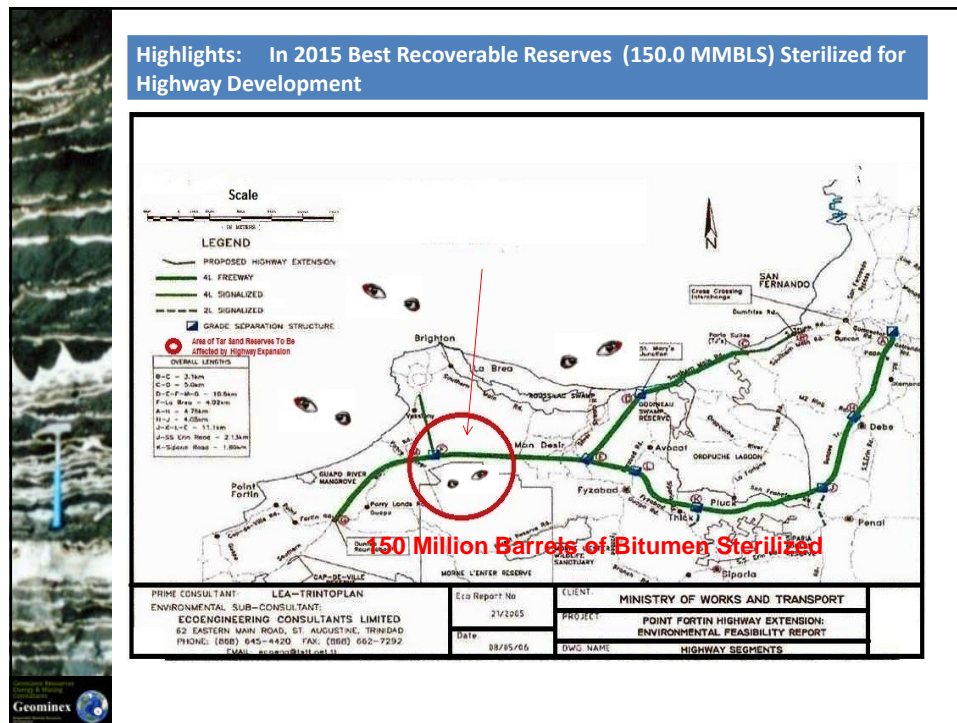
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## The Trinidad Energy and Mining Project Potential Impacts

2. Tar sand development systems are now more environmentally friendly: The combined mining and processing technologies that are available will enable the opportunity to occur without caustic or other significant emissions or residues and are much more environmentally friendly in both process and output.
3. Skilled employment spin-off factor: Numerous indirect jobs will be created to support each direct job.

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## The Trinidad Energy and Mining Project Potential Impacts

4. Efficient use of expanded refinery capacity: There will be a significant sunk cost in the order of USD 2.6 to 5.2 Bn for producing 30,000 to 50,000 + bpcd or the separate development of a new opportunity
5. Guaranteed Supply of Refinery Feedstock: Trinidad will gain a guaranteed supply of bitumen for the life of the project, one site alone will take about 25 to 50 + years to develop, with continuous domestic supply of bitumen at very low transportation costs compared to costly importation

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## The Trinidad Energy and Mining Project

### Potential Impacts

6. **Fiscal and Monetary Benefits: The fiscal and monetary benefits are at least four - fold:**
  1. The refinery may buy the bitumen at prevailing world market prices, and sell high-end product such as gasoline, jet fuel and diesel fuel, keeping the whole of the current net profit from refining for itself
  2. After payback of the Investment Capital, there will be a long term gross royalty and other percentages based upon equity, continued government taxes etc.
  3. Gross margin contribution on providing the Utilities, Fuel and Diluents on an ongoing basis
  4. Exporting product from home will have a beneficial effect upon Trinidad's international balance of payments

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## The Trinidad Energy and Mining Project

### Potential Impacts

7. **How can this be achieved?**
  1. The best option is via joint venture partnership with a Direct Foreign Investor and the GORTT with significant downstream local contractor input where available.
  2. The investor is a world leader possessing specific expertise, required capital and track record for successful implementation and development of this business.
  3. Possible GORTT participation equity, if there is interest. The reserves are over and above the requirements to support a 25 to 50 + year life project.

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## The Trinidad Energy and Mining Project Potential Impacts

**8 Gains**

1. Revenues for GORTT and the Investor from profit sharing and royalties and taxes.
2. Social impact to include the creation of diverse jobs.

Training at university level for professionals, and continuous short course training at the technical levels. In this regard we have already set up an [Institute of Energy and Mining](#) launched last October 2011.  
(Click Hyperlink for Details on IEM)

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## The Trinidad Energy and Mining Project Potential Impacts

**8 Gains/Continued**


"How many people have heard, for example, that the nascent tar sands development process in the country has gone a tentative step further with the setting up of an Institute of Energy and Mining as a non-governmental organisation (NGO) by the most passionate advocate of the retrieval of such oil, petroleum engineer and mining geologist, Herbert Sukhu?

**I would wager no one yet knows about this but they should because it could be the next step (State company Petrotrin has already taken core samples of tar sands in south Trinidad but seems to have gone no further with the matter) in the effort to produce as much as 30,000 b/d of this stuff, thus aiding Energy and Energy Affairs Minister, Kevin Ramnarine, in his goal of boosting crude production.**

Exploitable tar sands in Trinidad (the Pitch Lake, of course, excluded) straddle sandstone reservoirs in an area of about 12.8 sq km, of which 6.2 sq km outcrop at the surface and are thus visible, while another 6.5 sq km are near the surface at depths no greater than 210 metres.

**The Institute's prime aim will be, as Mr Sukhu says, activating 'formal discussions on various technical and training activities and providing solutions for developing our tar sands resources.'** Exploring every twist and turn By David Renwick Story Created: Oct 25, 2011

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## The Trinidad Energy and Mining Project Potential Impacts

**8 Gains/Continued**

3. Sustainable development of these resources through environmental planning and management.
4. Direct and indirect spending in the economy.
5. Delivery of 30,000 to 50,000 barrels of new land oil to a refinery that has the capacity to handle such quality and volumes. There is need to reduce the uncertainty of foreign supplies and capitalize on local economic supplies of crude oil.

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## The Trinidad Energy and Mining Project Potential Impact

**9 This opportunity can benefit the economic mix for the country at large.**

1. Long term revenue and added value will be created
2. By developing local content, this country will become a producer and net exporter of energy services for all segments of the energy industry.
3. In this way we can retrain our citizens for internal opportunities.
4. In this regard the GORTT should consider seriously developing the tar sand industries as one of its national energy policy initiatives as the production of synthetic crude oil from these un-booked heavy oil reserves would assist in some measure Trinidad and Tobago providing, simply for itself, additional high quality crude oil, and in addition providing a social rate of return
5. This proposal is therefore recommended as an alternative project for the south-western peninsular of Trinidad in addition to the previous chosen ones.

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## The Trinidad Energy and Mining Project Potential Impact

**This opportunity will benefit the socio - economic mix for the country at large...**

By doing this, programs and policies in the energy sector cannot be made without considering the environment. We are committed to greening our growth:

1. Let us place real and measurable environmental limits on our large industrial plants
2. Our pilot model in tar sands production for the first time, will assess the overall impacts to land, air and water and set regional limits. And in so doing introducing a framework to better manage the competing demands on Trinidadian landscape.

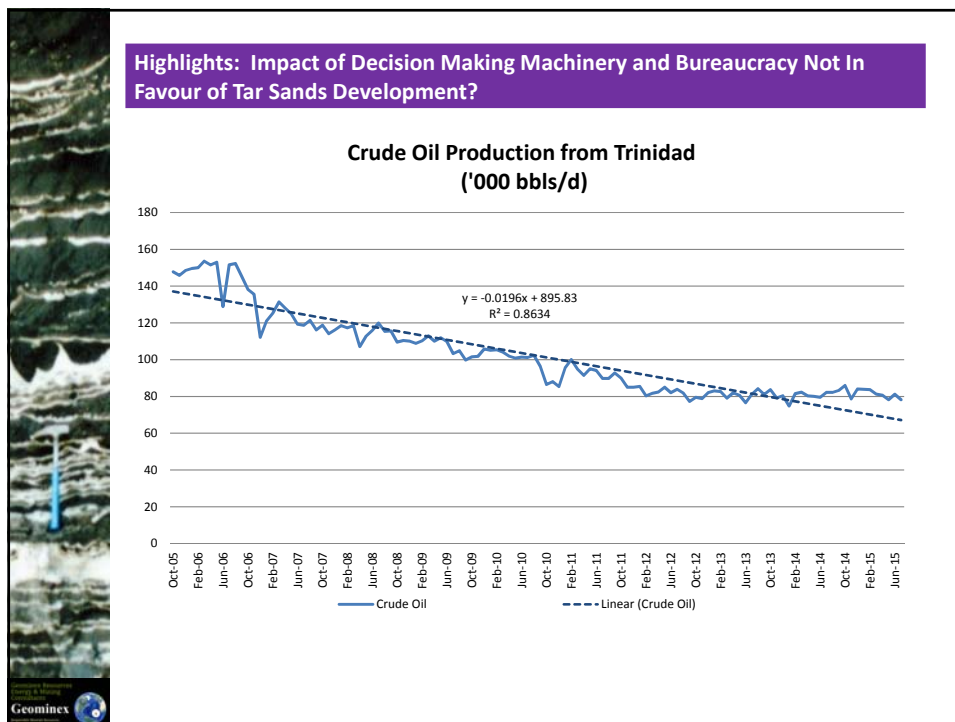
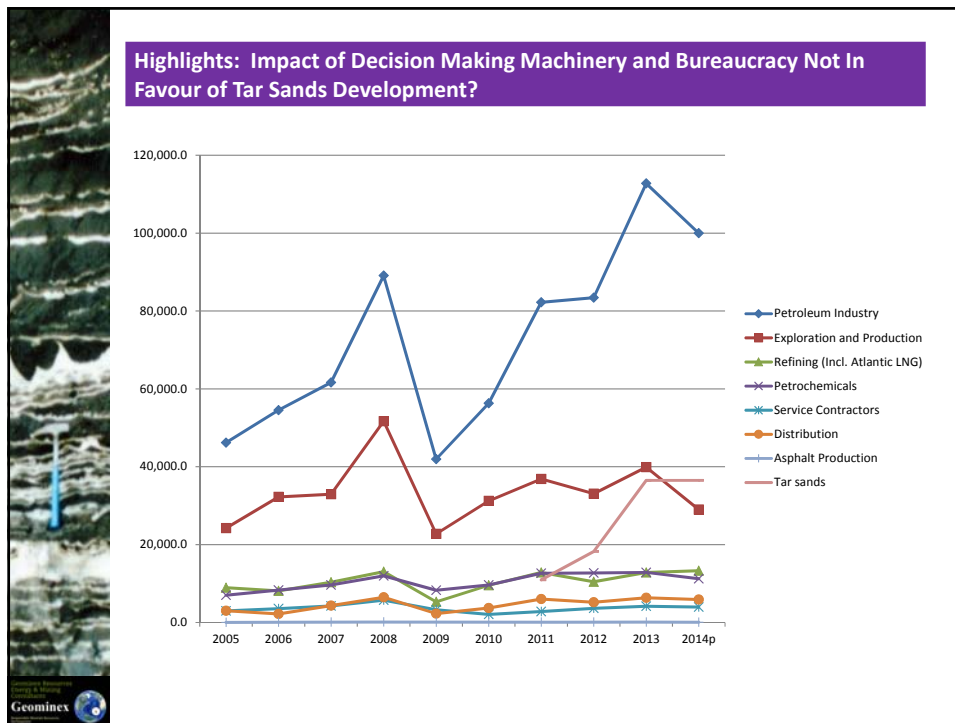
2016 95

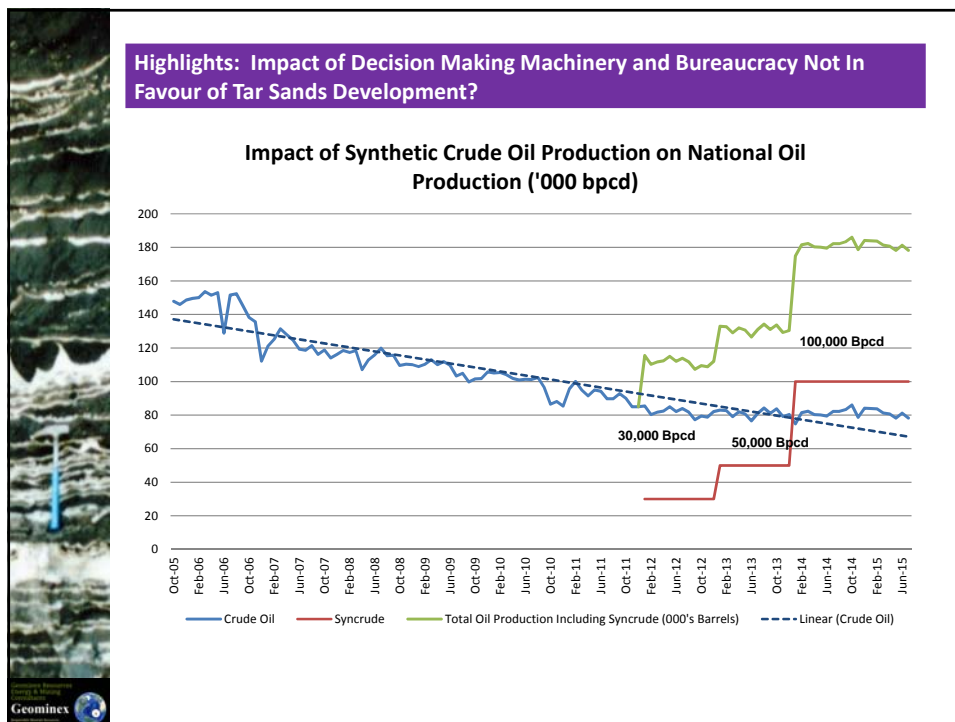
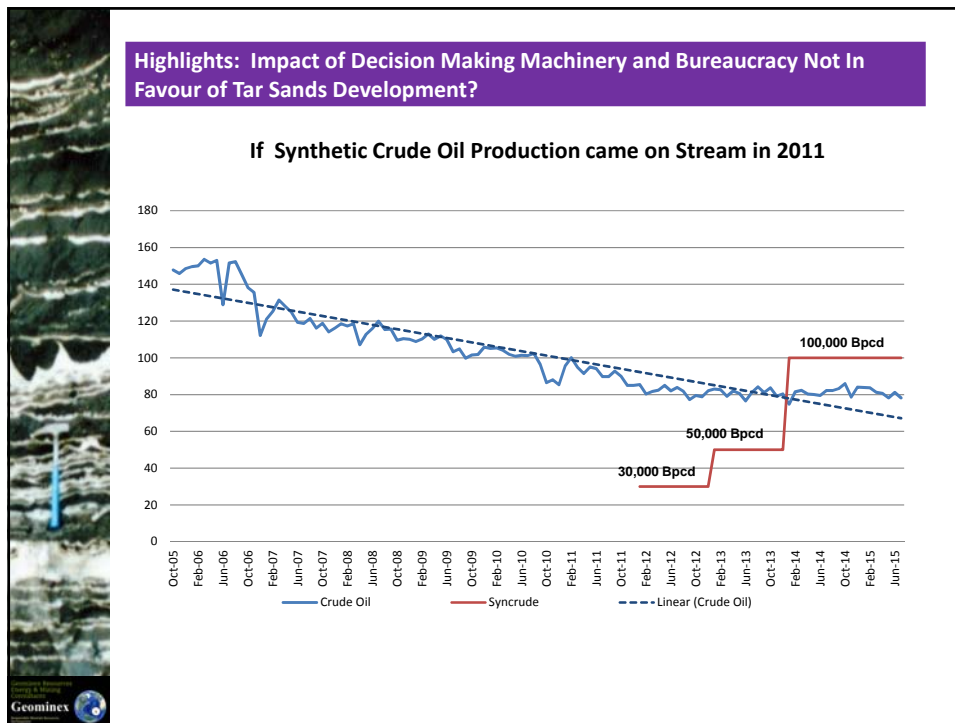


## The Trinidad Energy and Mining Project Potential Impact

3. At the same time developing a comprehensive energy strategy, one which will ensure the sustainable development of Trinidad and Tobago's resources in an environmentally responsible manner, making full use of innovations such as near zero-emissions.
4. To encourage responsible resource management, together we can continue to assess and recognize any new environmental fees or levies as an eligible cost of doing business, and therefore deductible in determining royalties on this tar sand project.
5. The IADB recently approved a loan to deal with only finding alternative employment (and other socio - economic impacts) outside of the ALNG Company in the ribboned coastal towns and villages in the south west peninsular of Trinidad without a holistic framework for the region as a growth pole.

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<b>Highlights: Impact of Decision Making Machinery and Bureaucracy Not In Favour of Tar Sands Development?</b>		
<b>Potential Loss of Synthetic Crude Oil Revenue from Trinidad's Unconventional Oil Resources</b>		
ITEM	2008 Application Made Startup <b>2012</b>	2011 Application Made Startup <b>2014</b>
Company	Western Oil Sands Now Trinidad Canada Oilsands	Geominex Resources Now Geominex TCOS
Decision Maker	GORTT	GORTT
Number of Months	44	20
Average Price /(USD/bbl)	93.32	79.51
Rev at 30k per day (BnUSD)	(4,105.10)	(1,311.90)
Rev at 50k per day (BnUSD)	(6,719.10)	(2,146.80)
Loss Ratio	3.1	1.0

Energy Caribbean

So Albiet....View from the Novel

# The Alchemist

WRITTEN BY PAULO COELHO

Beneath the novels compelling story and the shimmering elegance with which it was told lies a bedrock of wisdom

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Country: Trinidad & Tobago

Investor: Geominex Resources Limited

**Unconventional Oil Resources, Developing Trinidad's Tar Sands**  
Proven Future Energy in a Small Island Developing State  
An Environmentally Friendly Perspective  
Herbert McD M Sukhu  
Process Utilities & Petroleum Engineer and Mining  
Thornhill, Ontario, Canada  
Port of Spain, Trinidad & Tobago  
London, England, UK  
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**Geominex**  
Unconventional Energy (Oil Sands & Shales)  
Minerals Resources Consultants and Developers

**THE ALCHEMIST**  
PAULO COELHO

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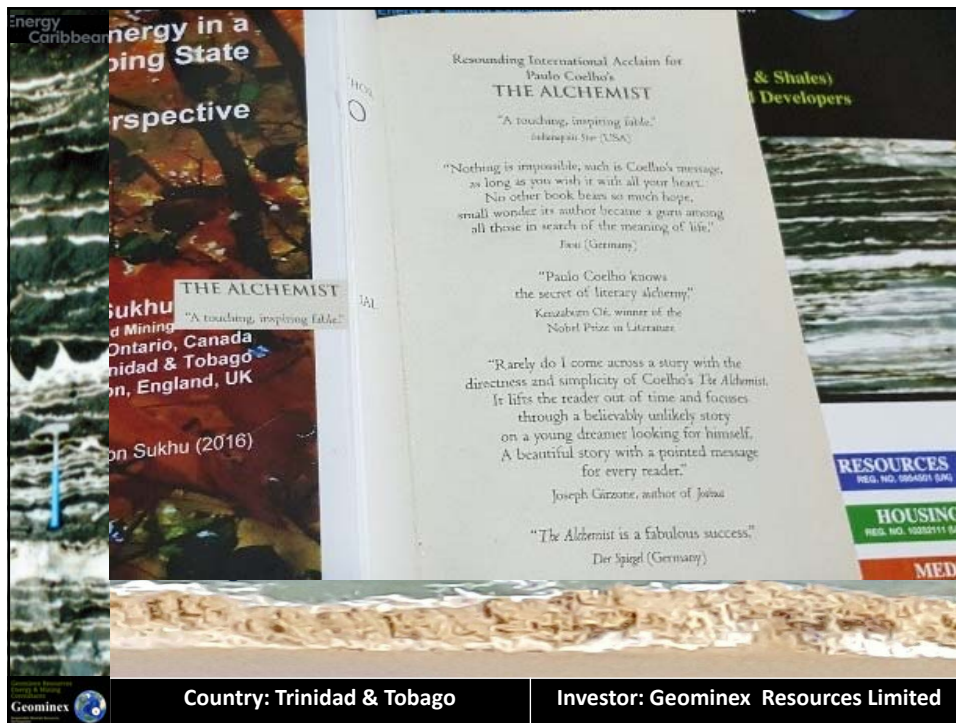
Recommended International Authors for  
**THE ALCHEMIST**  
"A touching, inspiring book."  
—Stephen King  
"Looking at immortality, death & Coelho's message, as long as you work, it will all give itself."  
—David Byrne  
"Paulo Coelho knows the secret of literary alchemy."  
—Eudora Welles  
"It only do I come across a story with the...  
—John Grisham  
"The Alchemist is a fabulous success."  
—Debra (1/2009)

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energy in a Caribbean State perspective

**THE ALCHEMIST**  
"A touching, inspiring fable."  
Sukhu (2016)

Resounding International Acclaim for Paulo Coelho's  
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"*The Alchemist* is a fabulous success."  
Der Spiegel (Germany)

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REG. NO. 98045011 (JAM)

**HOUSING**  
REG. NO. 92232111 (JAM)

**MEDI**

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**The Trinidad Energy and Mining Project**  
A Presentation to Ferrostaal Topsoe Projects  
Eisembau, Essen, GmbH

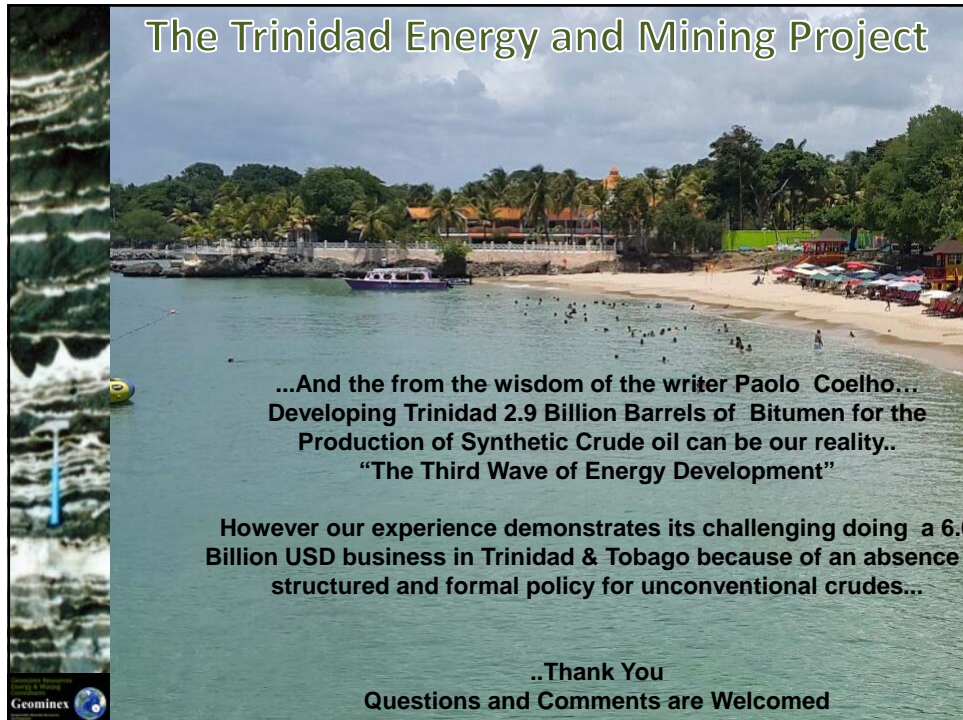
October 2016, 16<sup>th</sup> Caribbean Energy Conference  
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**Lets Develop the South-Western Peninsula  
No Harm to the People!**

**Parrylands, Guapo, Antilles-Vessigny Fields  
South-Western Peninsula**

Herbert Sukhu, PhD, MSc, BSc, CEng, CISM, FGS, FIQ (UK)  
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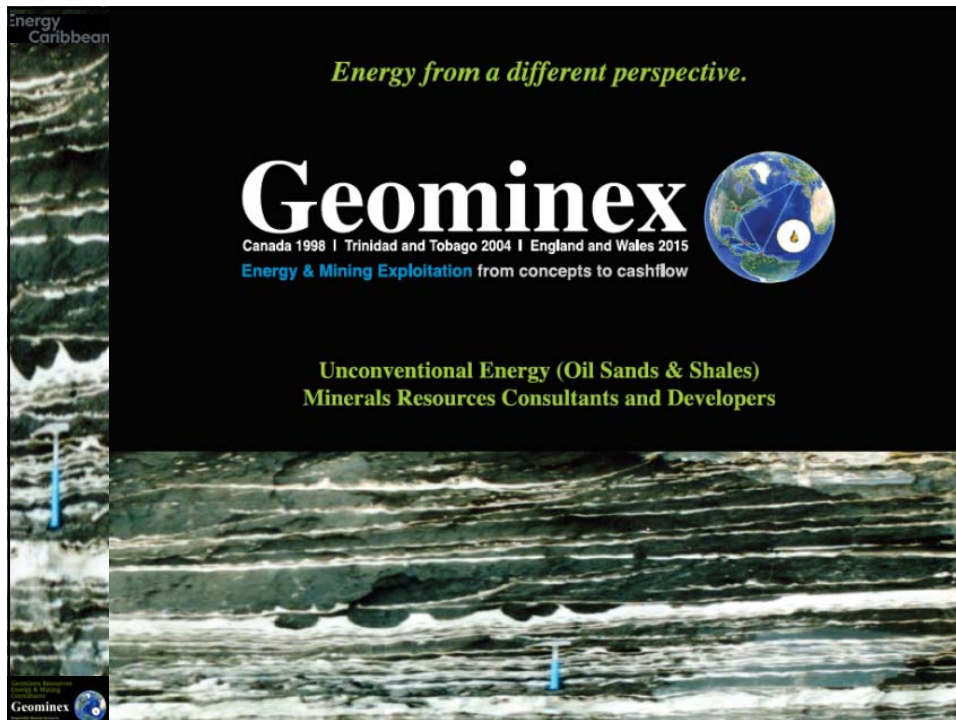
## The Trinidad Energy and Mining Project

...And the from the wisdom of the writer Paolo Coelho...  
 Developing Trinidad 2.9 Billion Barrels of Bitumen for the  
 Production of Synthetic Crude oil can be our reality..  
 "The Third Wave of Energy Development"

However our experience demonstrates its challenging doing a 6.0  
 Billion USD business in Trinidad & Tobago because of an absence  
 structured and formal policy for unconventional crudes...

..Thank You  
 Questions and Comments are Welcomed

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Energy Caribbean

*Energy from a different perspective.*

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Canada 1998 | Trinidad and Tobago 2004 | England and Wales 2015  
 Energy & Mining Exploitation from concepts to cashflow

Unconventional Energy (Oil Sands & Shales)  
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