



COLOMBIA ROUND 2021

YET TO FIND EVALUATION FOR CONVENTIONAL AND UNCONVENTIONAL HYDROCARBONS IN COLOMBIAN BASINS

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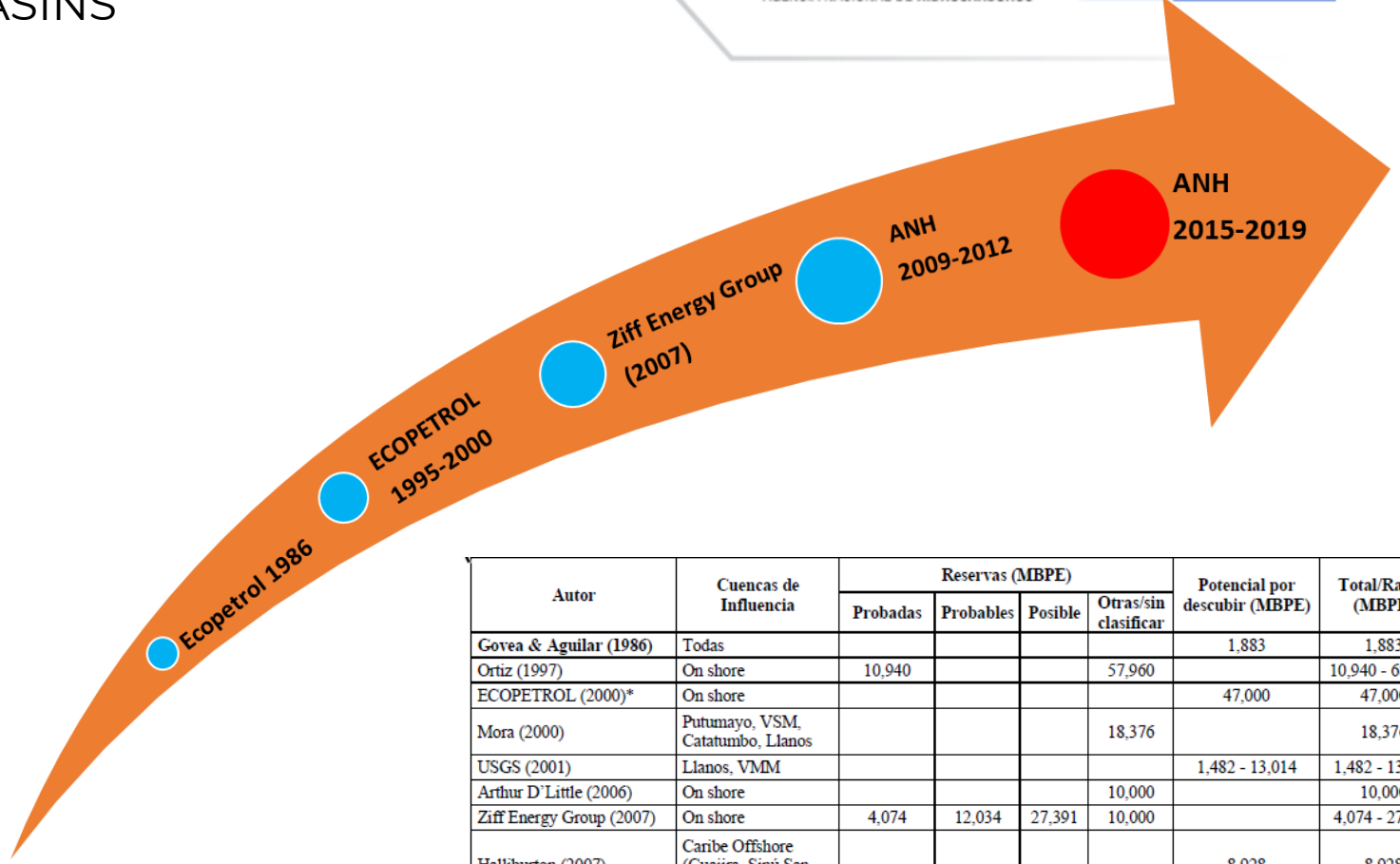
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YET TO FIND EVALUATION FOR CONVENTIONAL HYDROCARBONS IN COLOMBIAN BASINS



- 1. • Consolidation of a YTF methodology
- 2. • Updated geological and geochemical model
- 3. • Updated database
- 4. • Mass balance with probabilistic estimate
- 5. • Estimate of resources under the PRMS system

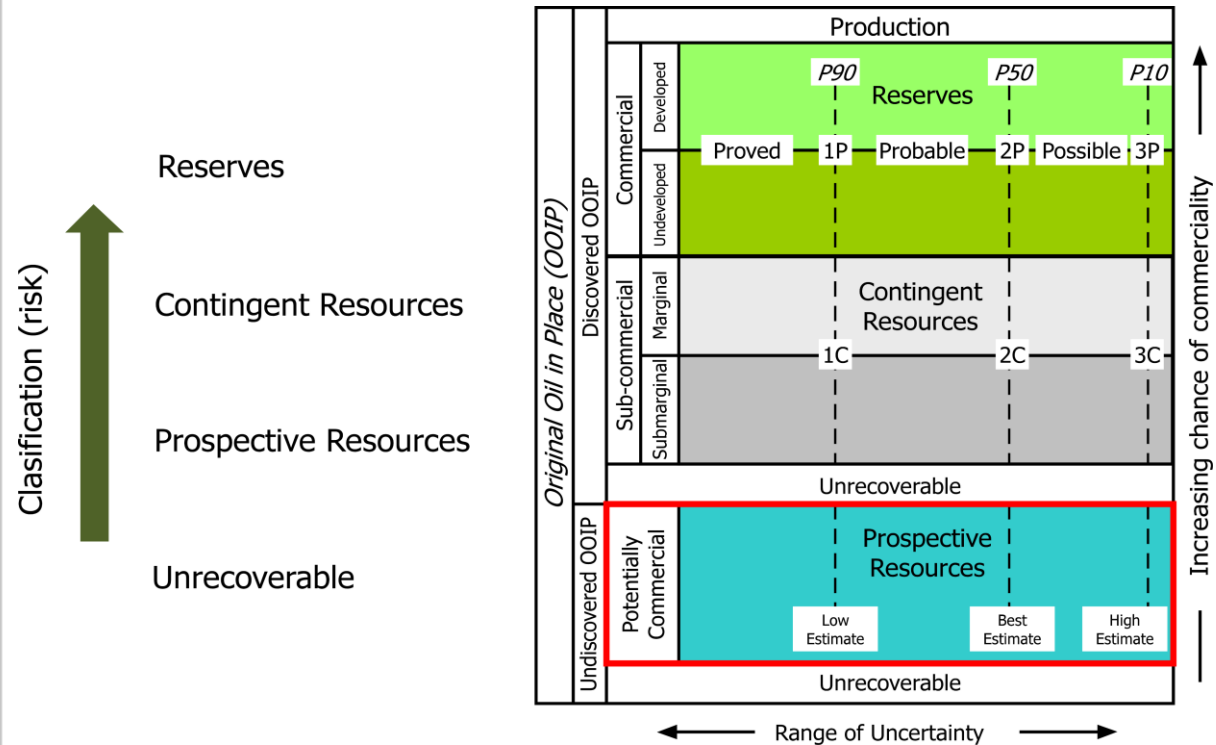


Autor	Cuencas de Influencia	Reservas (MBPE)				Potencial por descubrir (MBPE)	Total/Rango (MBPE)
		Probadas	Probables	Posible	Otras/sin clasificar		
Govea & Aguilar (1986)	Todas					1,883	1,883
Ortiz (1997)	On shore	10,940			57,960		10,940 - 68,900
ECOPETROL (2000)*	On shore					47,000	47,000
Mora (2000)	Putumayo, VSM, Catatumbo, Llanos				18,376		18,376
USGS (2001)	Llanos, VMM					1,482 - 13,014	1,482 - 13,014
Arthur D'Little (2006)	On shore				10,000		10,000
Ziff Energy Group (2007)	On shore	4,074	12,034	27,391	10,000		4,074 - 27,391
Halliburton (2007)	Caribe Offshore (Guajira, Simu San Jacinto-Urabá)					8,928	8,928
IHS (2008)	Todas					3,929 - 13,874	3,929 - 13,874
USIS (2008)	Cesar - Rancheria					2,000 - 10,700	2,000 - 10,700
UNAL (2008)	Cordillera Oriental					532 - 1,540	532 - 1,540
Halliburton (2008)	Llanos Orientales					22,927 - 241,000	22,927 - 241,000
UIS (2009)	Once (11) cuencas					37,000 - 296,000	37,000 - 296,000

Background to evaluation studies conducted in Colombia (studies published and available for industry use)



Petroleum Resources Management System (PRMS)



*“Prospective Resources are those quantities of Petroleum estimated as of a given date, to be potentially recoverable from undiscovered accumulations by applications of future development Projects. **Prospective Resources have both an associated chance of geologic discovery and a chance of development**”*

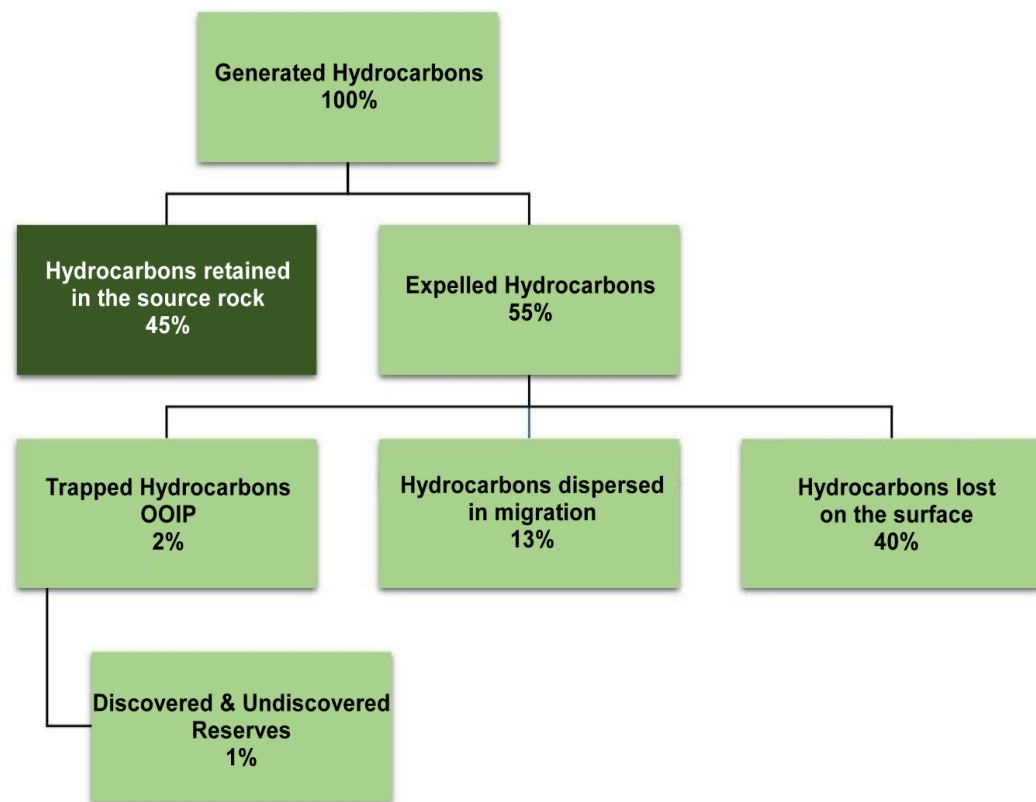


Taken from UNFC, 2015

Taken from Petroleum Resources Management System, 2017

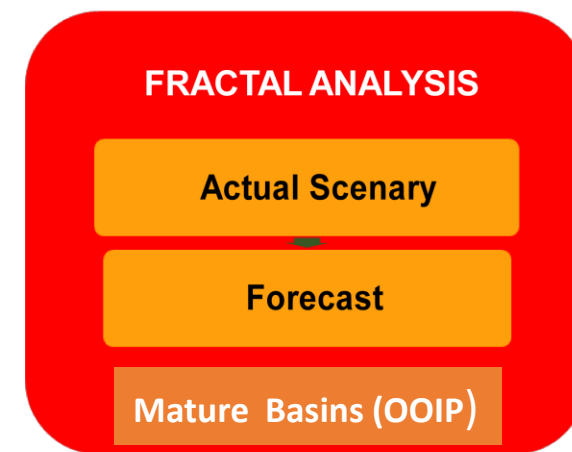
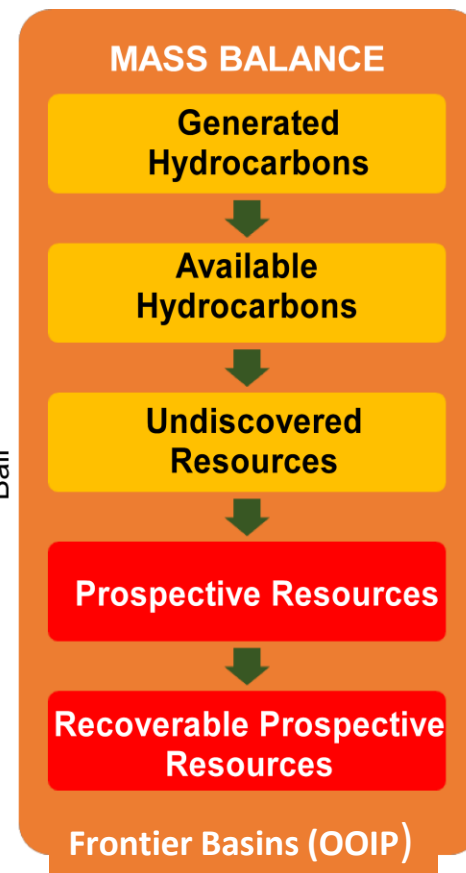


General outline of the methodology used in mass balance and fractal distribution analysis

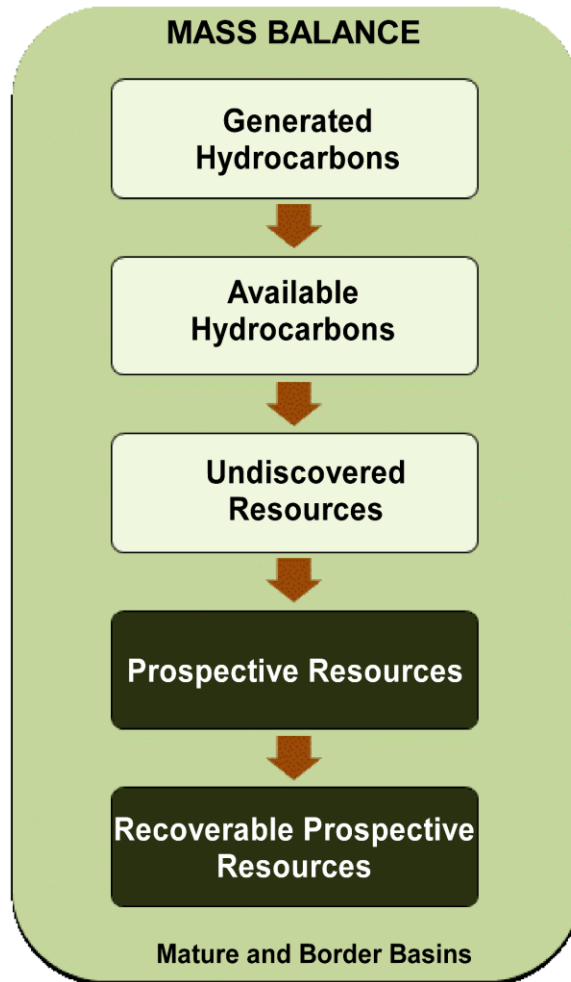


Modified from Hunt, 2006

Probabilistic Method / Monte Carlo Simulation / Crystal Ball



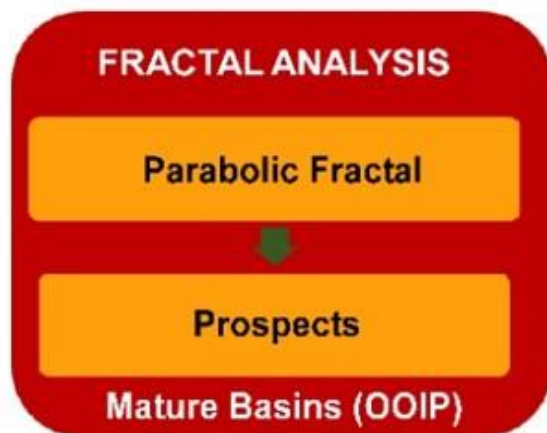
Mass Balance Estimate



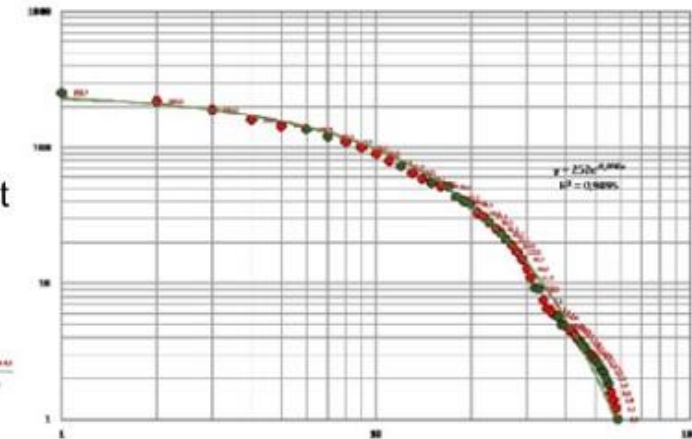
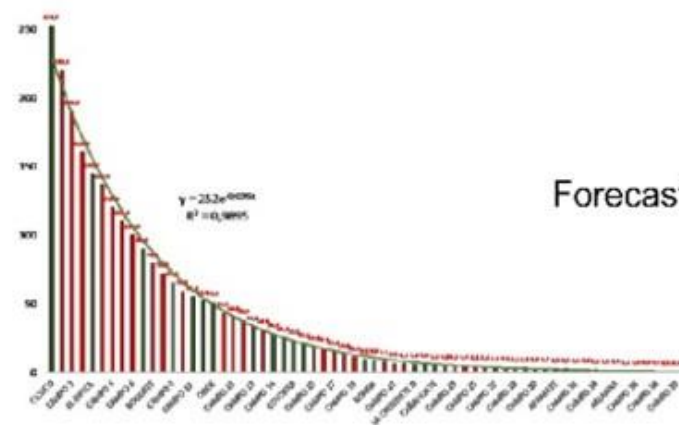
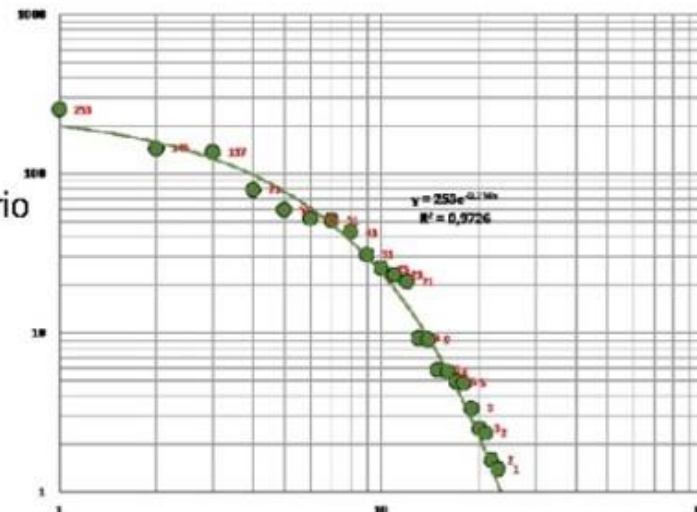
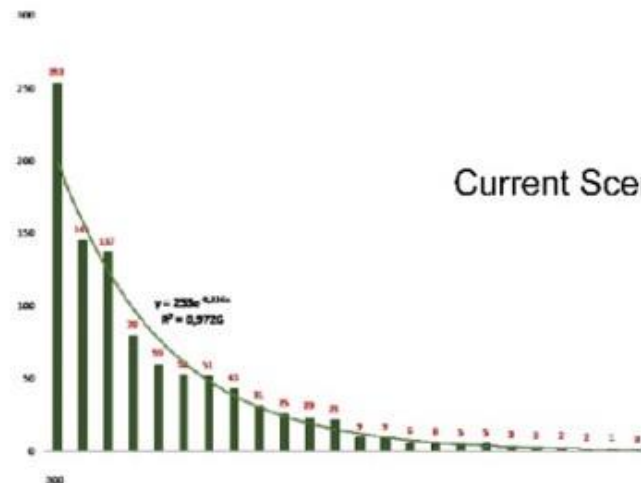
MASS BALANCE PARAMETERS IN THE LOWER MAGDALENA VALLEY BASIN / PLATO PALEOCENE FORMATION									
PARÁMETROS	Unidad	Dist.	P99	P90	P50	P10	P1	Mean	P10/P90
Area Foco Generador	Km2	LogNormal		4.520		4.880		4.697	1
Espesor Roca Gen. Efectiva	Metros	LogNormal		32		38		35	1
TOC Original	%	Normal		2,50		3,50		3,00	1
Densidad Roca Gen.	g/cm3	Normal		2,42		2,58		2,50	1
Gravedad API	° API	Normal		37,0		48,0		42,50	1
IH original	mgHC/grTOC	Normal		250,00		350,00		300,00	1
IH actual	mgHC/grTOC	Normal		22,00		48,00		35,00	2
Factor de Eficiencia de Expulsión	%	Normal		62,00		78,00		70,00	1
HCs. Perdidos durante Migración	%	Normal		82,00		88,00		85,00	1
Masa Carbono Orgánico	g TOC	LogN	8,39E+15	9,96E+15	1,22E+16	1,46E+16	1,63E+16	1,23E+16	2
Masa Total HCs Generados	Kg HC	LogN	1,91E+12	2,41E+12	3,19E+12	4,12E+12	4,91E+12	3,26E+12	2
HIDROCARBUROS GENERADOS POR LA Fm. Paleoceno	MBPE	LogN	14.964	18.642	24.586	32.034	38.268	25.197	2
TOTAL DE HIDROCARBUROS DISPONIBLES" Fm. Paleoceno	MBPE	LogN	1.368	1.817	2.559	3.504	4.507	2.646	6

PARAMETERS	UNITS	LMV BASIN			TOTAL
		FG SAN JORGE	FG PLATO	FG ALGARROBO	
HC's Generados / Paleoceno	mbpe	1.608	25.197	2.887	29.691
Hc's Disponibles / Paleoceno	mbpe	169	2.646	303	3.118
HC's Generados / Cansona	mbpe	3.547	49.622	4.012	57.181
Hc's Disponibles / Cansona	mbpe	479	7.071	542	8.092
Total HC's Generados	mbpe	5.155	74.819	6.898	86.872
Recursos Disponibles	mbpe	648	9.717	845	11.209
Recursos Descubiertos (OOIP)	mbpe	197	772	0	969
Recursos No Descubiertos	mbpe	451	8.945	845	10.240
Indice Éxito Exploratorio	%	15%	15%	15%	15%
Recursos Prospectivos (OOIP)	mbpe	68	1342	127	1536
Recursos Prospectivos Recuperables (FR = 25%)	mbpe	17	335	32	384

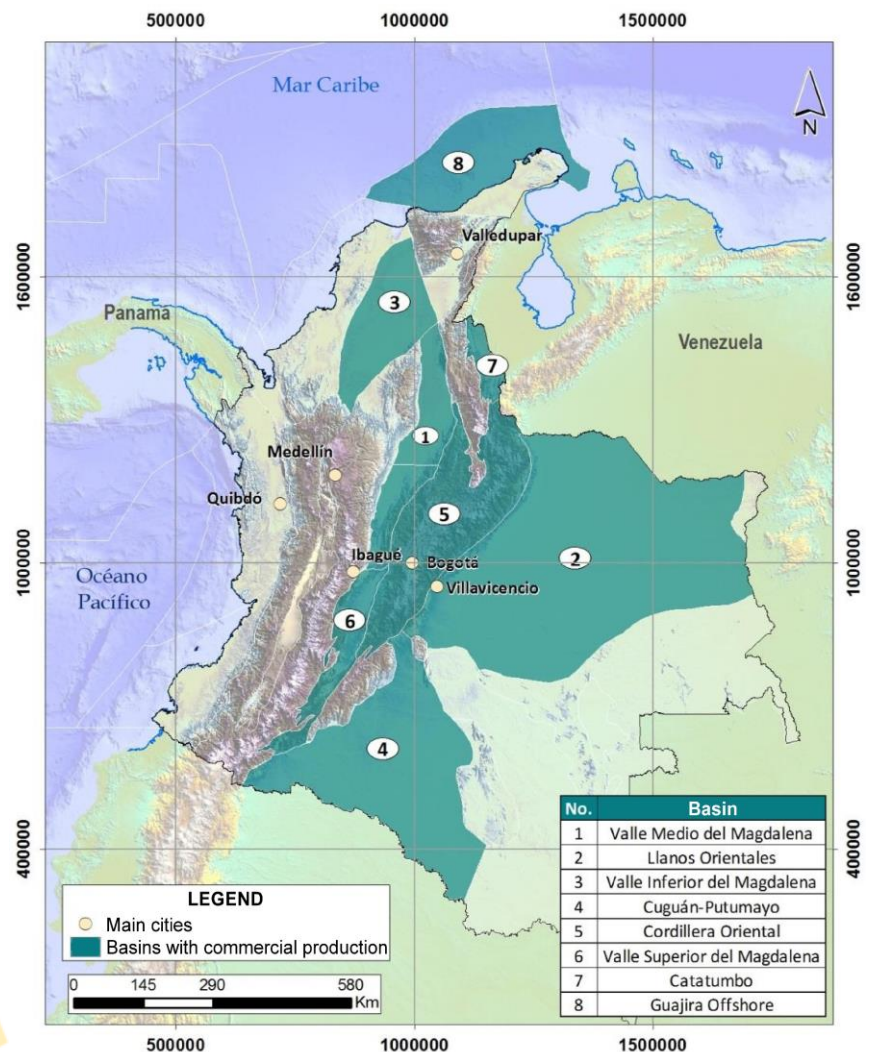
Probabilistic calculation of generated hydrocarbons and available resources



OOIP Size (Mmbpe)	# Projected Fields
entre 200-300	2
entre 150-200	2
entre 100-150	5
FNTRE 50-100	8
entre 20-50	9
entre 10-20	5
entre 5-10	6
menor de 5	26
TOTAL	63

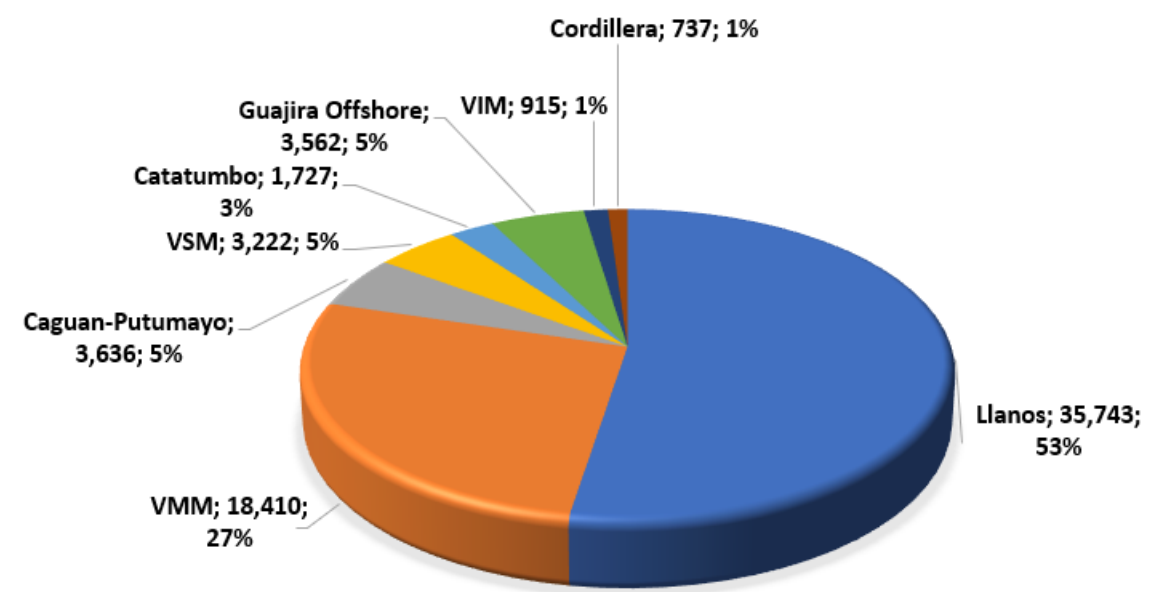


Distribution of resources discovered in Colombia (OOIP) according to the basins with commercial production (2020)

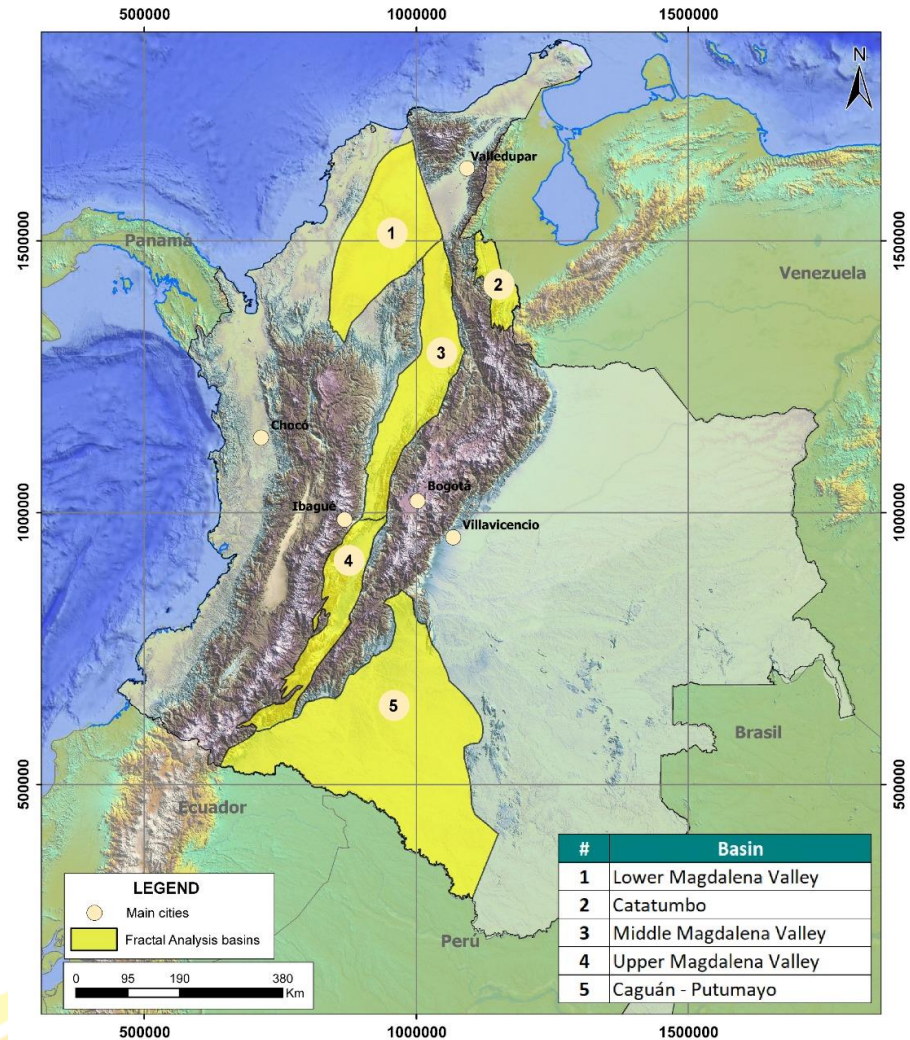


Basins	Discovered Resources (Mmboe)
Llanos	35,743
VMM	18,410
Caguan-Putumayo	3,636
VSM	3,222
Catatumbo	1,727
Guajira Offshore	3,562
VIM	915
Cordillera	737
TOTAL	67,952

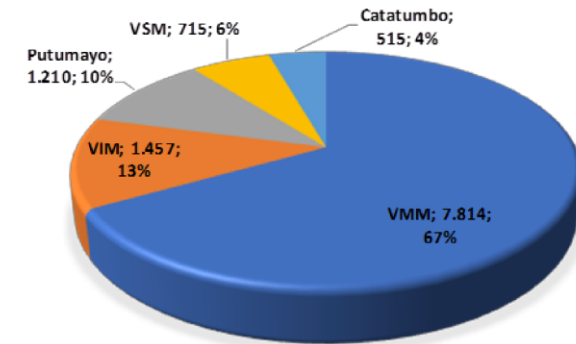
67 Bboe



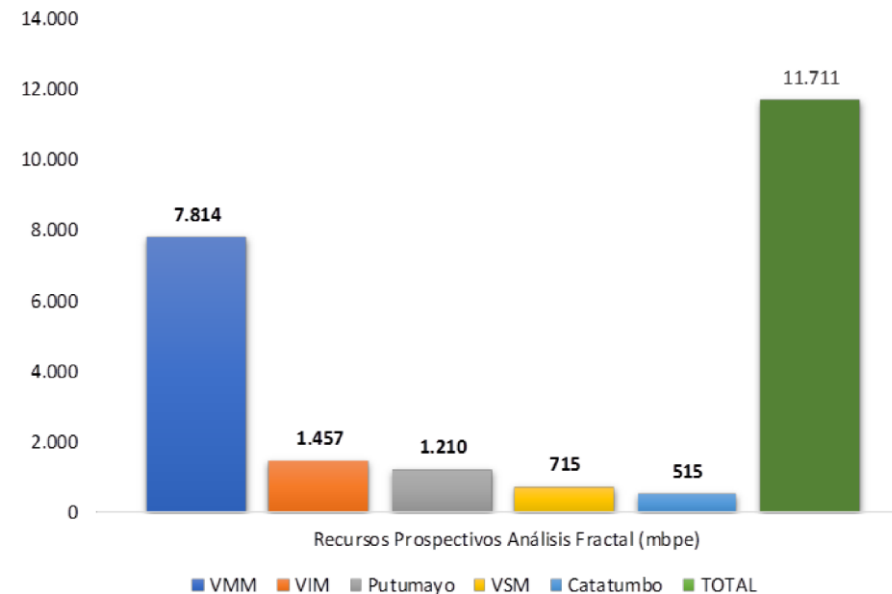
YTF Fractal Analysis



Basin	Prospective Resources Fractal Analysis (Mmbpe)
VMM	7.814
VIM	1.457
Putumayo	1.210
VSM	715
Catatumbo	515
TOTAL	11.711

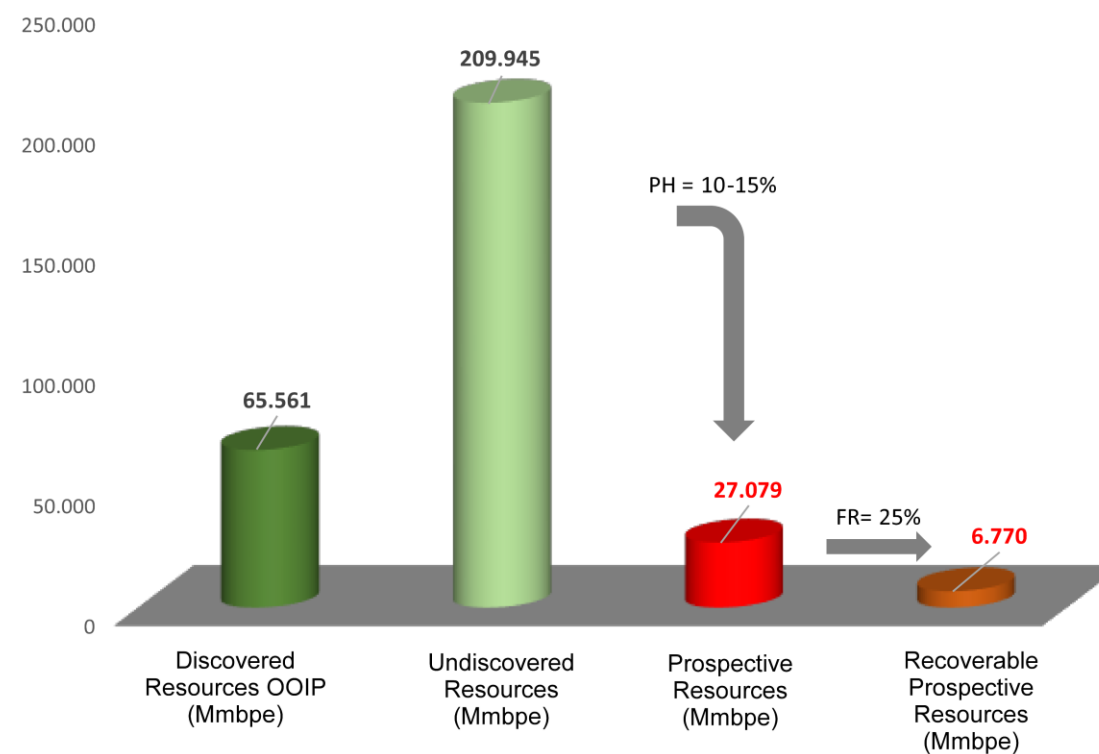


11.7 Bboe

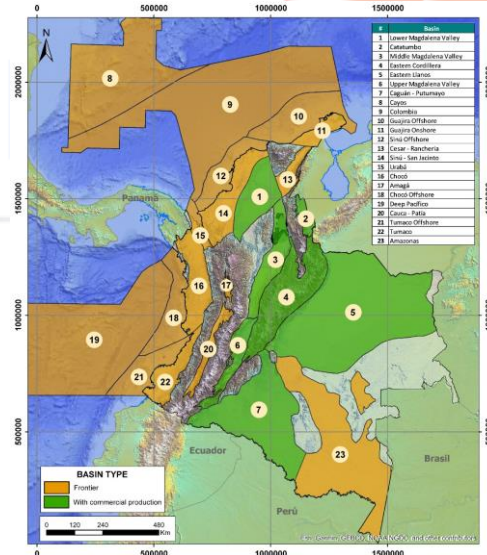


Estimate YTF Colombia / ANH 2019

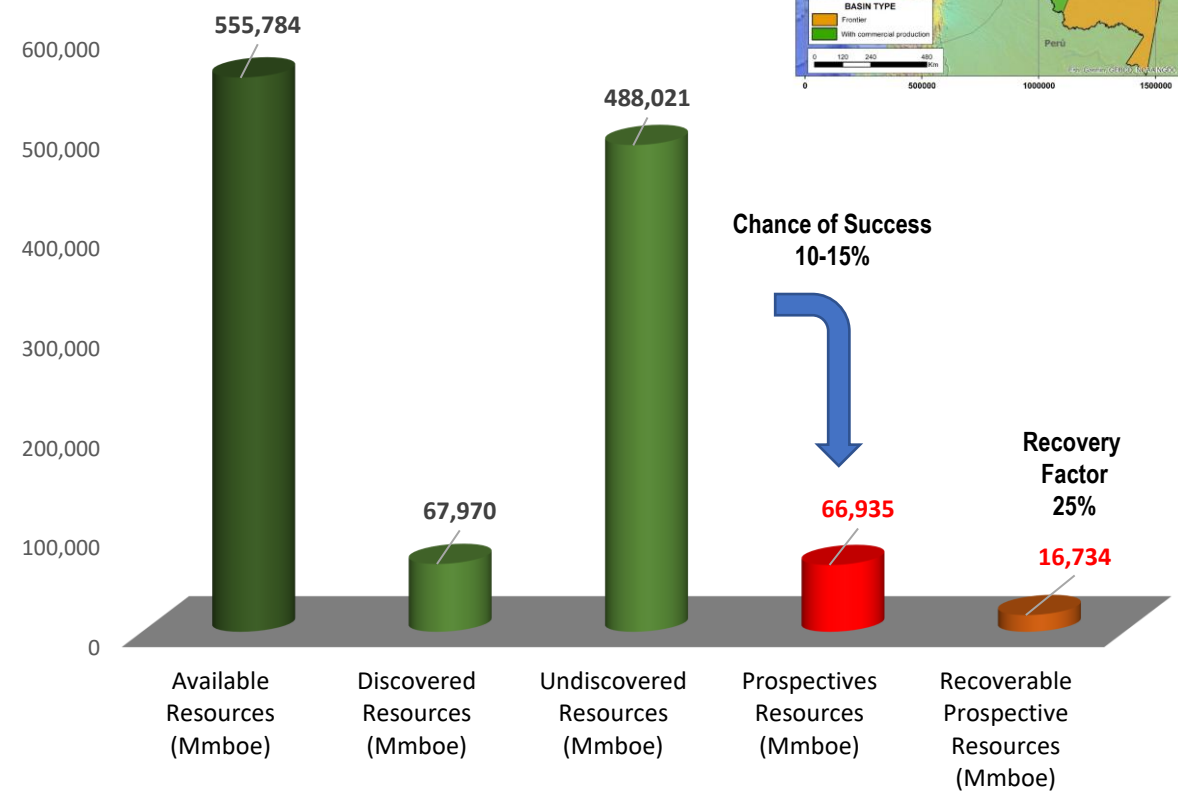
Type	Basin	Available Resources (Mmbpe)	Discovered Resources (Mmbpe)	Undiscovered Resources (Mmbpe)	Prospective Resources (Mmbpe)	Recoverable Prospective Resources (Mmbpe)
Basins with Commercial Production	VMM	70.052	18.410	51.642	7746	1937
	Llanos	51.833	35.743	16.090	2414	603
	VIM	11.209	969	10.240	1536	384
	Caguan-Putumayo	11.437	3.635	7.802	1014	254
	Cordillera	5.378	737	4.641	603	151
	VSM	7.092	3.222	3.870	580	145
	Catatumbo	5.438	1.727	3.710	482	121
	Guajira Offshore	3.202	1.100	2.102	315	79
Frontier Basins / Medium Prospectivity	Sinú-San Jacinto	26.304	16	26.288	3155	789
	Colombia	30.879	0	30.879	3088	772
	Sinú Offshore	21.854	0	21.854	2623	656
	Choco	15.292	0	15.292	1835	459
Frontier Basins / Low Prospectivity	Cayos	4.071	0	4.071	407	102
	Pacífico Profundo	3.208	0	3.208	321	80
	Choco Offshore	2.447	0	2.447	245	61
	Tumaco	2.544	0	2.544	305	76
	Guajira	1.372	0	1.372	206	51
	Tumaco Offshore	848	0	848	85	21
	Cesar-Ranchería	595	2	593	89	22
	Uraba	216	0	216	26	6
Non-Prospective Frontier Basins	Amagá	11	0	11	1	0
	Vaupes-Amazonas	9	0	216	1	0
	Cauca-Patía	7	0	7	1	0
TOTAL		275.299	65.561	209.945	27.079	6.770



Estimate YTF Colombia / 2021

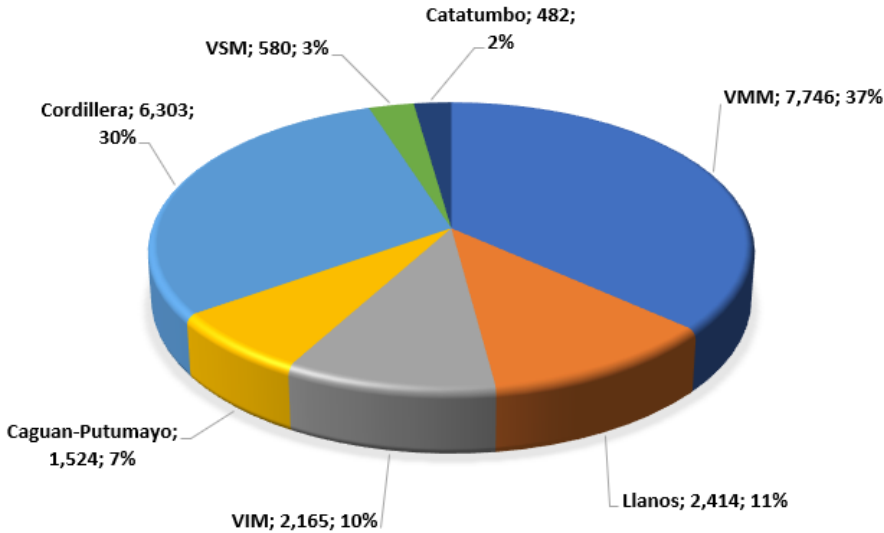
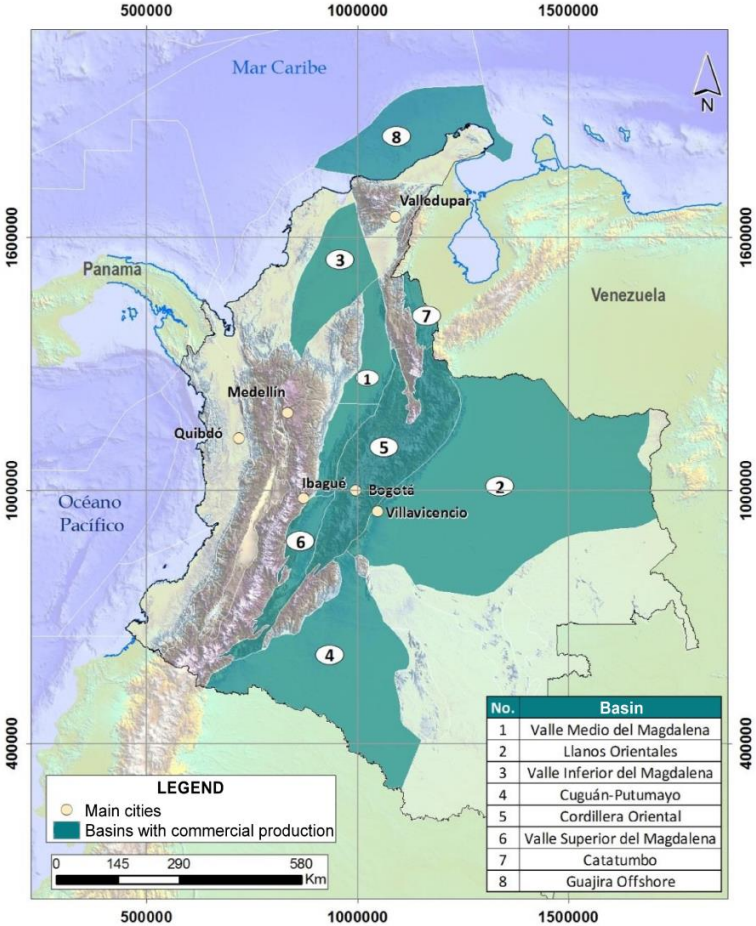


Type	Basin	Available Resources (Mmboe)	Discovered Resources (Mmboe)	Undiscovered Resources (Mmboe)	Prospectives Resources (Mmboe)	Recoverable Prospective Resources (Mmboe)
Basins Commercial Production	VMM	70,052	18,410	51,642	7746	1937
	Llanos	51,833	35,743	16,090	2414	603
	VIM	22,148	915	21,233	2165	541
	Caguan-Putumayo	15,361	3,636	11,725	1524	382
	Cordillera	49,226	737	48,488	6303	1576
	VSM	7,092	3,222	3,870	580	145
	Catatumbo	5,438	1,727	3,710	482	121
Frontier Basins	Guajira (Onshore&Offshore)	162,010	3,562	158,448	23767	5942
	Colombia	59,886	0	59,886	7785	1946
	Sinú Offshore	43,700	0	43,700	5681	1420
	Sinú-San Jacinto	37,874	16	37,858	4922	1230
	Choco	15,292	0	15,292	1835	459
	Cayos	4,071	0	4,071	407	102
	Pacífico Profundo	3,208	0	3,208	321	80
	Tumaco	2,544	0	2,544	305	76
	Cauca-Patía	1,924	0	1,924	250	63
	Choco Offshore	2,447	0	2,447	245	61
	Tumaco Offshore	848	0	848	85	21
	Cesar-Ranchería	595	2	593	89	22
	Uraba	216	0	216	26	6
	Amagá	11	0	11	1	0
Vaupés-Amazonas	9	0	216	1	0	
TOTAL		555,784	67,970	488,021	66,935	16,734



67 Bboe / OOIP

Estimate YTF / Basins With Oil Commercial Production



Basin	Prospectives Resources (Mmboe)	Recoverable Prospective Resources (Mmboe)
VMM	7,746	1,937
Llanos	2,414	603
VIM	2,165	541
Caguan-Putumayo	1,524	382
Cordillera	6,303	1,576
VSM	580	145
Catatumbo	482	121
TOTAL	21,215	5,304

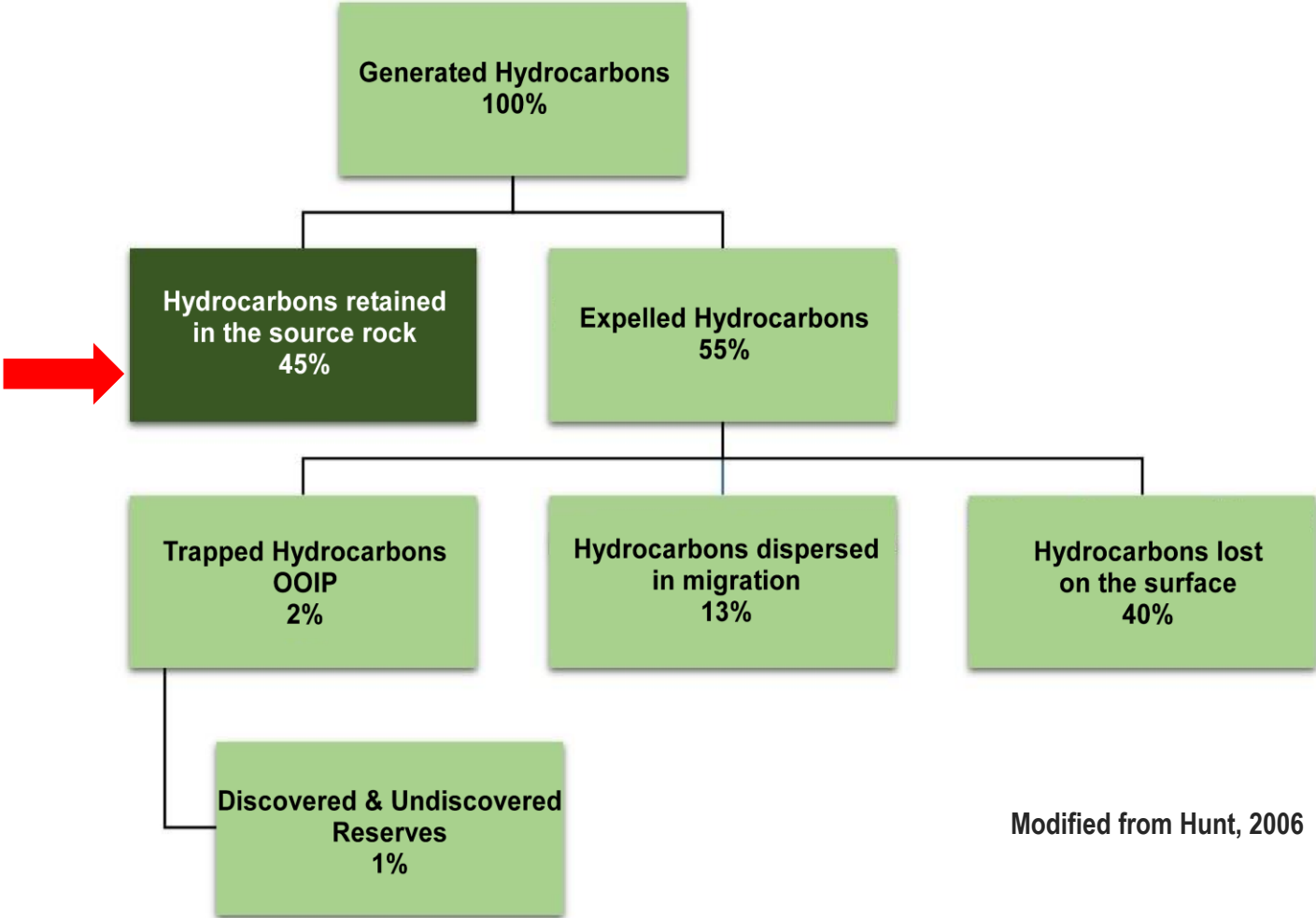
→ **5 Bboe / "Reserves"**
(Current Reserves 2 Bbop)

↓
21 Bboe / OOIP

This is a sensible and defensible YTF scenario from a petroleum geology point of view.

YET TO FIND EVALUATION FOR UNCONVENTIONAL (SRR) HYDROCARBONS IN COLOMBIAN BASINS

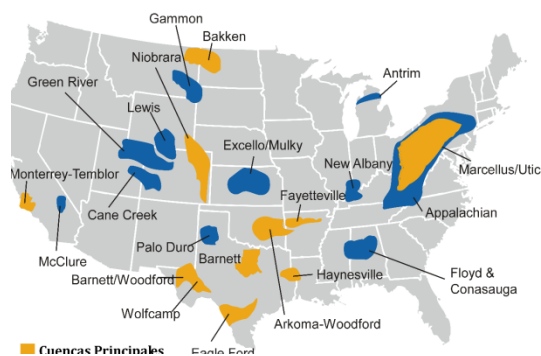
Global Mass Balance



A system of unconventional hydrocarbons in shales is a source rock rich in organic matter, with or without intercalations of "organic-lean lithofacies", which can produce naturally generated hydrocarbons (Jarvie, 2012).

Modified from Hunt, 2006

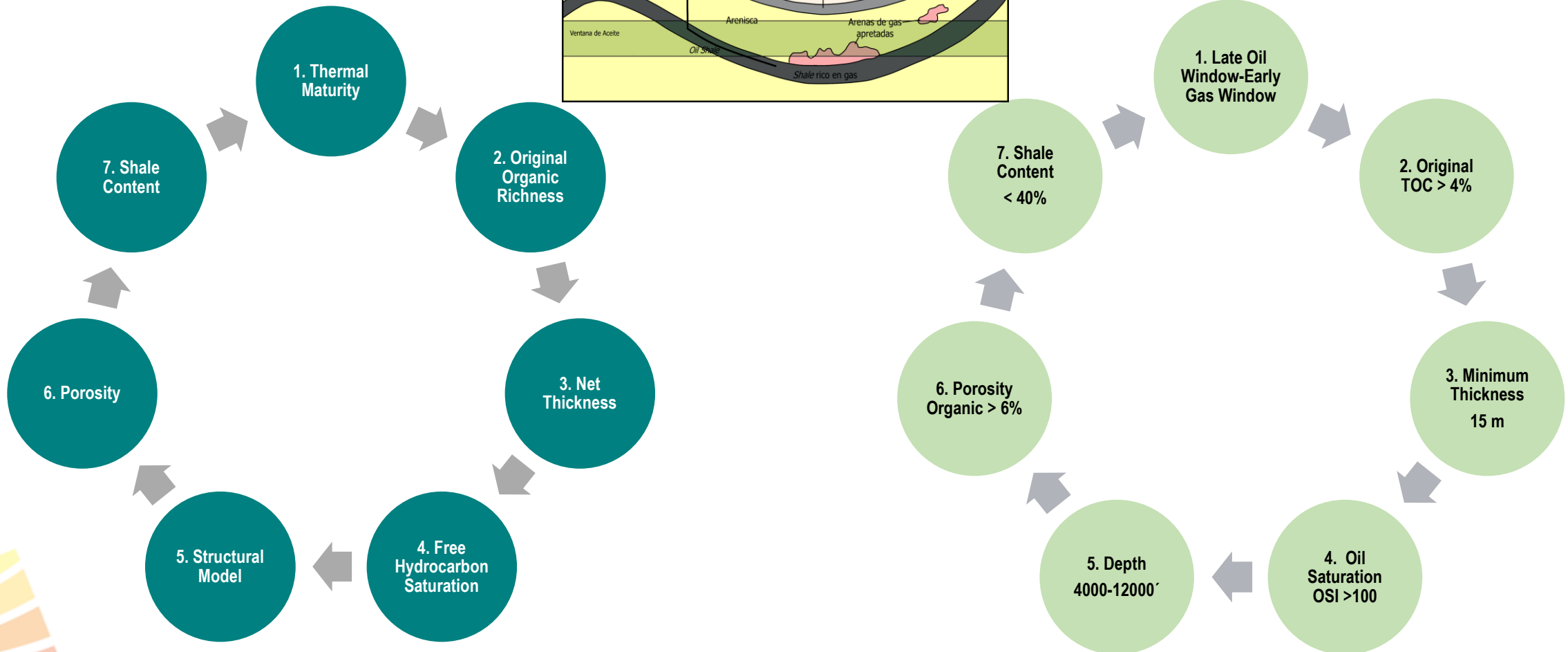
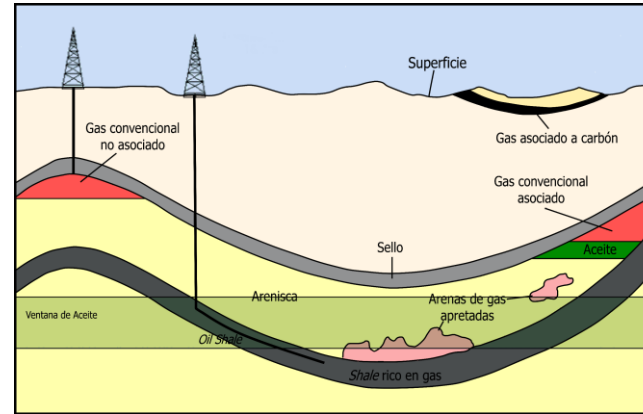
Features Of The Oil And Gas Shale Play In North America



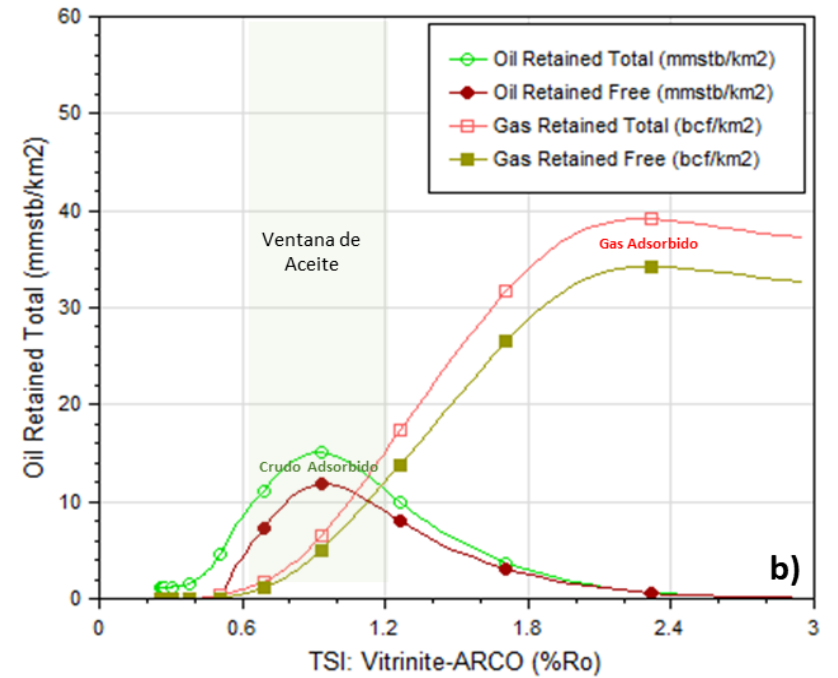
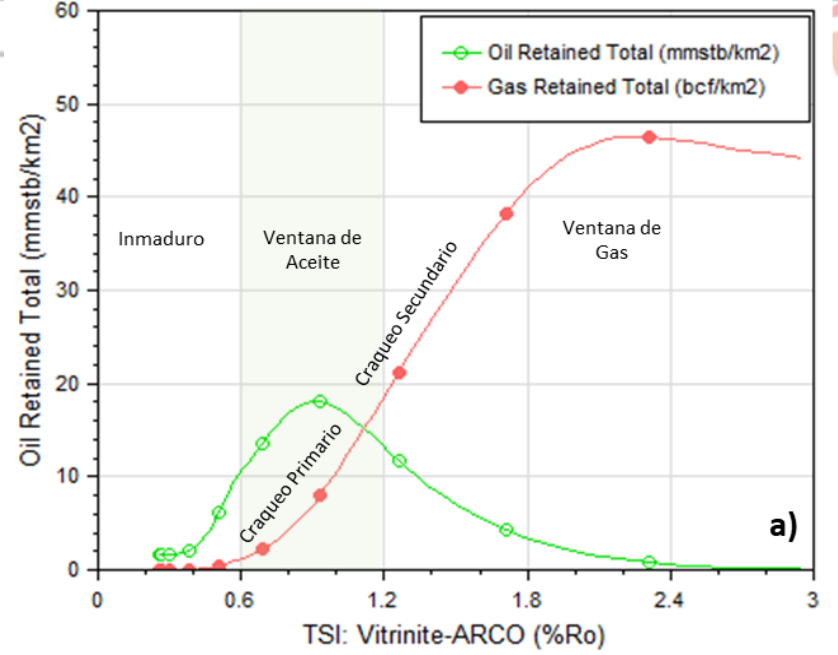
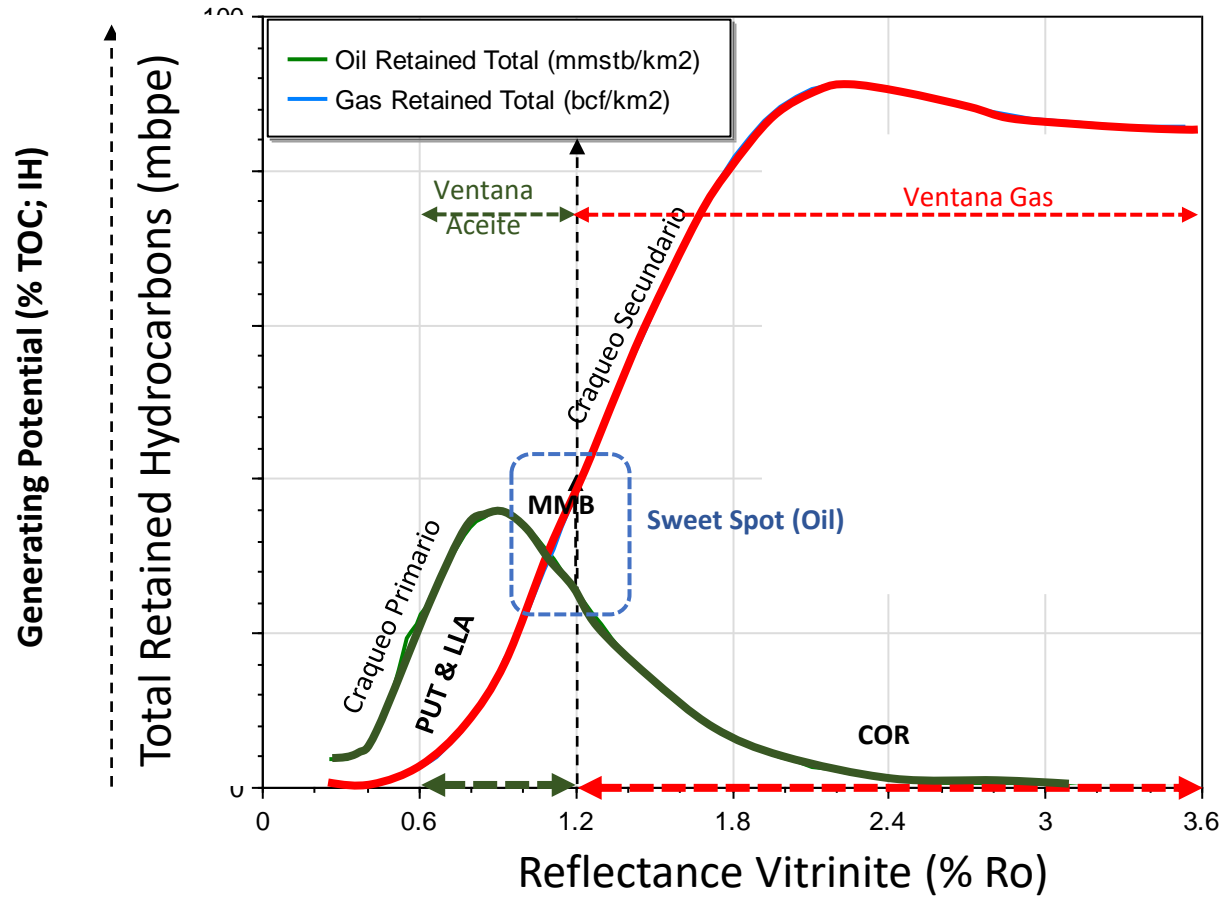
	United States of America: Shale Oil & Shale Gas											Canada: Shale Oil & Shale Gas		
Parámetros	Barnett Shale	Marcellus Shale	Fayetteville Shale	Woodford Shale	Haynesville Shale	Bakken Tight Oil	Eagle Ford Shale	Niobrara Shale	Utica Shale	Wolfcamp Shale	Monterey Shale	Horn River Shale	Montney Shale	Duvernay Shale
Age	Mississipiano Tardío	Devónico	Mississipiano Tardío	Devónico S. / Mississipiano Ta.	Jurásico Superior	Devónico S. / Mississipiano Te.	Cretácico Inf.	Cretácico Sup.	Ordovícico Medio	Pérmico	Mioceno	Devónico Medio	Triásico Temp.	Devónico Sup.
Area (km ²)	13.986 (10.528 Activa)	246.049	23.310	28.490	23.310	517.998	8.599 (Activa)	36.260	440.298	25.382	4.532	12.950	2.978	10.101
Depth (ft)	6.500–8.500	4.000–8.500	1.000 - 7.000	5.000–9.500	10.500–13.500	9.600–10.400	7.000–12.000	3.000–14.000	2.000–14.000	5.500 - 11.000	8.000–14.000	6.500 - 9.000	4.900 – 11.500	8.200–13.100
Thickness (ft)	100–600	50–200	20–200	15–250	200–300	40–75	100–475	50–300 (a 1.500)	70–750	1.500–2.600	1.000–3.000	125–450	150–1000	65–230
TOC (%)	4–5	2–8	4–9.8	4–8	0.5–4	9+	4–8	3	0.3–2.5	2–6	5	1–6	0.4–4.0	1–20
Thermal Maturity (Ro %)	1,3–2,1	1,3–2,4	1,5–4,0	1,2–2,8	1,7–2,8	0,6–1,0	0,7–1,8	0,5–1,4+ (Cocina Desigual)	1,1–4,0	0,8	0,6–1,0 (est.)	2,2–2,8	0,8–2,5	0,6–2,9
Porosity (%)	4–8	4–8	4–5	5–6	7–10+	8–12	4–10	7–12	6–12	2–10	13–29	4–8	2–9	3–8
Si Content (%)	40	10 - 60	20 - 60	50 - 65	25 - 45	-	10 - 25	-	-	-	-	55	60	50 - 70
Ca Content (%)	13	3 - 50	-	5 - 10	15 - 40	-	60 - 80	-	-	-	-	-	20	10 - 30
Sh Content (%)	23	10 - 35	-	30 - 35	30 - 45	-	10 - 20	-	-	-	-	-	-	15 - 30
Average IP / Well (MMcfd)	2,5	3,5	2,8	3,6	14+	-	8.0 + Cond.	-	4,5–17	-	-	10–30 (-12% CO ₂ , Tr. H ₂ S)	3.0–4.0	3.0–8.5 + Condensado
Average IP / Well (BOPD)	-	-	-	-	-	200–1,800	340–2,500 (41.5 °API)	400–500	200–1,500	1050	350–700 (Venoco)	-	575	60–700
Horizontal Lateral, Oil, (ft)	-	-	-	-	-	8.700–10.000	6.000–7.000	4.050–5.100	4.700–6.200	4550–6700	-	5.000–6.550	4.700–5.700	6.000–7.000
Horizontal Lateral, Gas (ft)	3.950–4.350	4.200 - 4.900	4.700 - 5.500	2.500–5.000	4.400–4.700	-	5.000–5.300	-	4.700–6.200	-	-	-	4.700–5.700	6.000–7.000
TRR (Tcf)	43	410	32	22	75	-	22	-	3.8 & 1.3 to 15.7 & 5.5 (Ohio)	-	-	165 (100 vendible)	49	440
TRR (BBO)	-	-	-	-	-	7.4 (Ind. est. 24)	8	1,5	-	30 (Ind. est. es 50)	15,4 y 1,5 a 2,0	-	1,1	62
TRR	-	-	-	-	-	-	-	-	est. 38 Tcf (Play total)	-	-	-	230, Tight Gas, Tcf	-
EUR/Well (Bcf)	1,6	4,5	2,1	2,1	6,5	-	5	-	3,6–5,4	-	-	15–35	4,0–5,0	-
EUR/Well (MBO)	-	-	-	-	-	700	600	350–750	500–900	650–750	230–800	-	-	-
Pressure Gradient (psi/ft)	0.43–0.45	0.60–0.70	0.38–0.45	0.50–0.55	0.7–0.9	0.50–0.60	0.5–0.75	0.42- 0.60	0,6	0,55–0,70	Normal	0,55–0,75	0,48	0,72–0,96
Well Spacing (Ac)	116	80	80	160	80	160	40–80	160 (D/S to 40)	160	80	160	-	-	-
Start of Production	1981	2005	2006	2006	2008	2008	2006	2006	2011	2011	1980	2005	Antes de 2000	2012

Fuente: Ahmed U. & Meehan N., 2016

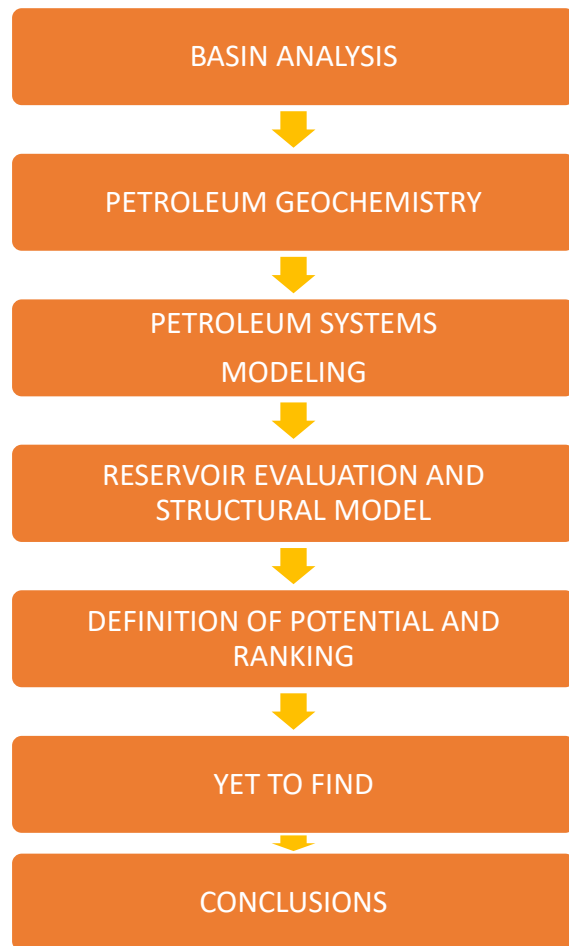
Oil And Gas Shale Play



Oil And Gas Shale Play / Retained Hydrocarbons

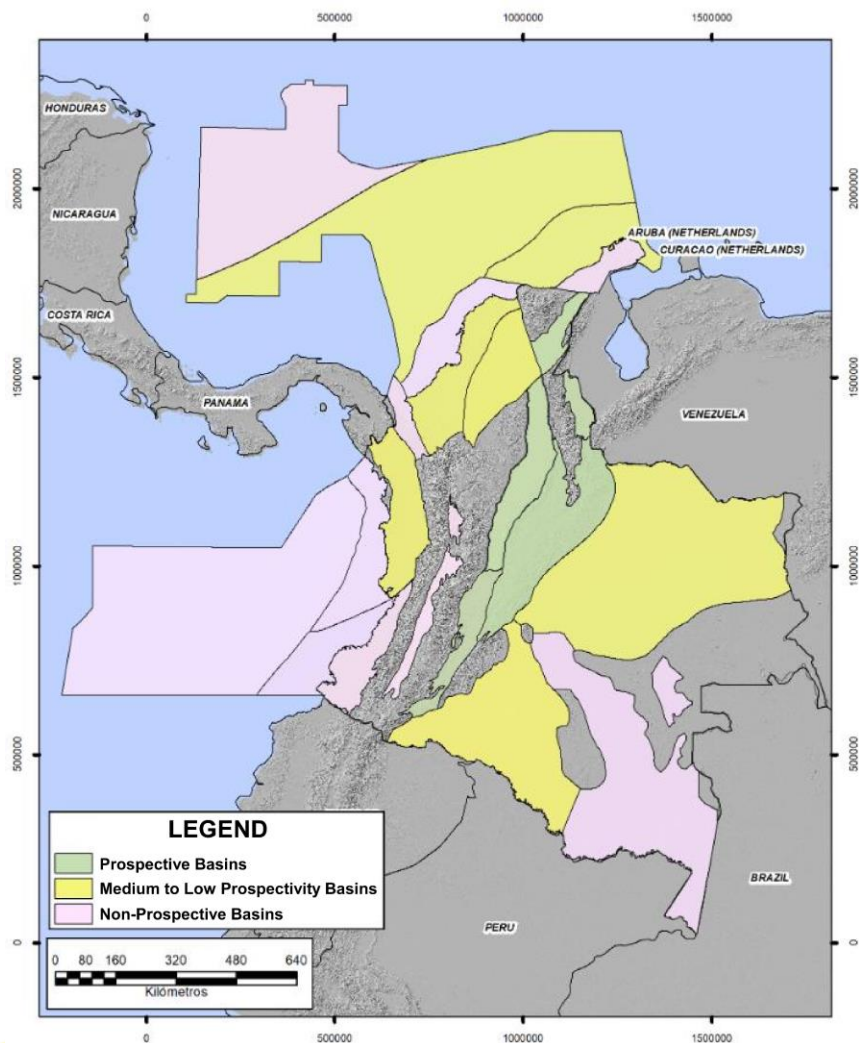


Methodology. Parameters and ranking



Variables	Ranking	Description
Hydrocarbon Generation Potential	Alto=10;Mo=7;Bajo=3	La calificación 10 se asigna en aquellas cuencas donde hay suficiente información geoquímica que permite caracterizar el potencial generador original. La calificación 7 para aquellas cuencas donde la información geoquímica es escasa pero existen algunos datos que sugieren la presencia de intervalos generadores. La calificación 3 es para aquellas cuencas donde a partir del modelo geológico se pueden plantear intervalos generadores hipotéticos.
Thermal Maturity	Inmaduro=3; Generación tardía-Ventana Gas temprana= 10; Ventana Gas tardía= 7	La calificación 10 se asigna en aquellas cuencas donde hay información de madurez dentro de las cocinas de generación. La calificación 7 para aquellas cuencas donde el modelamiento de pseudo pozos indica que existen cocinas de generación dentro del rango de madurez adecuado. La calificación 3 es para aquellas cuencas donde hay hidrocarburos pero no es posible mapear las áreas de generación.
Net Thickness	<15m=3;15-50 m=7;>50=10	La calificación 10 se asigna en aquellas cuencas donde la información indica que el espesor neto generador es superior a 50 m. La calificación 7 para aquellas cuencas donde no hay caracterización geoquímica pero la información estratigráfica sugiere que hay intervalos generadores hipotéticos con mas de 50 m de espesor. La calificación 3 es para aquellas cuencas donde el espesor generador es menor a 15 m.
Porosity	< 4%=3; 4-6%=7; >6%=10	La calificación 10 se asigna en aquellas cuencas donde la información indica que la porosidad promedio del intervalo generador es mayor al 6% . La calificación 7 para aquellas cuencas donde la información indica que la porosidad promedio del intervalo generador está entre 4 % y 6% La calificación 3 es para aquellas cuencas donde la información indica que la porosidad promedio del intervalo generador es menor al 4%
Free HC's Saturation	OSI<50=3;OSI 50-100 = 7; OSI > 100=10	La calificación 10 se asigna en aquellas cuencas donde la información de pirólisis confirma que el OSI es mayor a 100. La calificación 7 para aquellas cuencas donde la información de pirólisis confirma que el OSI está entre 50 y 100. La calificación 3 es para aquellas cuencas donde la información de pirólisis confirma que el OSI es menor a 50
Depth	<4000' = 3; 4000-12.000'=1 > 12.000'=3	La calificación 10 se asigna en aquellas cuencas donde las cocinas de generación se encuentran entre 4.000y 12.000pies de profundidad. La calificación 3 es para aquellas cuencas donde las cocinas de generación se encuentran a profundidades menores a 4000 pies o mayores a 12.000 pies.
Structural Complexity	Alto=3;Medio=7;Bajo=10	La calificación 10 se asigna en aquellas cuencas donde la complejidad estructural es baja. La calificación 7 para aquellas cuencas donde la complejidad estructural aumenta. La calificación 3 es para aquellas cuencas donde el ambiente tectónico es de alta complejidad y aplicado especialmente con estructuras de cabalgamiento.

Oil And Gas Shale Play / Basins Ranking



No	PROSPECTIVITY	BASIN	PLAY YRG - PROSPECTIVITY VARIABLES							TOTAL
			Potencial Generador	Thermal Maturity	Net Thickness	Porosity	Free HC's Saturation	Depth	Structural Complexity	
			Alto=10;Medio=7;Bajo=3	Inmaduro=3; Generación tardía-Ventana Gas temprana= 10; Ventana Gas tardía= 7	<15m=3;15-50m=7;>50=10	< 4%=3; 4-6%=7; >6%=10	OSI<50=3;OSI 50-100 = 7; OSI > 100=10	<4000'= 3; 4000-12.000'=10; > 12.000'=3	Alto=3;Medio=7;Bajo=10	
1	PROSPECTIVE BASINS	VMM	10	10	10	10	10	10	7	67
2		CESRAN	10	10	10	10	7	10	7	64
3		COR	10	7	10	10	7	10	7	61
4		CAT	10	10	10	ND	7	10	7	54
5		VSM	10	10	10	ND	7	3	10	50
6	MEDIUM TO LOW PROSPECTIVITY BASINS	Choco	10	7	10	ND	ND	7	10	44
7		SSJ	10	10	10	ND	ND	7	3	40
8		VIM	7	10	7	ND	ND	3	10	37
9		Llanos	10	10	10	ND	ND	3	3	36
10		Colombia	7	7	7	ND	ND	3	10	34
11		Caguan Putumayo	10	3	10	ND	ND	3	3	29
12		Guajira Offshore	7	7	ND	ND	ND	3	7	24
13	NON-PROSPECTIVE BASINS	Uraba	3	3	ND	ND	ND	3	10	19
14		Tumaco	3	3	ND	ND	ND	3	7	16
15		Sinú Offshore	ND	7	ND	ND	ND	3	3	13
16		Choco Offshore	ND	ND	ND	ND	ND	3	3	6
17		Pacifico Profundo	ND	ND	ND	ND	ND	3	3	6
18		Tumaco Offshore	ND	ND	ND	ND	ND	3	3	6
19		Guajira	ND	ND	ND	ND	ND	ND	ND	ND
20		Los Cayos	ND	ND	ND	ND	ND	ND	ND	ND
21		Vaupez-Amazonas	ND	ND	ND	ND	ND	ND	ND	ND
22		Amaga	NP	NP	NP	NP	NP	NP	NP	NP
23		Cauca Patía	NP	NP	NP	NP	NP	NP	NP	NP

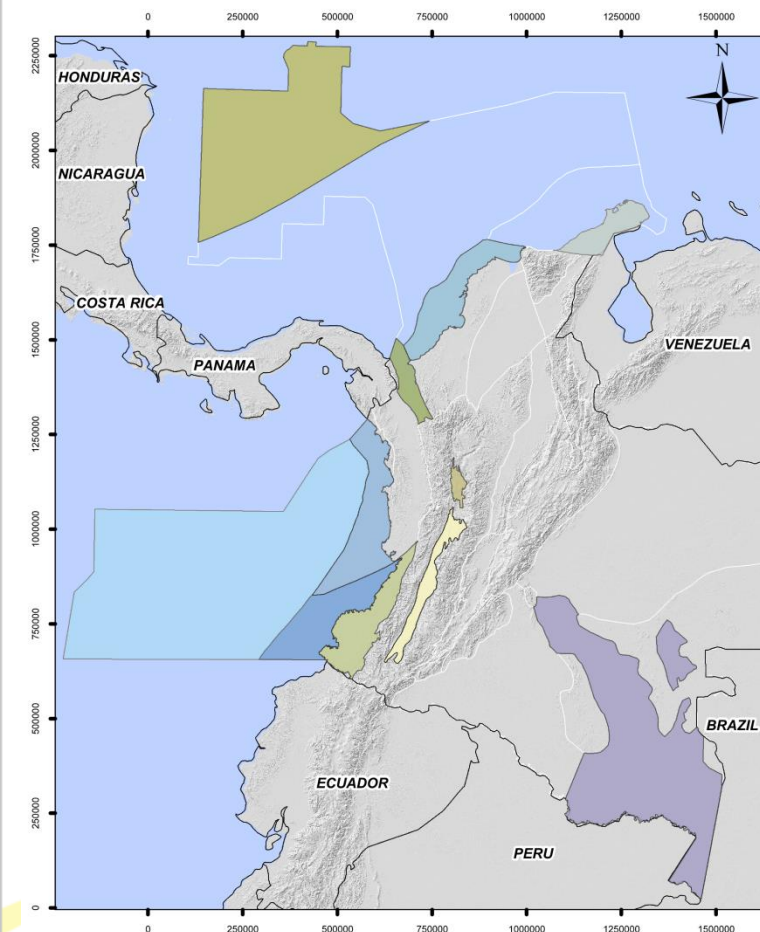
From modeling

ND Not Available

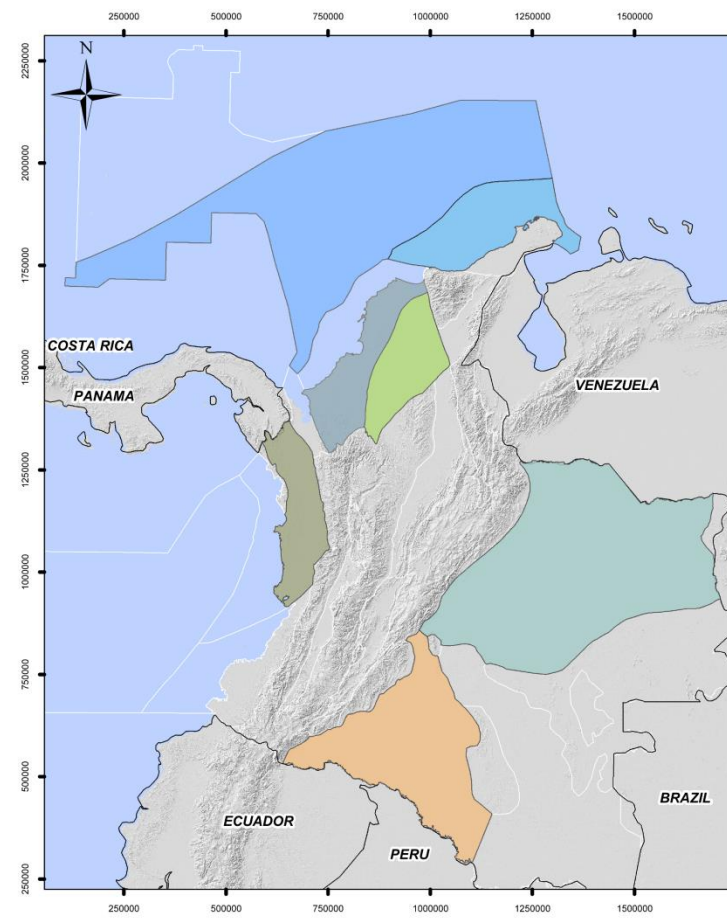
NP Without Prospectivity

Oil And Gas Shale Play / Basins Ranking

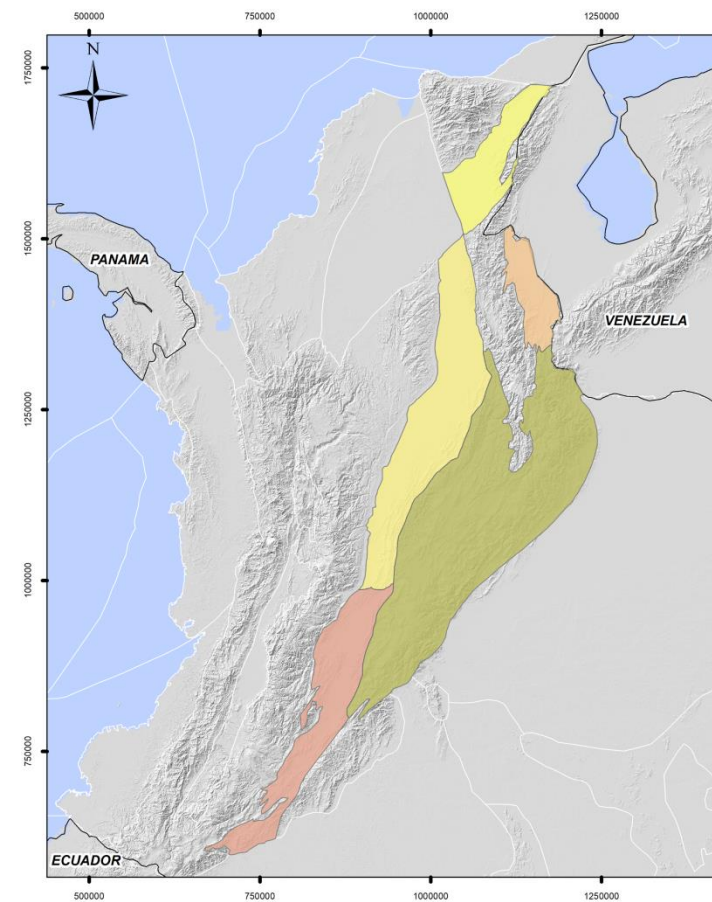
Non-Prospective Basins



Medium to Low Prospectivity Basins



Prospective Basins

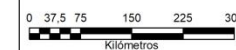


LEYENDA

- Valle Medio del Magdalena
- Cuenca Cesar - Ranchería
- Cuenca Cordillera Oriental
- Cuenca Catatumbo
- Valle Superior del Magdalena

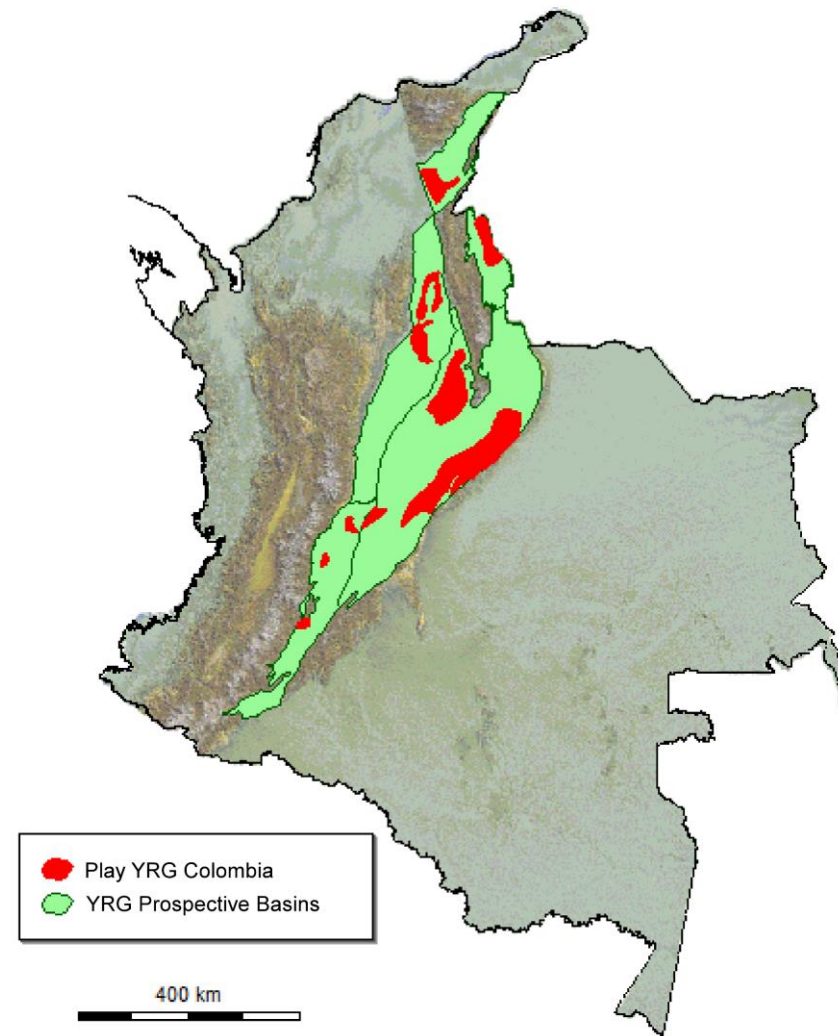
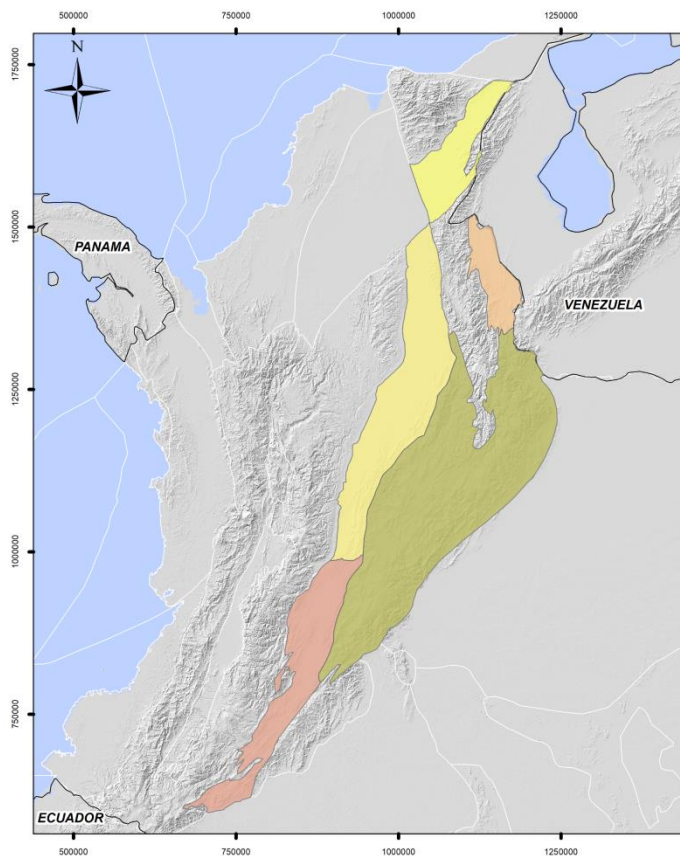
Información de Referencia

Sistema de coordenadas:
Magna Colombia Bogotá
Datum: Magna Sirgas
Unidad Lineal: Metros



MAPA DE LOCALIZACIÓN CUENCAS PROSPECTIVAS

Oil And Gas Shale Play / Basins Ranking



$$CRT = CRL + CRA$$



CRT corresponds to total retained oil, CRL to free retained oil and CRA to absorbed retained oil

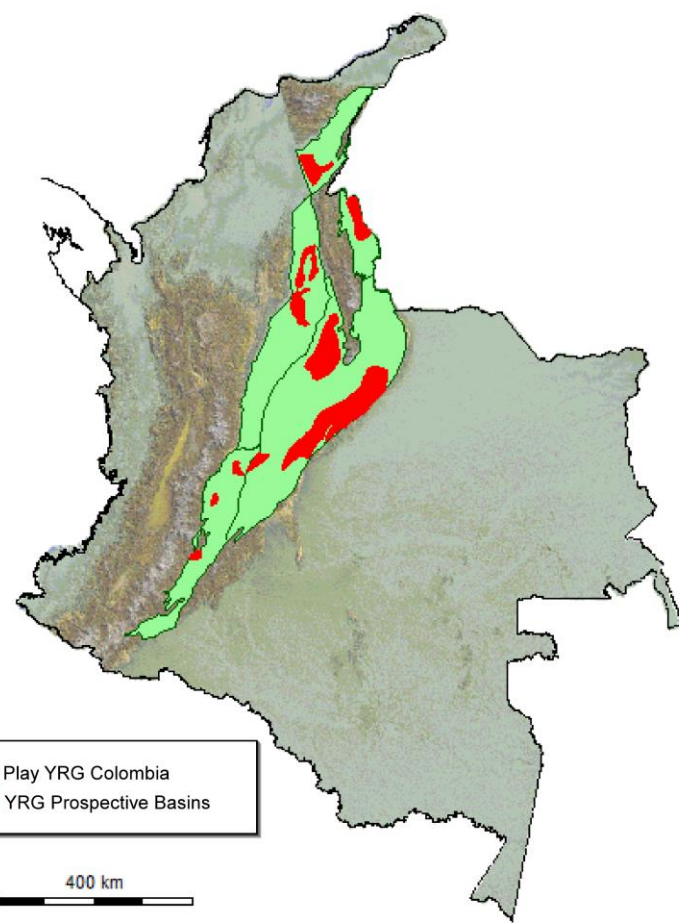
$$RP (OOIP) = CRL \times A$$

RP corresponds to Prospective Resources (OOIP), CRL corresponds to free retained oil and A to the area

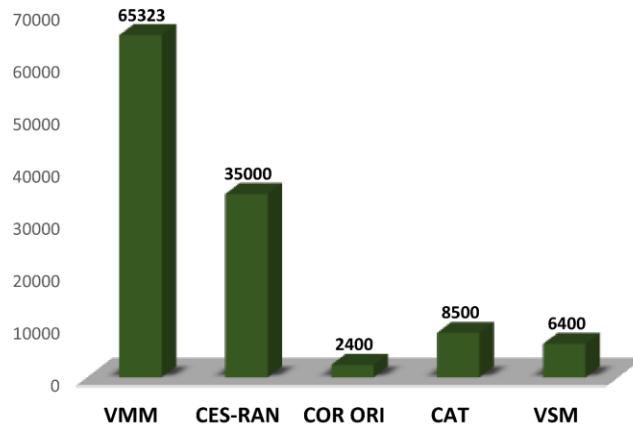
BASIN	Area (km2)	CRL (mbp/km2)	GRL (bcf/km2)	Prospective Resources Oil (mbp)	Recoverable Prospective Resources Oil (mbp)	Prospective Resources Gas (bcf)	Prospective Resources Gas (tcf)	Recoverable Prospective Resources Gas (tcf)	
VMM	Galembo	2700	9	21	24300	1701	56700	57	8,5
	Pujamana	2450	5	19	12250	858	46550	47	7,0
	Salada	2300	12	24	27600	1932	55200	55	8,3
	Tablazo	1173	1	34	1173	82	39882	40	6,0
CESAR RANCHERÍA	La Luna	1400	9	12	12600	882	16800	17	2,5
	Aguas Blancas	1400	10	18	14000	980	25200	25	3,8
	Lagunitas	1400	6	17	8400	588	23800	24	3,6
CORDILLERA ORIENTAL	Frontera	12000	0,2	12	2400	168	144000	144	21,6
CATATUMBO	La Luna	16000	0	40	0	0	640000	640	96,0
	Capachos	1500	5	18	7500	525	27000	27	4,1
	Uribante	1000	1	15	1000	70	15000	15	2,3
VSM	Uribante	500	0	20	0	0	10000	10	1,5
	La Luna	400	10	17	4000	280	6800	7	1,0
	Tetuan	400	6	11	2400	168	4400	4	0,7
TOTAL	44623				117623	8234	1111332	1111	167

BASIN	Area (km2)	Prospective Resources Oil (mbp)	Recoverable Prospective Resources Oil (mbp)	Prospective Resources Gas (bcf)	Prospective Resources Gas (tcf)	Recoverable Prospective Resources Gas (tcf)
VMM	8623	65323	4573	198332	198,3	29,7
CES-RAN	4200	35000	2450	65800	65,8	9,9
COR ORI	28000	2400	168	784000	784,0	117,6
CAT	3000	8500	595	52000	52,0	7,8
VSM	800	6400	448	11200	11,2	1,7
TOTAL	44623	117623	8234	1111332	1111	167

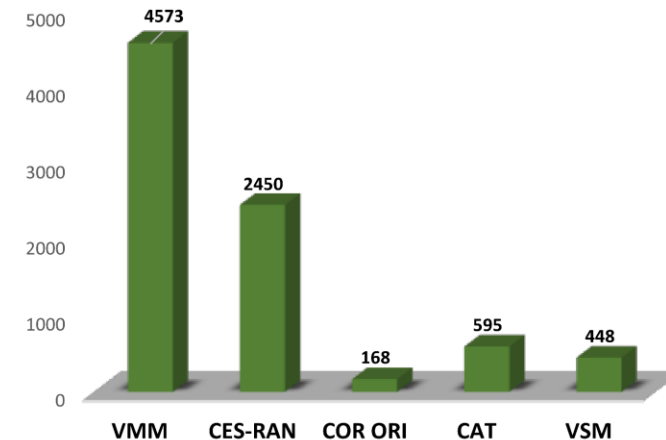
Oil And Gas Shale Play / YTF



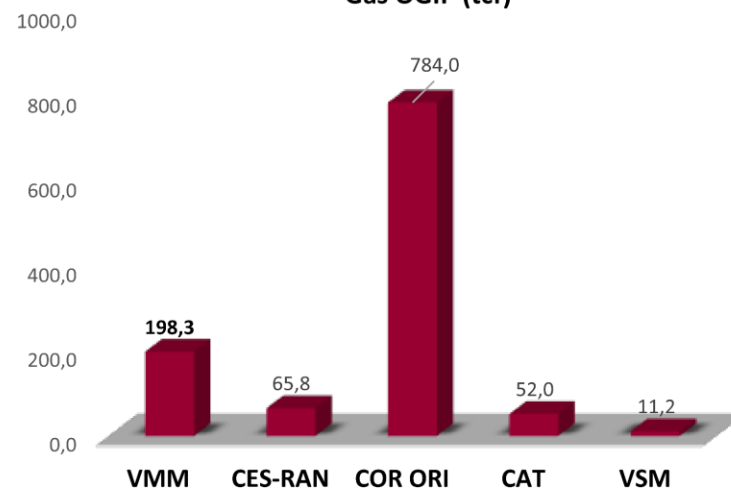
Prospective Resources
Oil OOIP (mbp)



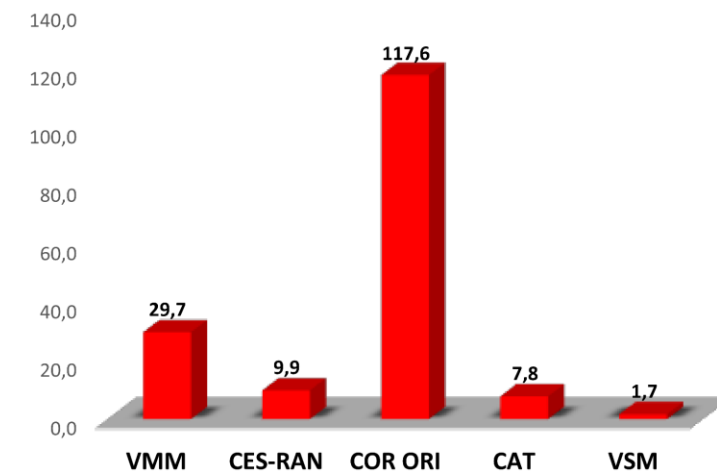
Recoverable Prospective Resources
Oil (mbp)



Prospective Resources
Gas OGIP (tcf)



Recoverable Prospective Resources
Gas (tcf)



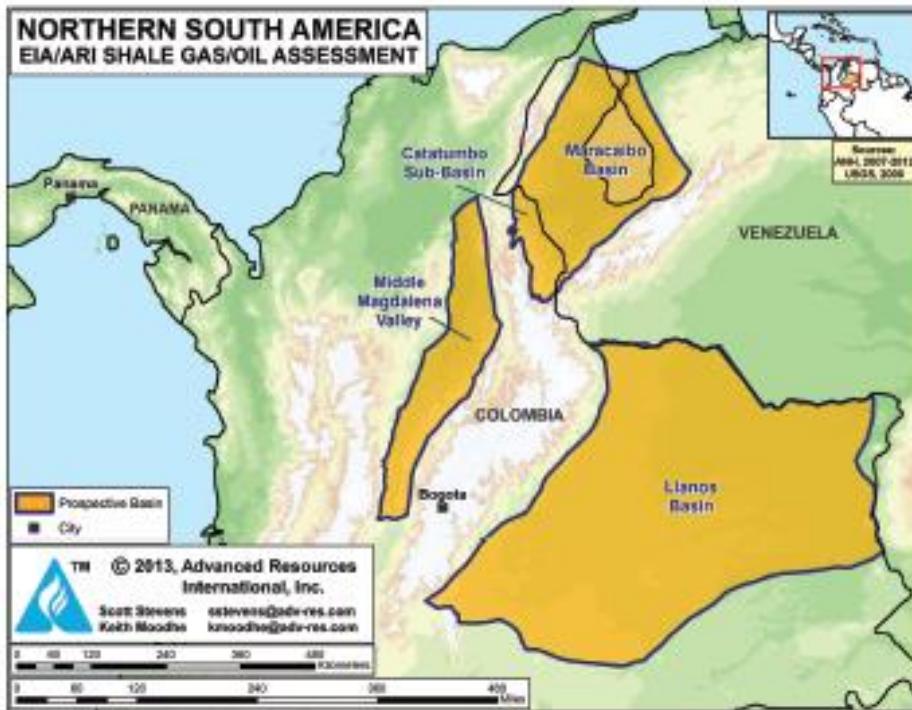


Fig. 4.35—Prospective shale basins of northern South America. (Source: ARI 2013.)

