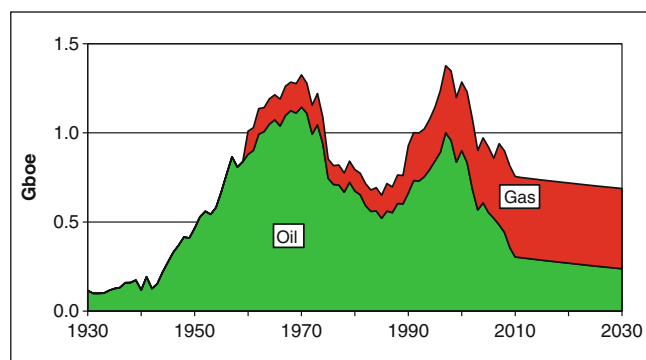
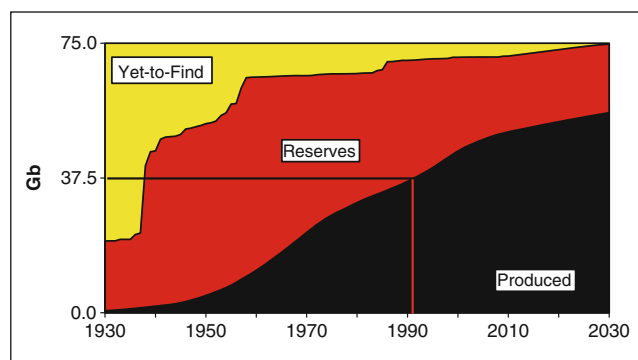


**Table 57.1** Venezuela regional totals (data through 2010)

Production to 2100						Peak Dates			Area	
Amount		Rate				Oil		Gas	'000 km <sup>2</sup>	
	Gb	Tcf	Date	Mb/a	Gcf/a	Discovery	1914	1941	Onshore	Offshore
PAST	50	65	2000	901	2,137	Production	1970	2030	916	100
FUTURE	25	185	2005	553	2,041	Exploration	1981		Population	
Known	21	166	2010	304	2,510	Consumption	Mb/a	Gcf/a	1900	3
Yet-to-Find	3.7	18	2020	269	2,500	2010	272	748	2010	29.3
DISCOVERED	71	232	2030	238	2,500		b/a	kcf/a	Growth	8.9
TOTAL	75	250	Trade	+31	+1,762	Per capita	9.3	26	Density	32

*Note: excludes Extra-Heavy oil (mainly from the Orinoco tar-belt) and Heavy Oil (<17.5° API)*

**Fig. 57.1** Venezuela oil and gas production 1930 to 2030**Fig. 57.2** Venezuela status of oil depletion

## Essential Features

Venezuela is a country with a diverse terrain. In the south lie the tropical rain forests of the high Roraima hinterland and the Orinoco River basin, which pass westwards into the grasslands and plains of the Llanos. Two Andean ranges, capped by Pico Bolivar, at an altitude of 5,007 m, follow to the north, before giving way to the badlands of Falcon and the deserts of Paraguana, complete with sand dunes and cactus. To the West, lies Lake Maracaibo, a large inland shallow sea, while to the East is the Orinoco delta and the Gulf of Paria, which separates Venezuela from Trinidad. The country has rich natural resources, with substantial iron-ore deposits in the interior, in addition to its ample oil endowment. It also owns a number of small Caribbean islands, including Sta. Margarita. It supports a population of 29 million, which is not an excessive number for such a rich county.

## Geology and Prime Petroleum Systems

A continuation of the Central Range of the Andes of Colombia is offset by major transcurrent faults to extend eastward along the coast of Venezuela, where it is known as the Coast Range, being made up of low-grade Mesozoic metamorphic rocks. The Eastern Range of Colombia divides into two branches; one, known as the Perija Range, runs northward along the frontier while the other continues north-eastwards across Venezuela to abut the Coast Range. These ranges flank the Maracaibo Basin, filled by Cretaceous and Tertiary sediments. Another large sedimentary basin, the East Venezuelan Basin, separates the Andes from the Guyana Shield to the south. The Oca and El Pilar faults are part of a major dextral transcurrent fault system cutting across the mouth of Lake Maracaibo to form the southern boundary of the Coast Range.

Both the Maracaibo and East Venezuelan Basins contain the rich Middle Cretaceous source-rocks, comprising the *La Luna Formation*, which has charged Cretaceous limestone reservoirs in Lake Maracaibo and overlying Tertiary sandstones in both basins. This source was so prolific that large amounts of oil migrated to shallow depths along the southern margin of the East Venezuelan basin where it was weathered and degraded by bacteriological action to give the well-known Orinoco tar-belt, holding perhaps 270 Gb of eventually recoverable Extra-Heavy oil, described in Chapter 12.

A third, much smaller petroleum system with gas potential, has been discovered recently in the Caribbean off the northeast coast.

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## Exploration and Discovery

The Pitch Lake of Trinidad attracted early interest to the oil potential of this part of the world, leading oil explorers to look across the limpid waters of the Gulf of Paria to wonder what Venezuela might offer, as it too had a pitch lake. The first well was in fact drilled in 1878 to the south of Lake Maracaibo, but it was not until 1907 that local interests secured concessions, which eventually passed into the hands of the major international oil companies. They began exploration in earnest in the years preceding the First World War. Shell was one of the pioneers, being introduced to the country by no less than the legendary Armenian oilman, Calouste Gulbenkian, founder of the Iraq Petroleum Company, who probably understood how to deal with General Gomez, the then dictator. These pioneering efforts were rewarded when a well on the shores of Lake Maracaibo blew out with a flow rate of over 100,000 b/d, having penetrated a highly fractured Cretaceous limestone reservoir. Standard of Indiana (now BP) had substantial holding before selling out to Exxon in the 1930s in exchange for a block of its stock. Gulf Oil (now Chevron) was the third principal operator. Venezuela was for many years the jewel in Shell's crown, which by 1932 had made it Britain's largest supplier.

The industry went from strength to strength both between and immediately after the two world wars, with production rising from 300 kb/d in 1930 to over three million in the late 1960s. A total of 2,300 exploration boreholes have been sunk, finding 71 Gb of oil and 232 Tcf of gas. These discoveries include an impressive list of giant fields, dominated by the Bolivar Coastal fields of Lake Maracaibo, found in 1914, which together hold some 31 Gb of oil.

It is a mature area, discovery having peaked in 1914. Exploration drilling peaked in 1981 when 122 boreholes were sunk, but has fallen steeply since, with no more than one or two a year being drilled in the recent past, due both to political constraints and the dwindling number of remaining prospects.

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## Production and Consumption

Oil production commenced in 1917, and grew rapidly to peak in 1970 at 3.1 Mb/d, before declining, in part due to OPEC quotas. Overall production stood at 2.2 Mb/d in 2010, of which, it is estimated, 832 kb/d are *Regular Conventional*, the balance being heavier than 17.5° API, coming mainly from the Orinoco tar-belt. It is expected to continue to decline at about 1.2% a year.

Recorded gas production commenced in the 1950s, rising to its current level of 2.5 Tcf a year. Most of it is associated gas coming from the oilfields and is expected to continue at this level for many years.

Oil consumption stands at 272 Mb/a making the country a major exporter. Gas consumption is at 748 Gcf/a, leaving modest exports in the form of NLG.

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## The Oil Age in Perspective

Little is known about the early history of the country before it was sighted by Christopher Columbus in 1498 on his third voyage to the New World. Spanish settlement began in 1520, when Caracas, the capital, was founded in an Andean valley, being administered until 1819 jointly by the Spanish Vice-Royalty of Peru and the Audencia of Santo Domingo. It was the birthplace of Simon Bolivar, known as the Liberator of South America. After several years of struggle, he brought independence to Venezuela in 1829, only to die in the following year, a disillusioned man, with his notion of a united Latin America having been destroyed by factional disputes. It could be said that Ugo Chavez, the present President, is doing his best to fulfil Bolivar's dream.

The subsequent history was characterised by revolution, counter-revolution and dictatorship, interspersed by brief periods of not very successful democratic government. Venezuela has been something of a backwater in terms of European settlement and immigration, despite its great mineral wealth. Even so, the population, which is of mixed European and African extraction, has increased almost ninefold over the past Century to reach its present level of 29 million, mainly living in the Andean and coastal regions.

The expropriation of BP's Iranian interests in 1951 did not pass unnoticed in Caracas, where the government was already in dispute with the foreign companies over the split of oil revenues. It led Perez Alonso, an idealistic oil minister, to open discussions with the major Middle East producers, to try to form a world equivalent of the Texas Railroad Commission, which in earlier years had regulated the US over-production to support price. He eventually succeeded with the formation of the Organisation of Petroleum Exporting Countries (OPEC) in 1960. The government

started passing laws imposing stiffer terms on the existing concessions, which paved the way for a full nationalisation in 1976. That was accompanied by the creation of a national company, Petroleos de Venezuela (PdVSA). By now, exploration was at a mature stage, so the main challenge was to develop the extensive heavy oil deposits that had long been known, and to work in the corridors of power at OPEC to obtain the best price.

The present President, Ugo Chavez, is an ex-paratrooper who won landslide elections in 1998, 2000 and 2006, but follows a long tradition of somewhat authoritarian rulers. Venezuela, like many Latin American countries, has been run by a wealthy elite of the so-called oligarchs, many of whom, no doubt, shift their money overseas, leaving the poor with a minor share of the country's great oil wealth. President Chavez has tried to change this relationship with a decidedly anti-globalist policy, having made well-publicised visits to Cuba. In 2007, his government withdrew from the International Monetary Fund and World Bank, the principal agents of globalism. He is successfully using his oil wealth to forge a new alliance of Latin American countries with a view to breaking free from what has been described as dollar imperialism. Plans to start trading oil in euros have been announced but failed to be implemented. He was almost ousted from power in 2002 in a coup, which was welcomed, if not orchestrated, by the United States, but he outwitted the conspirators. No doubt, further attempts to remove him will

be made, despite his popular mandate. The United States imports about 10% of its oil from Venezuela, explaining its interest in the politics of the country.

Gasoline is sold to the domestic market at extremely low prices, which nevertheless yield a satisfactory return to the State Company. The government would no doubt face popular outcry if it should need to cut internal demand to maintain profitable exports, but those days are still far off as world prices soar. Meanwhile, new wealth flows into the country, strengthening its currency and influence, giving it every motive to conserve its petroleum resources, despite external pressure. The country is making substantial arms purchases from Russia to strengthen its defences, but also faces rising inflation, despite its wealth. Indeed there are undercurrents of tension as food and other prices soar, despite Chavez's popular mandate. The country has lately nationalised the assets of the major oil companies in the tar-belt.

Venezuela is very well placed to face the second half of the Age of Oil with its modest population, its fertile lands and its substantial remaining oil and mineral wealth. It is likely to come under increasing pressure from the United States, which depends heavily on it for oil imports, but is well placed to resist such pressure, provided it does not reach military proportions. It is at the same time welding support elsewhere in Latin America for what could evolve into a hemispheric conflict, if Mexico shifts its allegiance south.

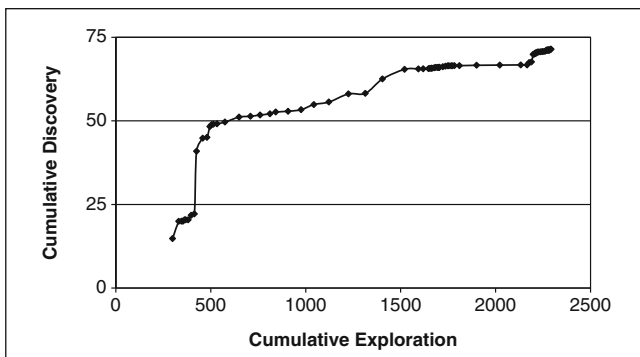


Fig. 57.3 Venezuela discovery trend

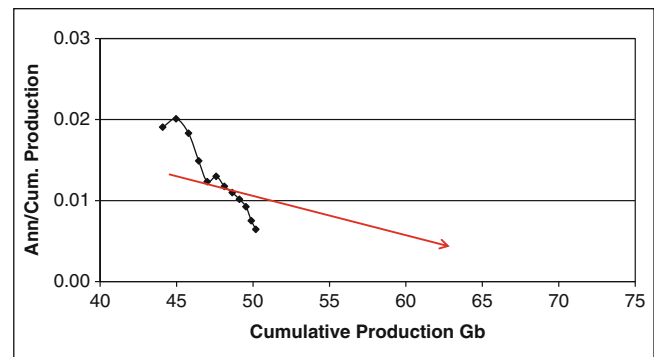


Fig. 57.4 Venezuela derivative logistic

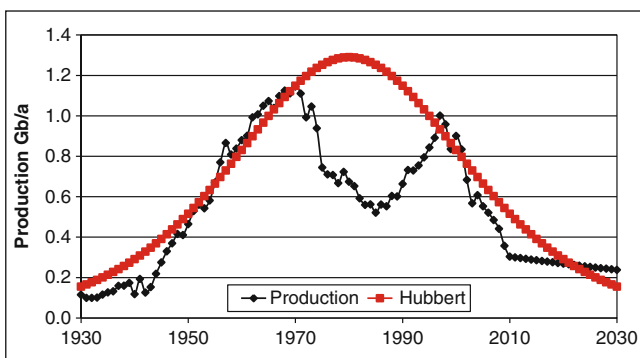


Fig. 57.5 Venezuela production: actual and theoretical

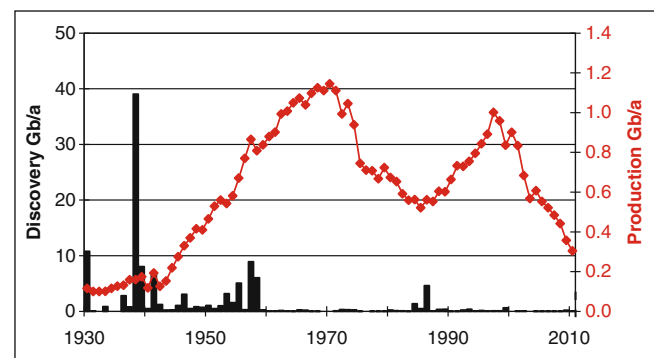


Fig. 57.6 Venezuela discovery and production