Dam Construction in Greece

An overview

By

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Presentation outline

An overview of dam construction

- From antiquity to present day
  - Activity per decade after 1950
  - The significant dam of each decade
- Dam volumes - Reservoir volumes
- Usage - Power production
- Current situation

Sources of presentation material

Much of the data on dams comes from the Greek Commission on Large Dams and the constant updating made with the help of Rhea Papahatzaki and the working group.

The Public Power Corporation, the Ministry of Infrastructure, the Ministry of Rural Development, the Water Authority of Athens (EYDAP) and many local authorities have assisted in the collection of the data.

Only large dams according to ICOLD, i.e. taller than 15m are presented here.

An overview of dam construction in Greece

Dams in Antiquity

Dams in Antiquity

- There is plenty of evidence about dam building in ancient Greece.
- Influenced, no doubt, by the strong tradition in dam building and water engineering of the great civilizations of the Middle East.
- The ancient Greeks built dams for irrigation, flood protection, stream diversion and probably for trapping the fertile sediment transport.
- There are two well known examples of ancient dams that still stand, Tiryns and Alyzeia.

Tiryns dam

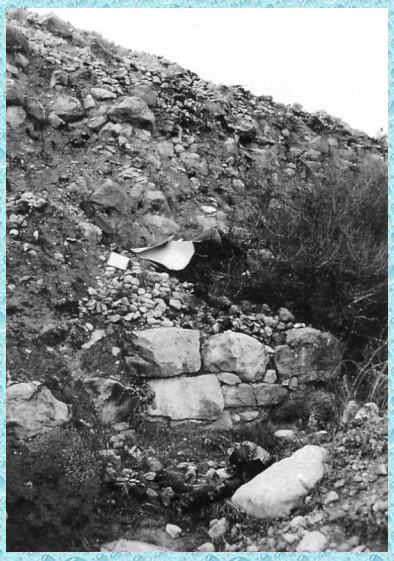
- The Tiryns dam is located in Argolis on the Peloponnesus (Balcer, 1974; Maroukian et. Al., 2004).
- Built in the Bronze Age (13th century B.C.) by the Mycenaeans most probably for flood protection of the environs of the acropolis of Tiryns.
- It diverted permanently the Megalo Rema torrent, by the digging of a 1.4 km long artificial channel.
- The dam is approximately 10m high with a base of approximately 60m wide. The length of the crest was 80 to 100 m. It has a central part made of compacted red clay with crushed rock fragments. The faces and the abutments were protected by wide Cyclopean masonry.

Antiquity

Tiryns dam

(Maroukian et. al., 2004)

c. 1300 B.C.



Antiquity

Alyzeia dam

- Alyzeia Dam is in the Myticas valley (Murray, 1984; Moutafis, 2006) near the west coast of central Greece.
- It is an 11 m high masonry dam from the 4th century B.C. in good condition.
- It either failed its purpose, since it was soon completely silted up, or it was meant as a head structure for the channeling of water for agricultural or water mill use.

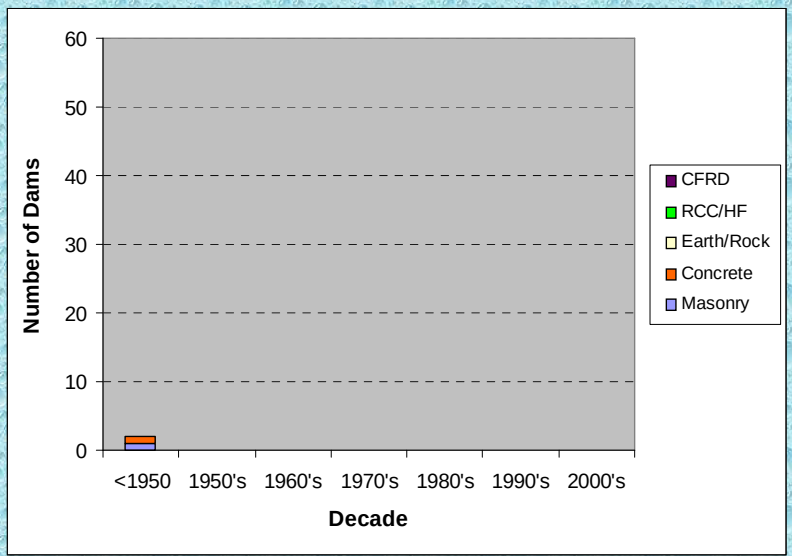
Antiquity

Alyzeia dam

c. 400 BC

(Moutafis, 2006)

Modern Greece Up to 1950

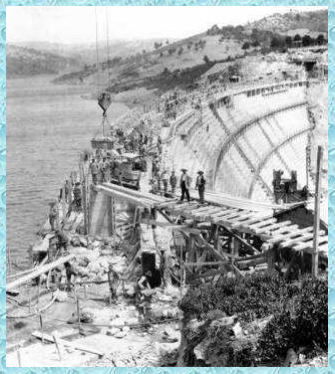


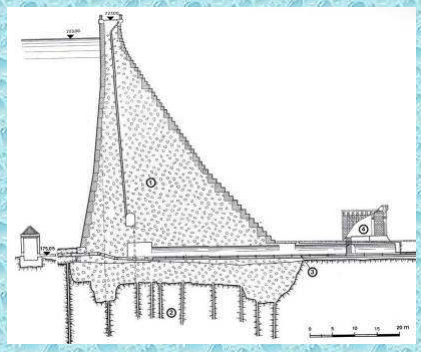
Up to 1950

Marathon dam

H= 63 m, Built 1930

Masonry dam. Still part of the water supply system of Athens. Close to the famous battlefield. Close to Athens it is worth a visit. Maybe the only marble faced dam.

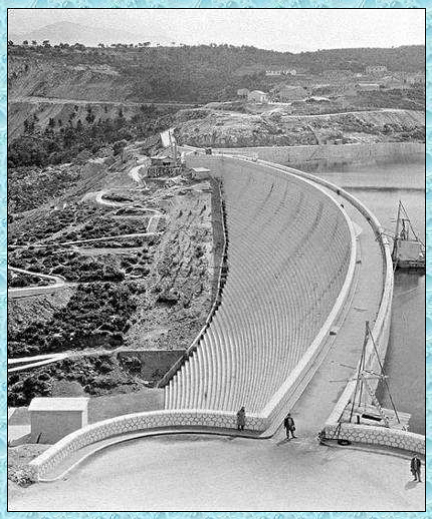




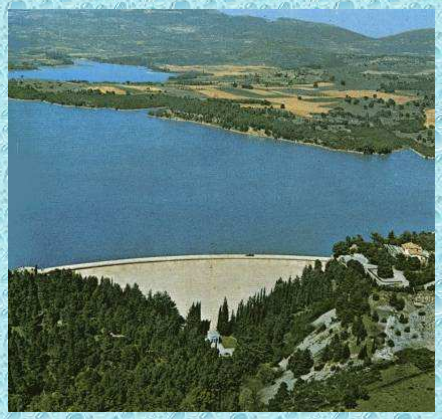
Up to 1950

Marathon dam

1930

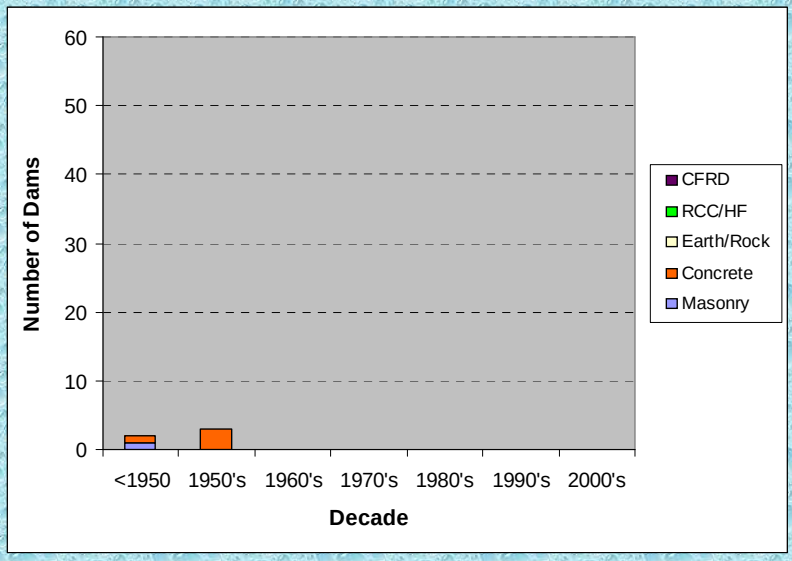


Now



Part A

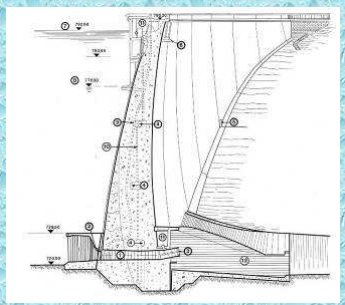
1950 to 1960



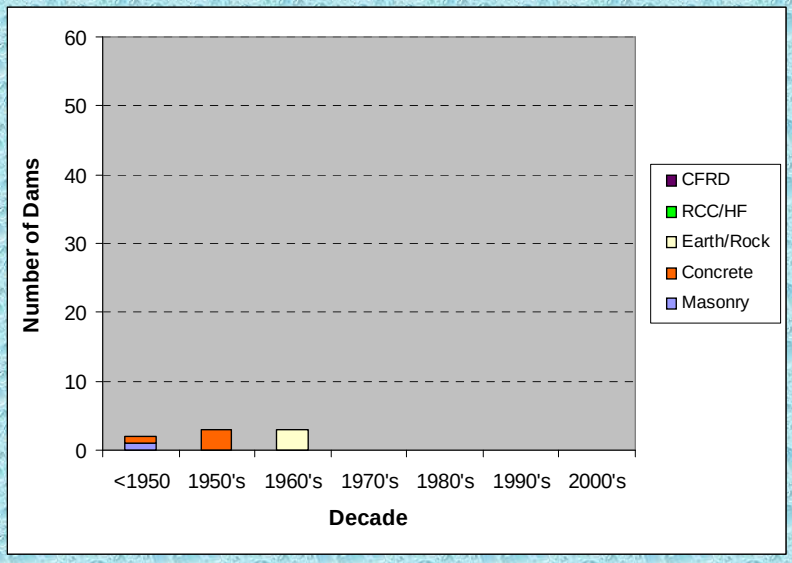
1950-1960

Megdovas (Plastiras Lake) 83 m high

Power Production

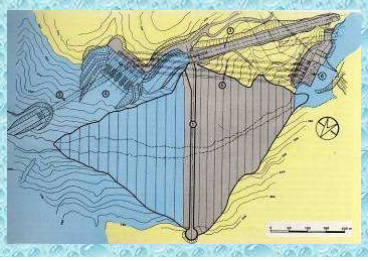


1960 to 1970

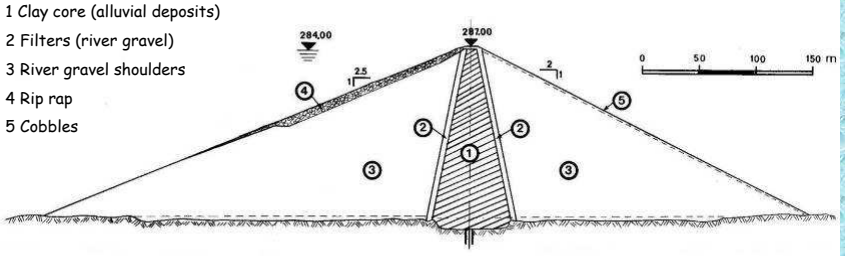


1960-1970

Kremasta (Aheloos River) 165 m high



1 Clay core (alluvial deposits)
2 Filters (river gravel)
3 River gravel shoulders
4 Rip rap
5 Cobbles

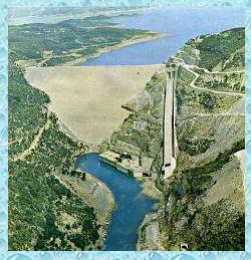


Siltstones – Sandstones – Calcareous Conglomerates

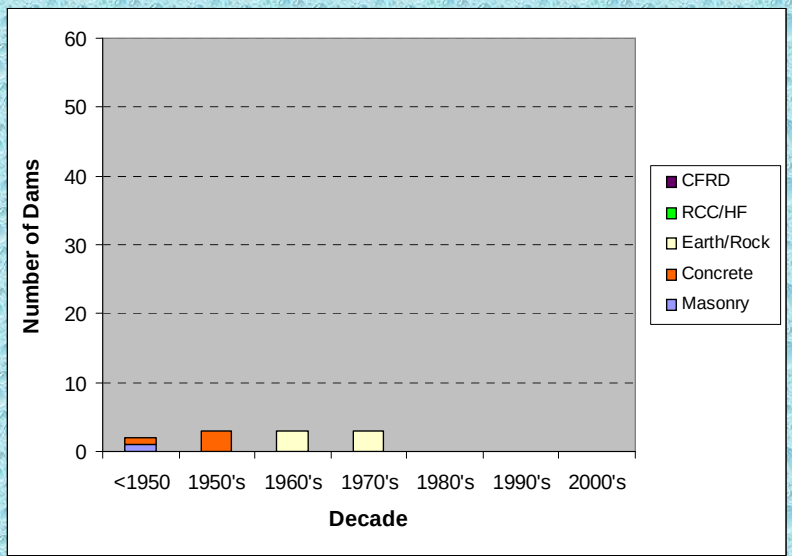
1960-1970

Kremasta (Aheloos River) 165 m high

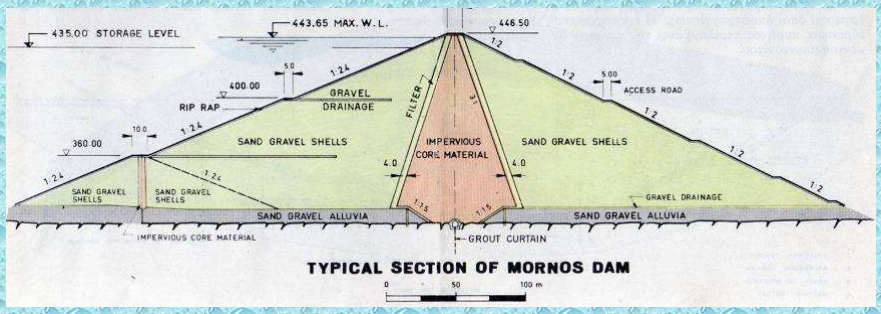
Power Production



1970 to 1980



1970-1980 **Mornos (Athens Water Supply)** 126 m

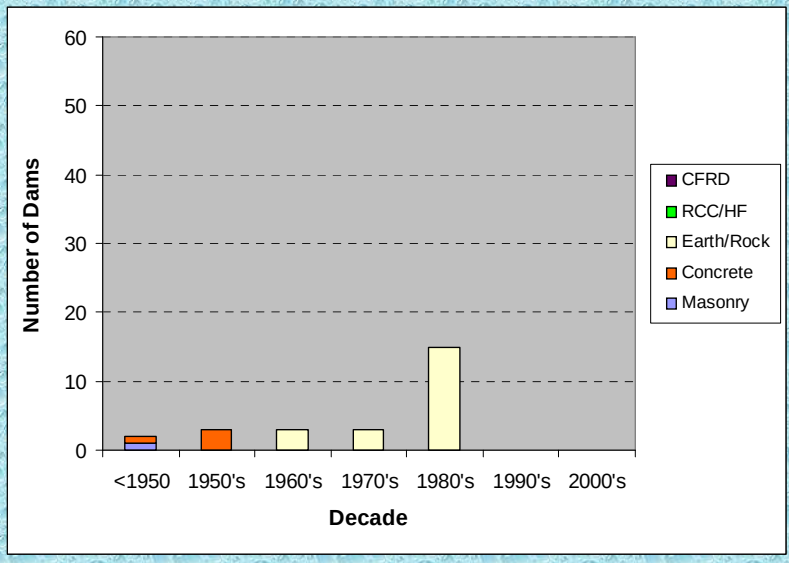


Dam construction in Greece 19

1970-1980 **Mornos (Athens Water Supply)** 126 m

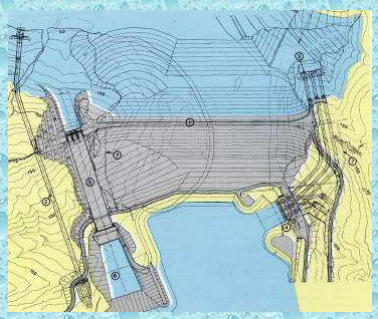
Dam construction in Greece 20

1980 to 1990



1980-1990

Pournari (Arachthos River) 107m high



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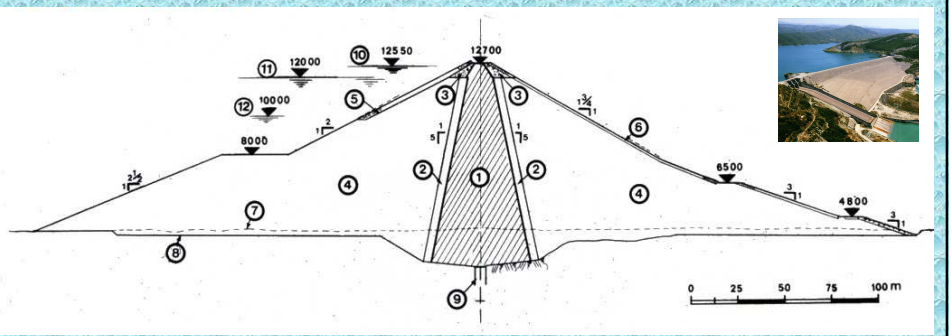
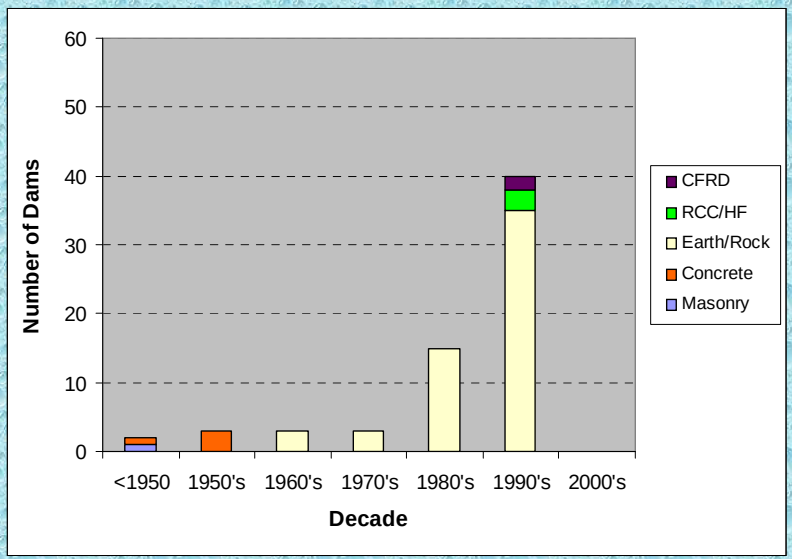


1 Impervious core
2 Transition zone
3 Transition zone at crest
4 River sand and gravel shells
5 Rockfill slope protection
6 Slope protection layer

7 Original ground
8 Dam excavation line
9 Grout curtain
10 Maximum flood level
11 Maximum power pool
12 Minimum power pool

1990 to 2000

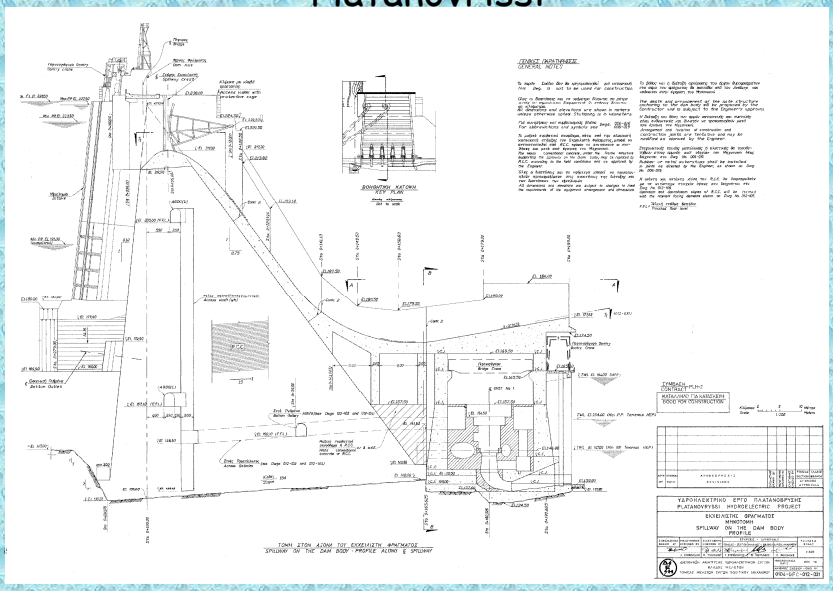


Example of Roller Compacted Concrete dam

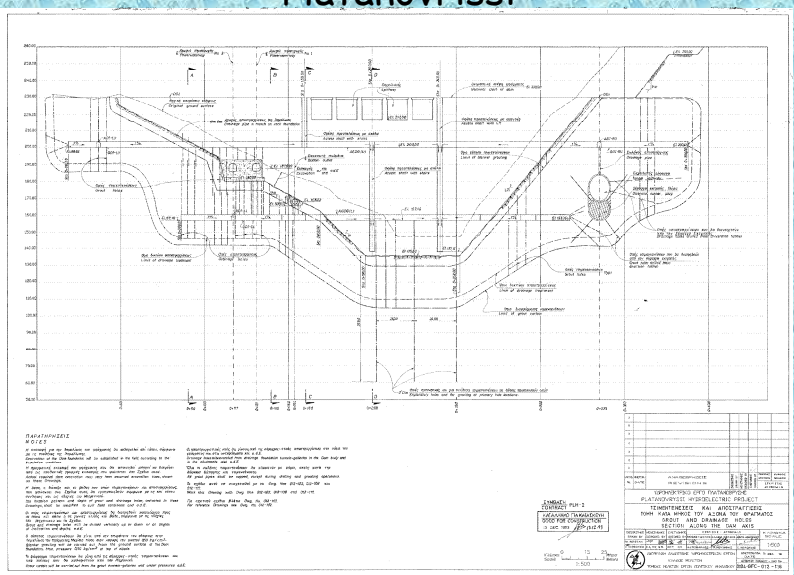
Platanovrissi dam, Nestos River (Greece)

H=95 m, Built 1999

Platanovrissi



Platanovrissi



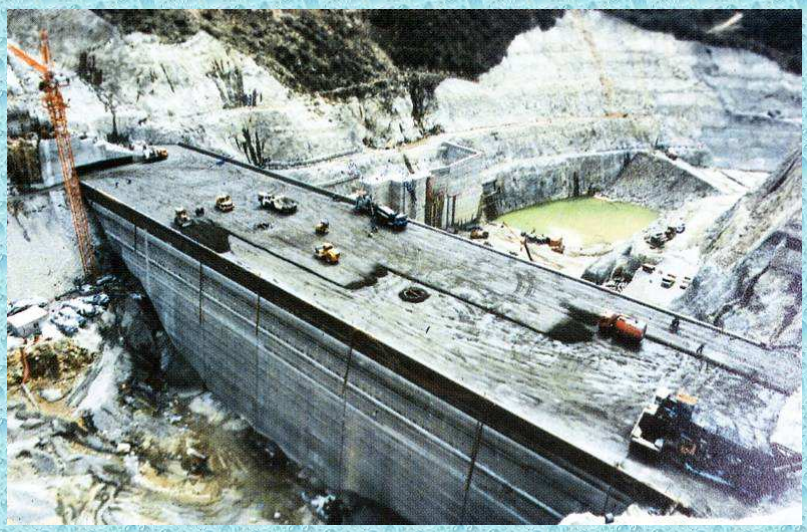
Introduction to Dam engineering

Platanovrissi

Introduction to Dam engineering

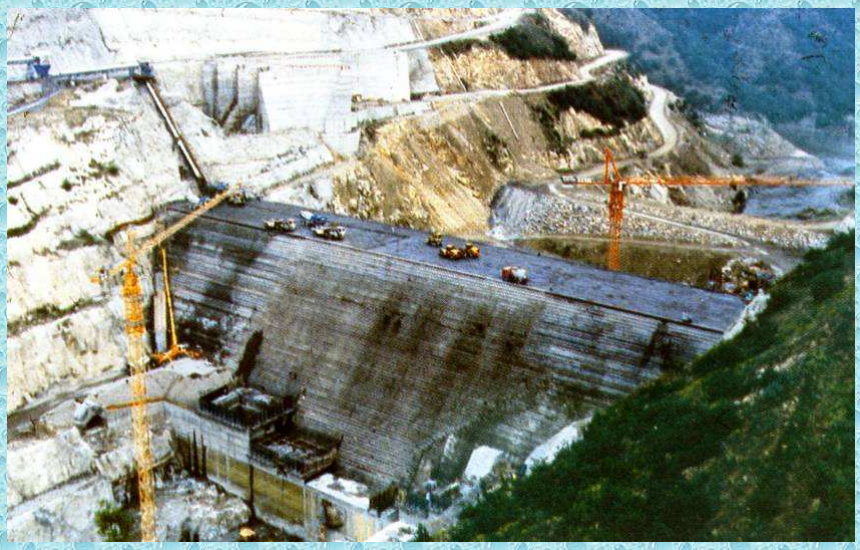
Platanovrissi

Platanovrissi



Platanovrissi

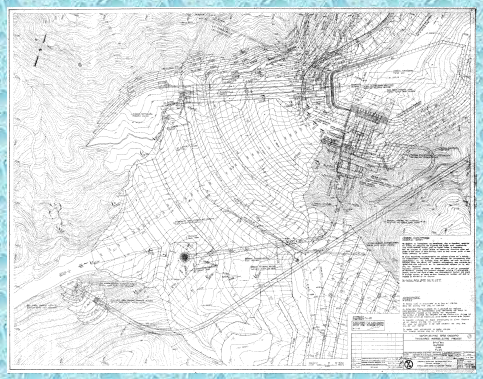
Platanovrissi



Platanovrissi

1990-2000

Thissavros (Nestos River) 172m high



1990-2000

Thissavros (Nestos River) 172m high

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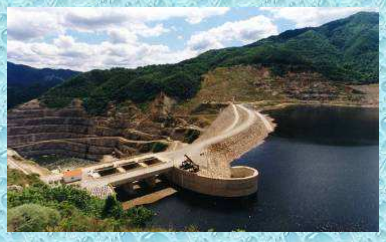
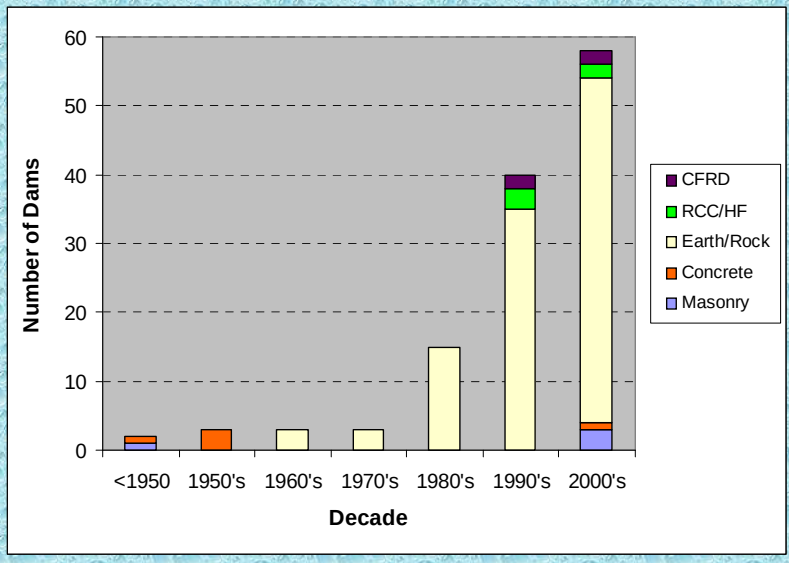
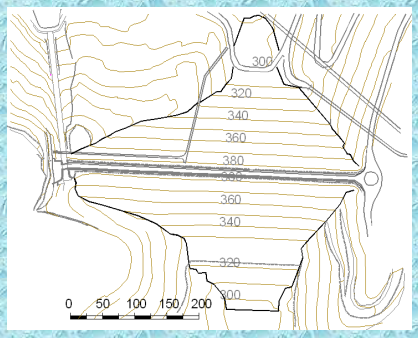


2000 to 2010



2000-2010

Smokovo dam (Onohonos River) 109m high



2000-2010

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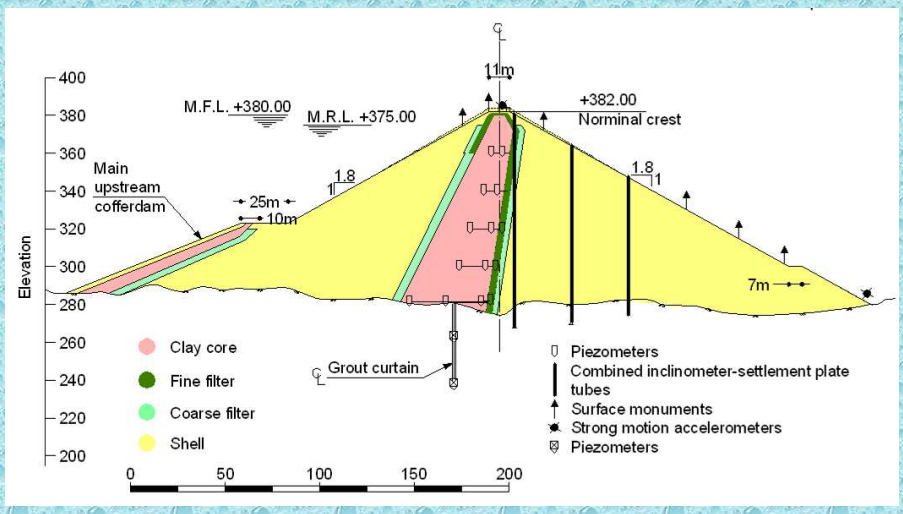


2000-2010

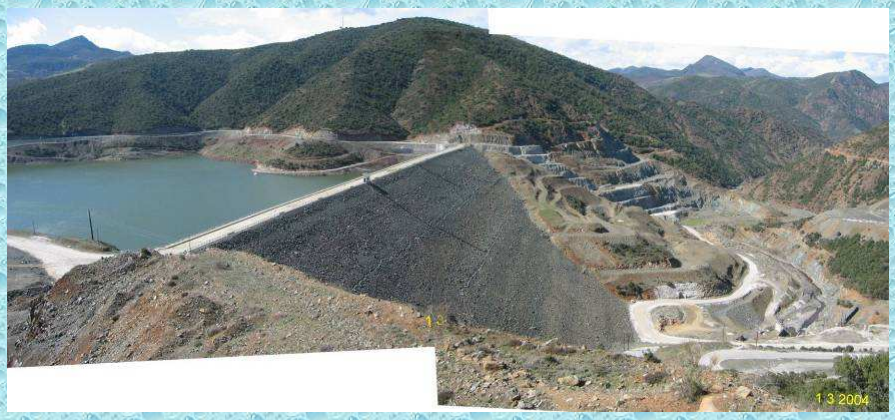
Smokovo dam (U/S face) 109m high

2000-2010

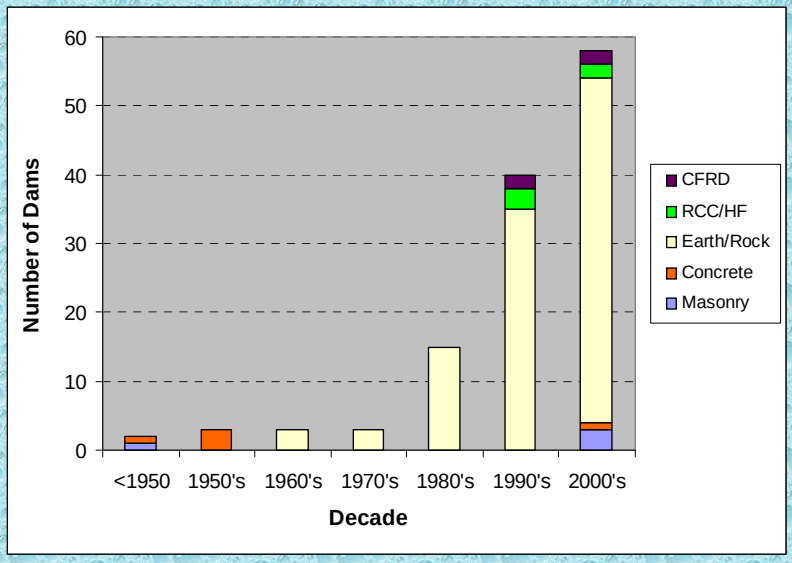
Smokovo dam (First impoundment)

2000-2010

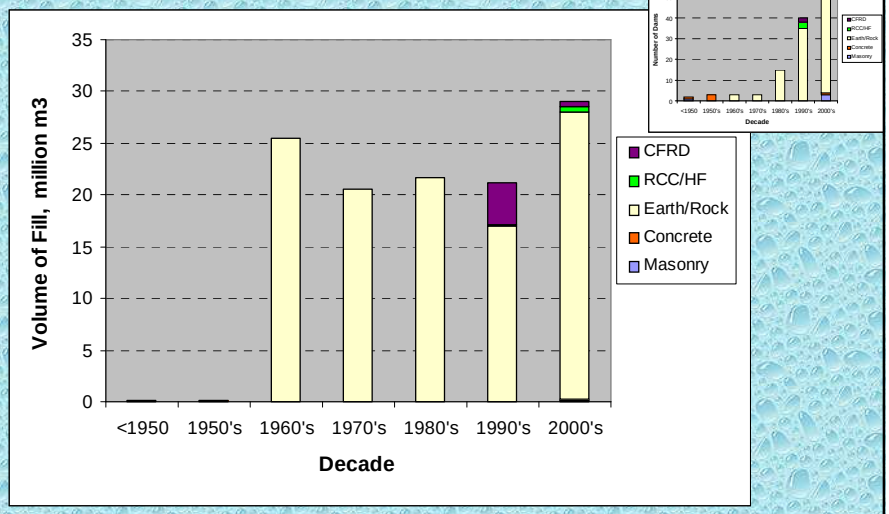
Smokovo dam (a year later)



Number of dams built per decade

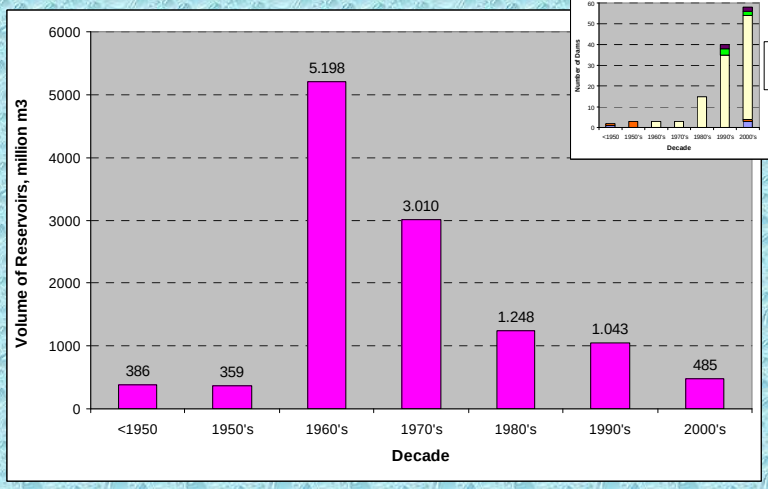


Volume of dam body (fill) built per decade



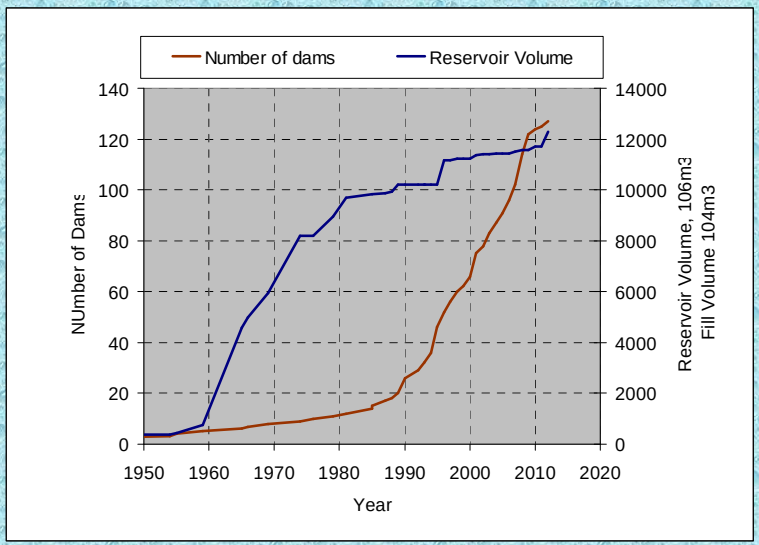
Numbers and Volumes - Evolution

Volume of reservoir added per decade



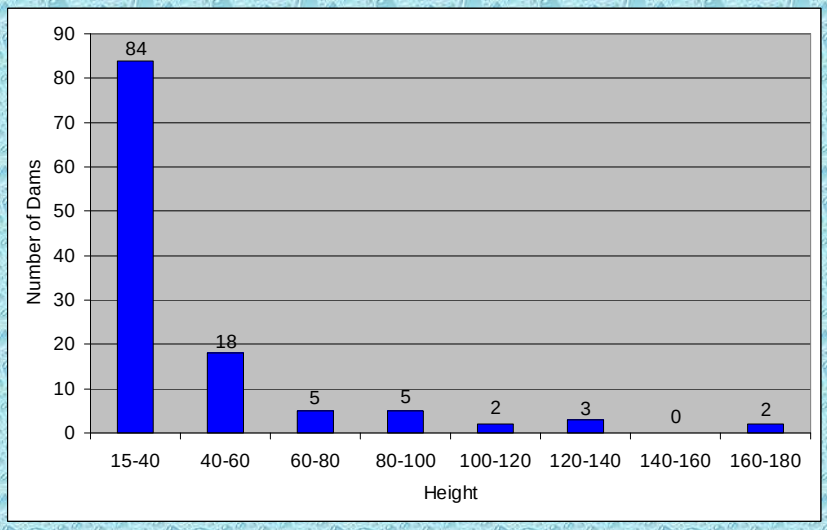
Numbers and Volumes - Evolution

Number of Dams + Reservoir Volume



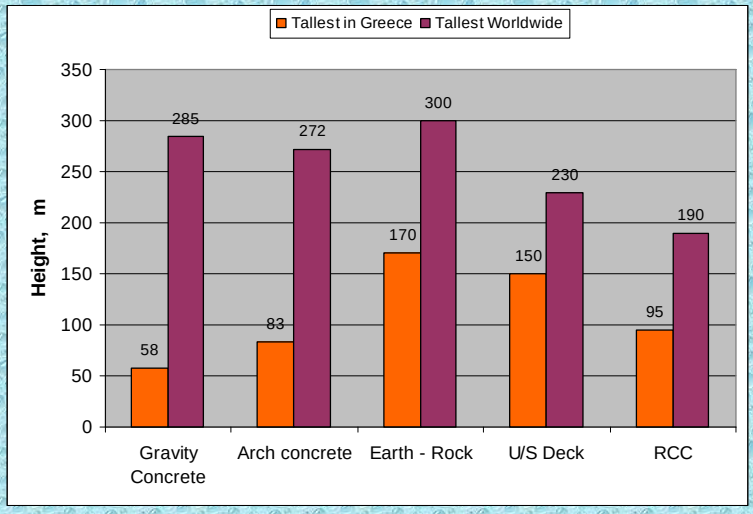
Numbers and Volumes - Evolution

Height of Greek Large Dams in Operation



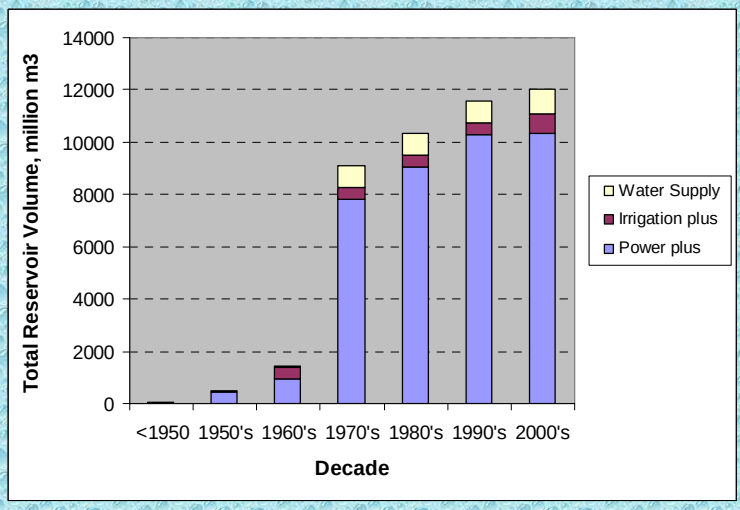
Numbers and Volumes - Evolution

The Higher dams in Greece and Worldwide

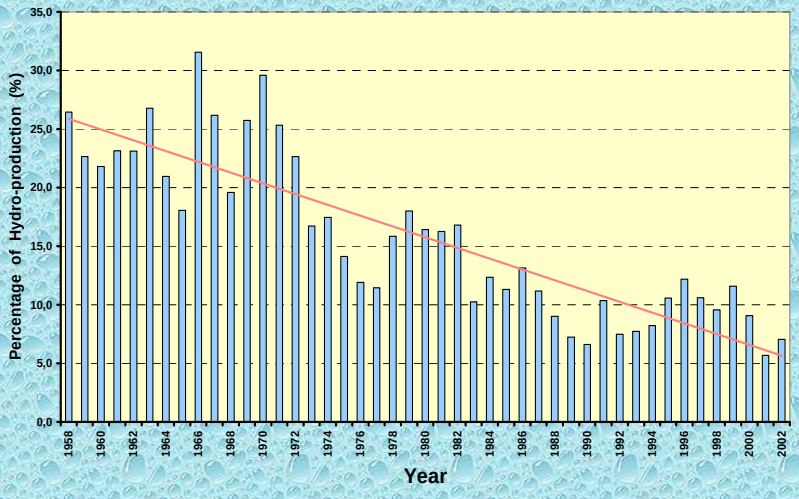


Numbers and Volumes - Evolution

Usage of Reservoirs



Percentage of Hydros participation to electric energy production (Stefanakos, 2003; Anastassopoulos, 2006)



Current situation

- More than 30 large dam projects are currently under construction
- More than 30 large dams are at the design stage
  - Mostly small to medium scale projects
  - Mainly water supply and irrigation
  - A considerable number of small hydros
- The great majority are Earth dams, a few are Hardfill dams and CFRD dams

Thank You for your Attention