

### NUMBERS OF MINAS GERAIS

Inhabitants	18,900,000
Area	588,400 km <sup>2</sup>
Capital	Belo Horizonte
Capital Inhabitants	4,800,000
Flag	

### NUMBERS OF CEMIG

CEMIG'S PRESENCE	
Number of consumers	5,774,200
Number of Employees	11,302
No. of Localities served	5,415
Municipal seats	774
Districts	510
Villages	4,131

**CEMIG is the only Latin American company in the electricity sector to have earned a place in the Dow Jones Sustainability Indexes for five consecutive years.**

### NUMBERS OF CEMIG

DISTRIBUTION NETWORK	
Urban Lines	51,502
Rural Lines	171,807
Total	223,309
Cemig has the largest distribution network in Latin America. It has been expanding at an average annual rate of 4.0% during the last ten years (1993/2002).	
TRANSMISSION NETWORK	
Voltage (kv)	Length (km)
Up to 69	637
69	2,915
138 to 161	6,566
230	467
345	1,216
500	1,350
Total	13,151

### NUMBERS OF CEMIG

MAIN POWER PLANTS	CAPACITY (MW)
São Simão (Paranaíba River)	1,710
Emborcação (Paranaíba River)	1,192
Nova Ponte (Araguari River)	510
Jaguara (Grande River)	424
Miranda (Araguari River)	408
Três Marias (São Francisco River)	396
Volta Grande (Grande River)	380
Others	684
TOTAL CAPACITY	5,704

## MAIN POWER PLANTS

### São Simão



**Commenced operation:** 1978

**Location:** Rio Paranaíba river, in the Triângulo Mineiro region (western triangular corner of Minas Gerais State), 880 kilometers from Belo Horizonte City

**Width of Dam:** 3,600 meters

**Maximum dam height:** 127 meters

**Reservoir volume:** 12.5 billion cubic meters

**Generation units:** 6

**First stage installed potential:** 1,613,100 kW

**Final installed potential:** 2,688,500 kW

## MAIN POWER PLANTS

### Emborcação



**Commenced operation:** 1982

**Location:** Rio Paranaíba river, in the Triângulo Mineiro region (western triangular corner of Minas Gerais State), 455 kilometers from Belo Horizonte City

**Width of Dam:** 1,507 meters

**Maximum dam height:** 156 meters

**Reservoir volume:** 17.6 billion cubic meters

**Generation units:** 4 with 298,000 kW potential each

**Final installed potential:** 1,192,000 kW

## MAIN POWER PLANTS

### Nova Ponte



**Commenced operation:** 1994

**Location:** Rio Araguari river, in the Triângulo Mineiro region (western triangular corner of Minas Gerais State), 500 kilometers from Belo Horizonte City

**Width of Dam:** 1,600 meters

**Maximum dam height:** 142 meters

**Reservoir volume:** 12.8 billion cubic meters

**Generation units:** 3 with 170,000 kW potential each

**Final installed potential:** 510,000 kW

## MAIN POWER PLANTS

### Volta Grande



**Commenced operation:** 1974

**Location:** lower Rio Grande river, in the township of Conceição das Alagoas, in the Triângulo Mineiro region (western triangular corner of Minas Gerais State), 520 kilometers from Belo Horizonte City.

**Width of Dam:** 1,603 meters

**Maximum dam height:** 36 meters

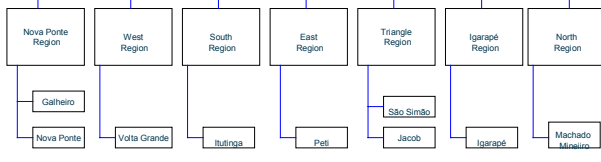
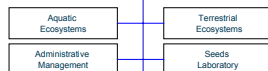
**Reservoir volume:** 2.3 billion cubic meters

**Generation units:** 4 with 95,000 kW potential each

**Final installed potential:** 380,000 kW

## Environmental Actions and Programs Department

Environmental Actions and Programs Department-GAP/PA



## DEPARTMENT MISSION

Assure that the Generation facilities' operation occur with adequate environmental performance, in accordance to legal obligations and, keep a good image of the company to shareholders, employees and society in general.

## AREAS OF ACTING

Generation process



Environmental programs



## POWER GENERATION PROCESS

- **INTERNAL ENVIRONMENTAL CERTIFICATION – CAI:**
  - environmental licences
  - waste management
  - environmental accident occurrence
  - green areas maintenance
  - soil conservation
  - facilities' adaptations
  - environmental legal accordance in general
- **ENVIRONMENTAL OCCURRENCE REPORT – ROA:**
  - oil spilling, fish killing ...

Nova Ponte  
Hydroelectric  
Power Plant

## Turbina Francis

### Operation Support

Turbine

Downstream Level

Upstream Level

## POWER GENERATION PROCESS

### RISK IN TURBINE OPERATION

- Turbine start
- Suction tube isolation
- Suction tube drainage
- Speed no load
- Power oscillations
- Low power
- Motor Synchronous / Generator Reversion
- Spill Tail operation

## POWER GENERATION PROCESS

### ELECTRICAL BARRIER EXPERIMENT



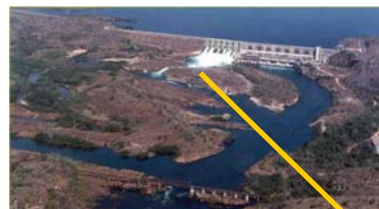
Electrode installation



Paralyzed Fish (mandi)

### Effects of electrical current on fish

Twitch- low voltage  
Taxis- median voltage  
Stun- high voltage







**ENVIRONMENTAL PROGRAMS**

- FISH CULTURE
- LIMNOLOGY
- CONSERVATION RESERVES
- REFORESTATION
- ENVIRONMENTAL EDUCATION
- WATER RESOURCES
- OTHERS

**FISH CULTURE**

Production  
Research

**Volta Grande Hatchery Station**

**Três Marias Hatchery Station-  
CEMIG/CODEVASF**

**Itutinga Hatchery Station**

## Machado Mineiro Hatchery Station



## Fish Culture-Farmers Partnership



## Fish Restocking



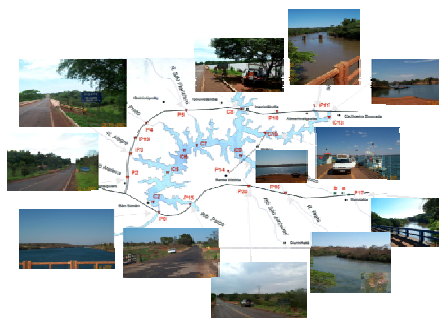
## Piracanjuba-*Brycon orbignianus*



## Fish Way

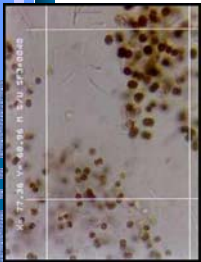


## Limnology





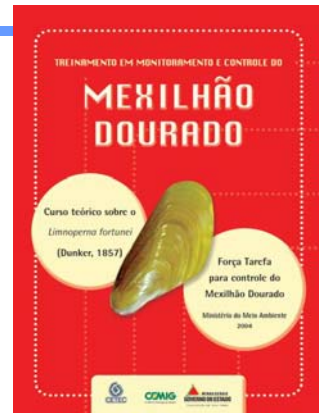
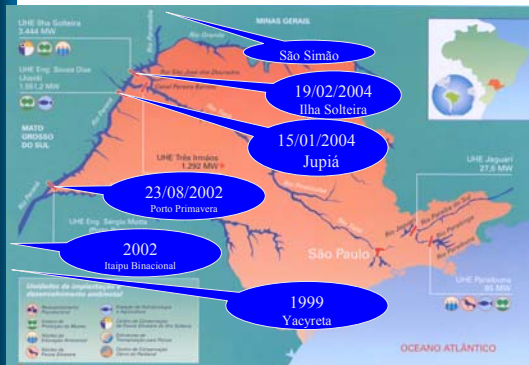
## Cyanobacteria



## Golden Mussel



## Golden Mussel Distribution



## Urban and Industrial Sewage Discharge



## Sediment Discharge Operation



## Conservation Reserves



## Animal Reintroduction



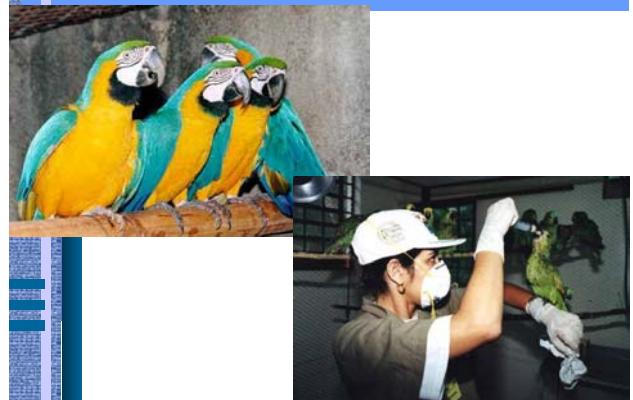
## Animal Reintroduction



## ASAS Project-CEMIG/IBAMA



## ASAS Project-CEMIG/IBAMA





## Riparian Reforestation



## Reservoir



## River



## Riparian Reforestation



## Research at Depletion Zone



### Equipe CEMAC

O CEMAC conta com especialistas de diversas áreas do conhecimento para desenvolver o planejamento, implantação da UFLA e o desenvolvimento produtivo com apoio técnico de todas instituições.



### Informações

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**CEMAC**  
Centro de  
Excelência em  
Matas Ciliares



## Farmers Partnership





**Community Integration****Riparian Forest Plantation****Riparian Reforestation****Riparian Reforestation****Riparian Reforestation****Riparian Reforestation**

## Riparian Reforestation



## Riparian Reforestation



## Riparian Reforestation



## SEEDS' LABORATORY



## SEEDLINGS NURSERY



## Volta Grande Seedlings Nursery





## Volta Grande Seedlings Nursery



## Itutinga Seedlings Nursery



## Water Resources



State Committees  
Federal Committees  
CNRH / CERH  
Internal Committee -  
CEMIG

## Fire: Control and Prevention



## Advertisement



## Reservoir Boards Invasions

MD-0011D

## Advertisement against reservoir board invasion



## Research & Development

### Basin research



Fish culture  
Water quality  
Fauna e flora  
Reforestation  
Water resources

### Fish Telemetry



Partnership  
CEMIG / UNIVERSITIES  
/ ANEEL

## Degradation Recovery



## Degradation Recovery



Três Marias

## Spring Preservation



Santa Cruz Basin

## Spring Preservation

### Preserved



### Disturbed



### Degradation





## Environmental Education



Peti

## Environmental Education



Partnership  
São Rafael Institute



## Environmental Education



## Environmental Education



Please visit us

[www.cemig.com.br](http://www.cemig.com.br)



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