Managing extreme in a Mega City:
The nexus of water scarcity and water pollution in São Paulo

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CEO of Sabesp:

SABESP IN NUMBERS

Largest sanitation company in the Americas

INVESTMENTS
R$ 3.5 billion
(US$ 1 billion)
In 2015

Fifth largest
in the world in terms of population served

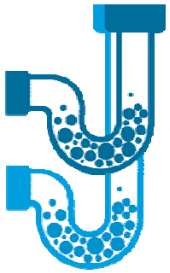
28.6 million clients
68% of the urban population of the state of São Paulo

365
municipalities

14,223
employees

235
water treatment plants

539
sewage treatment stations



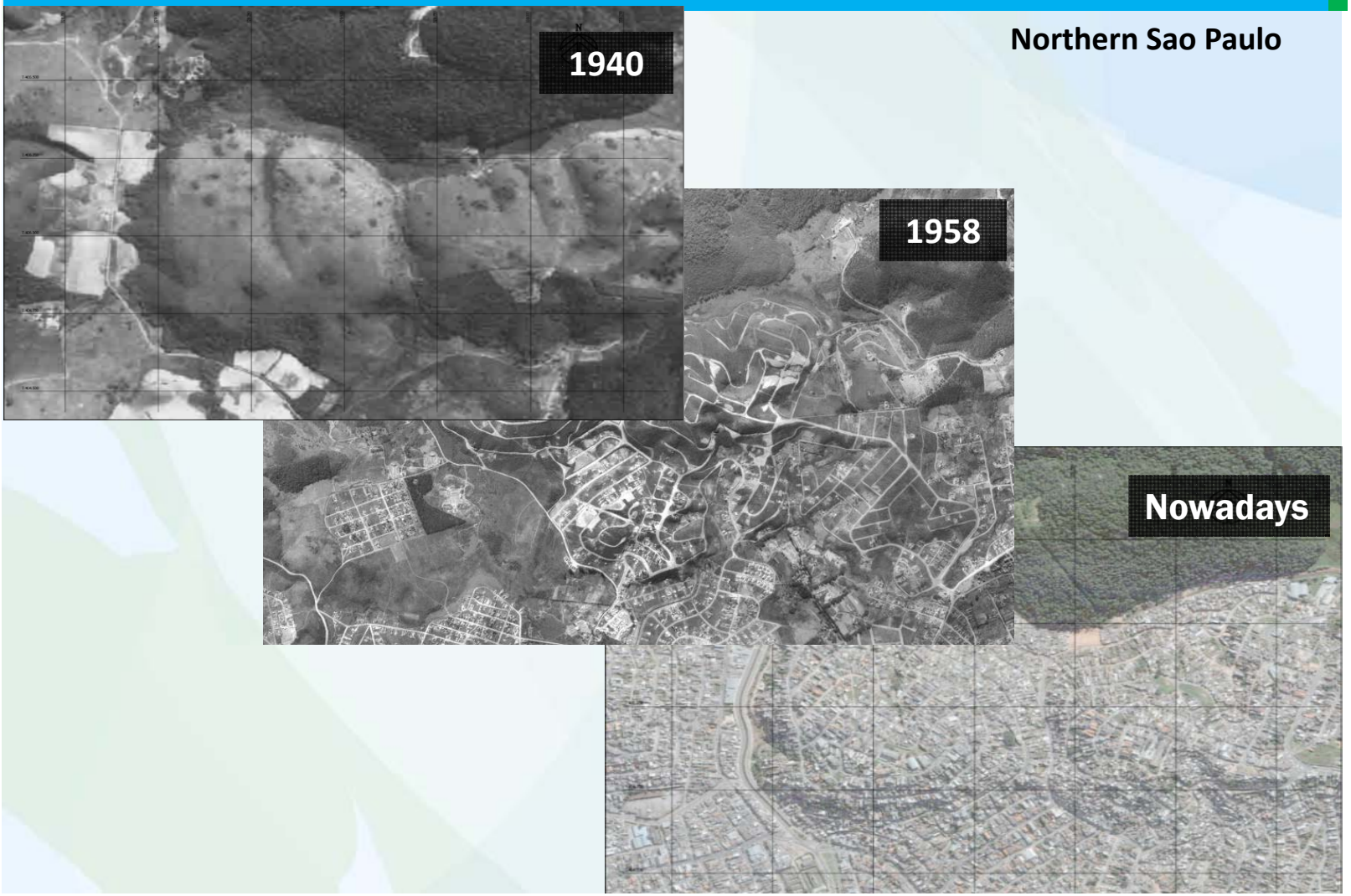
48,800 kilometers of **sewage** collection networks

71,700 kilometers of **water** distribution networks

Responsible for about **30%** of total investments anually made in the **country**

INFORMAL CITY EXPANSION

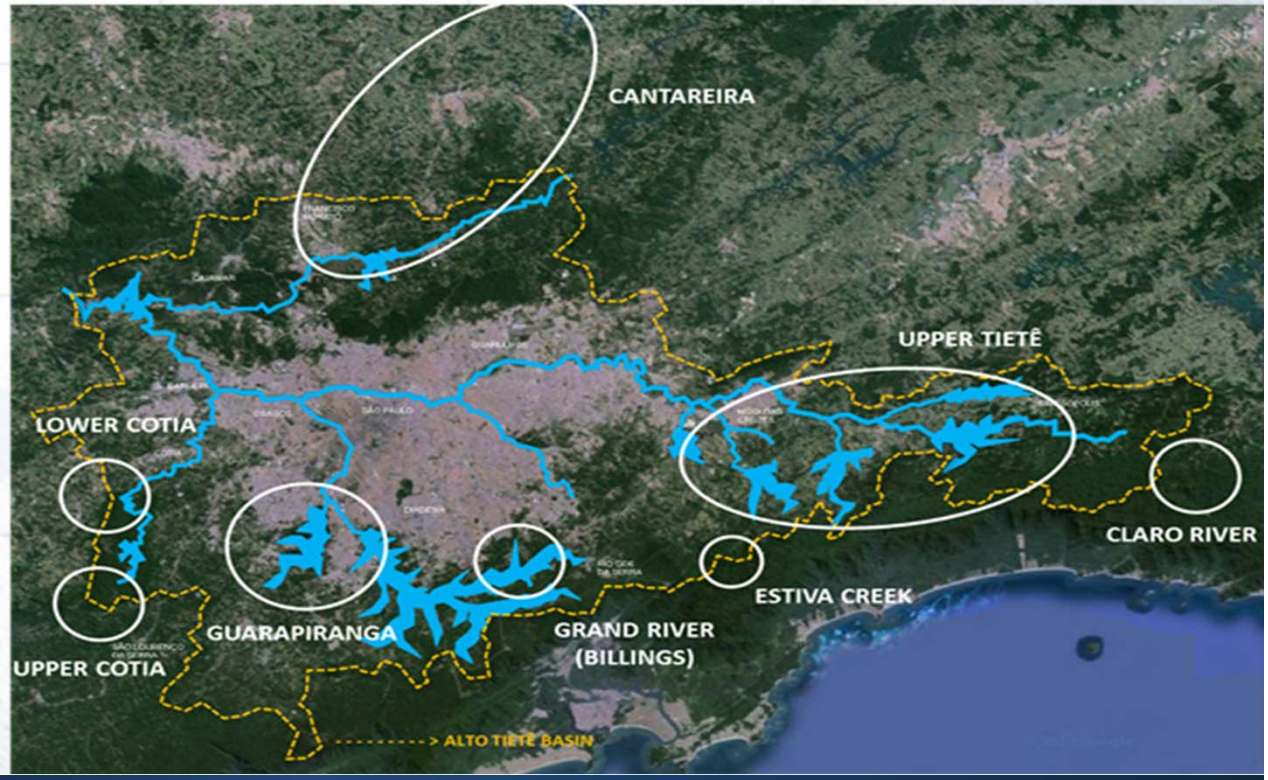
Northern Sao Paulo



Sabesp serves 365 cities.
It is necessary to plan new infrastructure according to priorities

U.N.	Município	Data Contrato	Cobertura Água (%)	Regularidade (IRFA)	Segurança Hídrica	Coleta de Esgoto (%)	Tratamento de Esgoto (%)	Coleta x Tratamento de Esgoto	Perdas Vol. Perdido (m³/mês)
RA	BOM SUCESSO DE ITARARÉ	Venc - 2027	100		POÇO	98,3	100	98,3	
RB	BORÁ	06/09/2007	99,0			98,7	100	98,7	
RM	BORACÉIA	02/07/2012	100			100	100	100	
RM	BOTUCATU	27/05/2010	100			97,1	100	97,1	355.083 - J
MN	BRAGANÇA PAULISTA	Venc - 2009	100			94,5	100	94,5	
RT	BREJO ALEGRE	Venc - 2030	100			85,7	100	85,7	
RA	BURI	20/05/2010	100			96,0	100	96,0	
RG	BURITIZAL	28/12/2007	99,9			100	100	100	
RJ	CABREÚVA	18/12/2008	96,4			88,5	100	88,5	
RV	CAÇAPAVA	02/07/2008	99,2			98,3	99,1	97,4	267.573
RV	CACHOEIRA PAULISTA	Venc - 2005	99,2			98,0	100	98,0	
RB	CAIABú	06/09/2007	99,1		POÇO	93,9	100	93,9	
MN	CAIEIRAS	02/07/2012	99,0	5,9		87,3	0,0	0,0	
MN	CAJAMAR	02/07/2012	95,7	12,2		81,9	0,0	0,0	
RR	CAJATI	22/06/2010	100			80,5	100	80,5	
RG	CAJURU	06/05/2010	99,8			99,0	100	99,0	
RA	CAMPINA DO MONTE ALEGRE	02/07/2008	100			80,8	100	80,8	

Metropolitan São Paulo
20 million people
7 water treatment plants
5 sewage treatment plants



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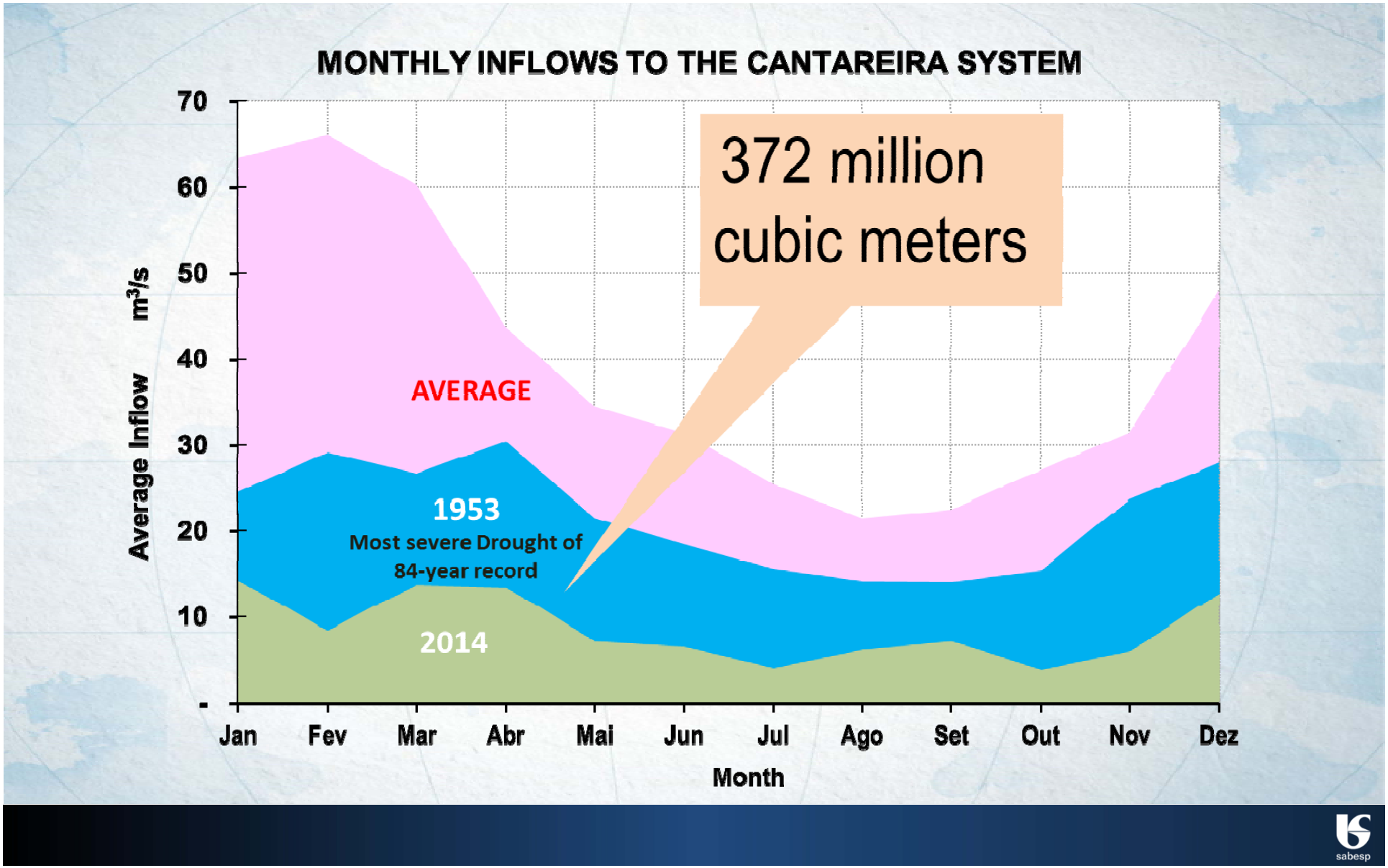
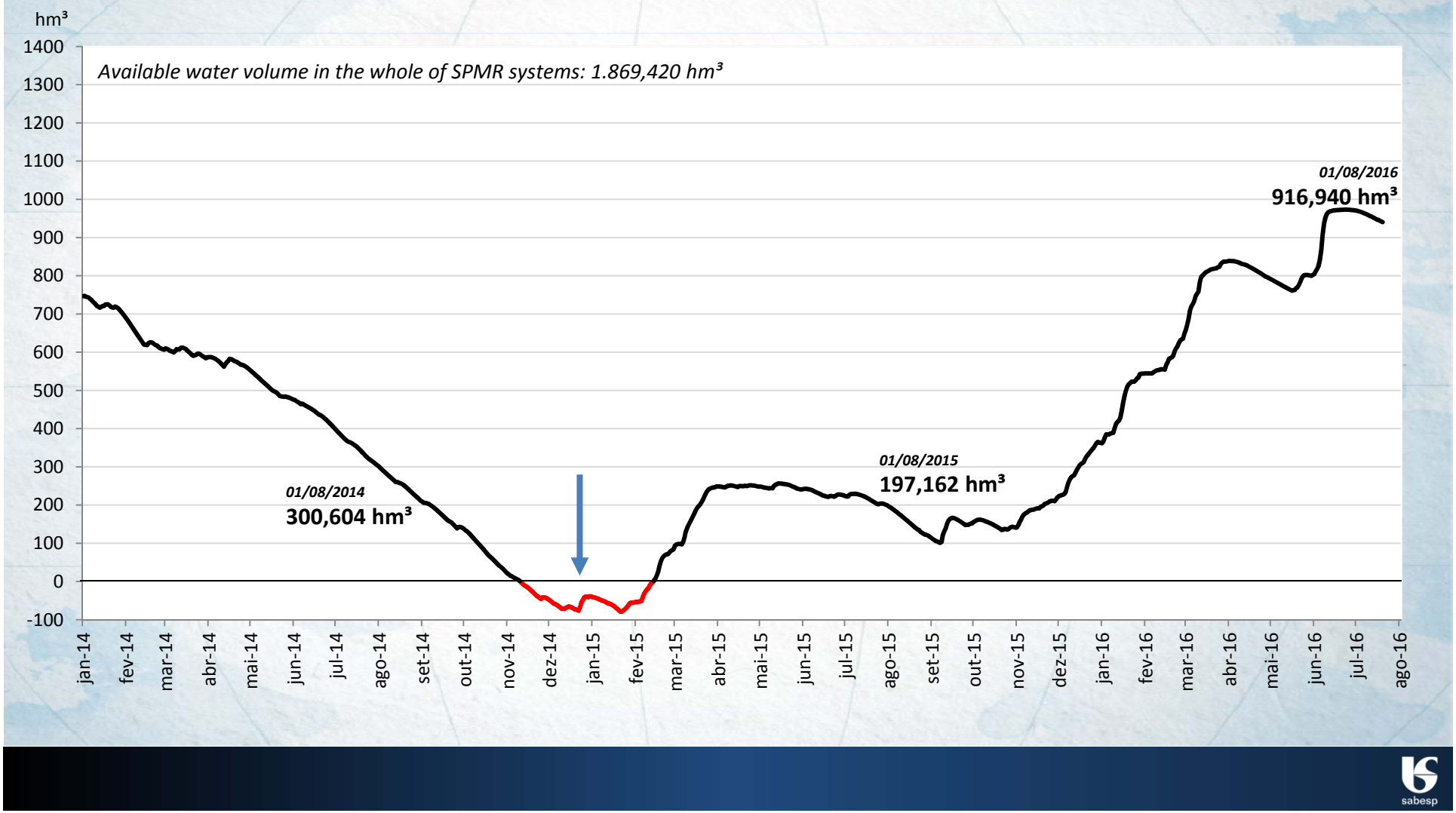
- Under ideal conditions, water locally available would almost meet the bulk water requirement
- Because of pollution, the intakes for the water treatment plants are located upstream from the metropolitan area, close to the boundaries of the watershed, where river flows aren't sufficient to supply the immense population
- The metropolitan area draws water from distant river basins
- The production and supply of potable water is essentially a quality problem


MONTHLY INFLOWS TO THE CANTAREIRA SYSTEM
372 million cubic meters
AVERAGE
1953
Most severe Drought of 84-year record
2014
Average Inflow m³/s
70
60
50
40
30
20
10
-
Jan
Fev
Mar
Abr
Mai
Jun
Jul
Ago
Set
Out
Nov
Dez
Month

Without technical reserves water available would run out in November 2014



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INFRASTRUCTURE

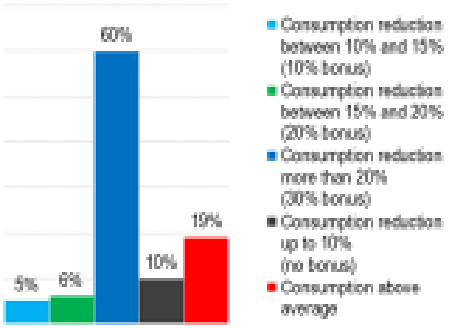
Interconnection of production Systems

6.6 m3/s transferred to Cantareira area

Equivalent Population of 3.5 million people using neighboring systems

Emergency Civil Works and Interbasin transfers

Economic Incentives Bonus & Fine



81% adhesion
Reduction of 6.0 m^3/s

Pressure Relief Valves and Water Loss Reduction

Reduction of 13.8 m3/s

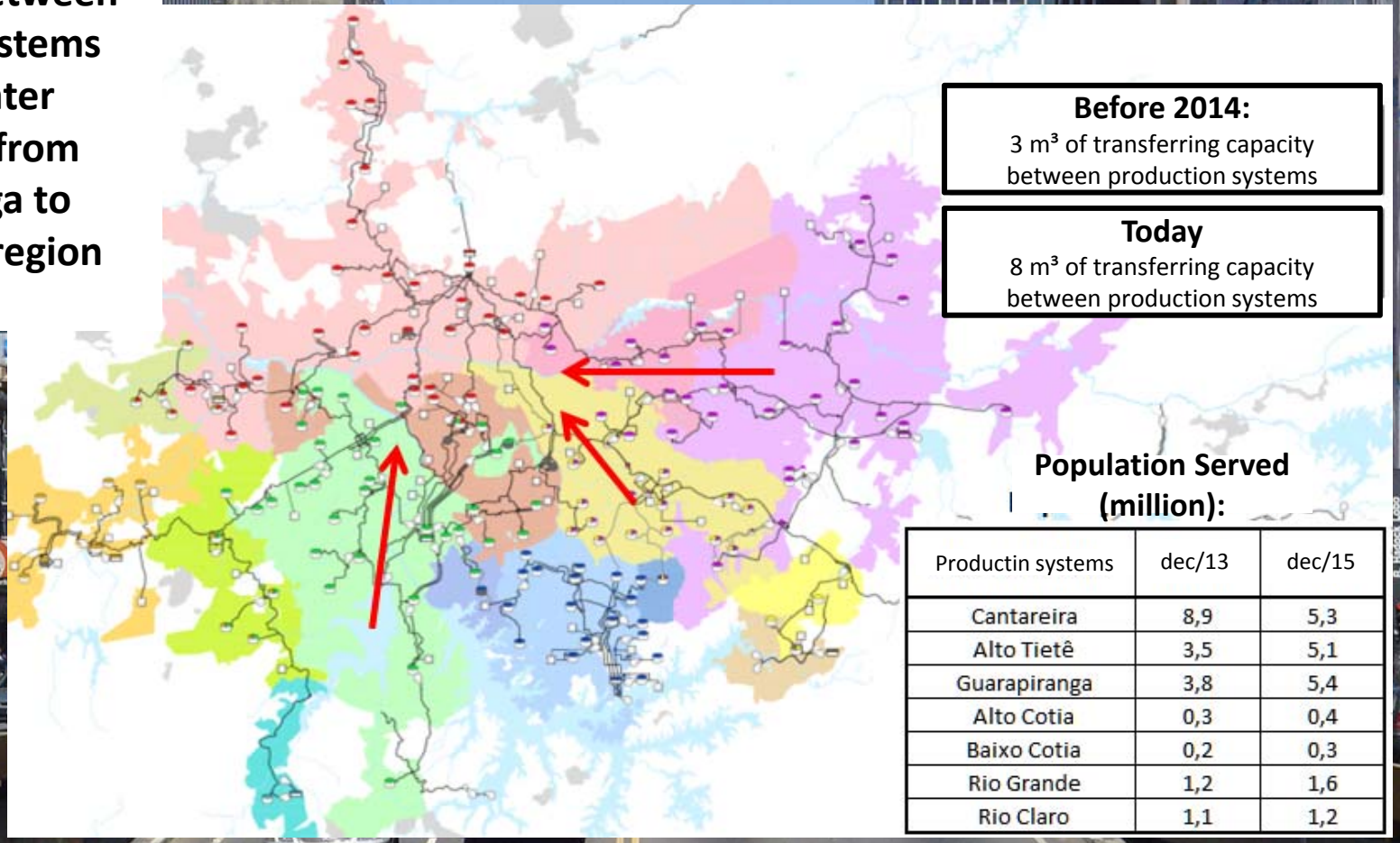
- Time to fix leaks: 36 to 17 hours
- 44% of the network with PRV
- More than 4,000 km/month were monitored to detect leaks
- More than 15,000 connection units/month were replaced
- More than 3,000 leakage repairs/month

DEMAND MANAGEMENT

Water from dead storage: cofferdams and floating pumps

Interconnection between bulk water reservoirs

Expansion of connections between production systems allowed water transferring from Guarapiranga to Paulista Ave. region



Before 2014:
3 m³ of transferring capacity between production systems

Today
8 m³ of transferring capacity between production systems

Population Served (million):

Productin systems	dec/13	dec/15
Cantareira	8,9	5,3
Alto Tietê	3,5	5,1
Guarapiranga	3,8	5,4
Alto Cotia	0,3	0,4
Baixo Cotia	0,2	0,3
Rio Grande	1,2	1,6
Rio Claro	1,1	1,2

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An average of 80% of MRSP population joined the efforts for water consumption reduction

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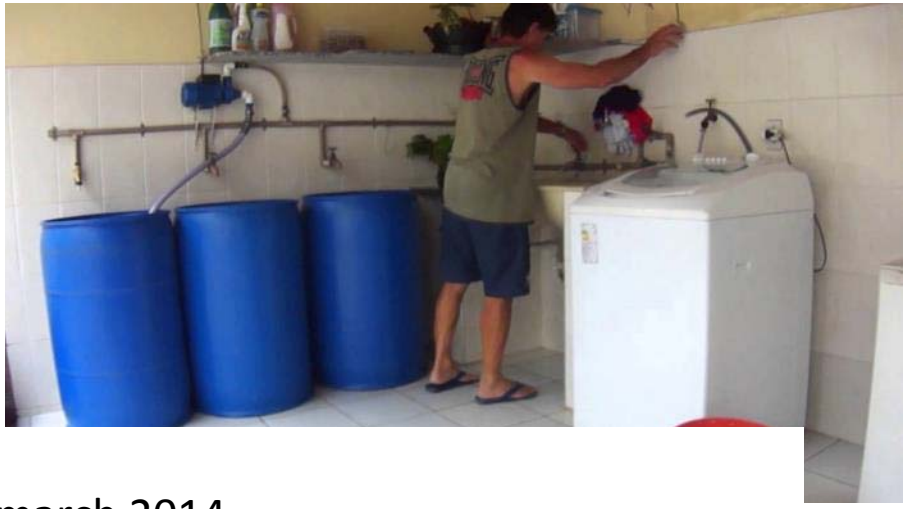
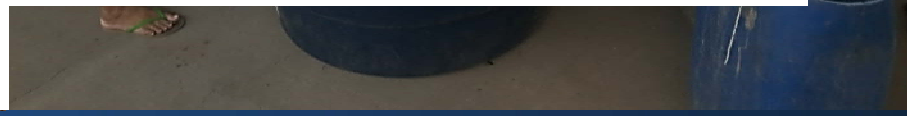
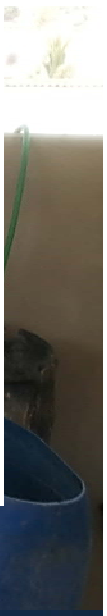


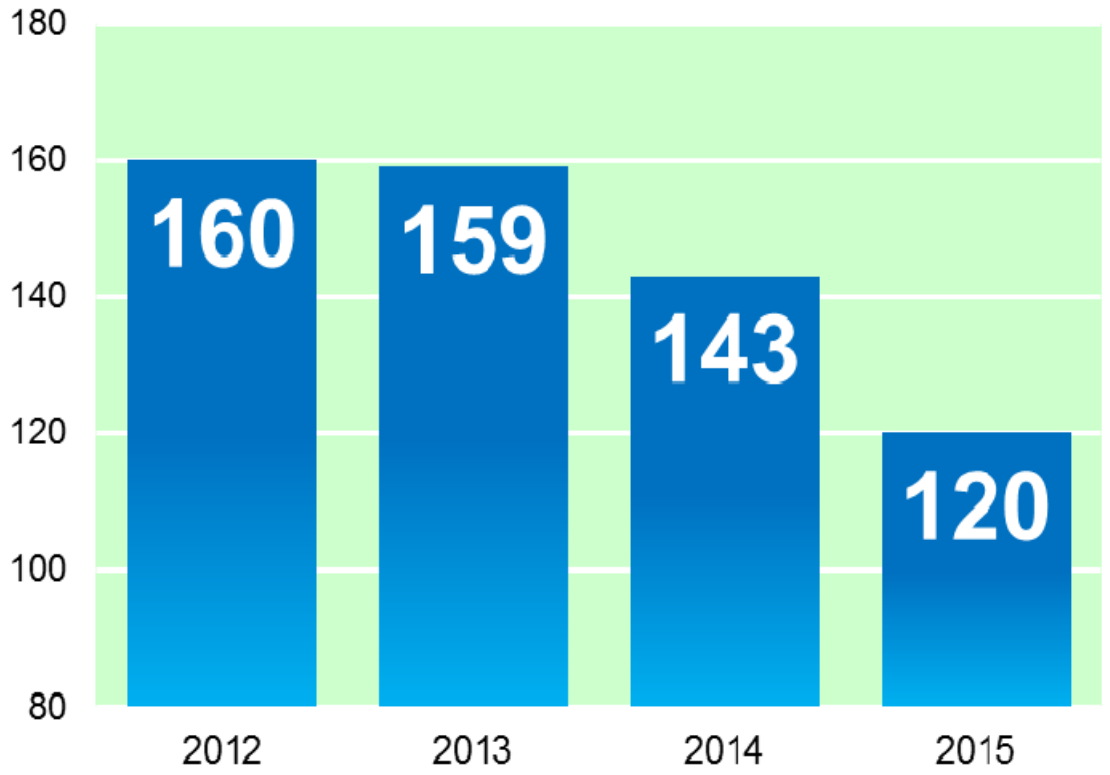
- Bonus Program: from march 2014
- Contingency charge: from February 2015
- Total costs: **R$ 650 million** (US$ 200 million)
- Total water saved throughout the crisis period: **332 million m³**
- Per capita consumption rate decrease:
  from **160** to **118 liters per hab/day**



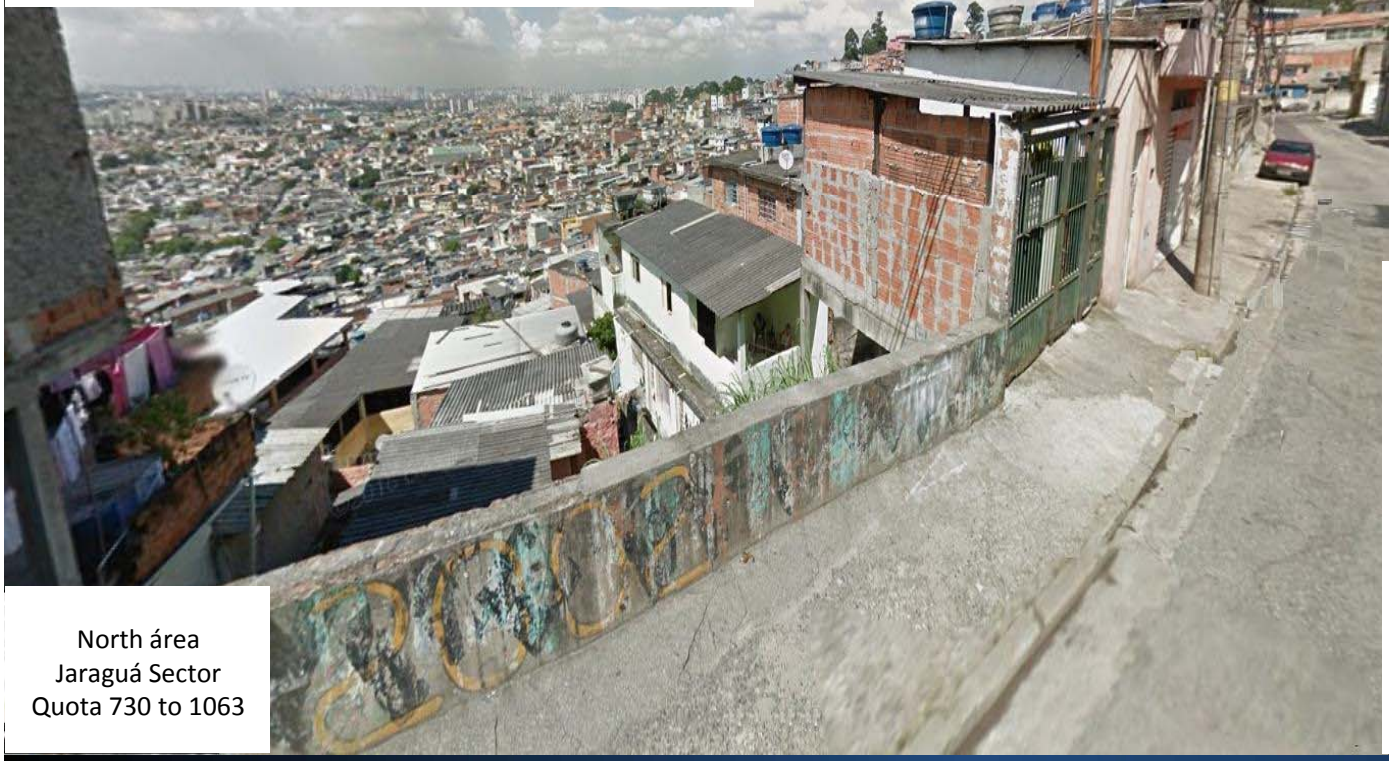


Per capita consumption in MRSP

(Liters/inhabitant/day)



Pressure in the distribution networks was reduced according to the topography of each region



North área
Jaraguá Sector
Quota 730 to 1063

Expansions of water treatment stations

Rio Grande Station: + 500 l/s - completed in 3 months' time (Aug – Oct/14)
RJCS Station: (1st stage)**+1 m³/s - completed in 1,5 year time** (Jul – Dec/14)
RJCS Station: (2nd stage)**+ 1 m³/s - completed in 6 months' time** (Jan –Jul/15)

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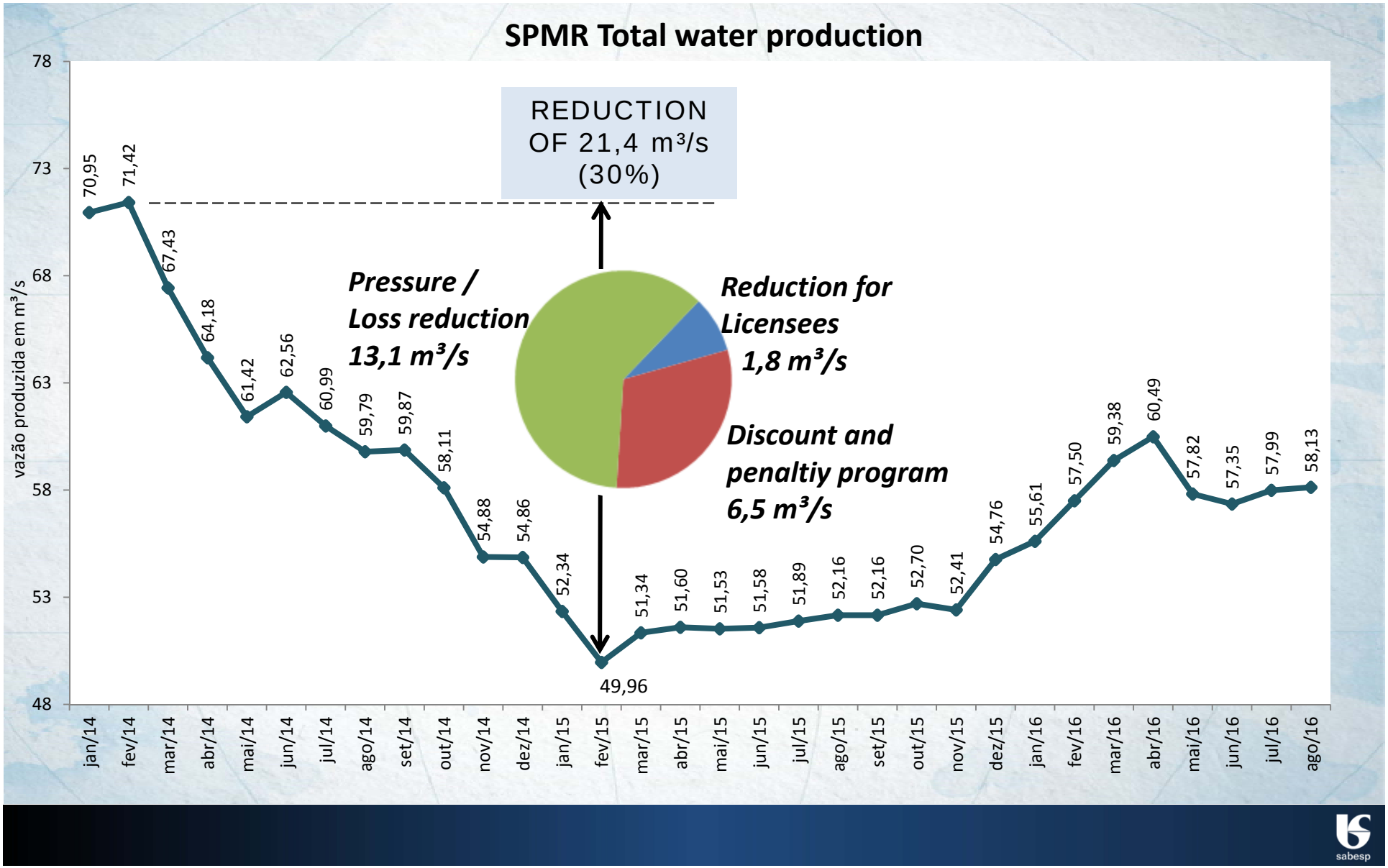
SPMR Total water production



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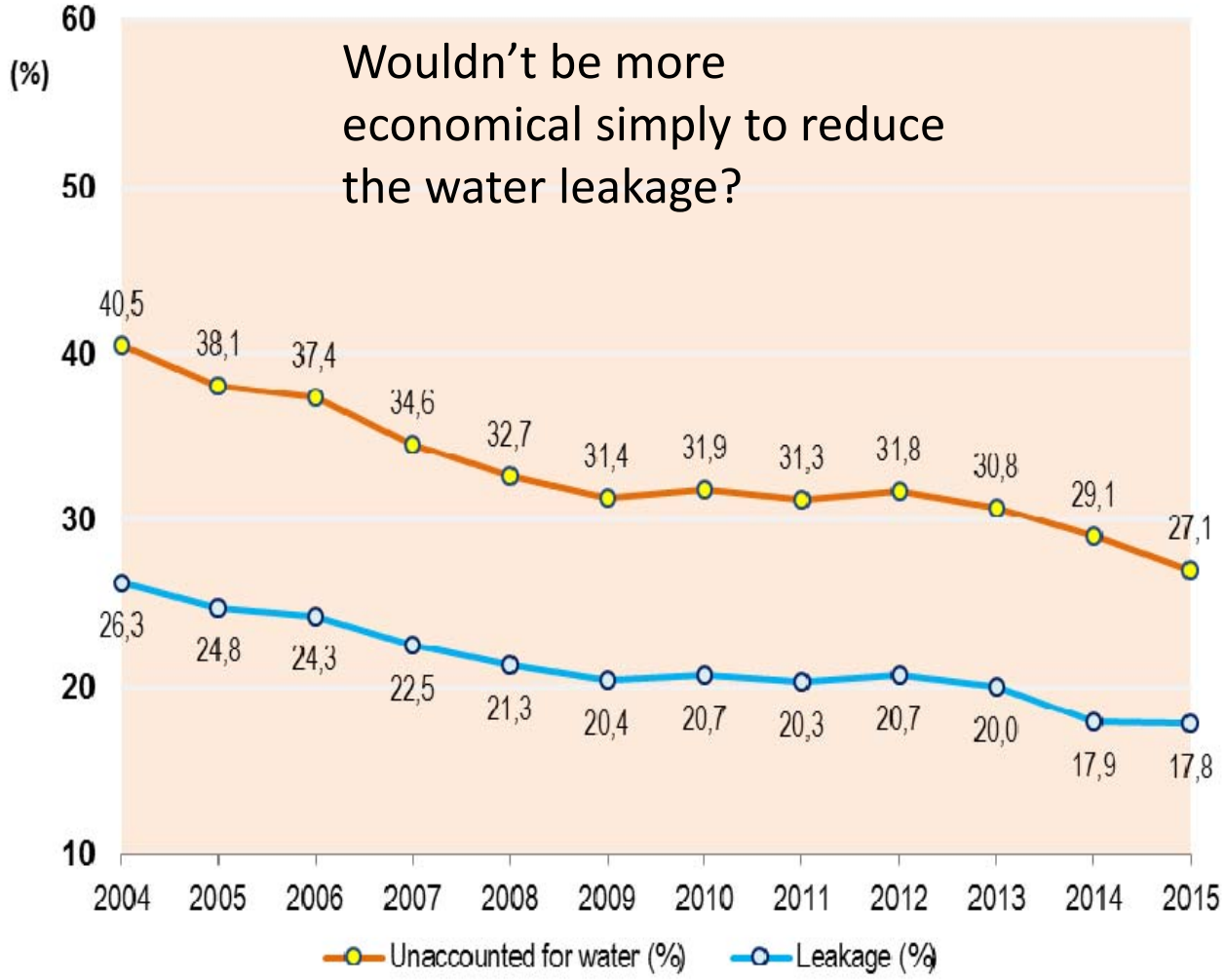
Wouldn’t be more economical simply to reduce the water leakage?

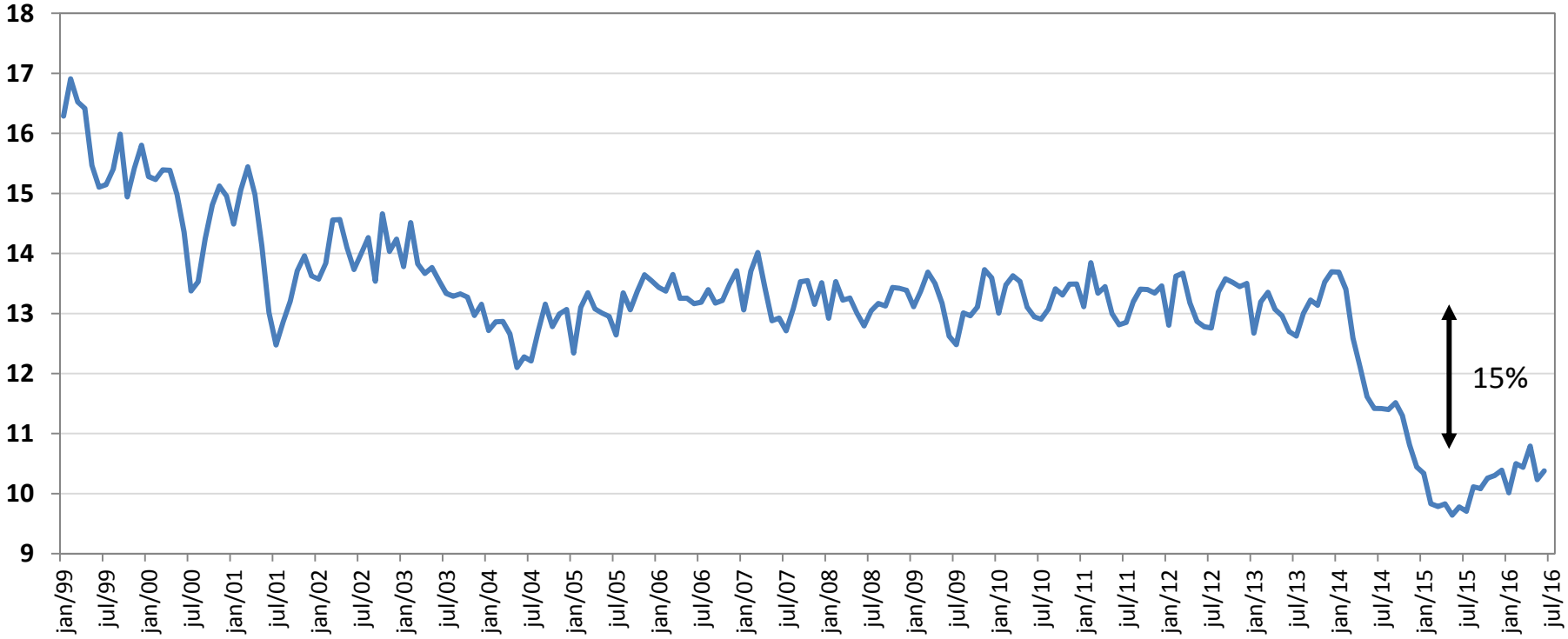


What is necessary to treat all the sewage?

How about water reuse?

Will population keep the rational consumption or get back to old patterns (before crisis)?

Average household water consumption – SPMR (m^3/month)



What could be done differently in the 2014-2015 drought?

For urban consumers of potable water, it would be economically attractive to pay an extra $/m^3 in order to compensate farmers not to use bulk water for irrigation during the drought

But this wasn´t done.

The 2014 crisis has revealed that SPMR needs to:

Increase the water supply by 10 m^3/s in the next 2 years

Decrease the physical losses of water from 20 per cent to 10 per cent in the next 10 years

Collect and treat all the sewage produced in the metropolitan region in the next 20 years

This will mean higher tariffs. How to deal with the capacity of paying of the poorest?