



Sabesp's SCOA Portal

How PI System is supporting one of the world's largest water and wastewater companies on integration of business process informations



Agenda



SABESP
Who we are



SCOA Project
What is SCOA?
Project initiatives



Project assumptions

- SCOA Infrastructure (Scada + PI System)
- Construction of the environment
- PI Asset Framework / PI Vision



Sabesp Expectations

- Main needs of Sabesp
- What kind of environment do we need?
- Project goals



Applications

- Indicator of water shortage
- Decision Making Aid



Results

- What we achieved so far



sabesp

Sabesp



- Founded in 1973
- Attends 27,7 millions of citizens in 368 municipalities of São Paulo state
- Employees: 14.170
- First sanitation company listed in New York Stock Exchange
- Sabesp is the fourth largest sanitation company in the world in assisted population

Metropolitan Region of São Paulo State



The high concentration of population demands large infrastructure

20% Brazil's Gross Domestic Product
 7,9 km² territorial extension
 21,2 million people (~77% Sabesp)

70% of Sabesp's Gross Billing

Hydric Resources Availability

BRAZIL

35.000 m³/hab.year

STATE OF SÃO PAULO

2.468 m³/hab.year

ONU CLASSIFICATION

SELF SUFFICIENT

> 2.500 m³/hab.year

POOR

< 2.500 m³/hab.year

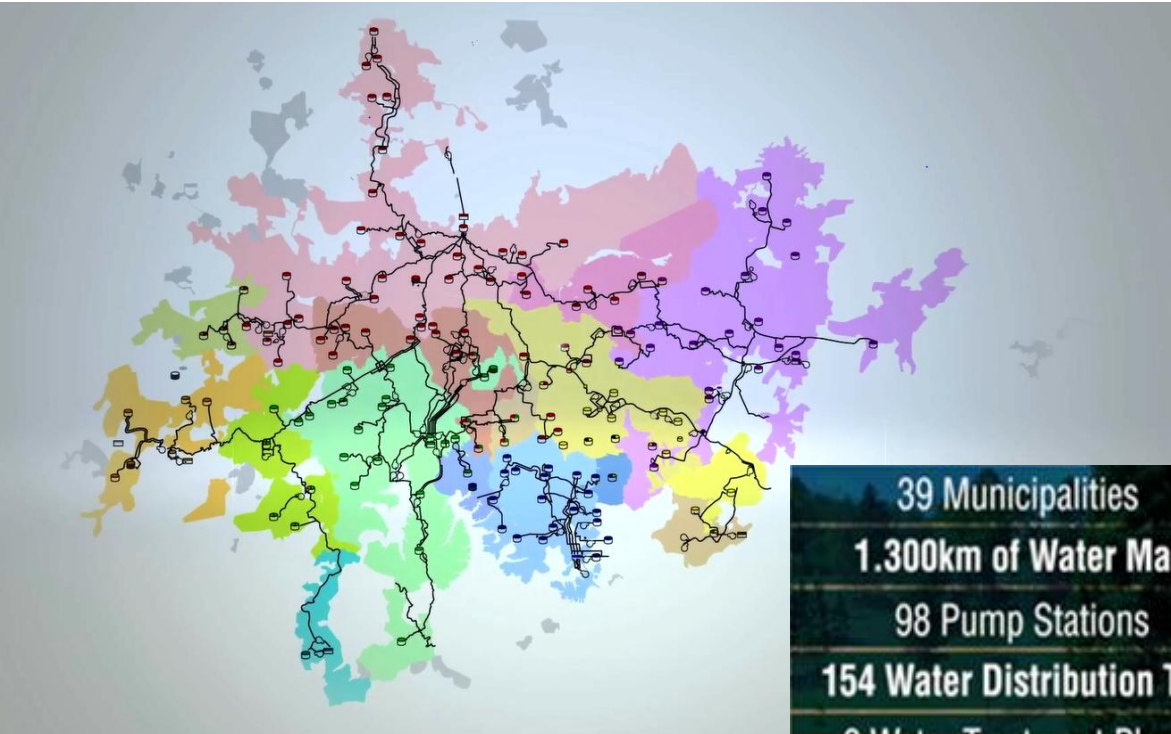
CRITICAL

< 1.500 m³/hab.year

The shortage of water resources demands efficiency on operation

Metropolitan Integrated System

Challenges: operate and manage complex infrastructure (present) to achieve goals (future)



39 Municipalities
1.300km of Water Mains
98 Pump Stations
154 Water Distribution Tanks
9 Water Treatment Plants

4,6 million of water connections
3,8 million of sewage connections

61 m³/s water production
18 m³/s treated wastewater

100% water supply
81% sewage collection
75% treated wastewater

	2022
Water Supply	~100%
Sewage Collection	93%
Sewage Treatment	83%



SCOA System on CCO: a legacy from the past

Cronology of our continuous evolution

- 1982 - start-up of telemetry data with hardware design developed especially for SABESP
- 1999 - Expansion of the system with new computers
- 2008 - SCADA system implementation (PowerCC 4.2)



From 2008 on: operating successfully using SCOA created new expectations...

- Reduce user dependency with support staff
- Fast integration of information from others business process for decision making
- Online monitoring of indicators affecting customers

New Project: Main Goals

- Deliver methodological and technological innovation, with positive impact for customers, working in challenges of present, visioning the future
- Develop an environment that provides an integrated analysis of the Sanitation Cycle processes, with a friendly interface
- Stable and reliable environment

SCOA Project: modernization and business process integration

2017 - SCADA system
update and PI System
Implementation



Main Expectations

1

Reduce user dependency
with support staff



Environment development

PI ProcessBook with PI Asset Symbol templates

PI Vision with PI AF templates

All native PI System tools



Distributed maintenance

Tag creation with PI AF

Reports in Excel

Main Expectations

1

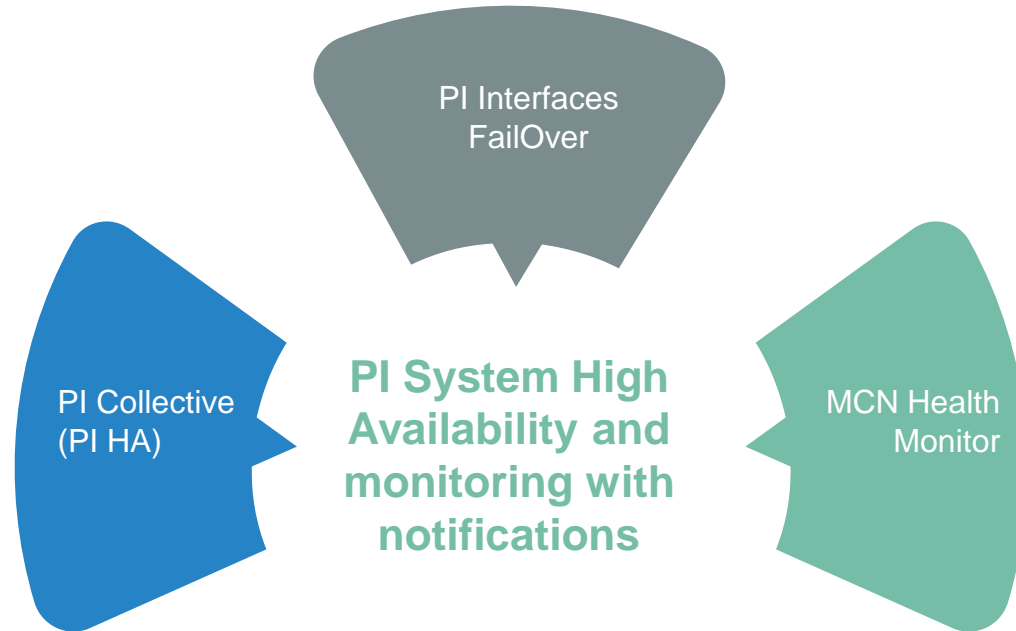
Reduce user dependency with support staff

2

Stable and reliable environment



Environment development



Main Expectations

1

Reduce user dependency with support staff

2

Stable and reliable environment



3

Fast information for decision making

Environment development

All applications in PI Vision

PI Analyses + PI Notifications



Online Availability and easy access
for all information

Main Expectations

1

Reduce user dependency with support staff

2

Stable and reliable environment

3

Fast information for decision making

4

Online monitoring of indicators



Environment development

Online calculation of indicators with

PI Analyses



78%

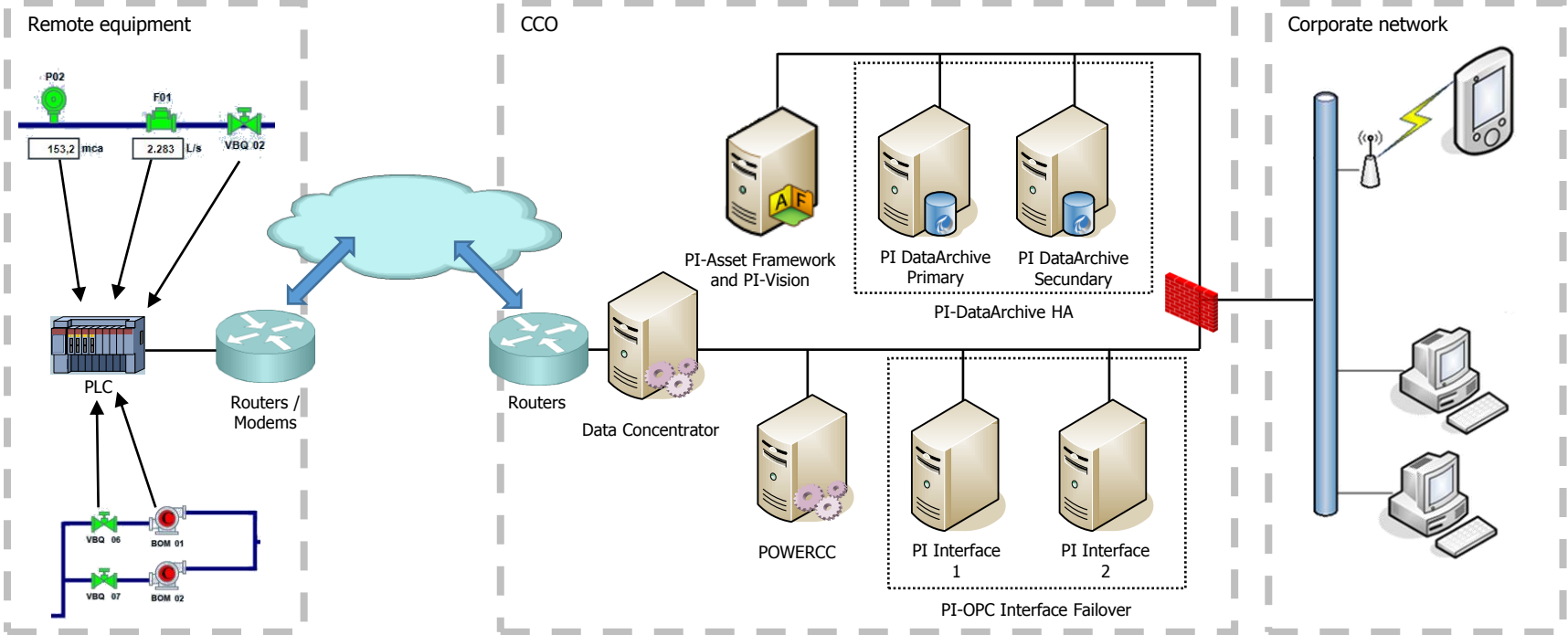
PI Notifications



PI Vision



SCOA Infrastructure



PI Asset Framework

The screenshot displays the PI System Explorer Legacy 32-bit interface. The main window title is "\\SPO-PROD73\SCOA-AF - PI System Explorer Legacy 32-bit". The menu bar includes File, Search, View, Go, Tools, and Help. The toolbar contains Database, Query Date, Back, Check In, Refresh, and New Element. The left pane shows a tree view of Elements, with Sabesp selected. The right pane shows the details for Sabesp, including Name, Description, Template, Type, Categories, and Find options. A diagram is visible in the center of the right pane.

Elements

- Elements
 - Sabesp
 - Aplicações
 - Distribuição
 - Esgoto
 - Grandes Consumidores
 - Mananciais
 - Produção
 - Tratamento
 - Element Searches

Sabesp

General | Child Elements | Attributes | Ports | Analyses | Notification Rules | Version

Name: Sabesp

Description:

Template: Type: None

Categories: Default Attribute: <None>

[Extended Properties \(0\)](#) [Annotations \(0\)](#) [Location](#) [Security](#)

Find: [Parents](#) [Children](#) [Event Frames](#)
[Models](#) [Layers](#) [Connections](#)

Elements

- Event Frames
- Library
- Unit of Measure
- Contacts

RECORDED WITH SCREENCAST-O-MATIC

Sabesp Modified:06/12/2017 09:24:59 Owner:system Version:01/01/1970 00:00:00, Revision 15

PI DataLink Reports

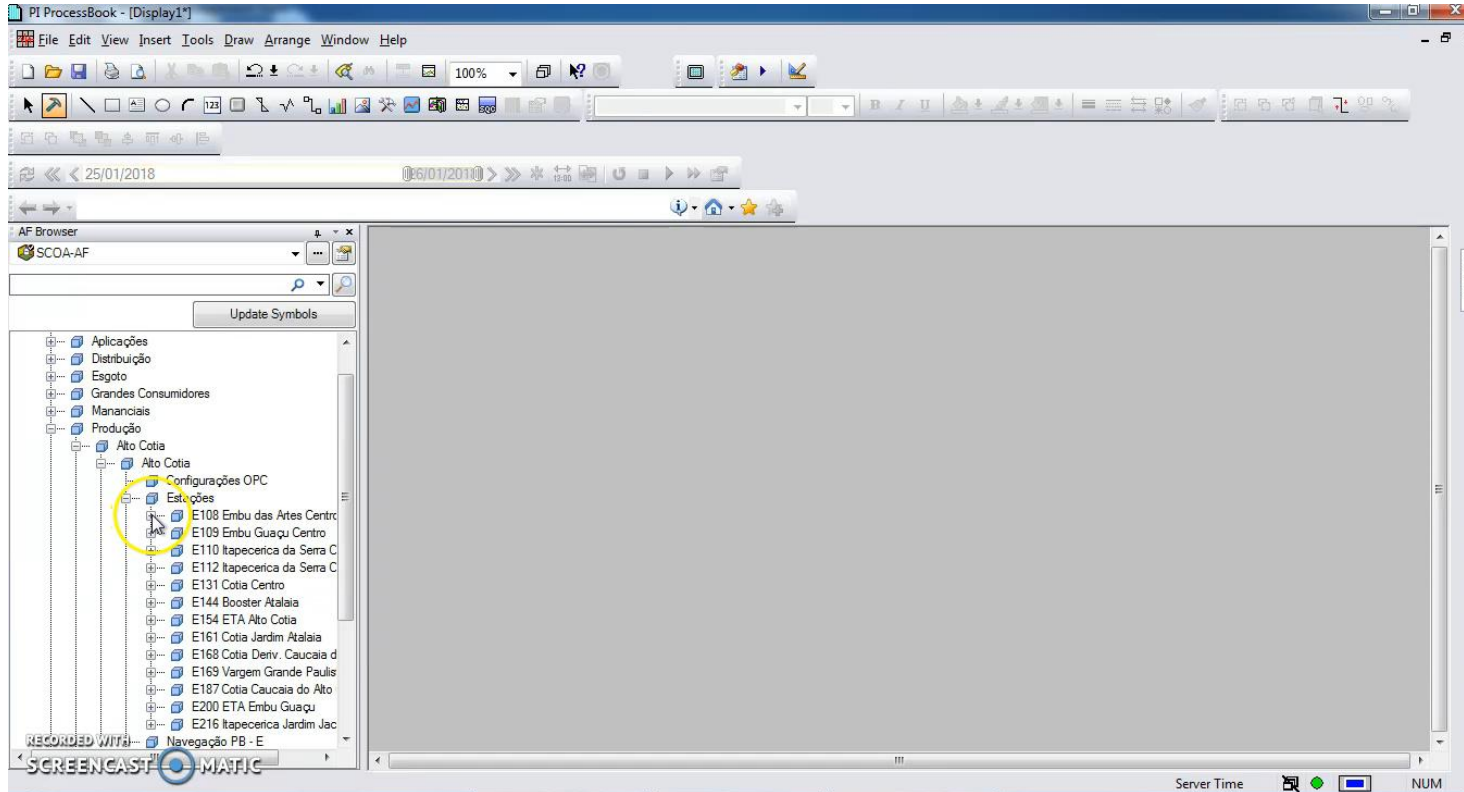
The screenshot displays the PI Vision software interface. At the top, there is a navigation bar with the PI Vision logo, the word 'Aplicações', and a user profile icon labeled 'PRODUCAO_ADlapreda'. Below this is a sub-header 'Aplicações' with a 'subesp' logo. The main area contains several report thumbnails:

- Relatório de Bombas**: Shows a pie chart and a data table.
- Relatório de Consumo**: Features a line graph and a data table.
- Relatório de Falta de Fase**: Includes a line graph and a data table.
- Relatório Falta de Comunicação**: Displays a line graph and a data table.
- Relatório Gestão de Energia**: Shows a bar chart and a data table.
- Relatório Macromedição**: Contains a data table.
- Histograma de Pressão**: Shows a histogram and a data table.
- Histograma de Vazão**: Shows a histogram and a data table.
- Relatório IRA**: Displays a bar chart and a data table.
- Qualificador IRA**: Shows a data table.

At the bottom of the interface, there is a status bar with the date '27/02/2019 02:25:24', a navigation arrow, the text '8h', a 'Now' button, and the date '27/02/2019 10:25:24'.

PI DataLink reports are available for download at PI Vision

PI Asset Framework



All screen symbols were associated with PI Asset Framework templates

PI Event Frame - Water shortage event

PROG_EstaçãoRA-Porto de Entrega-Variaveis

Name: Entrega
Description: Verifica se a população esta com Entrega de água (0 - Não atenc)
Categories: Expression
Analysis Type: SQC
 Enable analyses when created from template

Example Element: Select an example element

Name	Expression	Value at Evaluated	Value at Last Trng	Output Attribute
Variável1	if 'Valor Refer'			Entrega

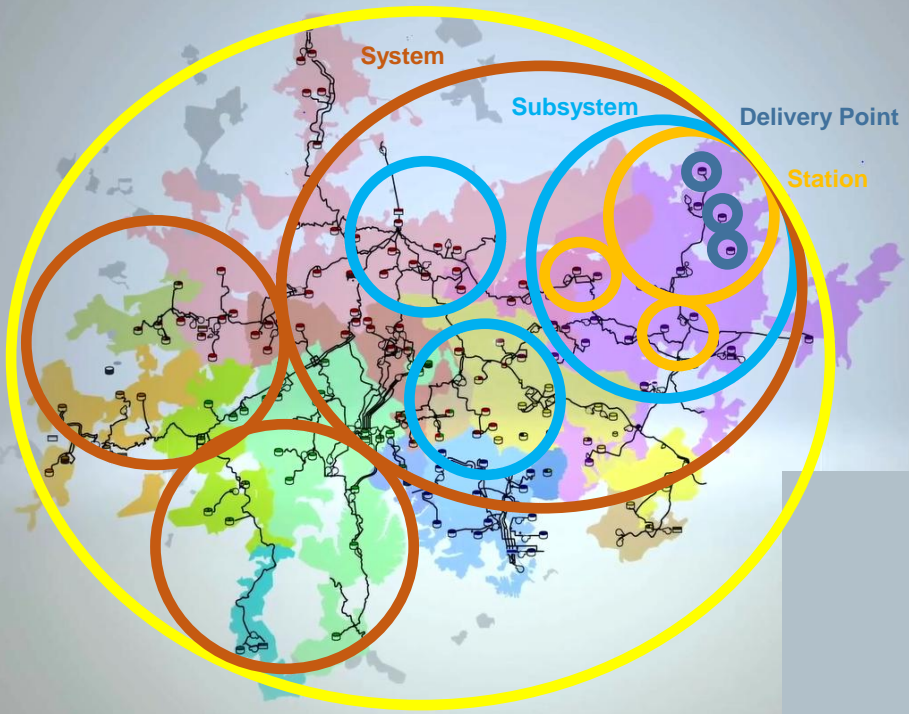
Functions: All, Abs, Acos, And, Asc, Ascii, Atan, Abs(number x) Return the absolute value of an integer or real number. Example: Abs(-2.2) Returns 2.2

Name	Duration	Start Time	End Time	Description	Category	Severity	Template	Primary Element
Falha De Água - Estação E086 Mauá Vila - Zona Baixa - Porto de En	0:09:58,00	22/11/2017 13:...	22/11/2017 13:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E086 Mauá Vila - Zona Baixa - Porto de En	0:04:00	22/11/2017 13:...	22/11/2017 14:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_TOR01	
Falha De Água - Estação E102 São Bernardo Parque Selecta - Zona Baixa - P	0:40:00	22/11/2017 14:...	22/11/2017 18:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_TOR01	
Falha De Água - Estação E047 Buarãrdi - Demarçã - Porto de Entrega DER	0:09:05,52	22/11/2017 14:...	22/11/2017 14:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM02	
Falha De Água - Estação E001 Osvaldo Jardim das Nações - Zona Baixa - P	0:20:00	22/11/2017 14:...	22/11/2017 15:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E193 São Bernardo Baeta Neves - Zona Baixa - PEI	0:15:00	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E180 Onda Dini - Caçuba do Alto - Demarçã - P	0:09:05,52	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E086 Mauá Vila - Zona Baixa - Porto de En	0:20:00	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E031 Cachoeirinha - Zona Baixa - Porto de Entr	0:15:00	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E072 São Bernardo Nova Petrópolis - Zona Baixa - P	0:15:00	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E084 Mauá Centro - Zona Baixa - Porto de Entr	0:15:00	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E102 Itapetini - Zona Alta - Porto de Entrega ITAP	0:44:05,551	22/11/2017 16:...	22/11/2017 16:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E011 Marante - Zona Baixa - Porto de Entrega MGI	0:19:05,551	22/11/2017 17:...	22/11/2017 17:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E105 Itapetini - Zona Alta - Porto de Entrega ITAP	0:54:05,551	22/11/2017 17:...	22/11/2017 17:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_CAM01	
Falha De Água - Estação E035 São Bernardo Taboão - Zona Baixa - Porto c	1:20:00	22/11/2017 18:...	22/11/2017 19:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_TOR01	
Falha De Água - Estação E029 Parque Carmo - Zona Alta - Porto de Entr	4:40:00	22/11/2017 18:...	22/11/2017 22:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	
Falha De Água - Estação E120 São Bernardo Vila Morchi - Zona Baixa - Port	0:35:00	22/11/2017 18:...	22/11/2017 19:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_TOR01	
Falha De Água - Estação E047 Buarãrdi - Demarçã - Porto de Entrega DER	1:15:00	22/11/2017 18:...	22/11/2017 20:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT01	
Falha De Água - Estação E012 São Bernardo Taboão - Zona Baixa - Porto c	2:25:00	22/11/2017 18:...	22/11/2017 21:...	Evento de fal...	IRA	None	IRA-FaladaÁgua_PT02	



Notification of a lack of water

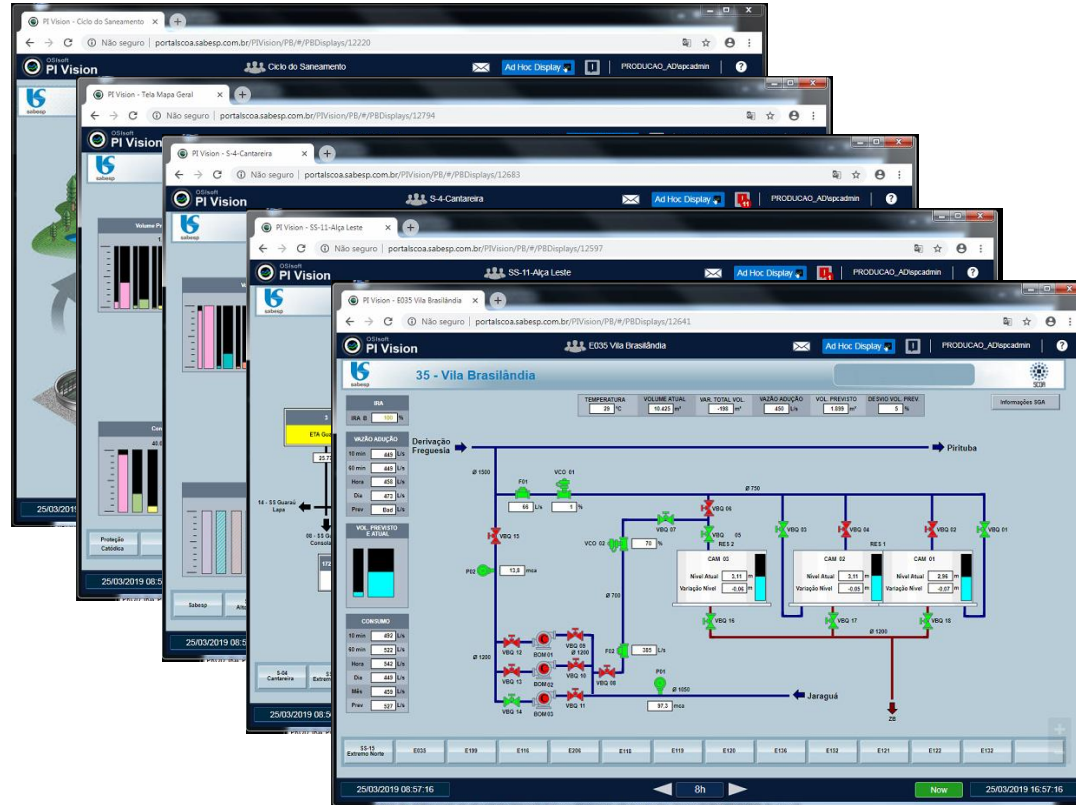
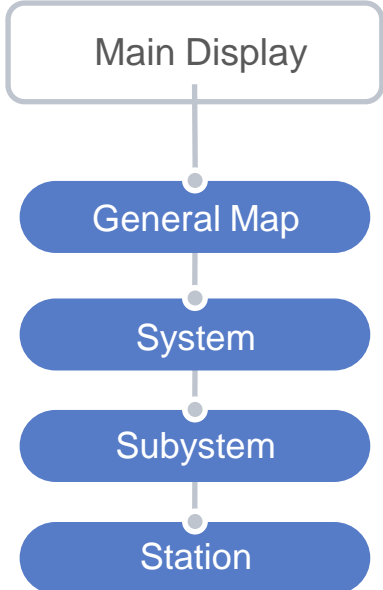
Main KPI - Supply regularity



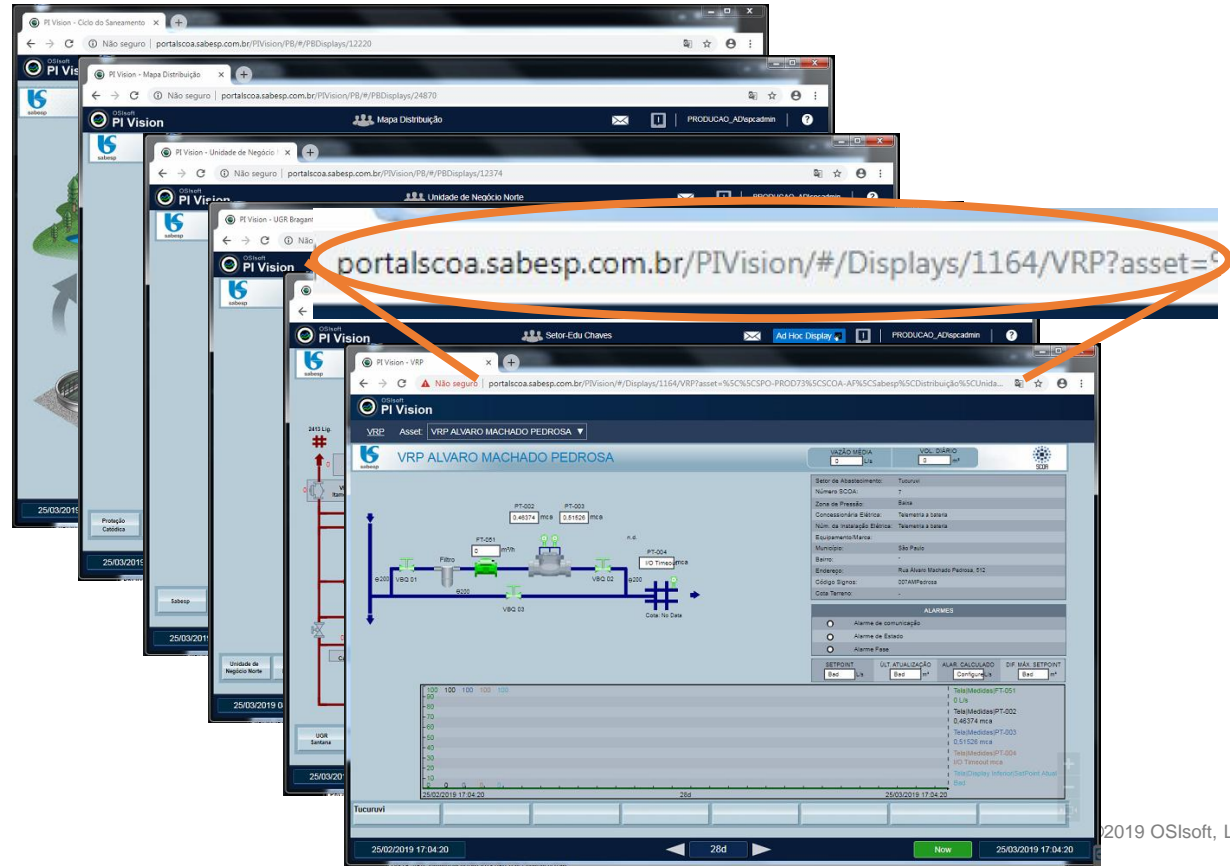
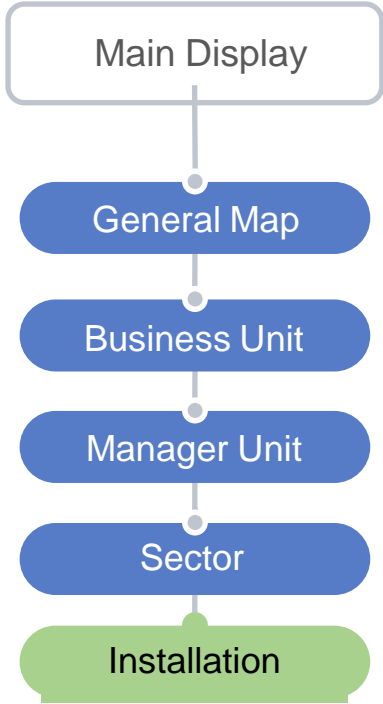
The regularity of water supply is measured accordingly to the **percentage of daily time with water delivery** weighted by:

- Delivery Point
- Population of Delivery Points (Station)
- Population of Stations (Subsystem)
- Population of Subsystems (System)
- Population of Systems (Global)

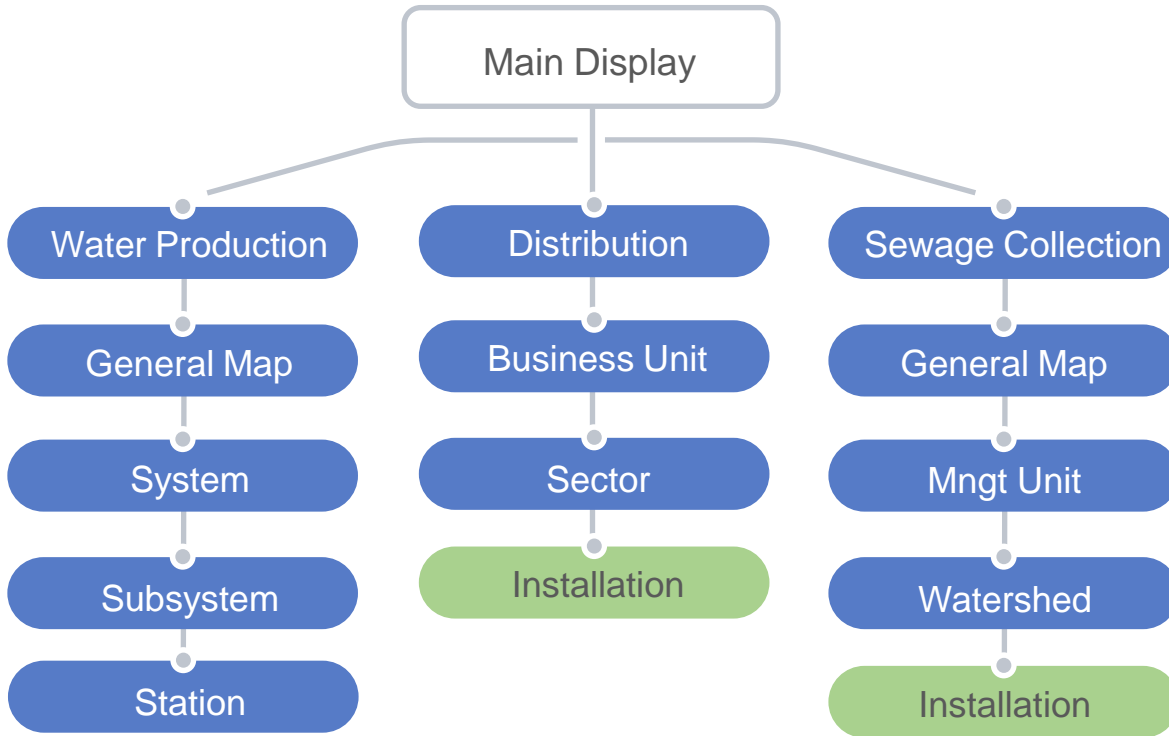
PI Vision Navigation (Water Production)



PI Vision Navigation (Water Distribution)



PI Vision Navigation (Main Streams)



Customized displays

PI ProcessBook

More than 700 displays developed (development accelerated by template functionality)

Similar displays

PI Vision

12 displays developed (representing **2400 assets**)

PI PB - Main Display: SCOA Portal

Where SCOA Implementation is more “visible”



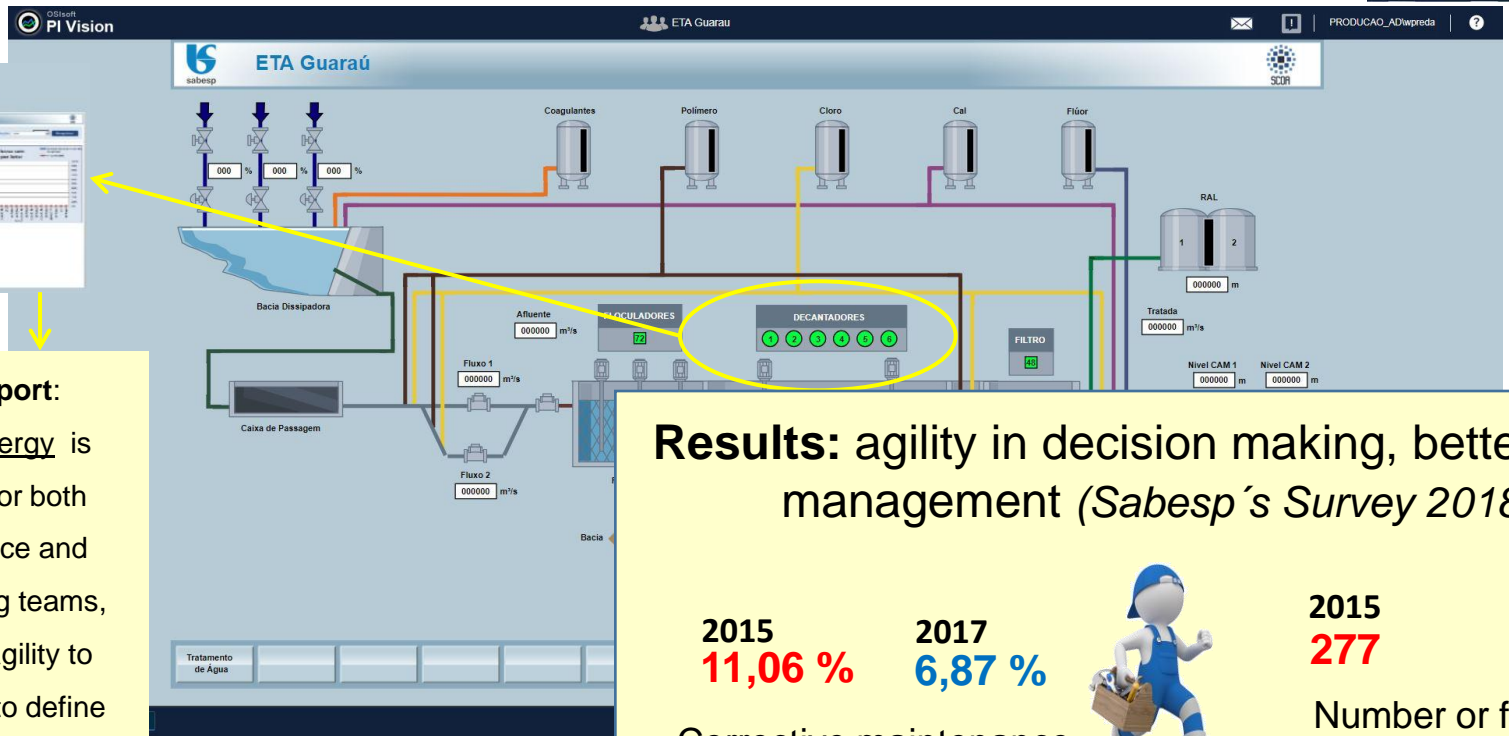
Business Process Integration
(Sabesp’s Intranet)

Friendly interface, providing quick and reliable access to all information from infrastructure

Alarms and Reports supporting Engineers and maintenance team, minimizing problems (**Predictives and Preventives actions**)

PI PB - Water Treatment Plant

Challenge: maximize water production



New Report:
Lack of Energy is available for both Maintenance and Engineering teams, providing agility to repair and to define preventive actions

Results: agility in decision making, better asset management (*Sabesp's Survey 2018*)

2015	2017	2015	2017
11,06 %	6,87 %	277	2681
Corrective maintenance		Number of field equipment monitored	

PI PB - Water Transportation and Distribution

IRA KPI Report, GIS Integration => support Loss Program continuously



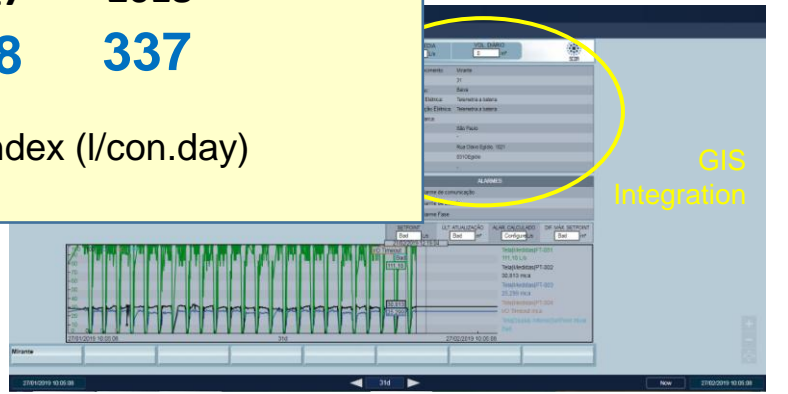
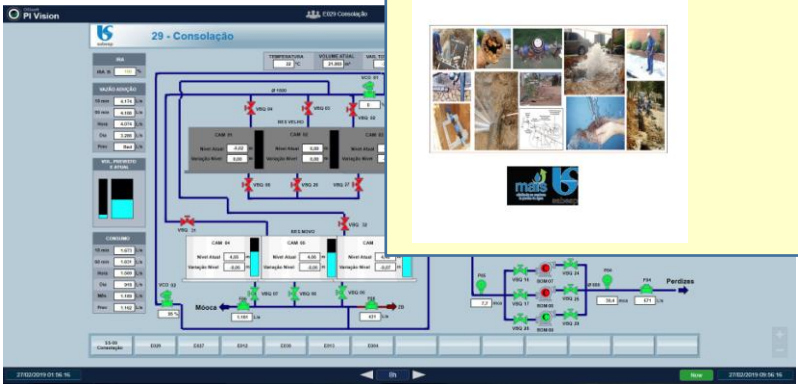
Data	Descrição	Valor	Status
11/02/2019	11 - 002 Consórcio SP	0	0
11/02/2019	11 - 003 Consórcio SP	0	0
11/02/2019	11 - 004 Consórcio SP	0	0
11/02/2019	11 - 005 Consórcio SP	0	0
11/02/2019	11 - 006 Consórcio SP	0	0
11/02/2019	11 - 007 Consórcio SP	0	0
11/02/2019	11 - 008 Consórcio SP	0	0
11/02/2019	11 - 009 Consórcio SP	0	0
11/02/2019	11 - 010 Consórcio SP	0	0
11/02/2019	11 - 011 Consórcio SP	0	0
11/02/2019	11 - 012 Consórcio SP	0	0
11/02/2019	11 - 013 Consórcio SP	0	0
11/02/2019	11 - 014 Consórcio SP	0	0
11/02/2019	11 - 015 Consórcio SP	0	0
11/02/2019	11 - 016 Consórcio SP	0	0
11/02/2019	11 - 017 Consórcio SP	0	0
11/02/2019	11 - 018 Consórcio SP	0	0
11/02/2019	11 - 019 Consórcio SP	0	0
11/02/2019	11 - 020 Consórcio SP	0	0

Results: Increase in billing, improve operational process and service quality
(Sabesp's Loss Program - 2019)

Programa Corporativo de Redução de Perdas de Água
Relatório de Acompanhamento
02/2019

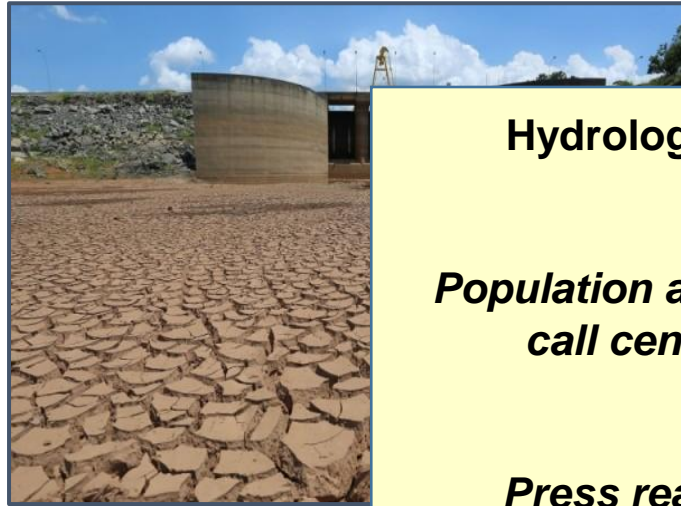
Year	Loss Index (l/con.day)
2017	348
2018	337

Loss Index (l/con.day)

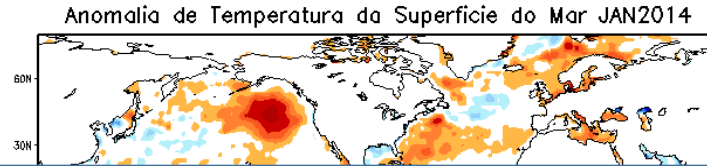


GIS Integration

Facing challenges, continuous learning



Water Crisis



**Hydrological information was updated daily
(Sabesp's Site - Internet)**

**Population asked for hydrological topics using our
call center, competing with commercial and
operational topics**

**Press reaches population more easily (many
communication resources)**

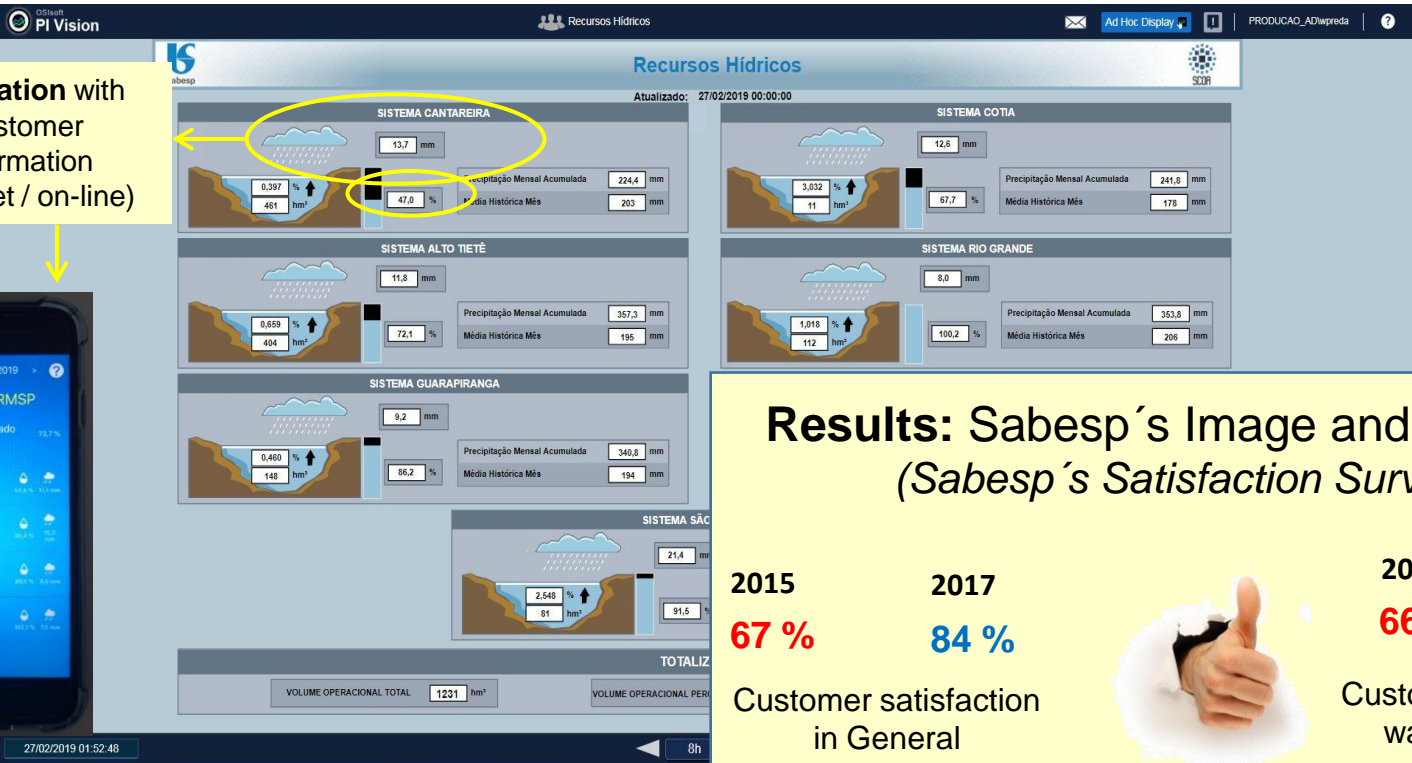


PI PB - Water Resources (Reservoirs)

Hydrological Information



Integration with Customer Information (Internet / on-line)



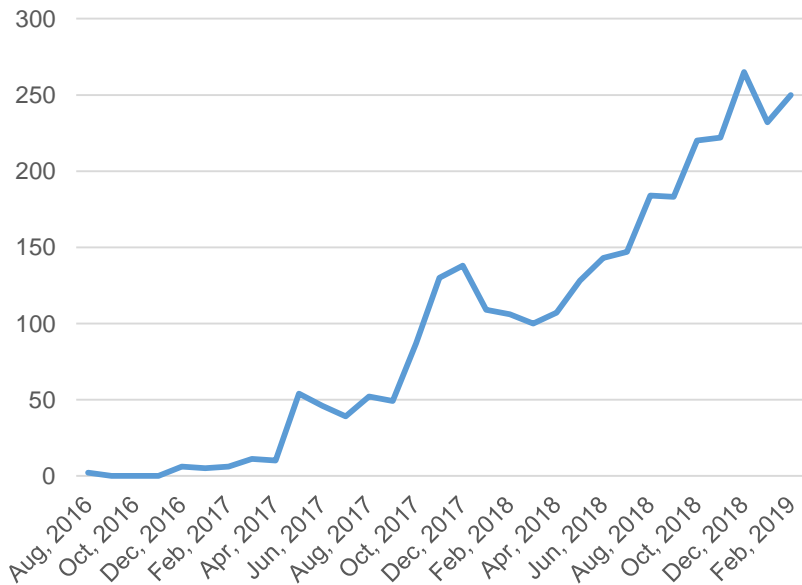
Results: Sabesp's Image and Transparency
(Sabesp's Satisfaction Survey 2018)

2015	2017	2015	2017
67 %	84 %	66 %	88 %
Customer satisfaction in General		Customer satisfaction for water consumption	

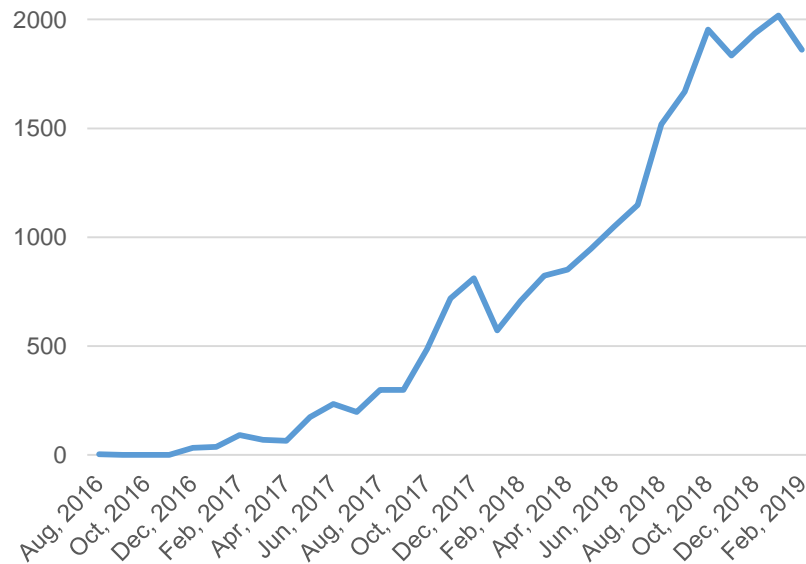
PI Vision - Usage per Month is growing up

SCOA Implementation demonstrated its usability

Users per Month



Access per Month



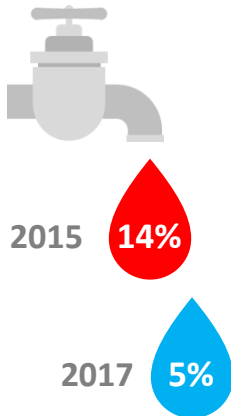
SCOA Project Numbers

- More than 100,000 tags
- 3,100 displays (700 customized + 12 templates)
- 60 reports (Represents more than 2,400 assets)
- 2 years of ~2 PI Consultants working in this project full time
- More than 250 trained users (50 in administration)
- 440 Users registered in the Active Directory

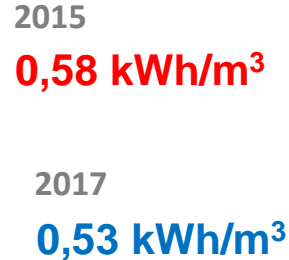


More Results

The lower the better



Claims about water shortage



Energy efficiency



Intangible benefits

Shareholders Valuing and strengthening the **brand of Sabesp**

Society Compliance with **regulatory requirements**

Employees Greater **assertiveness in solving problems** (the first team that will provide service is specialized)

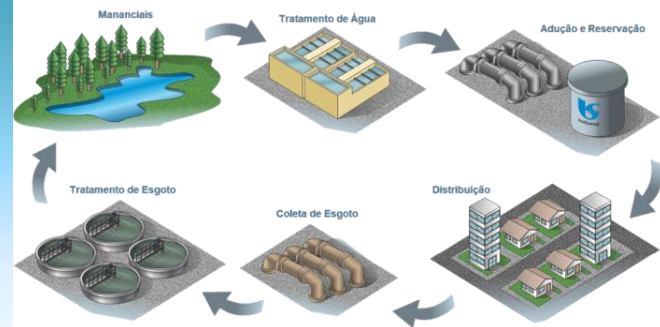
Easy and continuous access to field information enables **proactivity and preventive action**

New working procedures gave more **synergy between the teams**

SABESP

SCOA Portal

How PI System is supporting one of the world's largest water and wastewater companies on integration of business process informations



CHALLENGE

Integrate diverse systems and build an environment where the user has quick and reliable access to all information in a friendly interface.

SOLUTION

Use the PI Asset Framework's native tools integrated with PI System's client tools.

Training of key users for knowledge replication and learning culture.

RESULTS

Improvement in the Sabesp's image (awarded as the second most reliable public company in São Paulo - 2018 - IBOPE)

Contact Information



Silvana C. S. S. Franco

- Manager of Supply Control
- Sabesp
- silfranco@sabesp.com.br



Diogo Ávila de Castro

- Technology consultant
- IHM Stefanini
- diogo.castro@ihm.com.br



Questions?

Please wait for
the **microphone**

State your
name & company



Please remember

TO DOWNLOAD
APP, SEARCH
OSISOFT



謝謝 KEA LEBOHA
 TAPADH LEIBH 고맙습니다
 БАЯРЛАЛАА MISAOTRA ANAO
 DZIĘKUJĘ CI NGIYABONGA TEŞEKKÜR EDERIM GRACIES OBRIGADO شكرا SALAMAT
 DANKON TANK TAPADH LEAT
 KÖSZÖNÖM DANKIE TERIMA KASIH GRACIES
 СПАСИБО
 PAKMET CIZGE
 GO RAIBH MAITH AGAT
 БЛАГОДАРЯ GRACIAS MAHADSANID
 ТИ БЛАГОДАРАМ
 TAK DANKE MAHANSANID
 RAHMAT MERCI
 HATUR NUHUN
 GRACIAS TIBI
 DANK JE EΥΧΑΡΙΣΤΩ GRATIAS TIBI
 AČIŮ SALAMAT MAHALO IĀ 'ŌE TAKK SKALDU HA
 GRAZZI PAKKA PĒR ありがとうございます
 PAXMAT CAĢA SIPAS JI WERE TERIMA KASIH MATUR NUWUN
 CẢM ƠN BẠN
 WAZVIITA
 FALEMINDERIT UA TSAUG RAU KOJ
 ТИ БЛАГОДАРАМ СИПОС
 HVALA FAAFETAI
 ESKERRIK ASKO
 HVALA ХВАЛА ВАМ
 TEŞEKKÜR EDERIM
 GRAZIE
 DI OU MÈSI
 ĎAKUJEM
 MULŤUMESC
 HVALA

