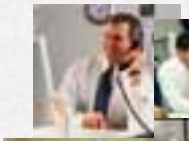
THE SUPERVISION OF QUALITY IN THE ELECTRICITY SECTOR

Alfredo Dammert

Chairman of OSINERGMIN

World Forum on Energy
Regulation IV
Athens, Greecee
October 18 – 21, 2009

INSTITUTIONAL STRUCTURE OF THE PERUVIAN ELECTRIC SECTOR



Osinergmin

- Regulator and inspector
- Establish Tariffs
- Resolves Disputes between participants

COES SINAC

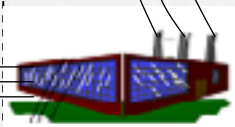
- Conformed by generation, transmission and distribution representatory
- Responsible for the operation of the system at minimum cost

Ministerio de Energía y Minas
República del Perú

- Normative organ and licensor

GENERATION

MARKETS
- Distributors (Regulated Tariff)
- Free (>200 KW can be unregulatedTariff)



transformation

Lines

TRANSMISSION

- Exclusive Concession
- Regulated Tariff

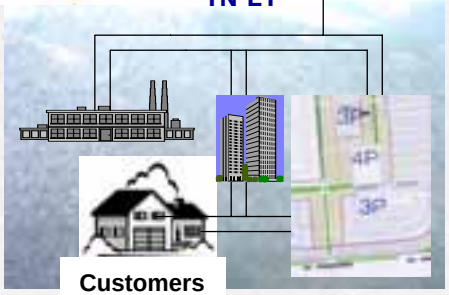
transformation

Lines

DISTRIBUTION

- Exclusive Concession
- Costumers
  - Regulated (Tariff regulated by typical sectors)
- Free (>200 KW can be unregulatedTariff)

DISTRIBUTION IN LT

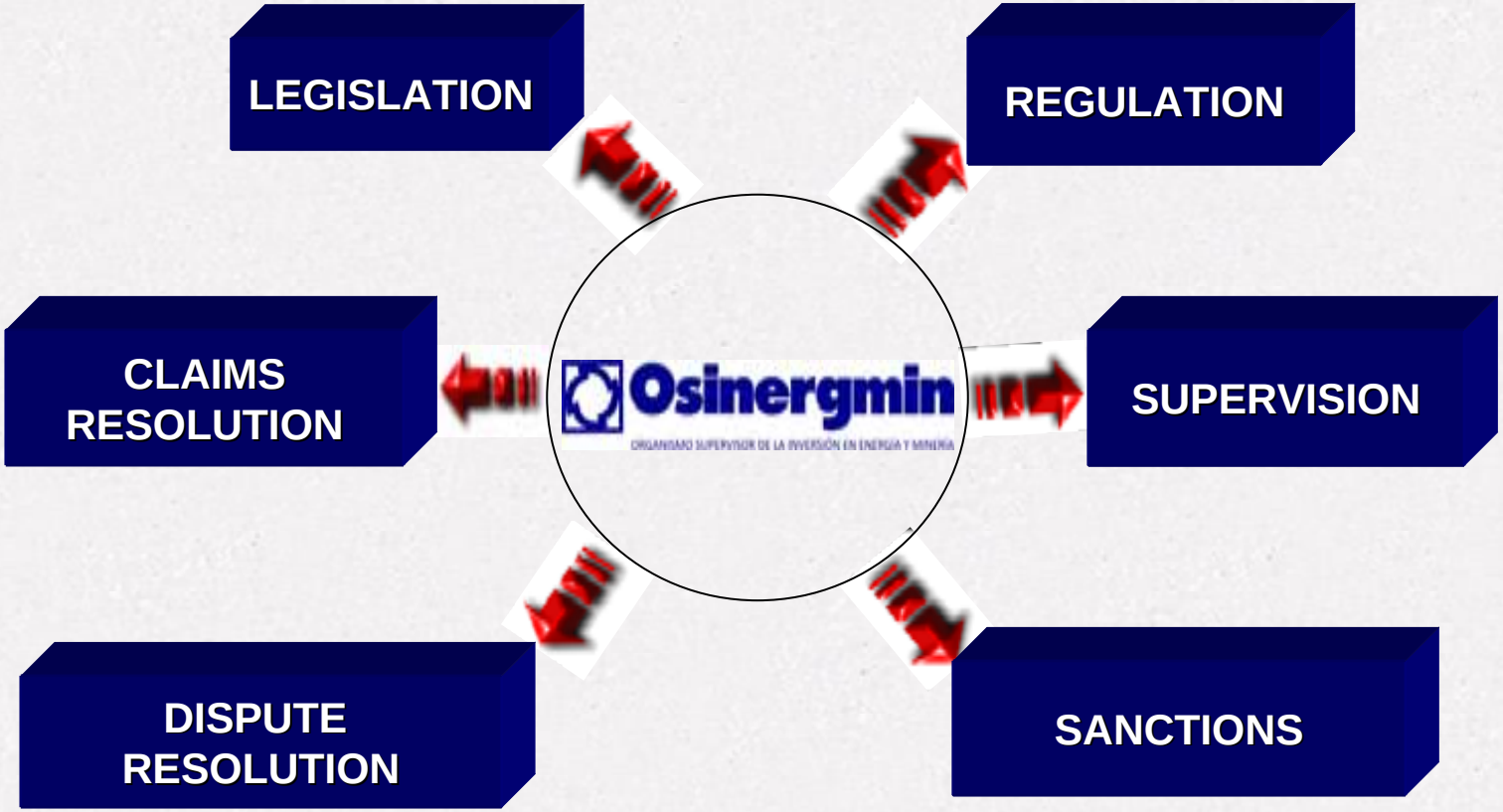


Customers

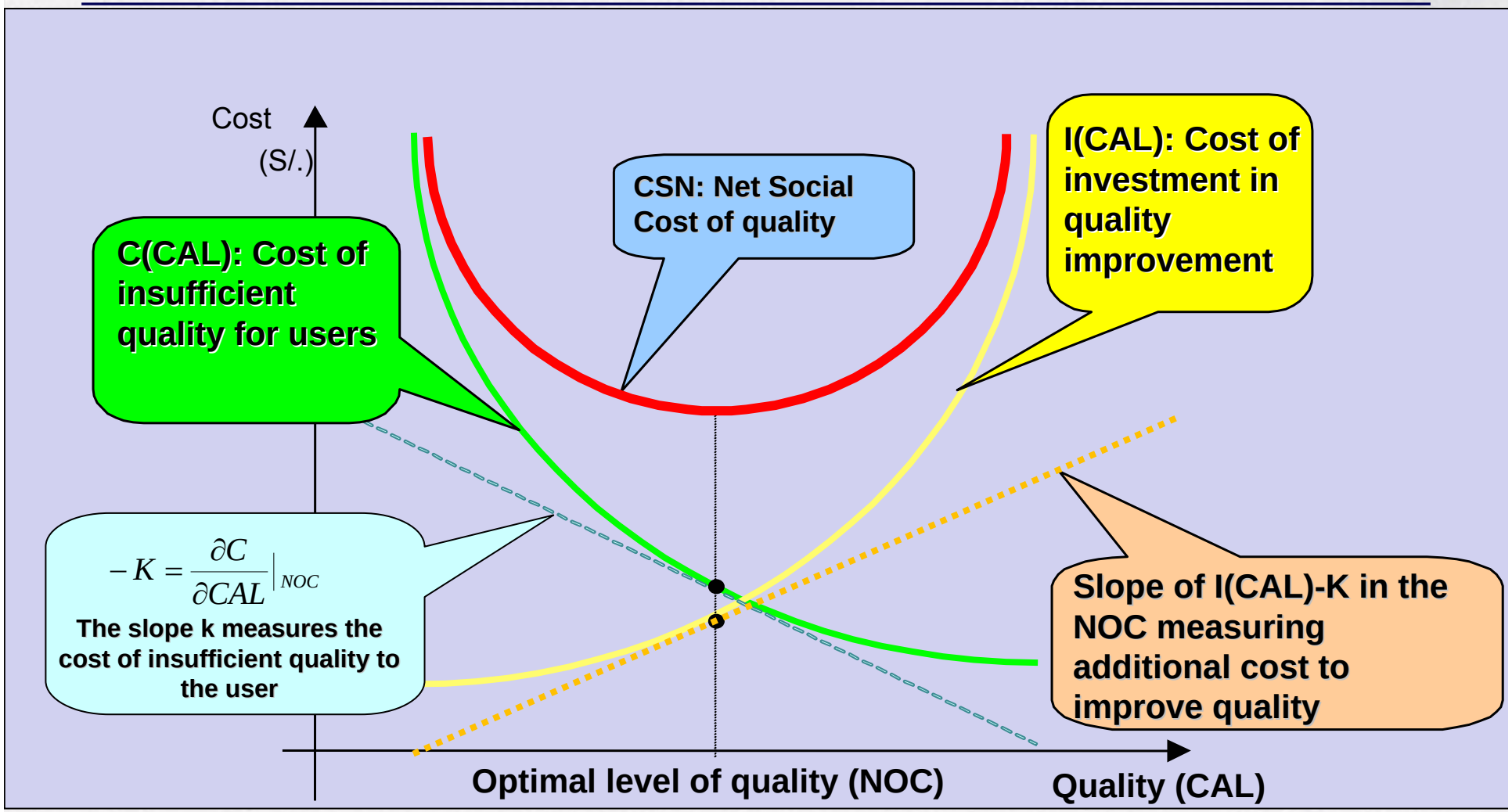
OSINERGMIN

- Regulator and supervisor of the power sector.
- Decentralized public institution, attached to the office of the prime minister.
- Directorial council comprised by 5 members: Duration: 5 years (annual renovation of 1 member).

FUNCTIONS


LEGISLATION
REGULATION
CLAIMS RESOLUTION
Osinergmin
SUPERVISION
DISPUTE RESOLUTION
SANCTIONS

QUALITY REGULATION Scheme – Avoided Cost



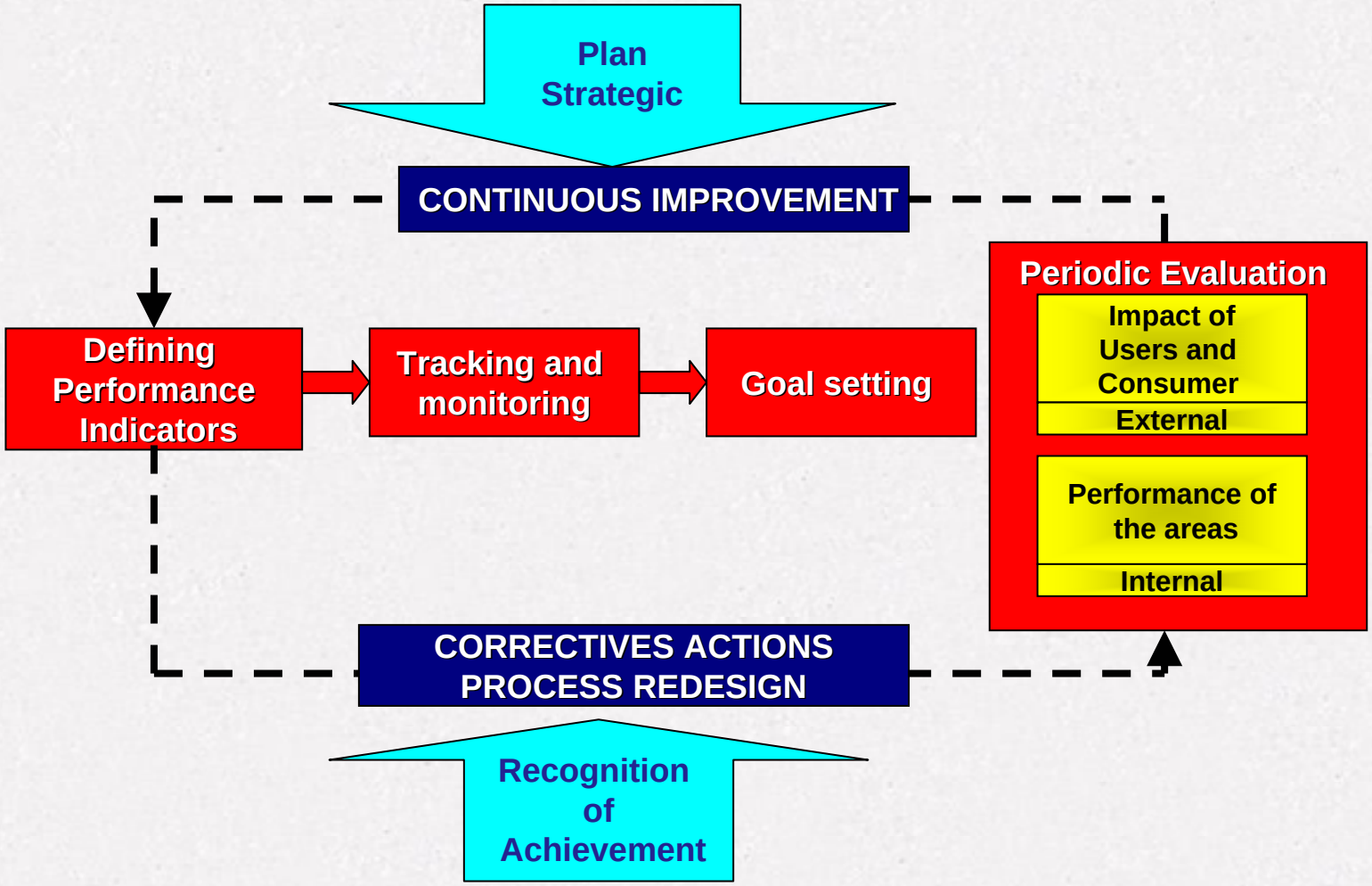
SUPERVISION OF ELECTRICITY SERVICES

Aspect	Indicator	Tolerance
Quality of product	Voltage variation	+/- 5% Vn
Quality of supply	Frequency and duration of interruptions	According to typical sector
Commercial quality	Waiting time Billing Meters verification	According to requirement
Quality of Public Lighting	Deficiencies	10% quality, 2% deficiencies
Public Safety	Transmission and distribution lines's deficiencies	According to voltage level

SUPERVISION PROCEDURES

The new supervision procesures began in 2003, these are based on statistical sampling and reports by the supervised companies with objective performance indicators.

GENERAL SCHEME OF SUPERVISION MODEL

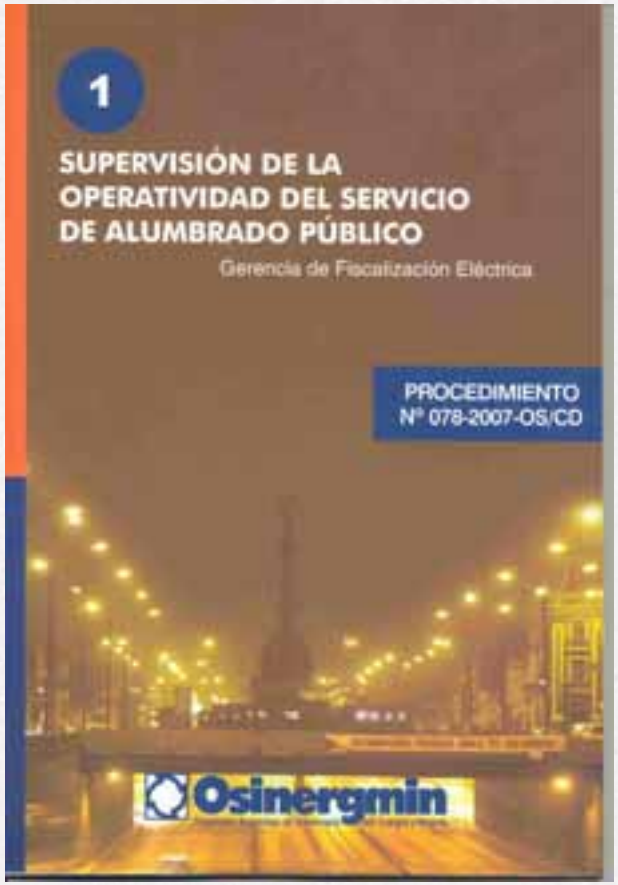


EXISTING SUPERVISION PROCEDURES BY 2009

SPECIFIC PROCEDURES	
GENERATION	
1. Availability and operating status of the units of SEIN (Peruvian Electric system)	2. Maintenance approved by the COES (system operator)
TRANSMITION	
3. Safety deficiencies in transmission lines and easements	4. Performance of transmission systems
DISTRIBUTION	
5. Operation of public Lighting services	11. Generation in isolated electrical systems
6. Contrasting and / or verification of meters	12. Disconnections and reconnection
7. Public safety in medium voltage lines	13. Safety in public establishments
8. Operation of electrical systems	14. Public safety in low voltage lines and electrical household connections
9. Billing, collection and customer service	15. Procedure for requesting stoppage of activities due to high risks
10. Supervision of reimbursements for power failures in the public electricity service	

CROSS SECTION PROCEDURES
17. Terms of use and free access to the electrical transmission and distribution services
18. Applications for qualification of force majeure for transmission and distribution facilities
19. Environmental supervision of the electricity companies

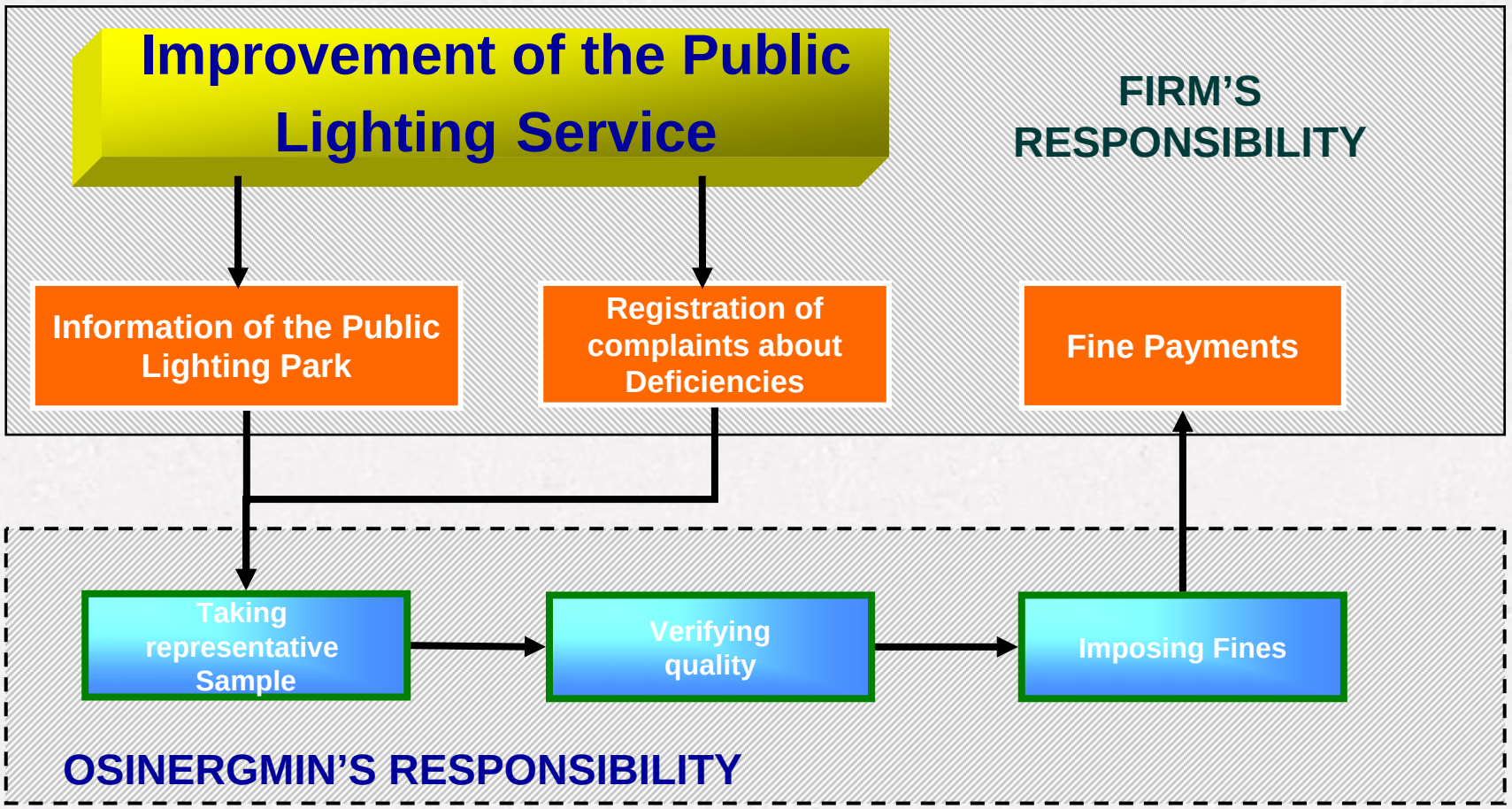
EXAMPLE : Supervision of Quality of Public Lighting



OSINERGMIN's Resolution N° 078-2007-OS/CD

This procedure establishes the maximum tolerances of defective Units of Public Lighting (**UAP** for their initials in Spanish: *Unidades de Alumbrado Público*), and the time to solve the public's complaints on deficiencies, with the objective of achieving a better and more effective control of quality of service.

SUPERVISION OF THE PUBLIC LIGHTING SERVICE



DEFICIENCIES IN THE PUBLIC ILLUMINATION

LACK OF PUBLIC LIGHTING

TREE'S INTERFERENCE

BROKEN OR NOT WELL GUIDED POST

NON OPERATIVE LAMPS

SAMPLE SIZE (1/2)

- The sample size n_0 for each company is defined as:

$$n_0 = \frac{p \times q \times Z^2}{d^2}$$

where:

- n_o : The sample size of UAP to verify.
- p, q : Portions of the universe, with and without Deficiencies.
- Z: Abscissa of the normal curve that cuts an area of α in the tail of the normal distribution.
- d: The level of precision wanted for the estimate.

SAMPLE SIZE (2/2)

- Correction for finite population :

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

- n: Constitutes the final sample size to evaluate (UAP).
- N: Population of UAP of the public illumination's park of the concessionaire that is evaluated in biannual periods.

THEORY OF SANCTIONS AND DISSUASIVE FINES (1/2)

The company evaluates its expected benefit, of not meeting the targets fixed by the regulator:

$$E(B) = p(e) \cdot (B - M) + (1 - p(e)) \cdot (B)$$

Where:

– B: avoided cost and / or illicit earnings.
– M: Amount of fine.
– E(B): Expected benefit of the company when being avoided the monetary cost or to be generated illicit earnings.
– P(e): Probability of detection of the infraction.

THEORY OF SANCTIONS AND DISSUASIVE FINES (2/2)

The dissuasive fines should be set to an amount equal or greater than the expected benefit:

$$E(B) = p(e)\cdot(B - M) + (1 - p(e))\cdot(B) = 0$$

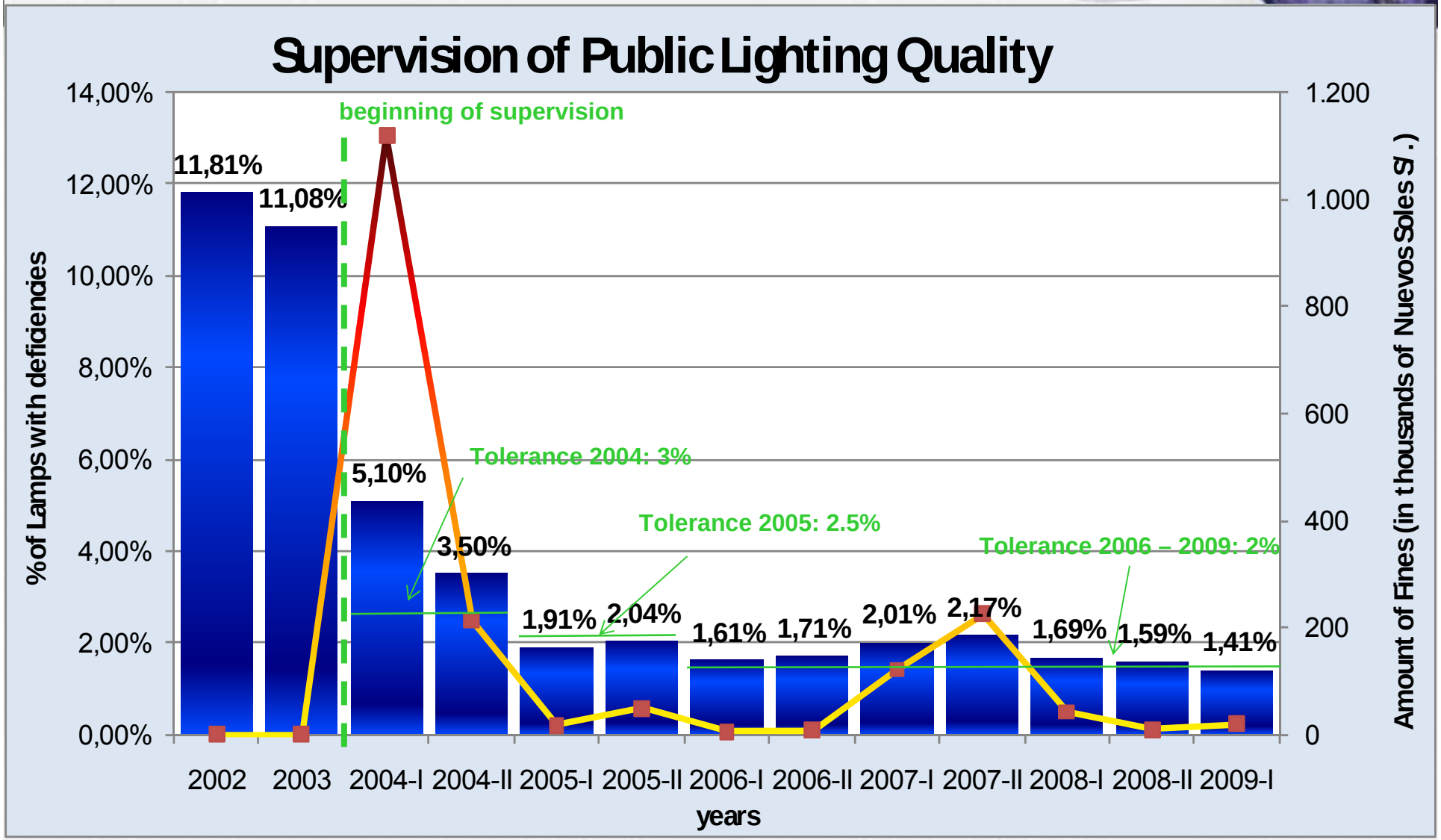
Then the dissuasive fine is:

$$M^* = \frac{B}{p(e)}$$

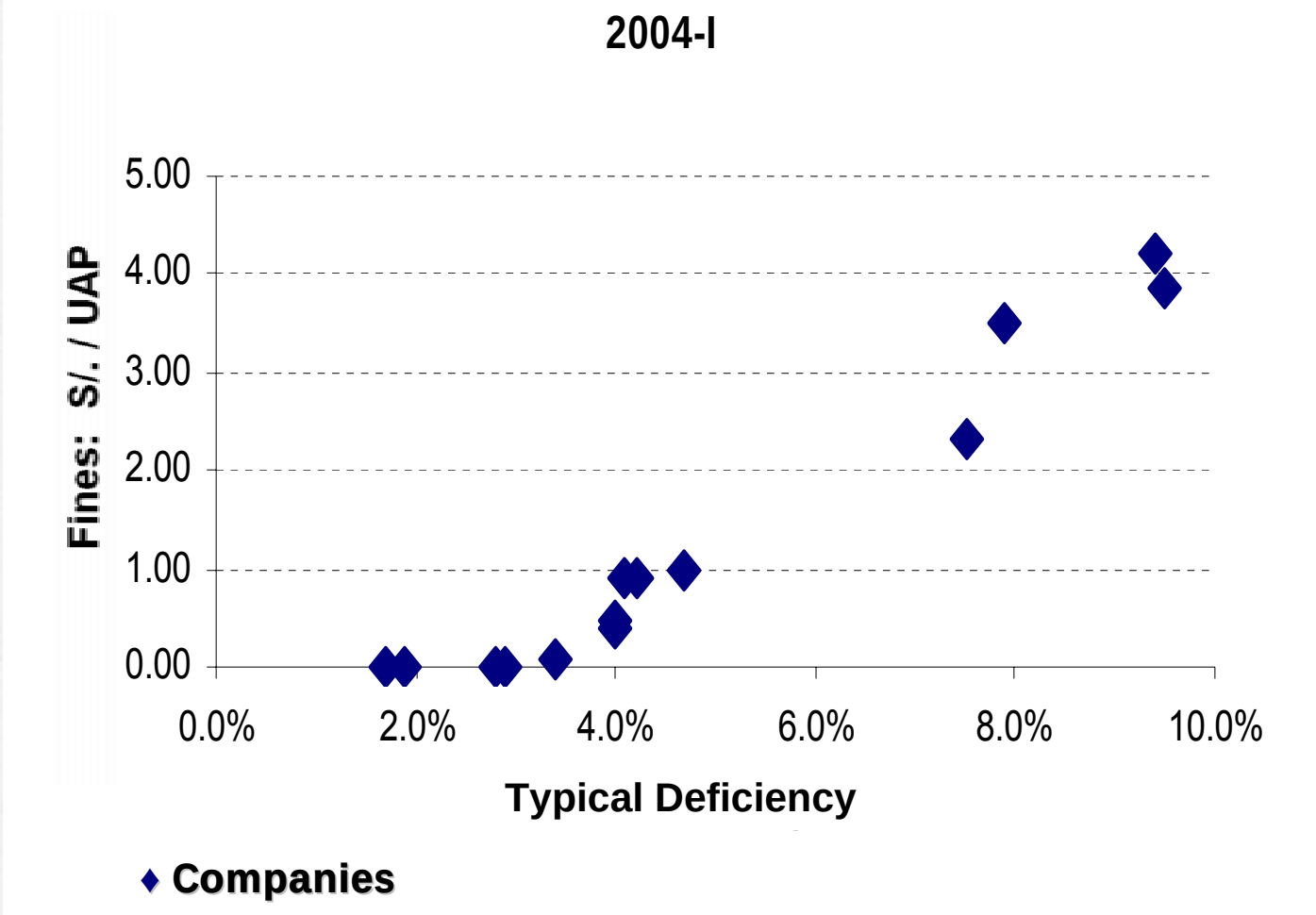
The benefit is calculated starting from the savings that the company obtains for not keeping the lights in operation at the target fixed by the regulator

Results of the Supervision of Public Lighting Quality

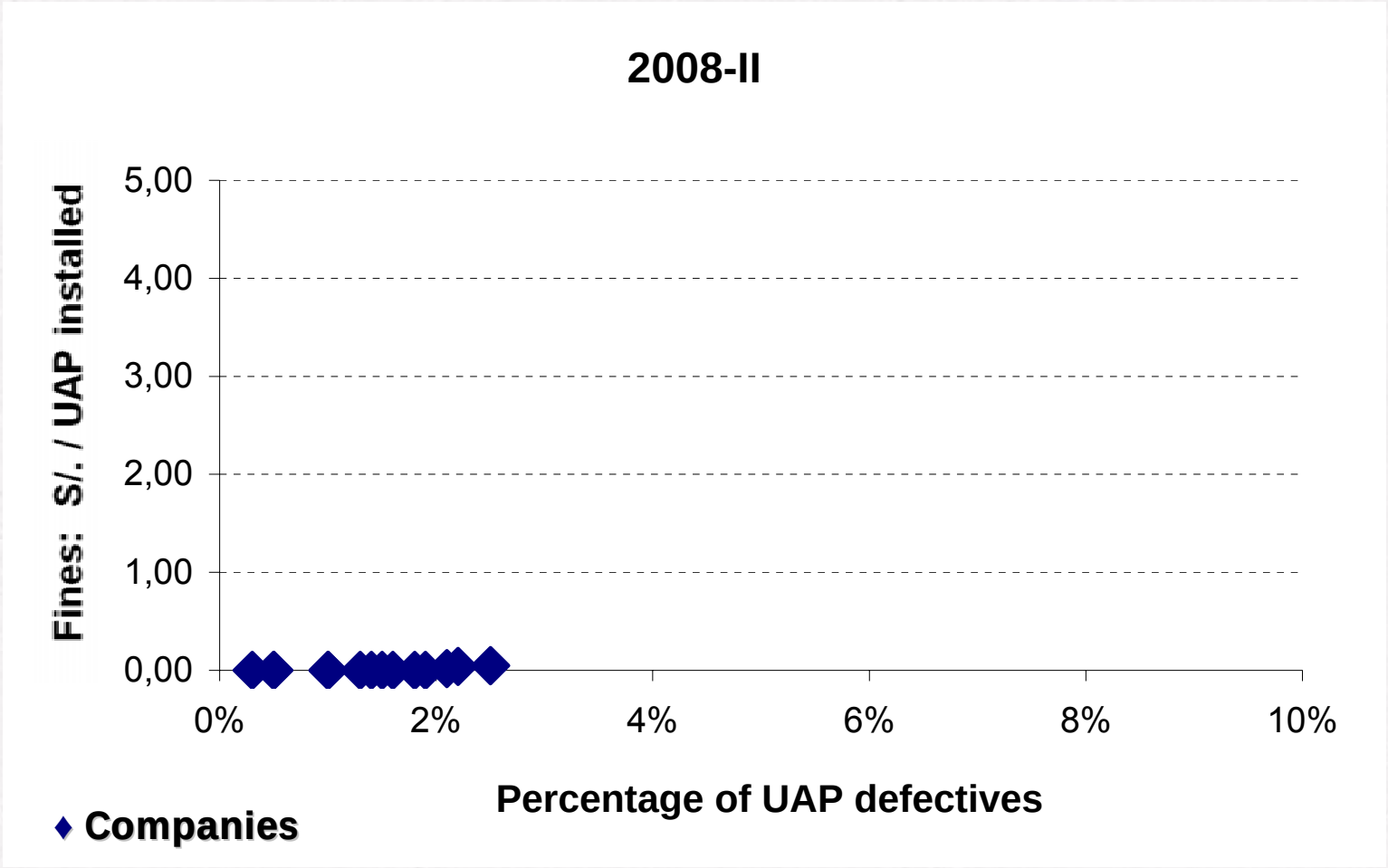
Supervision of Public Lighting Quality



DEFICIENCIES VS. FINES IN PUBLIC LIGHTING



DEFICIENCIES VS. FINES IN PUBLIC LIGHTING



SOME PERFORMANCE INDICATORS

Area	Concept	2004	2005	2006	2007	2008	2009
Public Lighting[1]	% of UAP defectives	4.30	1.98	1.66	2.09	1.64	1.41*
	Fines[2]	1 330.7	66.1	12.9.	346.1	50.8	19.5*
Meters Verification (% of total)	Number of Verifications[3]	7	18	28	40	51	56*
Quality of power supply	Hours of Interruption[4]	–	9.24	11.41	9.97	9.93	9.34
	Frecuency of Interruption[4]	–	9.23	10.72	9.87	9.55	9.24
Customer Service	Average Waitins per Customer (minutes)	_	19	18	15.5	15.31	15.56*
	Billing Errors (%)	_	0.0688	0.0520	0.0062	0.0334	0.0241*

*** First semester**
1 Averages of the biannual data
2Thousands of S/. (Nuevos Soles)
3Average anual

Thank You

www.osinerg.gob.pe