

REGULATION OF ELECTRICITY SUPPLY QUALITY: WHY AND HOW

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INTRODUCTION

- ◆ **CUSTOMER WELFARE IS AFFECTED BY BOTH PRICE AND NON-PRICE ISSUES**
- ◆ **REGULATORS ARE IN CHARGE OF INSURING THAT APPROPRIATE QUALITY IS DELIVERED TO CUSTOMERS**
- ◆ **COMPETITION DOESN'T NECESSARILY GUARANTEE ADEQUATE QUALITY TO CUSTOMERS**
 - **ESTERNALITIES**
 - **MOPOLISTIC ACTIVITIES**
 - **TRANSACTION COSTS**
 - **LONG-TERM EFFECTS**



CEER WORKING GROUP ON QUALITY OF SUPPLY: OBJECTIVES

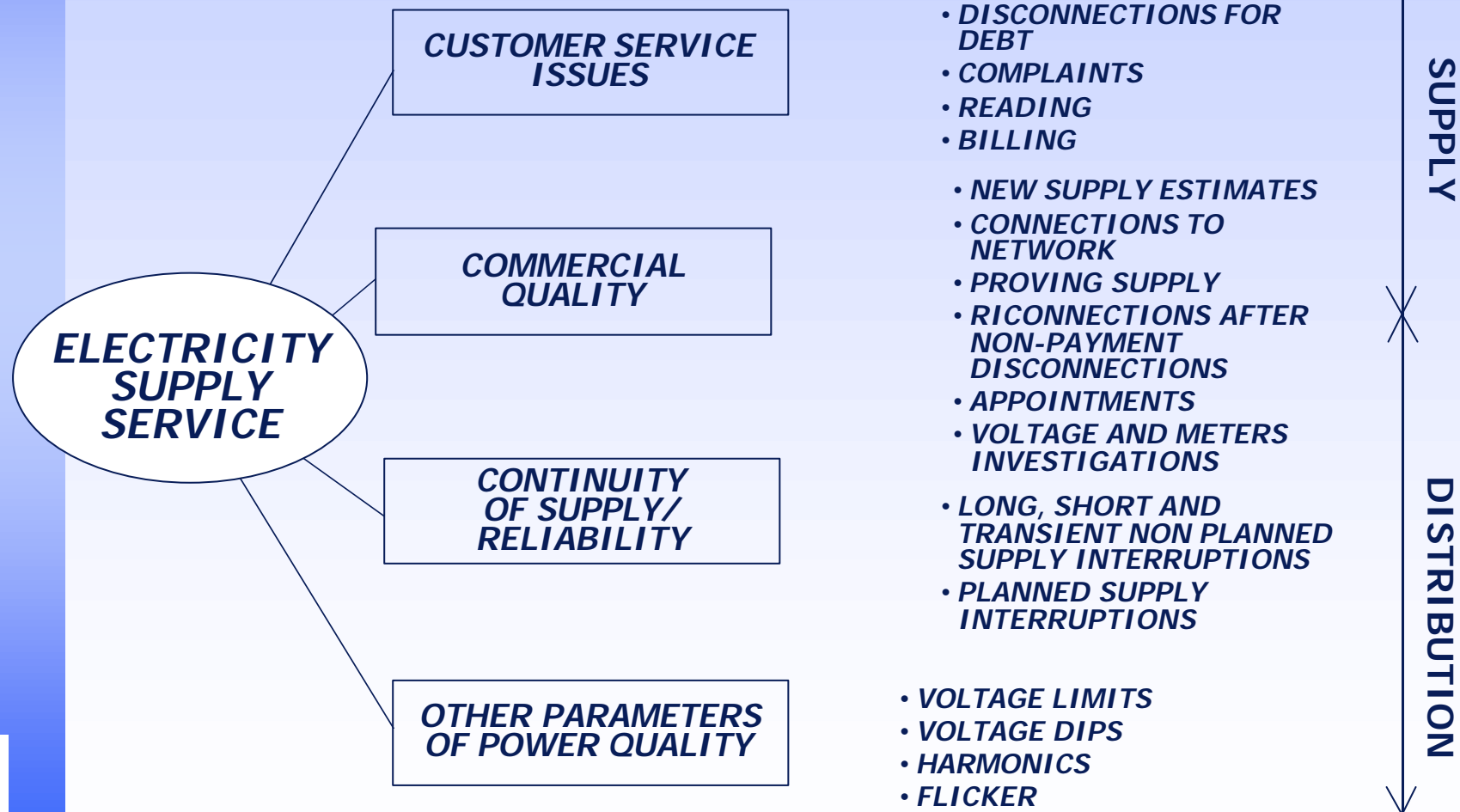
- ◆ **COMPARE STRATEGIES FOR DESIGNING AND IMPLEMENTING QUALITY OF SUPPLY REGULATION**
- ◆ **IDENTIFICATION AND SELECTION OF COMPARABLE INDICATORS/STANDARDS**
- ◆ **BENCHMARKING STUDY ON QUALITY OF SUPPLY**
- ◆ **POSSIBLE RECOMMENDATIONS FOR QUALITY OF SERVICE BENCHMARKING**

**PARTICIPANTS: ITALY, PORTUGAL, NETHERLANDS,
NORWAY, SPAIN, UNITED KINGDOM**



MAIN QUALITY FACTORS

Electricity Supply



BENCHMARKING OF ACTUAL LEVELS: COMMERCIAL QUALITY

- ◆ **COMMERCIAL QUALITY IS ASSOCIATED TO TRANSACTIONS BETWEEN COMPANIES AND THEIR NEW OR EXISTING CUSTOMERS**
- ◆ **TRANSACTIONS ARE IMPLICITLY PURCHASED WITH THE PRODUCT ITSELF**
- ◆ **THERE ARE BOTH REGULAR AND OCCASIONAL TRANSACTIONS**
- ◆ **SOME QUALITY FACTORS RELATED TO TRANSACTIONS CAN BE MEASURED, OTHERS CAN'T (FOR INSTANCE PERSONNEL BEHAVIOUR)**
- ◆ **THERE IS A BROADLY SIMILAR APPROACH TO THE TYPES OF INDICATORS USED TO DEFINE COMMERCIAL QUALITY**



COMMERCIAL QUALITY: MAIN TRANSACTIONS BETWEEN COMPANIES AND USERS

Transactions before supply	Transactions during contract validity	
	Regular transactions	Occasional transactions
<ul style="list-style-type: none"> • Connection (supply and meter) • Estimating charges* • Execution of works* 	<ul style="list-style-type: none"> • Accuracy of estimated bills • Actual meter readings • Service at customer centres • Telephone service 	<ul style="list-style-type: none"> • Responding to failure of supplier's fuse • Voltage complaints • Meter problems • Queries on charges and payments • Appointment scheduling • Responding to customer's letters (information requests) • Responding to customer's claims • Reconnection following lack of payment • Estimating charges* • Execution of works*

*Applicable to both types of transactions



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BENCHMARKING OF ACTUAL LEVELS: CONTINUITY OF SUPPLY

◆ WIDE VARIABILITY OF DEFINITIONS AND REPORTING PRACTICES

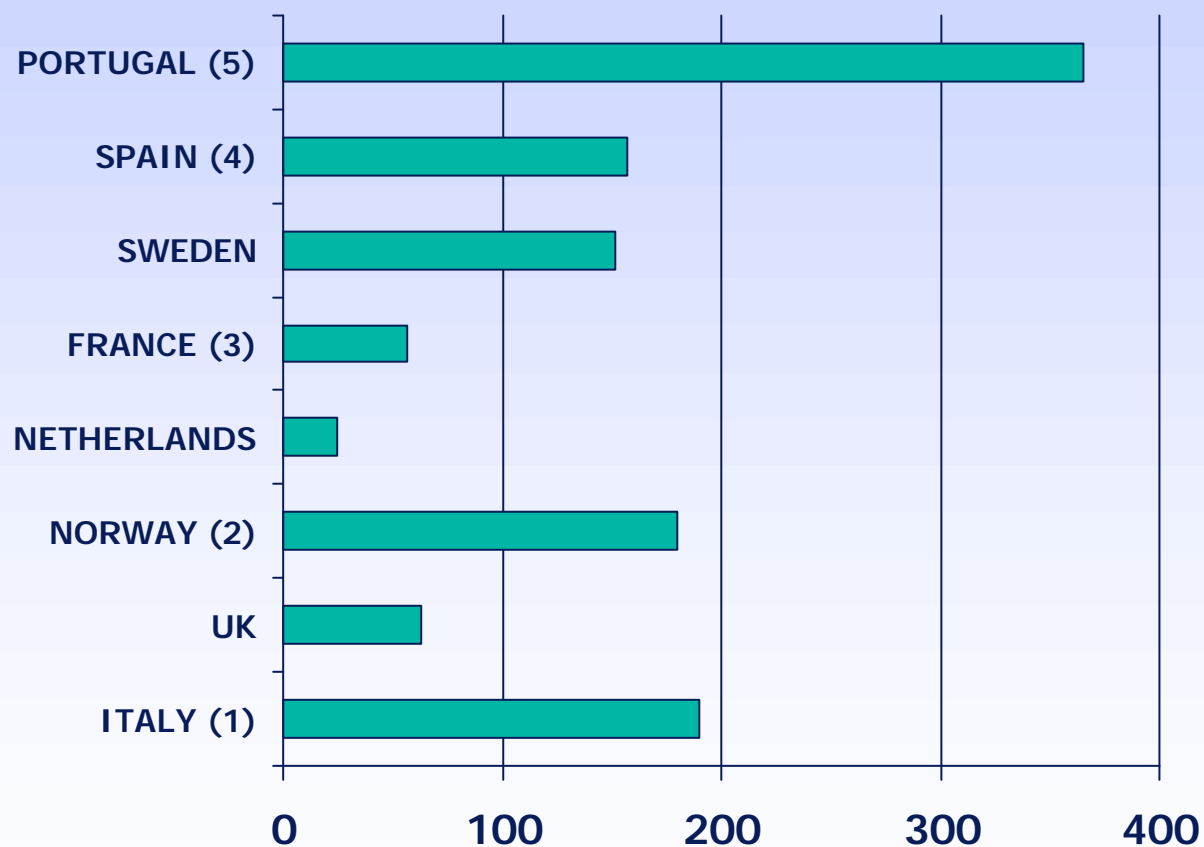
◆ CRITICAL ISSUES FOR COMPARISON

- ONLY UNPLANNED VS PLANNED+UNPLANNED INTERRUPTIONS
- INDICATORS WEIGHTED ON AFFECTED CUSTOMERS VS INDICATORS WEIGHTED ON AFFECTED POWER
- DEFINITIONS OF ACTS OF GOD (FORCE MAJEURE)
- DEFINITION OF "LONG INTERRUPTION": 3 MINUTES VS 1 MINUTE
- VOLTAGE LEVELS (ALL INTERRUPTIONS VS ONLY ABOVE 1kV)
- GEOGRAPHICAL CLASSIFICATION
- RECORDING PRACTICES

◆ AN INITIAL CRUDE COMPARISON HAS BEEN ATTEMPTED



BENCHMARKING OF ACTUAL LEVELS: CONTINUITY OF SUPPLY



**CUSTOMER MINUTES
LOST, 1999 (Unplanned
Long interruptions)**

*NOTES (for detail of comparison
see full report)*

(1) Only Enel (93% of Italy)

(2) Only interruptions above 1 kV

*(3) Excluded exceptional storms
(455 min. lost storms included)*

*(4) Only interruptions above 1 kV;
TIEPI (hours lost; indicator
weighted on affected power)*

*(5) Only interruptions above 1 kV,
planned and unplanned; TIEPI (see
above)*



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PRICE REGULATION AND QUALITY REGULATION

- ◆ **UTILITY REGULATION METHODS ARE MAINLY FOCUSED ON ECONOMIC REGULATION, BUT**
- ◆ **PRICE REGULATION INVOLVES INCENTIVES FOR QUALITY OF SUPPLY**
- ◆ **RATE OF RETURN REGULATION**
 - ➔ **INCENTIVE TO OVER-INVESTMENT**
(AVERCH-JOHNSON OVER-CAPITALISATION EFFECT, OR INCENTIVE TO “GOLD-PLATED” SERVICES)
- ◆ **PRICE CAP REGULATION**
 - ➔ **QUALITY EXPENDITURE REDUCTION CAN BE USED TO CUT COSTS AND INCREASE PROFITS**



IMPORTANCE OF QUALITY REGULATION

- ◆ **PRICE REGULATION WITHOUT QUALITY REGULATION MAY GIVE UNINTENDED AND MISLEADING INCENTIVES TO QUALITY LEVELS**
- ◆ **THE REGULATORY REGIME ABLE TO GIVE PERFECT INCENTIVES FOR QUALITY WOULD BE ONE WHERE PRICES CAN BE CONTINUOUSLY ADJUSTED TO QUALITY LEVELS**
- ◆ **IN THE REALITY SUCH A REGULATORY SCHEME CANNOT BE IMPLEMENTED**
- ◆ **UTILITY REGULATION SHOULD INCLUDE A CLEAR DEFINITION OF THE PRODUCT (QUALITY)**
- ◆ **PERFORMANCE-BASED REGULATION IS FREQUENTLY INCLUDING QUALITY INCENTIVES**



PRINCIPLES FOR QUALITY REGULATION/1

- ◆ **QUALITY IS MULTIDIMENSIONAL**
- ◆ **QUALITY MONITORING AND REGULATION SHOULD FOCUS ON THOSE DIMENSIONS OF SERVICE WHICH ARE**
 - **IMPORTANT TO CONSUMERS (SURVEYS)**
 - **CONTROLLABLE BY FIRMS (RESPONSIBILITY)**
 - **MEASURABLE BY REGULATORS (RULES)**
- ◆ **QUALITY REGULATION CAN BE FOCUSED ON**
 - **INPUTS (ENGINEERING SOLUTIONS)**
 - **EXPENDITURE (INVESTMENT AND OTHER COSTS)**
 - **OUTPUTS (CONSEQUENCE ON CUSTOMERS)**
- ◆ **REGULATION FOCUS IS SHIFTING TOWARD OUTPUTS**

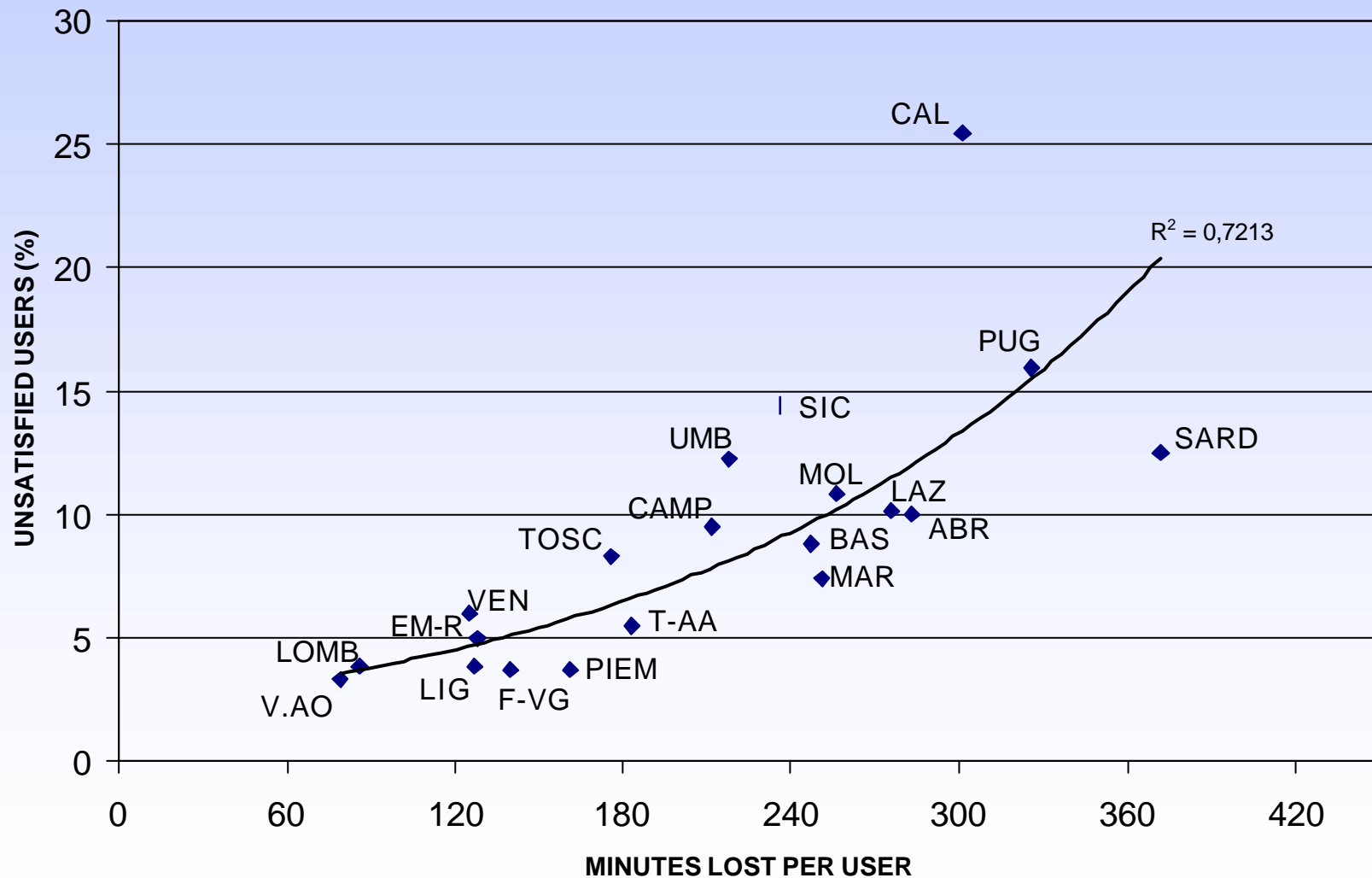


PRINCIPLES FOR QUALITY REGULATION/2

- ◆ **REGULATORS SHOULD AVOID TO FORCE TECHNICAL SOLUTIONS OR DECIDE INVESTMENT PLANS**
- ◆ **FOCUS ON INPUTS IS WELCOME IF OUTPUTS ARE NOT EASILY MEASURABLE**
- ◆ **QUALITY STANDARDS SHOULD REFLECT**
 - **USERS' PREFERENCES AND EXPECTATIONS (QUALITY FACTORS RANKING)**
 - **USERS' REQUIREMENTS (WILLINGNESS TO PAY FOR QUALITY)**
- ◆ **REGULATORS SHOULD ADDRESS THE REGULATED SYSTEM TOWARD AN OPTIMAL LEVEL OF QUALITY, WHICH IS BASED ON BALANCING MARGINAL COSTS AND MARGINAL BENEFITS**
- ◆ **STANDARDS SHOULD EMBODY SOME DEGREE OF REALISM**



Customer satisfaction is strongly affected by quality levels (Italian regional figures)



PRINCIPLES FOR QUALITY REGULATION/3

- ◆ **QUALITY STANDARDS ARE USUALLY PERIODICALLY MODIFIED**
- ◆ **PRICE REVISIONS AND QUALITY STANDARDS ENHANCEMENT ARE USUALLY SIMULTANEOUS**
- ◆ **STANDARDS REVISIONS TAKE INTO ACCOUNT SHIFTS IN MARGINAL COSTS (TECHNOLOGICAL CHANGE) AND IN MARGINAL BENEFITS (CONSUMERS PREFERENCES)**
- ◆ **CONSUMER GROUPS HAVE DIFFERENT PREFERENCES AND MARGINAL BENEFITS**
- ◆ **IF QUALITY OF SERVICE IS LOW, POSITIVE INCENTIVES SHOULD BE INTRODUCED**



INSTRUMENTS FOR QUALITY REGULATION

- ◆ **GUARANTEED STANDARDS (TO GUARANTEE A MINIMUM QUALITY THRESHOLD TO EACH SINGLE CUSTOMER)**
- ◆ **COMPENSATION PAYMENTS (IF GUARANTEED STANDARDS ARE NOT MEET)**
- ◆ **OVERALL STANDARDS (TO GUARANTEE A MINIMUM QUALITY THRESHOLD TO THE AVERAGE OF CUSTOMERS)**
- ◆ **LEAGUE TABLES (BENCHMARKS) PUBLICATION OF QUALITY PERFORMANCE (ACTUAL LEVELS) OR YARDSTICK COMPETITION**
- ◆ **INCENTIVE/PENALTIES MECHANISMS**



SANCTIONS

- ◆ **SANCTIONS CAN BE APPLIED FOR NON-RESPECT OF QUALITY STANDARDS**
- ◆ **HIERARCHY OF SANCTIONS**
 - WARNINGS
 - MONETARY FINES/PENALTIES
 - CONCESSION WITHDRAWAL/MODIFICATION
- ◆ **MONETARY FINES CAN BE PAYED**
 - TO CUSTOMERS
 - INTO A SPECIAL FUND AIMED AT PROMOTING QUALITY ENHANCEMENT
- ◆ **MONETARY FINES SHOULD BENEFIT THE AFFECTED CUSTOMERS VIA COMPENSATION OR TARIFF REDUCTION**



THE LINK BETWEEN QUALITY AND TARIFF /REVENUES

**PARAMETERS TO CALCULATE TARIFFS OR ALLOW
COMPANY REVENUES CAN ALSO INCLUDE**

- ◆ CONTINUITY OF SUPPLY**
- ◆ CUSTOMERS' COMPLAINTS**
- ◆ CUSTOMERS' OR EMPLOYEES' SAFETY**
- ◆ OTHER PERFORMANCE INDICATORS LIKE
TELEPHONE SERVICES INDICATORS**
- ◆ CUSTOMER SATISFACTION INDEX VARIATION**
- ◆ OTHERS**

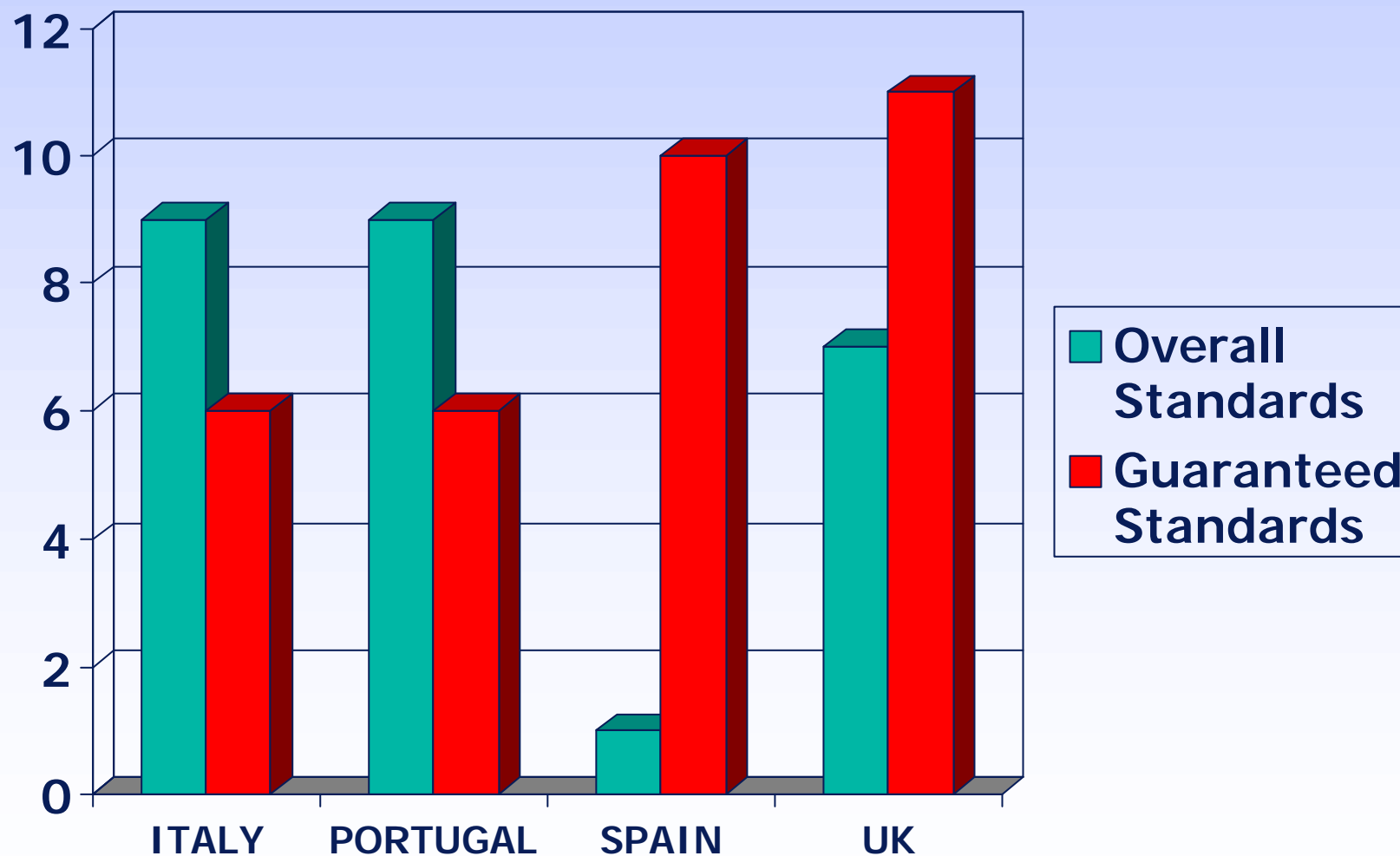


COMMERCIAL QUALITY REGULATION INSTRUMENTS

- ◆ **CODES/CONTRACTUAL CONDITIONS**
- ◆ **GUARANTEED STANDARDS**
- ◆ **PENALTY PAYMENTS**
- ◆ **OVERALL STANDARDS**
- ◆ **COMPARATIVE PUBLISHING**
- ◆ **INFORMATION**
- ◆ **CUSTOMER PARTICIPATION**
- ◆ **ACCESS TO JUSTICE/CONFLICTS RESOLUTION**



COMMERCIAL QUALITY: NUMBER OF OVERALL AND GUARANTEED STANDARDS



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CONTINUITY OF SUPPLY REGULATION

◆ AIMS

- GUARANTEE RELIABILITY
- ENHANCE SYSTEM QUALITY
- PROMOTE ADEQUATE INVESTMENT AND MAINTENANCE

◆ INSTRUMENTS

- SYSTEM RULES/RESPONSIBILITIES
- INDIVIDUAL STANDARDS (GUARANTEE)
- OVERALL STANDARDS (GUARANTEE OR ENHANCEMENT)

◆ PERSPECTIVES

- QUALITY DEPENDENT PRICE CAP OR REVENUE CAP SYSTEMS



VOLTAGE QUALITY REGULATION: STATE OF THE ART

- ◆ **VOLTAGE QUALITY INCLUDES DIFFERENT PHENOMENA (DISTURBANCES)**
 - FLUCTUATIONS OF VOLTAGE LEVELS
 - VOLTAGE DIPS/SWELLS AND SHORT INTERRUPTIONS
 - HARMONICS AND OTHER WAVEFORM DISTORTIONS
 - FLICKER, ETC.
- ◆ **THE EUROPEAN TECHNICAL STANDARD EN 50160:**
 - DEFINES VOLTAGE FLUCTUATIONS, FLICKER AND HARMONICS LIMITS
 - INTRODUCE ONLY INDICATIVE VALUES FOR RANDOM DISTURBANCES (LIKE VOLTAGE DIPS AND SHORT INTERRUPTIONS)
- ◆ **IN SOME COUNTRIES REGULATORS ENFORCE TECHNICAL STANDARD WITH ADDITIONAL RULES**



VOLTAGE QUALITY REGULATION: PERSPECTIVES

- ◆ **VOLTAGE QUALITY IMPORTANCE IS GROWING**
 - INDUSTRIAL USERS ARE VERY SENSIBLE TO RANDOM DISTURBANCES (ESPECIALLY VOLTAGE DIPS)
 - LACK OF QUALITY MAY GENERATE HIGH COSTS TO USERS
- ◆ **VOLTAGE QUALITY CAN BE MEASURED ONLY AT THE CONNECTION POINT**
 - MORE MEASURING EQUIPMENTS WILL BE NEEDED IN THE FUTURE
- ◆ **ECONOMIC EFFECTS OF VOLTAGE QUALITY CAN BE AN ISSUE FOR REGULATORS**
- ◆ **RULES ARE NEEDED TO INHIBIT USERS FROM “POLLUTING” THE NETWORK**



COMPETITION AND QUALITY REGULATION/1

- ◆ WHERE MARKET COMPETITION REPLACES MONOPOLY, QUALITY COMPETITION SHOULD REPLACE REGULATION
- ◆ SOME QUALITY FACTORS CANNOT BE INDIVIDUALLY NEGOTIATED
- ◆ OTHER QUALITY FACTORS ARE LINKED TO SAFETY OR EXTERNALITIES
- ◆ QUALITY COMPETITION REQUIRES TRANSPARENCY AND COMPARABILITY
- ◆ GUIDING PRINCIPLE UNDER LIBERALIZATION/PRIVATIZATION: NO CLASS OF CUSTOMERS SHOULD BE MADE WORSE-OFF BY RETAIL COMPETITION THAN THEY WERE UNDER A REGULATED MONOPOLY SYSTEM (or “FIRST: DO NOT HARM”)



COMPETITION AND QUALITY REGULATION/2

- ◆ **COMMERCIAL QUALITY: MARKET PARTIALLY
SUBSTITUTES REGULATION**
- ◆ **CONTINUITY OF SUPPLY: SOME MARKET
MECHANISMS CAN BE DEVELOPED IN ADDITION TO
MONOPOLY REGULATION**
 - **SPECIALLY TAYLORED SERVICES FOR ELIGIBLE
CUSTOMERS**
 - **SUPPLIERS CAN CONTRACT WITH DISTRIBUTION
COMPANIES SPECIAL CONTINUITY STANDARDS (EXTRA-
COSTS ARE ADDED TO THE WHEELING TARIFF)**
 - **SPECIAL HIGH-QUALITY TARIFFS FOR NON-ELIGIBLE
CUSTOMERS**

PROBLEM: CONTINUITY INDIVISIBILITY



CONCLUSIONS/1 RECOMMENDATIONS FOR FUTURE BENCHMARKING

- ◆ **INCREASED EXCHANGE OF INFORMATION BETWEEN REGULATORS**
- ◆ **INCREASED TRANSPARENCY OF REPORTING BOTH FOR COMPANIES AND REGULATORS**
- ◆ **ADOPTION OF AT LEAST ONE COMMON INDICATOR FOR CONTINUITY OF SUPPLY**
- ◆ **BETTER CO-ORDINATION BETWEEN NATIONAL REGULATORY BODIES AND INTERNATIONAL STANDARDISATION BODIES ON VOLTAGE QUALITY**
- ◆ **FURTHER WORK TO EVALUATE AND COMPARE FACTORS THAT AFFECT BENCHMARKING (RESPONSIBILITY, WEATHER EFFECTS, GEOGRAPHICAL DEFINITIONS, ETC.)**



CONCLUSIONS/2 COMPARING STRATEGIES AND EXPERIENCES

- ◆ QUALITY REGULATION HAS THE SAME MAIN OBJECTIVES; STRATEGIES CAN BE DIFFERENT
- ◆ COMPARATIVE PUBLISHING CAN BE VERY EFFECTIVE (FOCUS ON DEFINITIONS AND AUDITS)
- ◆ IN MOST COUNTRIES BOTH GUARANTEED STANDARDS WITH PENALTIES AND OVERALL STANDARDS ARE USED
- ◆ OVERALL STANDARDS ARE GENERALLY USED TO PROMOTE OVERALL QUALITY IMPROVEMENT; THEY CAN BE LINKED TO ECONOMIC EFFECTS
- ◆ A SHARE OF COMPANIES' REVENUE MAY BE AT RISK DEPENDING ON QUALITY PERFORMANCE (ITALY-2000, NORWAY -2001, UK-2002)



NEXT STEPS

- ◆ **ENLARGEMENT OF THE WG MEMBERSHIP TO INCLUDE MEMBERS FROM OTHER COUNTRIES**
- ◆ **BENCHMARKING OF BOTH QUALITY LEVELS AND REGULATION STRATEGIES IS USEFUL TO REGULATORS AND SHOULD GO ON**
- ◆ **MORE EVIDENCE ABOUT THE VALUE WHICH CUSTOMERS PLACE ON QUALITY OF SERVICE (PARTICULARLY CONTINUITY)**
- ◆ **ANALYSIS OF LIBERALISATION EFFECTS ON COMMERCIAL QUALITY REGULATION**

