THE ITALIAN ASSOCIATION AND THE "RECOMMENDATION FOR THE PURCHASE OF BUSES"

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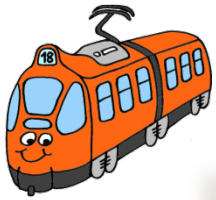
WHO WE ARE

ASSTRA represents a network of more than 150 companies running urban, suburban and extra urban public transport services on:



- buses,
- tramway,
- trolleybuses,
- metropolitan railway,
- light rail (Except those operated by Trenitalia S.p.A.),
- waterborne transport,
- tourist and school services,
- parking areas,
- towing away of vehicles.

WHAT IT DOES

Acts to create awareness of policy-makers and public opinion on the social, economical and environmental role of local public transport according to the principles of sustainable development.

Offers its members a wide spectrum of services such as legal, economic-financial and tax advice along with counselling in matters relating to trade unions, insurance, railways and technological progress.

Represents the interest of its members in front of governmental authorities, policy-makers, Trade Unions, economical, political and social organizations, both national, European and international.

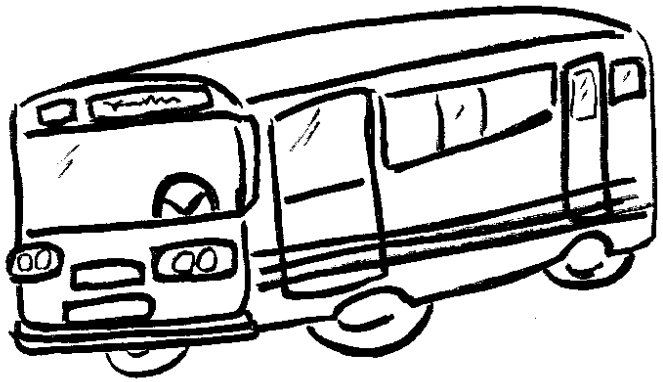
THE PRINCIPAL ASSTRA DATA

THE PRINCIPAL ASSTRA DATA	
Associate members	153
Quotes of market urban transport	95%
Quotes of market extra-urban transport	75%
Public Transport Fleet	40.000
Regional Common	830 trains
Net extent	210.000 km
Kilometers	1,65 billion
Employees	100.000
Served municipalities	5.000
Passengers per year	5 billion
Turnover	9 billion €

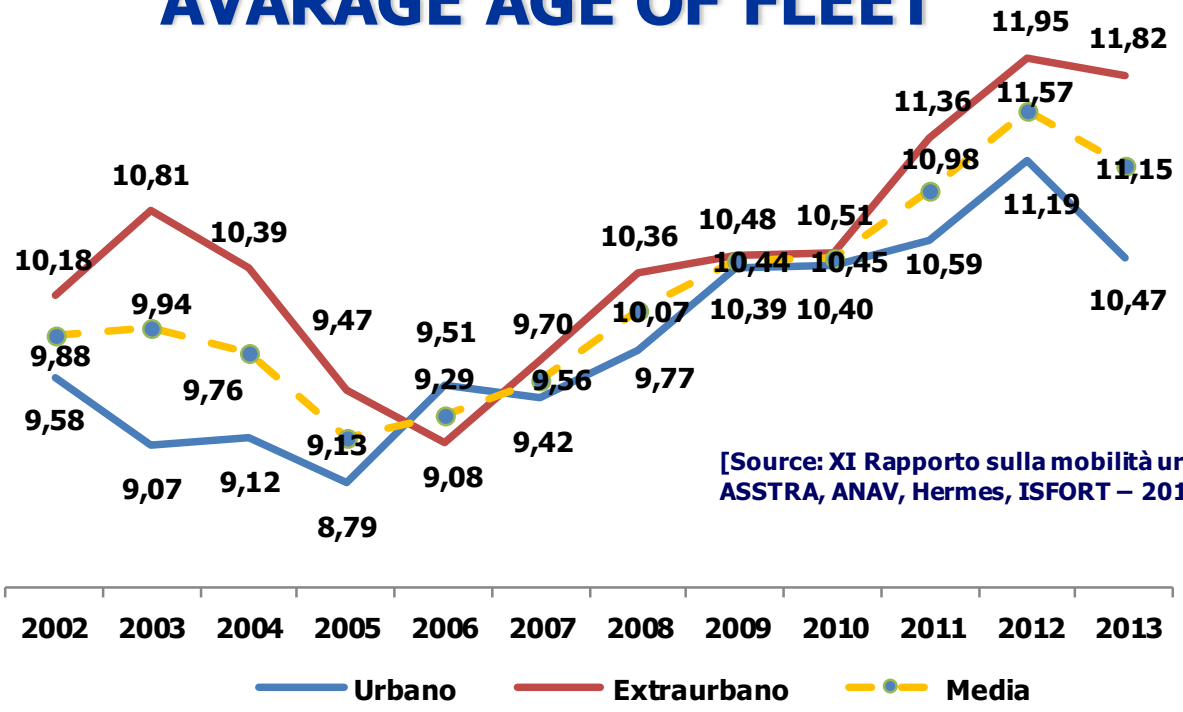
[Source: ASSTRA, Financial data-Business Year 2015]

THE OFFER OF VEHICLES OF PUBLIC LOCAL TRANSPORT

TYPE PARK	N. CARRIAGES	SOURCE
Bus	36.000	ASSTRA
Trolleybus	437	ASSTRA
Tram	1.102	ASSTRA
Underground	1.174	ASSTRA
TOTAL	38.700	



AVARAGE AGE OF FLEET

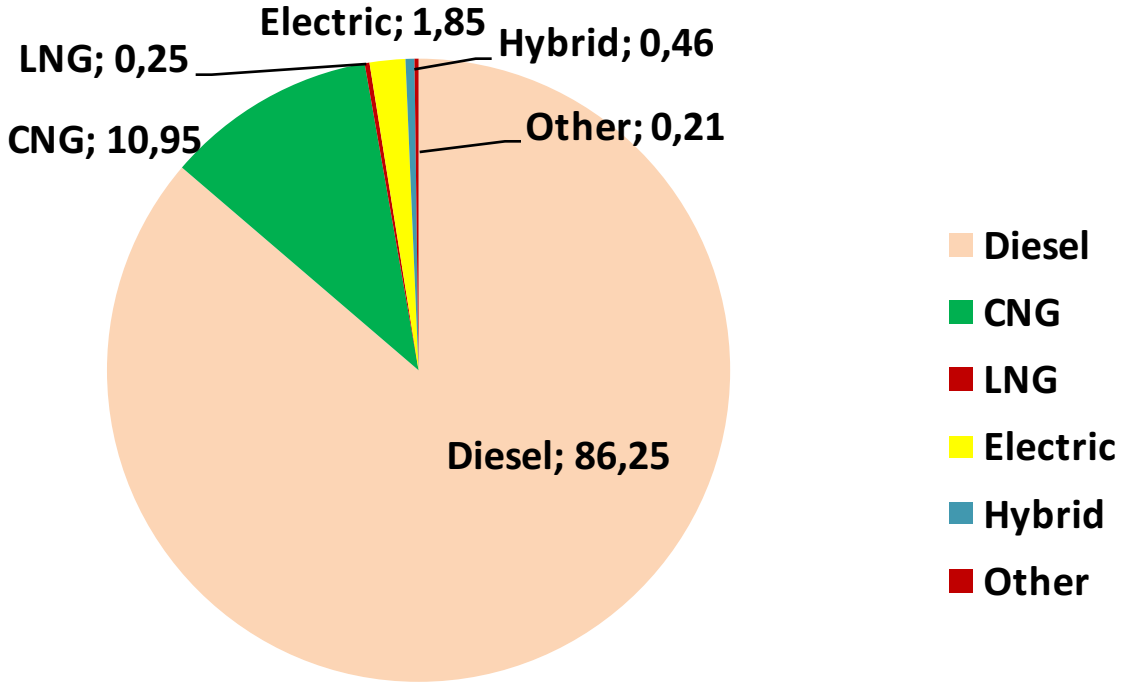


[Source: XI Rapporto sulla mobilità urbana in Italia – ASSTRA, ANAV, Hermes, ISFORT – 2014]

In 2013 there was, for the first year after seven years of growth, **a slight decrease in the average age of the fleet**, both in vehicles used on urban routes (10.47 years with a decrease of -6%), both in those for extraurban transport (11.82 years with a decrease of about 1%).

This performance stems **from investments made on the fleet** by some companies that have proceeded in 2013 to its coverage mainly **with own resources generated by operations or resorting to credit institutions**.

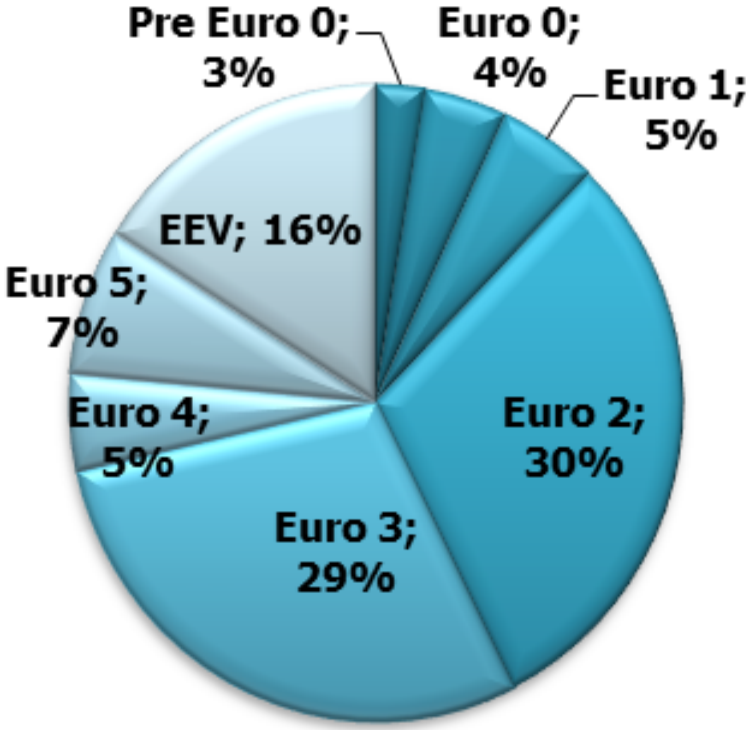
THE SOURCE FOR ENERGY (Urban, %)



The number of CNG buses has increased to 10,95%. Electric buses, hybrid and LPG are almost the 3% of the total. Any way the main source of energy is confirmed as diesel: 86% for Class I and 99% for Class II.

[Source: XI Rapporto sulla mobilità urbana in Italia – ASSTRA, ANAV, Hermes, ISFORT – 2014]

LEVEL OF EMISSIONS (Urban, %)



In the 2013 there is still **a low percentage of vehicles with low environmental impact** and conversely a high bus portion of Pre-Euro 0, € 0, Euro 1 (≈12%); most of the fleet is concentrated, again, in the Euro 2 and Euro 3.

[Source: XI Rapporto sulla mobilità urbana in Italia – ASSTRA, ANAV, Hermes, ISFORT – 2014]

SOURCE OF TRACTION: CNG

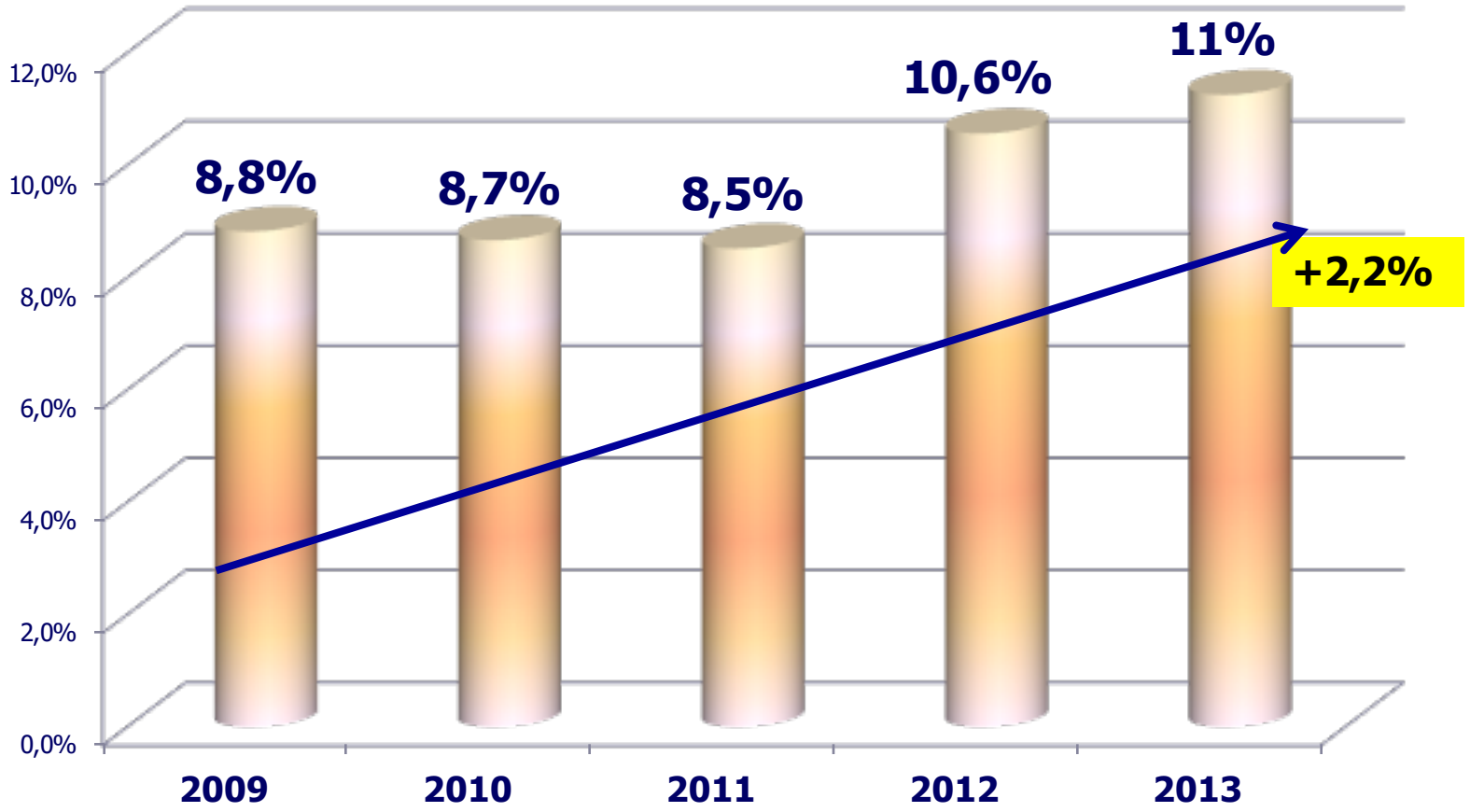
COMPANIES WITH CNG BUSES

[Source: ASSTRA DATA - Survey *"Bus and Investments" 2011-2013]*

CITTA'	AZIENDA	CITTA'	AZIENDA
Alessandria	ATM	**Lodi**	LINE
Ancona	CONEROBUS	**Macerata**	APM
Arezzo	TIEMME	**Modena**	SETA
Ascoli Piceno	START	**Molfetta**	M.T.M.
Asti	A.S.P.	**Napoli**	ANM
Avellino	C.I.T.- A.T.I	**Napoli**	CTP
Bari	AMTAB	**Novara**	SUN
Bergamo	ATB SERVIZI	**Padova**	APS HOLDING
Biella	A.T.A.P.	**Palermo**	AMAT
Bologna	TPER	**Perugia**	UMBRIA MOBILITA'
Bolzano	SASA SPA AG	**Pescara**	GTM
Brescia	BRESCIA TRASPORTI	**Pisa**	CTT
Brescia	SIA	**Pistoia**	COPIT
Camerino	CONTRAM	**Rieti**	ASM RIETI
Casale Monferrato	AMC	**Salerno**	CSTP
Catania	AMT	**Savona**	TPL LINEA
Chieti	A.R.P.A.	**Torino**	GTT SPA
Cosenza	A.M.A.CO.	**Trento**	TT ESERCIZIO
Foggia	ATAF	**Urbino**	AMI SPA
Foggia	**FDG**	**Venezia**	ACTV
Forlì	ATR		

CNG : THE BUSES

Total sample CNG fleet/Total sample urban fleet [%]



[Source: ASSTRA DATA - Survey *"Bus and Investments" 2011-2013]*

RESULTS FROM ASSTRA SURVEY

ADVANTAGE CNG

- Lowering the external noise produced by the engines;
- Lowest interior noise;
- No vibrations on the bodywork;
- Less harmfulness of the exhaust gases;
- Lower fuel costs (including secondary costs);
- Ease of procurement, because present in nature with deposits in amounts exceeding oil and it's more easily accessible.

DISADVANTAGE CNG

- Maintenance costs higher because of the numerous checks on the installation of fuel storage;
- Need of removal and installation of the cylinders to review them periodically;
- Costs of the refueling;
- Costs for the safety of methane workshop;
- The refueling times are higher than those needed for diesel vehicles.

[Source: ASSTRA – TECHNOLOGICAL INNOVATION DEPARTMENT]

RECOMMENDATIONS FOR THE PURCHASE OF BUSES

1999: "Recommendations for the purchase of urban buses from 12 m. Technical Specifications" (I edition)

2001: "Recommendations for the purchase of urban buses from 12 m. Technical Specifications" (II edition)

2002: "Recommendations for the purchase of buses of Class I and II – Technical Specifications" (III edition)

"Raccomandazioni per la fornitura di autobus di Classe II con bagagliera sotto pavimento. Indirizzi Tecnici Generali" (I edition)

2005: Edition completely renovated

2007-8: Updating of previous edition as a result of monitoring

2010-2011: "Recommendations for the purchase of buses of Class I and II"

2014: New Edition "Recommendations for the purchase of buses of Class I and II "

ASSTRA RECOMENDATIONS

- They are set for a **tender** to be awarded with the **criterion of the most economically advantageous tender**;
- Take into account the **new European Directives**, the **Italian legislation**, as well as standards of "Good technique" (ISO, UNI EN, CEN, UNECE, DIN, CUNA);
- Take into account the "**UITP Tender Structure**";
- Take into account the new legislations **on tender issues**;
- There are also vehicles from **18 meters** and those with **natural gas (CNG)**.

ASSTRA RECOMENDATIONS

They are exposed as "classic" tender, the aims pursued are:

1. Provide **precise definitions** to remove, whenever possible, ambiguities
2. Describe a **standard product** able to satisfy a wide range of needs and an equally wide possibility of finding on the market
3. Refer to **established technologies** including openings to i**nnovations**
4. Provide **manufacturing prescriptions** in order **to correct defects** and malfunctions of which he already has experience
5. Focus to **the ergonomics of the driving position** and to the measures that **facilitate the maintenance**
6. Suggest better solutions on the structures dedicated **to passengers with reduced mobility**
7. Focus to the problems associated with **the environmental impact**

ASSTRA RECOMENDATIONS: THE STRUCTURE OF THE DOCUMENT

- "GUIDELINES FOR THE CHOICE OF THE VERSION OF RECOMMENDATIONS" outlines the criteria for the choice of one or the other version (with and without LCC) to take account the different needs of the member companies.
- "VERSION WITHOUT LIFE CYCLE COST " is addressed to companies that set their tender without adopting the life cycle cost.
- "VERSION WITH LIFE CYCLE COST " is addressed to companies that set their tender adopting the life cycle cost which it is evaluated by using declarations made by the Supplier. This is reflected, of course, on the parameters of evaluation of the most economically advantageous tender.
- TECHNICAL SHEETS
- RECONNAISSANCE OF THE REGULATIONS.

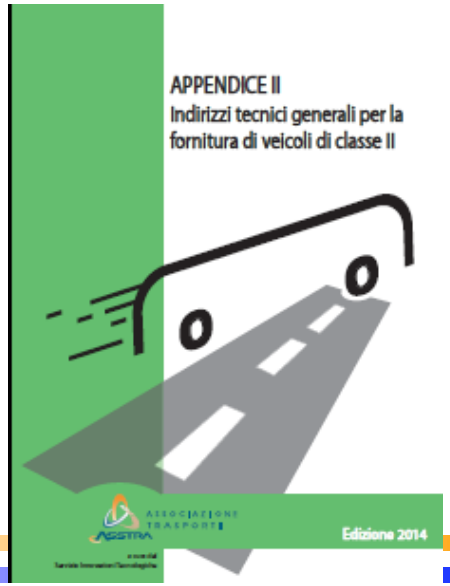
ASSTRA RECOMENDATIONS: THE STRUCTURE OF THE DOCUMENT

- **ADDENDUM I – "General technical specifictions for the supply of buses of Class I (Diesel and CNG)": it defines the requirements for identifying a "unified"bus used to urban service.**

TECHNICAL SHEETS OF ADDENDUM I

- **ADDENDUM II – ""General technical specifictions for the supply of buses of Class II": it defines the requirements for identifying a "unified"bus used to extraurban service.**

TECHNICAL SHEETS OF ADDENDUM I



CHAPTER 7 - LYFE CYCLE COST: TECHNICAL SHEETS

SIT/Innovazioni Tecnologiche	RACCOMANDAZIONI PER LA FORNITURA DI AUTOBUS COSTO PARTE AMMINISTRATIVA	Ediz: 2014 SCHEDA N° 7.2.A pag. 1/1

DA COMPILARE A CURA DEL CLIENTE

Par.fo Cap. 7	VOCE DI COSTO	ANNI (I valori sono espressi in Euro)										COSTO TOTALE
		1	2	3	4	5	6	7	8	9	10	
7.2.A	Assicurazioni											
7.2.A	Tassa di possesso											
7.2.A	Rata di Ammortamento											
TOTALE PARTE AMMINISTRATIVA												

ADMINISTRATIVE COSTS

CHAPTER 7 - LYFE CYCLE COST: TECHNICAL SHEETS

SIT/Innovazioni Tecnologiche	RACCOMANDAZIONI PER LA FORNITURA DI AUTOBUS COSTO PARTE TECNICA - MANUTENZIONE	Ediz: 2014 SCHEDA N° 7.2.B pag. 1/1

DA COMPILARE A CURA DEL FORNITORE

Par.fo Cap. 6	VOCE DI COSTO	ANNI (I valori sono espressi in Euro)										COSTO TOTALE
		1	2	3	4	5	6	7	8	9	10	
6.3.1	**Manutenzione programmata MO											
6.3.1	**Manutenzione programmata MT											
6.3.2	*Sostituzione parti principali MO											
6.3.2	*Sostituzione parti principali MT											
6.3.4	Manutenzione correttiva (MO + MT)											
TOTALE PARTE TECNICA												

MO = Mano d'opera (costo orario : .....€/ora) MT = Materiali

**Costo riferito all'esecuzione del piano di manutenzione periodica del Fornitore, allegato in offerta (Schede 7.3.2/a; 7.3.2/b)
*Costo riferito alla percorrenza dichiarata dal Fornitore per i complessivi riportati nella lista parti principali (Scheda 7.3.3)

TECHNICAL COSTS - MAINTENANCE

CHAPTER 7 - LYFE CYCLE COST: TECHNICAL SHEETS

SIT/Innovazioni Tecnologiche	RACCOMANDAZIONI PER LA FORNITURA DI AUTOBUS COSTO DEL CONTRATTO DI SERVICE MANUTENTIVO	Ediz: 2014 SCHEDA N° 7.2.B/bis pag. 1/1

DA COMPILARE A CURA DEL FORNITORE

Esempio di contratto di 6 anni con Start-up del service differito dopo 3 anni di garanzia integrale

Par.fo Cap. 7	VOCE DI COSTO	ANNI (i valori sono espressi in Euro)									COSTO TOTALE
		1	2	3	4	5	6	7	8	9	
7.2.B	Prezzo complessivo Euro/km	Garanz	Garanz	Garanz							

Esempio di contratto di 6 anni con start-up del service coincidente alla consegna e sovrapposto a 3 anni di garanzia

Par.fo Cap. 7	VOCE DI COSTO	ANNI (i valori sono espressi in Euro)									COSTO TOTALE
		1	2	3	4	5	6				
7.2.B	Prezzo complessivo Euro/km										

SERVICE MAINTENANCE CONTRACT COST

CHAPTER 7 - LYFE CYCLE COST: TECHNICAL SHEETS

SIT/Innovazioni Tecnologiche	RACCOMANDAZIONI PER LA FORNITURA DI AUTOBUS COSTO PARTE CONSUMI	Ediz: 2014 SCHEDA N° 7.2.C pag. 1/1

DA COMPILARE A CURA DEL CLIENTE

Par.fo Cap. 7	VOCE DI COSTO	ANNI (i valori sono espressi in Euro)										COSTO TOTALE
		1	2	3	4	5	6	7	8	9	10	
7.2.C	Consumo annuo combustibile											
7.2.C	Consumo annuo additivi											
7.2.C	Consumo annuo olio motore											
7.2.C	Consumo annuo liquido refrigerante; ...% di diluizione											
TOTALE PARTE CONSUMI												

CONSUMPTIONS COSTS

LCC ENERGY CONSUMPTION AND EMISSION

Takes into account

Directive 2009/33/EC

of the European Parliament and of the Council of 23 April 2009 on the **promotion of clean and energy-efficient road transport vehicles**.

The values of **energy consumption** and **emissions of pollutants** contained in the offering documents **will be evalueted for the life cycle cost of the vehicle** and used in the allocation of scores.

Technical sheet to calculate the operation costs for the emissions

- DIESEL
- CNG

LCC ENERGY CONSUMPTION AND EMISSION

FOGLIO DI CALCOLO PER I COSTI DI ESERCIZIO ENERGETICI E AMBIENTALI DEL CICLO DI VITA
TIPO MOTORIZZAZIONE: EURO VI - TIPO COMBUSTIBILE: CNG

1	**CC = Consumo dichiarato carburante**	**74,65**	**Sm3/100 km**	Rilevato secondo ciclo* **SORT1 o 2 o 3 o misto**	DA OFFERTA
2	eNOx = emissioni ossido d'azoto	**0,4000**	g/kWh	Con fattore di deterioramento DF - ciclo **WHTC**	DA OFFERTA
3	ePART = emissioni di particolato	**0,0100**	g/kWh	Con fattore di deterioramento DF - ciclo **WHTC**	DA OFFERTA
4	eNMHC = emissione idrocarburi non metanici	**0,1600**	g/kWh	Con fattore di deterioramento DF - ciclo **WHTC**	DA OFFERTA
5	CM = chilometraggio veicolo nell'intero ciclo di vita	800.000	km	prefissato	decreto 8 maggio 2012
6	Consumo energetico	35,98485	MJ/Sm3		DIR. 2009/33/CE e
7	Potere Calorifico CNG	9,995791	kWh/Sm3		VALORE STANDARD
8	eCO2 = emissioni di CO2	1,968	kg/Sm3	Tabella parametri nazionali ISPRA	VALORE STANDARD
9	cuC = costo unitario CNG	0,60	€/Sm3		VALORE AZIENDA
10	cuCO2 = costo unitario emissioni CO2	0,04	€/kg		DIR. 2009/33/CE e
11	cuNOx = costo unitario emissioni NOx	0,0088	€/g		DIR. 2009/33/CE e
12	cuPART = costo unitario emissioni Particolato	0,174	€/g		DIR. 2009/33/CE e
13	cuNMHC = costo unit. emissioni idrocarburi non metanici	0,002	€/g		DIR. 2009/33/CE e
14	Consumo Carburante [(1 x 5)/100]	597.200	Sm3	Consumo carburante [14 / 5]	**0,74650** sm3/km
15	Consumo Energetico Carburante [14 x 7]	5.969.487	kWh		
16	Emissioni CO_2 [14 x 8]	1.175.290	Kg	Emissioni CO2 [16 / 5]	**1,46911** kg/km
17	Emissioni NOx [15 x 2]	2.387.795	g	Emissioni NOx [17 / 5]	**2,98474** g/km
18	Emissioni PART [15 x 3]	59.695	g	Emissioni PART [18 / 5]	**0,07462** g/km
19	Emissioni NMHC [15 x 4]	955.118	g	Emissioni NMHC [19 / 5]	**1,19390** g/km
20	**COSTO CICLO DI VITA CARBURANTE [9 X 14]**	**358.320**	**€**		
21	**COSTO CICLO DI VITA CO_2 [10 x 16]**	**47.012**	**€**		
22	**COSTO CICLO DI VITA NOx [11 x 17]**	**21.013**	**€**		
23	**COSTO CICLO DI VITA PART [12 x 18]**	**10.387**	**€**		
24	**COSTO CICLO DI VITA NMHC [13 x 19]**	**1.910**	**€**		
25	**Cea = COSTI DI ESERCIZIO ENERGETICI ED AMBIENTALI DEL CICLO DI VITA [20+21+22+23+24]**	**438.641**	**€**		

* In attesa di pubblicazione di un ciclo standard specifico per i veicoli a metano

BIBLIOGRAPHY

- XI Report on the urban mobility in Italy – ASSTRA, ANAV, Hermes, ISFORT – 2014
- Recommendations for the purchase of buses of Class I and II – ASSTRA – 2014
- Survey "Buses and Investments" - ASSTRA - 2011-2013

✸ Thanks for the kind attention✸

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