



37<sup>TH</sup> INTERNATIONAL  
**NO - DIG**  
FLORENCE 2019

Fortezza da Basso • FLORENCE (Italy)

30<sup>th</sup> September • 2<sup>nd</sup> October 2019



INNOVATION FOR THE  
ENVIRONMENT: THE  
EXPERIENCE OF  
MARCHE MULTISERVIZI  
S.P.A.



Eng. Niko Bruni



# INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A. .....It all began in 2014

Montecchio (Vallefoglia Council)  
Crossing the Foglia River  
2 HDPE OD 250mm drainage pipes  
Length 150 m

Montesoffio (Urbino Council)  
Crossing S.S 73bis road  
HDPE OD 160mm water pipe  
Length 50 m

Pontedoccia (Piandimeleto  
Council)  
Crossing Mutino Stream  
HDPE OD 125mm water pipe  
Length 70 m

Canavaccio (Urbino Council)  
Crossing Metauro River  
Steel OD 150mm water pipe  
Length 90 m

Sant'Antonio (Fossombrone Council)  
Crossing Metauro River  
HDPE OD 180mm water pipe  
Length 145 m

Rogaccia (Urbania Council)  
Crossing Metauro River  
2 HDPE OD 180mm water pipes  
Length 90 m

Isola del Piano (Fossombrone Council)  
Crossing Tarugo Stream  
Steel gas pipe OD 100mm  
Steel casing OD 200mm  
Length 140 m

# INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A.



## CAGLI-ACQUALAGNA WATER PIPE REPLACEMENT WITH HDD

July-September 2019

HDPE Pipes OD 280/225

Length: 800 m



PROFILO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
PROFILO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
PROFILO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

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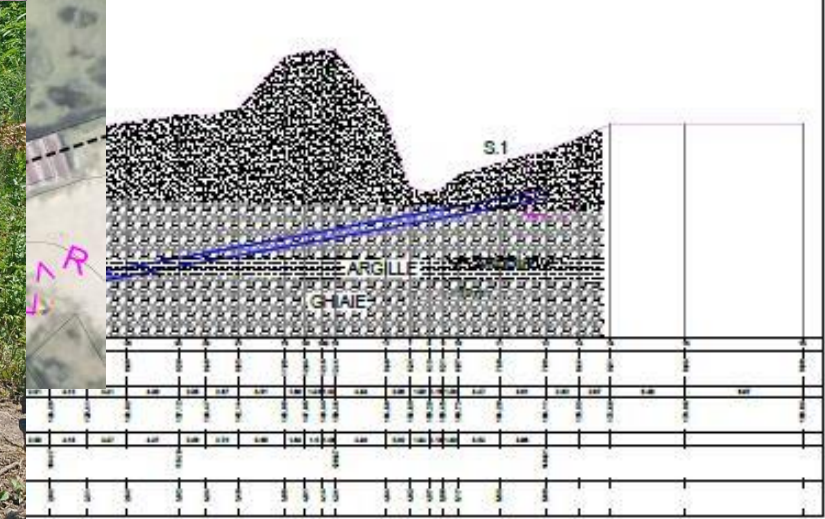


## HYDROCO WATER PIPE REPLACEMENT WITH HDD ACROSS THE RIVER FOGLIA IN PESARO

JUNE-JULY 2019

HDPE Pipes OD 355

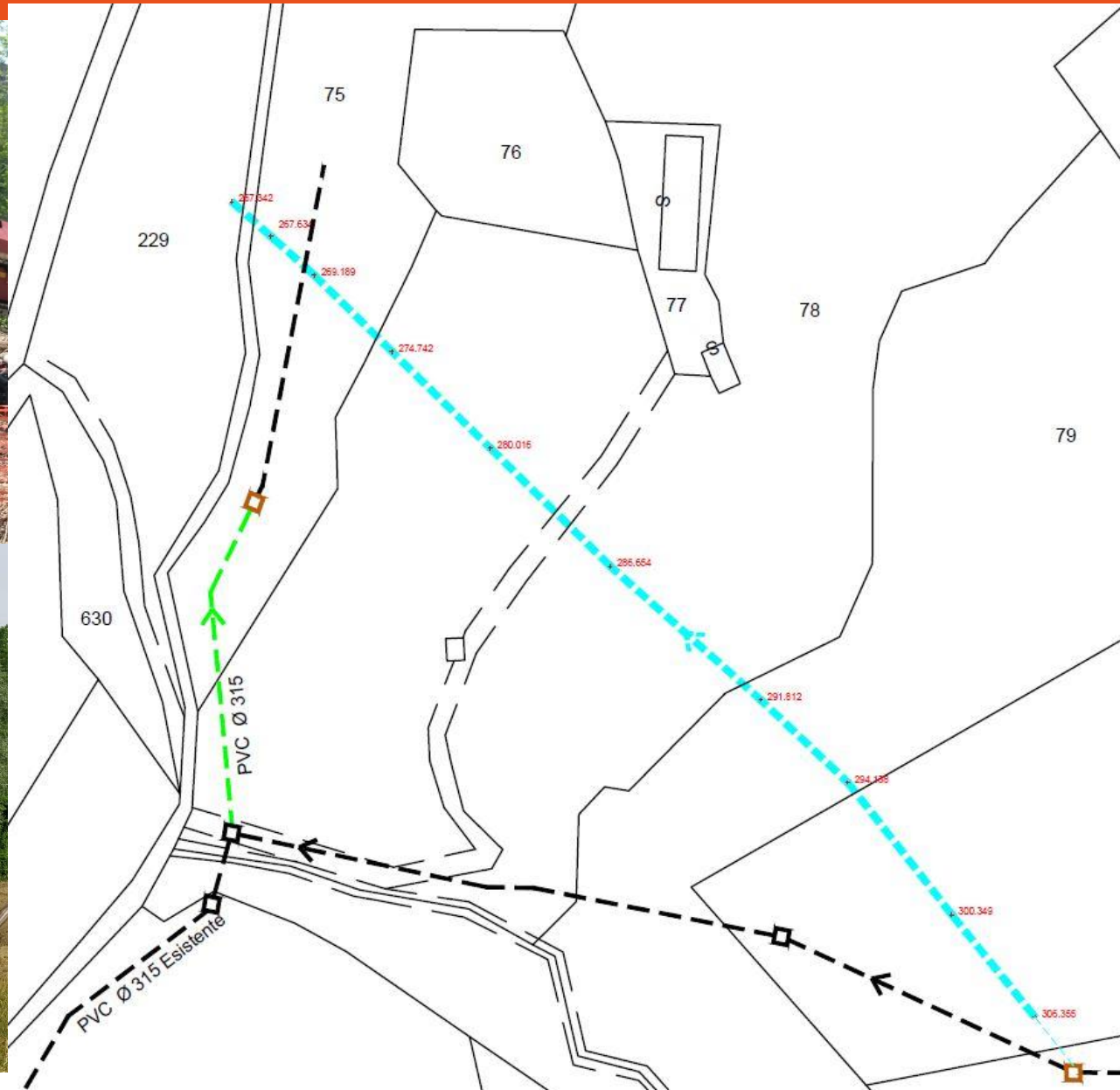
Length: 140 m



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**Cà Antonio SEWER PIPE  
REPLACEMENT with HDD,  
Sassocorvaro-Auditore**

May-June 2019

HDPE Pipes OD 450

Length: 175 m

prohibited.

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## HDD : The planning approach of Marche Multiservizi S.p.A

### Pre-feasibility study

- **MORFOLOGIC ANALYSIS** IN THE AREA OF OPERATION AND CHOICE OF ROUTE AND METHOD

### Feasibility study

- **TOPOGRAPHIC SURVEY AND GEOGNOSTIC TEST** CONSISTING OF FIELD AND LABORATORY TESTING (CORE TESTING, CPT, SPT, GROUND CLASSIFICATION, COMPRESSION AND EXPANSION TESTING) TO UNDERSTAND THE TERRAIN THAT MUST BE CROSSED.

### Detailed Design

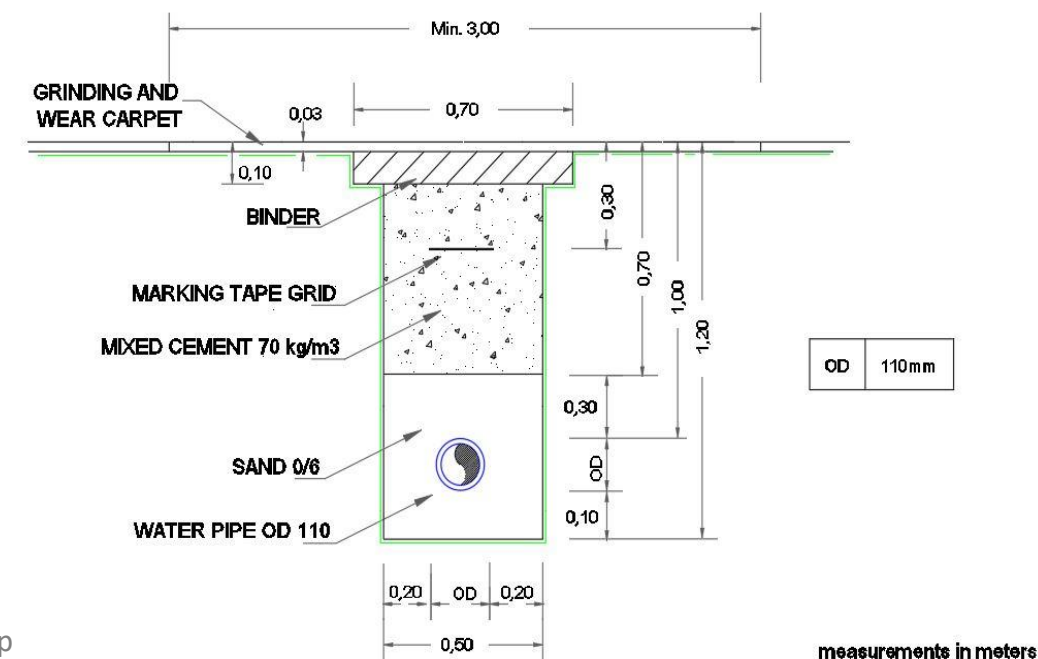
- **ROUTE DESIGN**, DEFINITION OF THE CURVATURE TO BE RESPECTED DURING THE LAY
- ALL THE DOCUMENTS NECESSARY TO THE BID PHASE, IN ACCORDANCE WITH THE LAW (**D.LGS. 50/2016**)

# INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A. COST-BENEFIT ANALYSIS: Open-air excavation vs no-dig (HDD)



The study compare four fundamental variables in order to choose the best method to lay high-density polyethylene (HDPE) water pipes with an external diameter of 110mm:

1. COST;
2. DURATION OF THE OPERATION,
3. CONSUMPTION OF MATERIALS;
4. CO2 EMISSIONS

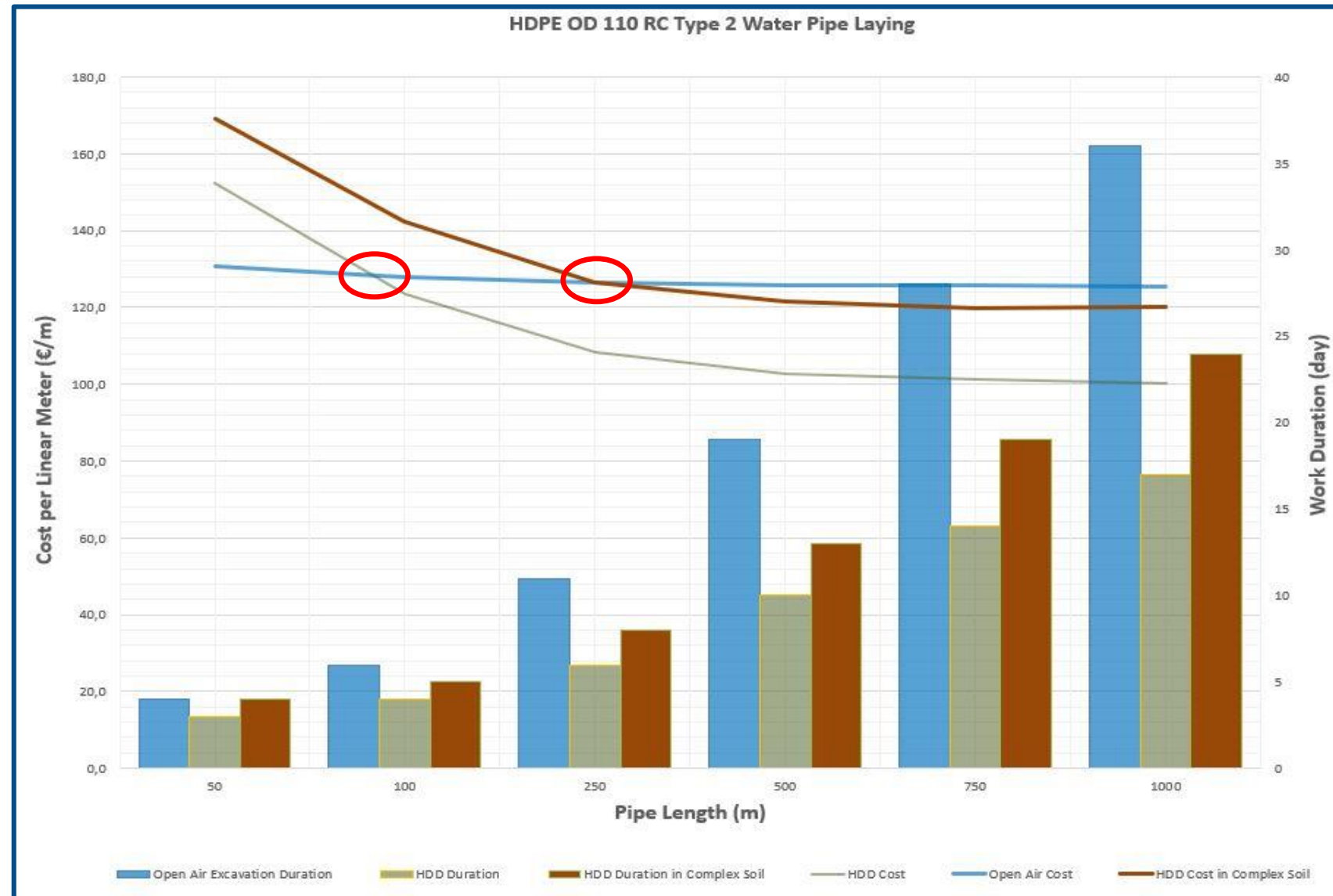


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**INNOVATION FOR THE ENVIRONMENT: THE  
EXPERIENCE OF MARCHE MULTISERVIZI S.P.A.  
COST-BENEFIT ANALYSIS: Open-air excavation vs no-dig  
(HDD)**



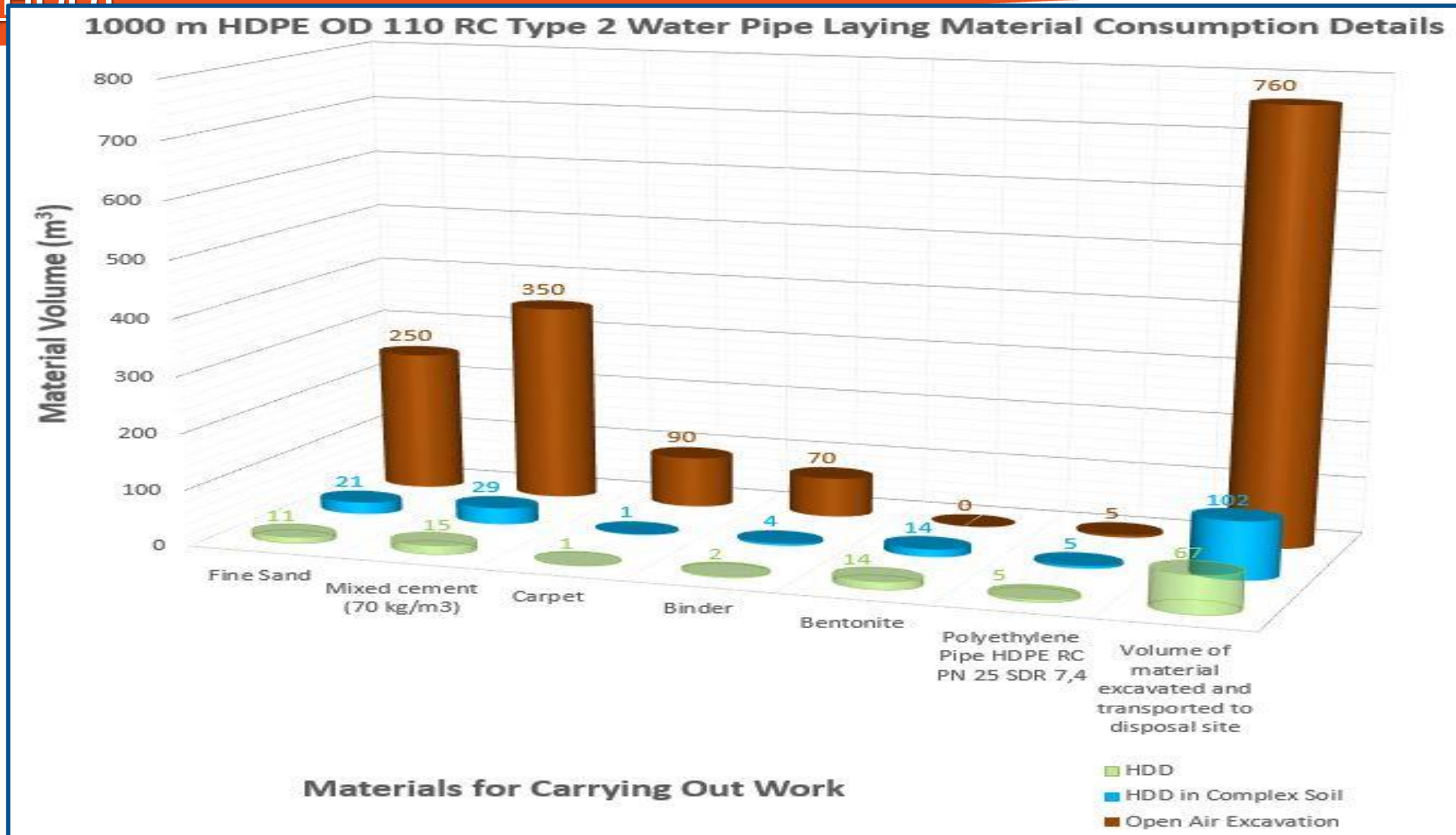
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**INNOVATION FOR THE ENVIRONMENT: THE  
EXPERIENCE OF MARCHE MULTISERVIZI S.P.A.  
MATERIAL CONSUMPTION: Open-air excavation vs no-  
dig (HDD)**



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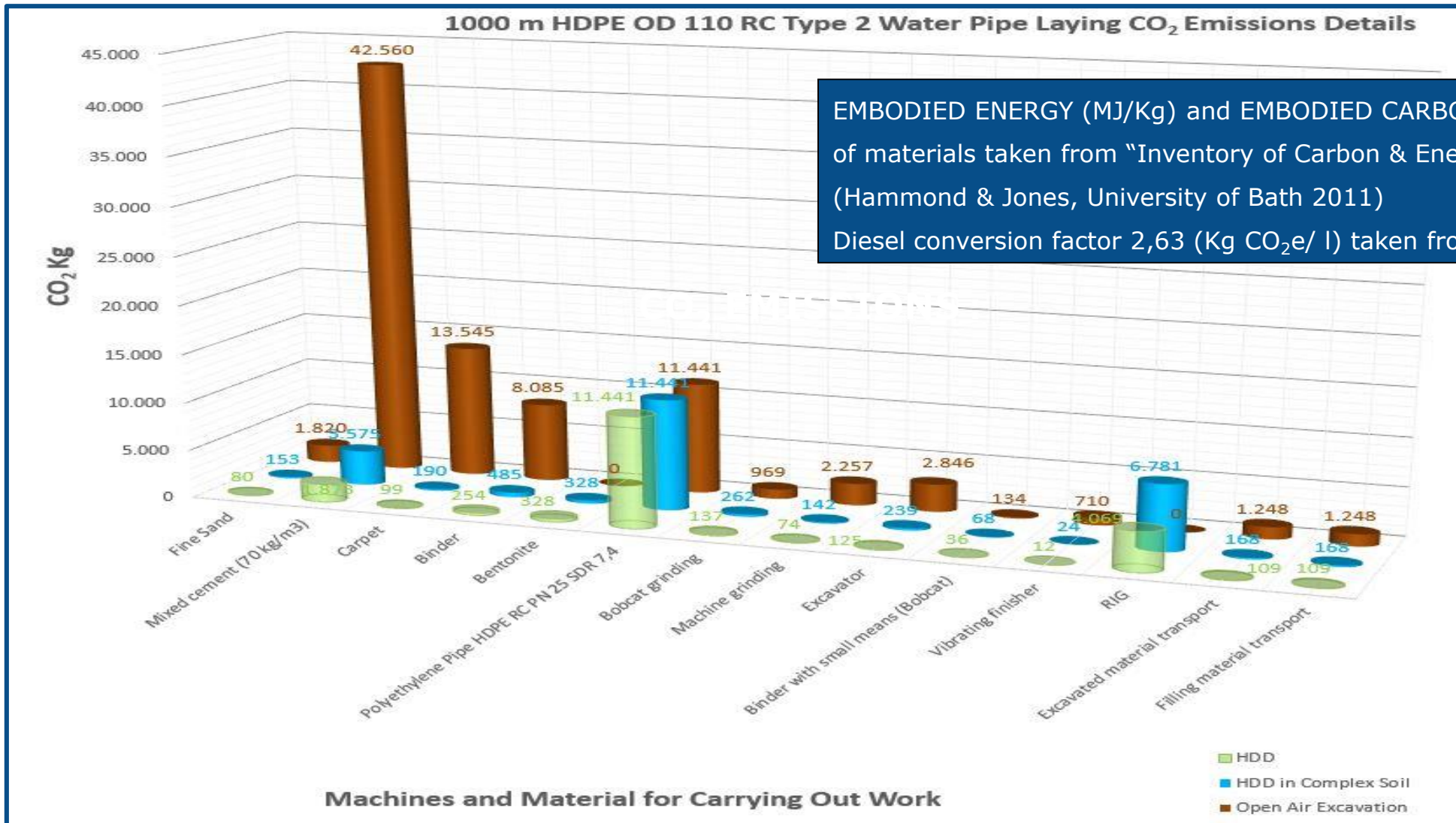


# INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A.

## CO<sub>2</sub> EMISSIONS : Open-air excavation vs no-dig (HDD)



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EMBODIED ENERGY (MJ/Kg) and EMBODIED CARBON (Kg CO<sub>2</sub>e/Kg) of materials taken from "Inventory of Carbon & Energy (ICE)"<sup>4</sup> (Hammond & Jones, University of Bath 2011)  
Diesel conversion factor 2,63 (Kg CO<sub>2</sub>e/ l) taken from Defra 2017

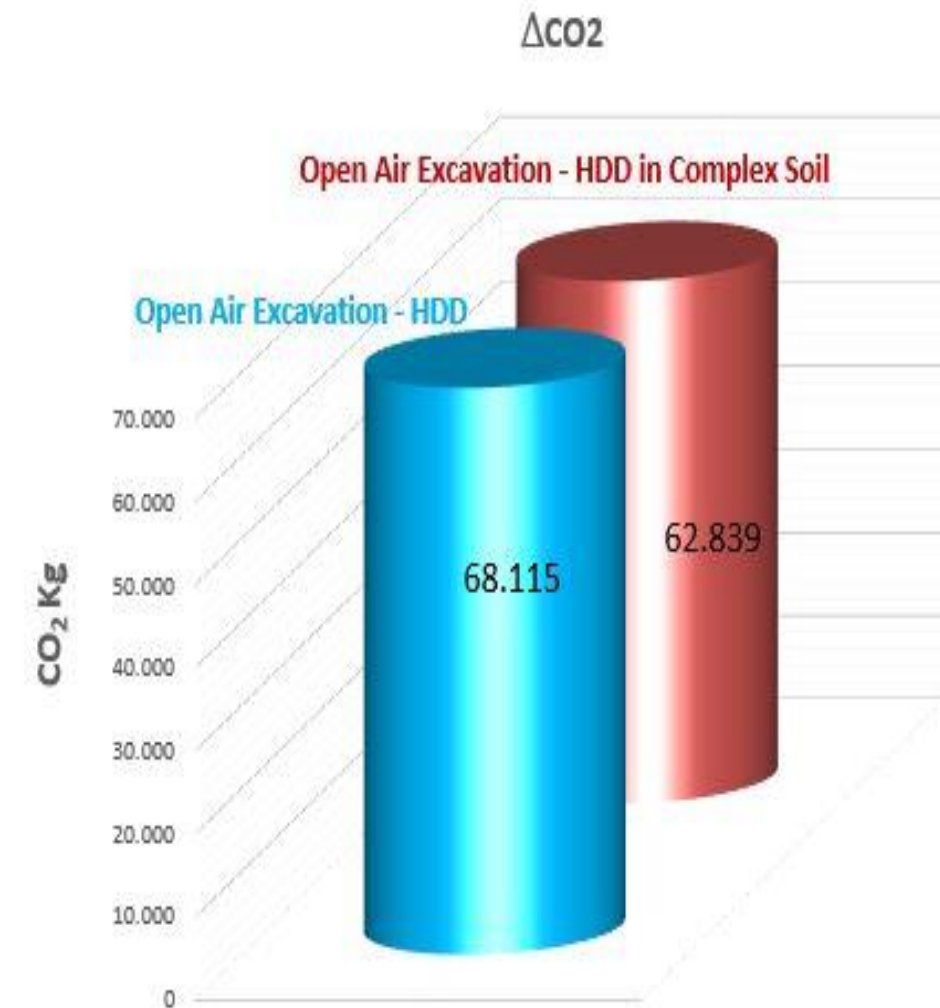
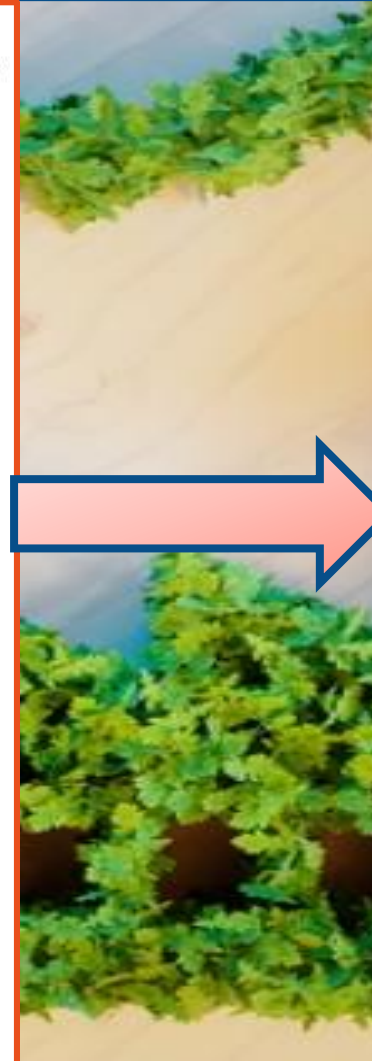
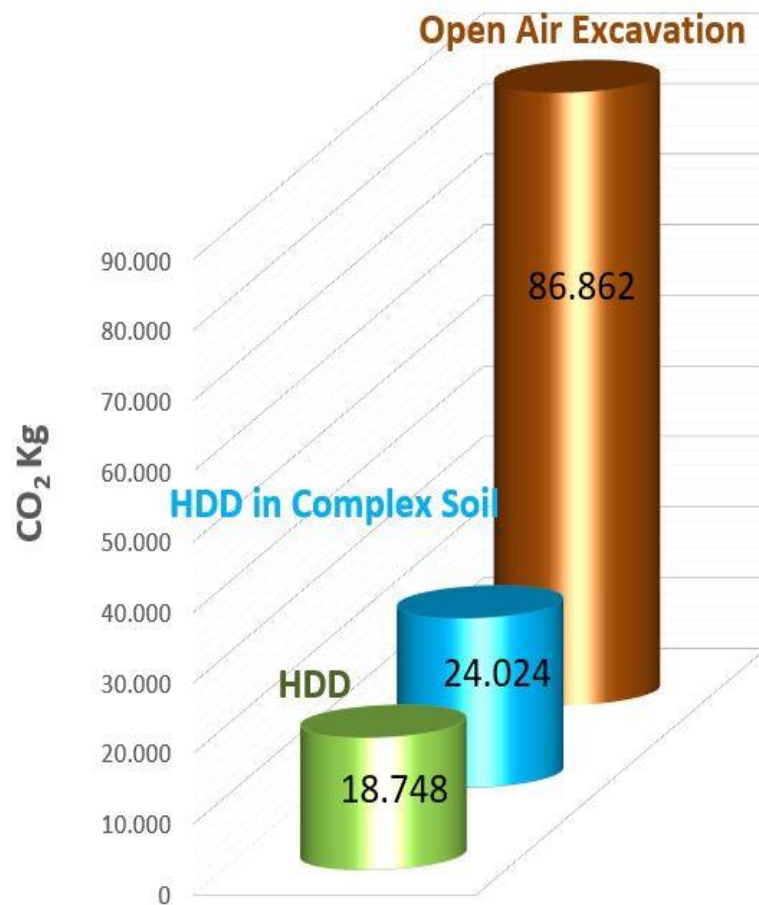
# INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A. CO<sub>2</sub> EMISSIONS : Open-air excavation vs no-dig (HDD)



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Balance of emissions for 1,000 m of Water Pipe Laying

HDPE OD 110 RC Type 2 CO<sub>2</sub> Emissions per 1000 m of Water Pipe Laying

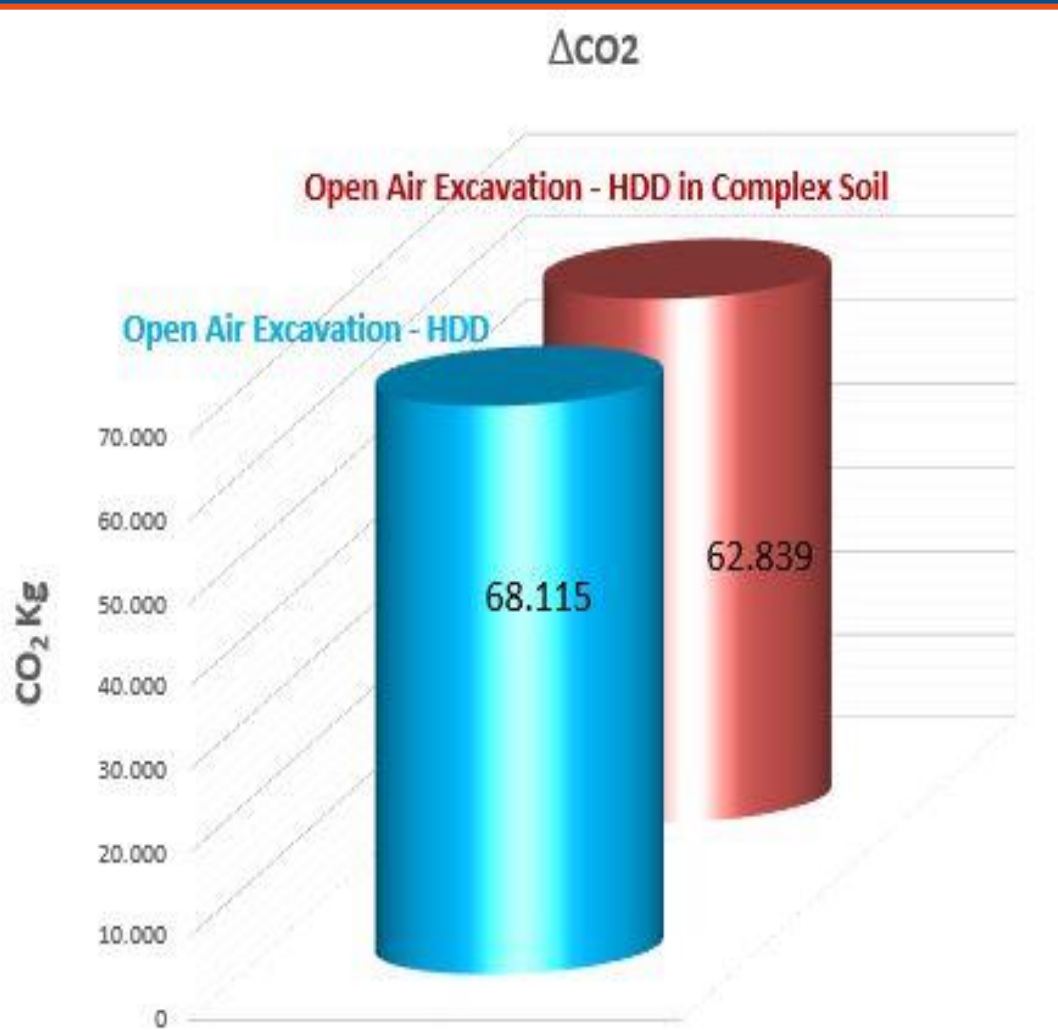


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Balance of emissions for 1,000 m of Water Pipe Laying



71 Families with an average electrical consumption of 2,700 KWh/y per family



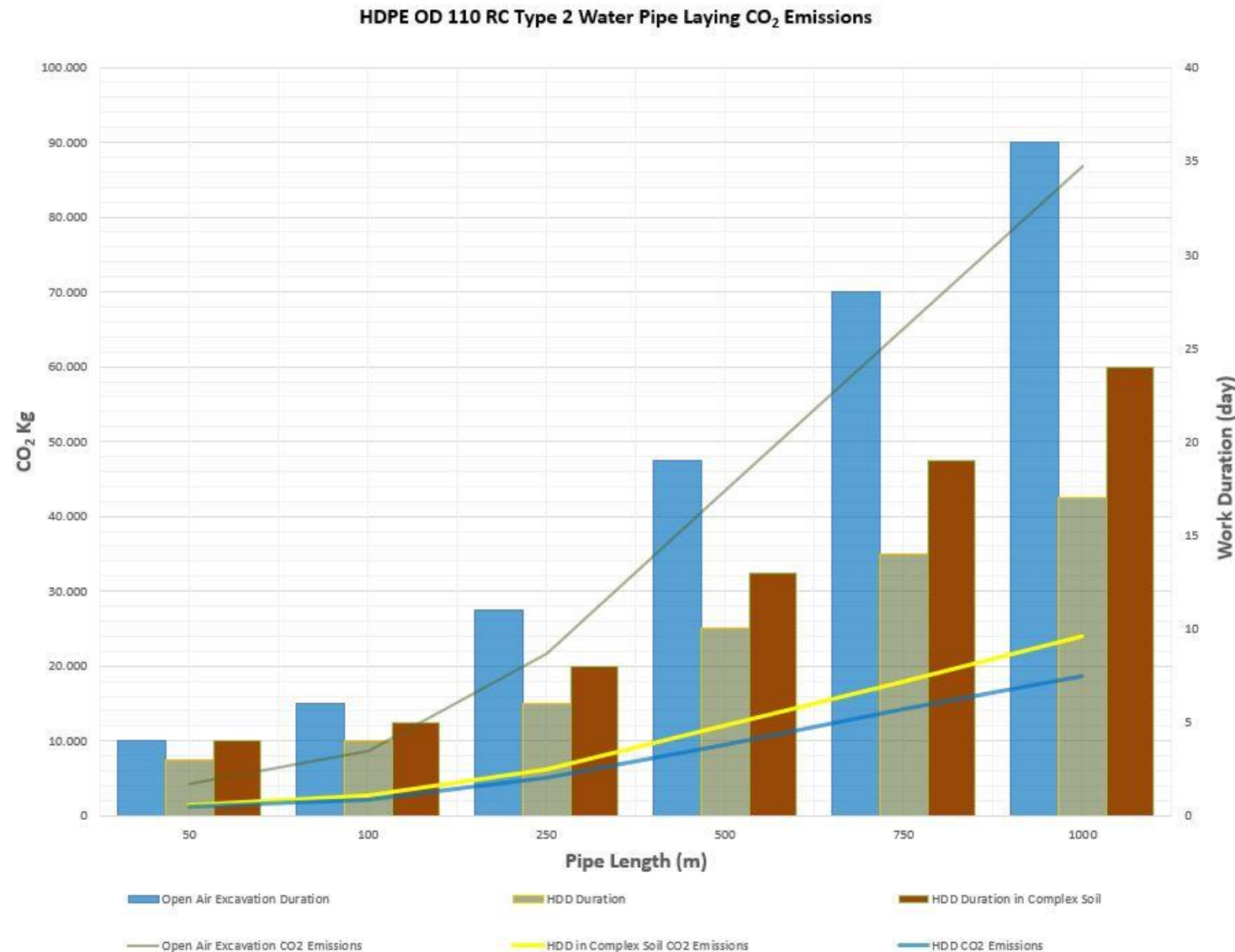
28 petrol cars with an annual mileage of 10.000 km with emissions of 230 g/km



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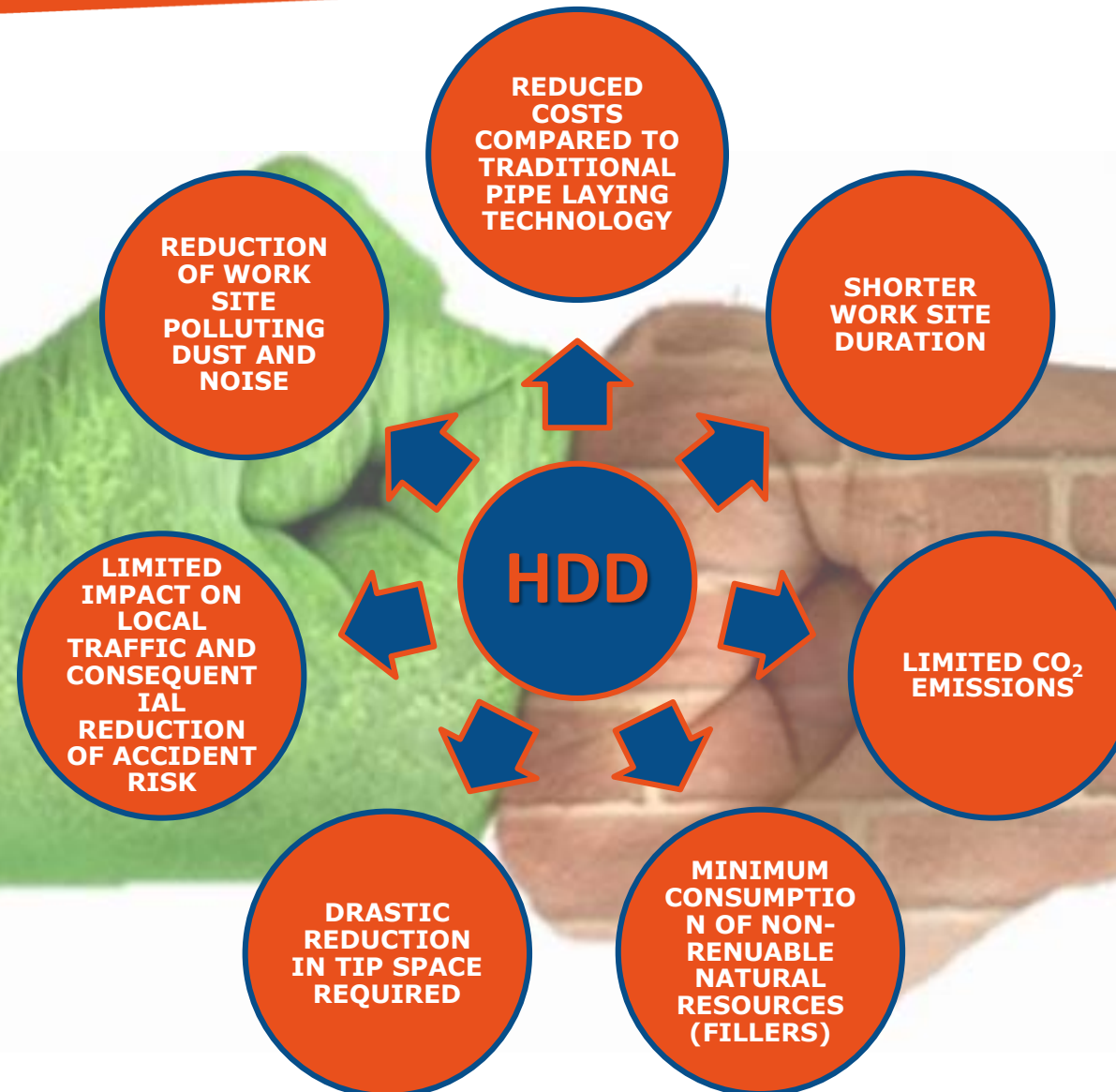


# *INNOVATION FOR THE ENVIRONMENT: THE EXPERIENCE OF MARCHE MULTISERVIZI S.P.A.*

## DIRECT AND INDIRECT ADVANTAGES OF HDD



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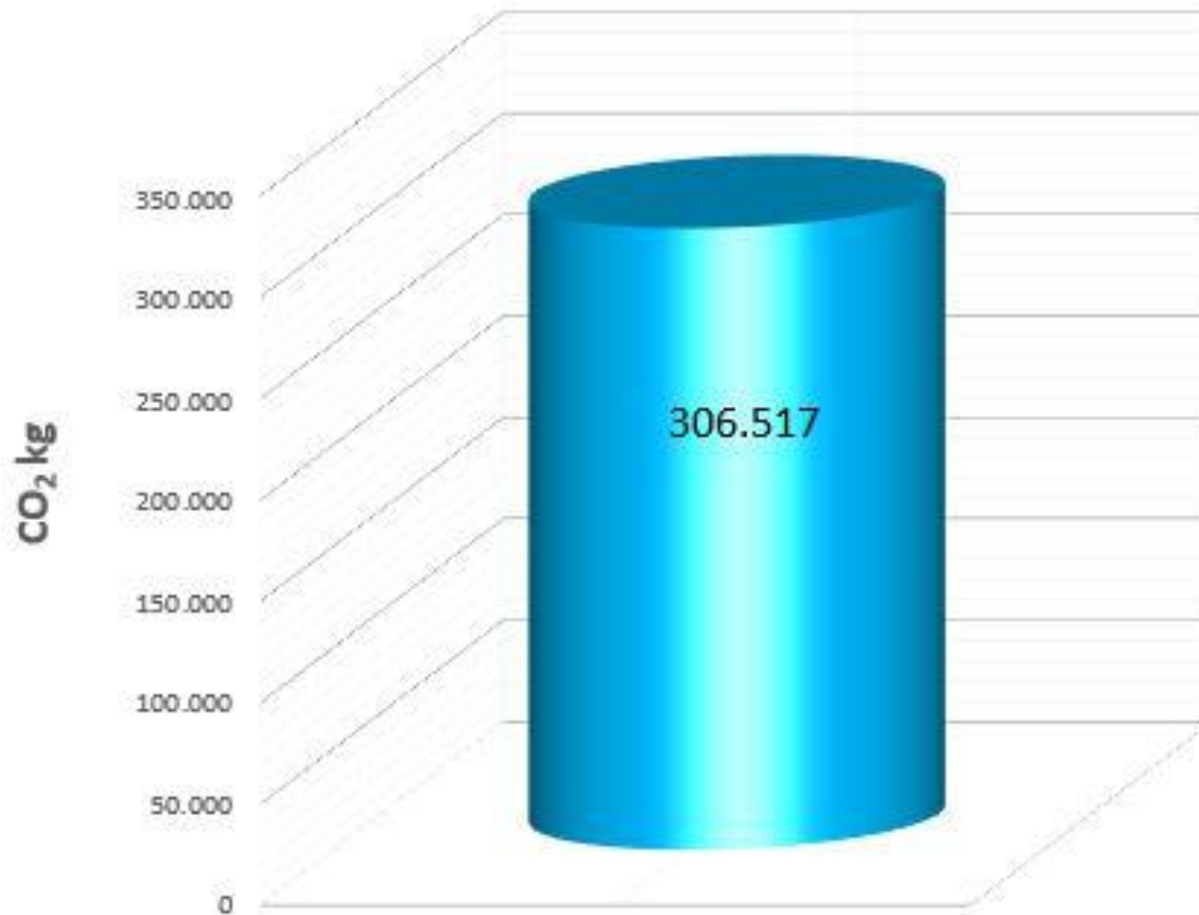
## No-dig technology at MARCHE MULTISERVIZI 2019



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TARGET 2019 5,0 Km of pipes layed with HDD

HDD in YEAR 2019



356 Families with an average  
elettrical consumption of 2,700  
KWh/y per family



139 petrol cars with an annual  
mileage of 10.000 km with  
emmissions of 230 g/km





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THANKS FOR YOUR  
ATTENTION

marche  
multiservizi



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