

International Bioeconomy Dialogues

The Gruppo CAP case study





GRUPPO CAP

Area



NO. INHABITANTS SERVED
2,5 MILLION



WATER NETWORK km
6.483



SEWAGE NETWORK km
6.808



WELLS
782



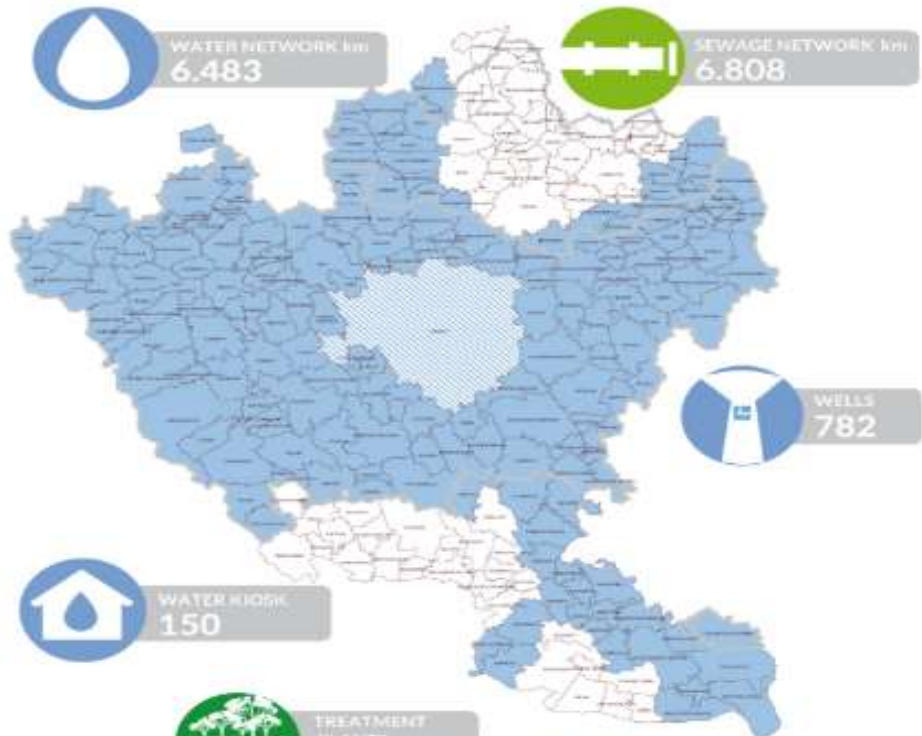
WATER KIOSK
150



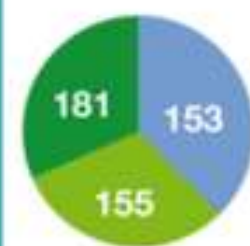
TREATMENT PLANTS
61



WATER PURIFICATION PLANTS
294



No. Municipalities served



AQUEDUCT



SEWERS



WATER TREATMENT



Users



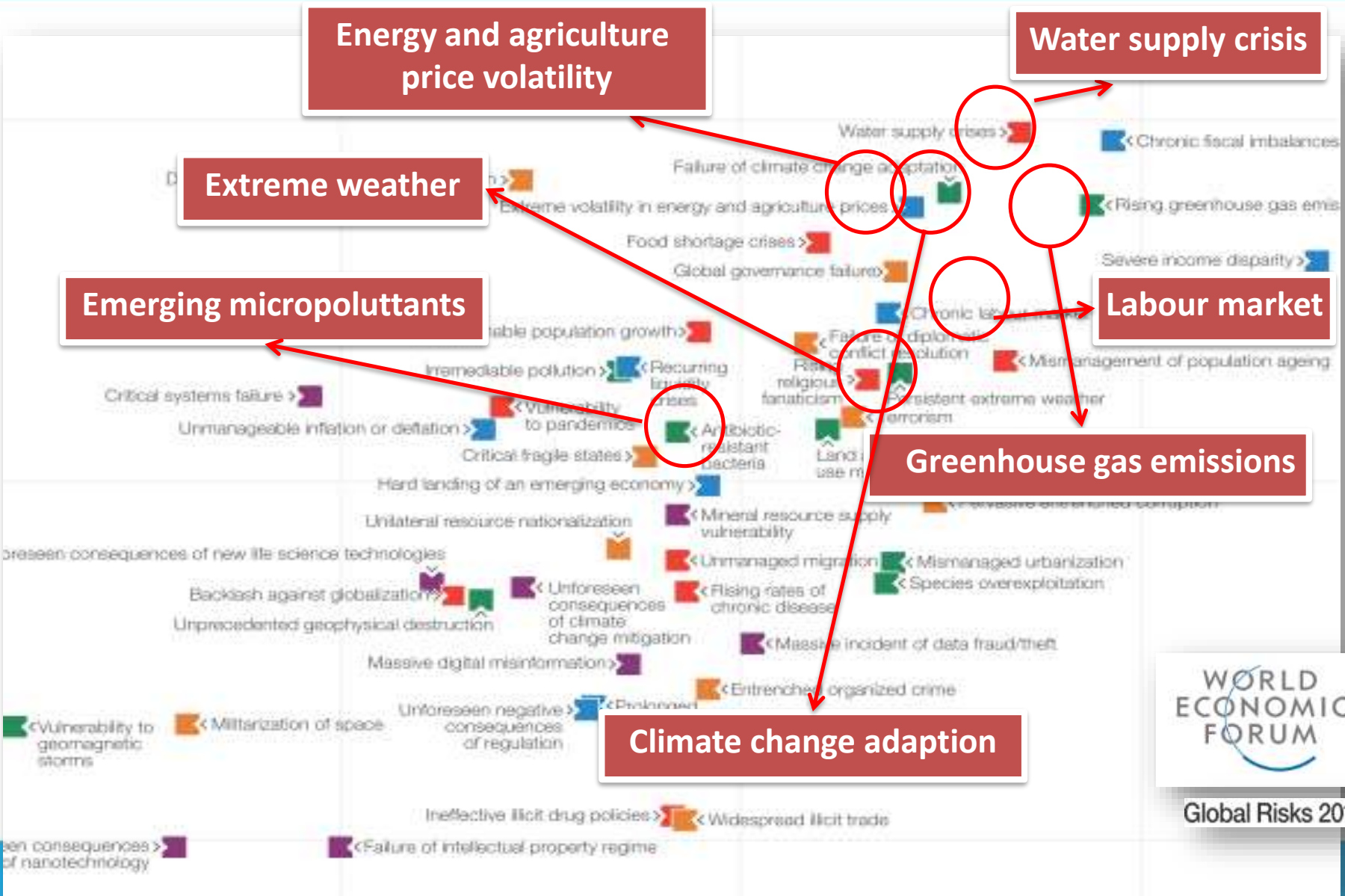
CIVIL
287.192



INDUSTRIAL
1034



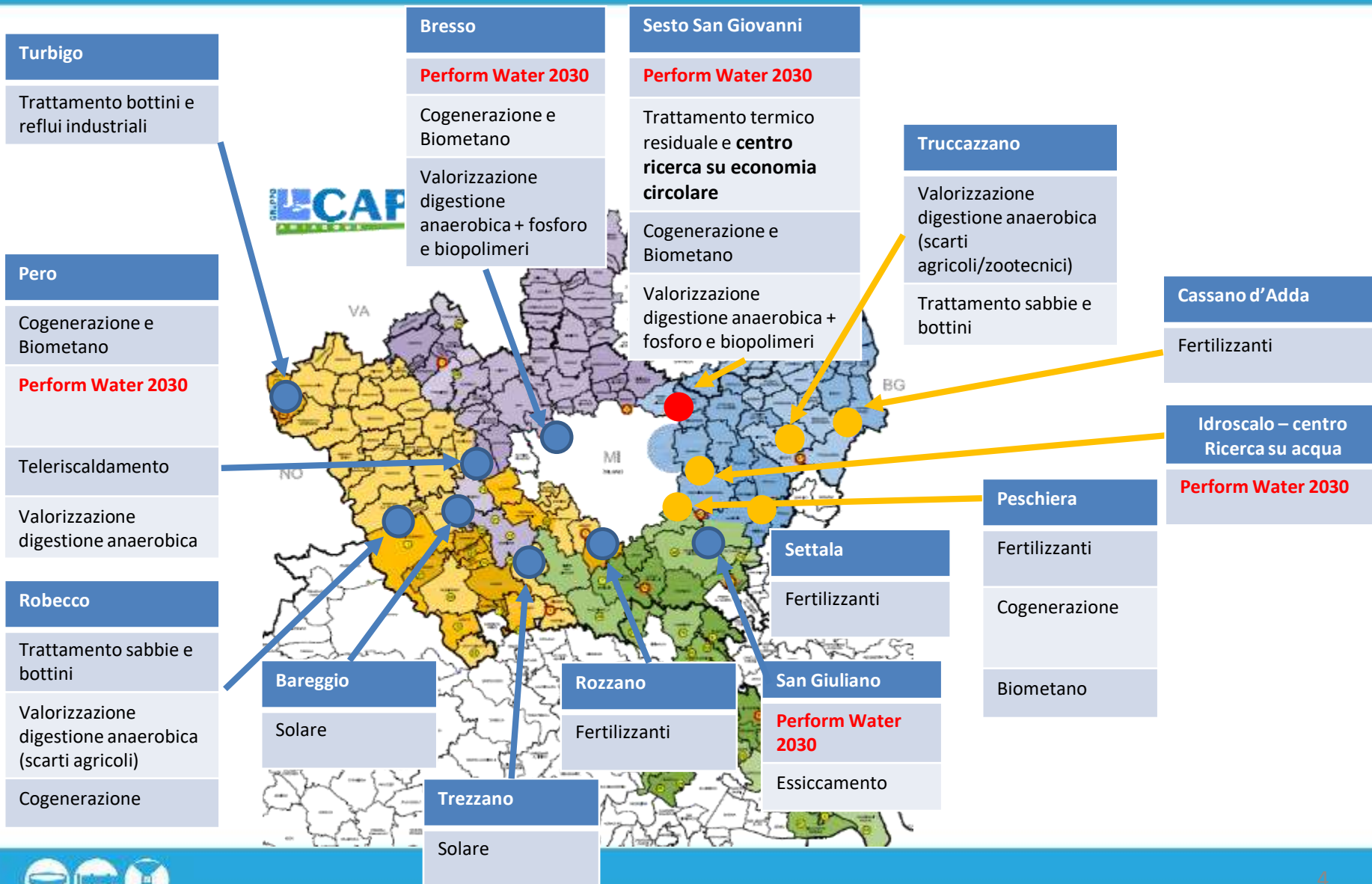
Global Nexus Risks and water management



Global Risks 2014



OUR NETWORK





THE CHALLENGE

SKILLS IMPROVEMENT AND SYNERGIES TOWARDS THE CIRCULAR PERSPECTIVE

PRODUCT PERSPECTIVE

RESOURCE PERSPECTIVE

UTILITY PERSPECTIVE

WATER AS A CONSUMABLE

WATER AS A DURABLE

WATER BALANCE OF A RIVER BASIN

AGRICULTURE AND NUTRIENTS BALANCE

USING EXISTING ASSETS FOR MORE SERVICES

SELLING PERFORMANCE S NOT WATER

DRIVING ASSET RECOVERY

OPTIMISING RESOURCE EFFICIENCY

OUR ABILITY TO EXTRACT ENERGY:
COGENERATION
DISTRICT HEATING
BIOMETHANE
SOLAR

OUR ABILITY TO EXTRACT NUTRIENTS AND UPGRADE CARBON TO CONSUMER PRODUCTS
PHOSPHORUS
BIOPLASTICS

OUR ABILITY TO REUSE WATER IRRIGATION

RESTORING OF ANCIENT IRRIGATION CANALS

FROM SLUDGE TO FERTILIZERS

INDUSTRIAL SYMBIOSIS

SEWAGE OPTICAL FIBER

PHONE ANTENNAS

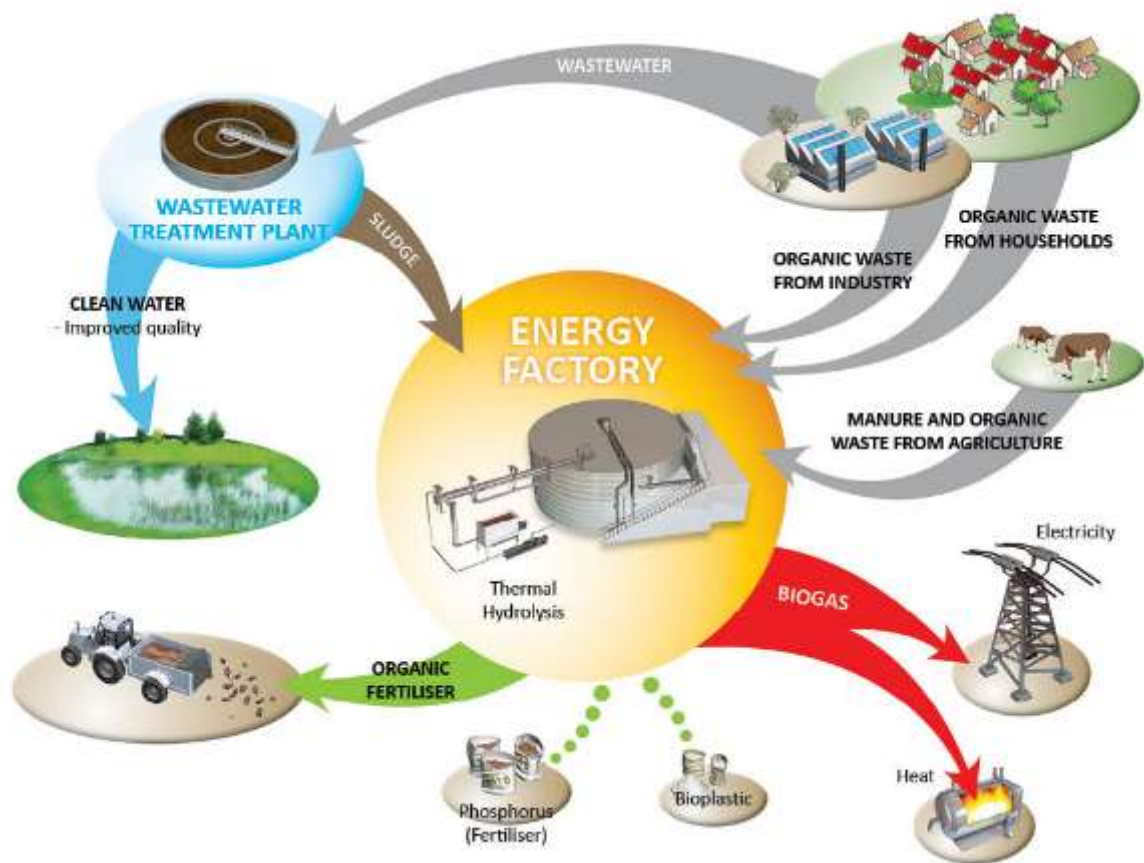
INTERNATIONAL BENCHMARKING

GREEN PUBLIC PROCUREMENT

ENERGY and ASSET OPTIMIZATION



Wastewater plants as biorefineries



The existing municipal wastewater treatment plants can be renovated and integrated to become multi-purpose urban biorefineries that serve the citizens to treat and valorize municipal waste streams, such as wastewaters and organic waste, towards a coherent urban strategy

Combination of eco-innovative technologies with anaerobic co-digestion allow for the integrated recovery of biomethane, phosphorus, biopolymers



Resources embedded in municipal wastewater

| Parameter | Value |
|--|---------|
| Reusable water (m ³ /capita year) | 75-100 |
| Phosphorus in P precursors (kg/capita year) | 0,6-1,0 |
| Nitrogen in N precursors (kg/capita year) | 4-5 |
| Methane (m ³ / capita year) | 10-13 |
| Organic Fertilizer (P-rich compost) (kg/capita year) | 8-10 |
| Cellulose (kg/capita year) | 5-8 |
| Biopolymers; PHA (kg/capita year) | 2-4 |

Verstraete et al. (2009) *Bioresource Technology* 100, 5537–5545
 Salehizadej and van Loosdrecht (2004) *Biotechnology Advances* 22, 261–279

Source: SMART-Plant



Supported by
 the Horizon 2020
 Framework Programme
 of the European Union

Plus:

- **Energy efficient wastewater treatment**
- **Additional resources embedded to the organic fraction of municipal waste!**



Energy extraction



From «0 km» BIOMETHANE.....

R.it | Ambiente

Fare il pieno con l'acqua: nasce il biometano a km zero

L'esperimento condotto a Milano dal gruppo Cap e da Fca: il combustibile viene dai liquami urbani. "Se si arrivasse a raccogliere il 72,5% dei rifiuti bio prodotti dalle famiglie italiane si potrebbero far viaggiare con gli scarti della cucina tutti gli automezzi della nettezza urbana", calcola Marangoni, ceo di Althesys

di ANTONIO CIANCIGLIO



To «0 km» Electric vehicle charging stations....



Resources extraction

To wastewater reuse....

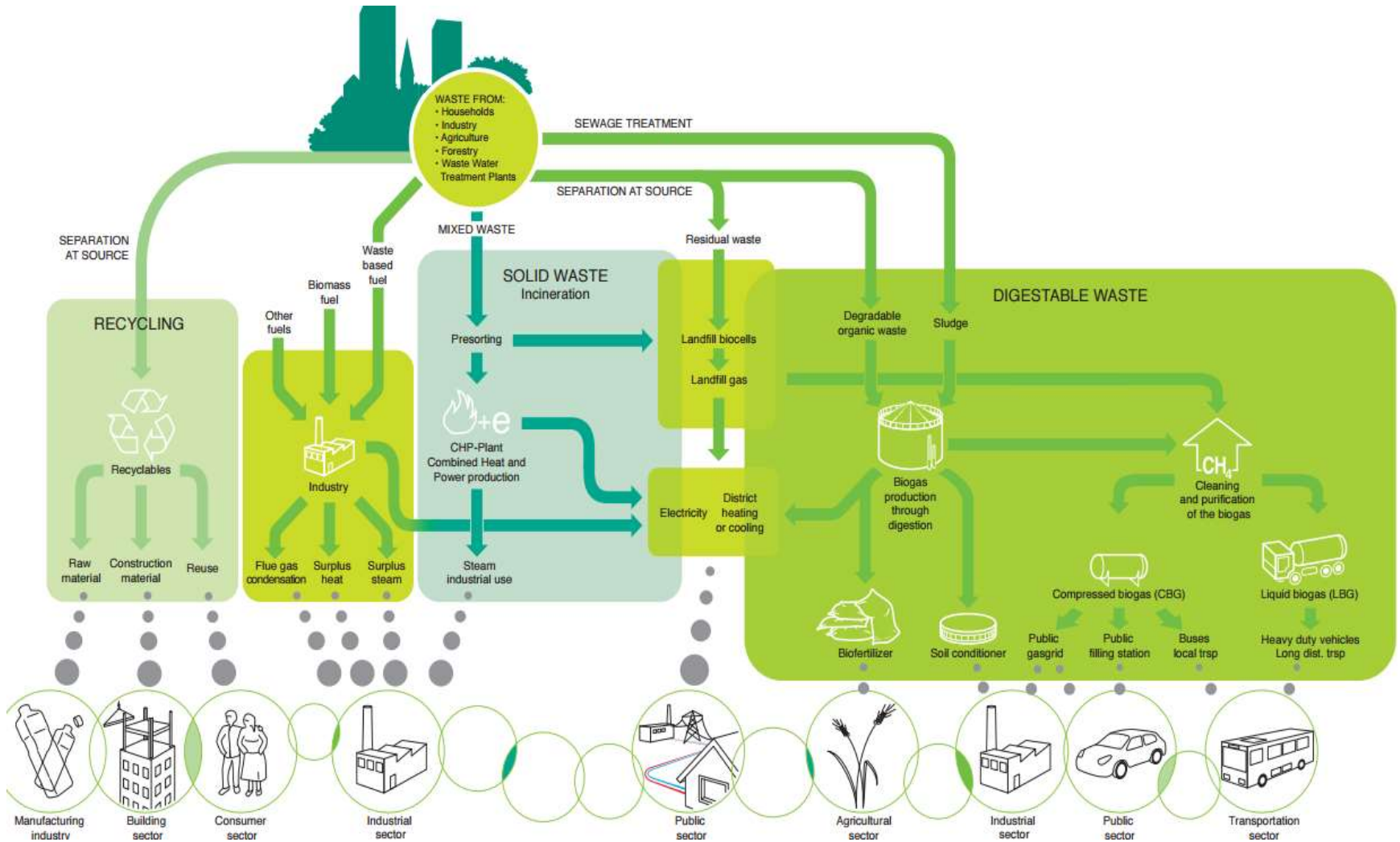


From Fertilizers....





INDUSTRIAL SYMBIOSIS





PARTNERSHIPS

BIOMETANO

**RECUPERO
NUTRIENTI**

LCA

**ENERGIA DA
RIFIUTI
AGROALIMENTARI**

UNIMIB

RSE

CNR-IIA

INNOVEN

POLIMI

F&B





LA TUA ACQUA IN BUONE MANI



LA TUA ACQUA IN BUONE MANI





LAY OUT

- 1. loggione-Pala
- 2. area sottopala
- 3. area di servizio
- 4. area fitness e yoga
- 5. sala meeting (FOTOGALILEI)
- 7. area relax
- 8. palestrina (FORSI)
- 9. CAP - area di servizio
- 10. area verde - Manutenzione
- 11. loggione di servizio
- 12. area di parcheggio (FOTOGALILEI)
- 13. area di parcheggio (FOTOGALILEI)
- 14. area di parcheggio (FOTOGALILEI)
- 15. area di parcheggio (FOTOGALILEI)
- 16. area di parcheggio (FOTOGALILEI)
- 17. area di parcheggio (FOTOGALILEI)
- 18. area di parcheggio (FOTOGALILEI)
- 19. area di parcheggio (FOTOGALILEI)
- 20. area di parcheggio (FOTOGALILEI)
- 21. area di parcheggio (FOTOGALILEI)
- 22. area di parcheggio (FOTOGALILEI)
- 23. area di parcheggio (FOTOGALILEI)
- 24. area di parcheggio (FOTOGALILEI)
- 25. area di parcheggio (FOTOGALILEI)
- 26. area di parcheggio (FOTOGALILEI)
- 27. area di parcheggio (FOTOGALILEI)
- 28. area di parcheggio (FOTOGALILEI)
- 29. area di parcheggio (FOTOGALILEI)
- 30. area di parcheggio (FOTOGALILEI)
- 31. area di parcheggio (FOTOGALILEI)
- 32. area di parcheggio (FOTOGALILEI)
- 33. area di parcheggio (FOTOGALILEI)
- 34. area di parcheggio (FOTOGALILEI)
- 35. area di parcheggio (FOTOGALILEI)
- 36. area di parcheggio (FOTOGALILEI)
- 37. area di parcheggio (FOTOGALILEI)
- 38. area di parcheggio (FOTOGALILEI)
- 39. area di parcheggio (FOTOGALILEI)
- 40. area di parcheggio (FOTOGALILEI)
- 41. area di parcheggio (FOTOGALILEI)
- 42. area di parcheggio (FOTOGALILEI)
- 43. area di parcheggio (FOTOGALILEI)
- 44. area di parcheggio (FOTOGALILEI)
- 45. area di parcheggio (FOTOGALILEI)
- 46. area di parcheggio (FOTOGALILEI)
- 47. area di parcheggio (FOTOGALILEI)
- 48. area di parcheggio (FOTOGALILEI)
- 49. area di parcheggio (FOTOGALILEI)
- 50. area di parcheggio (FOTOGALILEI)



CAP

PROGETTO PRELIMINARE

PLANIMETRIA GENERALE

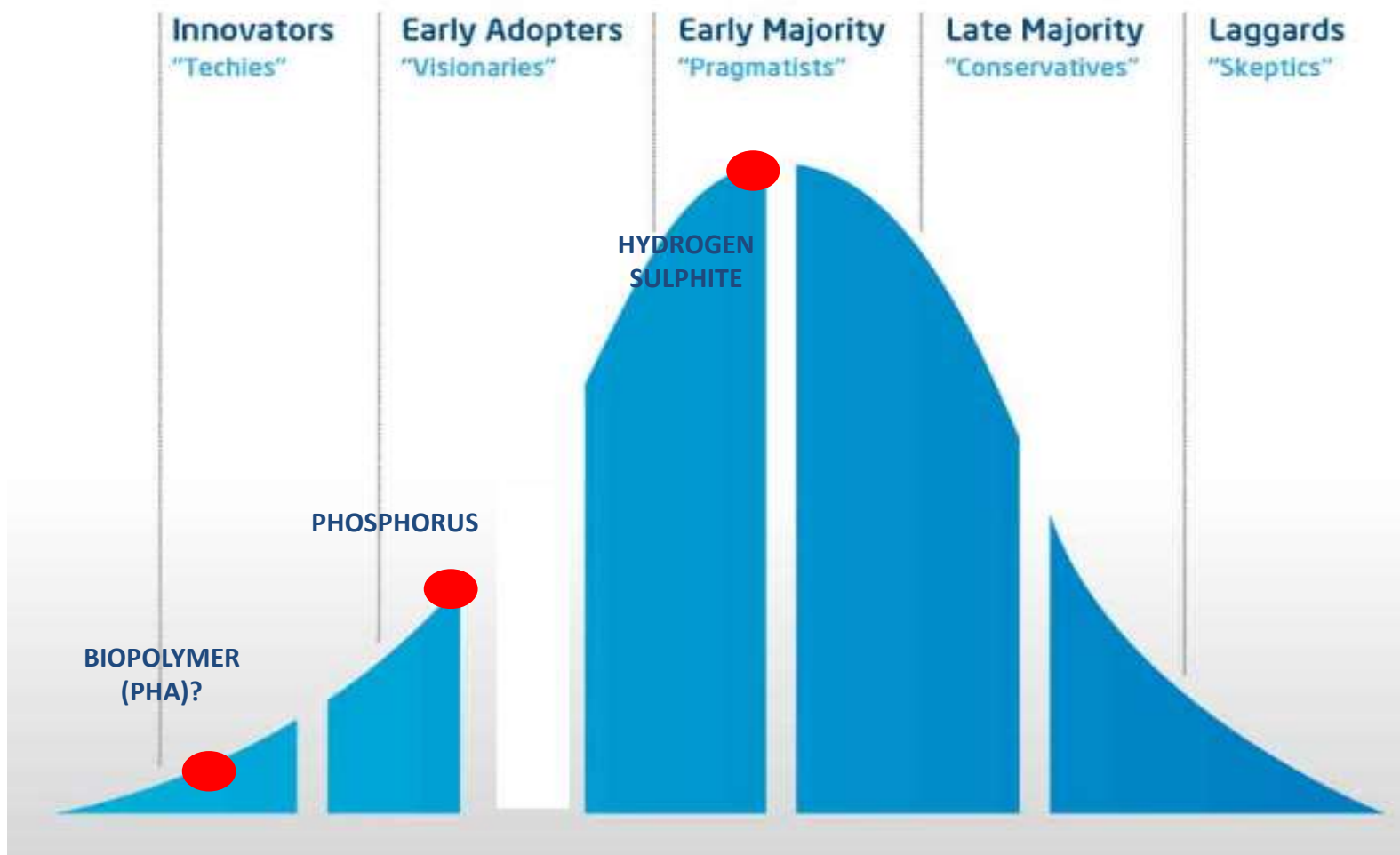
| Rev. | Data | Descrizione | Disegnato | Controllato |
|------|------------|--|-----------|-------------|
| 0 | 26.05.2018 | Primo abbozzato | MM | AC |
| 1 | 27.05.2018 | Abbozzato (preliminare) (FORSI) | MM | AC |
| 2 | 02.05.2018 | Abbozzato (preliminare) (FORSI) con abbozzo layout | MM | AC |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |

| | | | | |
|--------------|--------------|------------------|---------------------|---------|
| Scala: 1:500 | Formato: A1* | Data: 02.05.2018 | Disegnato: D-20-210 | Rev.: 2 |
|--------------|--------------|------------------|---------------------|---------|



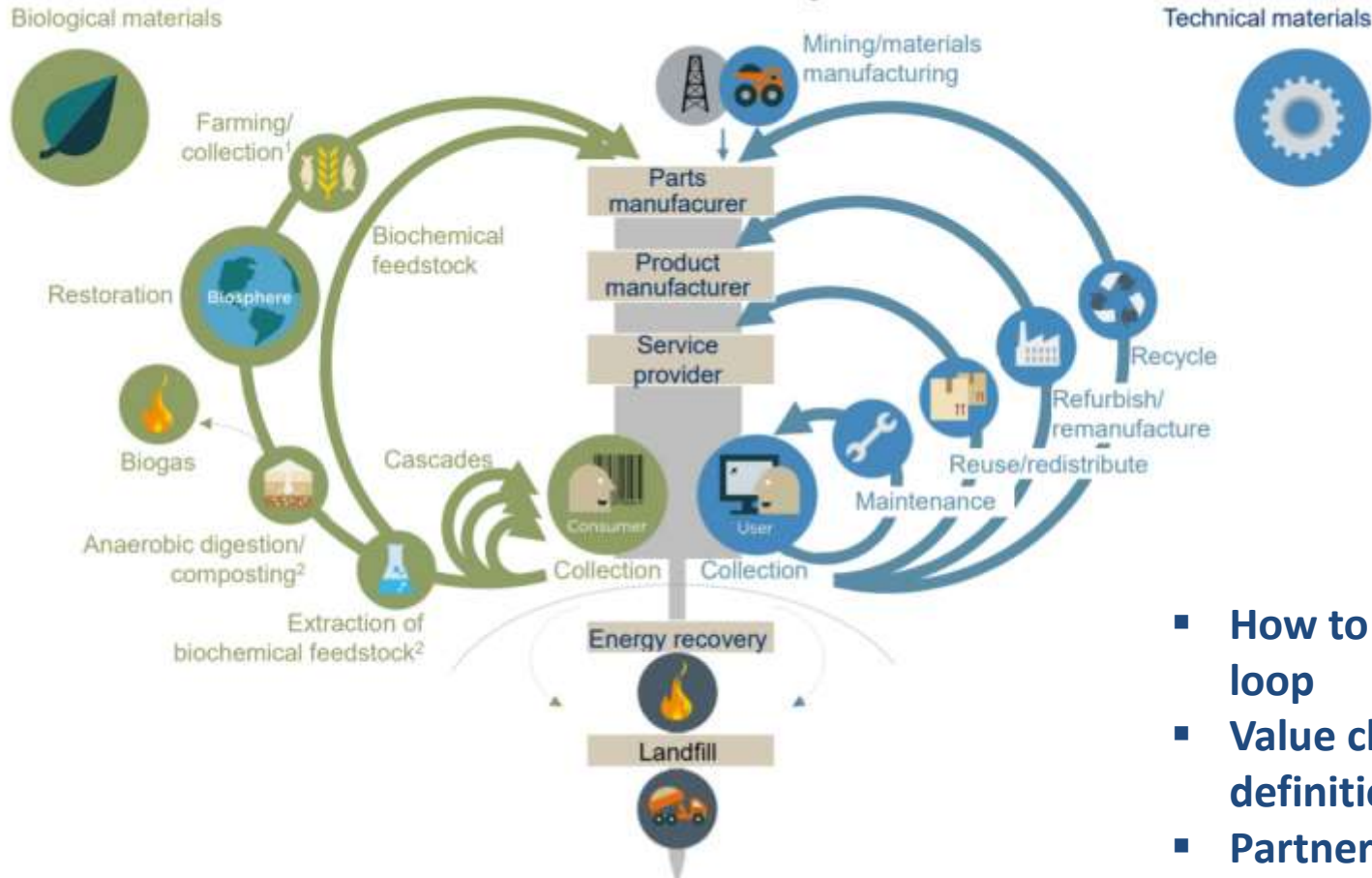
NEXT STEPS

Technology Adoption Life Cycle





OPEN DISCUSSION



- How to close the loop
- Value chain definition
- Partnerships
- Product or services?
-

Andrea Lanuzza
Email: andrea.lanuzza@gruppocap.it



SERVIZIO IDRICO INTEGRATO

