Heat Roadmap Europe 2050 — A low-carbon heating and cooling strategy

4DH — 4th Generation District Heating Technologies and Systems

reINVEST

3rd International Conference on Smart Energy Systems and 4th Generation District Heating
12-13 September 2017 · Copenhagen

Identification of potential and barriers for developing District Cooling in Lima, Peru – A case

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Is the provision of district cooling for public and commercial buildings in Lima's financial district a viable alternative?

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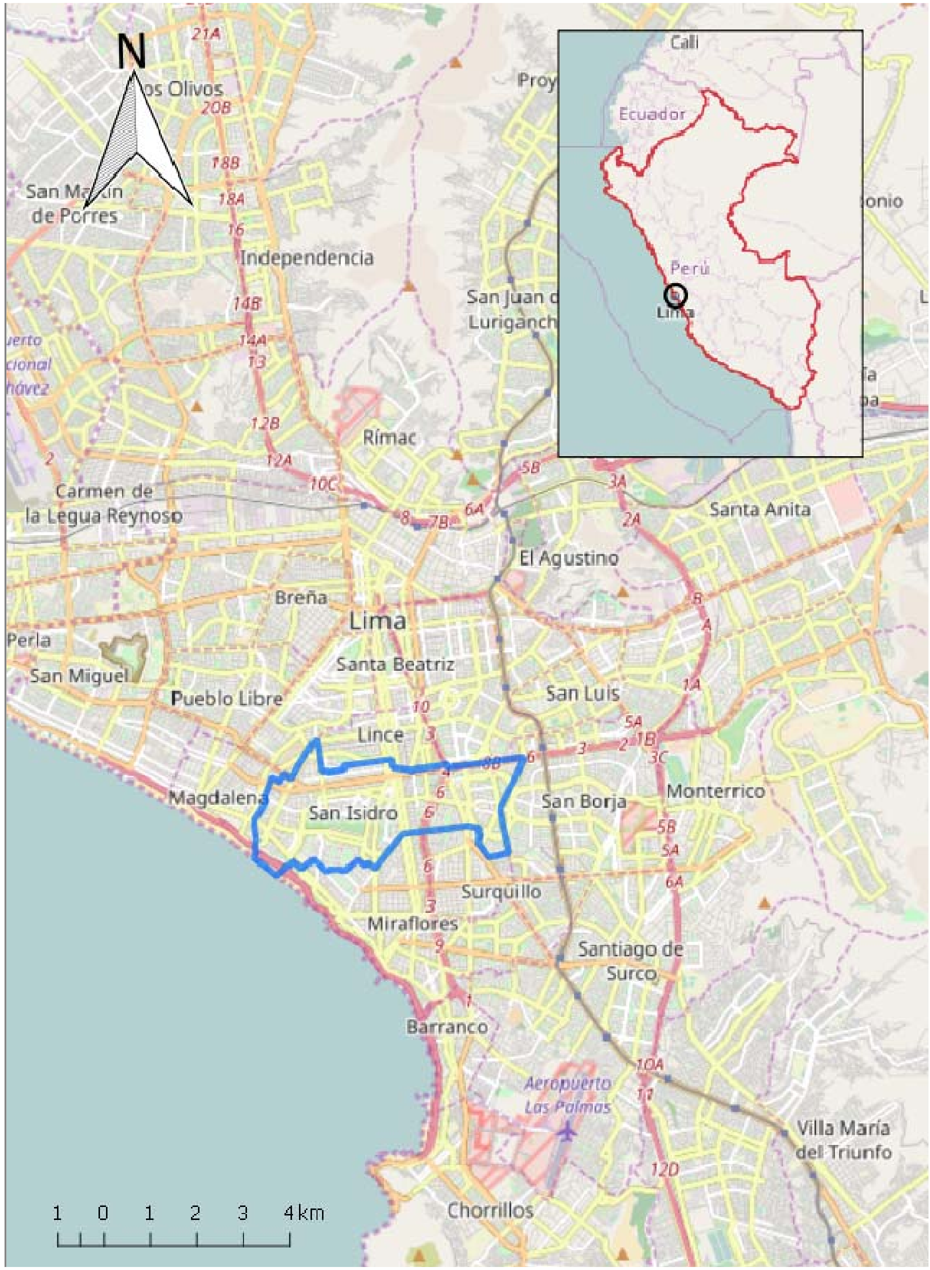
Background

- Location: San Isidro district, Lima, Perú
- Main commercial and special regulatory zones in the metro area
- General Issues warm urban areas:
  - High demand for space cooling
  - Urban heat island effect
  - Susceptibility to climate change
  - Refrigerant leaks in conventional AC




Ciudad Sostenible”
San Isidro
interbank

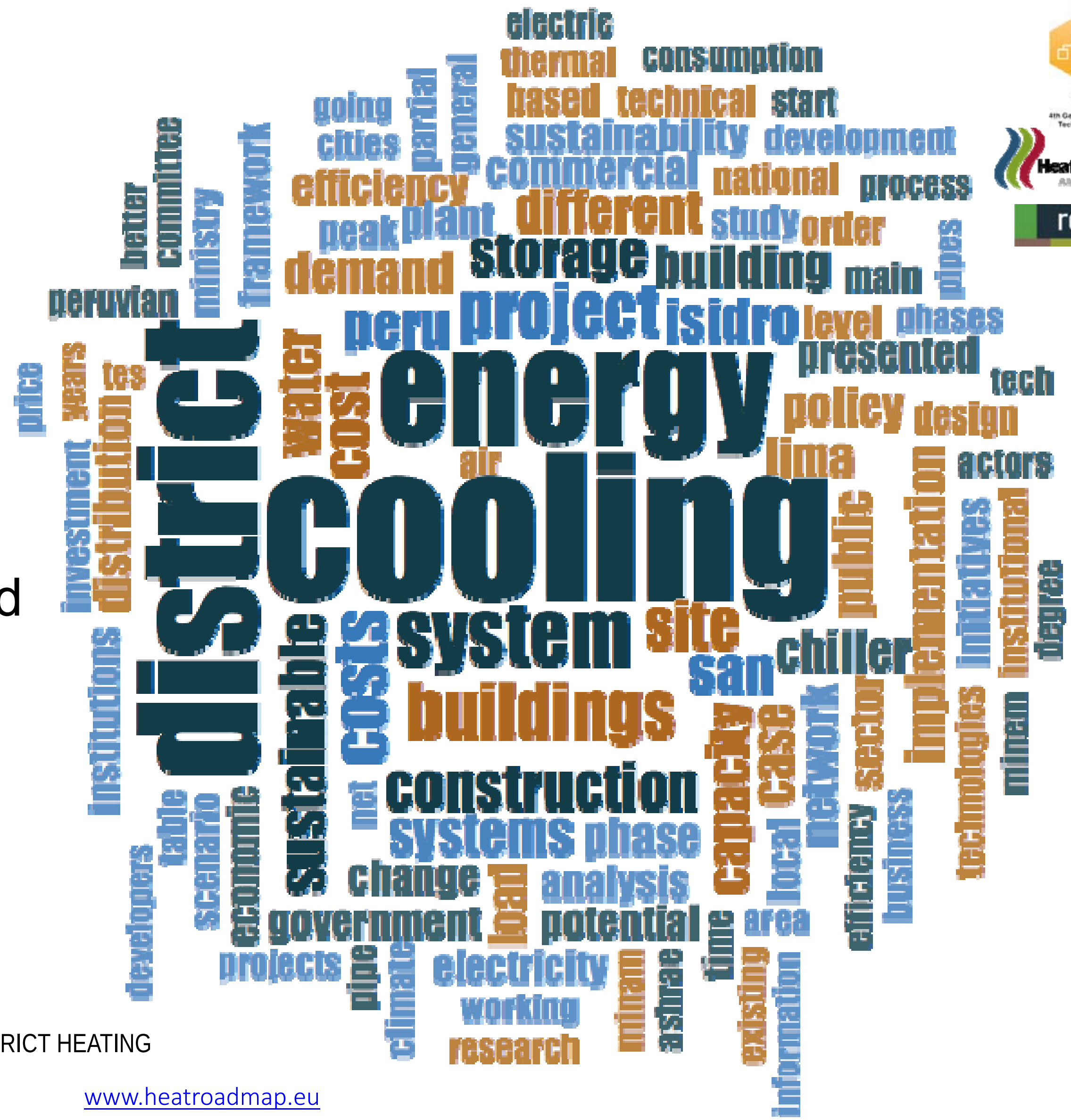


pacifico

RIMAC


Methods

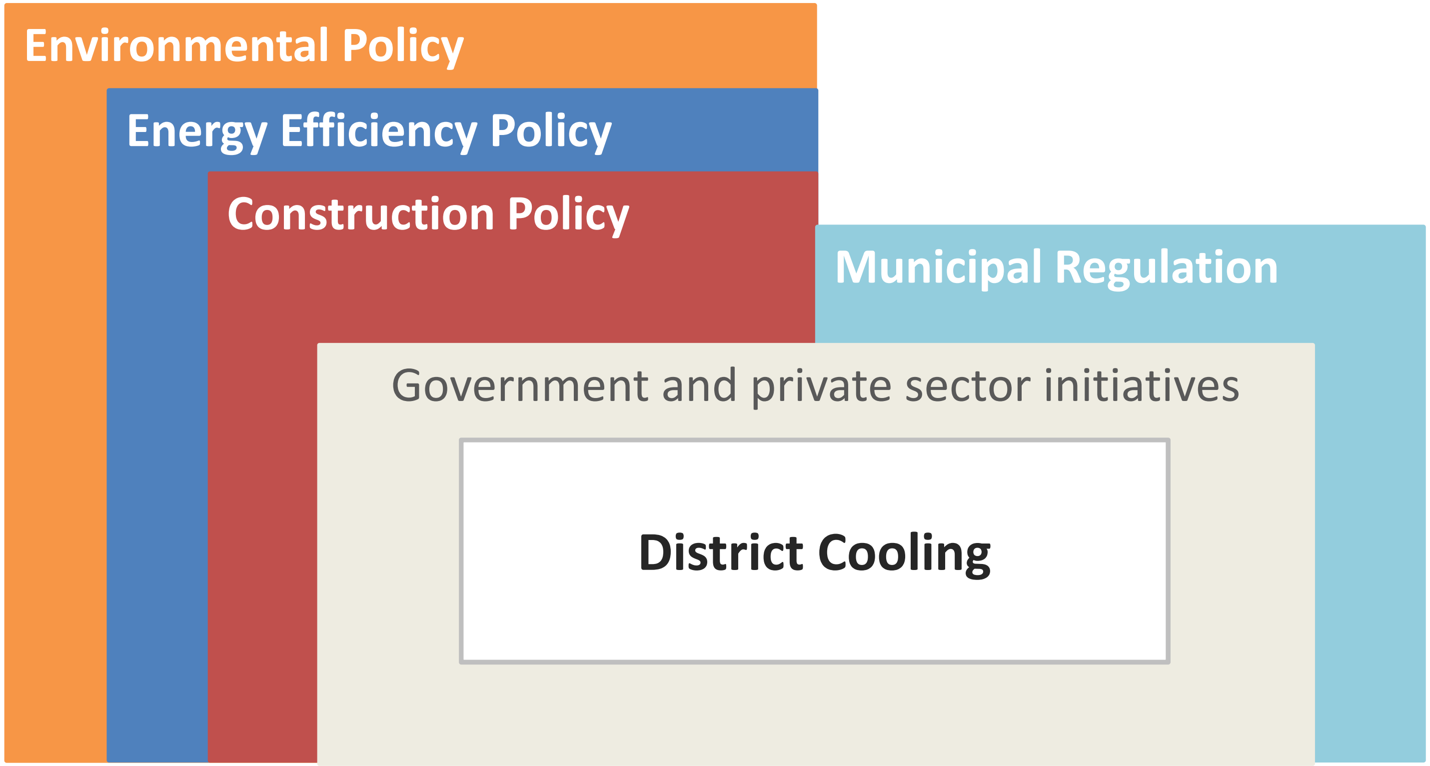
- Data Collection
  - **Interviews**
  - Literature
  - Databases
- Estimation of Cooling Demand
  - Cooling Degree-Days (CDD)
  - **Energy Mapping**
- System Sizing and Costs



Scope, Limitations and Considerations

- Exploratory study
- Limited to commercial and public buildings in San Isidro district
- Limited number of technologies considered
- No growth in existing building stock or cooling demand.
- Limited number of local stakeholders and related actors engaged.
- Final business model not assessed in detail.

Institutional Framework

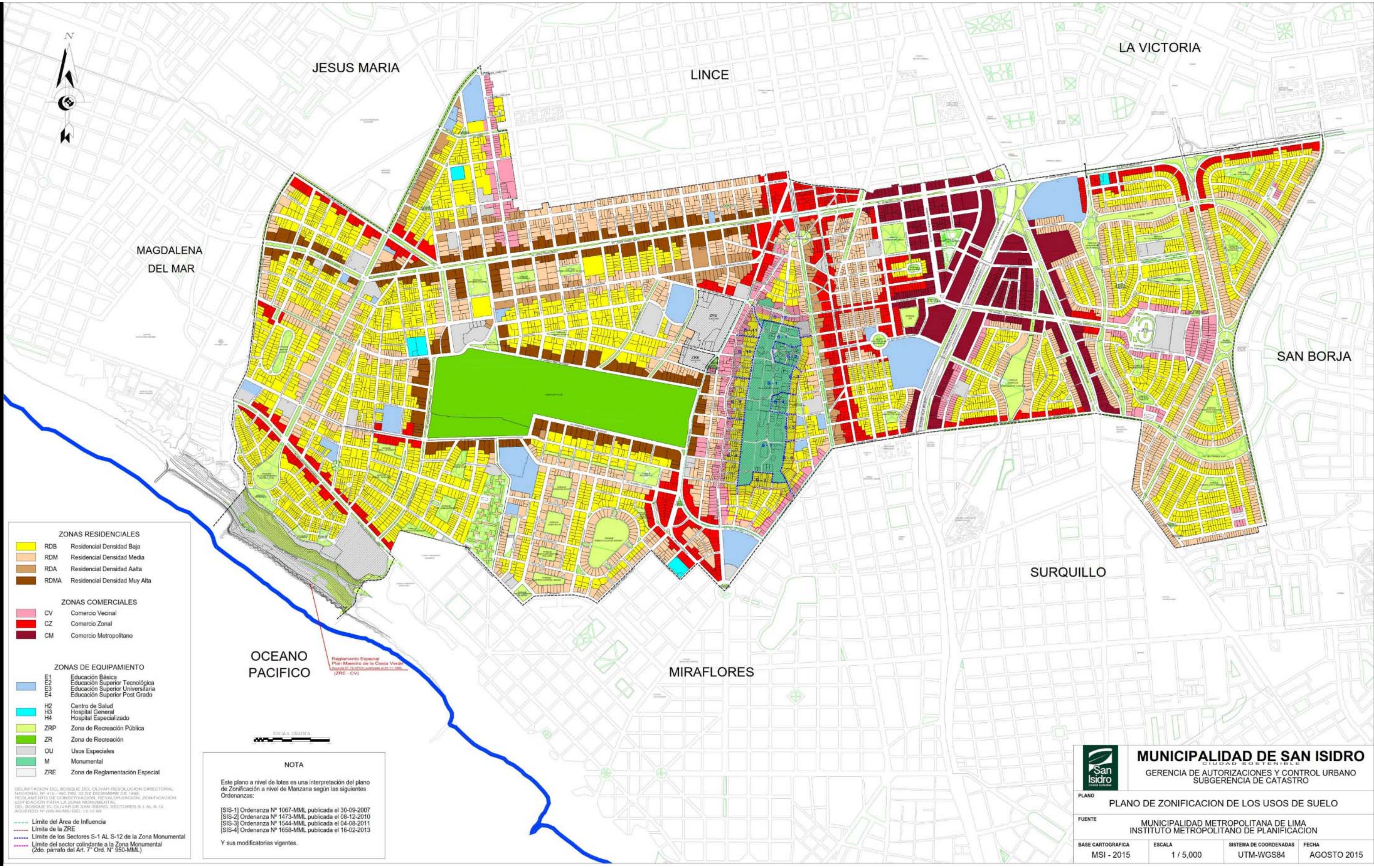


Institutional Barriers

- Conflicting attitudes and priorities within and between institutions
- Limited intervention outside of the public sector and by local governments.
- Economic cost-benefit is often the only decision driver
- Municipal zoning does not consider district energy
- No local DC expertise
- Citizens and end-consumers not in the loop
  - Generally apprehensive of public enterprises

Opportunities

- New trend towards sustainability, including energy efficiency
  - Favorable policy initiatives mandatory to public sector entities
  - Competitive edge for private sector real-state developers
- High CDD value: cooling demand year round
- High cooling demand density in the district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JESUS MARIA
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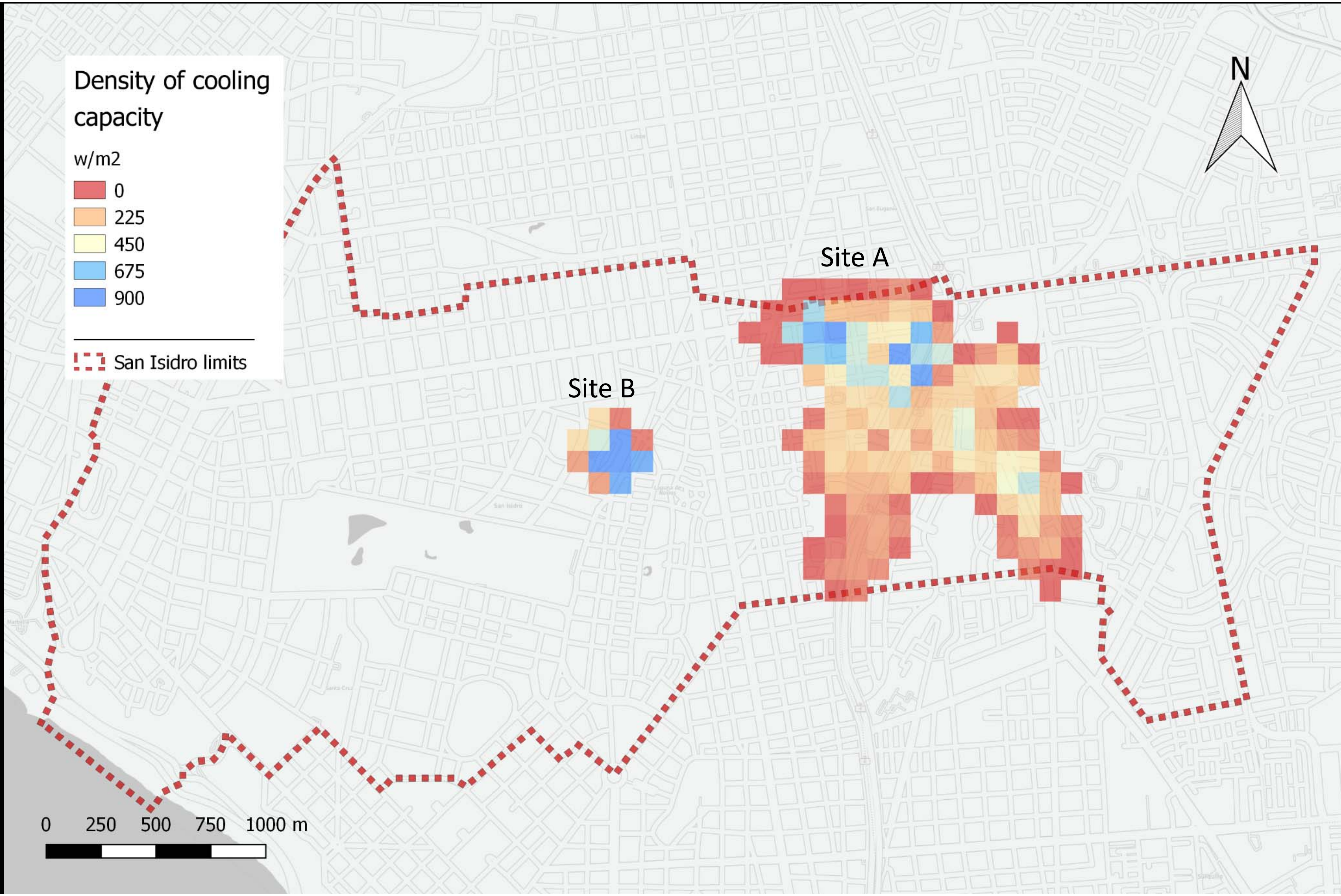
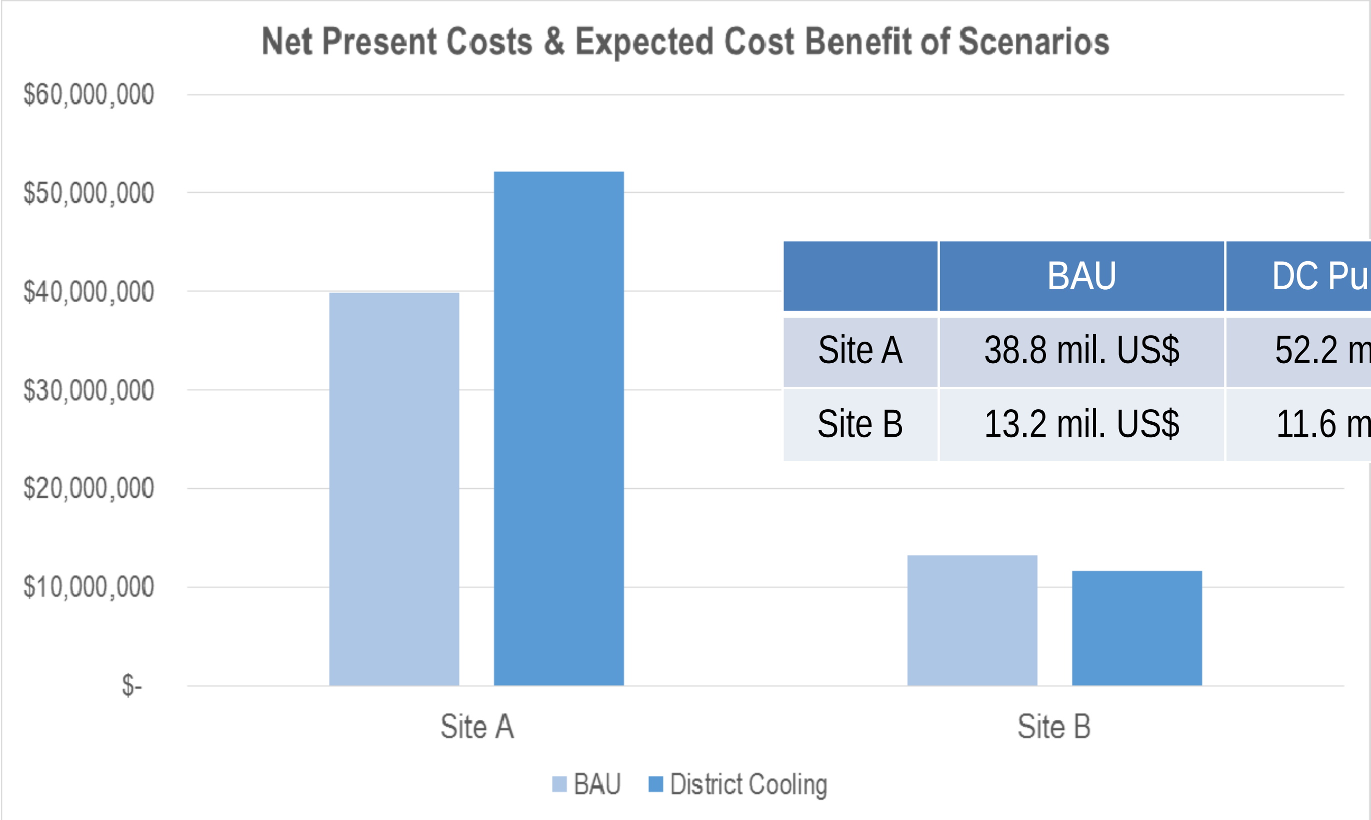
PACIFICO
MIRAFLORES
ZRE
Reglamento Especial
Plan Maestro de la Costa Verde
(ZRE - CV)
ZONAS RESIDENCIALES
RDB Residencial Densidad Baja
RDM Residencial Densidad Media
RDA Residencial Densidad Aalta
RDMA Residencial Densidad Muy Alta
ZONAS COMERCIALES
CV Comercio Vecinal
CZ Comercio Zonal
CM Comercio Metropolitano
ZONAS DE EQUIPAMIENTO
E1 Educación Básica
E2 Educación Superior Tecnológica
E3 Educación Superior Universitaria
E4 Educación Superior Post Grado
H2 Centro de Salud
H3 Hospital General
H4 Hospital Especializado
ZRP Zona de Recreación Pública
ZR Zona de Recreación
OU Usos Especiales
M Monumental
ZRE Zona de Reglamentación Especial
Límite del Área de Influencia
Límite de la ZRE
Límite de los Sectores S-1 AL S-12 de la Zona Monumental
Límite del sector colindante a la Zona Monumental
(2do. párrafo del Art. 7° Ord. N° 950-MML)
NOTA
Este plano a nivel de lotes es una interpretación del plano de Zonificación a nivel de Manzana según las siguientes Ordenanzas:
[SIS-1] Ordenanza Nº 1067-MML publicada el 30-09-2007
[SIS-2] Ordenanza Nº 1473-MML publicada el 08-12-2010
[SIS-3] Ordenanza Nº 1544-MML publicada el 04-08-2011
[SIS-4] Ordenanza Nº 1658-MML publicada el 16-02-2013
Y sus modificatorias vigentes.
San Isidro
MUNICIPALIDAD DE SAN ISIDRO
CIUDAD SOSTENIBLE
GERENCIA DE AUTORIZACIONES Y CONTROL URBANO
SUBGERENCIA DE CATASTRO
PLANO
PLANO DE ZONIFICACION DE LOS USOS DE SUELO
FUENTE
MUNICIPALIDAD METROPOLITANA DE LIMA
INSTITUTO METROPOLITANO DE PLANIFICACION
BASE CARTOGRAFICA
MSI - 2015
ESCALA
1 / 5,000
SISTEMA DE COORDENADAS
UTM-WGS84
FECHA
AGOSTO 2015



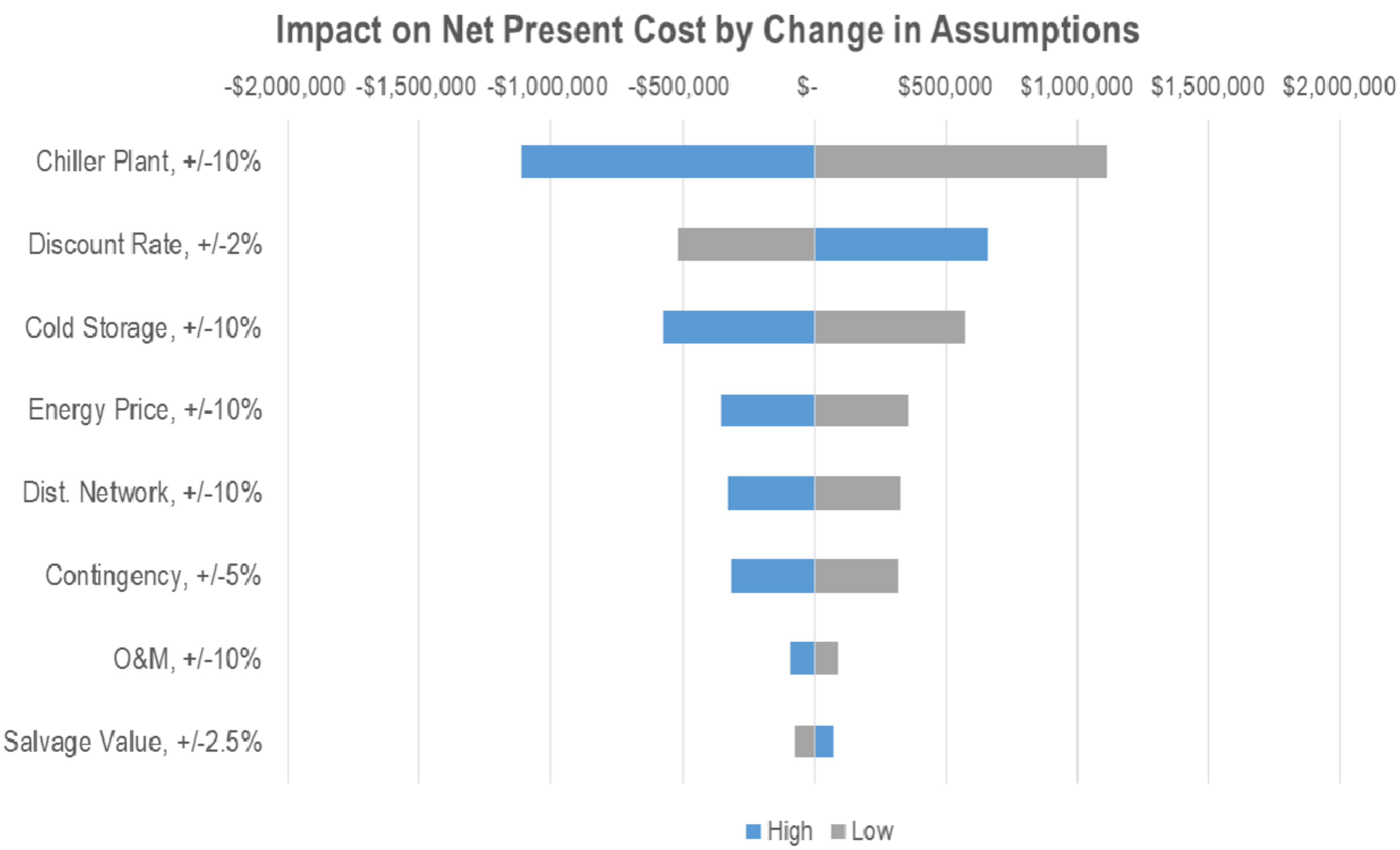
Density of cooling capacity
w/m2
0
225
450
675
900
San Isidro limits
Site A
Site B
N
0 250 500 750 1000 m

Opportunities – Cost Benefit



	BAU	DC Purchase	Avoided Cost
Site A	38.8 mil. US$	52.2 mil. US$	-12.4 mil. US$
Site B	13.2 mil. US$	11.6 mil. US$	1.6 mi. US$

Opportunities – Consumer Cost Benefit



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Conclusions

- Sometimes…economically viable
- Institutional and practical barriers present.
- Promotion, local expertise and changes in institutional governance needed.
- Climate change, energy efficiency and sustainable construction policy may serve as platforms for a district cooling developments.
- Energy mapping, and economic cost-benefit analysis serve as tools for identifying and promoting new district cooling potentials.

Further Work

- More detailed analysis of demand and implementation alternatives
- Analyze residential sector
- Further engagement with utility companies
- Explore cooperation options between public and private sector

Thank you!

Questions

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Specifications

	Site A	Site B
Estimated Capacity [MW]	51.8	13.3
Network length [m]	9942	1206
Chiller capacity [MW]	24.1	6.0
Storage capacity [MWh]	267	71
Storage size [m3]	28,700	7,600

Thank you!

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