



**bound by water, limited by land**  
rethinking the metabolism of tourism-transformed island territories in South Aegean, Greece

Evgenia Vamvakousi | 6082556  
P5 Presentation

# Cyclades

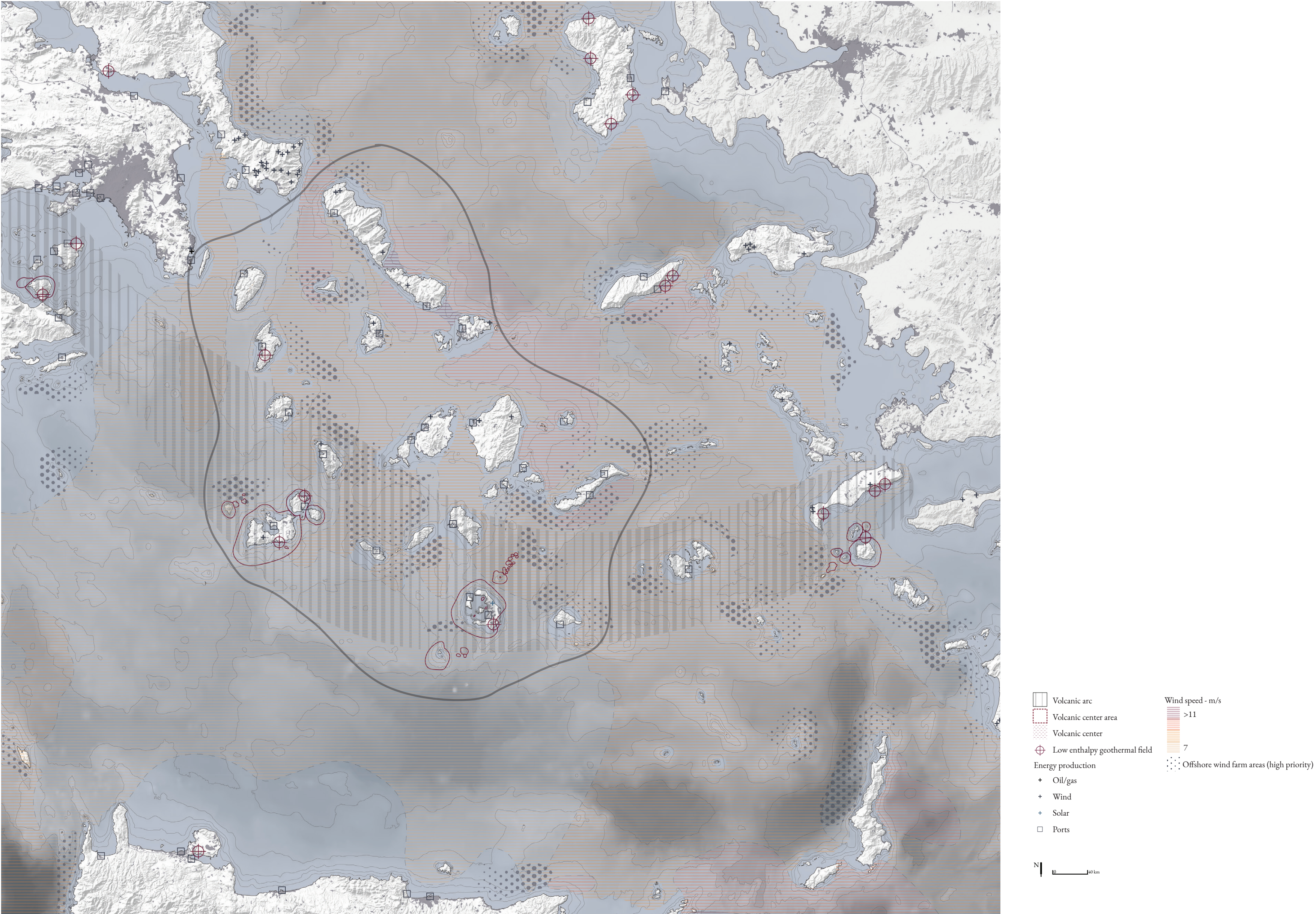


Figure 1. More than human presence in South Aegean

# global connection, local disconnection

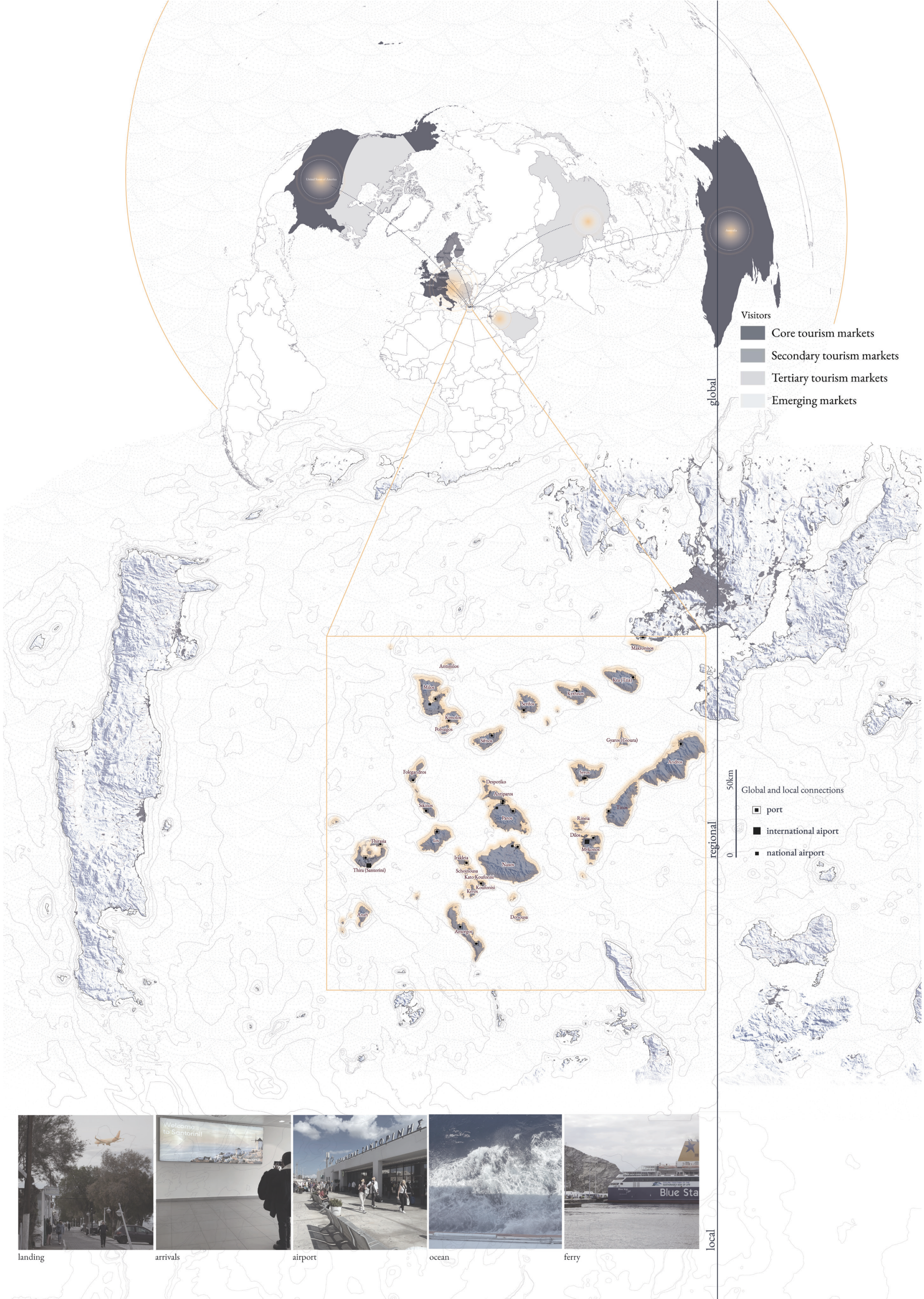


Figure 2. From global to local

island metabolism  
**island metabolism approach**

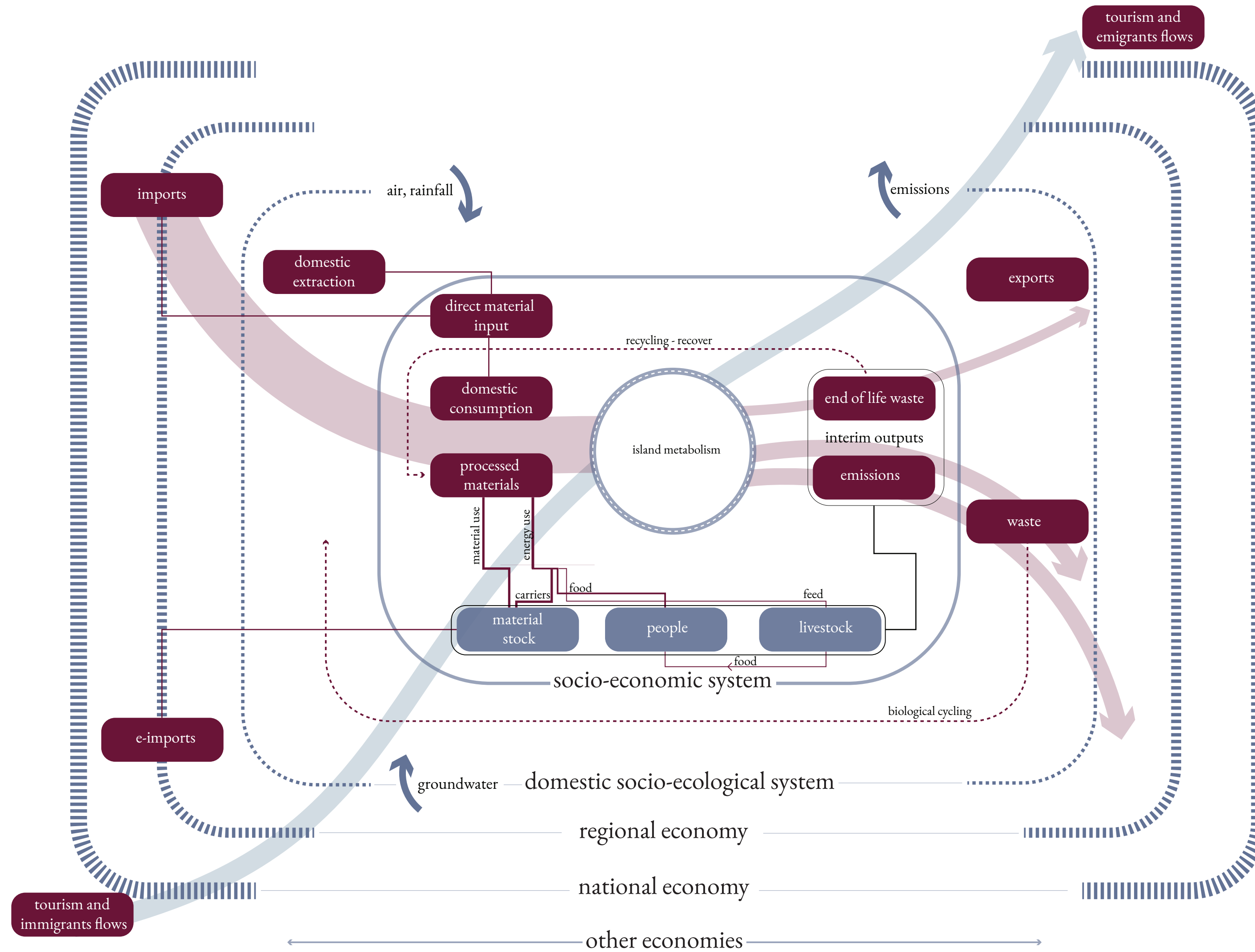
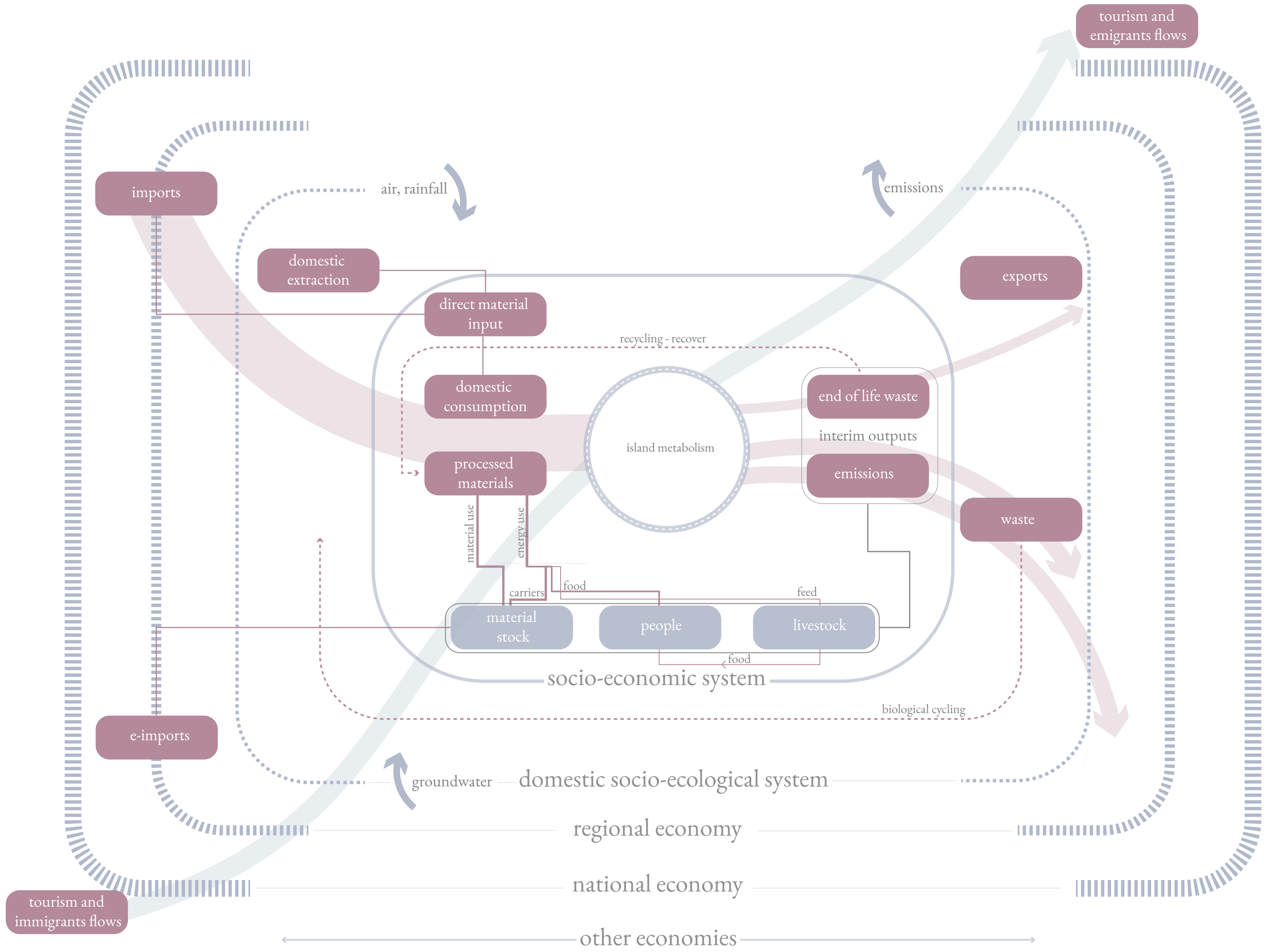


Figure 3. MEFA diagram, adapted from (Singh et. al., 2022) (Noll et. al., 2022) 4

# island metabolism approach | metabolism through the lense of landscape



energy

water

food

materials

waste



landscape

island metabolism  
traces of past metabolism



Figure 4. Object drawing, desalination plant in Ia, Santorini

Figure 5. Private borehole



Figure 7. Quarry



Figure 6. Oil thermal unit



Figure 8. Lanfill

small greek islands daily

Scientific seminar  
Planning (for) the limits of small islands

Ποιες είναι οι απειλές και πώς μπορούν να αντιμετωπιστούν;  
«Σχεδιάζοντας (α)τα όρια των μικρών νησιών», την Τετάρτη 6 Νοεμβρίου,  
11πμ - 7μμ.



Τα νησιά μας κινδυνεύουν άμεσα να απολέσουν οριστικά τη μοναδική τους ταυτότητα. Ποιες είναι οι απειλές και πώς μπορούν να αντιμετωπιστούν;

... before they lose their unique identity

our recent legislation approaches the concept of carrying capacity is entirely unscientific, confusing parameters and ultimately reducing carrying capacity to a political decision



...we avoid measuring the pressure exerted by tourism so that we remain UNAWARE

...prioritizing monumental investments

...“war” for the urban plans of the islands

Last chance for the islands?

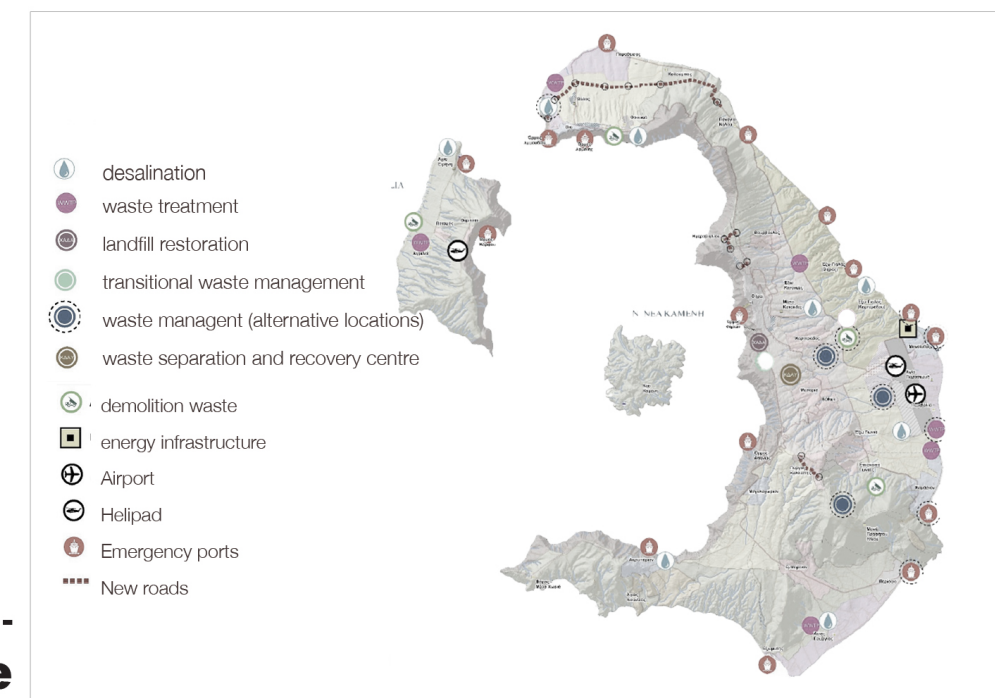
Κοινωνία  
Τελευταία ευκαιρία για τα νησιά;

Το ταπεινό παλαιό κτίριο ανάμεσα στα νεοκλασικά κτίρια στο Μύκονο και στο Σαντορίνι. Πόσο πιθανό είναι να αποκτήσουν νέους όρους διάκρισης οι δύο επιφανή νησιά προσαρμοσμένοι; Οι τοπικοί φορείς σκεπάζονται.



Κατασκευαστικό εργοστάσιο στο Μύκονο, όπου κλείνει της σκεπές, αυξανόμενης πίεσης της τουριστικής αγοράς για όλα και παραδοσιακές κτίσεις. (Miklos Argenteos/The New York Times)

Proposed spatial organization - technical and environmental infrastructure



...tourism investments on islands larger than their settlements

"Our islands are not a museum to be put behind a glass, nor a backdrop for the vacations of the entire planet."

"A limit must be established based on the carrying capacity of each island and its human environment to preserve island identity".

Figure 9. Debates around carrying capacity and spatial plans

**problem statement**

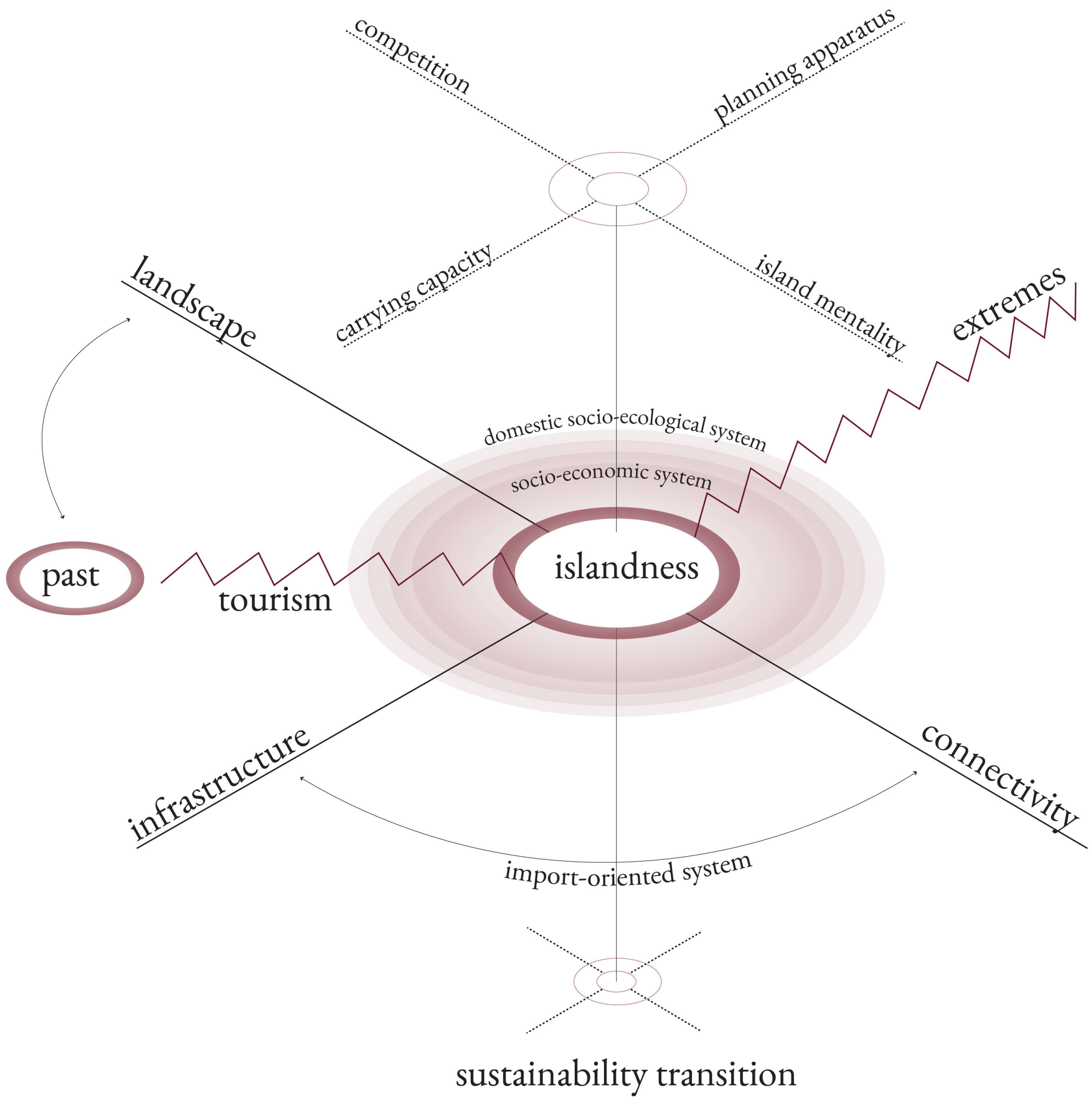


Figure 10. Problem statement

# project trajectory

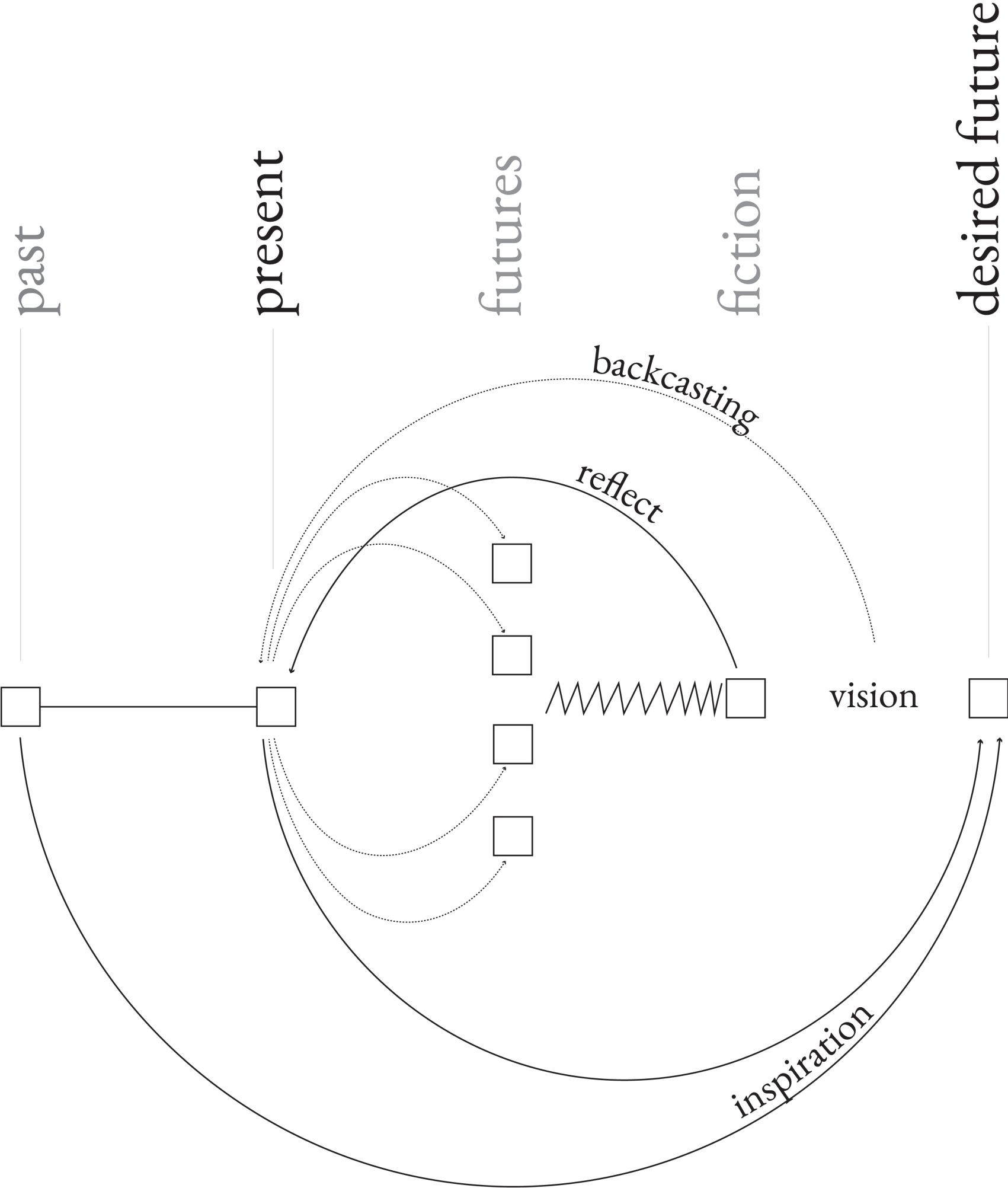


Figure 11. Project trajectory

crafted fiction  
project trajectory

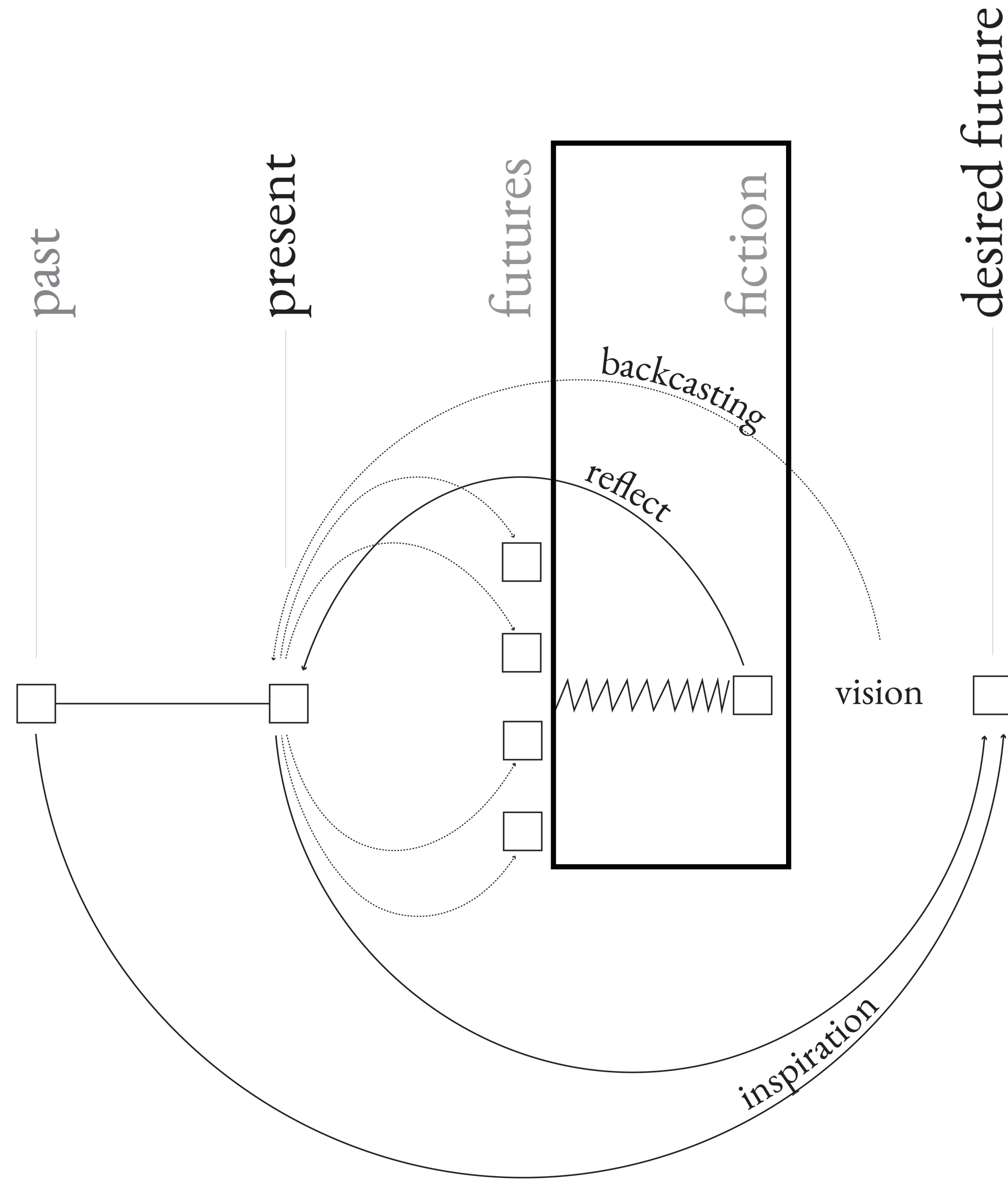


Figure 12. Project trajectory

crafted fiction  
**crafted fiction overview**

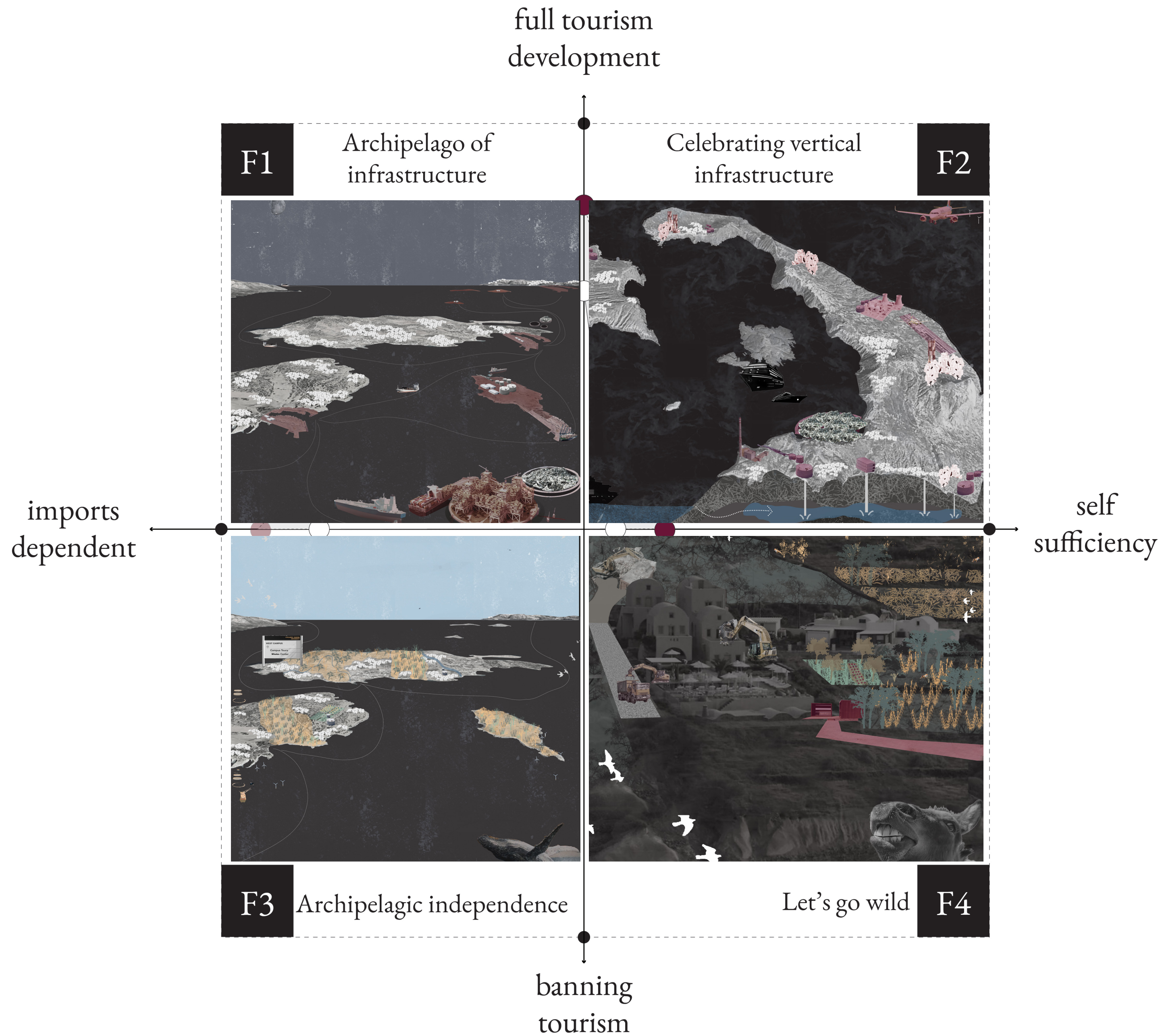
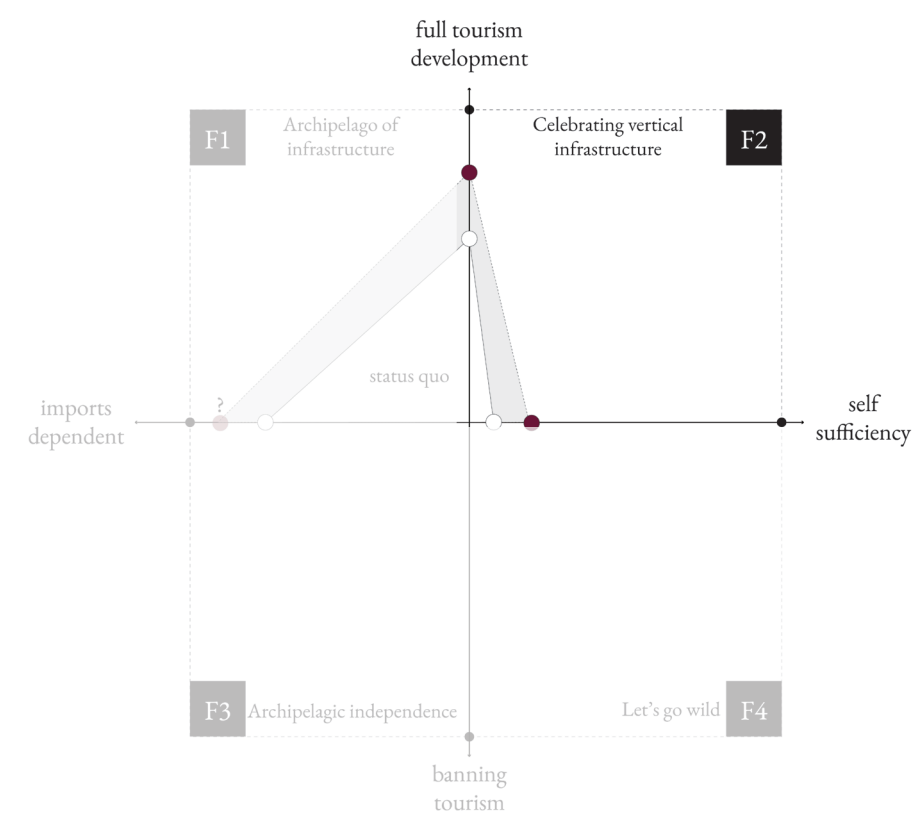


Figure 13. Crafted fiction overview

## fiction 2. celebrating vertical infrastructure

*“You can find the cheapest hotels next to the nuclear power plant”.*

Jen, Travel Blogger



crafted fiction  
reflective positioning

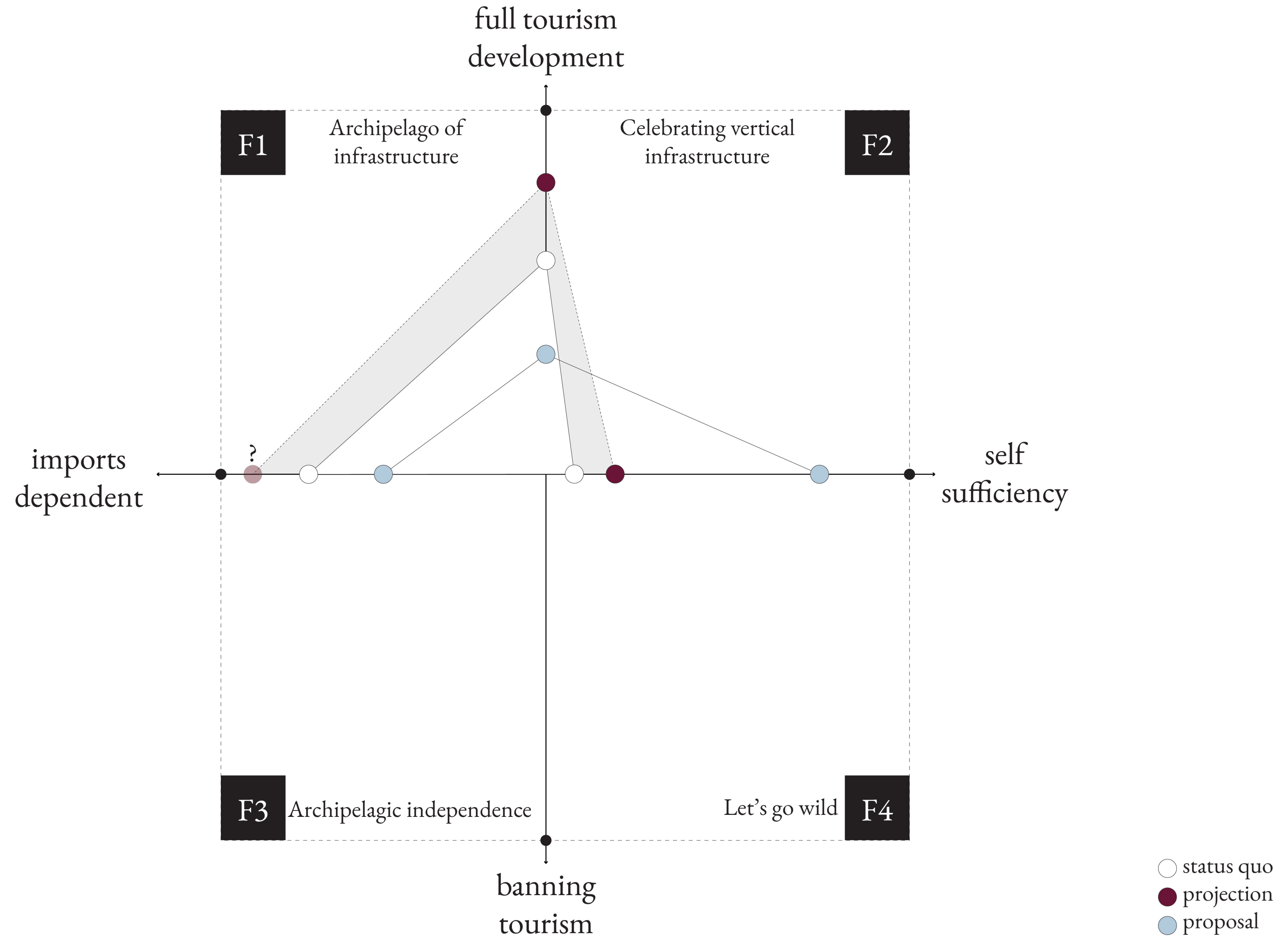


Figure 14. Reflective positioning

project trajectory

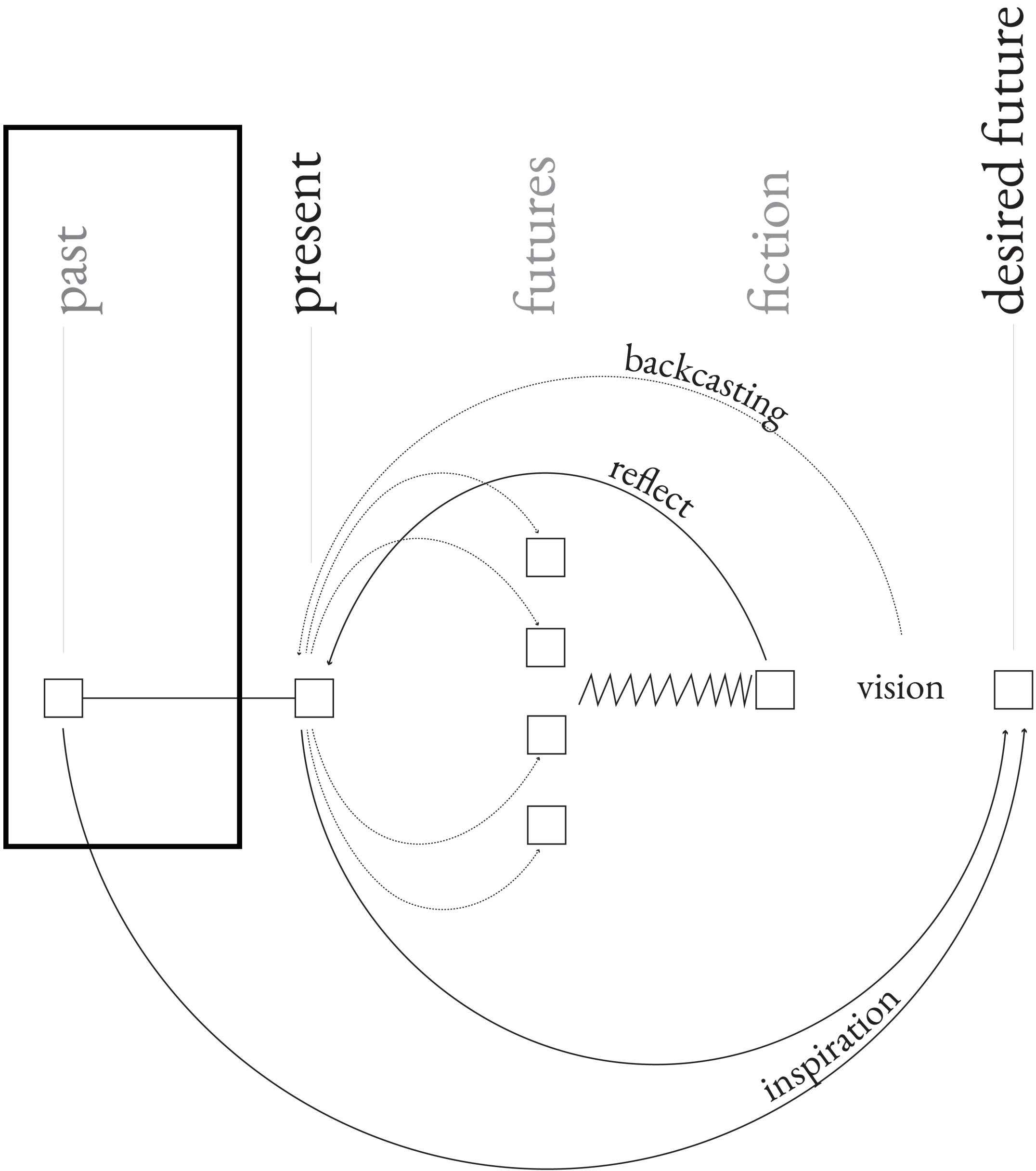
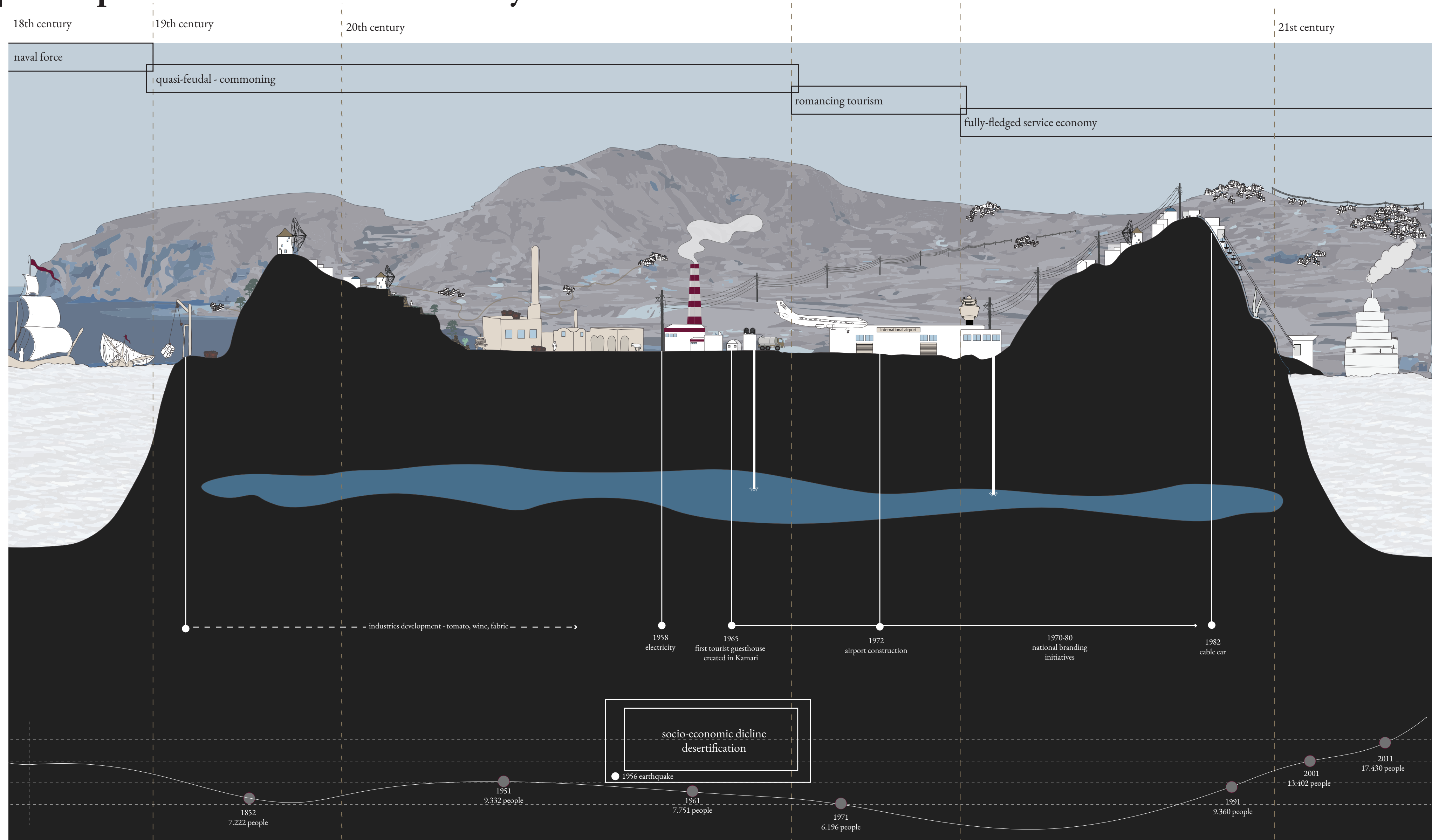


Figure 15. Project trajectory

case study  
**Santorini | from quasi-feudal to service economy**



island metabolism  
past handmade landscape

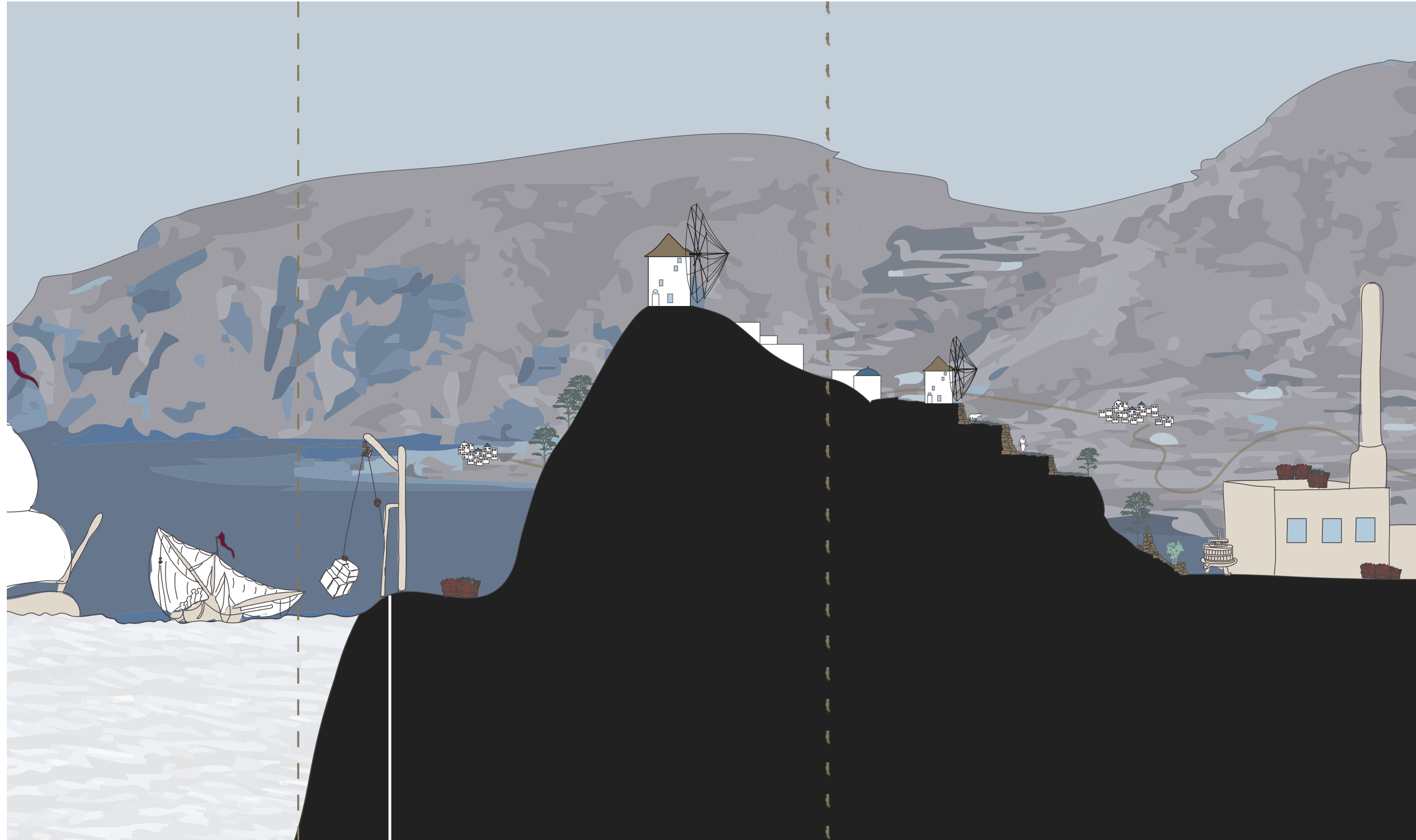


Figure 17. Handmade landscape

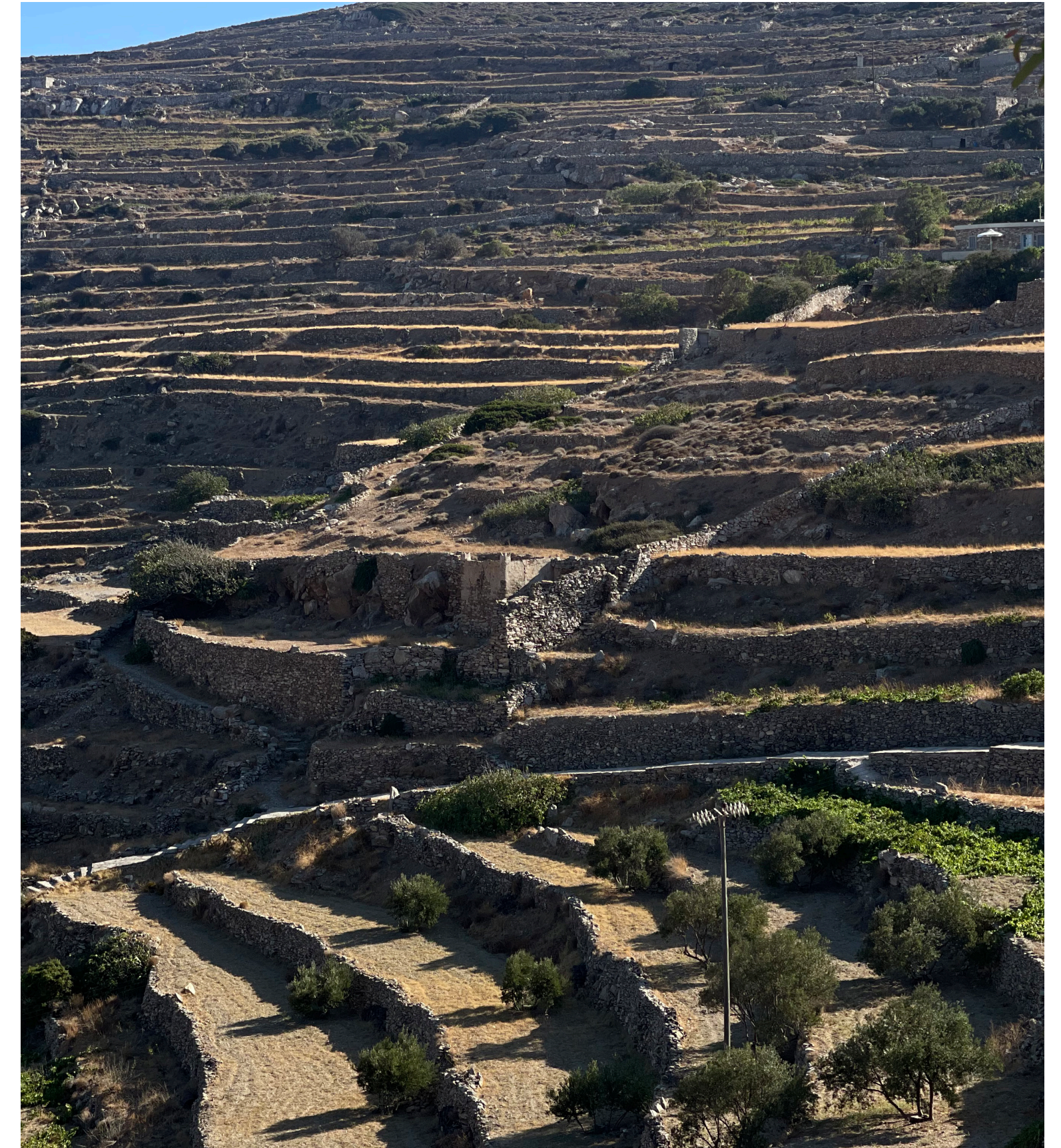


Figure 16. Terraced landscape in Sikinos, July 2024



Figure 18. Traces of past metabolism

crafted fiction  
project trajectory

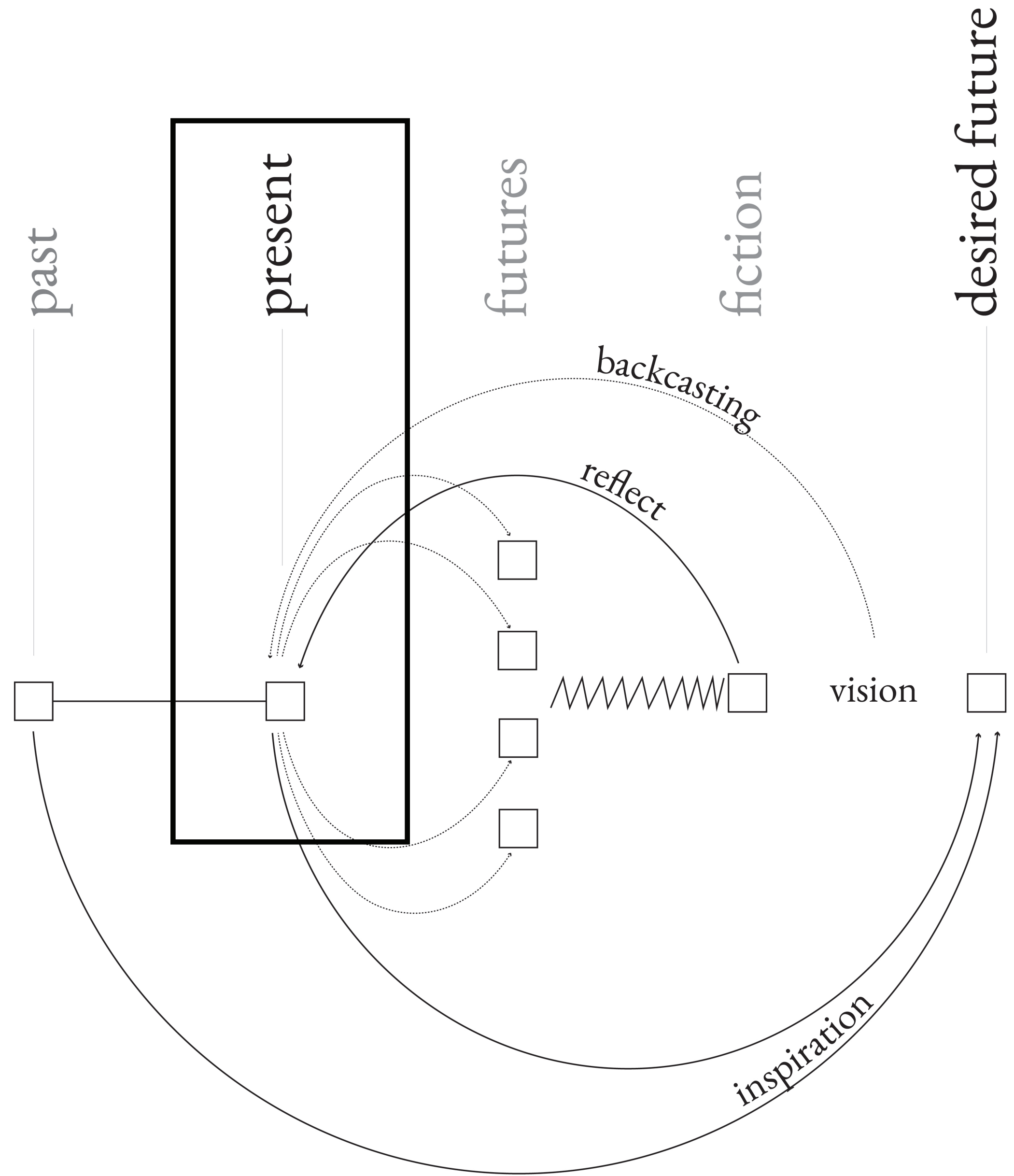


Figure 19. Project trajectory

island metabolism  
emergence of tourism

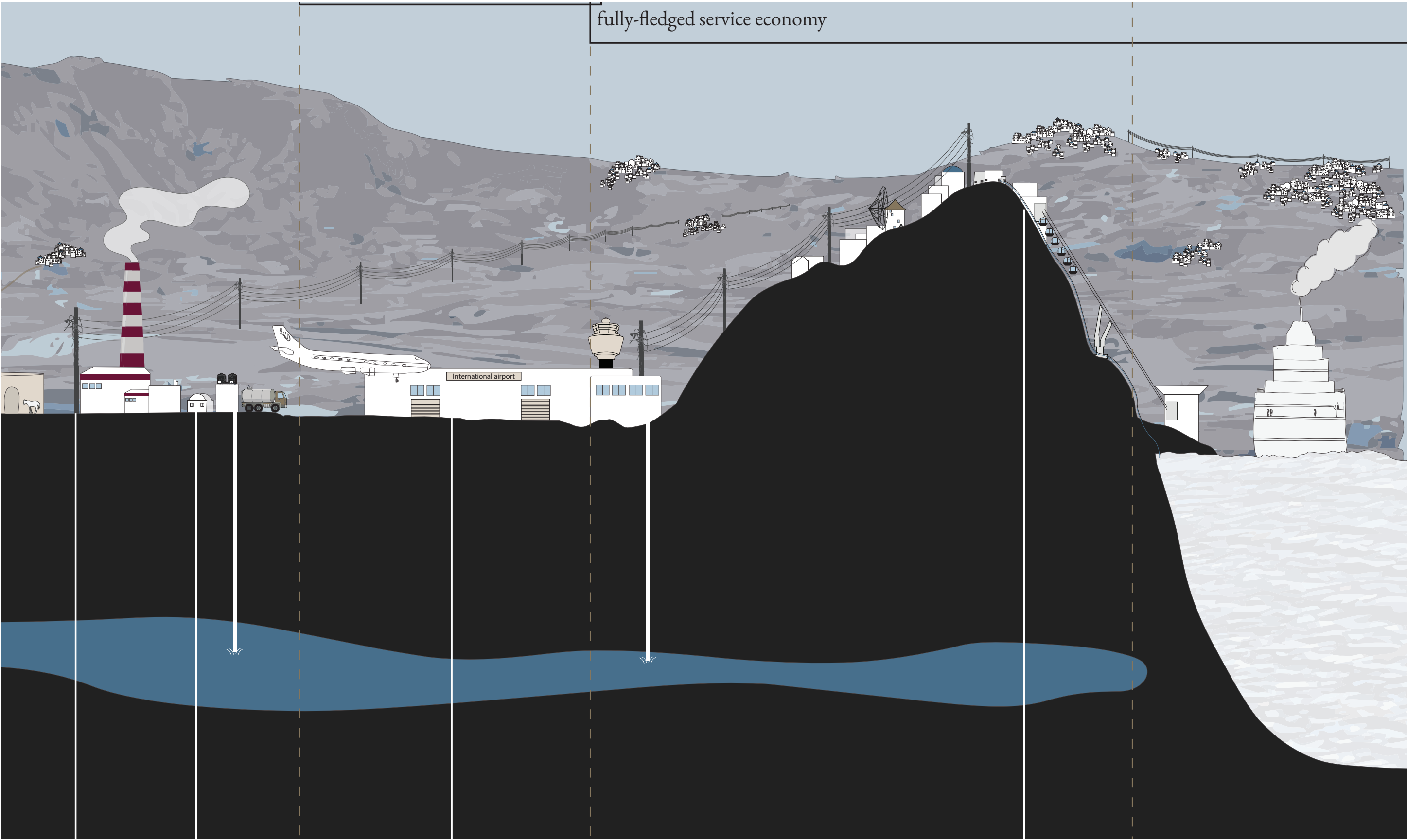


Figure 20. What was the crucial moment in time when everything changed?, made by the author with data from Lichrou et. al., 2017 and ELSTAT

island metabolism  
 emergence of tourism and infrastructuralization

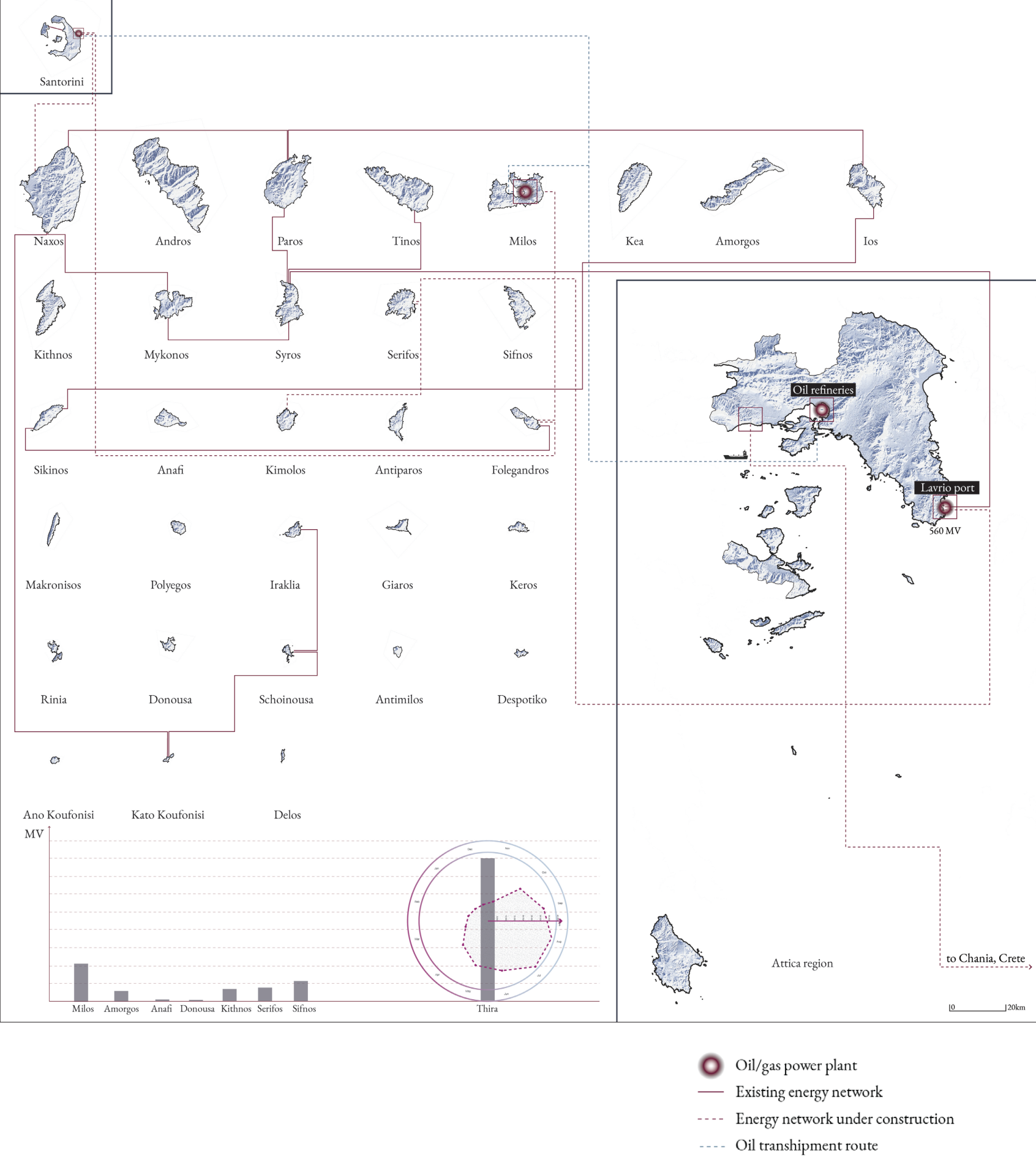
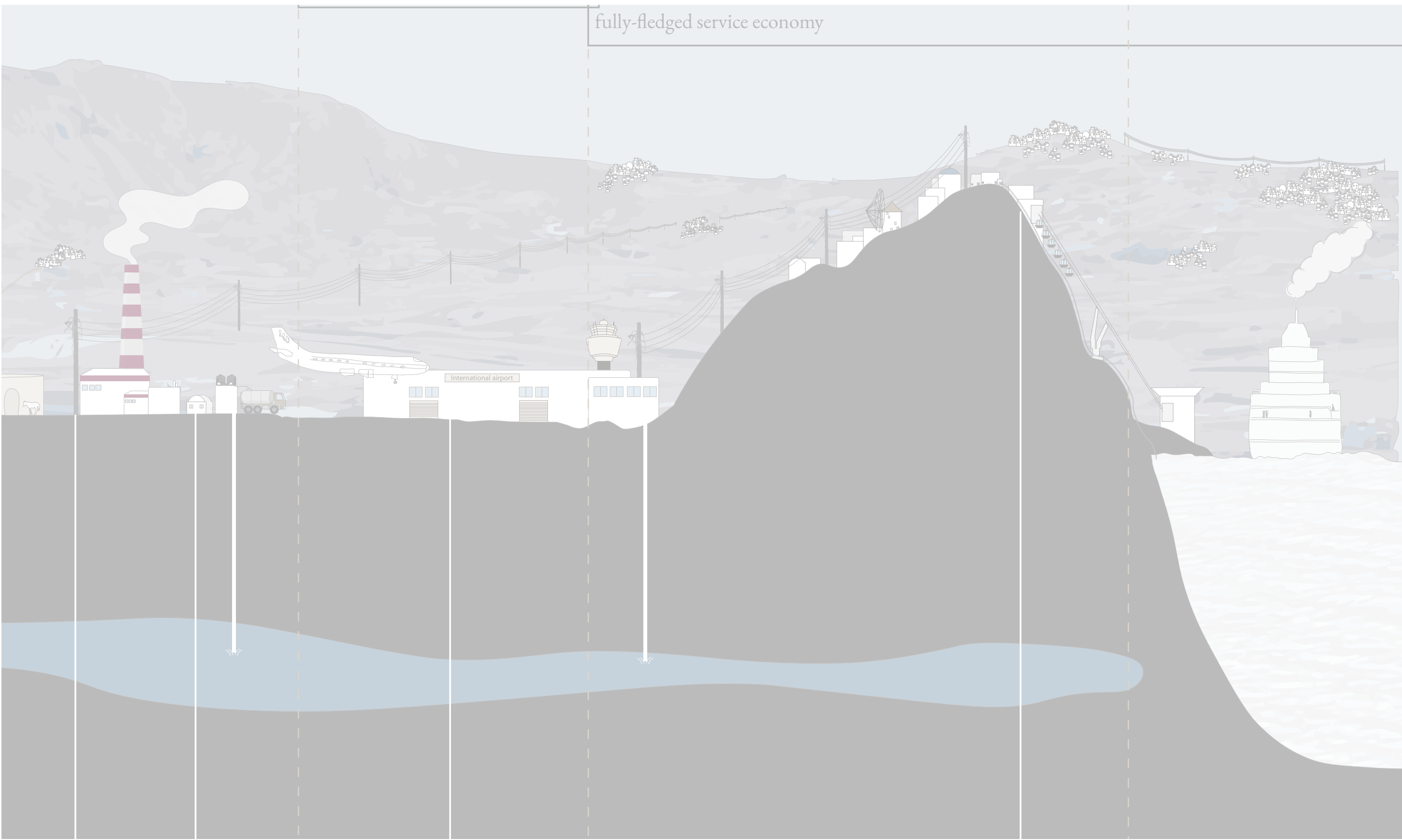


Figure 21. Infrastructuralization, made by the author with data from Lichrou et. al., 2017 and ELSTAT

Figure 22. More than city | human drawing - inverted city-hinterland 20

island metabolism  
**import-oriented system**



Figure 23. Materials arriving from Aliveri, Evia

island metabolism  
transformation

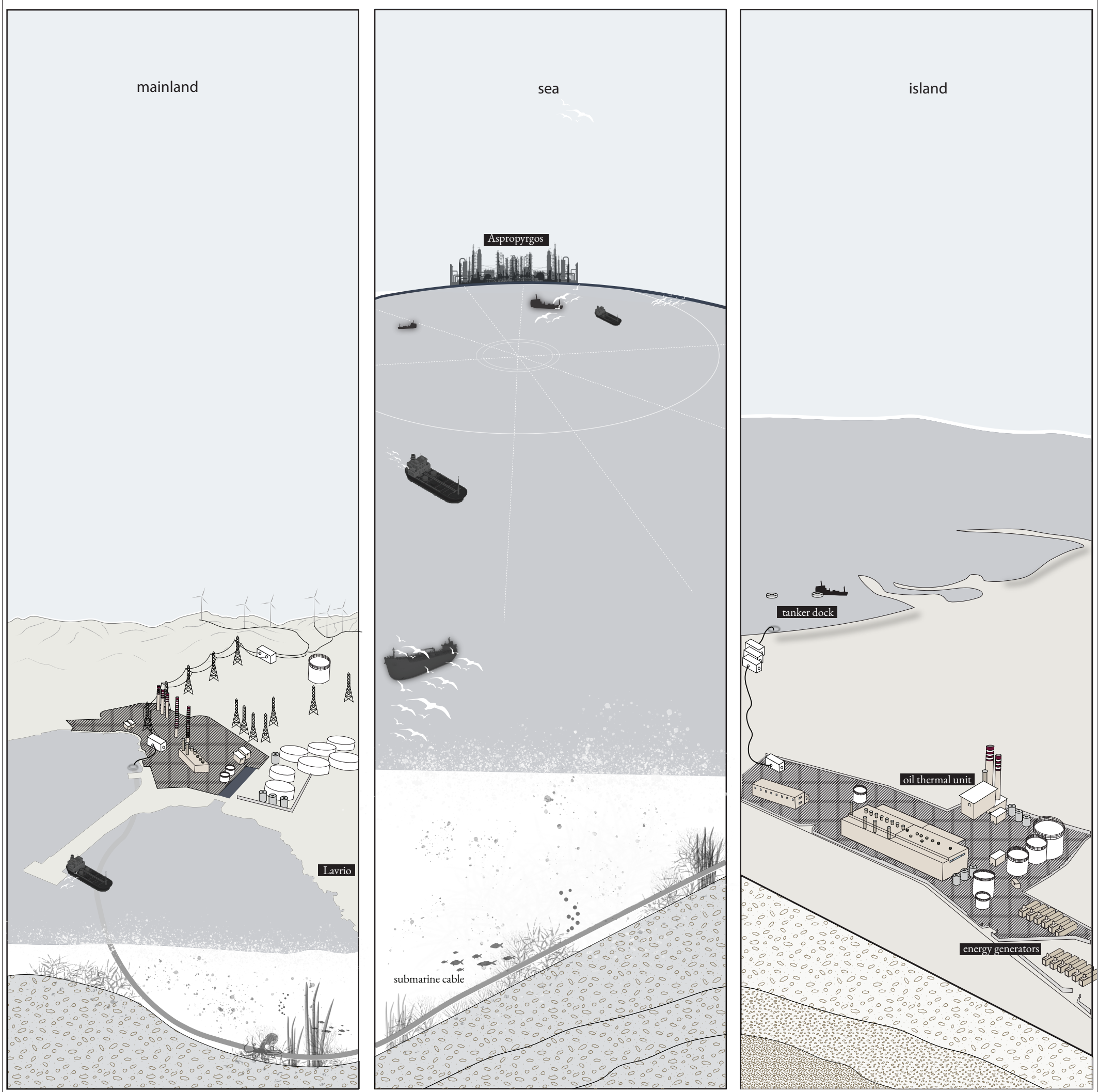


Figure 24. Energy production



Island dynamics (CPT)

Administrative dependencies

●●● regional

--- subregional

⋮ subregional units

Settlements dynamics (CPT)

■ highest order center

● middle order center

□ Settlement network

⋮ CPT polygons

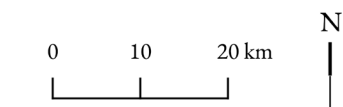


Figure 25. Map illustrating the current island dynamics

island metabolism  
island dynamics

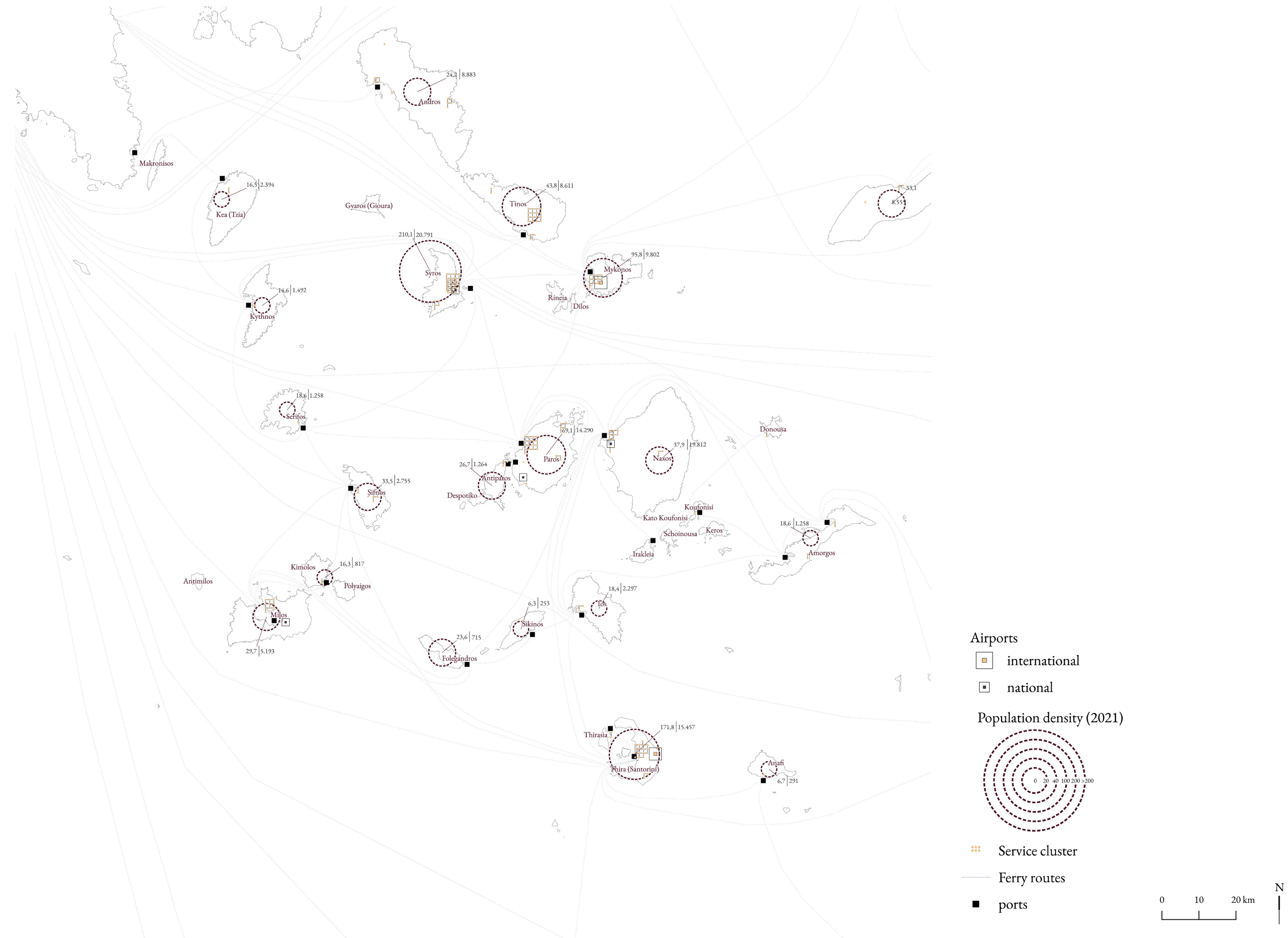


Figure 26. Services, infrastructure, connections, and population dynamics

island metabolism  
current profiles

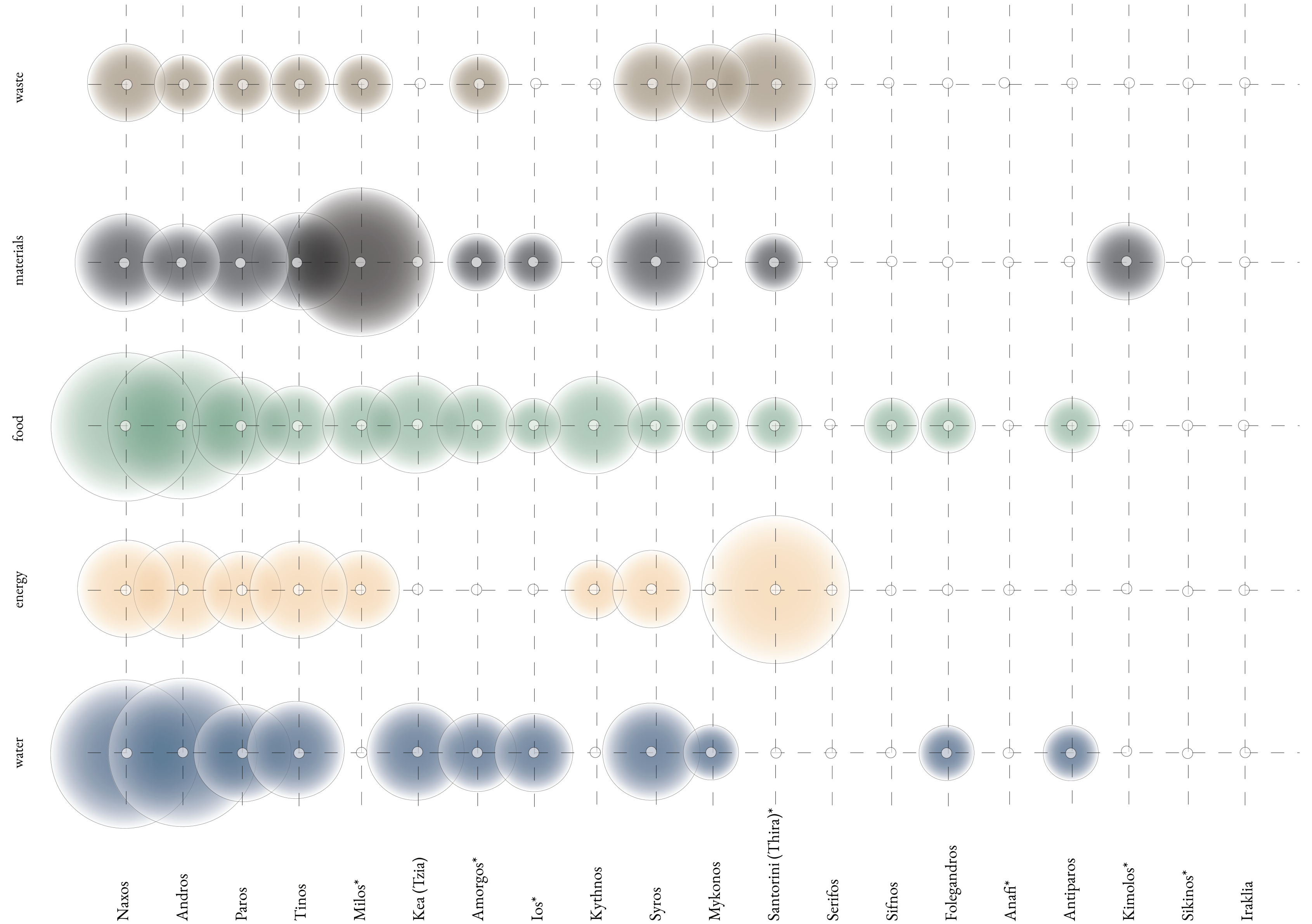


Figure 27. Metabolic profiles

island metabolism  
tidal pressure

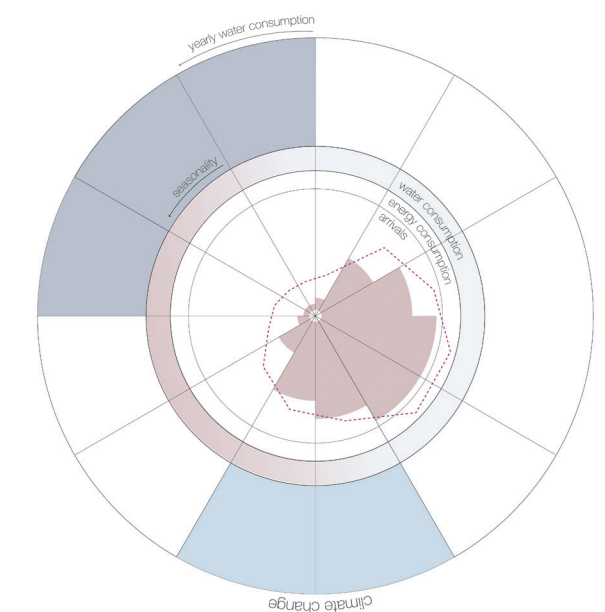
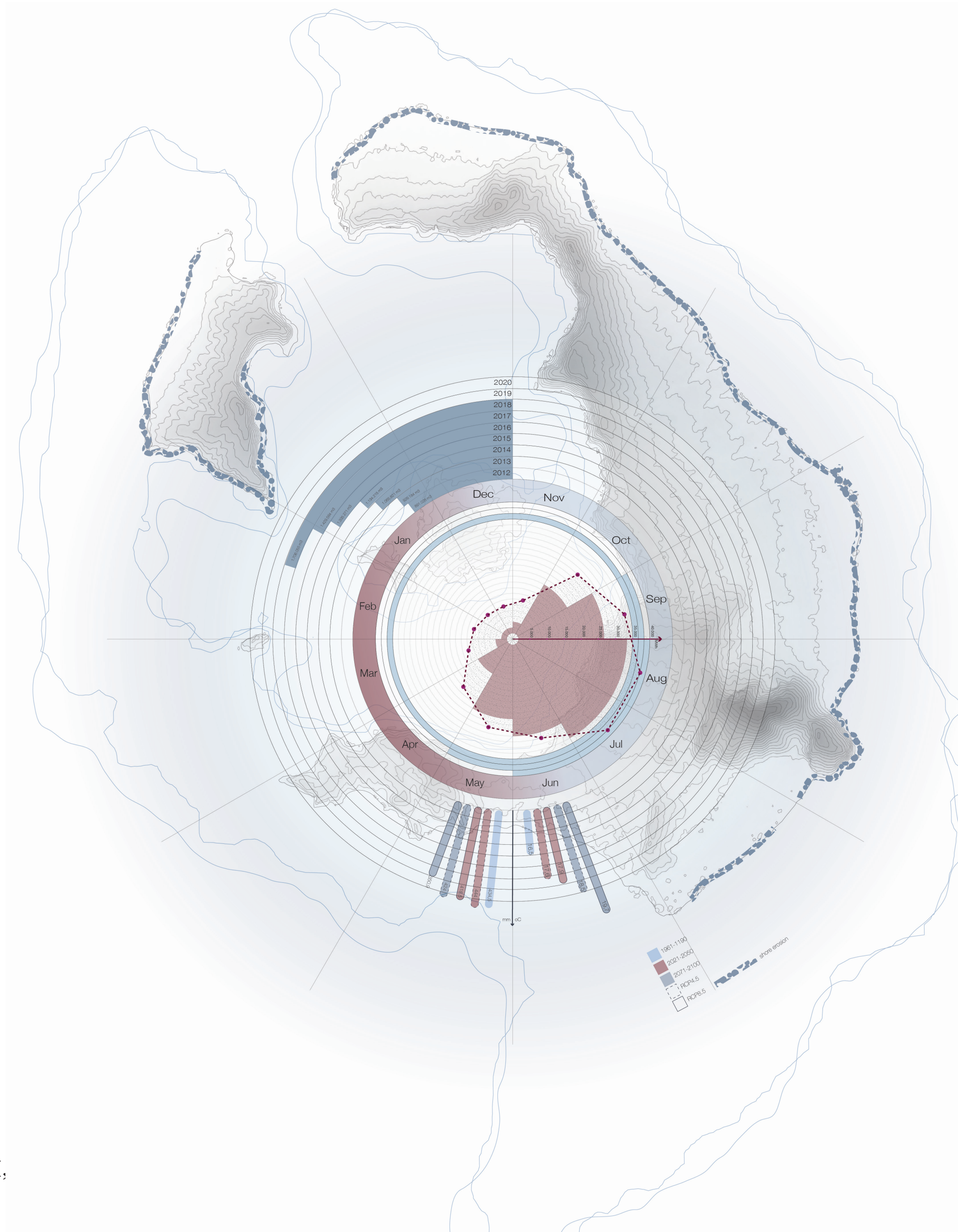


Figure 28. Tidal pressure, limits drawing, data from: IPTO, Fraport, EYATH,

island metabolism  
tidal labor

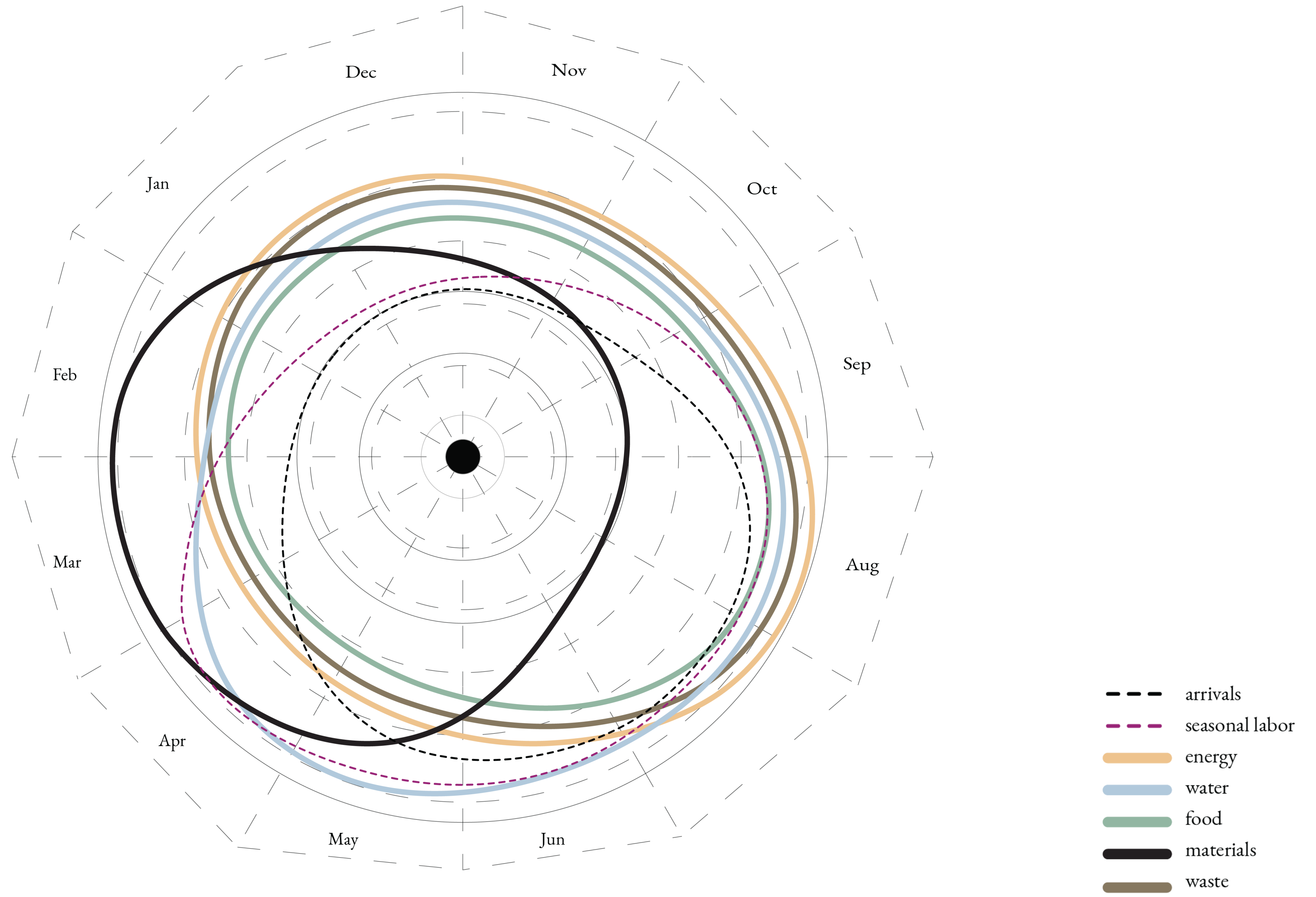
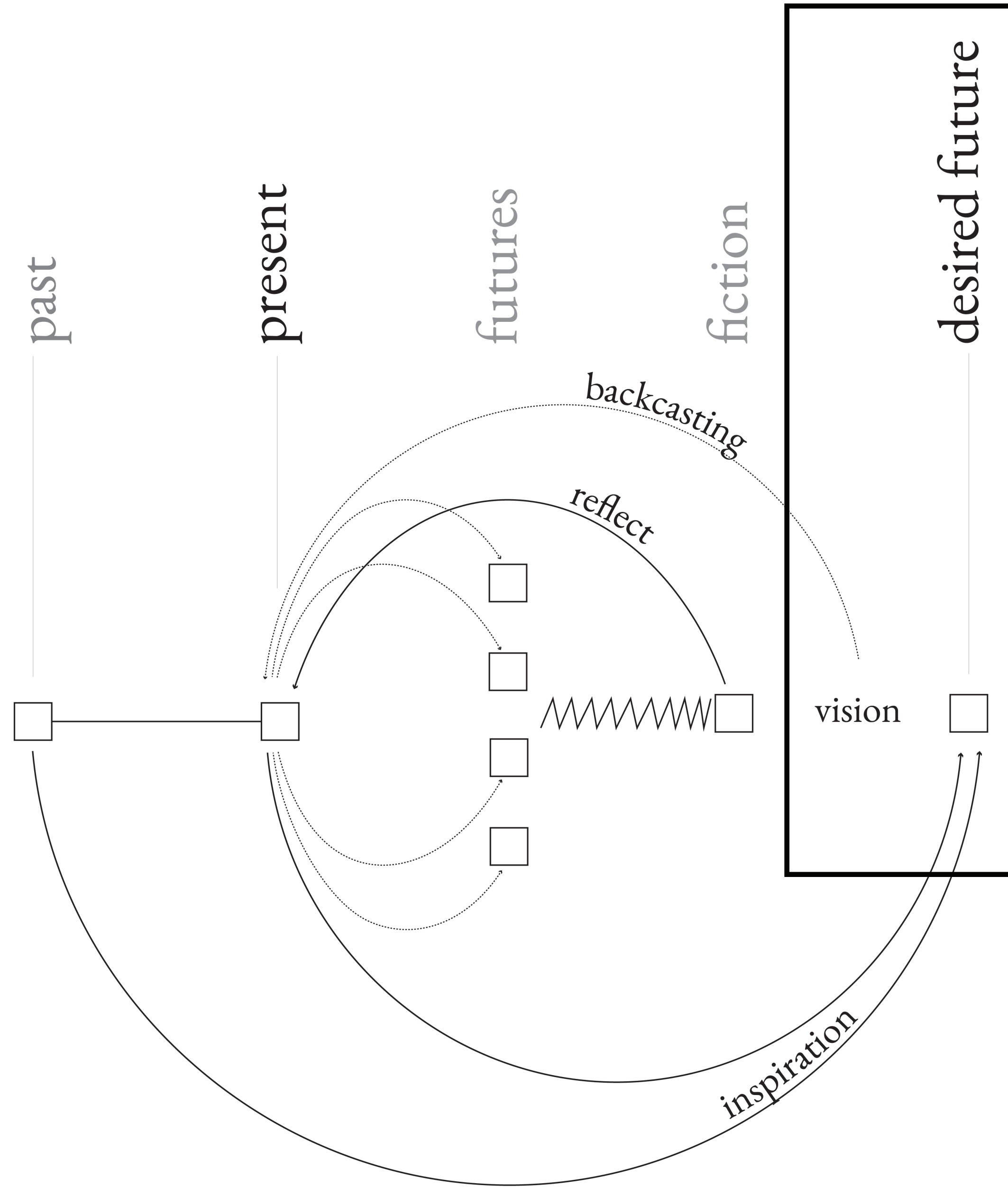


Figure 29. Metabolic processes, arrivals and seasonal labor

# project trajectory



introduction  
conceptual framework

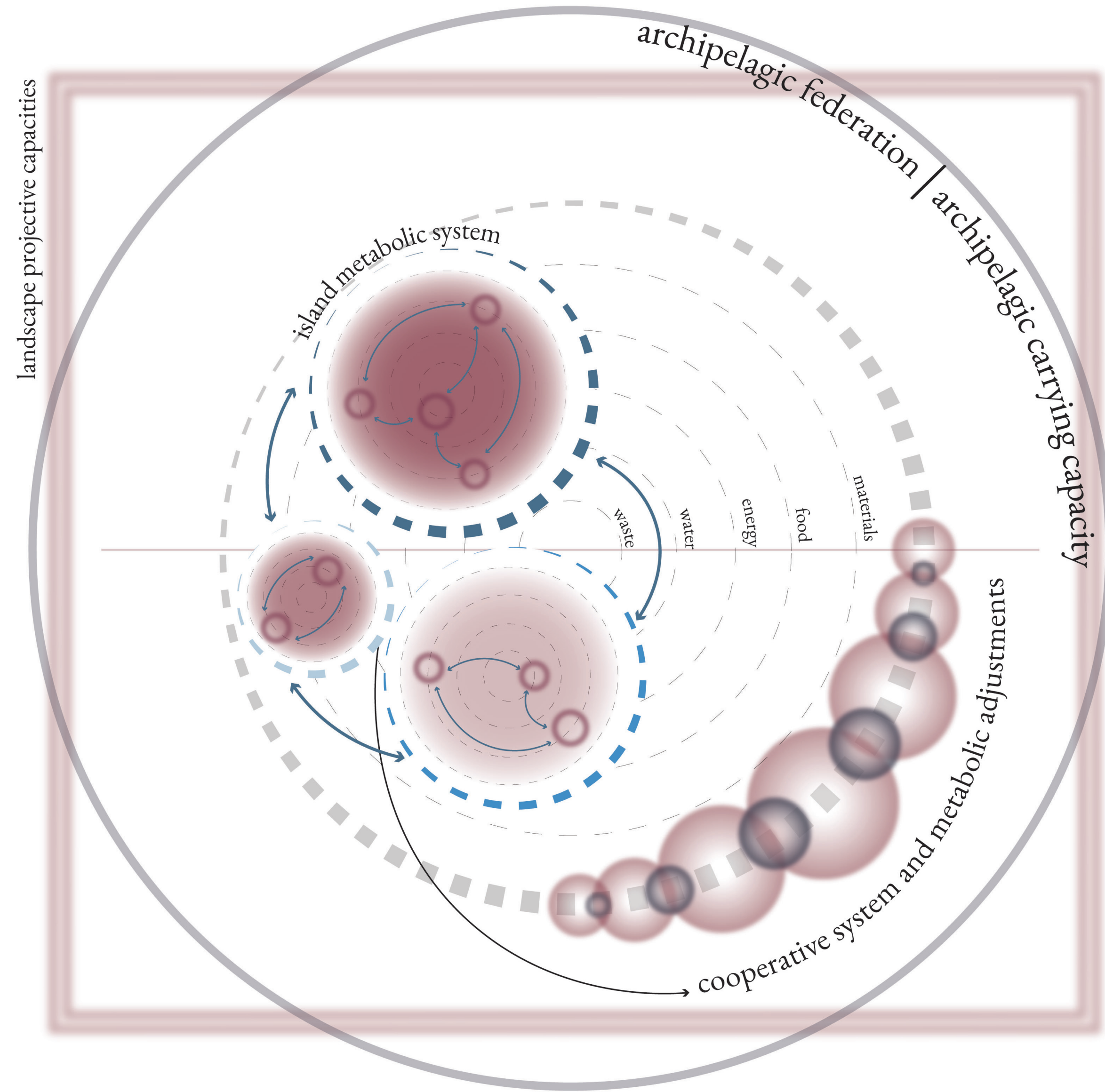


Figure 30. Conceptual framework

proposal  
regional vision

A resource-conscious and economically diverse archipelago that reactivates its landscape by embracing local capacities and harnessing natural processes, while supporting synergies and collaboration across scales

re-activate the productive landscape while integrating small scale technological elements

decentralized metabolic processes

spatial conflicts by supporting competitive to tourism functions

archipelagic and flexible carrying capacity assessment

Archipelago of sharing

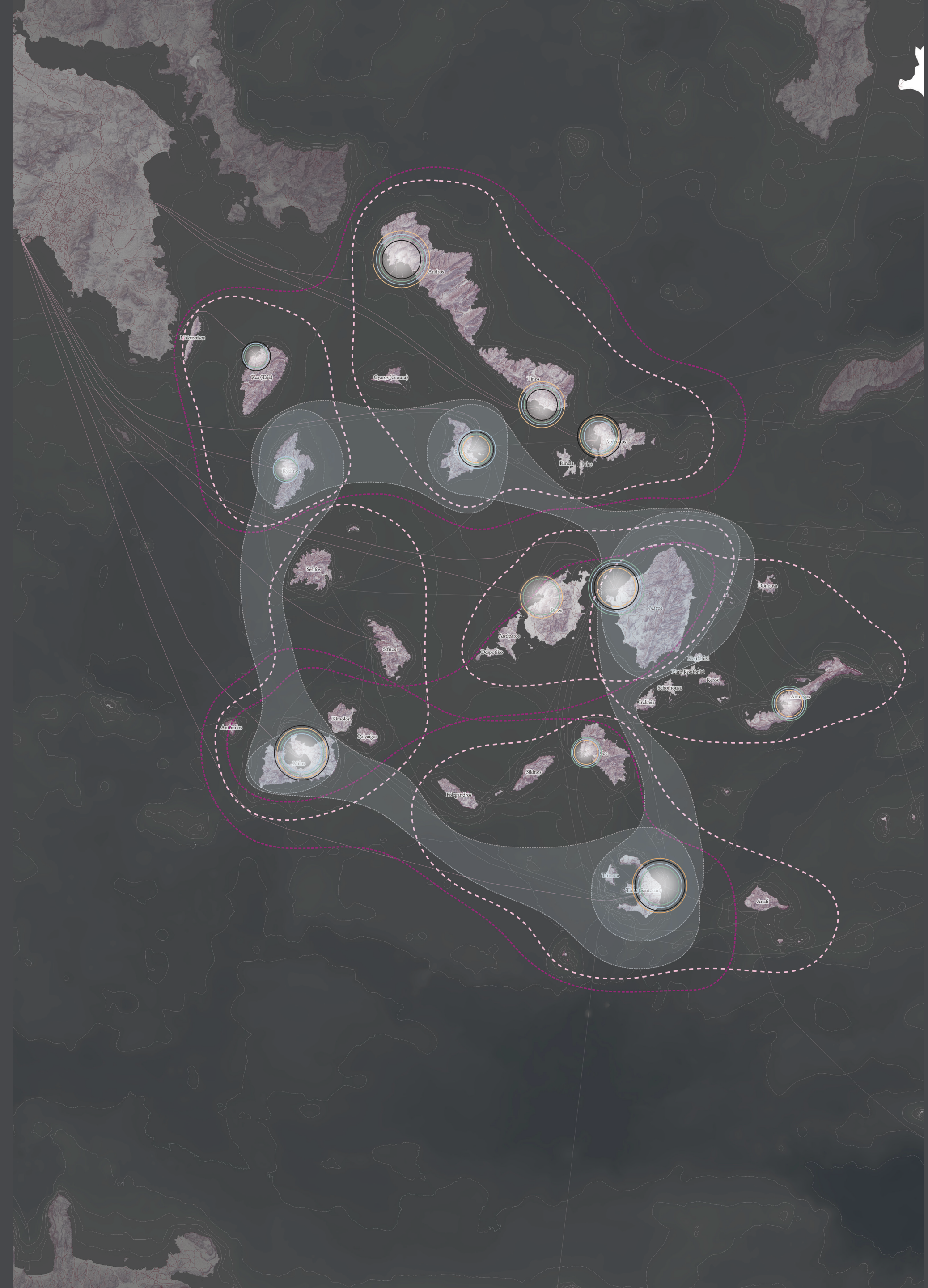


Figure 31. Regional vision map

# proposal design methodology

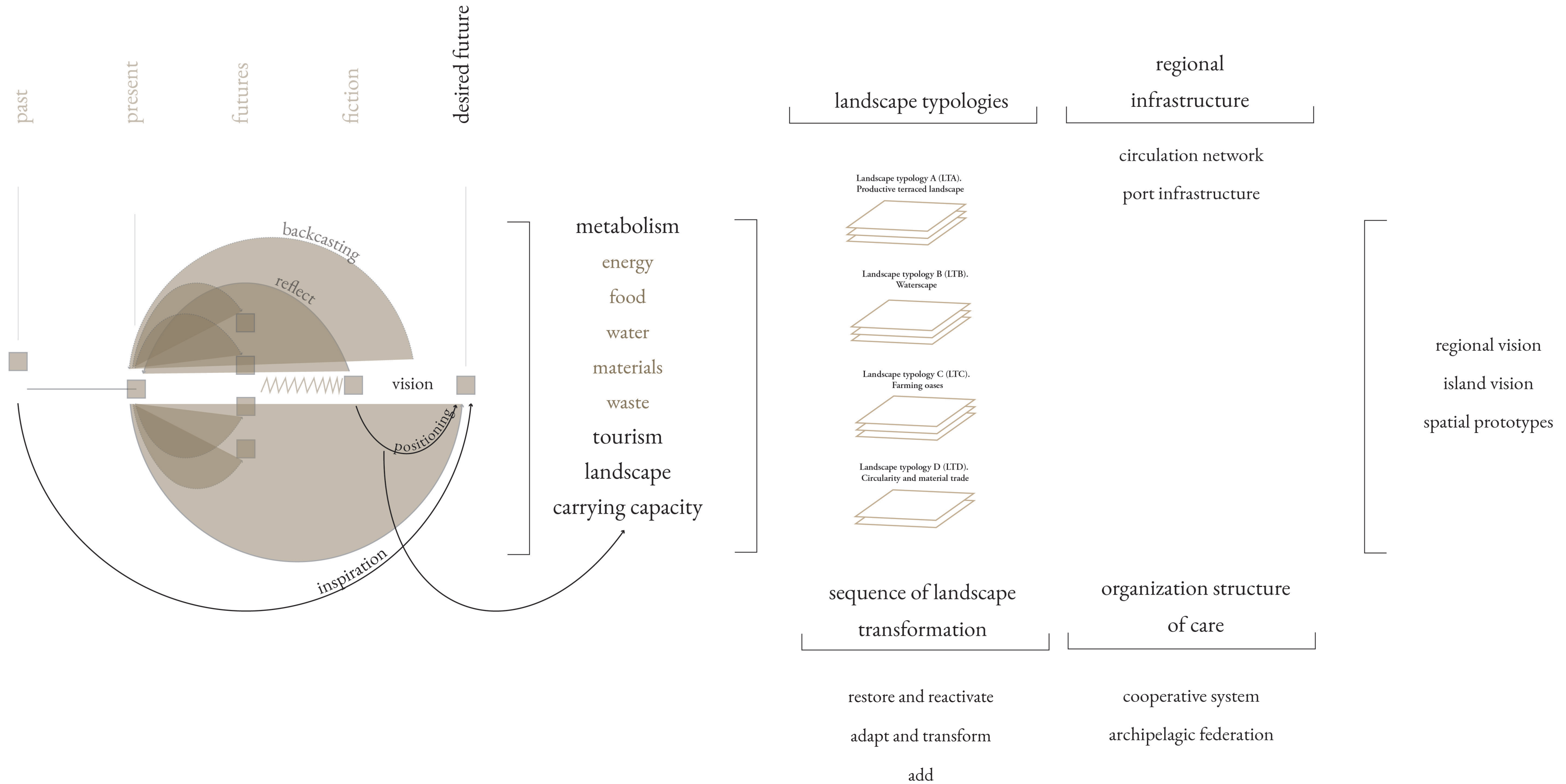
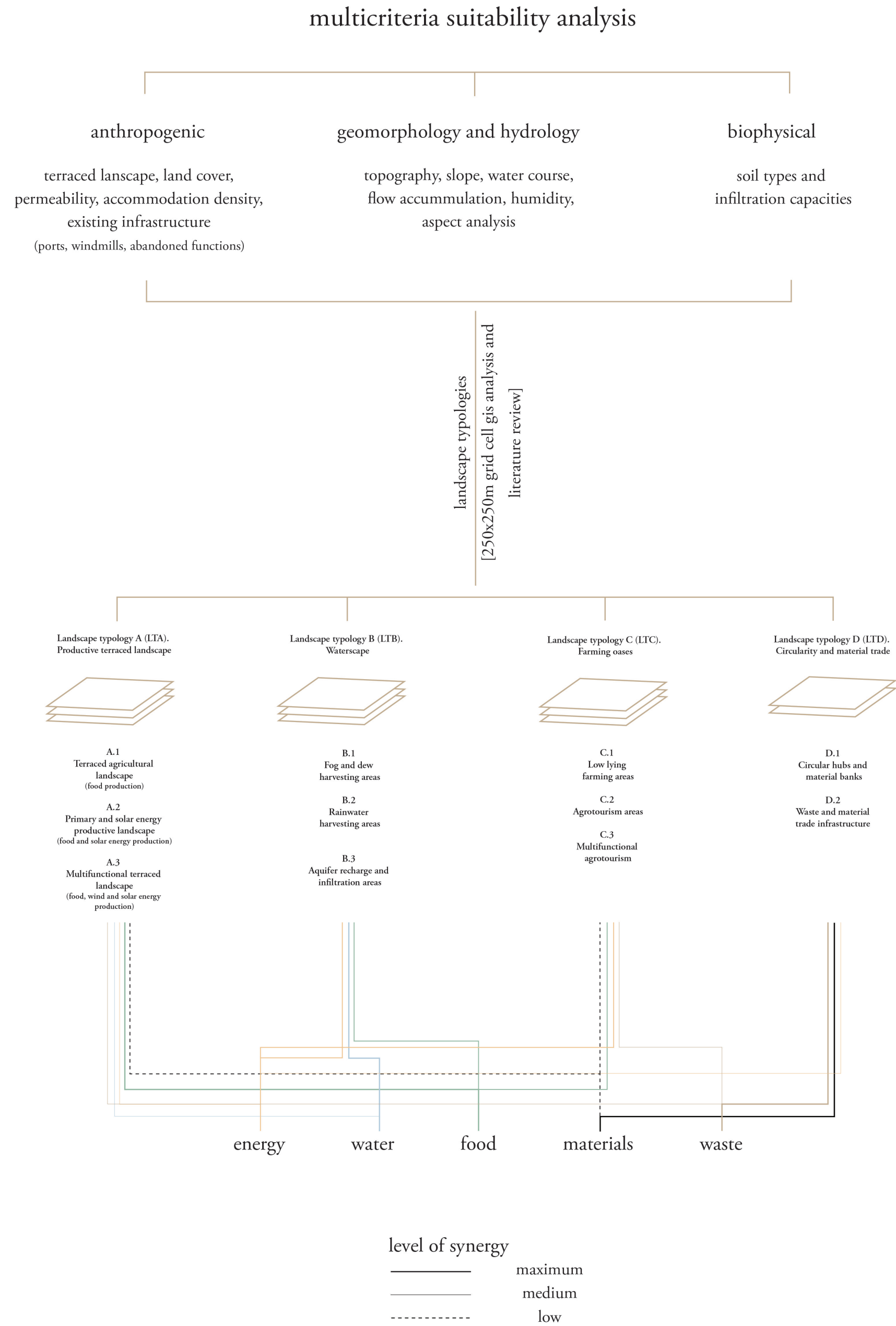


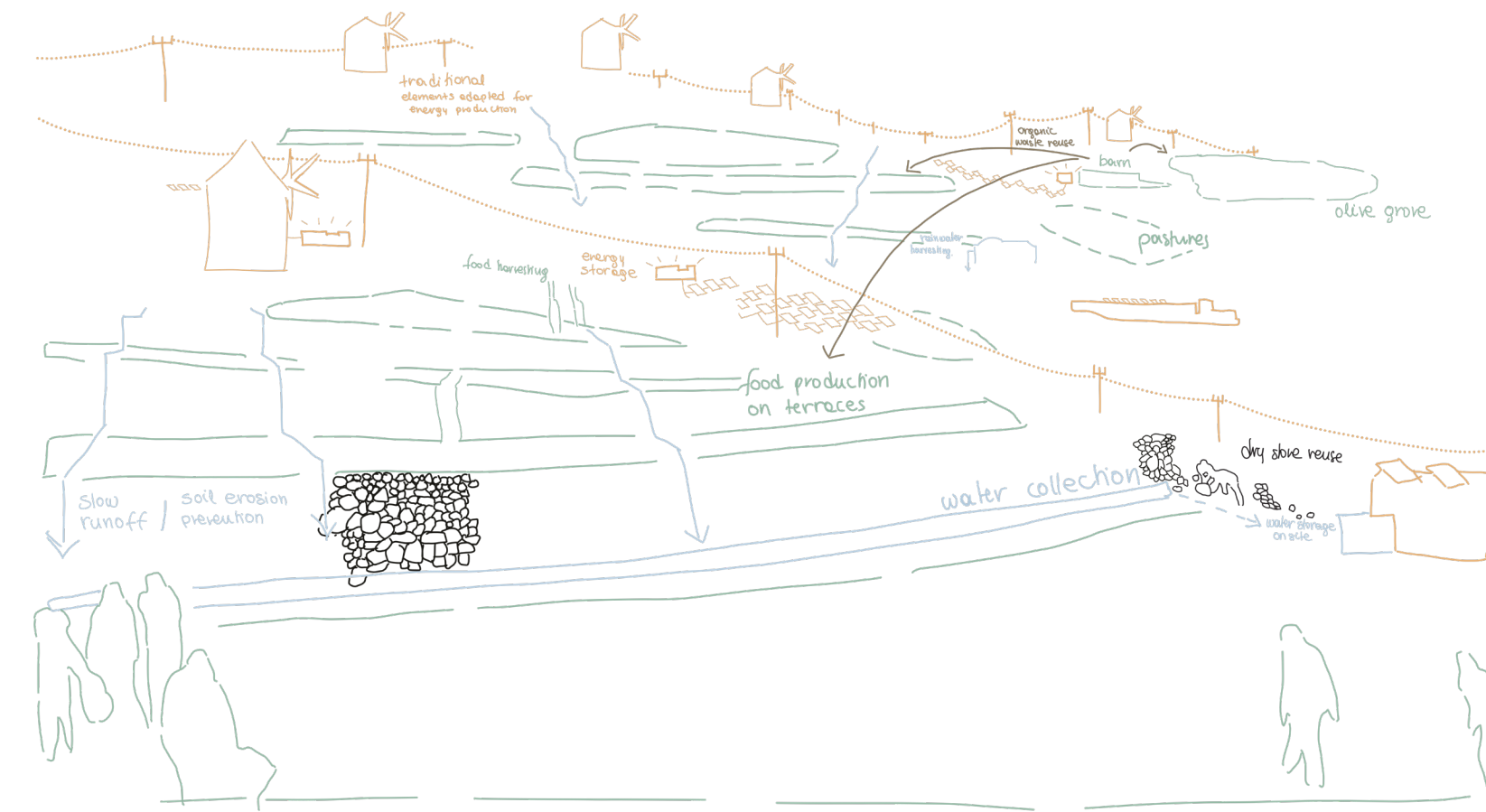
Figure 32. Proposal methodology

proposal  
**landscape typologies: projective capacities**



proposal  
**landscape typologies: productive terraced landscape**

	A.1 Terraced agricultural landscape	A.2 Primary and solar energy productive landscape	A.3 Food, wind and solar landscape
land cover   vegetation types	agricultural (active or abandoned) or seminatural areas	agricultural (active or abandoned) or seminatural areas	agricultural (active or abandoned) or seminatural areas
topography	elevation > 50m slope: 15-30%	slope: 10-30%	slope: 10-30%
aspect	-	south facing	south facing
traditional windmills	-	-	yes



proposal  
landscape typologies: productive terraced landscape



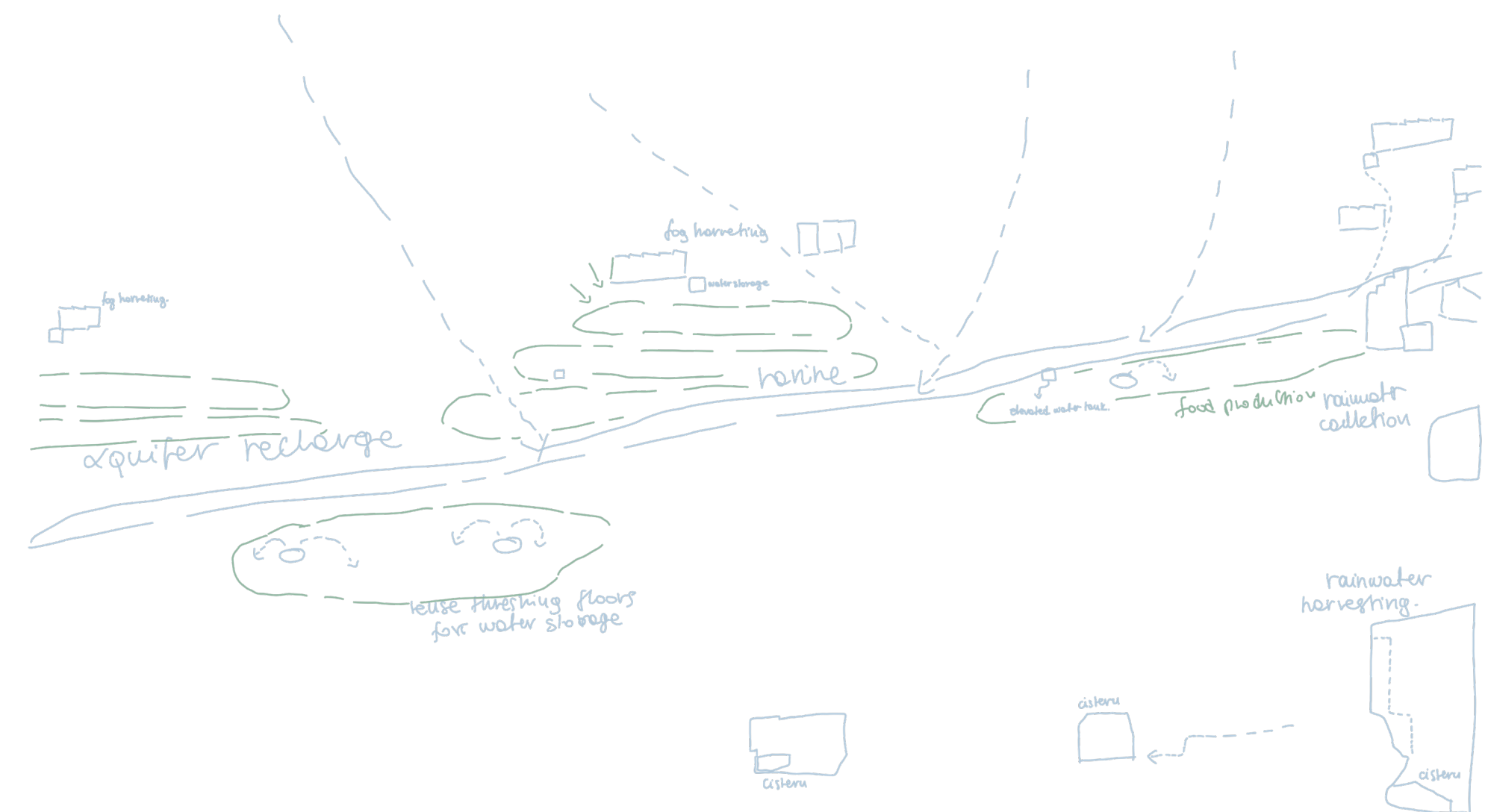
Landscape typologies: A. Productive terraced landscape - synthesis  
LTA.1 Terraced agricultural landscape  
LTA.2 Primary and solar energy productive landscape  
LTA.3 Food, wind and solar landscape

0 1 2 km

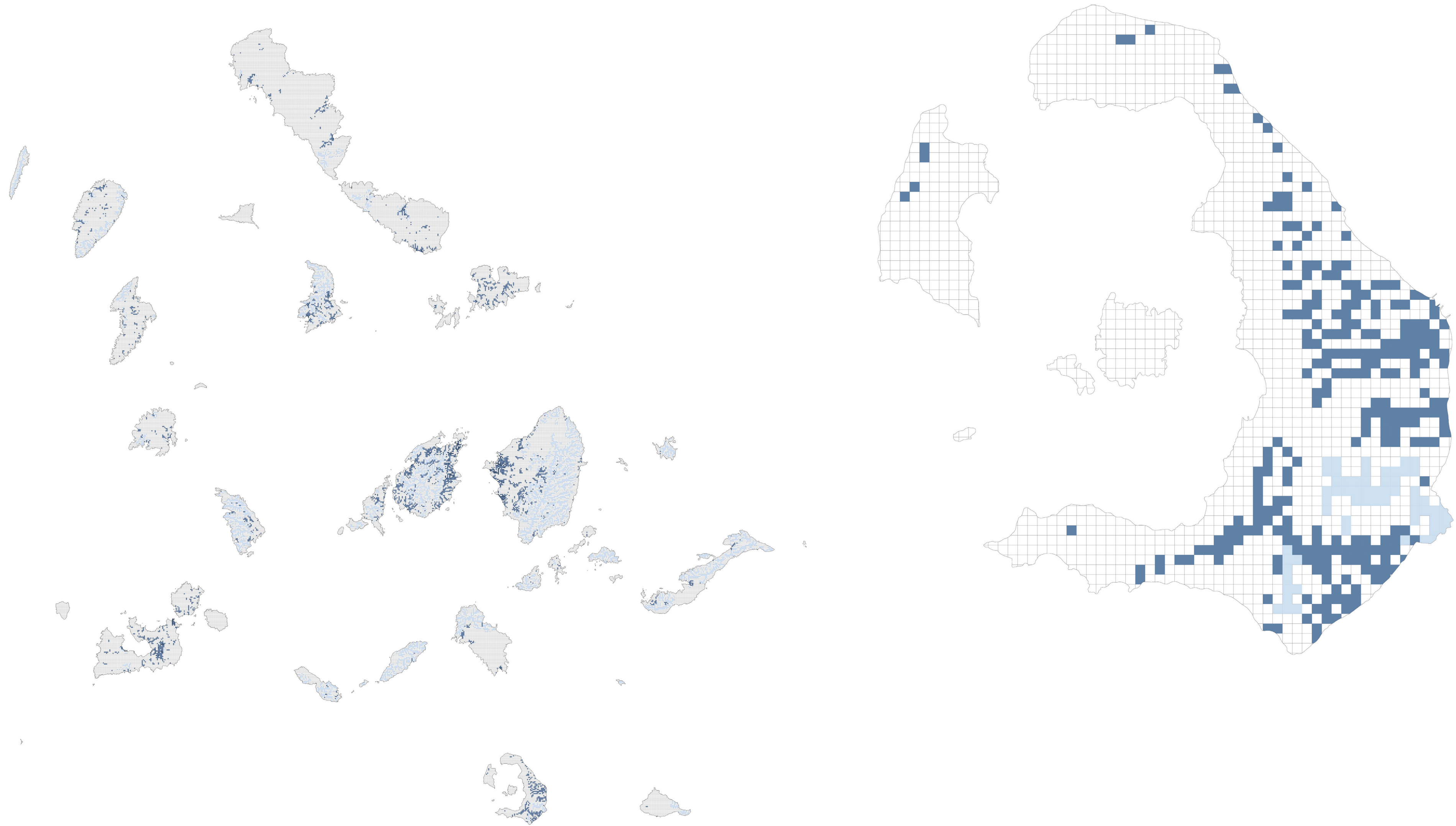


proposal  
**landscape typologies: waterscape**

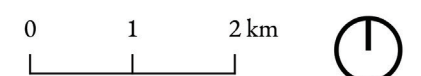
	B.1 Fog and dew harvesting areas	B.2 Rainwater harvesting areas	B.3 Aquifer recharge and infiltration areas
land cover   vegetation types	forests, grasslands (vegetated areas)	urban areas (impervious surfaces) and agricultural	forests, grasslands (vegetated areas)
topography	high elevation areas (>100m) and slope > 5%	slope: 0-10%	slope: 0-10%
soil types	A, K, L, C	-	A,B, F
flow accumulation	low	high	low
rainfall trends	moderate to low	high	moderate



proposal  
landscape typologies: waterscape

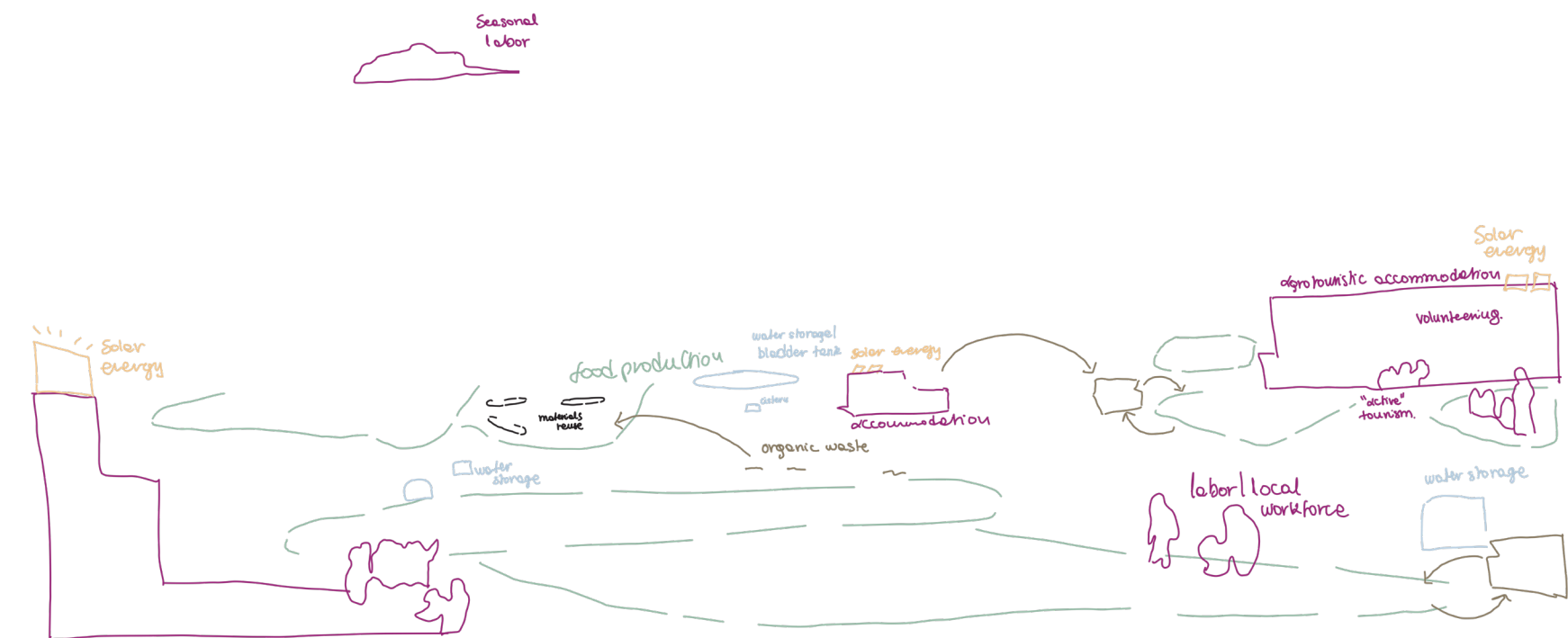


Landscape typologies: B. Waterscapes - synthesis  
■ LTB.1 Fog and dew harvesting areas  
■ LTB.2 Rainwater harvesting areas  
■ LTB.3 Aquifer recharge and infiltration areas

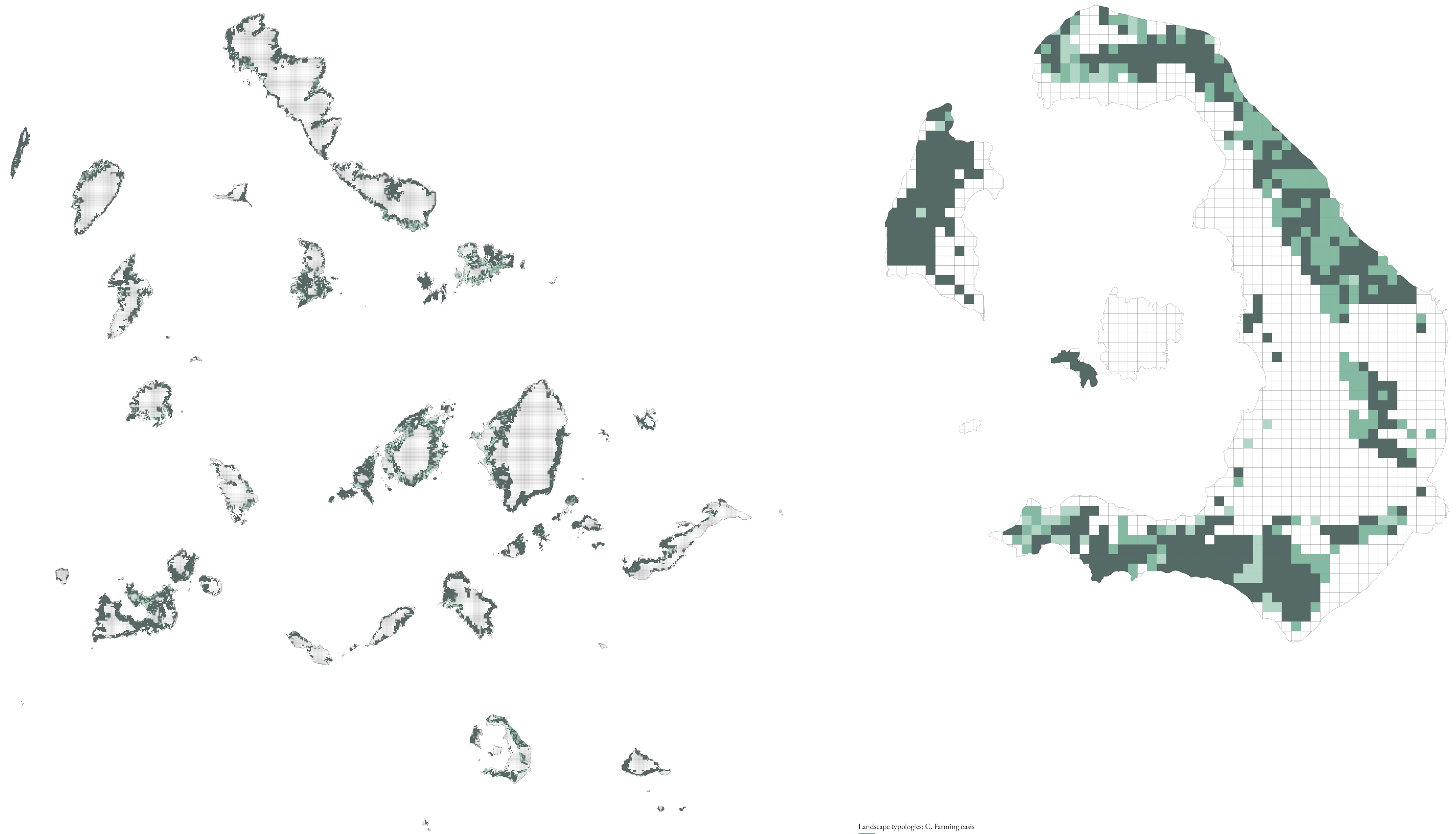


proposal  
**landscape typologies: farming oasis**

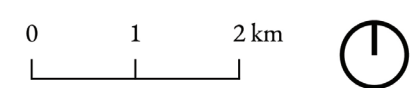
	C.1 Farming estates	C.2 Agrotourism estates	C.3 Eco-lodge
land cover   vegetation types	agricultural are and seminatural vegetation		
topography	slope: 5-15 elevation: 0-100m		
accommodation	-	low accommodation concentration	low accommodation concentration
aspect	-	-	south facing



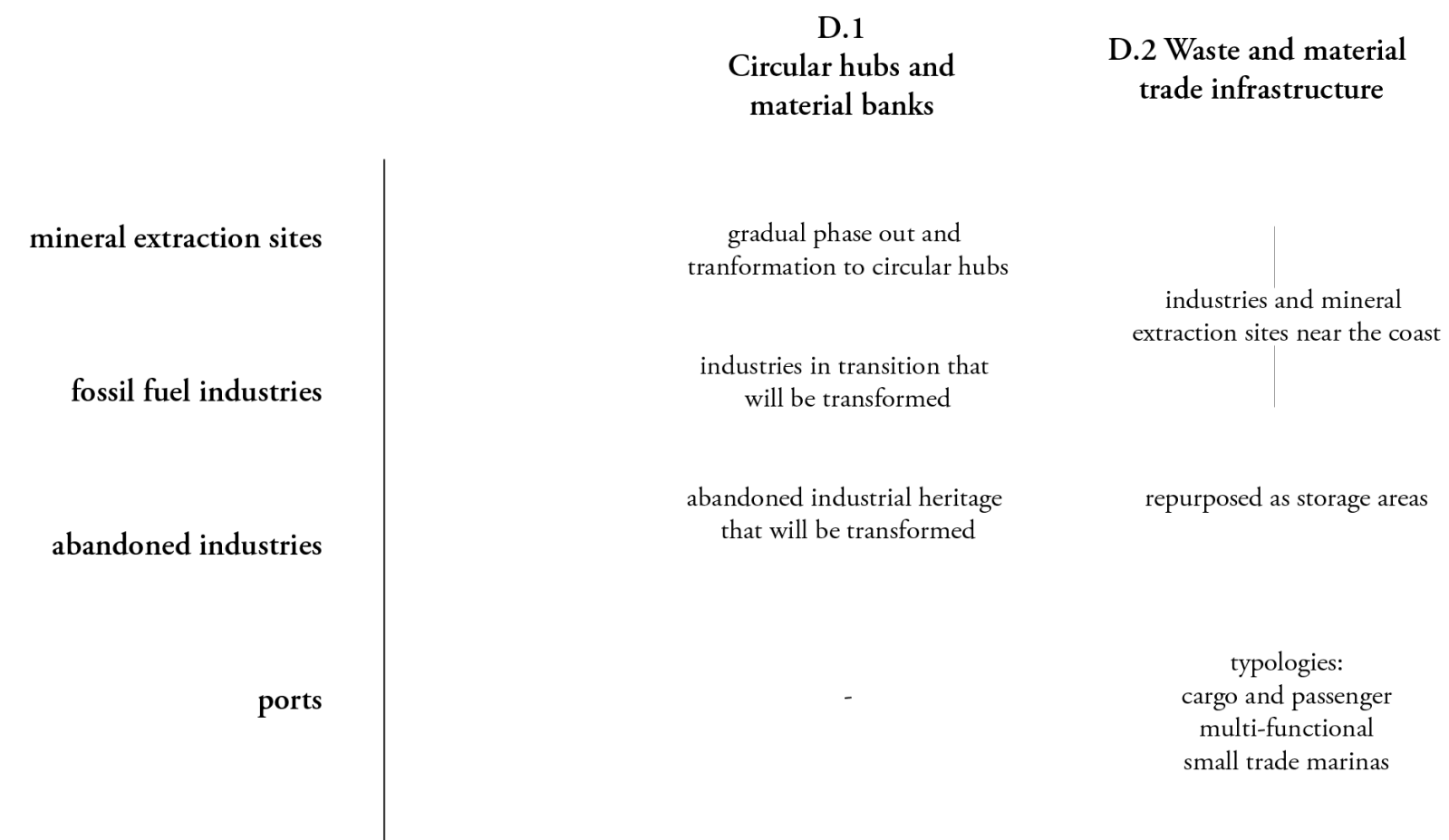
proposal  
landscape typologies: farming oasis



Landscape typologies: C. Farming oasis  
LTC.1 Farming estates  
LTC.2 Agrotourism estates  
LTC.3 Eco-lodge



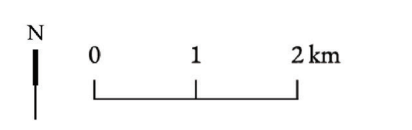
# proposal materials and circularity



proposal  
a. materials and circularity



Landscape typologies: D. Materials and circularity  
■ LTD1. Circular hubs and material banks  
■ LTD2. Trade infrastructure



proposal  
landscape typologies | synthesis

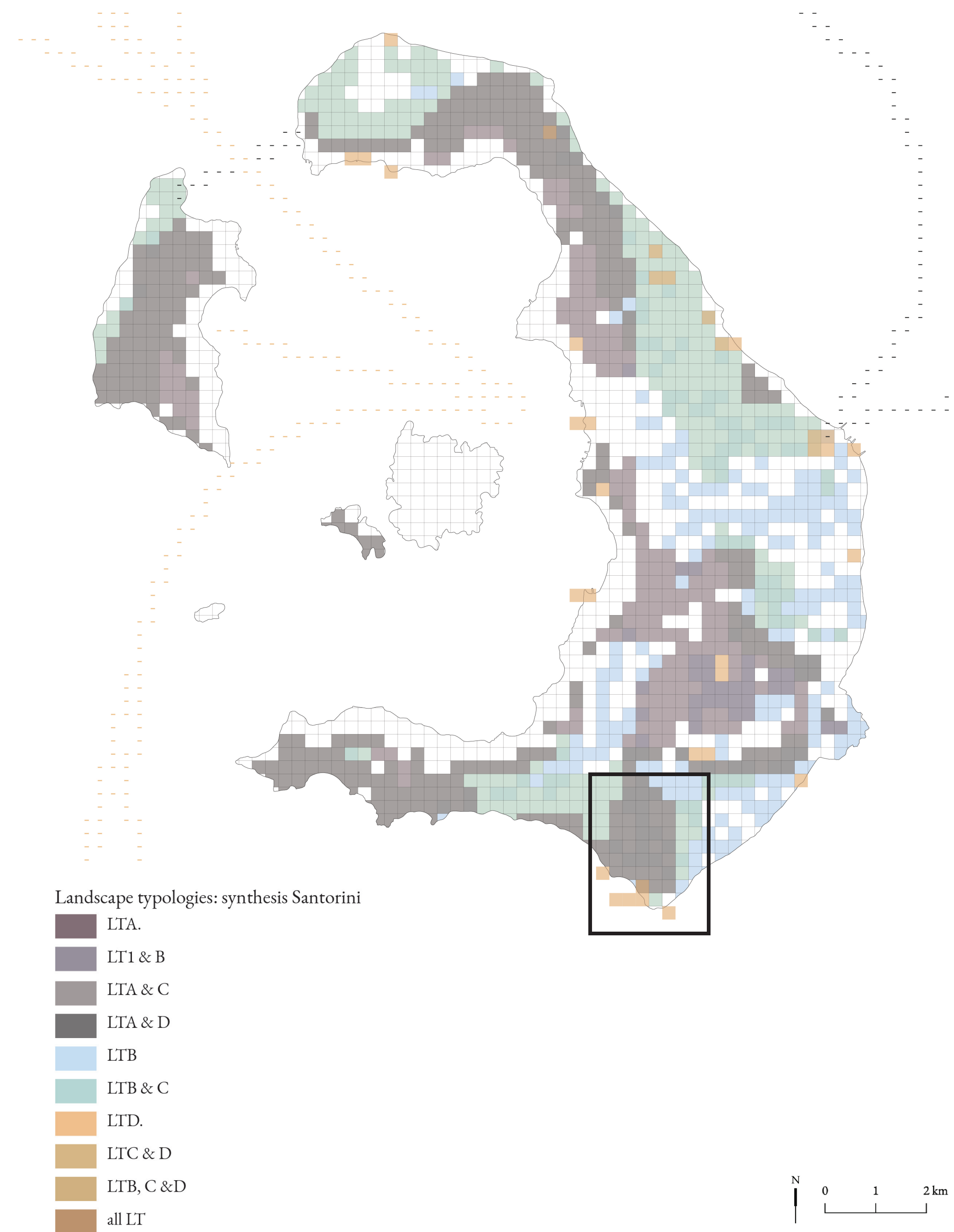


Figure 33. Landscape typologies synthesis

proposal  
sequence of landscape transformation

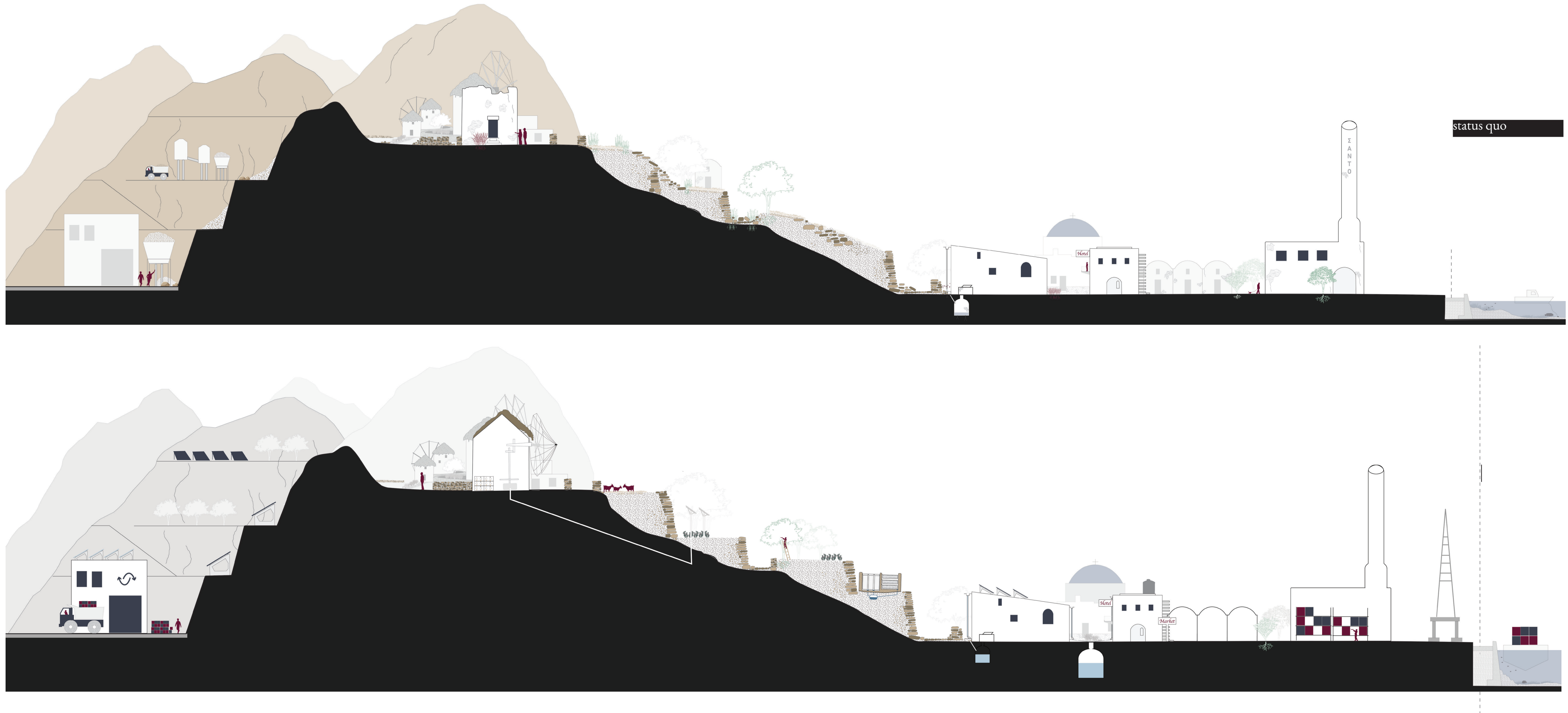
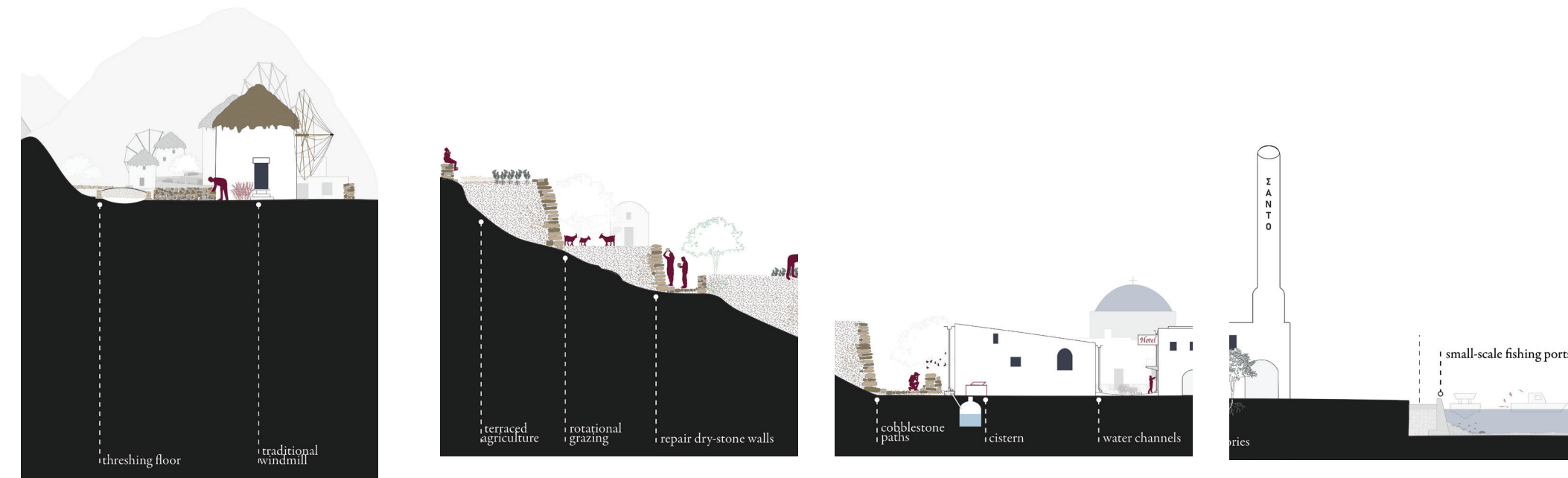


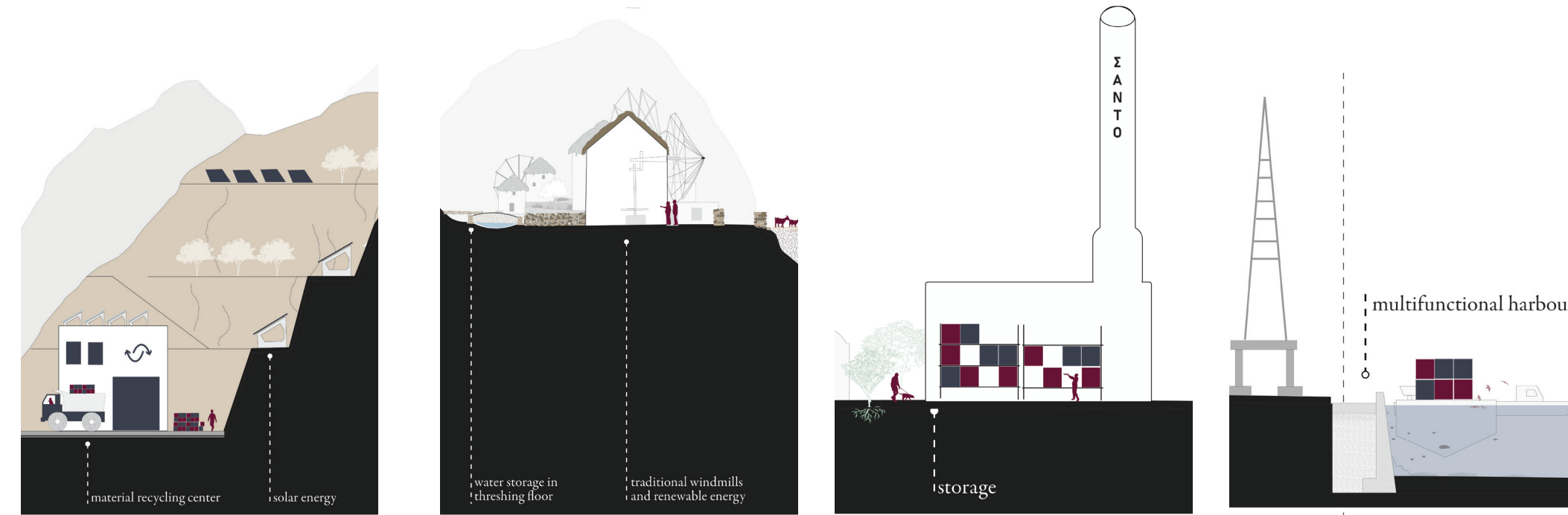
Figure 34. Landscape alteration over time, before, after

proposal  
 sequence of landscape transformation

restore and reactivate



adapt and transform



add

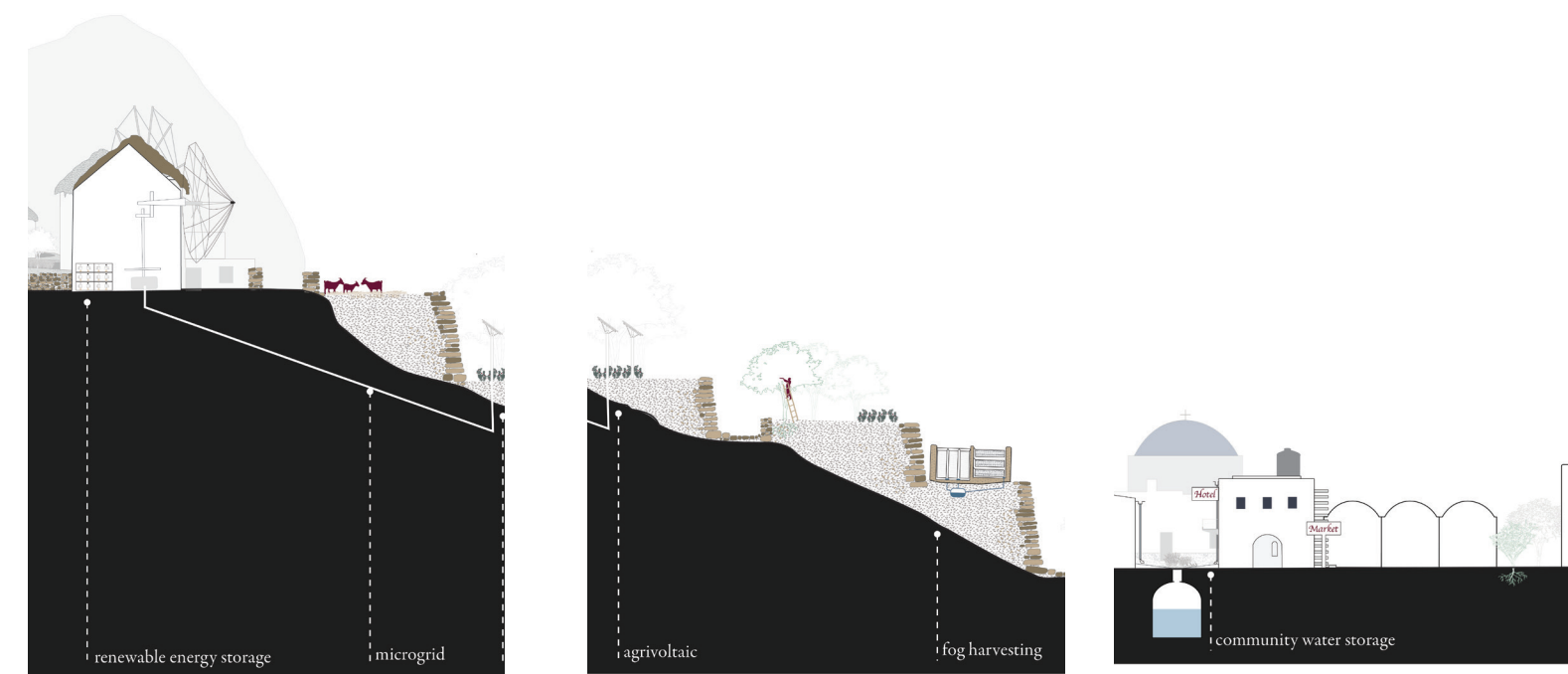


Figure 35. Restore and reactivate, adapt and transform, add

proposal  
**organization structure - cooperatives**

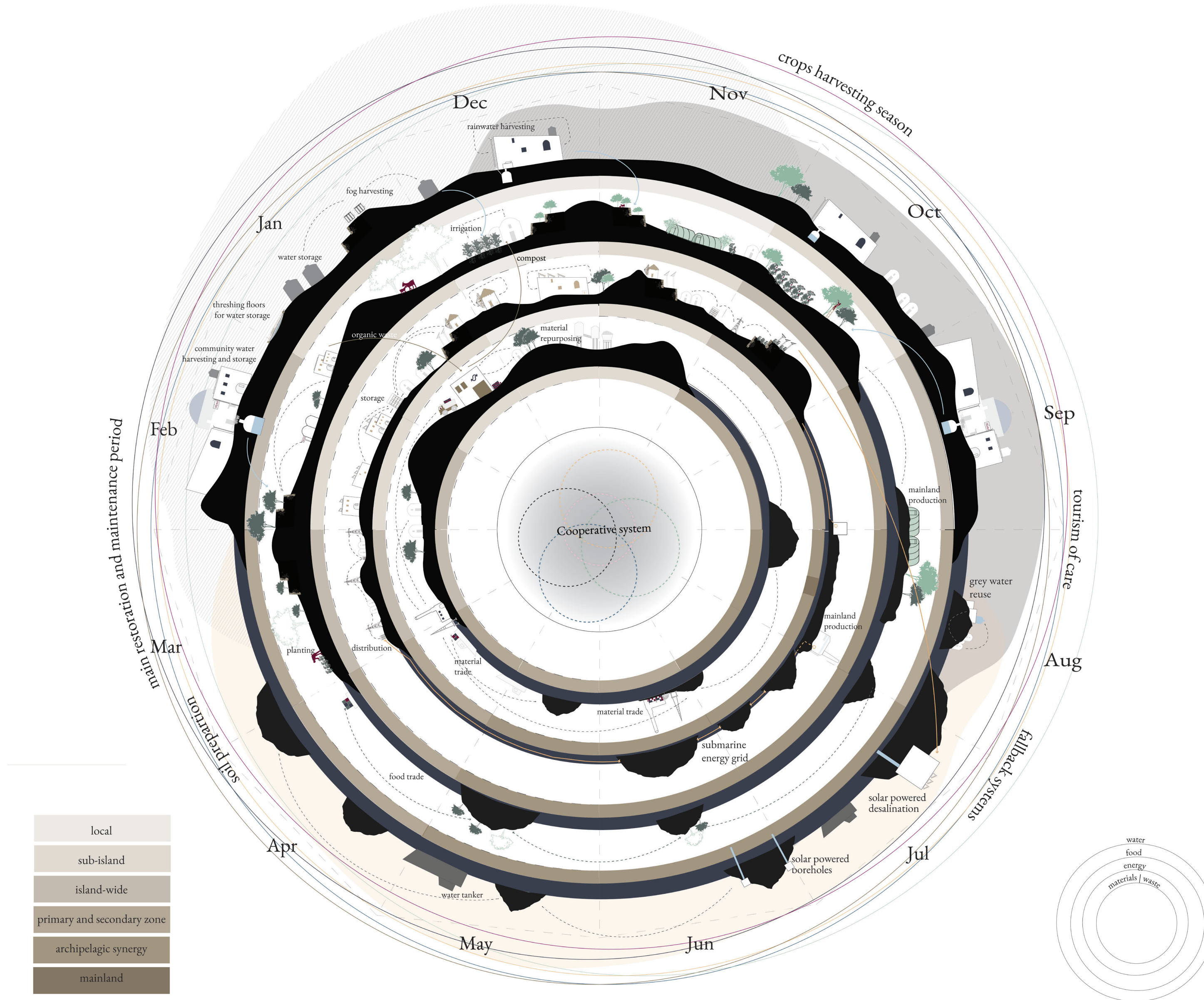
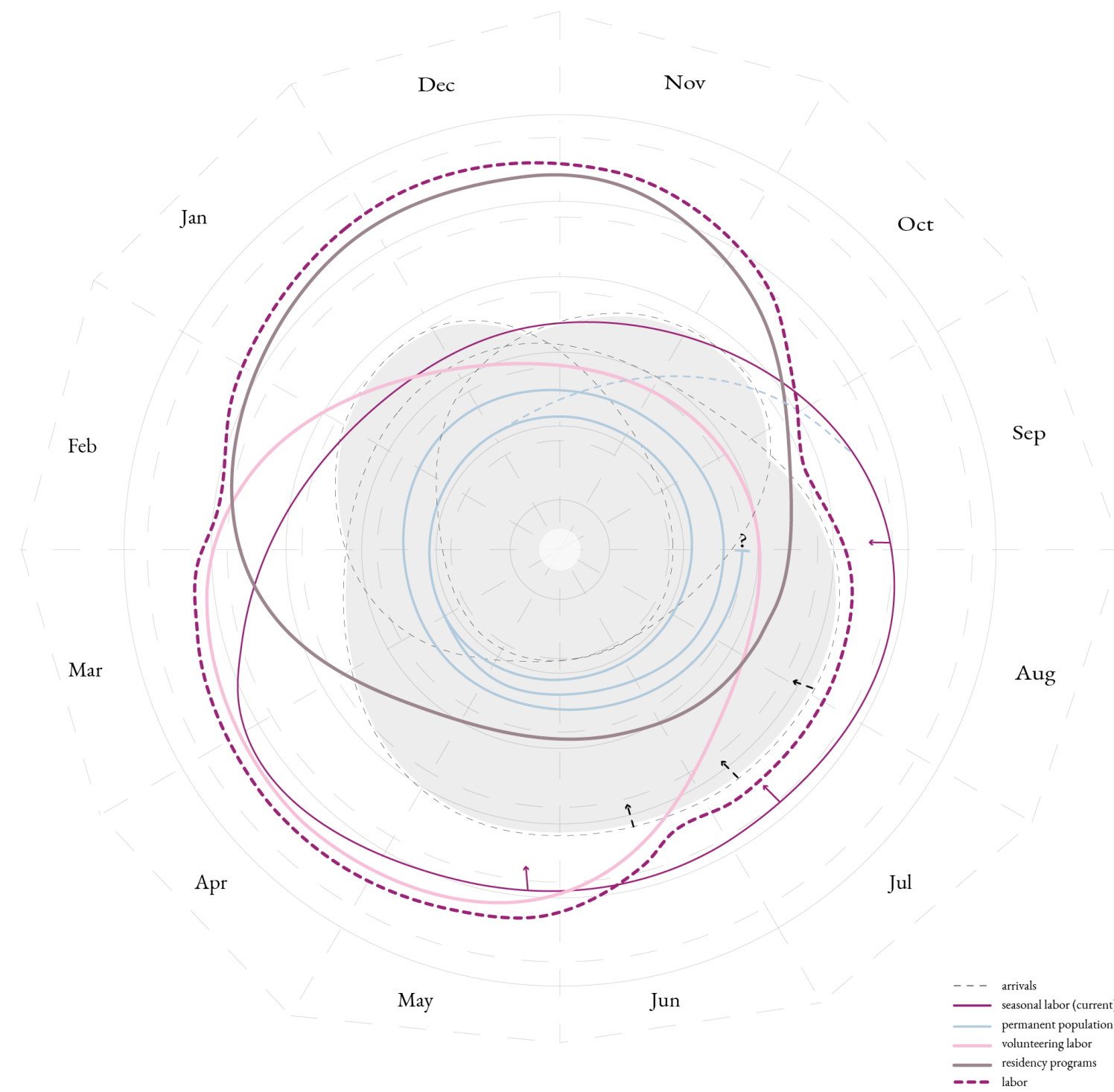


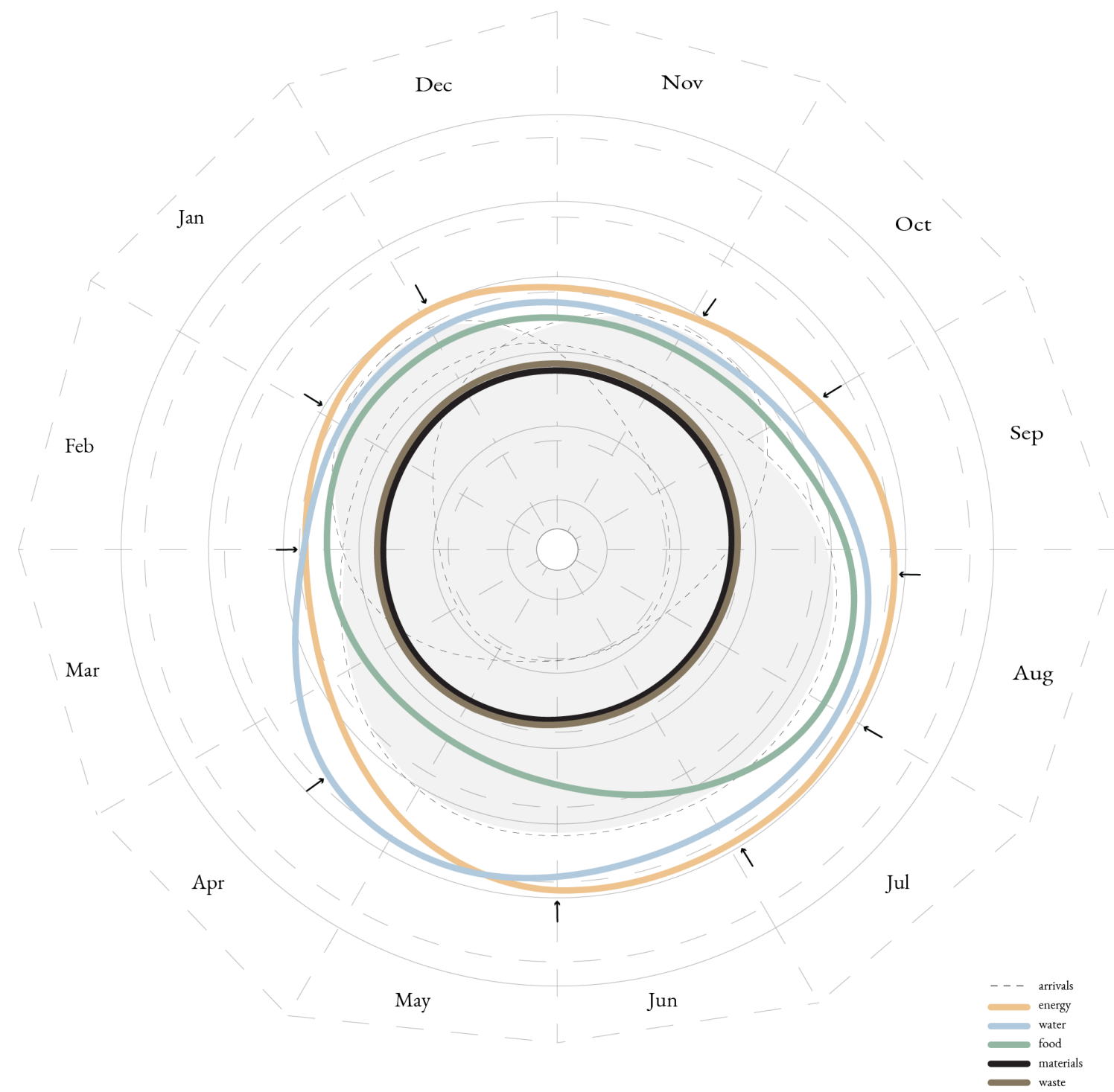
Figure 36. Cooperative system of care and repair 44

proposal  
**organization structure - seasonality**



--- arrivals  
 — seasonal labor (current)  
 — permanent population  
 — volunteering labor  
 — residency programs  
 - - - labor

Figure 37. Labor profile and shifts



--- arrivals  
 — energy  
 — water  
 — food  
 — materials  
 — waste

Figure 38. Metabolic processes and degrowth

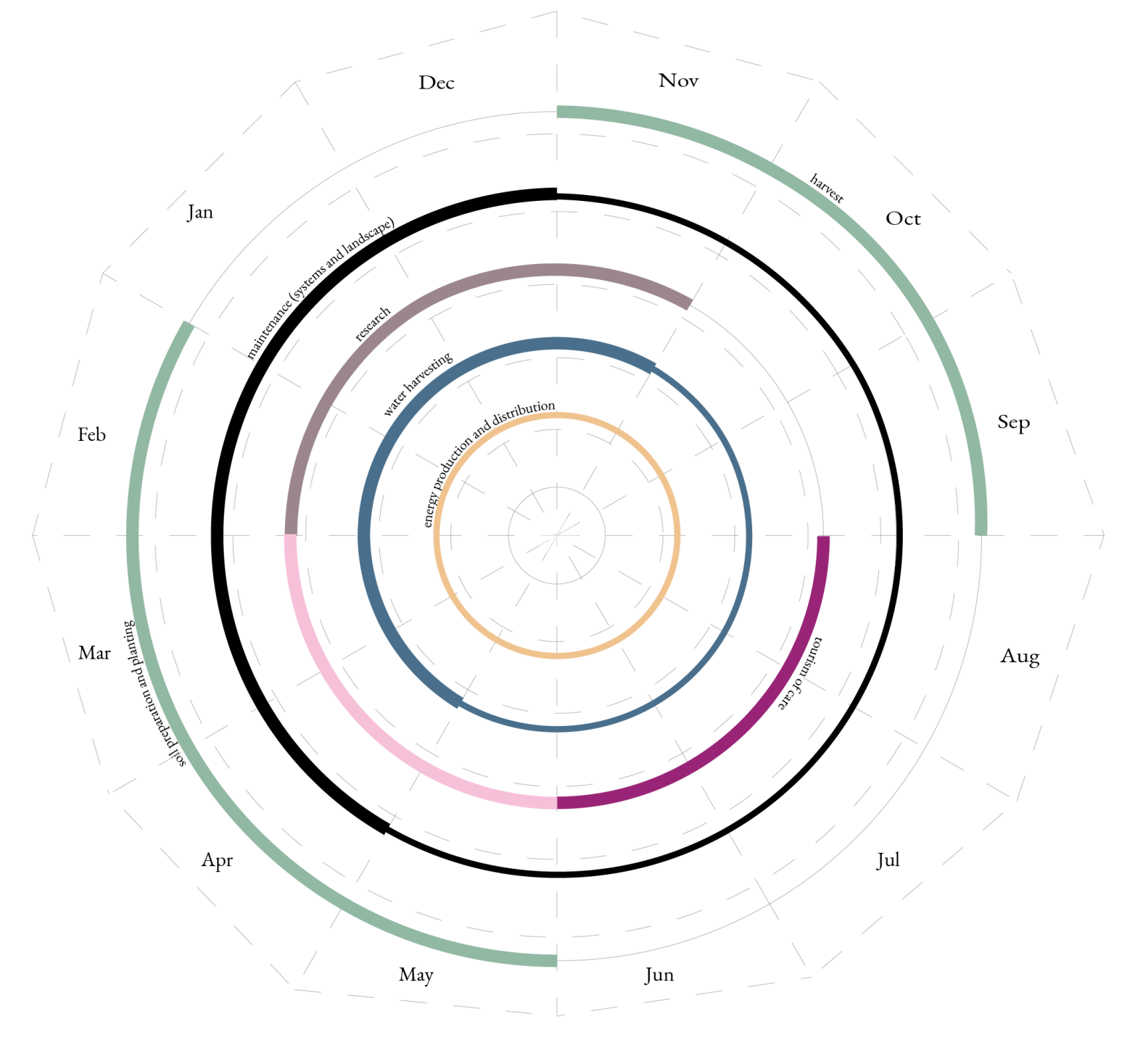
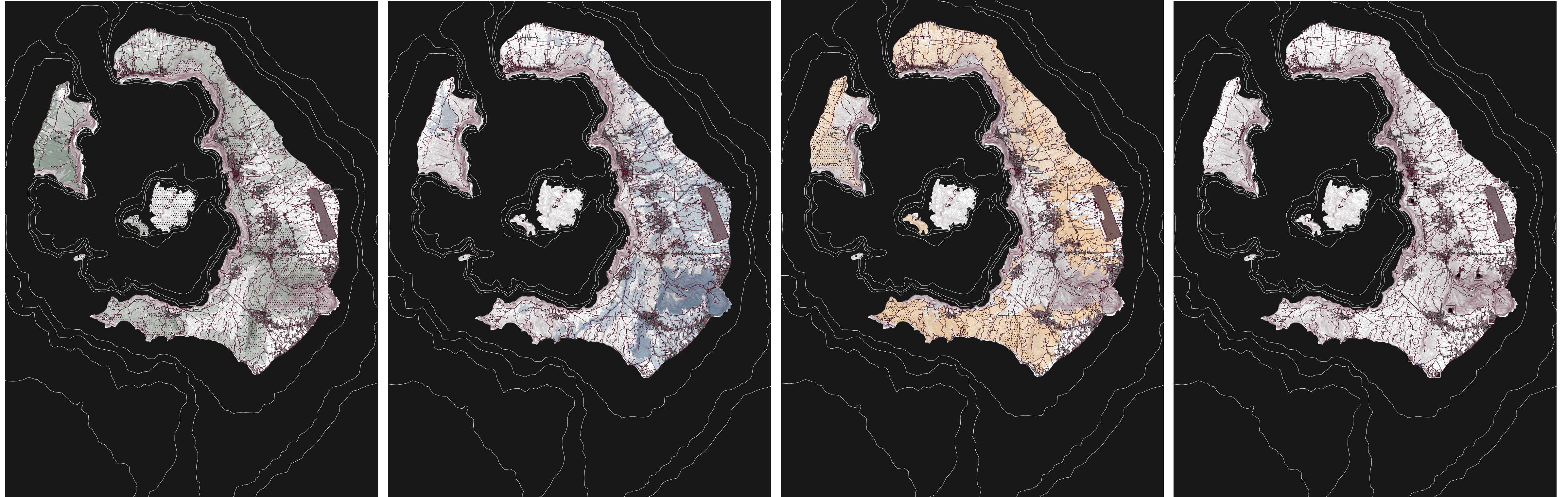


Figure 39. Processes and seasonality

Figure 40. Santorini landscape typologies



Productive terraced landscape

- Settlements
- Main street network
- Additional street network
- Sea contours
- Land cover
- Dense urban fabric (IMD  $\geq 30-80\%$ )
- Low density fabric (IMD  $< 30\%$ )
- Airports and associated land
- Landscape typologies
- Restored terraced agriculture
- Agrovoltaic zone
- Multifunctional terraced landscape

Waterscape

- Settlements
- Main street network
- Additional street network
- Sea contours
- 5m contour line
- Land cover
- Dense urban fabric (IMD  $\geq 30-80\%$ )
- Low density fabric (IMD  $< 30\%$ )
- Airports and associated land
- Landscape typologies
- Fog and dew harvesting zone
- Rainwater harvesting zone
- Water course
- Aquifer infiltration buffer

Farming oasis

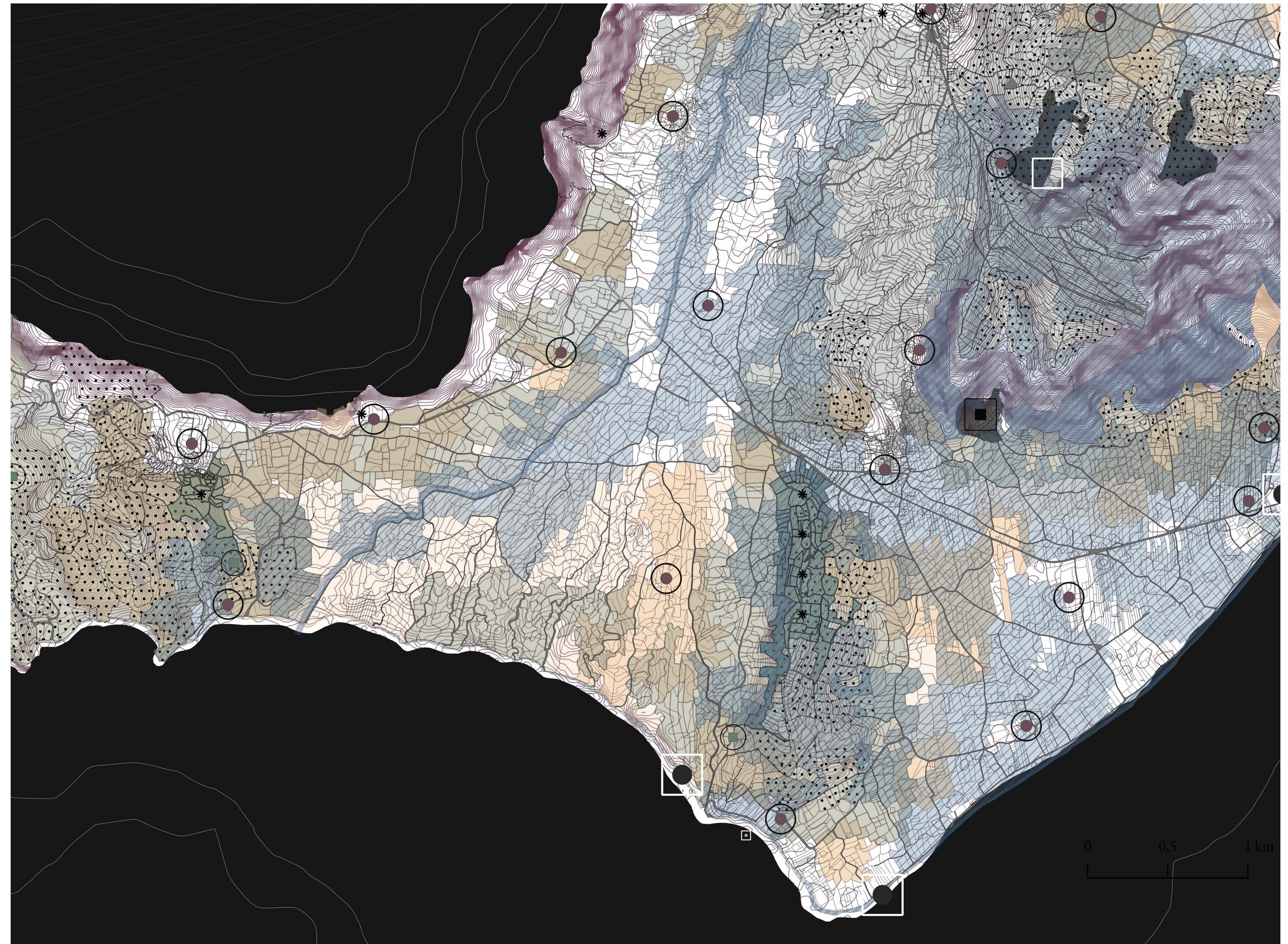
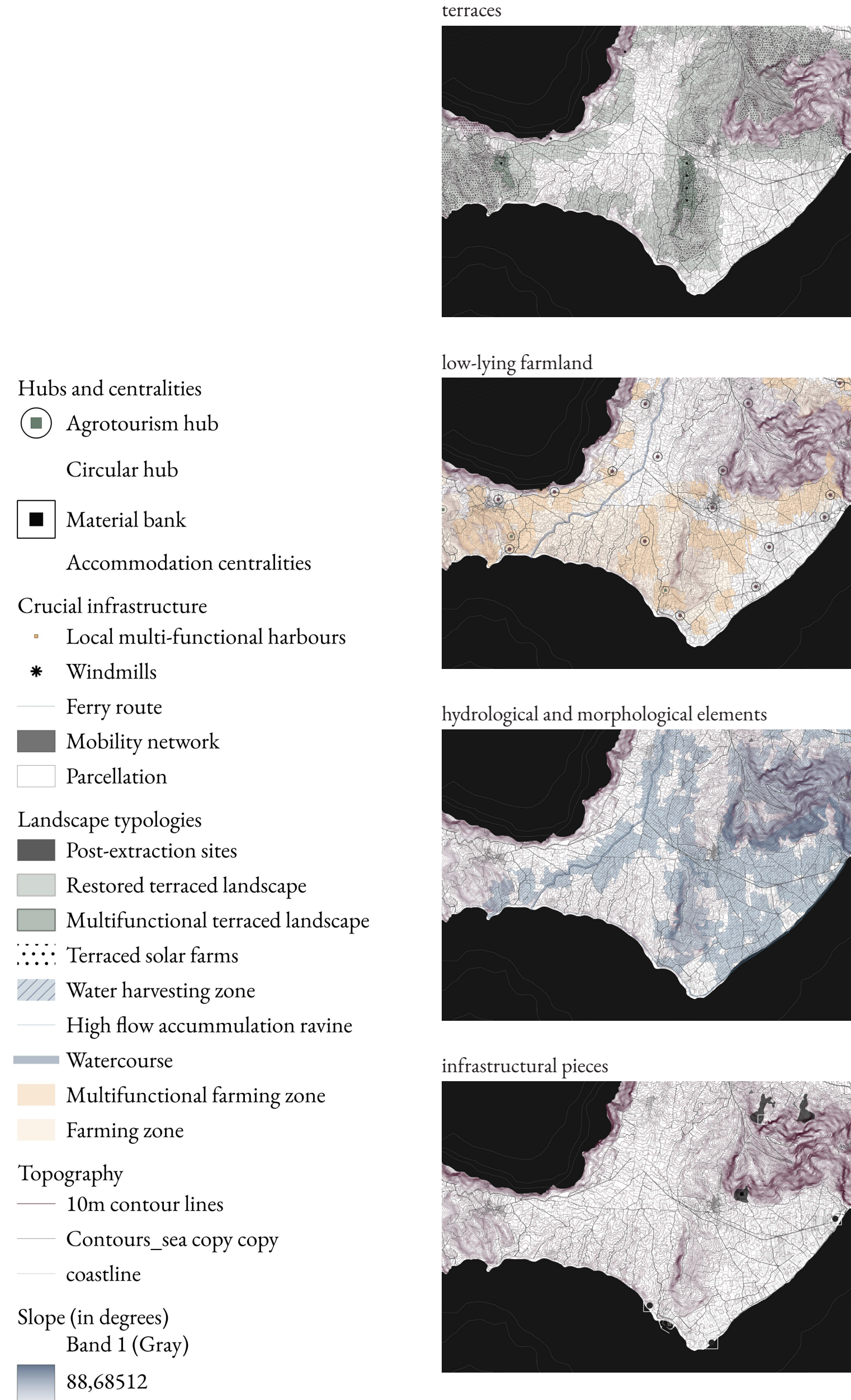
- Settlements
- Main street network
- Additional street network
- Sea contours
- 5m contour line
- Land cover
- Dense urban fabric (IMD  $\geq 30-80\%$ )
- Low density fabric (IMD  $< 30\%$ )
- Airports and associated land
- Landscape typologies
- Multifunctional agrotourism
- Low lying agrotourism
- Low lying farming zones

Circularity and material trade

- Settlements
- Main street network
- Additional street network
- Sea contours
- 5m contour line
- Land cover
- Dense urban fabric (IMD  $\geq 30-80\%$ )
- Low density fabric (IMD  $< 30\%$ )
- Airports and associated land
- Landscape typologies
- Circularity hub
- Material bank
- Post extraction sites
- Crucial infrastructure
- Passenger port
- Local multi-functional harbours

# proposal island vision | structure

Figure 41. South Santorini vision



proposal  
sub-island territory - synergies

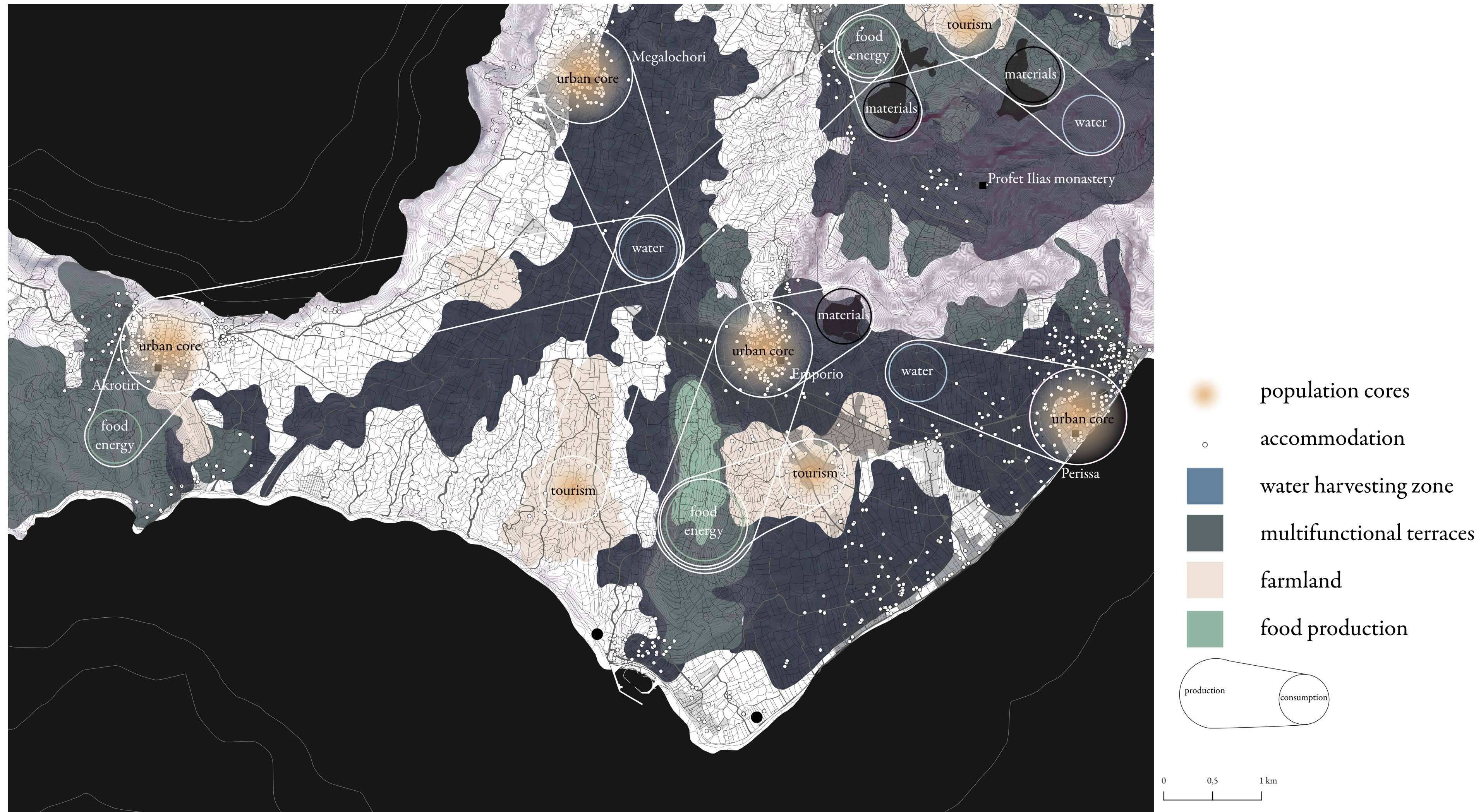


Figure 42. South Santorini vision - synergies

proposal  
regional | relevant scales

Archipelago of sharing

-  process capacities
-  waste and material repurposing
-  energy
-  water
-  food
-  primary synergy zone
-  secondary synergy zone
-  archipelagic synergy
-  emergency mainland connection
-  cargo and passenger routes

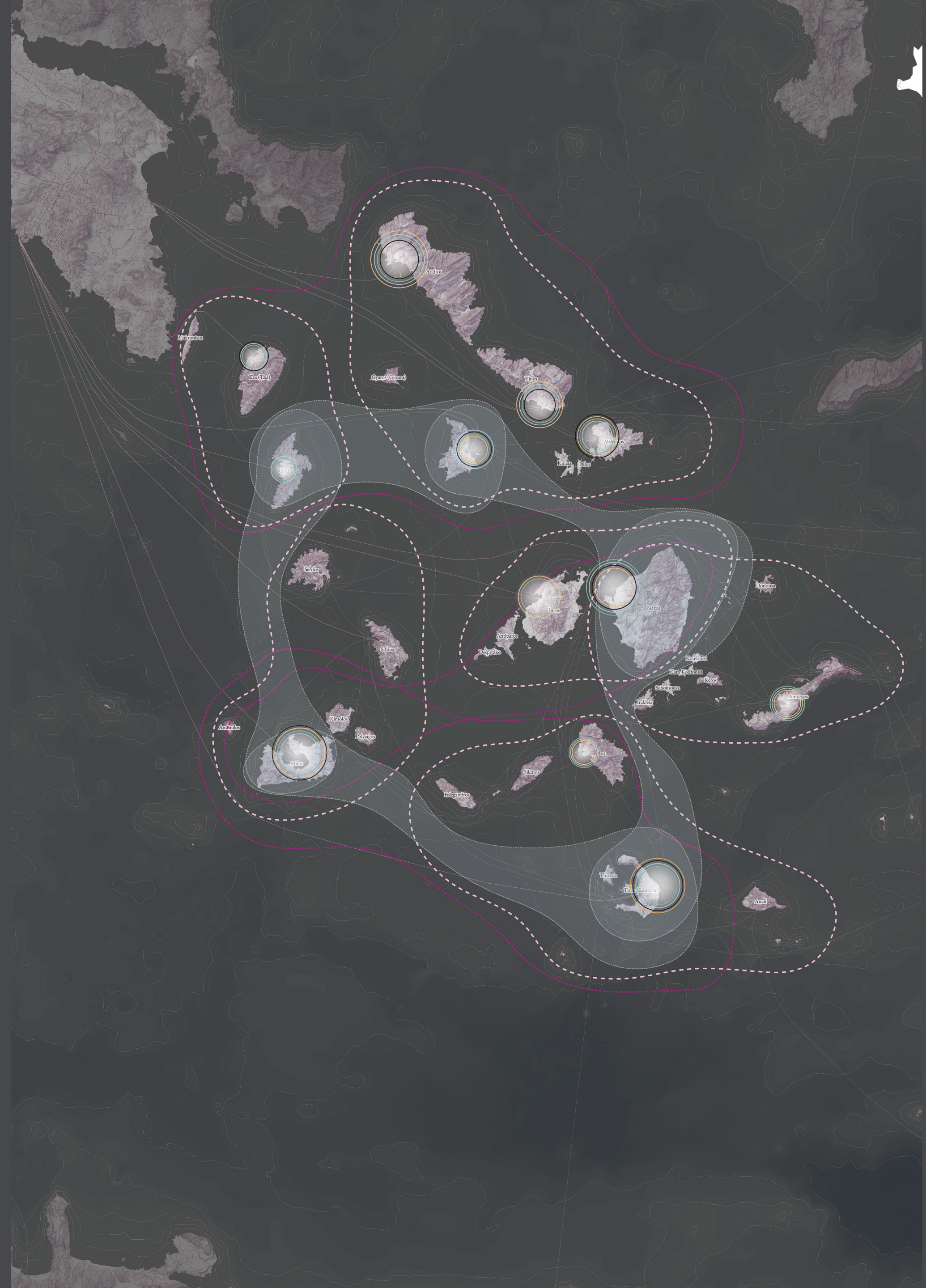


Figure 43. Regional vision map



proposal  
metabolic processes - altered dynamics

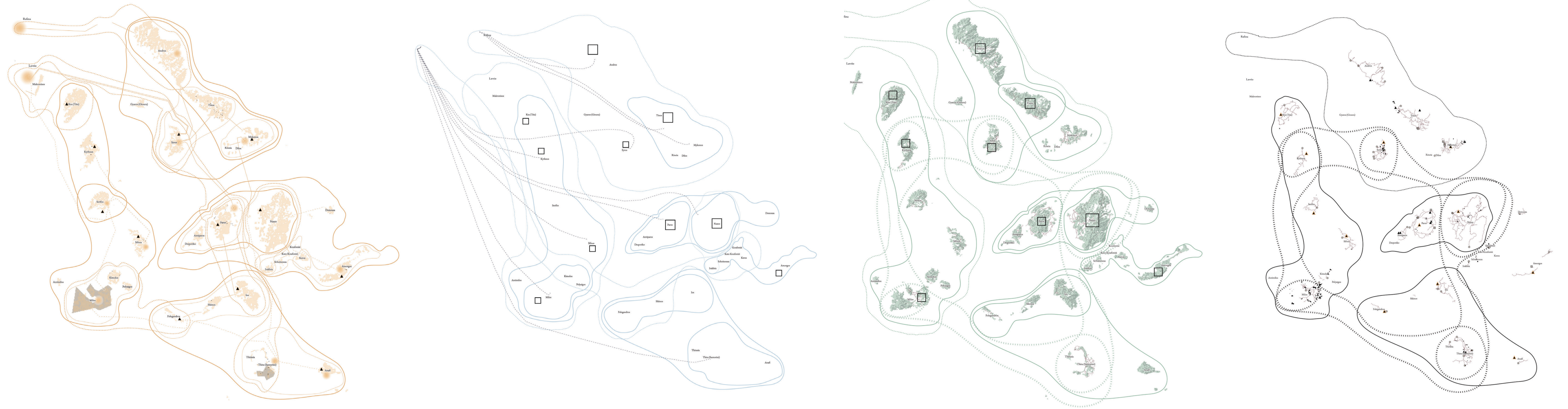


Figure 44. Metabolic processes

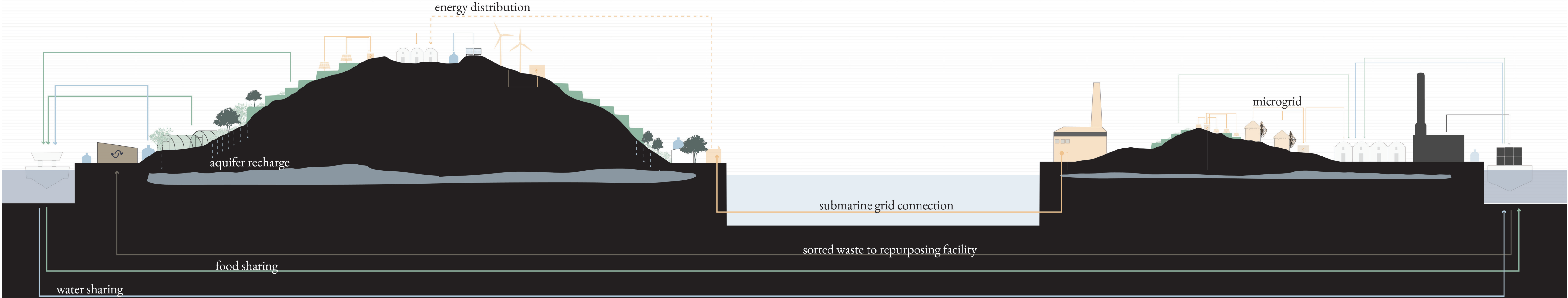
spatial prototypes  
**exemplary spatial prototypes: metabolic profiles**

Naxos and Thira - metabolic analysis

- port
- borehole
- spring
- river or stream
- Reservoirs
- Water course
- ▲ sanitary landfill
- road network
- high flood risk zone
- urban fabric
- salines and lagoons
- intertidal flats
- Mineral extraction areas or dumpsites
- Arable irrigated and non-irrigated land
- Greenhouses
- Cultivated area or managed grassland
- Forests and woodlands
- Sclerophyllous scrubs

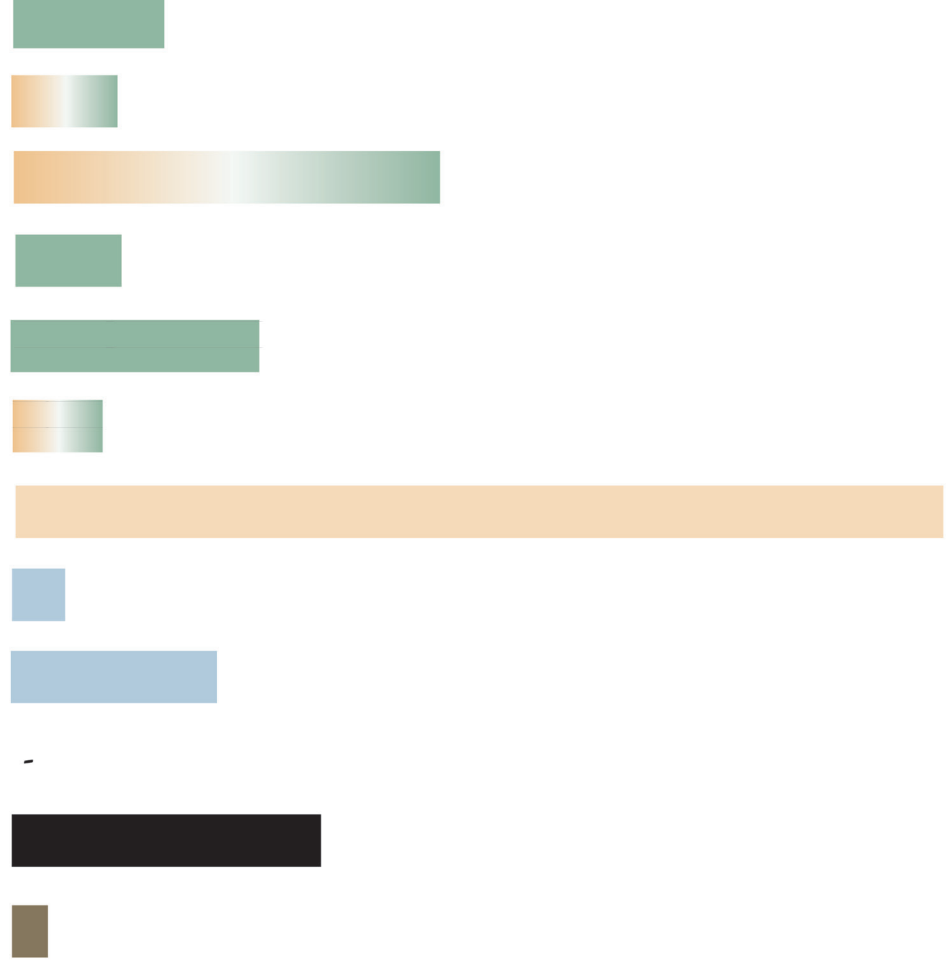
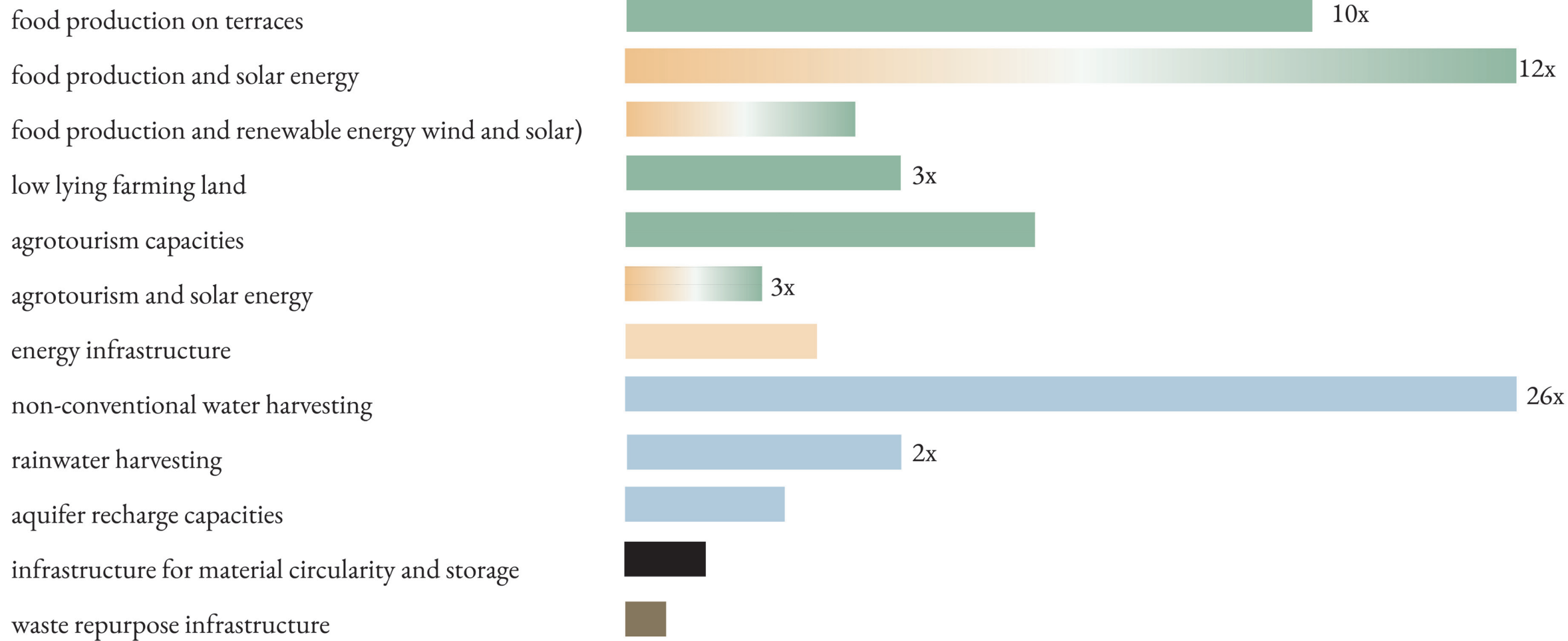


spatial prototypes  
**exemplary spatial prototypes: relation**



Naxos

Thira



spatial prototypes  
energy production and water harvesting in Emporio, South Santorini



1:100

spatial prototypes  
food production and aquifer recharge in Galini, northeast Naxos



1:200

- hypothesizes that by giving a metabolic function to the landscape - power to **indirectly control tourism sprawl**
- urban metabolism through its **spatial footprint to highlight the complications of limitless growth** and a fully outsourced metabolism by using islands for experimental conceptualization
- the import-oriented and fully infrastructuralized system provides an **illusion that resources are infinite** - blending the areas of production with areas of consumption, raise awareness about scarcity and the need for behavioral change
- the project does not focus on providing solutions, but **flexible alternatives** and key structures that could **initiate the change**
- redefines the **role of the urbanist**, not as someone who intervenes radically on space, but as someone who provides imaginaries (Savini, 2021a), who can act as a **facilitator of possibilities and alternatives** with interventions that respect the local context and sensitivities while stating the need to set boundaries.

**Thank you!**

