Unit 3.7 Capacity to transform unstainable development pathways: How can we move beyond isolated actions to move whole sectors or regions to more sustainable development pathways?

Transformative capacity represents the culmination of our exploration of capacities for sustainable development. Of all the capacities, transformation uniquely requires orchestrating multiple other capacities toward a fundamental restructuring of development pathways—from unsustainable to sustainable ones. Transformations are shifts from one regime and its associated development pathways to another. Unlike adaptation (Unit 3.4) which seeks to maintain systems within their current regimes, often through dampening feedbacks, transformation involves fundamentally restructuring systems often through reinforcing or amplifying feedbacks that push toward new states. Sustainability transformations are shifts from regimes associated with unsustainable pathways to alternative regimes where development pathways are provisionally more sustainable—such as shifts from fossil fuel-based to renewable energy systems, or from industrial agriculture to agroecological food systems.

The need for transformations arises when current regimes prove fundamentally unsustainable. Path dependence and lock-in can make incremental adaptation insufficient or even counterproductive for long-term sustainability. Research over the past two decades has revealed that development pathways are stabilized by assemblages of institutions (rules, norms, beliefs), technologies, and incumbent power structures that resist change. Dominant pathways exhibit lock-in through increasing returns to scale and powerful interests threatened by decline. Yet transformations do occur—driven by novelty and innovation at micro-levels, exploiting windows of opportunity at macro-levels, and navigating tensions between speed of change and equity concerns.

The heart of transformative capacity is innovation—but not innovation for market returns alone. It requires actors across society to orient their innovative efforts toward collective goals that transcend individual gain, fostering change not just in technologies but in institutions, social practices, and the very goals that guide development. This unit explores what science and practice reveal about fostering such deliberate transformations—from understanding the multi-level dynamics that enable change, to creating shared visions that make transformation conceivable, to organizing mission-driven efforts that reshape markets toward sustainability.

Preparation for class: To prepare for this Unit, please:

a) **Read**: Harley, A. G., & Clark, W. C. (2025). *Building Capacity to Transform Unsustainable Development Pathways into Sustainable Ones: Lessons from scholarship and practice* (Nos. 25–03; Sustainability Science Program Working Paper, p. 21). Harvard Kennedy School of Government. https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/sustsci/files/Transform%20Capacity_SSP%20Working%20Paper_Final.pdf (Available in Course Library)

This working paper synthesizes insights from transitions scholarship and contemporary practice, examining what's needed to shift from unsustainable to sustainable development pathways.

b) **Read**: Geels, F. W., Sovacool, B. K., Schwanen, T., & Sorrell, S. (2017). Sociotechnical transitions for deep decarbonization. *Science*, *357*(6357), 1242–1244. https://doi.org/10.1126/science.aao3760.

This concise paper broadens findings from the German Energiewende to general lessons for decarbonization, offering an authoritative summary of strategies to support goal-oriented transitions toward a lower carbon future. The authors emphasize "coevolutionary interactions between technologies and societal groups" rather than narrow technological approaches.

c) **Read**: Kattel, R., & Mazzucato, M. (2018). Mission-oriented innovation policy and dynamic capabilities in the public sector. *Industrial and Corporate Change*, *27*(5), 787–801. https://doi.org/10.1093/icc/dty032

This paper examines how governments can drive sustainability transformations through mission-oriented approaches that create new markets rather than simply fixing existing ones. The authors

argue that building transformative capacity requires public sector capabilities to coordinate across sectors, take risks, and maintain long-term vision in the face of uncertainty.

d) **Watch**: Klein, N., & Crabapple, M. (2019, April 17). A message from the future with Alexandria Ocasio-Cortez. *The Intercept*. https://theintercept.com/2019/04/17/green-new-deal-short-film-alexandria-ocasio-cortez/

This short film uses the power of storytelling to make radical climate transformation feel both urgent and possible. Narrated by Alexandria Ocasio-Cortez from the year 2030, it turns policy into human narrative, showing how society might rebuild itself around justice and sustainability.

e) **Review**: The Appalachia case from Unit 2.6, i.e. Harley, A., & Wexner, H. (2022). The Struggle for Sustainable Development in Appalachia's Mineral Rich Mountains. *Sustainability Science Program Working Paper*, *2022*(1), 65. and in the Course Library.

As you re-read, consider how the institutional arrangements and power structures you analyzed in Unit 2.6 create lock-in that prevents transformation away from extractive industries.

Study Questions to help you get the most out of the readings:

I. **Multi-level dynamics:** The Geels et al. paper (reading 'b') analyzes transformations through the Multi-Level Perspective: niche innovations (micro), regimes (meso), and landscape pressures (macro). Using the transformation imagined in "A Message from the Future" (reading 'd'), identify: What landscape pressures create openings for change? What regime elements are being challenged? What niche innovations are emerging? How must these three levels align for transformation to occur?

II. **Regimes and incumbent resistance**: Reading 'a' discusses how development pathways are stabilized by "assemblages of institutions, technologies, and power structures that resist change." Using the Appalachia case (reading 'e'), identify what keeps the region locked into extractive industries. How does power operate not just through active resistance but also by making alternatives seem unrealistic or unthinkable? How do "increasing returns to scale and powerful interests threatened by decline" explain coal's persistence despite its decline?

III. **Imaginaries and transformation**: "A Message from the Future" (reading 'd') presents an imaginary of transformed futures. How does this narrative approach differ from traditional policy proposals in building public support? What role do such imaginaries play in making radical system change conceivable when actors are locked into incremental responses?

IV. **Mission-oriented transformation**: Reading 'c' presents mission-oriented policy as essential for sustainability transformations. How does their "market-shaping" approach differ fundamentally from traditional "market-fixing" policy? Consider the transformation in "A Message from the Future" (reading 'd') - what specific market-shaping interventions would be needed to achieve it? How do these interventions go beyond simply correcting market failures to actively creating new markets and directing innovation toward collective goals?

V. **Your case**: Consider a specific transformation needed in your case—shifting from an unsustainable development pathway to a sustainable one. First, map how each of the six capacities from Part III would contribute to this transformation. Then analyze: Which capacities are currently strong or weak in your case? More importantly, what would it take to align these capacities toward a common mission as reading 'c' suggests? Is transformation failing because key capacities are missing, or because existing capacities aren't coordinated toward a shared purpose?

Digging deeper (optional materials for further exploring frontiers in the pursuit of sustainability):

f) **Read**: Jasanoff, S., & Kim, S.-H. (2009). Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea. *Minerva (London)*, *47*(2), 119–146. https://doi.org/10.1007/s11024-009-9124-4

This foundational article introduces the concept of "sociotechnical imaginaries"—collectively held visions of desirable futures. By comparing how the US and South Korea differently imagined nuclear power's role in their national development, the authors show how imaginaries influence which transformative pathways societies envision and pursue.Jasanoff, S. (2018). Just transitions: A humble approach to global energy futures. *Energy Research & Social Science*, *35*, 11–14. https://doi.org/10.1016/j.erss.2017.11.025

g) **Read**: Kern, F., & Howlett, M. (2009). Implementing transition management as policy reforms: A case study of the Dutch energy sector. *Policy Sciences*, *42*(4), 391–408. https://doi.org/10.1007/s11077-009-9099-x

This case study explores how the Netherlands attempted to govern energy system transformation through transition management approaches. The authors analyze the practical challenges of implementing transformation governance, including coordination across scales, managing competing interests, and balancing long-term vision with short-term political pressures.