

# Geographic Machines: The Tennessee Valley Authority's Landscape of Power

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**The material conditions of geographic space and infrastructure has tended to dominate architectural discourse at the expense of a nuanced understanding of the important role immaterial systems also have to play. Increasingly, however, the immaterial conditions of objects and institutions are being integrated into contemporary discourse on the dynamics of geographic space and infrastructure. The Tennessee Valley Authority (TVA), a New Deal agency, initiated a vast infrastructure of power generating hydroelectric dams along the Tennessee River and its tributaries. The TVA fundamentally transformed the rituals and practices of life in the Tennessee Valley by integrating all aspects of the everyday within a system of power, infrastructure, environment, politics, and consumer capitalism. This essay examines the geographic territory constructed by the TVA, which emerged through the overlap of power in the form of physical infrastructure, and soft power in the form of consumerism. To illustrate this point, I will describe the spatial consequences of two artifacts critical to the TVA's development: the electrical appliance and the power system map. After exploring the nuanced conditions of each invention, I will make the argument that they inhabit a system of objects that renders intriguing, less-understood geographic epistemologies and conceptual adjacencies, which reveal novel trajectories for a discourse on geographic and infrastructural space.**

In the past, discourse on geographic space and infrastructure has tended to focus largely on the material conditions of geographic space at the expense of a nuanced understanding of the important role immaterial systems also have to play. But increasingly, the immaterial conditions of objects and institutions, for example, are being integrated into contemporary discourse on the dynamics of geographic space and infrastructure. As Desmini and Waldheim note: "the trajectory of representation – of concept and context – has moved from the material and physical description of the ground toward the depiction of unseen and often immaterial fields, forces, and flows. This has resulted in an important critique of geographical determinism within design culture."<sup>1</sup> Similarly, Jane Bennett, in her theory of vital materiality, considers the material and immaterial; human and non-human actors that shape a landscape of objects and their political ecology.<sup>2</sup> These two discursive trajectories indicate the

need to re-evaluate the past of geographic space and infrastructure in order to reflect on the present and future. Accordingly, this essay will examine a part of the Tennessee Valley Authority's early history (focusing mainly on the years from 1933-1938), using contemporary theoretical frameworks to reflect on the dynamics of how we inhabit geographic space and infrastructure.

Despite addressing specific needs at the outset, The Tennessee Valley Authority Act initiated a vastly complex, geographic machine that eventually integrated all aspects of life within a system of power, infrastructure, environment, politics, and economy:

An Act to Improve the Navigability and to Provide for the Flood Control of the Tennessee River; to Provide for Reforestation and the Proper Use of Marginal Lands in the Tennessee Valley; to Provide for the Agricultural and Industrial Development of Said Valley; to Provide for the National Defense by the Creation of a Corporation for the Operation of Government Properties at and near Muscle Shoals in the State of Alabama, and for Other Purposes.<sup>3</sup>

In this context, the seemingly innocuous phrase, "and Other Purposes," which concludes the opening paragraph of the Act is prophetic. These words were likely inserted without much consideration, as perfunctory short-hand for activities that might be involved in the normal course of business. Indeed, while the insipidness of these words may be sincere, looking back at the Act, "Other Purposes" stands out: It embodies how seemingly marginal, often-overlooked activities constituted primary mechanisms by which the TVA came to be known as The Authority - a pervasively affective organism that at once re-territorialized geographic space and completely transformed the rural subjectivity of the Tennessee Valley. As it would be an impossible task to address all of these facets in such a short essay, I will focus on two inventions that make the TVA's "Other Purposes" salient: the electrical appliance and the power system map. I contend that these two artifacts inhabit a system of objects that renders intriguing, less-understood geographic epistemologies and conceptual adjacencies.

Electric appliances and maps of power grids appear – at least overtly – to inhabit very different social and political configurations: Appliances foreground the social territory of the home,



Figure 1. Electro-domestics increased demand for power and were a vehicle for conveying the vocabulary of modern life. Arthur Rothstein, Library of Congress.

while maps foreground the political realm of geography. This distinction, however, is quickly destabilized when one examines them not as individual objects with distinct, singular intentions, but as social and political artifacts within a shared system. While seemingly opposite in scale, the appliance and the map both collapsed geographic space, obliterating the scalar distinctions between The Authority and its customers. For the customer, the electric appliance correlated the vast scale of power infrastructure with the notion of utility. For The Authority, the map correlated the notion of utility with the geographic space of power. The dual meaning of power and the conceptual adjacency this double-entendre produces underwrites the discussion to follow: in both the electric appliance and the map, power is embodied in the artifact explicitly as the capacity to influence behaviors and electrical energy, but also, implicitly as force, flow, and potential. In the paragraphs to follow, I will foreground and unpack how both artifacts are distinct yet integrated object-systems, which manifest important conceptual adjacencies that re-shaped territory, human subjectivity, and the TVA itself. My examination of these two inventions—the appliance and the map—will be inclusive of their material vitality, but perhaps more importantly, the socio-political contours that endowed them with the capacity to not only re-territorialize daily life, but also the subjectivity of those who lived it.

In his 1980s essay, Reyner Banham noted that: “the TVA dams employ a vocabulary of design that occupies a unique space between regular International-Style modern . . . and the emerging streamline shapes felt proper to the age of electro-domestic appliances.”<sup>4</sup> Banham’s words recall Le Corbusier’s impressions when he visited Norris Dam in 1945. Le Corbusier’s impression of the dams, however, was as “generators of electrical power and monumental expressions of power” that were “facts and symbols of modern life,” which he conceptualized in terms of a sublime, grand infrastructural narrative embodied in the dams themselves.<sup>5</sup> Banham, on the other hand, recognized that the TVA’s grand narrative of power is distributed equally within the small-scale semantics of the home appliance. In identifying both scales of action, the appliance and the dam become coextensive objects, operating in a unified semantic territory: The sublime landscape produced by the dams is thus reproduced within a sublime domestic landscape, while the appliance itself is both a dam in miniature and its corollary.

However, the semantic agency of electro-domestics as proxies for the TVA’s vast infrastructural landscape is only a single facet of a vast epistemological network. The viability of the Tennessee Valley as a power region relied on the TVA’s ability to articulate the utility of electricity to a rural public while also presenting it as an idea. Michelle Mock describes it well when she states that not just appliances, but the whole of “the electrified, modern



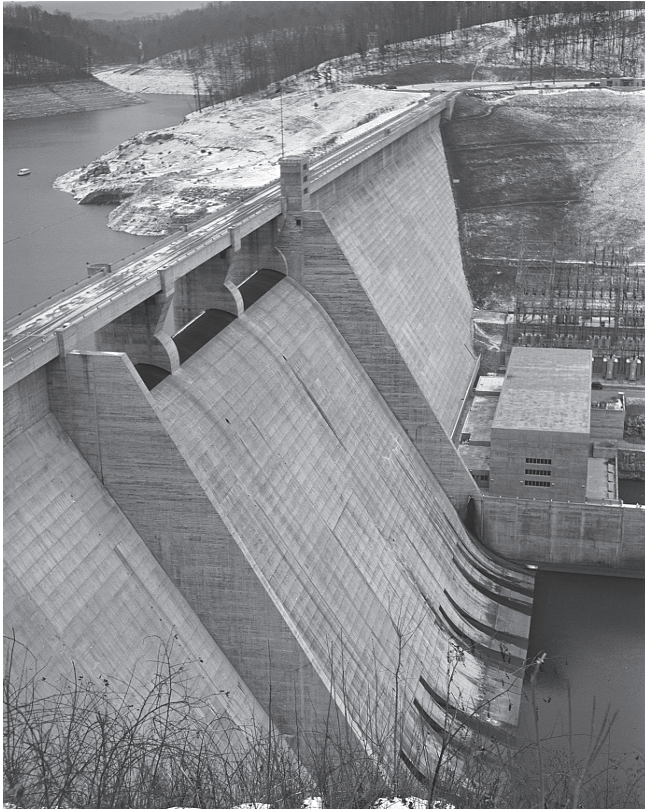


Figure 2. Norris Dam. The design of TVA dams symbolized the nation's technological progress and modernity. Arthur Rothstein, Library of Congress.

American kitchen took shape within a government-managed economic, social, and technological infrastructure, in which not only appliances themselves but also, and more fundamentally, home electrical service first became widely affordable and understood.”<sup>6</sup>

To successfully integrate electricity into the everyday lives of the Tennessee Valley's rural public, the TVA sought to create a power economy. Rather than merely supplying excess electricity from the dams to private utilities, the idea of an economy necessitated the expansion of existing markets and the creation of new ones.<sup>7</sup> The directors of the TVA, following Fordist principles of production, sought to transform The Valley's farmers into mass-consumers of electricity by making electro-domestics accessible, affordable, and pervasive in the rural home.<sup>8</sup> However, electro-domestic appliances that drew the most power (such as refrigerators and electric washing machines) were prohibitively expensive. In 1926 the least expensive refrigerator manufactured by Frigidaire was priced at \$468 while the median family income was just over \$2000, and the prices did not drop much before the TVA came into being in 1933.<sup>9</sup> Thus, within six months of the TVA Act, President Roosevelt declared the creation of the Electric Home and Farm Authority (EHFA) by executive order, which would have “the powers and functions of a mortgage-loan company,” and was to be managed by the

TVA's directors.<sup>10</sup> This effectively created a financial arm for the TVA that would allow them to manipulate both the supply and consumer side of appliances through the use of credit. Through the EHFA, the directors of the TVA offered low-interest loans that increased farmers' purchasing power and allowed them to buy appliances on credit. Meanwhile, the EHFA negotiated with electro-domestic manufacturers to supply stripped down, low-cost EHFA-approved models. The strategy worked remarkably well so that by 1934, an approved refrigerator model manufactured by Norge Corporation retailed for \$79.95.<sup>11</sup> By 1938, 60 percent of Valley households owned refrigerators (compared to less than 50 percent for the Nation) and 23 percent owned electric ranges (compared to 9 percent in the Nation).<sup>12</sup>

Electric appliances transformed the pace, rituals, and tasks of everyday life in The Valley. But, more insidiously, electro-domestics existed within and were inextricably linked to the creation of a credit region. Everyday life was now not just about the utility of electricity afforded by electro-domestics, but about the provisions of ownership and citizenship in relation to credit. In a short time, The Farmer was simultaneously transformed from agrarian to consumer and debtor— or what Baudrillard calls the “Consumer-Citizen,” for whom credit exists as a kind of free gift from the world of production that connects the idea of choice and will (rights) to specific objects. Once credit is introduced as an economic right, any restriction to this right is “felt to be a retaliatory measure on the part of the State.”<sup>13</sup> Thus, credit gains a form of power equal to the intangible force and utility of electricity: credit becomes integrated with and re-organizes patterns of use between the farmer, the appliance, and electricity (an appliance uses electricity, and the farmer uses the appliance). What is revealed through this analysis is that the appliance is not an autonomous object, but an artifact existing within a constellation of material and immaterial socio-political actors constantly shaping meaning and identity.

This re-territorialization of the farmer's subjectivity is similarly evident in how geographic space is represented in the maps produced and used by the TVA. The 1936 promotional publication *Electric Power on the Farm* was published in order to tell the “story of electricity, its usefulness on farms, and the movement to electrify rural America”<sup>14</sup> to a broad public. The booklet prominently features two juxtaposed maps. *What the Countryside Shows* is an axonometric that highlights objects in a landscape, privileging illustrative space and a familiar embodied sense of the countryside. Importantly, it signifies life in a town through iconic features that show literal connections between the home, the church, the town center, the street, electrical lines, etc., but also rhetorical connections in the electrical grid as a system of objects that delivers utility to the domestic interior, which is only implied. *What Your Map Should Show* removes pictorial figures, transforming them into graphic symbols. Here, not only does the map foreground the cartographic space of

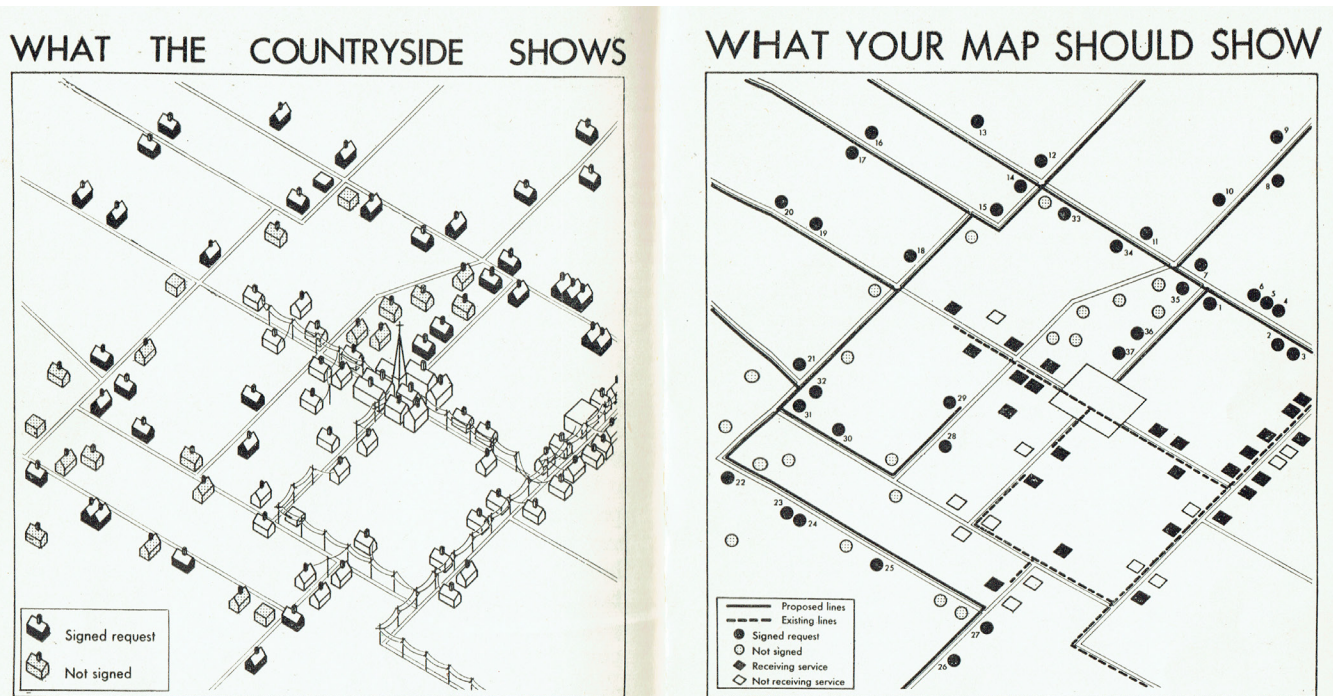


Figure 3. Maps included in “Electric Power on the Farm,” a promotional publication for the Rural Electrification Administration. They represented a new connection between the geographic space of power, infrastructure, and the home. Rural Electrification Administration, *Electric Power on the Farm*. (United States, 1936).

the territory it represents, but it also signifies life as an abstract infrastructural space of conduits and nodes.

At first it seems odd that the map on the right would be a more desirable image of space for a rural public. Further consideration, however, reveals that by erasing life as iconic, familiar figures, the map foregrounds modernity in the form of expansion and progress. The iconic map on the left is static; but by making possible the arrival of new electrical lines, and therefore new electrified homes, the map on the right also allows for the expansion of the town itself. If the home is not an object, but a symbolic node, it can be added with ease and plugged into the grid, much like an appliance. Additionally, the map on the right, in showing the system rather than the view, is not limited to what is visible; the street gives way to the circuitry of the electrical grid as a present and future condition, while the ground becomes merely a referential plane rather than a spatial determinant. By deactivating the z-axis— a primary feature of the axonometric on the left — the specific form of the town is de-emphasized in favor of the virtual space of representation itself and of the system it depicts.

While a rural farmer may not have fully grasped the nuances of this juxtaposition, they would almost certainly have recognized that the map on the right represents modernity and progress. At a subconscious level the map also de-emphasizes personal property and ownership in favor of the collective citizenship of the power economy, reinforcing the notion that electrification

delivers progress to everyone, and everyone stands to benefit equally.

The map, together with appliances, represented a new kind of community for the rural farmer: a community based on power infrastructure rather than the architectural space of iconic form. And while the appliance made power tangible as the work of objects, the map instrumentalized power as a form of citizenship within a cartographic space. Taken together, it is possible to describe the condition of territory constituted in the Tennessee Valley as an assemblage that was much more decentralized and irreducible than historians and theorists tend to indicate. This does not mean that the actions and transformations brought about by the TVA were any less all-encompassing. Instead, it means they were much more convoluted and prone to the internal contradictions of vast geographic systems in which people, objects, institutions, material and immaterial things are integrated.

While it is important to continually evaluate the past in its context, it is equally important to establish forward-thinking methods of practice that define new ways in which designers and theorists might participate in a discourse on geographic space and infrastructure. As such, I would like to conclude by briefly pointing out two design research practices that deftly instrumentalize design as an analytical tool for critically engaging a public discourse on geographic space and infrastructure.



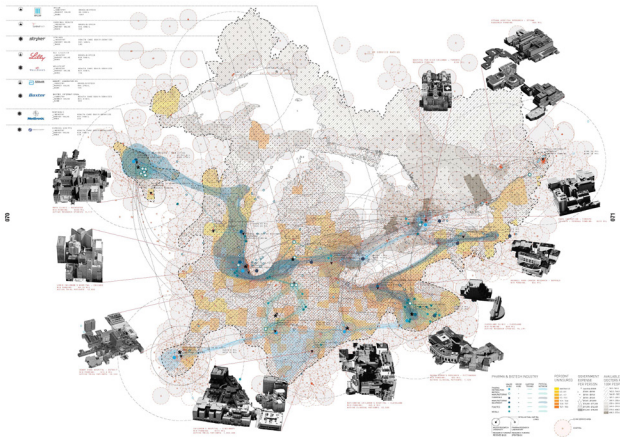


Figure 4. Map of the Great Lakes Region MediShed. Copyright RVTR.

Lateral Office and RVTR are two design research collaboratives whose important contributions to discursive design culture, through mapping in particular, wrangle with the political ecology and “Other Purposes” of geographic space and infrastructure. Lateral Office’s *Many Norths* potentially synthesizes a past and present of Canada’s internal colonization of The North as both a territory and an idea. *Many Norths* pressurizes geographic space through the collapse of experimental maps and on-the-ground narratives.<sup>15</sup> RVTR takes a more conceptual, yet no less impactful approach to explicating the political ecology of territory. Their project for the Great Lakes Megaregion, *Infra Eco Logi Urbanism*, deploys agent-based mapping, which conjures actors within the “Infra-” (infrared, infrasonic, infradian), the “Eco-” (ecology, economy), and the “Logi-” (logics, logistics) to describe territory.<sup>16</sup> Both Lateral Office and RVTR manage to overcome the tendency of geographic space to be seen as static and determinate. They destabilize our conception of geographic space and infrastructure as purely cartographic, instead elucidating territory as an emergent stage-of-events.

These practitioners and theorists share a concern for the global state-of-affairs after the 2008 economic crisis which re-structured global power dynamics. Power as influence, energy, force, utility, etc., exists today within an inherently more complex geopolitical context, with increasingly diffuse actors taking part in how geographic space is defined. Following the 2008 crash, nations turned to extra-State mechanisms to provide infrastructural development funds. For example, China’s “Belt and Road Initiative” has accelerated in recent years, as has the European Union’s involvement in hydroelectric projects in the Balkans. This makes it all the more pressing that design culture position itself within a discourse that situates action across scales and within emergent assemblages of objects, institutions, spaces, and events. We would also do well to pay close attention to those who, whether through academia and/or practice, seek to explicate the deeper, less explicit inter-actions learned from the “Other Purposes” of past, present, and future histories like

Canada’s North, the Great Lakes Megaregion, and of course, the Tennessee Valley.

#### ENDNOTES

1. Jil Desimini, and Charles Waldheim, *Cartographic Grounds: Projecting the Landscape Imaginary* (New York: Princeton Architectural Press, 2016)
2. Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2009).
3. “An Act to Improve the Navigability and to Provide for the Flood Control of the Tennessee River; to Provide for Reforestation and the Proper Use of Marginal Lands in the Tennessee Valley; to Provide for the Agricultural and Industrial Development of Said Valley; to Provide for the National Defense by the Creation of a Corporation for the Operation of Government Properties at and near Muscle Shoals in the State of Alabama, and for Other Purposes,,” in *Enrolled Acts and Resolutions of Congress, 1789-1996*, ed. U.S. Congress (<https://www.ourdocuments.gov/>: National Archives, 1933)
4. Reyner Banham, “The Grand Job of the Century,” *Habitat International* 5, no. 5-6 (1980): 595.
5. Mardges Bacon, “Le Corbusier and Postwar America: The Tva and Béton Brut,” *Journal of the Society of Architectural Historians* 74, no. 1 (2015): 23.
6. Michelle Mock, “The Electric Home and Farm Authority, “Model T Appliances,” and the Modernization of the Home Kitchen in the South,” 80 (2014).
7. The Tennessee Valley Authority, “Annual Report of the Tennessee Valley Authority for the Fiscal Year Ended June 30, 1936,” (Knoxville, Tennessee: The Tennessee Valley Authority, 1936).
8. Mock, 78-79.
9. *Ibid.*, 74.
10. *Executive Order No. 6514*, (December 19, 1933).
11. Mock, 81-83.
12. The Tennessee Valley Authority, “Annual Report of the Tennessee Valley Authority for the Fiscal Year Ended June 30, 1938,” (Knoxville, Tennessee: The Tennessee Valley Authority, 1938).
13. J. Baudrillard and J. Benedict, *The System of Objects* (New York: Verso, 1996): 156.
14. United States. Rural Electrification Administration. and David Cushman Coyle, *Electric Power on the Farm: The Story of Electricity, Its Usefulness on Farms, and the Movement to Electrify Rural America* (Washington, D.C.: U.S. G.P.O., 1936).
15. Lola Sheppard and Mason White, *Many Norths: Spatial Practice in a Polar Territory* (Barcelona: Actar Publishers, 2017).
16. Geoffrey Thün, Kathy Velikov, Dan McTavish and Colin Ripley, *Infra Eco Logi Urbanism: A Project for the Great Lakes Megaregion* (Zurich: Park Books, 2015).