China's Western Development Strategy for Modernization Drive

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Abstract: *The Western Development Strategy (WDS) is a key aspect of China's coordinated regional development strategy and effort to build a modern country. The world is undergoing profound changes that have not been witnessed in a century. This paper discusses the WDS's importance in regards to China's modernization drive and the great rejuvenation of the Chinese nation. First, this paper identifies the WDS's mission to improve people's livelihood in China's western regions, promote common prosperity for the Eurasian continent, and support the green transition of China's and Eurasian energy economic and environmental systems, and safeguard ecological security in Asia at large. Second, this paper suggests that the key to the WDS is to reshape the geographical layout of economic activity in the western regions to avoid inefficiency. Specifically, China should develop a compact geographical layout of economic activity in the western regions, introduce a unique competition strategy, as well as find solutions for coordinated regional development based on key river basins. Finally, develop smart internet and inland free ports within the western regions.*

Keywords: *China, modernized country, coordinated regional development, Western Development Strategy (WDS), spatial diseconomies*
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Since the founding of the People's Republic of China in 1949, China has made great efforts to develop its western regions in three phases for coordinated regional development.[1] In Stage I (the 1950s), China constructed regional production facilities near raw material and fuel supplies in the western regions, specifically within the range to the east of Baotou-Lanzhou Railway and the north of the Yangtze River. This implementation of 156 construction projects aided by the former Soviet Union to reverse the distorted and extremely imbalanced industrial layout left as a legacy from Old China.

In Stage II (1964-1978), China launched the "Third Front Movement" for the construction of defense, research, industrial, and transportation infrastructures in inland areas that were less vulnerable than coastal regions to potential foreign attacks, focusing on Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia, and Qinghai.

In Stage III (2000-2020), China launched the Western Development Strategy (WDS) to build

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[1] The "western regions" generally refer to the 12 contiguous provinces, municipality and autonomous regions -- Sichuan, Shaanxi, Gansu, Qinghai, Yunnan, Guizhou, Chongqing, Guangxi, Inner Mongolia, Ningxia, Xinjiang, and Tibet. However, WDS policies also apply to Enshi Tujia and Miao Ethnic Autonomous Prefecture in Hubei, Xiangxi Tujia and Miao Ethnic Autonomous Prefecture in Hunan, and Yanbian Korean Autonomous Prefecture in Jilin.

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全面建设现代化国家的西部大开发战略

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摘　要：西部大开发是实施区域协调发展战略、全面建设现代化国家的重要内容。本文从中华民族伟大复兴战略全局和世界百年未有之大变局出发，系统探讨全面建设现代化国家的西部大开发战略。首先，论文提出西部大开发战略使命是让西部人民同全国人民一起均等获得幸福、促进亚欧大陆共同繁荣、支撑中国和亚欧能源—经济—环境系统绿色发展转型以及保障中国和亚洲生态安全。其次，论文指出西部大开发战略关键是重塑西部地理以规避和克服西部低效空间格局，包括塑造紧凑型经济地理、实施新型别具一格竞争战略、采取以流域为基础的区域协调发展解决方案，建设互联网西部和内陆自由港。

关键词：中国；现代化国家；区域协调发展；西部大开发战略；空间格局不经济学说

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新中国成立以来，为促进区域协调发展、实现第一个百年奋斗目标，西部[1]大开发经历了三个周期。一是20世纪50年代生产力布局西进，以包（头）兰（州）线以东、长江以北为范围，以苏联帮助设计的156个建设项目重点布局为内容，以最大限度接近原料地燃料地和市场地、形成地域生产综合体、平衡工业发展布局为原则，以改变旧中国遗留的、极不均衡的畸形工业布局为目标；二是1964年至1978年的三线建设，以川、贵、云、陕、甘、宁、青为主要范围，以大规模国防、科技、工业和交通基础设施建设为内容，以战备为指导思想；三是2000年至2020年西部大开发，以基础设施建设、生态建设和环境保护、特色优势产业发展、新的经济增长极培育、社会事业发展和深化改革扩大开放为主要内容，以全面建成小康社会为目标。2021年西部大开发踏上全面建设社会主义现代化国家新征程。2020年5月发布的《中共中央国务院关于新时代推进西部大开发形成新格局的指导意见》（以下简称《意见》）明确了未来形成西部大开发新格局的定位[2]。《中共中央关于制定国民经济和社会发展第十四个五年规划和二〇三五年远景目标的建议》要求推动西部大开发形成新格局。“不谋全局者不足谋一域”，必须从中华民族伟大复兴战略全局和世界百年未有之大变局出发，认识和把握全面建设现代化国家的西部大开发战略，明确其使命、关键和道路。本文循此路线从地缘经济角度探讨全面建设现代化国

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[1] 通常指四川、陕西、甘肃、青海、云南、贵州、重庆、广西、内蒙古、宁夏、新疆、西藏12个省、市、自治区构成的连片地域，但西部大开发政策适用范围还包括湖北恩施土家族苗族自治州、湘西土家族苗族自治州、延边朝鲜族自治州。

[2] 根据《意见》，笔者以为，这一新格局的基本定位是推动大保护、大开放、大变革、高质量发展，到2035年基本实现社会主义现代化。

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infrastructure, protect the environment, foster advantageous local industries as new growth drivers, develop social programs, and deepen reforms in western regions under the goal of building a moderately prosperous society. The year 2021 unveils a new journey for the Western Development Strategy. In May 2020, the CPC Central Committee and the State Council issued guidelines on advancing Western regions' development.[2]

In its proposals on formulating the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035, the CPC Central Committee called for forming a new pattern for the development of western regions. Regional development cannot be planned in isolation from overall national development. We must approach China's Western Development Strategy and identify its missions, priorities, and paths from the strategic perspective of the great rejuvenation of the Chinese nation and the once-in-a-century changes taking place in today's world. Following this approach, we will discuss China's Western Development Strategy as part of its modernization drive from a geo-economic perspective.

1. Strategic Mission of the Western Development Strategy

The Chinese nation's great rejuvenation is at the historic crossroad of the "two centennial goals." The primary contradiction facing Chinese society is unbalanced and inadequate development and the people's ever-growing need for a better life. China, Asia, and the Eurasian continent as a whole have come front and center on the world stage to create a community that shares a future for the advancement of humankind. We have identified the missions and responsibilities for the Western Development Strategy under China's modernization drive in this context.

1.1 Raise Living Standards for People in Western Regions

From a geographical layout perspective, economic development is often accompanied by the concentration of manufacturing activity and the equalization of living standards. According to international experience, inequality within living standards follows a non-linear and inverted U-shape pattern amid economic development. Before a country reaches the upper-middle-income stage, gaps in living standards will widen. However, in the middle-income stage, gaps in basic living expenses, public services, and income distribution will narrow, in that order (the World Bank, 2009).

Since the 11th Five-year Plan (FYP) period (2006-2010), the Chinese government has vowed to equalize living standards as the goal of coordinated regional development amid China's transition from a middle-income country to an upper-middle-income country. Specifically, the 11th FYP aimed to reduce the gaps in public services and living standards as the basic goals of coordinated regional development. The 18th CPC National Congress vowed to "reduce income distribution gaps." In 2017, General Secretary Xi Jinping put forth three goals of coordinated regional development in an important speech at the Central Economic Work Conference, i.e. to equalize essental public services, access to public infrastructures, and living standards. In 2020, General Secretary Xi Jinping said in his proposal to initiate a new journey towards building a socialist modern country at the Fifth Plenum of the 19th CPC Central Committee saying "We must give more prominence to promoting common prosperity for all the people and make down-to-earth, proactive, and lasting efforts towards this goal."[3]

With an area of 6.78 million square kilometers, China's western regions account for 71% of China's total land area - equivalent to 73.3% of the US land area - and are home to 380 million people, or 27% of

[2] According to the *Guidelines*, we believe that this "new pattern" is characterized by ecological protection, economic openness, reforms, and high-quality development for the basic achievement of socialist modernization by 2035.

[3] Xi Jinping: Explanations on the *CPC Central Committee's Proposals on Formulating the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and the Long-Range Objectives Through the Year 2035*, Xinhua News Agency, November 3, 2020.

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家的西部大开发战略，试图揭示其使命、关键和路径。

一、西部大开发战略使命

中华民族伟大复兴已站在“两个一百年”奋斗目标历史交汇点上，中国社会主要矛盾已经转化为人民日益增长的美好生活需要和发展不平衡不充分的矛盾，中国、亚洲乃至亚欧大陆正再一次走进世界舞台中央、成为构建人类命运共同体的历史枢纽。基于这一时空背景来看，以全面建设现代化国家为目标的西部大开发战略，其使命和责任可以概括为以下四个方面。

（一）让西部人民同全国人民一起均等获得幸福

经济发展在地理空间上是一个生产集中化、生活均等化的过程，在生产集中中实现共同富裕是客观规律的体现。国际经验表明，随着经济发展，生活水平均等化呈现非线性、倒“U”型变化，即：在发展尚未进入上中等收入阶段时，生活水平差距随着经济发展而扩大，当发展进入上中等收入阶段时，生活水平差距会依基本生活支出、公共服务、收入分配顺序转向缩小（世界银行，2009）。为适应发展由中等收入向上中等收入阶段的转变，“十一五”规划以来，生活水平均等化开始逐步成为我国区域协调发展的目标被全面提出：“十一五”规划明确把公共服务和人民生活水平差距趋向缩小作为区域协调发展的基本目标，党的十八大提出“收入分配差距缩小”的目标。在此基础上，2017年，习近平总书记在中央经济工作会议重要讲话中系统提出区域协调发展要实现基本公共服务均等化、基础设施通达程度比较均衡、人民生活水平大体相当三大目标；2020年，习近平总书记在党的十九届五中全会上提出在全面建设社会主义现代化国家新征程中，“我们必须把促进全体人民共同富裕摆在更加重要的位置，脚踏实地，久久为功，向着这个目标更加积极有为地进行努力”[3]。西部国土面积678万平方公里，占我国国土面积的71%，相当于美国国土面积的73.3%；人口3.8亿，占我国总人口的27%以上，是美国总人口1.16倍[4]。2019年西部人均GDP7790美元，按世界银行划分标准，已跨入中等偏上收入地区行列，但明显不及同期全国10098美元、全球11339美元的人均GDP水平，更只有美国人均GDP6.5万美元的1/8，是我国落后的巨型欠发达地区。由此可见，在全面建设社会主义现代化国家新征程中，西部大开发在向着全体人民共同富裕这个目标更加积极有为地努力中具有十分重要的地位和作用，全面建设社会主义现代化国家应把西部地区人民共同富裕放在区域协调发展更加重要的位置。

西部大开发战略实施以来，西部地区与全国发展的相对差距趋于缩小，但居民生活水平差距的缩小明显滞后于生产水平差距的缩小。以居民可支配收入为例，目前西部地区居民人均可支配收入只及全国平均水平的70% ，明显落后西部地区人均GDP相当于全国77%的水平。究其原因，一个重要因素是在过去的西部大开发中存在一定程度的强调地理空间上的经济繁荣之倾向。这种倾向强调生产而忽视生活、妨碍经济活动在地

[3] 习近平，关于《中共中央关于制定国民经济和社会发展第十四个五年规划和二〇三五年远景目标的建议》的说明，新华社，2020-11-03。

[4] 中国国土数据根据《中华人民共和国行政区划》相关数据计算，人口数据根据《中国统计年鉴》计算。美国人口数据来源于United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects: The 2019 Revision, https://population.un.org/wpp/。

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China's total population, which is 1.16 times the total population of the United States.[4] With a per capita GDP of 7,790 US dollars in 2019, China's western regions reached an upper-middle-income level by the World Bank's criteria. China's national average fell short of 10,098 US dollars and the global average of 11,339 US dollars and was only 1/8 that of US GDP per capita of 65,000 US dollars. By these criteria, China's vast western regions are less developed. In the new journey towards building a modern socialist country, the Western Development Strategy plays a more positive and vital role in achieving common prosperity for all the people. Building a modern socialist country, we should deliver common prosperity for our people in the western regions in order to coordinate regional development.

The implementation of the Western Development Strategy has narrowed development gaps in the western regions relative to other parts of China. However, gaps in living standards have narrowed at a much slower pace compared with the productivity gaps. For instance, household disposable income in the western regions was only 70% of the national average. In the same period, however, GDP per capita in the western regions was 77% of the national average. This gap in disposable income reflects a bias in implementating the Western Development Strategy, which prioritized regional economic prosperity over the improvement of living standards. In the long run, economic prosperity cannot sustain if living standards fail to keep up. Hence, we must give more prominence to common prosperity in the western regions in our regional development strategy. In developing the western regions, we must balance people's wellbeing with regional economic prosperity and strive to enhance people's sense of gain, happiness, and security.

1.2 Promote Common Prosperity in Eurasian Continent

From a Eurasian perspective, the world can be divided into the Eurasian center, the periphery, and the sea. Since the late 19th century, academics have put forth different geopolitical theories based on their different understandings of these geographical divisions. In 1890, American geologist Alfred Thayer Mahan put forth the sea power theory. In his view, the sea is the nexus of countries and world history. Seapower, especially over straits, peninsulas, and islands, is vitally important to a country's destiny. In contrast to Alfred Mahan's sea power theory, British geographer Halford John Mackinder published his heartland theory in *The Geographical Pivot of History* in 1904. According to the heartland theory, the Eurasian continent is the fulcrum of world history, which developed from the Eurasian heartland to the monsoon periphery, Australia to the southeast, the American continent through Siberia and Alaska to the northeast, and the European periphery and southern heartland to the west. "Whoever controls Eastern Europe controls the Heartland; whoever controls the Heartland rules the World-Island; whoever rules the World-Island rules the world," argued Halford Mackinder. Unlike the sea power theory and the heartland theory, Nicholas John Spykman, an American geographer of Dutch descent, published the rimland theory in *The Geography of the Peace* in 1944. Control over the Eurasian fringe means access to vast Eurasian coastlines, consumer markets, natural resources, and influence over the Eurasian continent. As Spykman pointed out, "whoever controls Rimland controls Eurasia, and whoever controls Eurasia controls the fate of the world."

Since the 2010s, the United States has taken a host of geopolitical maneuvers based on the land, rimland, and sea power theories to maintain its influence over the Eurasian continent, where economic integration has made great strides. Through Brexit, the US has tightened its control over the straits, peninsulas, and islands in Western Europe. While curbing France, Germany, and the Middle East's independent tendencies at the rim of the European continent, the US has increased intervention in Eastern Europe at the heart, such as stationing troops in Poland, to block European integration and prevent the

[4] China's land areas are calculated with data from the *Administrative Jurisdictions of the People's Republic of China*, and demographic data is calculated based on China's statistical yearbooks. US demographic data is from the United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects: The 2019 Revision (https://population.un.org/wpp/).

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理空间上的有效集聚，既不利于西部地区提升经济增长质效也不利于西部地区更好地缩小与全国生活水平的差距。因此，为把西部地区与全国共同富裕放在区域协调发展更加重要的位置上，未来西部大开发应处理好人的幸福和地理的经济繁荣之间的关系，坚持以人民为中心，把增强人民群众获得感、幸福感、安全感放到突出位置，以人的幸福而非地理的经济繁荣为目的，以增强西部地区人民群众获得感、幸福感、安全感而非地理经济繁荣为使命和责任。

（二）促进亚欧大陆共同繁荣

从亚欧大陆视角来看，世界可分为亚欧大陆心脏、边缘和海上三个地带。19世纪末以来，由于对三大地带地位和作用认识不同，产生了三种不同的地缘政治经济理论。1890年，美国地理学家阿尔弗雷德·塞耶·马汉（Alfred Thayer Mahan）提出海权论，认为海上地带是国家和世界历史的枢纽，强调制海权在国家和世界命运中的决定意义以及海峡、半岛、岛屿对制海权的关键作用。与马汉海权论相对立，1904年，英国地理学家哈尔福德·麦金德（Halford John Mackinder）发表《历史的地理枢纽》，提出陆心论，认为亚欧大陆是世界历史枢纽，世界历史总的是由亚欧大陆腹心地带分别向东南方向季风边缘区和澳大利亚、向东北方向经西伯利亚和阿拉斯加到美洲、向西到欧洲边缘地带和南部腹地发展的，强调“谁控制了东欧，谁就控制了心脏地带；谁控制了心脏地带，谁就控制了世界岛；谁控制了世界岛，谁就控制了世界”。与马汉海权论、麦金德论不同，1944年，荷兰籍美国地理学家尼古拉斯·斯皮克曼（Nicholas John Spykman）发表《和平地理学》提出边缘地带说，认为亚欧大陆边缘地带凭借其地理位置、人口、天然资源优势，控制围绕亚欧大陆的印太连绵海岸，并对亚欧大陆心脏地带形成制衡，“谁支配着边缘地带，谁就控制亚欧大陆；谁支配亚欧大陆，谁就掌握世界的命运”。

随着亚欧大陆经济一体化发展，21世纪10年代以来，美国为防止对亚欧大陆控制失灵，综合运用陆权论、边缘论和海权论，制定实施了一系列地缘战略。一是通过促使英国脱欧强化对西欧海峡、半岛、岛屿控制；二是在防止法德、中东等欧洲大陆边缘地带独立于美国控制的同时，强化对东欧的介入（如驻军波兰），干涉心脏地带，以阻止欧洲统一、欧俄联盟和欧洲一体化；三是在企图通过接触我国以控制亚洲大陆边缘地带的计划失败后，提出实施“亚太再平衡”战略并扩展为“自由而开放的印太战略”[5]，升级美台合作、发表“南海宣言”，以加大围堵我国崛起力度。

中国是一个陆海兼备的超大规模国家，既具内涵广袤的大陆边缘地带和心脏地带，又有辽阔的海上地带，但人口经济高度集中于大陆边缘地带。为应对美国战略挑战、实现总体国家安全和区域协调发展，党的十八大以来，我国坚持陆海统筹，倡导“一带一路”建设，实施区域协调发展战略，以我国大陆边缘地带为依托，“东出西进、南下北上”，加强与亚欧大陆心脏地带、边缘地带和海上地带的交流和发展，促进亚欧共同繁荣、共建人类命运共同体。

西部地区地处亚欧大陆心脏地带、边缘地带、海上地带的中国接合部，是我国西向深入亚欧大陆心脏地

[5] 美国“亚太再平衡”和“自由而开放的印太战略”分别是奥巴马政府于2011年和特朗普政府于2017年提出的，从二者地理范围和实质目标来看，显然是以马汉海权论和斯皮克曼边缘地带说为理论基础的。

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Europe-Russia alliance. After failing to engage China and control Asia's rimland, the US vowed to "rebalance Asia-Pacific" and pursue the "Free and Open Indo-Pacific (FOIP) strategy,"[5] stepping up efforts to prevent China's rise by cooperating with China's Taiwan and meddling in the South China Sea.

China boasts vast land, including rimland and heartland, and maritime territories, but its population and economic activity are highly concentrated in the rimland. Since the 18th CPC National Congress, China has launched the Belt and Road Initiative (BRI), i.e. the Silk Road Economic Belt and the 21st Century Maritime Silk Road, to enhance exchanges and development cooperation with the Eurasian heartland, rimland, and maritime territories. In order to promote common Eurasian prosperity and build a community that shares future prosperity for all humankind.

The western regions are at the forefront of China's westward corridors to the Eurasian continent with over 18,000 kilometers of land borders, accounting for 91% of China's total land borders, and 1,595 kilometers of coastline, or 1/11 that of the nation's total coastline, situated at the intersection of the Eurasian heartland, rimland, and maritime territories, The western regions are the starting points and intermediate channels of international economic corridors between China and the Eurasian countries, including China-Mongolia-Russia, the New Eurasian Continental Bridge, China-Central Asia-West Asia, China-Indochina Peninsula, China-Pakistan, and Bangladesh-China-India-Myanmar. In the new journey of building a modern socialist country, China should develop the western regions to promote common prosperity for the Eurasian continent. Taking the BRI's historic opportunities, the western regions should serve as a westward gateway between Asia and Europe.

1.3 Supporting Low-Carbon Transition for Sustainable Development in China and Eurasia

Energy cooperation is a priority under the BRI.[6] In 2019, 30 countries, including China, unveiled the BRI Energy Partnership (BREP).[7] As pointed out by Igor Sechin,[8] former vice prime minister of the Russian Federation and chief of Rosneft, Eurasia's energy geography comprises the following regions of production and consumption: (i) energy production regions in central Eurasia, including energy-rich Arctic, Russia, the Caspian Sea, and the Middle East. In 2017, the Middle East, Russia, and Turkmenistan accounted for 40.9%, 18.1%, and 10.1% of the world's total natural gas reserves, respectivey.[9] (ii) Asia-Pacific energy consumption regions, including China, India, and Pakistan. (iii) Energy consumption regions in Western and Eastern Europe, including Western Europe, Turkey, and Ukraine.

With the most significant energy consumption globally, China is at the center of the Asia-Pacific energy consumption regions. Despite overall energy self-sufficiency above 80%, China has become the world's largest crude oil and natural gas importer and is highly dependent on oil and natural gas imports. In 2018, China's oil and gas dependence reached 70.8% and 45.3%, respectively, and around 70% of China's oil imports were transported through the Malacca Straits. The energy production regions in Central Eurasia are the primary source of China's oil and gas imports. The Middle East and Russia, for instance, account for 44.0% and 15.48% of China's crude oil imports, respectively. Forty percent of China's natural gas imports were from Central Asia. With China-Russia East-Route Natural Gas Pipeline put into operation since the end of 2019, Russia has become China's largest source of natural gas imports.

Situated between the energy production region in Central Eurasia and the Asia-Pacific energy production region, China's western regions are of great importance in building an energy supply network

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[5] "Rebalancing Asia-Pacific" and "Free and Open Indo-Pacific (FOIP) strategy" were adopted by Obama administration and Trump administration in 2011 and 2017, respectively, and judging by their geographical scope and intentions, obviously based on Mahan's sea power theory and Spykman's rimland theory.

[6] *Xi Jinping sends a congratulatory letter to the BRI Energy Ministerial Conference at the International Energy Transition Forum*, Xinhua News Agency, October 18, 2018.

[7] *BRI Energy Partnership unveiled in Beijing*. Xinhua News Agency, April 25, 2019.

[8] /www.rus7077.com/shangpin/elsxy/14134.html.

[9] Source: *BP World Energy Statistical Yearbook*, 2018, page 26.

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带的前沿地域，陆地边境线长达1.8万余公里，约占全国陆地边境线的91%，大陆海岸线1595公里，约占全国海岸线的1/11，是中国与亚欧国家共同建设的中蒙俄、新亚欧大陆桥、中国－中亚－西亚、中国－中南半岛、中巴和孟中印缅国际经济走廊起迄基地和中介通道。因此，在全面建设现代化国家新征程中，西部大开发应以促进亚欧大陆共同繁荣为重要战略使命，抓住“一带一路”建设的历史机遇，因势利导地打造中国西向融通亚欧的陆上桥头堡。

（三）支撑中国和亚欧能源-经济-环境系统绿色低碳可持续发展转型

能源合作是共建“一带一路”的重点领域[6]，中国等30个国家共同成立了“一带一路”能源合作伙伴关系[7]。从能源生产和消费关系来看，正如俄罗斯联邦政府原副总理、俄罗斯石油公司（Rosneft）首席执行官伊戈尔·谢钦（Igor Sechin）所指出的[8]，亚欧能源地理大体可以划分为：（1）亚欧中部能源生产区，包括北极和俄罗斯、里海和中东地区，石油、天然气等能源资源富集，以2017年天然气储量为例，中东、俄罗斯、土库曼斯坦居世界前列并分别占全球的40.9%、18.1%和10.1%[9]；（2）亚太能源消费区，包括中国、印度、巴基斯坦等在内的亚太地区；（3）西欧能源消费区，包括西欧、土耳其和乌克兰等在内的欧洲。我国能源消费量居世界第一，是亚太能源消费区中心，虽然能源总体自给率长期保持在80%以上，但已是全球第一原油和天然气进口国，石油和天然气对外依存度高，2018年分别达到70.8%和45.3%，进口石油的70%左右通过马六甲海峡运输。亚欧中部能源生产区是我国石油和天然气进口主要来源地。其中，中东地区和俄罗斯已分别占我国原油进口总量的44.0%和15.48%左右；天然气进口40%来自中亚地区，随着中俄东线天然气管道2019年底启动供气，俄罗斯正成为中国最大的天然气进口来源国。我国西部地区居于亚欧中部能源生产区、亚太能源消费区之间，一方面，不仅是我国潜力巨大的主要能源供给基地，而且是沟通亚欧中部能源生产区和亚洲能源消费区日益突出的主要国际能源通道，对保障我国能源安全、支撑中国和亚欧中部能源生产区经济社会发展，具有十分重要的意义；另一方面，是我国太阳能、水能、风能等清洁能源发展的战略基地和桥头堡，对建设我国、亚欧甚至全球能源互联网（刘振亚，2020），推动能源－经济－环境系统绿色低碳转型具有引领作用。因此，在全面建设现代化国家征程中，西部大开发应以支撑引领中国和亚欧能源－经济－环境系统可持续发展转型为重要战略使命，抓住“碳达峰”、“碳中和”、能源革命和“一带一路”建设的历史机遇，打造中国融通亚欧的安全、高效、清洁国际能源互联网枢纽。

（四）保障中国和亚洲生态安全

在“人类世”[10]，人类是地球系统动态变化的主要力量，其影响可以用方程式I＝PAT表示，其中，I代表

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[6] 习近平向“一带一路”能源部长会议和国际能源变革论坛致贺信，新华社，2018-10-18。
[7] “一带一路”能源合作伙伴关系在北京成立，新华社，2019-4-25。
[8] http://www.rus7077.com/shangpin/elsxy/14134.html。
[9] 资料来源：《BP世界能源统计年鉴》（2018年），第26页。
[10] “人类世”（Anthropocene）是地质纪元概念，强调地球已进入一个人类主导的新地质时代，由诺贝尔化学奖得主保罗·约瑟夫·克鲁岑（Paul Jozef Crutzen）（2000）提出。2009年，国际地层委员会（ICS）专门设立人类世工作小组（Anthropocene Working Group，AWG），以考察人类活动引起的变化是否满足正式开创一个新的地质时代的标准。2016年在南非举办的第35届国际地质大会非正式投票通过地球进入“人类世”。据著名科学杂志《自然》，2019年5月21日，人类世工作组根据第一颗原子弹爆炸遗留在地层中的放射性物质，提出20世纪中叶地球已经进入新纪元——人类世。2021年国际地层委员会将正式投票通过。

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for China, Eurasia, and the world (Liu, 2020), spearheading the low-carbon transition. In China's modernization drive, its western regions should lead the transition towards sustainable development for energy, economic, and environmental systems in China and Eurasia, seizing the historic opportunities from the carbon peak, carbon neutrality, energy revolution, and the BRI initiative, thereby developing into a secure, efficient, and clean international energy supply hub between China and Eurasia.

1.4 Protecting Ecological Security for China and Asia at Large

In the Anthropocene Epoch[10], humankind plays a primary role in driving changes in the Earth systems. The impact of human activity can be expressed by the equation I=PAT, where I is impact, P is population, A is affluence, and T is technology (Ehrlich and Holdrn, 1971; Yang, 2019). Asia and Europe are home to over 70% and 60% of the world's population and GDP, respectively. As the world's most important energy producers with promising economic growth potentials, Asia and Europe are the leading forces in optimizing man-land relationships and protecting the Earth. In the spirit of green silk roads under the BRI,[11,12] China and its international partners have initiated the BRI Green Development International Alliance.[13]

China's western regions account for 8.3% and 7.2% of Asian and Eurasian populations, respectively,[14] and are home to the "Third Pole of the Earth" with vast land borders. The western regions represent a unique position in the ecological civilization of the Eurasian continent. They are home to the "Two Screens and One Belt" as part of China's "Two Screens and Three Belts" ecological layout, i.e. the "Qinghai-Tibet Plateau Ecological Screen," the "Loess Plateau-Sichuan and Yunnan Ecological Screen," and the "Northern Sand Protection Belt."

As the most important river sources in Asia and rich in biodiversity, the western regions are bestowed with the mandate to support a green and low-carbon transition for energy, economic, and environmental systems in China and Eurasia. As the most biodiverse plateau in the world, the Qinghai-Tibet Plateau serves as a regulator for climate change in the northern hemisphere, having a critical position in the ecosystem. Home to Asia's river sources, the western regions host the most critical upstream waterways in the world (He, Liu, *et al*., 2014), and Asia's water conservation area. The upper reaches of the Yangtze River and the mid-and upper reaches of the Yellow River are located in the western regions, and so are many of the major international rivers in Asia (Table 1). These rivers nourish the bulk of Asia's population and are vehicles for China's international river diplomacy. In exploring a new landscape for the development of the western regions, we should seize the historic opportunities from the green BRI and the Beautiful China Initiative (BCI) to strengthen the ecological screens in the western regions to protect ecological security in China and Asia.

2. Strategic Priorities of the Western Development Strategy (WDS)

The equation I=PAT omits some important factors (Rui, 2010; Yang, Dong, 2020). Rui (2010)

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[10] "Anthropocene" is a geological time scale concept, emphasizing that the Earth has entered a new geologic epoch dominated by the humankind. The concept was put forth by Paul Jozef Crutzen (2000), a Nobel launreate in chemistry. In 2009, the International Commission on Stratigraphy (ICS) established an Anthropocene Working Group (AWG) to examine whether geologic changes caused by human activity meet the criteria for opening a brand-new geologic epoch. In 2016, an informal vote at the 35th International Geological Congress (IGC) approved the designation of the Anthropocene. According to *Nature*, a science journal, the AWG announced that the Earth had entered into a new epoch since the mid-20th century based on the radioactive matters.

[11] The National Development and Reform Commission, the Ministry of Foreign Affairs, and the Ministry of Commerce. *Visions and Actions for Building the Silk Road Economic Belt and the 21st Century Maritime Silk Road*, March 28, 2015.

[12] The then Ministry of Environmental Protection, the Ministry of Foreign Affairs, the National Development and Reform Commission (NDRC), the Ministry of Commerce: *Guiding Opinions on Advancing BRI Development*, May 16, 2017.

[13] *"Belt and Road" Green Development International Alliance unveiled in Beijing for green development cooperation and communication.* Xinhua News Agency, April 25, 2019.

[14] In 2018, the eleven provinces, municipalities and autonomous regions in western parts of China had a total population of 380 million, and Eurasia and Asia had populations of 5.31 billion and 4.56 billion, respectively. Source: *China Statistical Yearbook*, 2019, and the United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects: The 2019 Revision (https://population.un.org/wpp/).

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影响(Impact),P代表人口(Population),A代表富裕(Affluence),T代表技术(Technology)(Ehrlich and Holdren,1971;杨开忠,2019)。亚洲和欧洲不仅人口、GDP分别占全球的70%和60%以上,而且为全球最重要的能源生产基地和最具成长性的经济体,是优化人地关系、保护地球的主要力量。因此,绿色丝绸之路始终是"一带一路"建设的基本目标[11,12],中国与国际合作伙伴还共同发起成立了"一带一路"绿色发展国际联盟[13]。

我国西部地区人口分别占亚洲和亚欧洲地区的8.3%和7.2[14],坐拥地球"第三极",陆地边境线漫长,在亚欧大陆生态文明建设中具有独特地位,不仅集聚中国"两屏三带"生态战略中的"两屏一带",即"青藏高原生态屏障"、"黄土高原-川滇生态屏障"和"北方防沙带",负有支撑中国和亚欧能源-经济-环境系统绿色低碳可持续发展转型的使命,而且是亚洲最重要的"江河源"、世界生物多样性富集区,其中,青藏高原是世界高海拔地区生物多样性最集中的地区、北半球气候变化的"启张器"和"调节器",生态地位极端重要。作为亚洲"江河源",西部地区是全球最重要的上游水道地区(何大明、刘昌明等,2014)、亚洲水源涵养区,以西部地区为上游的长江、以西部地区为中上游的黄河等国内大江大河和以西部地区为源头的亚洲主要国际河流(见表1)滋养了亚洲绝大部分人口,是我国开展国际河流水外交的桥头堡。因此,抓住绿色"一带一路"和美丽中国建设的历史机遇,筑牢生态屏障,确保中国和亚洲生态安全,是西部大开发形成新格局的重要历史使命和责任。

表1 我国西部地区主要国际河流

河流	流经区域	面积(万平方公里)
黑龙江	中国黑龙江、内蒙古,蒙古,俄罗斯	185.5
额尔齐斯河-鄂毕河	中国新疆,哈萨克斯坦,俄罗斯	164.3
伊犁河	中国新疆,哈萨克斯坦	15.1
伊洛瓦底江	中国云南,缅甸	43.0
怒江-萨尔温江	中国青海、西藏、云南,泰国,缅甸	32.5
澜沧江-湄公河	中国青海、西藏、云南,缅甸,老挝,泰国,柬埔寨,越南	81.0
珠江	中国云南、贵州、广西、广东、湖南、江西、越南	45.4
雅鲁藏布江-布拉马普特拉河	中国西藏,印度,孟加拉国	62.0
巴吉拉提河(恒河)	中国西藏,印度,孟加拉国	108.0
森格藏布河(印度河)	中国西藏,巴基斯坦,阿富汗,印度	103.4
元江-红河	中国云南,越南	15.8

[11] 国家发展改革委、外交部、商务部,推动共建丝绸之路经济带和21世纪海上丝绸之路的愿景与行动,2015-03-28。
[12] 环境保护部、外交部、发展改革委、商务部.关于推进绿色"一带一路"建设的指导意见,2017-05-16。
[13] "一带一路"绿色发展国际联盟在京成立,打造绿色发展合作沟通平台,新华社,2019-04-25。
[14] 2018年西部十一省市自治区人口合计3.8亿,亚欧地区和亚洲分别为53.1亿和45.6亿。数据来源:《中国统计年鉴》(2019),以及United Nations, Department of Economic and Social Affairs, Population Division (2019), World Population Prospects: The 2019 Revision, https://population.un.org/wpp/。

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Table 1: Major International Rivers in China's Western Regions

River	Regions	Area (km^2)
Heilongjiang	Heilongjiang and Inner Mongolia in China; Mongolia, Russia	185.5
Irtysh River - Ob River	China's Xinjiang; Kazakhstan, Russia	164.3
Yili River	China's Xinjiang; Kazakhstan	15.1
Irrawaddy River	China's Yunnan; Myanmar	43.0
Nujiang-Salwen River	China's Qinghai, Tibet and Yunnan; Thailand, Myanmar	32.5
Lancang River-Mekong River	China's Qinghai, Tibet, Yunnan; Myanmar, Laos, Thailand, Cambodia, Vietnam	81.0
Pearl River	China's Yunnan, Guizhou, Guangxi, Guangdong, Hunan and Jiangxi; Vietnam	45.4
Yarlung Zangbo River-Brahmaputra River	China's Tibet; India, Bangladesh	62.0
Bagirati River (Ganges)	China's Tibet; India, Bangladesh	108.0
Seng Zangbo River (Indus River)	China's Tibet; Pakistan, Afghanistan, India	103.4
Yuanjiang River-Honghe River	China's Yunnan; Vietnam	15.8

included urban land utilization and infrastructure into this equation, i.e. I=LPAT, where L is land use and infrastructure. Rui followed the right direction. However, research suggests that geographical segmentation, distance, density, and heterogeneity profoundly constrain economic development and ecological protection. Like the internal city structure at the local scale, the spatial structure of human activity at the national and international scales also influences changes in the Earth's systems (Yang and Dong, the World Bank, 2009). Hence, the equation I=PAT should at least include the spatial layout of human activity in a more general sense (Yang, Dong, 2020), i.e. I=PSAT, where S is the spatial layout, including the city space layout at the local scale and the spatial structure at national and international dimensions.

Academics have put forth two fundamental theories on the Western Development Strategy (WDS), i.e. the factor scarcity theory and the spatial layout diseconomies theory. According to the spatial layout diseconomies theory (Yang, 1996; 2001, 2003), six important features can be found in China's western regions' spatial socio-economic layout. (i) Eurasian economies are relatively distant from each other, stretching from the East Asian coastlines to Western European coastlines. China's western regions are distant from the coastlines of Western Europe and East Asia and are situated at the center of the Eurasian continent. For instance, Urumchi, a central city at the heart of the Silk Road Economic Belt, has a straight-line distance of 7,500, 3,000, 3,400, and 4,500 kilometers from London, Beijing, Shanghai, Hong Kong, and Tokyo, respectively.

(ii) The relative distance between population settlements is long. For instance, Urumchi, the capital of Xinjiang Uygur Autonomous Region, has an average distance of 690 kilometers to the central cities of various prefectural jurisdictions, which is greater than the distance between Beijing and Zhengzhou.

(iii) Despite a higher population density than that of the United States, China's western regions are sparsely populated compared with its central and eastern regions.

(iv) Population settlements in the western regions are divided by mountains, valleys, and deserts. Such division is compounded by the segmentation of administrative jurisdictions and a lack of Mandarin-language education among some ethnic minorities.

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二、西部大开发战略关键

公式I=PAT遗漏了一些重要因素(瑞吉斯,2010;杨开忠、董亚宁,2020)。瑞吉斯(2010)曾在该公式中加入城市土地利用和基础设施,即:I=PLAT,其中,L代表土地利用和基础设施。瑞吉斯的方向是正确的,但研究表明,地理分割、距离、密度和异质性深刻制约经济发展和生态保护,与地方尺度的城市内部结构一样,国家和国际尺度的人类活动空间结构同样是影响地球系统变化的重要因素(杨开忠,2001;世界银行,2009)。因此,在公式I=PAT中至少应加入更具一般意义的人类活动空间格局(杨开忠、董亚宁,2020),即:I=PSAT,其中,S代表空间格局,包括地方尺度的城市空间格局、国家和国际尺度的空间结构。

无论过去还是未来,关于西部大开发战略的关键主要存在两种不同的基本学说,即要素稀缺论和空间格局不经济学说。依据我们提出和主张的空间格局不经济学说(杨开忠,1996,2001,2003),我国西部地区经济社会空间格局具有六个方面的重要特征。一是亚欧经济地理位置相对偏远。亚欧经济地理中心为东亚陆海边缘地带和西欧陆海边缘带,其中,东亚陆海边缘地带是日益突出的世界最大经济中心,中国经济核心地处东亚陆海边缘地带。西部地区深居亚欧大陆中部,既远离西欧陆海边缘地带又远离东亚陆海边缘地带中枢。例如,乌鲁木齐是丝绸之路经济带核心区中心城市,其到伦敦、北京、上海、中国香港、东京等主要中心城市的直线距离大约分别达7500公里、2400公里、3000公里、3400公里和4500公里。二是人口聚落系统分布分散、相互间平均距离较远。例如,新疆首府乌鲁木齐至各地级行政区中心城市平均距离高达690公里,略大于北京至郑州的距离。三是虽然人口密度高于美国,但与我国中东部相比,城乡人口聚落平均密度低、平均规模小;四是高山峡谷、沙漠戈壁等难以利用的土地类型广布,加之按管辖人口计的行政区划碎片化以及一些民族人口普通话语言文字教育缺失,人口聚落对内对外分割严重。五是绝大部分为西北半干旱干旱地区和青藏高寒地区,且与美国半干旱干旱地区相比西部地区半干旱干旱地区水资源少、昼夜温差大、宜居性比较差。六是农牧交错带、黄土高原、西北荒漠绿洲交接带、西南岩溶山地沙漠化地区、青藏高原复合侵蚀地区等生态脆弱区密集分布。这些特征使西部地区空间格局相对低效,具体主要表现在以下几个方面。

第一,空间交往成本相对高昂。西部地区地理位置偏远、封闭,城乡聚落间距离长、分割严重,缺乏交流的规模经济,因而,对内对外空间交流机会少、成本高、效率低。例如,根据《中国物流年鉴》,2018年,宁夏回族自治区社会物流总费用、运输费用占全区GDP的比重分别为17.49%和13.7%,均远高于全国平均水平14.8%和7.7%。这意味着,同样产品即使在东中西部地区是以相同成本生产,但由于空间交往成本相对高昂,在市场竞争中西部地区所生产产品也将处于不利地位。

第二,市场分享效应相对欠缺。城乡聚落规模小、密度低、相互分离,使基础设施、公共服务、专业化供应商以及消费者能够有效分享的本地市场规模相对狭小,从而难以有效发展。这表现在,除成渝地区、关中地区和省会、首府城市相对特殊外,其他西部广大地区一方面可利用的基础设施和服务不提供却仍有需求,而提供了则又缺乏有效需求,“短缺”与“过剩”并存,商业繁华度普遍很低;另一方面,产业联动相对较弱,结构单一松散,产业链和产业集群发育水平相对低下,产业配套条件差。

第三,劳动力池效应相对较弱。除成渝地区、关中地区和省会、首府城市相对特殊外,其他西部广大地区

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(v) Most parts of China's western regions are semiarid with arid regions in the northwest and alpine regions in Qinghai and Tibet. Semiarid and arid regions in China's western regions suffer from severe water resources scarcity, significant day-night temperature differences, and poor habitability.

(vi) The western regions suffer from an inefficient spatial layout due to a high concentration of farming-pastoral regions, loess plateau, desert-oasis transition zones in the northwest, karst, mountains, desertification in the southwest, and regions with complex wind and water erosion in Qinghai-Tibet Plateau, among other ecologically vulnerable regions. With these traits, the inefficiency in the spatial layout of the western regions can be reflected in the following aspects:

(i) Exorbitant transportation cost: With their remote and inconvenient locations and distant and segregated urban and rural settlements, the western regions have fewer opportunities for internal and external communication, which is costly and inefficient. According to the *China Logistics Yearbook*, the total costs of logistics and transportation accounted for 17.49% and 13.7% of Ningxia Hui Autonomous Region's GDP, which was far above the national averages of 14.8% and 7.7%, respectively. Even with the same production cost across eastern, central, and western regions, transportation costs have made products from central and western regions less competitive.

(ii) Absence of a shared market: Small, sparse, and separated urban and rural settlements have resulted in small local markets, causing diseconomies for public infrastructures, services, suppliers, and consumers. Except for the Chengdu-Chongqing region, central Shaanxi Province, and provincial capitals, demand for public infrastructures and services is small and scattered across other parts of the vast western regions plagued by business inactivity, a lack of industrial correlation, as well as underdeveloped supply chains and industrial clusters.

(iii) Labor shortage: Except for the Chengdu-Chongqing region, central Shaanxi Province, and provincial capitals, other parts of the western regions are sparsely populated. Despite the low cost of labor, the local workforce is too small to meet the needs of large factories. Limited labor market demand compounds unemployment risks for workers. When labor demand spikes, firms struggle to recruit enough workers from local labor pools.

(iv) Insufficient knowledge spillovers: New knowledge is generated by first-rate universities, research institutes, and R&D centers through people-to-people exchanges and by emulating and imitating competitors. Knowledge spillovers tend to be strong in populous regions with frequent people-to-people exchanges, and weak in sparsely populated areas. Except for the Chengdu-Chongqing region, central Shaanxi Province, and provincial capitals, other parts of the western regions are sparsely populated with infrequent people-to-people exchanges. Such an environment does not help the western regions attract and retain human resources vital to innovation.

(v) Ecological fragility: Despite a small population density, some parts of the western regions suffer from a vicious cycle between ecological degradation and poverty. With the Western Development Strategy implementation, the western regions have returned farmland to forest and grassland, resettled poor populations to regions with better living conditions, and greatly reduced ecological fragilities. Yet grave challenges remain.

Therefore, in implementing the Western Development Strategy, the key is to avoid and overcome the less efficient spatial layout of economic activity in the western regions.

3. Future Path towards Success

Reshaping the geographical layout of economic activity holds the key to the successful implementation of the Western Development Strategy, which must focus on the following strategic priorities.

3.1 Developing Compact Western Regions through International Economic Corridors

In the final analysis, development should improve public welfare and not just regional prosperity in

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人口稀疏、人口聚落规模小、密度低，本地劳动力池小。一方面，尽管劳动力价格便宜，经济上是丰裕的，但在物理上，劳动力规模常常过小，以至于往往满足不了大规模办厂兴业对劳动力数量的门槛需求，制约了招商引资；另一方面，劳动力市场供求匹配机会少，劳动者因偶发冲击而导致持久失业的风险较大，企业突然增加劳动需求时雇佣到额外劳动力的成本较大，以至于工人和企业之间难以形成良性的循环累积因果互动。

第四，知识溢出效应相对薄弱。新知识既来源于一流大学和研究院所、研究与开发中心，也来源于竞争对手的相互学习、模仿和激励以及个人之间的交流，特别是面对面的交流。高密度地域人与人面对面交流机会多、频率高，因而知识溢出效应较强；反之，低密度地区知识溢出效应较弱。除成渝地区、关中地区和省会、首府城市相对特殊外，西部其他广大地区人口和经济稀疏，人与人面对面交流少、频率低，知识溢出效应弱。这种环境不利于西部地区吸引和留住人才，制约了西部地区创新能力的提升，造成西部地区人才饥渴与流失并存。

第五，生态脆弱区人地关系失调相对严重。西部地区生态脆弱区虽然人口绝对密度低，但仍普遍地超过生态系统承载能力，陷入自然退化与人口贫困的不良循环。西部大开发战略实施以来，随着退耕还林还草和易地扶贫，生态脆弱区人地失衡现象得到明显缓解，但要彻底解决问题依然任重道远。

因此，在全面建设现代化国家征程中，西部大开发战略关键在于规避和克服西部地区相对低效的空间格局。

三、西部大开发战略成功之路

重塑西部地区地理格局以规避和克服西部地区低效空间格局，是全面建设现代化国家的西部大开发战略的成功之道，必须持续着力于以下战略行动。

（一）以国际经济走廊为区位指向打造紧凑型西部

发展的目的是人的幸福而非地理空间的普遍繁荣。2000年以来的西部大开发虽然一直明确要求以线串点，以点带面，实行重点开发，“十三五”时期还进一步提出了“五横两纵一环”轴线开发格局，但因规划建设过度依赖于历史所形成的城镇地理格局，依然在相当程度上自觉和不自觉追求了地理的普遍繁荣。为克服规避西部地区低效空间格局，形成西部大开发新格局，必须以最大限度让人民生活更美好为目的，大力促进经济集聚，形成紧凑型经济地理格局（杨开忠，1998）。

第一，坚持以国际经济走廊为区位指向。我国与“一带一路”沿线国家共建新亚欧大陆桥、中蒙俄、中国－中亚－西亚、中国－中南半岛、中巴和孟中印缅六条陆上国际经济走廊（国家发展改革委等，2015），其中，新亚欧大陆桥和中蒙俄走廊必经西部地区，中国－中亚－西亚、中国－中南半岛、中巴和孟中印缅走廊以西部地区起迄。这些走廊连接西部地区主要城市、沟通亚欧大陆东西南部边缘地带人口和经济密集区，企业和居民在这里选址落户，既可分享主要城市的规模经济，又可以借用并贡献亚欧大陆东西南部边缘地带人口经济密集区对流互动的规模经济，既有利于最大限度地获取规模经济、降低空间交往成本，有效建设沟通亚欧大陆的内陆桥头堡，又有利于减轻生态脆弱区的人口经济压力，促进人与自然和谐共生发展。因此，克服规避西部地

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a broad geographical sense. Since 2000, the Western Development Strategy has focused on priority cities and regions. In the 13th Five-Year Plan (FYP) period (2016-2020), the Chinese government identified a "Five Horizontal, Two Vertical and One Ring" axial layout for developing the western regions. However, excessive dependence on the cities' historic layout delivered geographically broad prosperity at the expense of efficiency. In shaping a new layout for the development of western regions, we must raise local living standards, encourage economic concentration, and form a more compact economic layout (Yang, 1998).

First, regional development should center around international economic corridors. Together with BRI countries, China has created six international economic corridors on land, including the New Eurasian Continental Bridge and China-Mongolia-Russia, China-Central Asia-West Asia, China-Indochina Peninsula, China-Pakistan, and Bangladesh-China-India-Myanmar international economic corridors (National Development and Reform Commission and others, 2015).

The New Eurasian Continental Bridge and China-Mongolia-Russia economic corridor pass through the western regions, and China-Central Asia-West Asia, China-Indochina Peninsula, China-Pakistan, and Bangladesh-China-India-Myanmar economic corridors all start from the western regions. These corridors link major cities in China's western regions and rimlands in eastern, western, and southern parts of the Eurasian continent. Through the establishment of footholds along the economic corridors, firms may benefit from the economies of scale from major cities and people-to-people exchanges between populous eastern, western, and southern rimlands of the Eurasian continent. Development along the economic corridors will help ease population and economic pressures in ecologically fragile regions to benefit man-nature harmony. Therefore, to avoid inefficient spatial layout in western regions, we should focus on developing central cities and city clusters along the international economic corridors.

Second, we should develop compact international economic corridor systems. Compact development is essential to increasing public infrastructure and service efficiency, generating economies of scale, and spatial transactions. Following the principle of inducing economic growth without the expense of ecological equilibrium, we should build a more centralized rather than scattered transportation network and compact China-Europe railway transportation route as well as new land and maritime channels in the western regions.

We should also pursue a centralized approach to urbanization, encourage populations and industrial chains to concentrate in provincial capitals as well as develop sub-central cities in Xinjiang and other provincial-level regions with appropriate conditions. While developing existing city clusters, including Chengdu-Chongqing, Central Shaanxi, Beibu Gulf, Central Guizhou, and Central Yunnan city clusters. China should also create compact metropolitan circles and city clusters, reversing the currently scattered layout of city clusters in Hohhot-Baotou-Erdos-Yulin, Lanzhou-Xining, and Ningxia-Yellow River regions as well as the northern slopes of the Tianshan Mountains.

Third, we should resettle populations from ecologically fragile regions. Resettlement is the final solution to the vicious cycle between ecological degradation and poverty. For pubic welfare and ecological security, we should relax household registration (*hukou*) restrictions, step up poverty reduction through resettlement, return farmland and grazing areas to forest and grassland, and adjust the fragmented administrative jurisdictions. The goal is to resettle populations from ecologically fragile regions to the metropolitan circles and city clusters along the international economic corridors in the western regions and beyond.

3.2 Implementing a Unique Competition Strategy

Another way to avoid the inefficient spatial layout of economic activity in the western regions is to pursue a differentiated competition strategy, i.e. to create products and services that are unique and globally competitive. Since 2000, China has attached great importance to adopting a unique competition strategy for the western regions, focusing on unique local industries. However, over-dependence on

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区低效空间格局，应当坚持以国际经济走廊为区位指向，集中发展走廊沿线中心城市和城市群。

第二，培育发展紧凑型国际经济走廊系统。为避免设施和服务利用不充分的问题，提高设施和服务效率，获取规模经济和空间交易效率，西部地区国际经济走廊应走紧凑发展之路，按照既有利经济增长又不危害生态平衡的原则，一方面，更集中而非分散布局运输网络，打造紧凑型西部地区中欧铁路运输通道和西部地区陆海新通道系统；另一方面，走集中而非分散的城市化之路，促进人口和产业链向省会/首府城市集聚，并在新疆等有条件的省市区培育发展副中心城市。在建设成渝地区双城经济圈、关中平原、北部湾、黔中、滇中城市群的同时，针对呼包鄂榆、兰州—西宁、宁夏沿黄、天山北坡城市群布局过度分散问题，重构其空间结构，使之转变为紧凑型都市圈和紧凑型城市群。

第三，强力推动生态脆弱区人口易地发展。为促使生态脆弱区全面彻底地走出自然退化与人口贫困的不良循环，让人民更幸福、生态更安全，应以基于市场的解决方案为基础，通过全面放开落户限制、更大力度推动易地扶贫、退耕退牧退居还林还草还自然以及调整碎片化行政区划等系统干预，强力推动人口从生态脆弱区向西部地区国际经济走廊都市圈和城市群以及西部地区域外转移。

（二）实施新型别具一格竞争战略

克服规避低效的西部地区空间格局的另一条道路是实施别具一格竞争战略，通过打造产品和服务的独特性来获取全球市场竞争优势。2000年以来，西部大开发一直高度重视别具一格竞争战略，始终把发展特色产业经济作为重点方向和任务之一。然而，在获取别具一格竞争优势的方式上，西部地区长期依靠基于物质线性代谢的资源驱动。这种方式，一方面，主要靠天赋自然人文资源投入驱动，附加值和效率低、辐射带动力小；另一方面，“资源-产品-废弃物”单向流动，高消耗、高排放、高污染和资源利用率低，既不可持续，也不适应让人民生活更美好的要求。亟待加速转向物质循环代谢导向的创新驱动发展方式。

与基于物质线性代谢的资源驱动发展方式不同，物质循环代谢导向的创新驱动发展方式一方面，主要依靠创新驱动获取别具一格竞争优势，产业高值、高效、高辐射；另一方面，“资源-产品-废弃物-再生资源”循环流动，低消耗、低排放、低污染和资源高利用，既有利于可持续发展，又让人民生活更美好。因此，进入全面建设现代化国家新征程，随着让人民生活更美好和生态文明建设的要求日益突出，西部大开发应实施新型别具一格竞争战略，加速获取别具一格竞争优势，从基于线性代谢的资源驱动型转向基于循环代谢的创新驱动型。一方面，着力支持西部地区优先布局国家级创新基础设施，积极营造西部地区产业创新生态系统，提升西部地区产业创新能力，最大限度地提高西部地区把资源转化为市场价值的创意、速度、柔性水平，确保西部地区转换到主要依靠创新获取别具一格竞争优势的轨道上来；另一方面，把经济物质循环代谢纳入创新维度，优先支持纳入经济物质循环代谢的创新计划，大力规划建设国家清洁能源、清洁生产和循环经济基地，确保实现经济物质代谢从线性向循环模式转变。

（三）实施基于流域的区域协调发展解决方案

工业革命以来，随着人类社会发展，水资源逐渐成为日益普遍和重要的地方性稀缺资源、地区和国际冲

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natural and cultural resources has resulted in a low value-addition, polluting, and inefficient development paths. The western regions have yet to develop a more sustainable circular economy and shift from resource-driven to innovation-driven development to meet people's expectations for a better life.

Unlike resource development with a linear material flow, we advocate an innovation-driven approach to develop a circular economy. We must foster competitive strengths through innovation and create high-value and efficient industries with significant spillover effects. We should develop a circular economy in which wastes are recycled back into resources with less polluting and more efficient industries contributing to sustainable development and better living standards.

In the new journey of building a modern socialist country, we must strive to meet people's needs for a better life and build an ecological civilization. Therefore, the western regions should follow a unique competition strategy to acquire unique competition strengths and transition from a resource-driven to an innovation-driven and sustainable development path. Conversely, we should prioritize the development of state-level innovation infrastructures and foster innovation ecosystems in the western regions, as well as help the western regions become more creative and flexible in order to turn local resources into market value. The western regions must rely on innovation and not just resource endowments to foster their unique competitive strengths. On the other hand, we should include economic and material circulation as a key aspect of innovation, vigorously develop national clean energy, clean production, circular economy centers, and ensure a smooth transition towards a circular economy.

3.3 Implementing a Solution for Balanced Regional Development Based on River Basins

Since the Industrial Revolution, water has been an increasingly scarce resource and has fueled many regional and international conflicts. River basins form basic geographical units for water distribution and economic and social activity. Water basins are of great importance to China's development of the western regions, achievement of the vision for a "Beautiful China," and implementation of the BRI to create a community that shares a future for the advancement of humankind. We should take stock of the regional cooperation experiences from the Yangtze River Economic Belt, the Yellow River Basin, the Pearl River-Xijiang River Economic Belt, and the Lancang-Mekong River Basin. Based on such experiences, we should strengthen the western regions' position as Asia's river sources and ecologically essential regions in order to promote coordinated regional development through the river basins.

First, we should protect river basins by creating a benign water cycle essential for humankind to co-exist with nature. Traditionally, our socio-economic governance has been dominated by a two-sector (market-government) or three-sector (government-market-community) approach. With the environment in mind, we should establish a new governance model comprising the "nature, government, markets, and communities" (Yang, 2019). Specifically, we should develop a unified market for ecological factors and products and create a basin-wide ecological compensation mechanism, demarcate main function areas, implement a system of "ecological protection red line, environmental quality bottom line, resource consumption limit, and a negative list for environmental regulations." Meanwhile, we should understand, respect, and follow the water cycle laws, advocate nature-based solutions, and protect river basin ecosystems with a holistic and integrated approach.

Second, we should transform the river basin-periphery layout. The center-periphery structure underpins the spatial layout of socio-economic activities in the river basins (Shi, 1991, 1998, 2002; Lu, 2000; Lu, Dong, 2005). The lower reaches along river valleys are more prosperous core regions. The upper reaches tend to be less developed peripheral regions, and midreaches are the intermediate regions. Geographically, plains are core regions, mountainous areas are peripheral regions, and hills are intermediate regions. Under the traditional model, the core areas of river basins thrive at the expense of environmental degradation and poverty in peripheral regions, such as the western regions. Developing the western regions, we should explore more effective center-periphery regional coordination in integrating the upper reaches with the lower reaches, rivers, tributaries, and each side of the riverbanks

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突根源、生态环境优劣的关键。流域是河流集水和人类聚集的区域，其自然、经济、社会、空间经由水循环耦合成为人与自然生命地域共同体，是应对水危机、促进人与自然和谐共生、构建人类命运共同体的区划单元。为适应未来西部大开发的战略要求，更好促进美丽中国、“一带一路”和人类命运共同体建设，要在总结长江经济带、黄河流域生态保护和高质量发展、珠江－西江经济带以及澜沧江－湄公河国家区域合作经验的基础上，进一步发挥西部地区作为亚洲“江河源”“生态源”的优势，以流域为基础全面推进对内对外区域协调发展。

第一，以构建良性水循环为中心着力推进流域生态一体化保护。树立自然－人类“水循环”和“共生”的理念，以构筑流域良性水循环为中心，跳出传统的“市场－政府” 两部门或“政府－市场－社群”三部门治理模式的窠臼，树立“自然－政府－市场－社群”四部门治理模式（杨开忠，2019），在深入推动流域生态要素和生态产品统一市场改革，建立健全流域生态补偿机制、主体功能区制度和“三线一单”制度以及社会参与机制的同时，认识、尊重、顺应水循环规律，倡导和实施基于自然的解决方案，发挥自然力量在流域生态一体化治理中的基础作用，实现流域生态全社会、全要素、全过程、全地域一体化保护。

第二，着力转变流域核心－边缘结构模式。核心－边缘结构是流域社会经济空间规律（施坚雅，1991，1998，2002；鲁西奇，2000；陆玉麒、董平，2005），一般表现为，在沿河谷的纵深方向上，下游是流域社会经济相对发达的核心区，上游是流域社会经济相对不发达的边缘区，介于二者之间的则为中间地带；在河谷的横切方向上，谷平地是核心区，山地是边缘区，而丘陵岗地是中间地带。传统模式流域核心区的繁荣是以流域边缘区生态破坏、生活贫困等为代价的，是不可持续的。这是西部地区生态退化和居民生活水平相对较低的结构基础。因此，未来西部大开发要更好地统筹上下游、干支流、左右岸，建立更加有效的核心－边缘区协调发展机制，推动流域核心－边缘结构由传统不可持续模式向可持续模式转变。

第三，着力开展国际河流水外交。西部地区地处江河源头，具有上游优势，跨境流域相对密集且大多在周边国家生态、经济、社会发展中具有重要战略地位和作用，是我国推动共建“一带一路”、构建人类命运共同体的重要地域依托。未来西部大开发要发挥这一优势，积极开展国际河流水外交，着力推进西部地区跨境流域双边、多边国际合作，推动绿色“一带一路”建设，共建流域人类命运共同体。

（四）加速西部地区互联网建设

从空间来看，信息化、数字化、智能化就是以信息技术为基础，以交流最大化、交流成本最小化为目的，把不同区位的人、物有效联结起来的网络化过程，既可在一定范围内摆脱物理世界地理因素制约，又可显著降低生态冲击，既可降低社会经济活动成本、提升响应速度和质量，又产生新服务、新业态、新模式，是克服规避低效空间格局、提高区域竞争力的基本方式。实施西部大开发战略以来，我国采取“减小数字鸿沟－西部行动”计划等行动加快了西部地区信息化、数字化、智能化步伐，与中东部的数字鸿沟总体趋于缩小，西藏、新疆、青海甚至超过全国平均水平（林双全，2018）。然而，进入新时代以来，随着数字化和智能化的兴起和发展，西部地区与中东部数字鸿沟转而呈现扩大之势。因此，未来西部大开发必须高度重视信息化、数字化、智能化对西部地区的特殊意义，抓住新一轮信息技术革命和建设网络强国、数字中国、智慧社会的战略机遇，与紧凑

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to transition towards sustainable river basins under a core-periphery structure.

Third, we should strive to conduct river diplomacy. The western regions are home to many international rivers' upper reaches with significant ecological, economic, and social significance to neighboring countries. By conducting international river diplomacy, we should vigorously advance bilateral and multilateral cooperation over cross-border river basins in the western regions due to our commitment to a green BRI and a community of shared future for humankind.

3.4 Building an Information Society in the Western Regions

Information, digital, and smart technologies maximize communication at minimal costs, connecting people and places at different locations. Virtual communication takes place beyond geographical boundaries with minimal environmental impacts. Such technologies create new services and business modes, avoid inefficient spatial layouts and help increase regional competitiveness. Since the Western Development Strategy implementation, China has expedited IT applications in the western regions to narrow the digital divide between the western, central, and eastern regions. As a result, Tibet, Xinjiang, and Qinghai have exceeded the average national information infrastructure level (Lin, 2018).

With the rise of digitalization and smart applications, the digital divide between the western, central, and eastern regions has widened. Recognizing the significance of information, digital, and smart technologies to China's western regions, we must seize the strategic opportunities from a new round of IT revolution and build an information-based society, a "digital China," and a smart society, especially in the western regions. In the Western Development Strategy, we should give more prominence to the role of information, digital, and smart technologies in socio-economic development, prioritize investment in new infrastructures and public services, and encourage information, digital, and smart applications in the western regions. Taking strategic opportunities from the 5G network and the BeiDou global satellite navigation system, we should enable wireless communications in the western regions, especially among businesses, schools, and households in remote areas.

3.5 Development of Inland Free Trade Ports

The western regions must pursue integrated spatial development to minimize spatial transaction costs and overcome the inefficient existing spatial layout in order to move forward (Yang, 2001). While integrating infrastructures and market systems across regions, special arrangements for preferential policies for free trade ports in the western regions should be arranged.

Inland free trade ports are a natural choice for China to deepen reforms, opening up, and coordinating regional development (Li, 2018; Cheng, 2018; Li, 2018; Liu, 2019; Xue, Cheng, 2019). Such free trade ports make spatial transactions considerably less costly and more efficient, overcoming the western regions' inefficient spatial layout. Hence, we should take the strategic opportunities of free trade port development to consider the western regions' pivotal positions in linking the Eurasian continent with the coastal economic belts of the Pacific, Atlantic, and Indian Ocean rims, thereby increasing the level of openness via global standards. We should develop inland free trade ports in the western regions based on national central cities, including Chengdu, Chongqing, and Xi'an, as well as global second-tier cities and their international airports. Developing inland free-trade experimental zones such as Sichuan, Chongqing, and Shaanxi transforms governmental functions and liberalizes and facilitates investment and trade.

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型经济地理建设相协同，加速网络强区、数字西部、智慧西部建设，形成“紧凑型+互联网西部”。为此，应根据西部大开发战略在区域协调发展战略中的优先位置和信息化、数字化、智能化在社会经济中的基础性、先导性作用，把西部地区信息化、数字化、智能化放在我国网络强国和西部大开发战略的优先位置，在资源配置中优先西部地区的新型基础设施和公共服务建设，重点鼓励西部地区信息化、数字化、智能化应用。同时，为了最大限度地克服规避低效的西部地区空间格局，应抓住5G网络和北斗全球卫星导航系统运营的战略机遇，以无线通信技术实现西部地区互联，特别是连接西部地区偏远地区的企业、学校、家庭。

（五）规划建设内陆自由贸易港

最大限度地降低空间交易成本、提高空间交易效率，克服西部地区空间格局低效性，未来西部大开发必须走高水平空间一体化发展之路（杨开忠，2001），在深化基础设施、市场制度空间无差别一体化的同时，力争自由贸易港等空间差别化的特殊安排。

内陆自由贸易港是新时代我国深化改革、高水平对外开放和区域协调发展的必然选择（李彬瑞，2018；程圩，2018；李名良，2018；刘渝阳，2019；薛飞、程健，2019），对最大限度降低西部地区空间交易成本、提高空间交易效率、克服西部地区空间格局低效性具有重要意义。因此，实现西部地区大开放、大保护高质量发展，应抓住我国自由贸易港谋篇布局的战略机会，发挥沟通亚欧大陆与太平洋、大西洋、印度洋沿海经济带的内陆桥梁和枢纽位置潜力和优势，对标全球最高开放水平，重点依托成都、重庆、西安等国家中心城市和全球二线城市及其国际空港、国际铁路港，以四川、重庆、陕西等内陆自由贸易试验区为基础，规划建设西部地区内陆自由贸易港，加快政府职能转变，加快推进投资贸易自由化、便利化。

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