乌兰巴托低碳城市发展：减少温室气体排放，提高空气质量

LOW CARBON CITY DEVELOPMENT IN ULAANBAATAR: REDUCING GHG EMISSIONS AND IMPROVING AIR QUALITY

Speakers:
Zolzaya Enkthtur
Climate change and project management specialist
Otgonbaatar Dorjgotov
Transport consultant

演讲人:
Zolzaya Enkthtur
气候变化与项目管理专家
Otgonbaatar Dorjgotov
交通顾问

Beijing , China
“International Forum on Low carbon development for CAREC program cities”
2018.12.05

试点城市简介（蒙古·乌兰巴托）
Pilot city profile (Ulaanbaatar, Mongolia)

人口 Population	1.440.447 (46.2% of Mongolian population)（占蒙古国总人口46.2%）
GDP	65.8% of Mongolian total（占蒙古国GDP总量65.8%）
城市中主要排放部门 Key emitter sectors of Ulaanbaatar city	For 2015: Energy sector, Industry, Waste and agriculture 2015年：能源，工业，废弃物，农业
主要气候风险 Key climate risks	城市小气候，植被覆盖丧失，公共疾病增加，降水减少，山洪频发以及自然灾害事件造成的城市基础设施破坏Urban microclimate, loss of vegetation cover, increased public disease, less precipitation, frequent flash floods and city infrastructure damages caused by natural disastrous events
气候变化影响 Climate change impact	热压力和炎热天气影响，热浪，寒潮，土壤冻结频率增加，水质差，过多的降雨、风暴，虫害和疾病爆发，过敏或传染病增加，能源供应系统发生崩溃Heat stress and hot weather impact, heat waves, cold waves, increased frequency of soil freeze, poor water quality, excess rainfall or storm, outbreak of pest insects and diseases, increased allergic or infectious disease, collisions in energy supply system
乌兰巴托市主要市政管理机构Key focal authorities in Ulaanbaatar city municipality	乌兰巴托市市长办公室政策规划处 项目与合作部门 乌兰巴托市环境局 Ulaanbaatar city Governor’s office Policy planning division, Projects and cooperation unity Ulaanbaatar city Environmental Agency

蒙古关于低碳发展的主要政策文件
The main Mongolian state and government policy documents in relation to Low Carbon Development

国家National

- **蒙古国可持**续发展愿景2030Mongolia Sustainable Development Vision 2030
- **蒙古国**绿色发展政策Mongolia's Green Development Policy
- **国家气候行**动计划National Action Program on Climate Change
- **可再生能源法**ngLaw on renewable energy
- 节约能源法Law on Energy Conservation
- 2016-2020**蒙古国政府行**动计划Action Program of the Government of Mongolia for 2016-2020
- **与提交至**UNFCCC**有关的温室气体减排**GHG Mitigation related documents submitted to UNFCCC (NAMA, National Communications)
- **国家自主**贡献Intended Nationally Determined Contribution (INDC)

地区Subnational

- **首都市**长行动方案2016-2020Capital City Mayor's Action plan 2016-2020
- 乌兰巴托2020发展战略Strategic plan for development of Ulaanbaatar up to 2020
- 乌兰巴托对蒙古自主贡献的**帮助**Ulaanbaatar city's Contribution to the Mongolia's NDCs
- **城市次**级项目与区域项目管理方案UB city's sub-programs and sectorial master plans
- **城市气候**变化次级项目（待定）UB city sub program on climate change (pending)
- **城市垃圾次**级项目UB city sub program on waste
- **城市能源管理**计划UB city's Energy master plan
- **城市**热能改造次级项目Hire nengchenUB city sub program on thermos technical renovation etc.

POLICY TIMEFRAME FOR ULAANBAATAR
乌兰巴托政策时间线

БАЙГАЛЬ ОРЧИН,
АЯЛАЛ ЖУУЛЧЛАЛЫН ЯАМ

6/13/2014

国家绿色发展政策
NATIONAL GREEN DEVELOPMENT POLICY

The Parliament of Mongolia approved the Green Development Policy (GDP) for Mongolia. The GDP aims to ensure that green development becomes one of Mongolia's fundamental goals.

11/29/2015

发展政策规划法
DEVELOPMENT POLICY PLANNING LAW

The Parliament of Mongolia approved the Law on Development Policy Planning. The purpose of this Law is to determine stages of planning, implementation, monitoring and evaluation of the development Policy of Mongolia.

3/23/2016

乌兰巴托绿色发展战略行动计划
UB GREEN DEVELOPMENT STRATEGIC ACTION PLAN

City Council approved Ulaanbaatar Green Development Strategy 2020.

POLICY TIMEFRAME FOR ULAANBAATAR
乌兰巴托政策时间线

2/5/2016

蒙古可持续发展目标2030
SUSTAINABLE DEVELOPMENT GOALS MONGOLIA 2030

By 2030, Mongolia aspires to be amongst leading middle-income countries based on per capita income. It hopes to be a multi-sector stable economy, and a society dominated by middle and upper-middle income classes, which would preserve ecological balance, and have stable and democratic governance.

09/2017

乌兰巴托绿色发展政策2030最终版
FINAL UB GREEN DEVELOPMENT POLICY 2025

Capital city Environmental Agency is working with international organizations such as The Asia Foundation to amend previous UB GDSAP to meet the requirements of national sustainable development goals and actions.

10/2017

乌兰巴托气候变化研究
UB CLIMATE CHANGE STUDY

GGGI is working with Capital city Environmental Agency to develop its municipal level contribution to the national INDCs and prioritized the investment pipeline of the capital.

POLICY TIMEFRAME FOR ULAANBAATAR
乌兰巴托政策时间线

ADB ASIAN DEVELOPMENT BANK

2017-2019

亚行重建低碳发展
ADB RETA ON LOW CARBON DEVELOPMENT

Based on the previous studies and results of policy planning activities Asian Development Bank's Technical assistance on Low carbon development in CAREC cities will further enable climate smart solutions for UB city

2020-2025

执行
IMPLEMENTATIONS

Successful implementations of low carbon projects and successful transition towards climate resilient and sustainability.

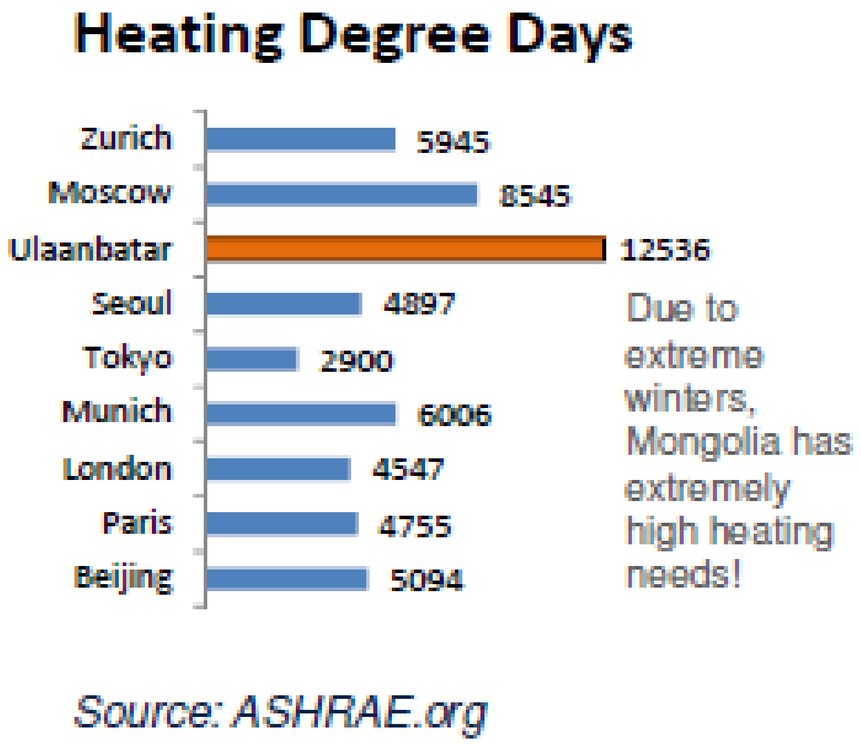
FUTURE

可持续的与气候韧性的城市
SUSTAINABLE AND CLIMATE RESILIENT CITY

Overall objectives will be fulfilled, evaluated and monitored.

80%的空气和土壤污染来自Ger区域
80 percent of the air and soil pollution comes from Ger-areas

- 蒙古国是亚洲城市化水平最高的国家之一Mongolia is one of the **most urbanised** countries in Asia
- 乌兰巴托是世界上最寒冷的首都Ulaanbaatar is the **coldest capital** in the world



缺乏必要的城市服务是乌兰巴托繁荣和发展的主要瓶颈，也是空气，土壤和水污染的主要来源Lack of **essential urban services** is a major bottleneck for prosperity and development of Ulaanbaatar, and a main source of **air, soil, and water pollutions**

46%的人可以使用区域供暖，水和卫生设施；54%的居民居住在Ger区域，使用低效的炉灶进行烹饪和取暖，并从配水点收集水。46% has access to district heating & water and sanitation; 54% live in *gers*, using inefficient stoves for cooking and heating, and collect water from water distribution points

ADB ASIAN DEVELOPMENT BANK

空气污染来源Sources of the air pollution

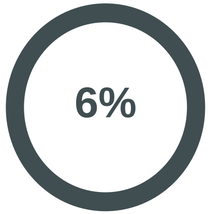
GER区域 GER DISTRICT

216,021户，3000个采暖炉，每年煤耗超过100万吨
216,021 households, **3000** heating stoves , annual coal consumption exceeds over **1 million tonnes**

交通 TRANSPORTATION

道路上的车辆总数为458,212辆，车龄超过10年的车占总数的72%
458,212 vehicles and **72%** of the total vehicles on the road aged more than **10 years**

热电联产CHP

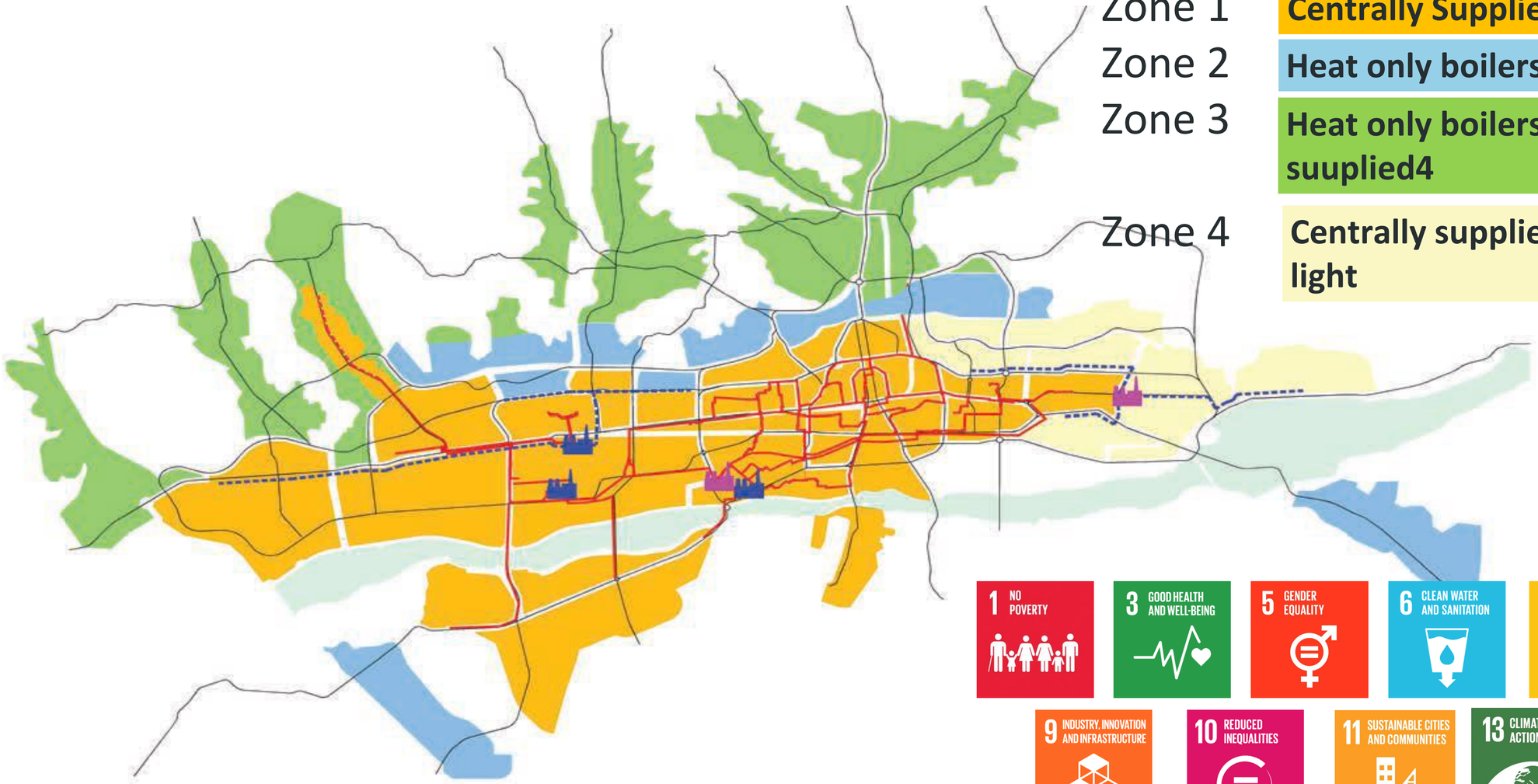


在乌兰巴托运营的3个热电联产，每年消耗的煤耗超过510万吨
3 CHPs operating in Ulaanbaatar with more than **5.1** million tonnes of coal consumption annually

其他OTHERS

来自不同活动的灰尘，废物燃烧，灰烬，建筑和其他污染物
Dust, waste burning, ashes, construction and other polluting spurces from different activities

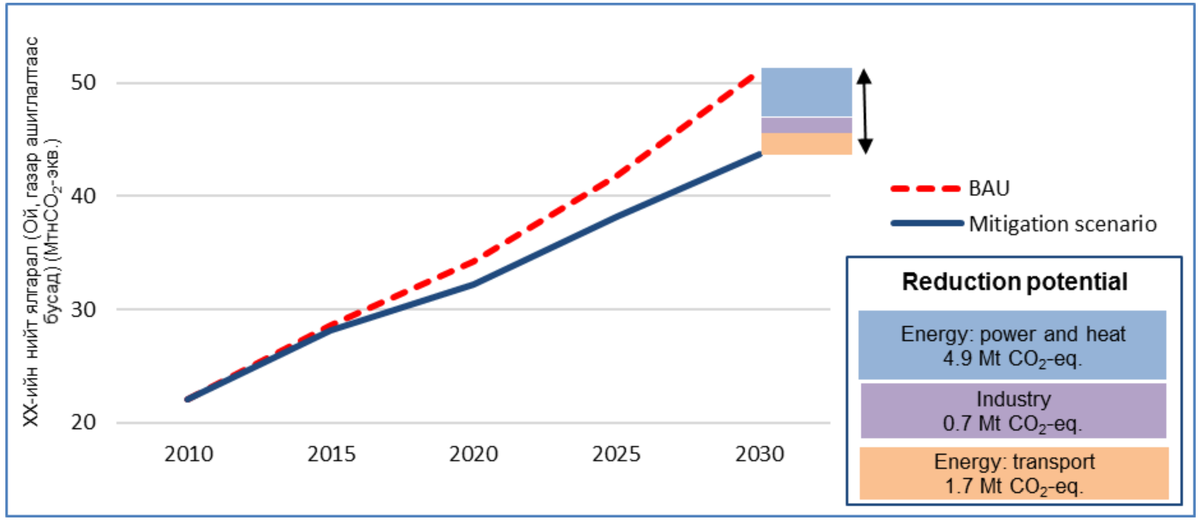
Gers可以同时实现系统减排、削减贫困以及低碳发展
Gers could achieve both Systematic Emission Reductions, Poverty Reduction & Low Carbon Development



Zone 1	**Centrally Supplied**
Zone 2	**Heat only boilers**
Zone 3	**Heat only boilers independently suuplied4**
Zone 4	**Centrally supplied heat only boilers light**

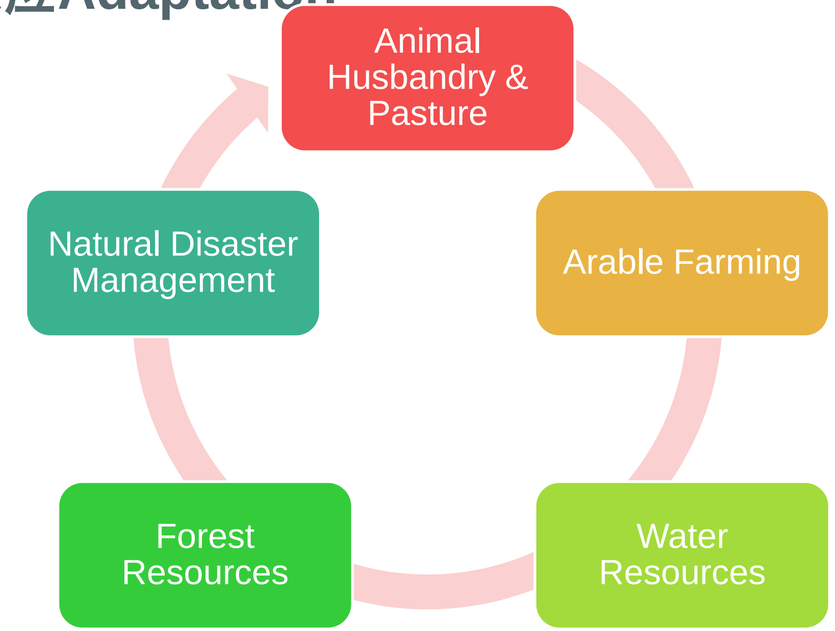
蒙古的国家自主贡献Mongolia’s NDCs

削减Mitigation



Source; Mongolia’s Intended nationally determined contribution, 2015
Note: Excludes LULUCF

适应Adaptation



2030年削减730万吨CO_2当量，相较BAU情景减少14%。
7.3 Mt CO_2-eq. reduction per annum in 2030, i.e. **14%** reduction compared to a BAU scenario

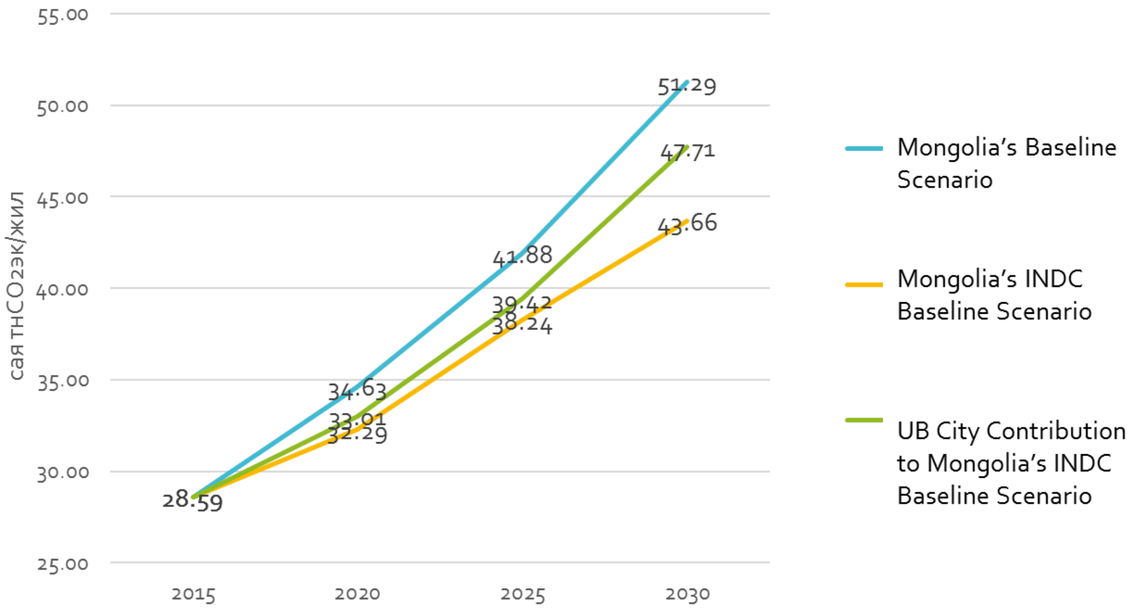
削减需要34亿美元投资，适应需要27亿Investment needs USD 3.4 billion for mitigation and USD 2.7 for adaptation measures
在可获得科技转移与融资时可以实现国家自主贡献NDCs implementation is contingent upon **technology transfer** and access to **finance**

乌兰巴托对蒙古自主贡献的帮助UB City contribution to Mongolia's NDCs

减缓 – 乌兰巴托室内温室气体排放削减及情景Mitigation - GHGs emissions in UB City Territory & Scenario

UB mitigation scenarios, 1000t CO_2-eq/year

Items	2015	2020	2025	2030
Baseline Scenario				
INDC Baseline Scenario	**28,591**	**34,632**	**41,877**	**51,294**
UB Mitigation Scenario				
1. Efficiency improvement of electricity, heat production and distribution	**0.00**	**786.16**	**990.00**	**1280.69**
1.1 Reduction of internal use of electricity in CHPs	0.00	93.51	160.00	226.95
1.2 Reduction of electricity transition and distribution losses	0.00	276.95	370.00	417.94
1.3 Reduction of heat distribution losses	0.00	385.70	420.00	583.80
1.4 Efficiency improvement of water heating boilers	0.00	30.00	40.00	52.00
2. Efficiency improvement of electricity, heat consumption	**0.00**	**480.00**	**638.00**	**825.60**
2.1 Electricity and heat saving in big industries and entities	0.00	80.00	88.00	94.40
2.2 Reduce heat losses in buildings	0.00	400.00	550.00	731.20
3. GHG emission reduction in transport sector	**0.00**	**150.00**	**435.00**	**880.00**
4. Increase the share of renewable energy in the total electricity generation capacity	**0.00**	**200.00**	**400.00**	**594.00**
GHG emission reduction total	**0.00**	**1616.16**	**2463.00**	**3580.29**



Baseline scenario and UB mitigation scenarios, 1000CO_2-eq/year

	2010	2015	2020	2025	2030
Baseline scenario	21,950	28,591	34,632	41,877	51,294
UB mitigation scenario	**0**	**0**	**1,616**	**2,463**	**3,580**
%			4.67	5.88	6.98

乌兰巴托市气候投资7领域Ulaanbaatar city’s 7 climate investment sectors		
1	能源（生产与消费）Energy (Production and consumption)	减缓Mitigation
2	交通（提高效率）Transport (Increasing efficiency)	减缓Mitigation
3	水（防止日益增长的水压力）Water (Combating growing water stress)	适应Adaptation
4	森林资源（促进碳捕捉）Forest resources (Promoting carbon capture)	减缓Mitigation
5	城市规划（低碳城市/工业）Urban planning (Low carbon cities/industries)	减缓/适应Mitigation/Adaptation
6	垃圾管理（固体废物发电）Waste management (Solid waste to energy)	减缓/适应Mitigation/Adaptation
7	灾难管理（抵抗力）Disaster management (Resilience)	适应Adaptation

CAREC RETA乌兰巴托市的产出
CAREC RETA Outputs for Ulaanbaatar city

After series of consultative meeting with stakeholders, following four major outputs will be delivered with this RETA:

1. Sustainable data management systems for greenhouse gas (GHG) data assessed and enhanced at city level;
2. Recommended investment road maps for low-carbon economic growth at selected cities developed;
3. A source book on successful practices and measures driving low-carbon economic development at city level developed and disseminated;
4. Strengthened capacity for low-carbon city development among CAREC countries expanded.

在与利益攸关方举行一系列磋商会议之后，将通过此RETA提供以下四项主要产出：

1. 在城市一级评估和加强温室气体数据的可持续数据管理系统；
2. 制定了选定城市低碳经济增长的推荐投资路线图；
3. 制定并传播了关于推动城市低碳经济发展的成功实践和措施的资料书；
4. 加强CAREC国家低碳城市发展能力。

我们了解的乌兰巴托LCC的优先事项
What we heard as LCC priorities for Ulaanbaatar

- 温室气体清单分析 GHG Inventory analysis
- 吸引私营部门投资的选择 Options for attracting private sector investments
- 气候变化与绿色发展的能力建设 Capacity building for the Climate Change and Green Development Unit
- 公交线路合理化与城市交通低碳战略 Bus route rationalization and Low Carbon strategy for Urban Mobility
- 减少污染和GER污染整治的公众意识运动 Public awareness campaign for Pollution Reduction, and GER pollution remediation
- 为可负担住房和BRT项目的PMO提供支持 Support to PMOs for Affordable Housing and BRT Projects

乌兰巴托现在的交通形势
Current Transport situation in Ulaanbaatar

乌兰巴托注册交通运输车辆458,212 其中每天参与交通运输的达200,000

Total number of registered transportation units in UB 458,212 out of which 200,000 involved in daily traffic.

如果我们不采取任何措施来减缓增长，到2030年运输工具的总数将达到970,000

In case if we don’t take any measures to slow down the growth the total number of transportation means will reach 970,000 by 2030

UB 458,212 out of which

200,000

involved in daily traffic.

Number of transportation means will reach

970,000

by 2030

乌兰巴托现在的交通形势
Current Transport situation in Ulaanbaatar

交通拥堵 Traffic Congestion :

- below 5kph during peak-hours in CBD
- Cost 3.5% of GDP , $250 million per year

低质量公共交通 Low Quality Public Transport :

- Slow and congested low quality buses
- Vehicle ownership has doubled

交通事故 Traffic accident :

- 824 death in 2011 nation wide (26th in the world)
- 70% accidents in UB, 80% passenger cars

机动车空气污染与CO_2排放 Air Pollution and CO_2 by vehicles:

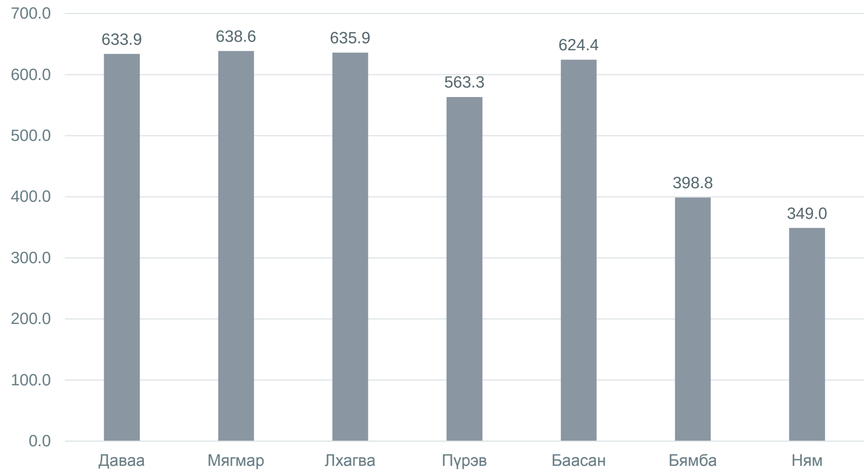
- 33% of NOx and 14% od CO_2
- 80% od vehicles not meet emission standards

城市交通Urban transport

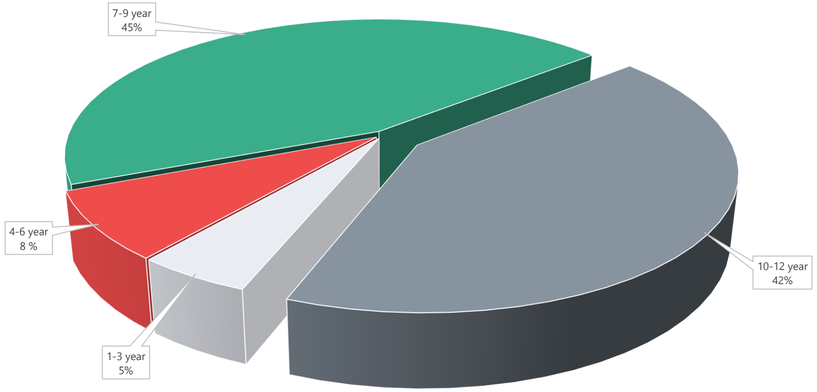
Bus

937
bus

Daily trip /thousand/
September-November, 2018

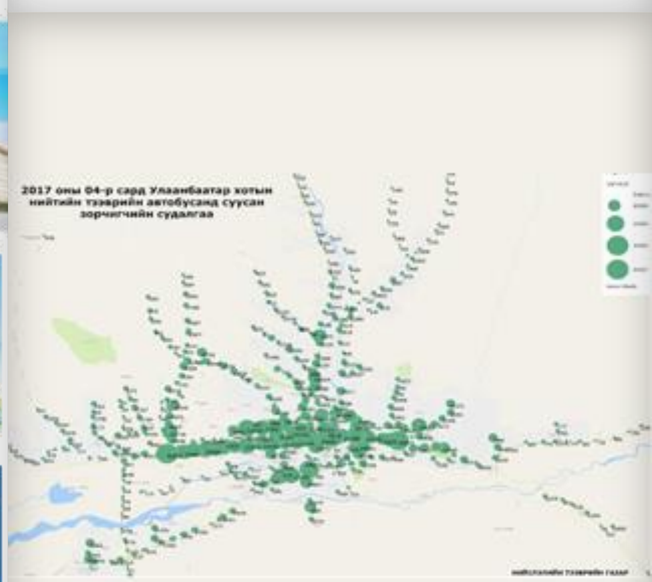


Resource: Ulaanbaatar city transport agency, 2018



Resource: Ulaanbaatar city transport agency, 2018

公共汽车管理系统Bus management system,
公共汽车信息系统bus information system,
电子票务系统e-ticketing system



乌兰巴托市长办公室的倡议
Governor office of Ulaanbaatar’s Initiatives…

- UB BIKE project, which introduces Ulaanbaatar's bicycle service, has been implemented since July 9, 2018.
- Starting from 01 April 2017, the public transportation of Ulaanbaatar City fully adopted the electronic card system.
- MUB has plan 21 EV plug-in Station by 2018 000 less vehicles on the road (19% reduction)

UB BIKE sharing

UB smart card system

EV/ charging Station and Incentive

Locally manufactured

乌兰巴托当前交通形势 Current Transport situation in Ulaanbaatar

乌兰巴托城市管理计划2020-2030 ULAANBAATAR CITY MASTER PLAN 2020-2030

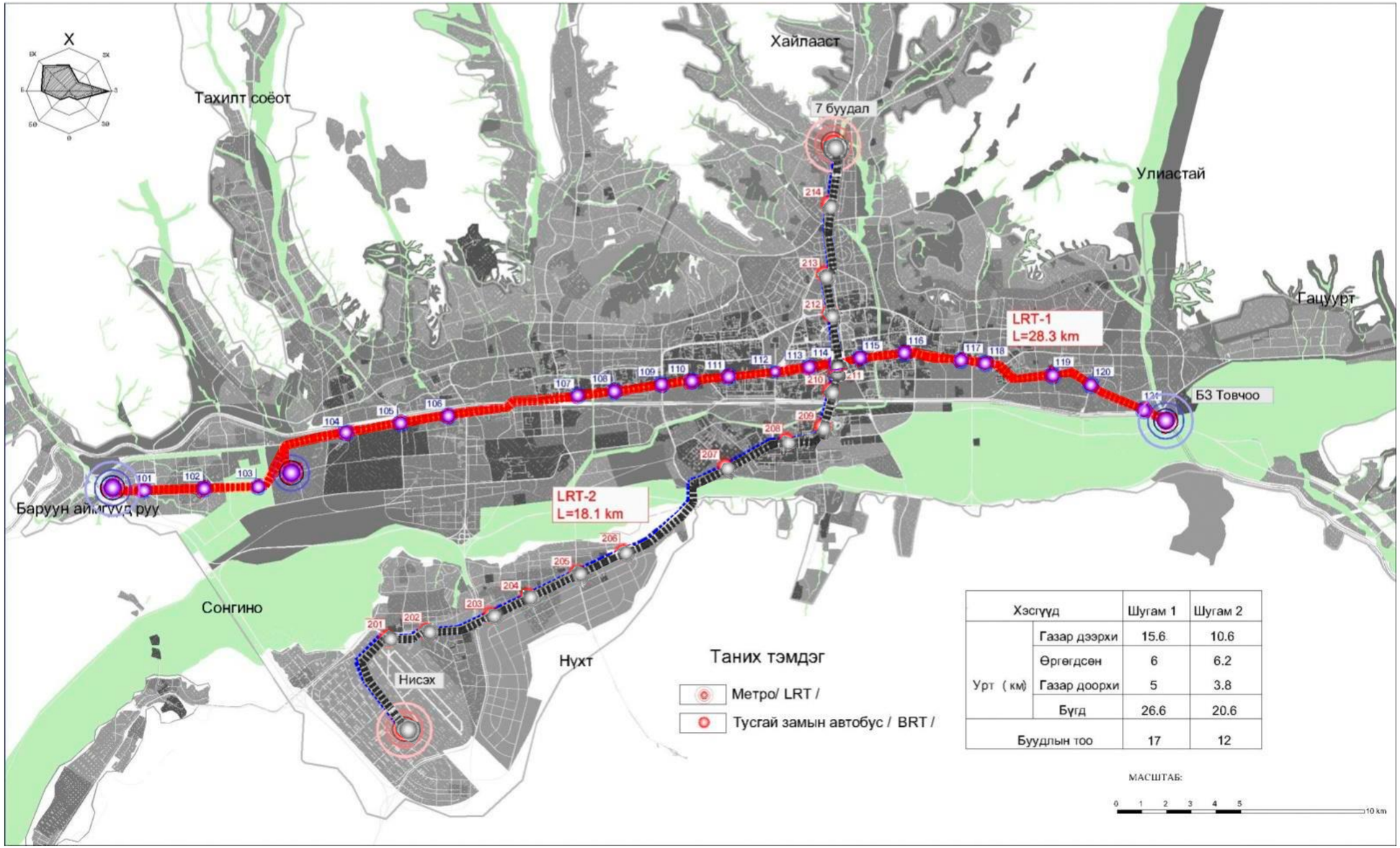
1. Reduce traffic congestion
2. Improve public transport
3. Improve traffic safety (Pedestrian and Vehicle)
4. Reduce vehicle emissions

1. 减少交通拥堵
2. 改善公共交通
3. 提高交通安全（行人和车辆）
4. 减少车辆排放

主要目标 MAIN GOALS

1. 快速公交BRT (Bus Rapid Transit)
   - BRT走廊设计UB BRT Corridor Design
   - 站台选址与设计Station Location & Design
2. 道路提升Road Improvement
   - 道桥提升Road and Bridge Improvement
   - 电车提升Trolley Bus Improvement.
3. 交通管理Traffic Management
   - 跨区域提升Intersection Improvement
   - 交通安全提升Traffic Safety Improvement
4. 停车管理与NMT Parking Management & NMT
   - CBD停车控制 CBD Parking Control
   - 停车政策 Parking policy

METRO(JICA) , BRT(ADB)



Хэсгүүд		Шугам 1	Шугам 2
Урт (км)	Газар дээрхи	15.6	10.6
	Өргөгдсөн	6	6.2
	Газар доорхи	5	3.8
	Бүгд	26.6	20.6
Буудлын тоо		17	12

BRT的未来
BRT Future

Before

After

Before

After

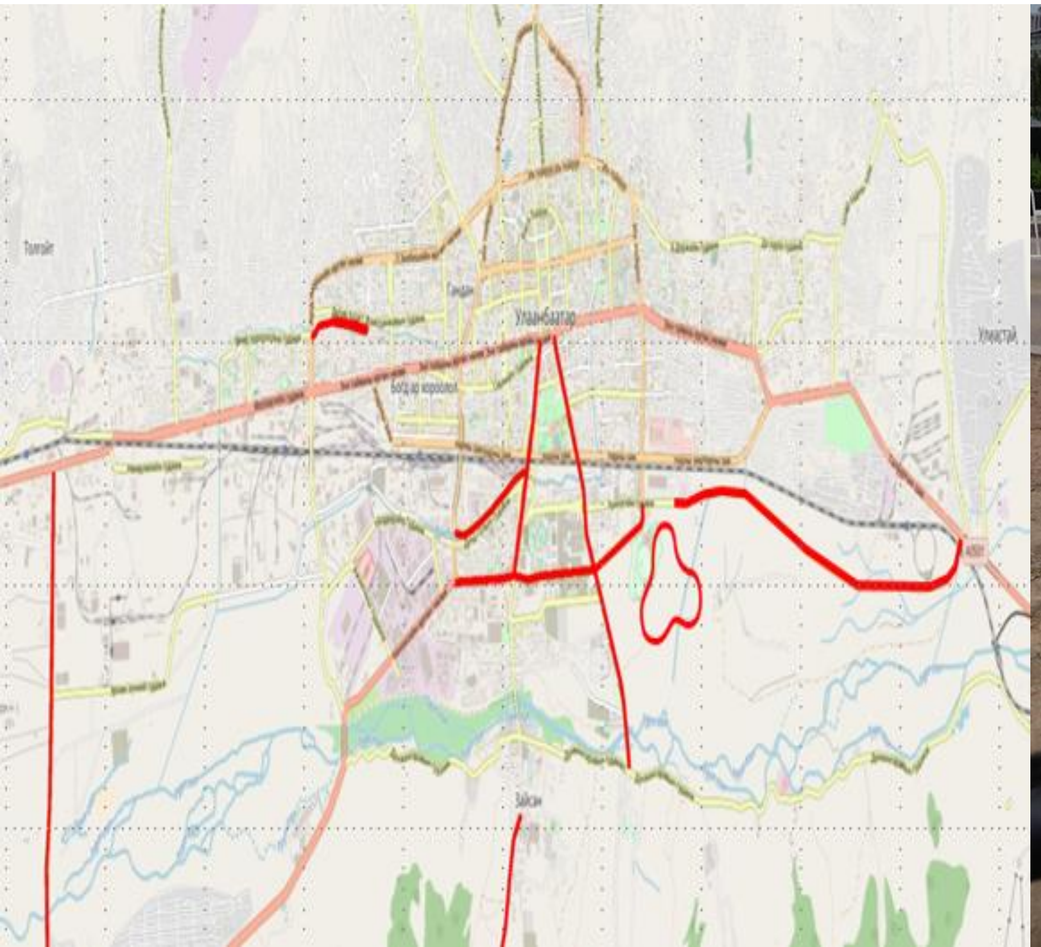
为什么乌兰巴托选择BRT？
Why BRT for Ulaanbaatar city?

1. **便于实施 Flexible implementation :**
   - BRT corridor : 29m minimum with road
   - BRT vehicles : Diesel buses, trolley buses, hybrid buses
2. **实施快Short time Implementation (1.5 ~ 3 years)**
3. **低成本、承载量大**
   Low cost ($1-$5 million per km) and high capacity
4. **行人使用方便 Easy access by the passengers :**
   - At grade, pedestrian bridges, underground pedestrian pass
5. **低国外技术依赖Low dependence on foreign technology**

Better Branding Improved transit service quality

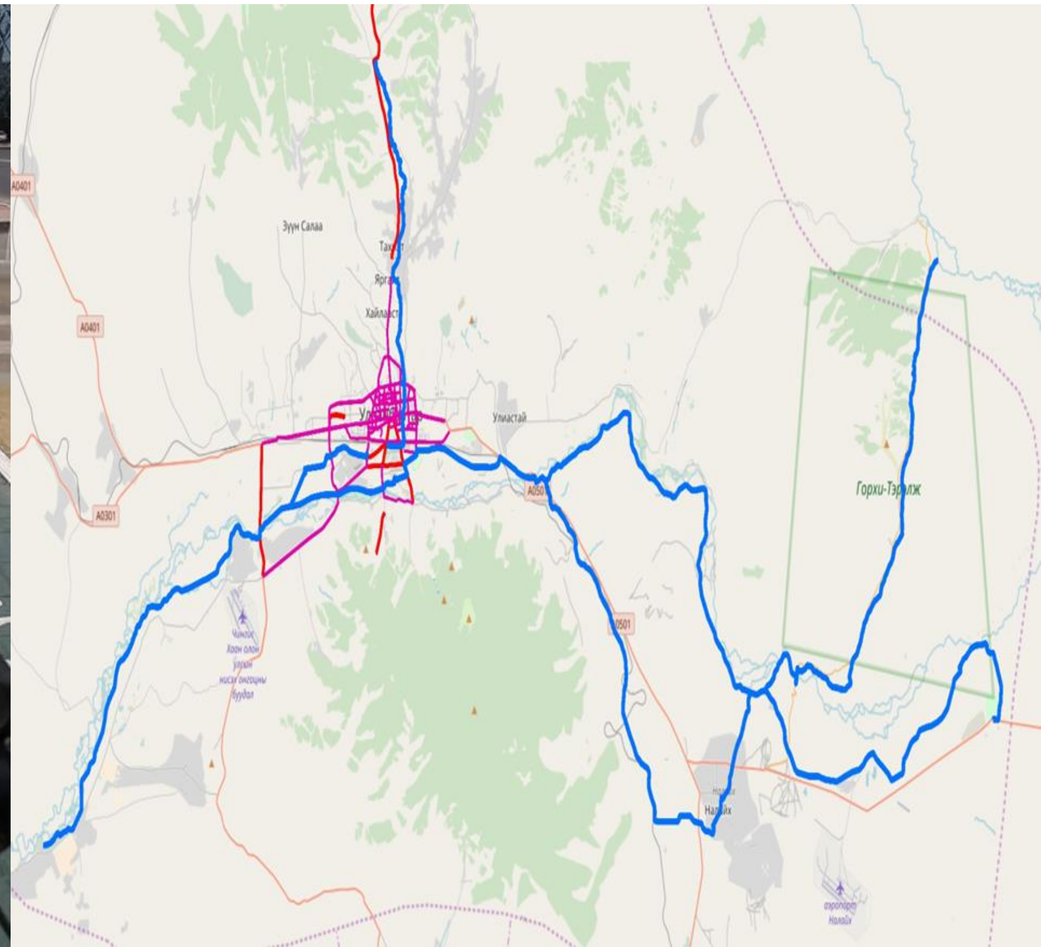
现有自行车道Existing bike lanes

60.5 km



计划自行车道Planned bike lanes

350.2 km



下一步要做什么？
So what are the next steps needed?

更多关于城市交通的对话

More upstream dialogue on urban transport

全社会——政府、私营部门、消费者共同努力

Efforts must come from all of society – government, private sector and consumers

长期 Long term engagements

- 政策改革与部门发展Policy reform and sector development
- 管理计划与部门水平项目Master plans and sector level programs
- 融资、实施更大更长期的政策Financing and implementation of larger and longerterm policy

短期 Short term engagements

- 新项目准备工作 New Project Readiness Facility (PRF)
- 公众的电动汽车意识 EV awareness among public
- 为公共EV充电基础设施 - 试点项目提供资金 Funding for Public EV Charging Infrastructure-Pilot project

感谢倾听
Thanks for your attention

给我们发邮件获取更多详细信息：
Email us for more detail:

zolzaya.env@gmail.com
oogii123@gmail.com