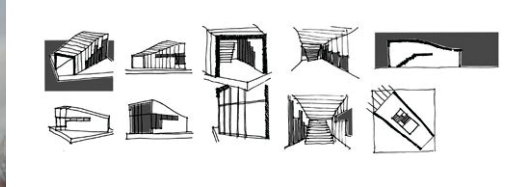
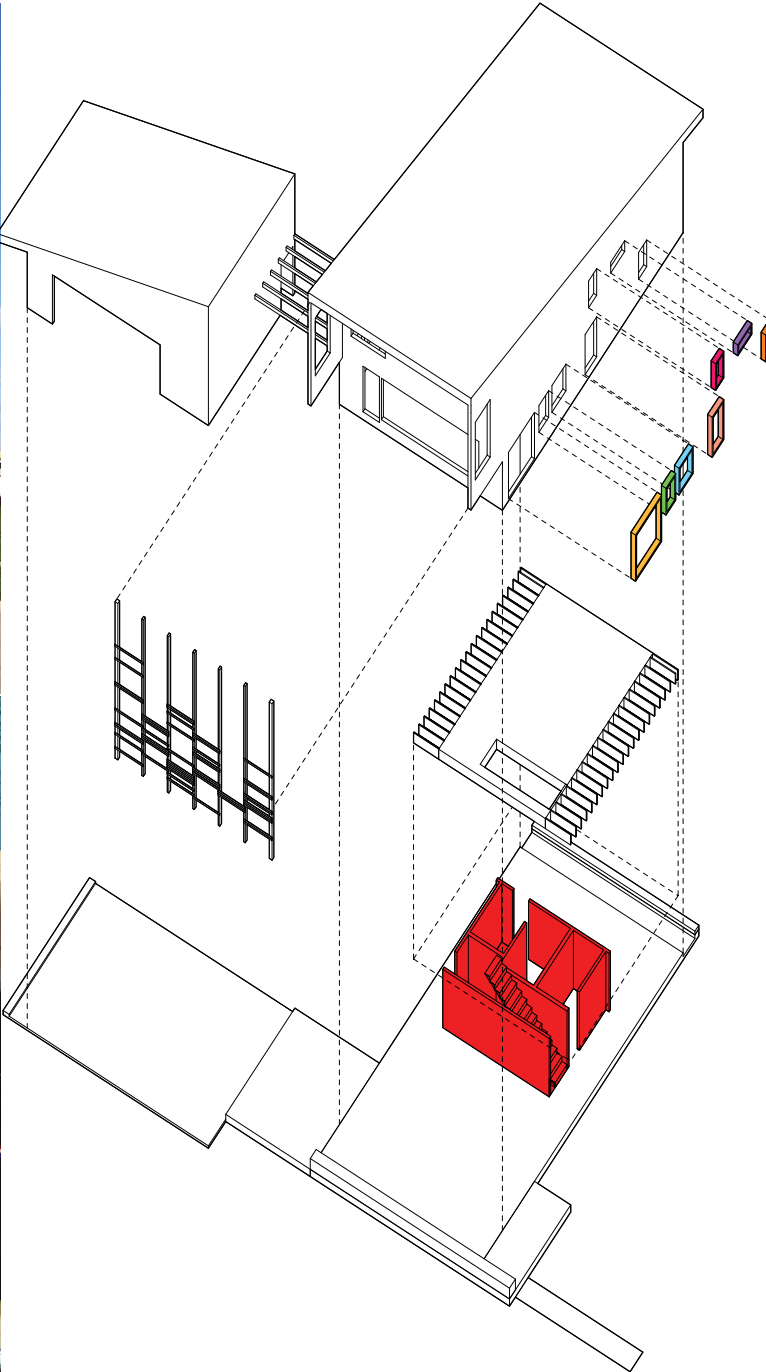


efargo

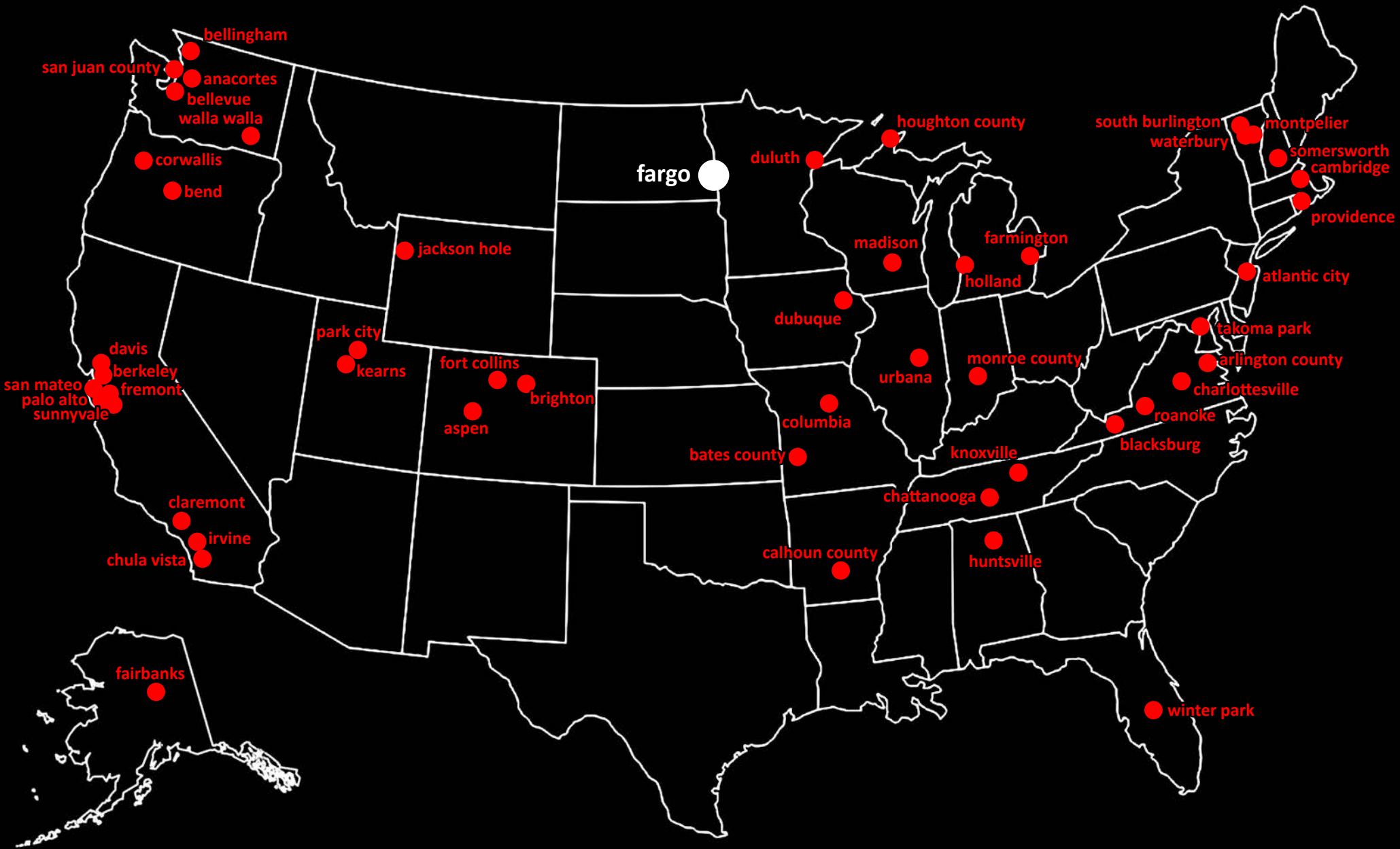
efargo is a copyright of Design and Energy Laboratory (DandeLab)





copyright DandeLab

Georgetown University Energy Prize
2015 - 2016



GO
2030

FARGO COMPREHENSIVE PLAN

GUIDING PRINCIPLES



WATER AND ENVIRONMENT

Fargo will create permanent flood protection and ensure the quality and supply of this precious resource through water conservation. We will celebrate water by embracing the Red River of the North and the Sheyenne River and integrating sustainable rainwater management techniques into the fabric of the city. We will protect our natural resources and preserve the health and beauty of our environment.



ENERGY

Fargo will aggressively seek innovative strategies to support national energy independence. The community will find energy savings through efficiency measures and invest in renewable sources for the future.



ARTS AND CULTURE

Fargo will flourish with a stronger arts and culture movement. We will nurture and increase the presence of both the performing arts and the visual arts, and we will increase access to cultural events and arts-related educational opportunities.



ECONOMY

Fargo will build on its agricultural and manufacturing heritage and will be known as a cutting-edge creative economy. We will educate and retain the best workforce in the nation and foster an innovative and entrepreneurial environment.



NEIGHBORHOODS, INFILL, AND NEW DEVELOPMENT

Fargo will promote attractive and welcoming neighborhoods by promoting a diverse and affordable housing stock. Fargo will support neighborhoods where residents can age in place, children can walk to school, and essential services are only a short walk away. Fargo will promote infill development, planned growth, and increasing density and vitality in its established neighborhoods.



EDUCATION

Fargo will uphold and improve its world class K-12 education system. Fargo will continue to embrace the universities and post secondary education institutions and acknowledge their positive influence on the economy, workforce, and culture of Fargo.



HEALTH

Fargo will encourage healthy choices and improve the health of residents by enhancing awareness, increasing year-round recreational opportunities, increasing access to healthy food, and ensuring access to quality healthcare.



TRANSPORTATION

Fargo will transform its transportation system to encourage walking, biking, and transit. The City will coordinate infrastructure investments and land use policy in a supportive and synergistic way.



SAFETY

Fargo will ensure safety through excellent police and fire service. The design of neighborhoods, districts, and public spaces will work to promote safety by increasing visibility and eyes on the street.

LANDFILL WIND AND SOLAR

By using a solar panel and wind generator to generate renewable electricity, the amount of purchased power is decreased drastically.

METHANE ELECTRICAL GENERATION

Fargo utilizes the landfill in a unique way to capture methane gases to create energy to both power the facility and also to sell.

KOHL'S

Kohl's Fargo location was LEED Certified in 2011.

BOY SCOUTS TREE HOUSE / GREENHOUSE

The tree house will educate youth about passive building design and innovative energy sources.

W. FARGO SCHOOL GREEN ROOFS

The West Fargo Public School is reviewing the ability to add green roofs to their building not just as an efficiency measure but as an effort that will be rich in educational opportunities.

S.T.E.M. EDUCATION

K-12 schools like Liberty Middle School are incorporating sustainability and energy efficiency into their S.T.E.M. curriculums.

SOLAR GARDEN

Fargo is in discussions with a local electric provider to develop a partnership that would use a new ground storage water reservoir for a large solar collection area.

MICROSOFT

Fargo Microsoft achieved LEED Gold Certification in 2011.

MATBUS GENERATOR AND BIODIESEL

MATBUS now uses 20% blended biodiesel fuel during the summer months, and the Metro Transit garage provides a power generator for times of peak energy use to reduce cost and load on power grids.

WASTEWATER RECYCLING

1 Million gallons of wastewater are sold each day to a nearby ethanol plant.

THE PLAINS: OIL SHOW

The Plains Art Museum will be hosting an Oil Show to discuss and visualize the effects of the Oil Boom in North Dakota.

GEOHERMAL TECHNOLOGY AT CITY HALL

Geothermal technology is being incorporated into the design of the new City Hall building in Downtown Fargo. There is also ongoing discussion of LEED Certification.

LED RETROFIT

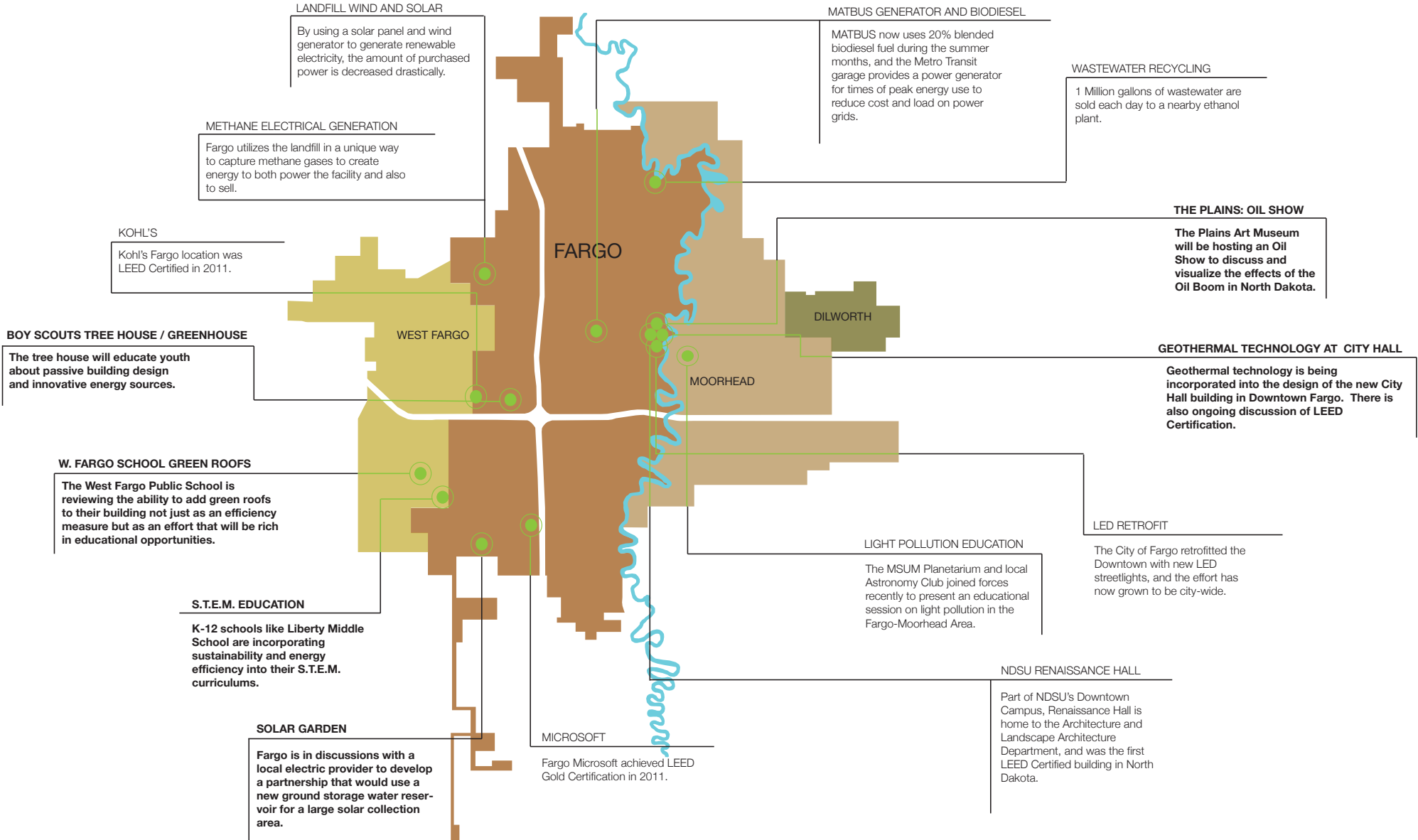
The City of Fargo retrofitted the Downtown with new LED streetlights, and the effort has now grown to be city-wide.

LIGHT POLLUTION EDUCATION

The MSUM Planetarium and local Astronomy Club joined forces recently to present an educational session on light pollution in the Fargo-Moorhead Area.

NDSU RENAISSANCE HALL

Part of NDSU's Downtown Campus, Renaissance Hall is home to the Architecture and Landscape Architecture Department, and was the first LEED Certified building in North Dakota.



vision:

eFargo will aggressively seek community-wide efficiencies in renewable and non-renewable energy production, distribution and consumption resulting in reduced emissions.

5 / 5 / 5

30 / 30 / 30

Hirst and Brown's concept of the ENERGY-EFFICIENCY GAP and related literature.

Hirst and Brown identified and coined the term “**energy efficiency gap.**”

They noted the failure of households, businesses, manufacturers and government agencies to take full advantage of cost-effective energy-conserving opportunities and discussed the structural and behavioral barriers to closing the energy-efficiency gap.

The behavioral barriers that were in the control of the end-user were **attitudes towards energy efficiency, perceived risk of energy efficiency investments, information gaps and misplaced incentives.**

Hirst, E. and M. Brown (1990). “Closing the efficiency gap: barriers to the efficient use of energy.” *Resources, Conservation and Recycling* 3(4): 267-281.

Hirst and Brown's concept of the ENERGY-EFFICIENCY GAP and related literature.

In general, the energy efficiency gap is well documented. To summarize, **large-category reasons for the gap are:**

(1) financial (unaffordability of the adoption costs, lack of incentives);

(2) informational (lack of accurate and customized information from reliable resources, lack of how-to, misinformation);

(3) behavioral (inertia in adoption, attitudes towards energy efficiency, perceived risks).

Outline of PACE Strategy

POLICIES

CATALYST PROJECTS	1. City Hall Performance Standards
YEAR 2 POTENTIAL PROJECTS	2. Loan or Tax Credit or Incentives program
YEAR 3 POTENTIAL PROJECTS	3. Performance standards for buildings receiving public funding
YEAR 4 POTENTIAL PROJECTS	4. Benchmarking and Commissioning for existing municipal buildings
YEAR 5 POTENTIAL PROJECTS	5. Renewable energy programs
	6. Fast-track permitting for green buildings
	7. Incentives to home builders
	8. Incentives and innovative financing for energy efficiency retrofits
	9. Incentives for rental housing, affordable housing, renaissance zone

PARTNERSHIPS - UTILITIES

CATALYST PROJECTS	1. Utility Publicity Program
YEAR 2 POTENTIAL PROJECTS	2. efargo dashboard
YEAR 3 POTENTIAL PROJECTS	3. Individual dashboards
	4. Home Energy Score
	5. Municipal dashboards, especially K-12

PARTNERSHIPS - UNIVERSITY

CATALYST PROJECTS	1. Expertise and team collaboration
YEAR 2 POTENTIAL PROJECTS	2. Partnered grant activities
	3. Space sharing
	4. efargo DEMONSTRATION

PARTNERSHIPS - LENDERS

CATALYST PROJECTS	1. Creative financial models (ESA, PACE, OBF, ESCO)
YEAR 2 POTENTIAL PROJECTS	2. Real Estate credits for energy efficiency
	3. Programs like METRUS and NAESCO
	4. Low interest retrofit loans for HVAC

PARTNERSHIPS - ORGANIZATIONS

CATALYST PROJECTS	1. Employee education programs
YEAR 2 POTENTIAL PROJECTS	2. Fund-raising and employee incentives
YEAR 3 POTENTIAL PROJECTS	3. Innovative financing for retrofits of multi-structure campuses
	4. Federal aid for University campus retrofits
	5. Training programs for builders and contractors

PARTNERSHIPS - ARTS

CATALYST PROJECTS	1. Oil Show collaboration
YEAR 2 POTENTIAL PROJECTS	2. efargo MOBILE
	3. Partner with K-12 as a building typology

ACTION

CATALYST PROJECTS	1. efargo CAMPAIGN
YEAR 2 POTENTIAL PROJECTS	2. efargo CHALLENGE
	3. Demonstration
	4. Solar Park
	5. Full cut-off LED lighting for the entire city
	6. efargo COMMUNITY

COMPETITION

CATALYST PROJECTS	1. Let' play efargo!
YEAR 2 POTENTIAL PROJECTS	2. efargo K-12 COMPETITION
	3. Annual repetition of competitions

EDUCATION

CATALYST PROJECTS	1. efargo CATALOGS
	2. efargo CLASSES
	3. K-12 curriculum consultancy and partnership
YEAR 2 POTENTIAL PROJECTS	4. efargo APPS
	5. Boy Scouts of America environmental greenhouse facility
	6. West Fargo public schools green roofs

POLICIES

CATALYST PROJECTS

YEAR 2 POTENTIAL PROJECTS

YEAR 3 POTENTIAL PROJECTS

YEAR 4 POTENTIAL PROJECTS

YEAR 5 POTENTIAL PROJECTS

1. City Hall Performance Standards
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3. Performance standards for buildings receiving public funding
4. Benchmarking and Commissioning for existing municipal buildings
5. Renewable energy programs
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PARTNERSHIPS - UTILITIES

CATALYST PROJECTS

YEAR 2 POTENTIAL PROJECTS

YEAR 3 POTENTIAL PROJECTS

1. Utility Publicity Program
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CATALYST PROJECTS

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4. efargo APPS



YEAR 2 POTENTIAL PROJECTS

5. Boy Scouts of America environmental greenhouse facility
6. West Fargo public schools green roofs











- KEY**
- MARKETING
 - FUNDING
 - HUMAN RESOURCES
 - SPACE

eFargo Programs (PACE)

		Fargo City Gov.	Utilities	Local Businesses						Local Schools			Local Universities					Local Organizations								Media											
		City Departments	Fargo Commission	XCEL Energy	Cass County Electric	Kilbourne Group	Microsoft	Gate City Bank	Fargo Public Library	Other Businesses	Administration	Teachers	Students	Student Organizations	Residence Hall Association	Administration	Dept. of Engineering	Dept. of Architecture & LA	Architects / Designers	Plains Art Museum	Chamber of Commerce	Riverkeepers	Astronomy Club	Convention & Visitor's Bureau	Downtown C.P.	MSUM Planetarium	Other Non-Profits	Boy Scouts	Neighborhood Groups	Television Stations	Radio Stations	Internet Providers					
P Policy & Partnership	Achieve LEED Certification and adhere to 30/30/30 standard for the new City Hall.		FUNDING															MARKETING	HUMAN RESOURCES																		
	Implement loan, tax credit/exemption or incentive program.	HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	MARKETING																																
	eFargo Utilities Campaign	HUMAN RESOURCES		MARKETING	MARKETING	MARKETING						HUMAN RESOURCES							HUMAN RESOURCES	MARKETING	MARKETING				MARKETING	MARKETING		MARKETING						MARKETING	MARKETING	MARKETING	
	Integrate 4 NDSU students from different departments into project team.	FUNDING	FUNDING														HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES																		
	Oil Show Workshops										SPACE			HUMAN RESOURCES					HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	MARKETING											MARKETING	MARKETING			
A Action	Start-up event with local celebrities.		HUMAN RESOURCES			FUNDING	HUMAN RESOURCES	FUNDING	SPACE			HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	FUNDING	HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	FUNDING	MARKETING	MARKETING	HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	SPACE	HUMAN RESOURCES				MARKETING	MARKETING				
	eFargo Campaign & Challenge	HUMAN RESOURCES				FUNDING	SPACE			SPACE		HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	FUNDING	HUMAN RESOURCES	SPACE	FUNDING	MARKETING	MARKETING	HUMAN RESOURCES	HUMAN RESOURCES			SPACE	SPACE										
	Solar Park	FUNDING		FUNDING	FUNDING								MARKETING							MARKETING	MARKETING												MARKETING	MARKETING			
	Demonstration Building	FUNDING				FUNDING	FUNDING					HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	MARKETING	FUNDING	HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	FUNDING	MARKETING		HUMAN RESOURCES					HUMAN RESOURCES				MARKETING	MARKETING				
C Competition	eFargo Competition (K-12)					FUNDING	FUNDING		MARKETING		MARKETING	MARKETING	HUMAN RESOURCES	MARKETING				MARKETING	FUNDING	MARKETING	MARKETING				MARKETING					MARKETING			MARKETING	MARKETING			
	Let's Play eFargo! (Serious Urban Game)	HUMAN RESOURCES		HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES	FUNDING	FUNDING	MARKETING				HUMAN RESOURCES	HUMAN RESOURCES				HUMAN RESOURCES	FUNDING	MARKETING					MARKETING					HUMAN RESOURCES			MARKETING	MARKETING			
E Education	eFargo Apps					FUNDING					HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES					HUMAN RESOURCES	HUMAN RESOURCES									HUMAN RESOURCES							MARKETING		
	eFargo educational classes			HUMAN RESOURCES	HUMAN RESOURCES	FUNDING	SPACE	FUNDING	FUNDING				HUMAN RESOURCES	HUMAN RESOURCES	MARKETING				HUMAN RESOURCES	FUNDING	MARKETING													MARKETING	MARKETING		
	Boy Scouts of America Treehouse Project					FUNDING						HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES					HUMAN RESOURCES	HUMAN RESOURCES								HUMAN RESOURCES	HUMAN RESOURCES			MARKETING	MARKETING				
	K-12 Curriculum Partnership										FUNDING	HUMAN RESOURCES	HUMAN RESOURCES	HUMAN RESOURCES					HUMAN RESOURCES	HUMAN RESOURCES									SPACE	HUMAN RESOURCES			MARKETING	MARKETING			

- KEY**
-  MARKETING
 -  FUNDING
 -  HUMAN RESOURCES
 -  SPACE

eFargo Programs (PACE)

		Fargo City Gov.		Utilities	
		City Departments	Fargo Commission	XCEL Energy	Cass County Electric
P Policy & Partnership	Achieve LEED Certification and adhere to 30/30/30 standard for the new City Hall.				
	Implement loan, tax credit/exemption or incentive program.				
	eFargo Utilities Campaign				
	Integrate 4 NDSU students from different departments into project team.				
	Oil Show Workshops				

schedule

	QTR 1	QTR 2	QTR 3	QTR 4	QTR 5	QTR 6	QTR 7	QTR 8
P Policy	Design and Construct City Hall to meet LEED Certification and eFargo's 30/30/30 Goal				Apply Performance Standards to any publically funded building			
	Propose Loan, Tax Credit/Exemption or Incentive Program			Institute a schedule for benchmarking and commissioning all municipal buildings.				
	Utility Dashboards			eFargo Utilities Campaign				
P Partnership	Partner with NDSU Students							
	Partner with NDSU and the City of Fargo for Grant Activities						eFargo Dashboard	
	Research & Implement Financial Programs for the Community				Create an Efficiency Standard Among Local Agents, Brokers, Appraisers, Lenders			
	Partner With Local Businesses to Provide Employee Education Programs			Provide assistance to multi-building, large organizations to institute energy efficiency measures.				
	Fundraising Programs with Local Businesses, Organizations & Institution							
	Oil Show Workshops		eFargo Mobile Museum					
A Action	eFargo Campaign							
	eFargo Challenge			Identify other demonstration projects in each building typology in the Neighborhood Revitalization Zone				
	Complete the ACEEE self-scoring analysis		Demonstration Project		eFargo Community Demonstration			
	Design & Build a Solar Park							
C Competition					Let's Play eFargo! (Serious Urban Game)			
				K-12 eFargo Competition		K-12 eFargo Competition		
E Education	K-12 Planning							
	eFargo Community Educational Classes							
	K-12 Curriculum Partnership							
	Design a Web App for the Urban Game			West Fargo Public Schools Greenroof Project				
	Boy Scouts of America Treehouse/Greenhouse							

quarterly evaluations

economy / equity / environment

financial / human / natural

funding

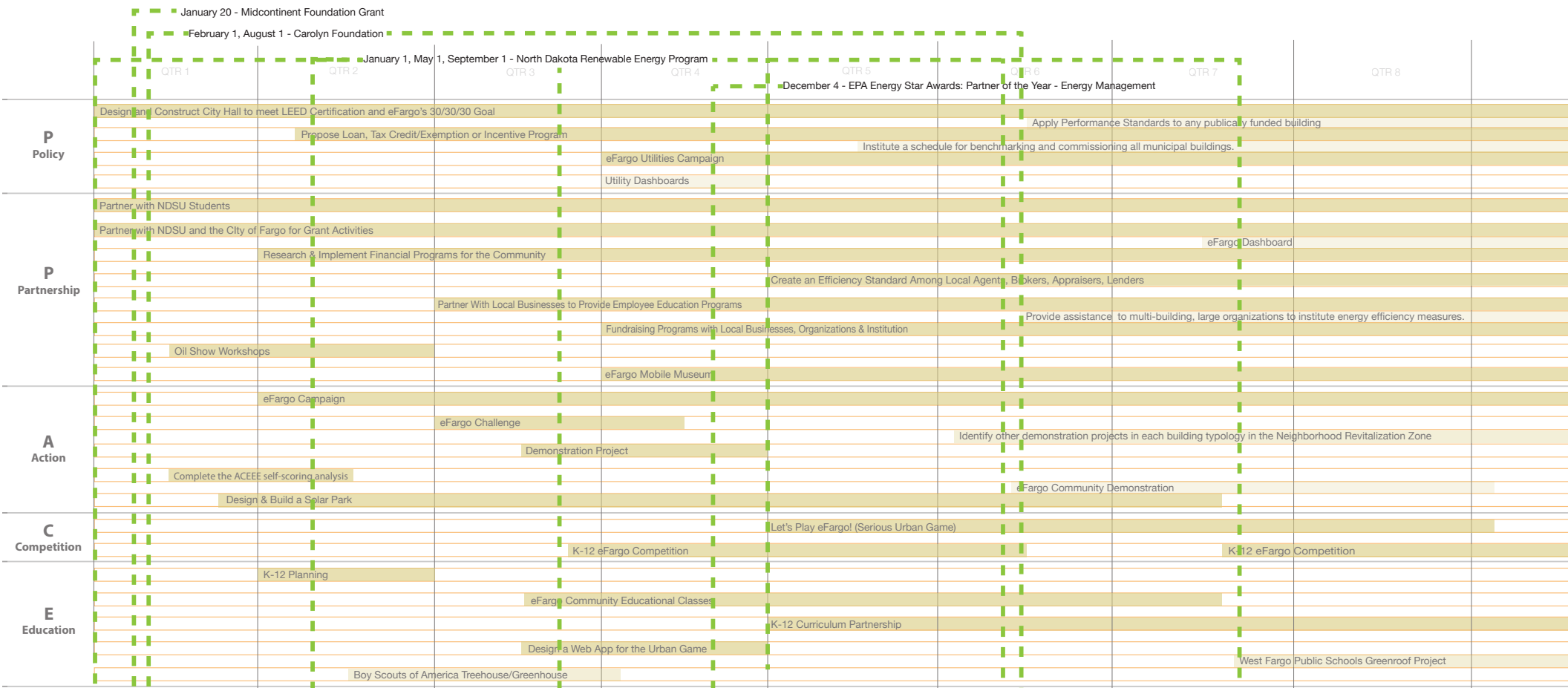
grants / fundraising / challenge

city - university / volunteer

funding tracker

Name	Organization/Agency	Min Amount	Max Amount	Deadline
Alex Stern Family Foundation				To Be Announced
Building America Industry Partnerships for high performance housing inovation	DOE			To Be Announced
Building Blocks for Sustainable Communities	Environmental Protection Agency			To Be Announced
Carolyn Foundation, Environmental Grantmaking				Feb 1, Aug 1
Community Improvement, Capacity Building, Environmental Quality, Protection, and Beautification,Health	Environmental Protection Agency		30,000	12/15/14
Delivering Efficient Local Thermal Amenities	ARPA-E			9/18/14
Deploying Solutions to Improve the Energy Efficiency of U.S. Commercial Buildings	EERE			To Be Announced
EERE Commercialization	EERE			To Be Announced
Energy Assurance	ND Department of Commerce		\$258,858	To Be Announced
Energy Conservation Grant	ND Department of Commerce, DCS	10,000	100,000	To Be Announced
FM Area Foundation		\$0	\$25,000	4/18/14
Lexus Eco Challenge	Lexus		\$10,000	12/8/14
Midcontinent Foundation		\$1,000	\$3,000	1/20/15
ND Community Services Block Grant	ND Department of Commerce / DHHS			Ongoing
North Dakota Weatherization Assistance Program for low income	ND Department of Commerce / DOE			Rotating
Otto Bremer Foundation				Jan 7, April 8
Renaissance Zones	ND Department of Commerce			To Be Announced
Renewable Energy Program	ND Department of Commerce		500,000	Jan 1, May 1, Sept 1
Rural Energy for America Program - Renewable Energy System and Energy Efficiency Improvement Guaranteed Loan and Grant Program	USDA			To Be Announced
Smart Growth Implementation Assistance			75,000	Ongoing
State Energy Program	ND Department of Commerce			To Be Announced
Unsolicited Proposals	DOE			To Be Announced
Community Grant Program	Walmart	\$250	\$2,500	12/31/14
Verizon Foundation Grant	Verizon Foundation			Continuous
ENERGY STAR Awards: Partner of the Year - Energy Management	EPA			yearly 12/4/2014

funding schedule



Literature concerning games, SERIOUS GAMES, and PERVASIVE GAMES

Very broadly, games can be **digital or non-digital or both.**

Digital games require computers to create the game environment and playing the game requires human-computer interaction.

Non-digital games are traditional board games, such as Monopoly or Scattegories. Several, traditionally non-digital games may also have digital versions.

Non-competitive games set up cooperative relationships within which education is a primary goal.

Some games named **autonomous games** by Poplin **do not require active human participation** and are played between computers or robots. **Immersive games** can be experienced through immersion in virtual environments, such as Blossom Entrepreneurship, within which players develop business models based on technology.



Serious Games Summit, Game Developers Conference 2010,
Entrepreneurship training game
<http://www.seriousgamesmarket.com/2010/02/gdc-10-blossom-immersive.html>



Immersion into virtual environments, Game Design Ideas (AI + complex systems)
<http://www.gamedesignideas.com/video-games/a-fresh-look-at-the-concept-of-immersion.html>

Literature concerning games, SERIOUS GAMES, and PERVASIVE GAMES

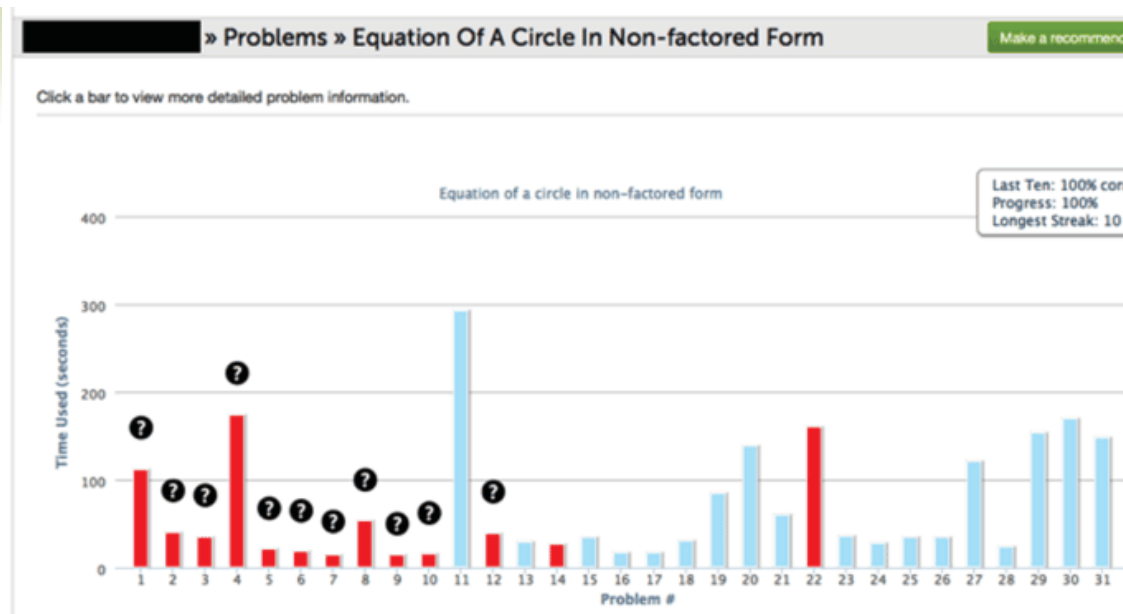
Games that do more than entertain are called **Serious Games**.

Usually, Serious Games immerse the player in an entertaining, educational environment with a goal of **training or teaching skills**. These have been used extensively in education, corporate environments, healthcare, military, government and politics, public policy and urban planning.

<http://www.miketheteacher.com/>

Play remains an important quality of serious games.

The screenshot shows the Khan Academy interface. At the top, it says "10,000,000 lessons delivered" and "Khan Academy". Below the navigation bar, there is a search bar and a video player for "Scale of the Small". To the right of the video player, there is a "Watch Practice" section with the text "Learn almost anything for free." and "With a library of over 2,600 videos covering everything from arithmetic to physics, finance, and history and 214 practice exercises, we're on a mission to help you learn what you want, when you want, at your own pace." Below this, there are buttons for "Watch a video" and "Practice with an exercise". There are also social media sharing options and a "Get Updates" button.

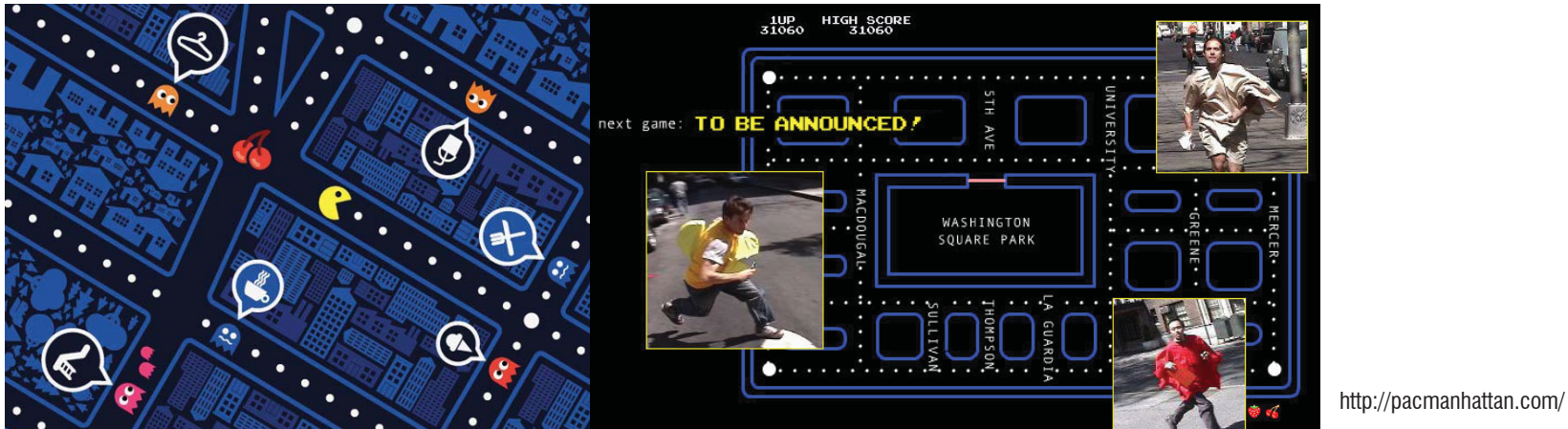


Michael, D. R. and S. L. Chen (2005). *Serious games: Games that educate, train, and inform*. Muska & Lipman/Premier-Trade.

Literature concerning games, SERIOUS GAMES, and PERVASIVE GAMES

City-scale or urban-scale immersive games are usually in the big games category or **big urban games** and have digital and physical components which require participants to immerse themselves in the city as the game space armed with digital and mobile technologies. **Erickson** calls this use of physical space as the game board as **the shift from two-dimensional game design to three-dimensional game design**.

An example is the game **Pac Manhattan** that has all the components, such as Pac-Man, human players, mobile devices and central tracking that makes visible the progress of the human players and Pac Man over the internet.



http://www.wired.com/2010/07/pr_levy_foursquare/

Poplin, A. (2012). "Playful public participation in urban planning: A case study for online serious games." *Computers, Environment and Urban Systems* 36(3): 195-206.

Ingrid Erickson, J. G., LeAnne Wagner, Hillary Kolos, Kan Yang Li (2011). Urban Game Design as a Tool for Creativity, Collaboration and Learning among Youth. *Proceedings of the 7th international conference on Games + Learning + Society Conference*. C. M. Constance Steinkuehler, Amanda Ochsner: 83-90.

Literature concerning games, **SERIOUS GAMES**, and **PERVASIVE GAMES**

McGonigal describes **pervasive games** as those that “explore urban identity, **critique habitual behaviors**, and seek to construct experimental social structures” in the tradition of urban computing. She further describes pervasive games having a “big” as in large-scale and shocking presence and performance aspect to jolt people into behavior change. **Gabriele Ferri** argues that gaming can promote “active, **responsible forms of citizenship, awareness-raising on key socio-cultural and political issues and promotion of more participative urban design and development processes.**”

McGonigal and Ferri discuss in depth the **Big Urban Game (B.U.G.)** commissioned and executed by Janet Abrams of the University of Minnesota Design Institute as part of the Twin Cities Design Celebration.



McGonigal, J. (2006). *This Might Be a Game: Ubiquitous Play and Performance at the Turn of the Twenty First Century.*

McGonigal, J. (2007). Disruptive Play: The Pervasive Games. *IE2007: Proceedings of the 4th Australasian Conference on Interactive Entertainment.*

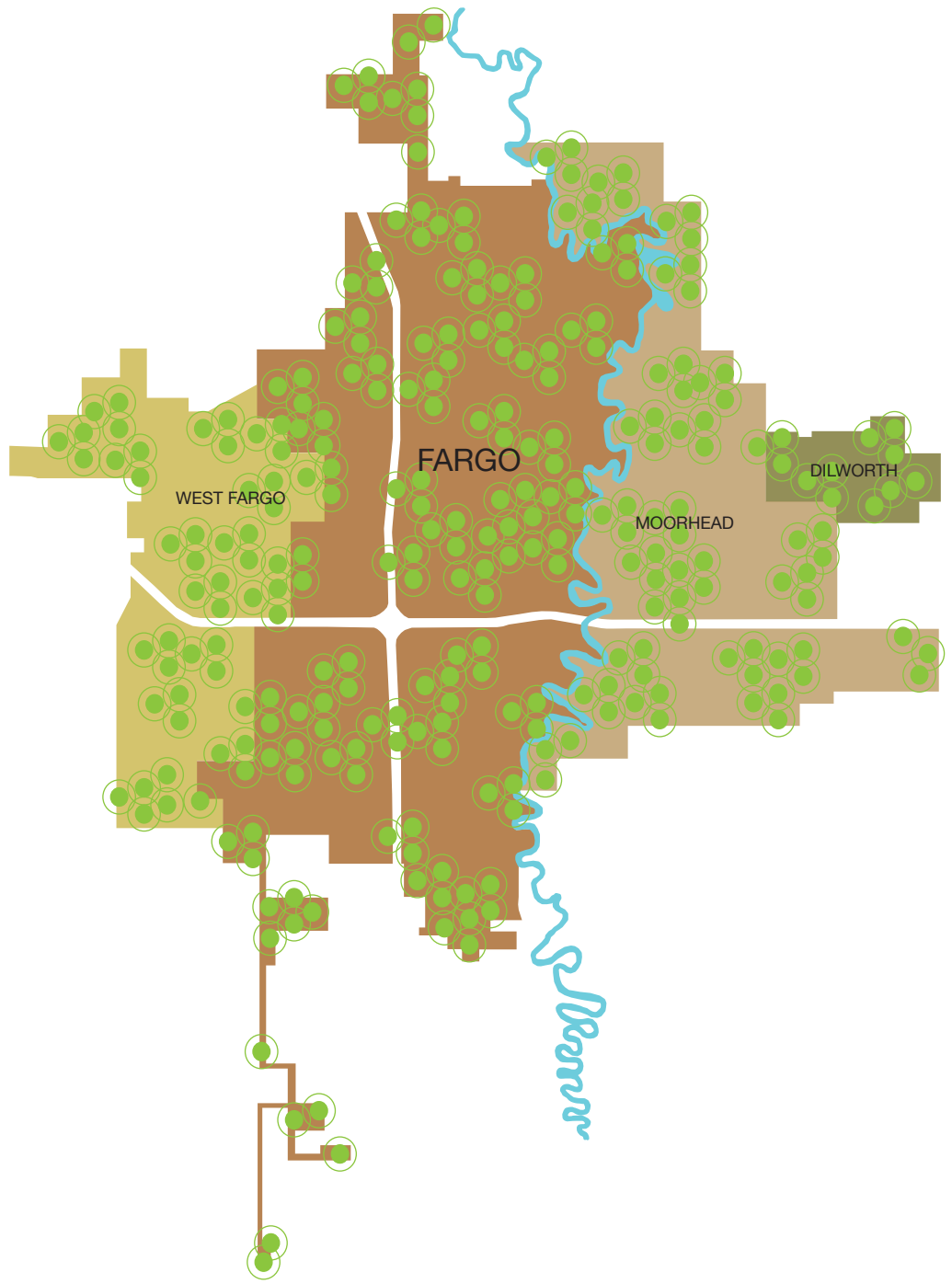
Gabriele Ferri, P. C. (2012). *Serious Urban Games. From play in the city to play for the city.* “Media & the City Workshop”. E. W. Group. Articolo presentato presso il, Università Cattolica di Milano. Febbraio 2012: 12.

Can Serious and Pervasive Urban Games be used to bridge the energy-efficiency gap?

In her extensive work in playful participation in urban planning and the design of the Next Campus game, **Poplin** established the basic elements of a game as:

the game environment	game objects (e. g., actual buildings and events)	game goals (i. e., the most satisfactory urban planning solution)	game rules including resources and consequences	a player (e. g., an individual)	maps, physical and digital models, i. e., game tools
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Poplin, A. (2012). "Playful public participation in urban planning: A case study for online serious games." *Computers, Environment and Urban Systems* 36(3): 195-206.



thank you!

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