

## CHAPTER III

### HEAVY INDUSTRY/NATURAL GAS WELL BUILD-OUT

A build-out is a planning tool that estimates the potential impact of cumulative development upon a town's land area once all of the potentially developable land has been used for the purpose in question; it is by its nature "speculative."<sup>1</sup> The build-out provides information that examines potential future gas development intensities and patterns.

The purpose of this build-out is to help our Town Board and residents to imagine and help determine if community visions and goals identified in the Town of Rensselaerville Comprehensive Plan can be met, should the heavy industrial activities associated with natural gas extraction operations occur in the TOR.

#### Definitions of Heavy Industry:

- *"A use engaged in the basic processing and manufacturing of materials and products predominately from extracted or raw materials, or a use engaged in storage of, or manufacturing processes using flammable or explosive materials, or storage or manufacturing processes that potentially involve hazardous or commonly recognized offensive conditions."* (American Planning Association)
- Heavy industry is more specifically *"A use characteristically employing some of, but not limited to the following: smoke stacks, tanks, distillation or reaction columns, chemical processing or storage equipment, scrubbing towers, waste-treatment or storage lagoons, reserve pits, derricks or rigs, whether temporary or permanent. Heavy industry has the potential for large-scale environmental pollution when equipment malfunction or human error occurs. Examples of heavy industry include, but are not limited to: chemical manufacturing, drilling of oil and gas wells, oil refineries, natural gas processing plants and compressor stations, petroleum and coal processing, coal mining, steel manufacturing. Generic examples of uses not included in the definition of "heavy industry" are such uses as: milk processing plants, dairy farms, garment factories, woodworking and cabinet shops, auto repair shops, wineries and breweries, warehouses, equipment repair and maintenance structures, office and communications buildings, helipads, parking lots, and parking garages and water wells serving otherwise allowed uses of the property. Agriculture and surface gravel and mining facilities shall not be considered heavy industry."* (Town of Middlefield, NY)

The figures set forth on the **Heavy Industry/Natural Gas Well Build-Out** chart in this chapter are intended to assist the Town Board and residents in evaluating and understanding the potential implications of the heavy industrial activity of natural gas extraction operations in the TOR and the potential impacts on water resources, property values, road use and safety, community character, and quality of life.

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<sup>1</sup> "Community Impact Assessment: High Volume Hydraulic Fracturing," Tompkins County Council of Governments, GreenPlan, Inc., December 15, 2011.

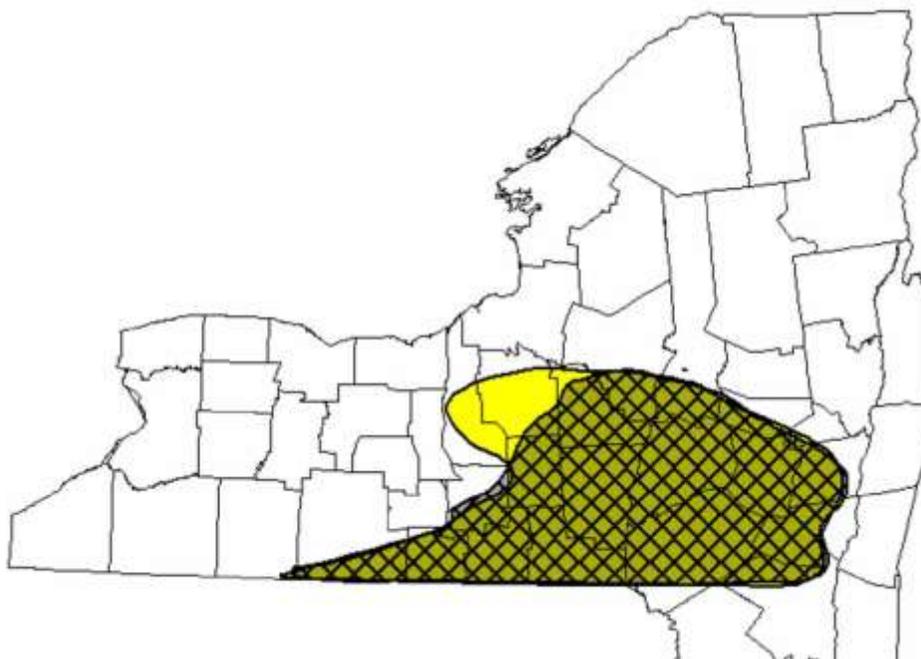
*“In New York State, all land use regulations must be in accordance with a comprehensive plan (Section 272-a). The Town of Rensselaerville Comprehensive Plan is the basis for regulatory programs. All land use laws should be reviewed and updated where necessary, to be in accordance with this plan.”<sup>2</sup>*

**A key question: Is heavy industrial development consistent with the vision and goal statements as described in the Town of Rensselaerville Comprehensive Plan?**

### **Estimating Acreage for Potential Natural Gas Well Development**

According to Figure 4.12 in the dSGEIS, estimated acreage for portions of the Town of Rensselaerville overlaying the Marcellus shale fairway are difficult to calculate, because Town lines are not superimposed on the map and the TOR is on the edge of the fairway. It is clear that all the lands of the Town of Rensselaerville overlay the Utica shale fairway, according to Figure 4.7, dSGEIS.

The following map shows all the lands of the TOR to be in both the Marcellus and Utica shale fairways.



**Figure 23 Map of Utica and Marcellus fairways. They overlap in eastern side of basin.<sup>3</sup>**

Although it has been reported that citizens of the TOR need not be concerned about natural gas extraction operations as the gas has been “cooked out”, the map above indicates that the lands in the TOR could prove to be quite productive for natural gas. In fact, the two fairways indicated on this map display what “will” represent the most Eastern edge of the gas field in the United States. Exploratory drilling is underway to begin producing gas in the Utica shale, with drilling activity concentrated on the shallower northern areas. Producers expect

<sup>2</sup> Town of Rensselaerville Comprehensive Plan, 2007, p 7.

<sup>3</sup> Richard Nyahay, <http://www.searchanddiscovery.com/documents/2007/07101nyahay/images/23.htm>

to place a premium price for gas produced from this play as it is within the Eastern gas market.<sup>4</sup>

It is possible that both Marcellus and Utica shale formations could be exploited either consecutively or concurrently.<sup>5</sup> At the same time, there is not much public information available about the potential future development of the Utica shale and other gas bearing formations. Utica shale gas production has been referred to as “*Marcellus shale on steroids*.”<sup>6</sup>

The Comprehensive Plan reports the TOR has a total area of 62 square miles, or 40,000 acres, with a population density of 30.9 people per square mile.

**ESTIMATE OF POTENTIAL DRILLING AREA:**

62 sq. miles x 640 acres =	<b>40,000 acres</b>
0.4 sq. mi. water x 640 acres =	<u>- 256 acres</u>
	39,360 acres
<u>Lands with Conservation Easements</u>	
Parcel #1	-47.3 acres
Parcel #2	-130.
Community Services <sup>7</sup>	-412.
Rensselaerville State Forest Parcels <sup>8</sup> :	-1,667.63
EN Huyck Preserve, Inc.	-2,000.
Wetlands:	
15 State regulated wetlands <sup>9</sup> (ECL 24)	-450.
(There are also numerous smaller unregulated wetlands throughout the Town that provide important environmental benefits.)	
Acreage of 5 hamlets	X
Steep Slope	<u>X</u>
	<b>35,487.07 potential drilling acres</b>
	(88% of total area)

For purposes of developing the following speculative gas well build-out chart, the following acreage was subtracted from the total land area of the Town: private conservation easements showing a “no surface or subsurface mining” or “no heavy industry” clause, community services, State forest parcels, water (lakes), and wetlands. Total acreage for the hamlets and acreage accounting for steep slopes is not known at this time and therefore was not subtracted. Accordingly, there are 35,487 potential drilling acres or 88% of the total TOR area.

Bradford County, PA has a population density of 54 people per square mile and 85% of its total land area is under natural gas leasing. The NYC DEP used the figure of 85% to

<sup>4</sup> “Utica Shale Play of Eastern New York,” Richard E. Nyahay, et. al., Presentation at AAPG Eastern Section Meeting, Pittsburgh, PA, 2008.

<sup>5</sup> “Land Use Analysis: Heavy Industry & Oil, Gas or Solution Mining and Drilling,” Greenplan Inc May 10, 2011, p 3.

<sup>6</sup> “The Giant Utica Shale: Marcellus on Steroids,” David Fessler, Investment U, November 10, 2011, <http://www.investmentu.com/2011/November/utica-shale-marcellus-on-steroids.html>.

<sup>7</sup> Town of Rensselaerville Comprehensive Plan, 2007, p 130.

<sup>8</sup> Town of Rensselaerville 2012 Town Tax Role, p 564. March 1, 2011 – July 1, 2010.

<sup>9</sup> Town of Rensselaerville Comprehensive Plan, 2007, p 100.

calculate the potential impact of natural gas well drilling in its watershed area. It seems reasonable, with a population density of about 31 people per square mile in the TOR to use a figure of 88% to calculate the potential impacts of gas well development. However, the figure of 85% will be used, as that has been a figure used to develop build-out estimates. (62 square miles x .85 = 53 square miles of potential gas well development.)

**HEAVY INDUSTRY/NATURAL GAS WELL BUILD-OUT**

	<b>VERTICAL DRILLING</b>	<b>HVHF DRILLING</b>
<b>Wells per pad</b>	<u>1</u> 16 wells per sq. mile	<u>6-10</u> wells per pad; may be up to <u>16</u> <sup>10</sup> ; 1 pad per sq. mile
<b>Estimated # of Pads</b>	16 x 53 = <u>848 pads</u>	<u>53</u> multi-well pads (85% x 62 sq. miles = 53 square miles of potential well development)
<b>Estimated # Of Wells</b>	<u>848</u> wells	6 x 53 = <u>318 wells to</u> 10 x 53 = <u>530 wells</u>
<b>Water Consumption</b>	50,000 <sup>11</sup> gallons x 848 wells = <u>42,400,000 gallons</u> 299,999 <sup>12</sup> x 848 = <u>254,399,150 gallons</u>	5.1 million <sup>13</sup> gallons x 318 wells = <u>1,621,800,000 gallons</u>
<b>One-Way Truck Trips<sup>14</sup></b>	387 x 848 = <u>328,176</u>	1979 <sup>15</sup> x 318 = <u>629,322</u>
<b>Town Wide Site Disturbance</b>	4.8 acres x 848 = <u>4,070.4 acres</u>	7.4 acres x 53 = <u>392.2 acres</u>
<b>Volume of Flowback</b>	50,000 x .25 = 12,500 gallons x 848 = <u>10.6 million gallons</u>	5.1 million x .25 = 1.275 million gallons x 318 = <u>405.45 million gallons</u>
<b>Cubic Yards of Cuttings</b>	125 cu. Yds x 848 = <u>106,000 cu. Yds.</u>	217 cu. Yds x 318 = <u>69,006 cu. Yds.</u>
<b>Gallons of Chemicals Remaining in Ground<sup>16</sup></b>	50,000 – 12,500 = 37,500 37,000 x .02 = 750 gal. per well 750 x 848 = <u>636,000 gallons</u>	5.1 million – 1.275 million = 3.828 million x .02 = 76,500 gal. 76,500 x 318 = <u>24.327 million gallons</u>

A single horizontal well may have a spacing unit of 9 wells per square mile.<sup>17</sup>

<sup>10</sup> dSGEIS, Chapter 5, p 22.

<sup>11</sup> Average 20,000 gallons to 80,000 gallons of water = 50,000 gallons

<sup>12</sup> New definition of “low volume” HF includes water use <300,000 gallons of water dSGEIS Chapter 2, p. 1.

<sup>13</sup> Average 2.4 million gallons to 7.8 million gallons of water = 5.1 million gallons of water.

Approximately 25% of flowback may be recycled by some gas companys. Flowback used for recycling must be diluted with fresh water to get TDS levels & other chemical constituents to fall within an acceptable concentration range where the recycled flowback can be used. “Oil & Natural Gas Technology,” John A. Veil, Argonne National Laboratory, Argonne, Il., July 2010, p. 10.

<sup>14</sup> dSGEIS Chapter 6, Table 6.62, p 303 shows higher estimated truck volumes.

<sup>15</sup> Heavy truck trips only, not including estimated additional 1,420 light truck one-way trips.

<sup>16</sup> Formula: (Water Consumption per well) – (flowback) x (.02) x (number of wells).

## **MORE NOTES on the BUILD-OUT:**

Potential land use for natural gas gathering lines, waterlines, above ground or underground electric lines, natural gas compressor stations, and “*edge effects*” are not factored into the build out. No estimates for other forms of heavy industry are included at this time, as there doesn’t seem to be demand or interest.

Although the industry expects that statewide, 90% of all wells to be developed by HVHF and only 10% of the wells to be developed by single vertically fracked wells, should natural gas extraction operations occur in the Town of Rensselaerville, it is not known what type of gas wells would be permitted by DEC: vertical, horizontal wells in a single-well spacing unit (low or high-volume), or horizontal wells with multiple wells drilled from common pads (HVHF wells).

According to the Oil and Gas Investor, “*As plays become further developed and the reservoir is better understood, downspacing begins.*” So, if this area proves to be economically fruitful for the gas industry, there are provisions within DEC regulation that may result in more than one vertical well per 40 acres. “*Infill wells*” may be drilled upon justification to DEC that a greater density of wells is necessary to efficiently extract gas reserves.

At the time of this writing, a survey of Albany County Clerk records of deeds and DEC Wells Data Search <http://www.dec.ny.gov/cfm/xtapps/GasOil/search/wells/index.cfm> shows that there are no known gas leases in the Town of Rensselaerville.

## **FROM THE TOWN OF RENSSELAERVILLE COMPREHENSIVE PLAN:**

The residents of the Town of Rensselaerville, as described in its 2007 Comprehensive Plan, use *quality of life* as its guidepost for community decisions, and have been consistent in their overwhelming support for:

- Protecting rural character<sup>18</sup> which defines its sense of space
- Protecting the environment and critical habitats
- Maintaining un-fragmented open space, historic buildings, beautiful vistas, unpaved roads and low traffic volumes
- Supporting agriculture and farming

There is strong public sentiment that the Town protect these qualities, which help define the TOR’s attractive quality of life.<sup>19</sup>

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<sup>17</sup> “Observations Concerning the Role of Local Governments in Relation to Natural Gas Exploration and Production in the Marcellus Shale in the Southern Tier East Region of New York State,” Southern Tier East Regional Planning Development Board, Technical Paper #08-07, August 18, 2008, p. 21

<sup>18</sup> A “rural community” is defined as one with a population density of 150 persons per square mile, or less. NYS Legislative Commission on Rural Resources. Also see pictorial definition, TOR Comprehensive Plan, p. 80-82.

<sup>19</sup> TOR CP, p 4.

## **ECONOMIC DEVELOPMENT**

Residents of the Town of Rensselaerville envision an economy that is consistent with its historic and rural character; with businesses that are protective of the environment.<sup>20</sup>

Most of the labor force commutes to other communities for employment. Local business categories identified in the Plan are:

- Contracting, Home Building, Home Improvements
- Farms, Farm-related Businesses and Forestry
- Antiques, Collectibles, Arts & Crafts
- Realty, insurance, finance & Legal Services

And also restaurants, specialty foods; auto repair, sales and services; child care & education services; accommodations; salvage and trash removal; welding, fabrication and polishing; conference centers; and other miscellaneous services.

Economic development should be consistent with these valued characteristics, with “*new businesses designed to fit into the town’s aesthetic character and that are protective of the environment.*” Whereas, the residents of the Town express keen support for renewable energy sources that provide a net benefit to the Town, and desire to promote energy sustainability and renewable resources, the proposed DEC plan to apply regulations for natural gas extraction operations to all areas, directs the State to develop the finite resources of fossil fuels. Instead of demonstrating energy conservation, and prime support for renewable and sustainable energy resources, it is projected that by 2035, shale gas will supply 45% of the U.S. total natural gas supply.<sup>21</sup> Also, assuming 2,000 new wells are drilled in NYS’s Marcellus shale, the produced gas would contribute to <1% of the annual US energy use.<sup>22</sup>

At the time of this writing, there is currently no heavy industry of any kind within the Town, including oil, gas or solution mining and drilling. Should natural gas extraction operations be permitted and occur in the TOR, the heavy industrial activity has the potential to go on for generations. The Town of Rensselaerville rural landscape could be turned into a heavy industrial region.

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<sup>20</sup> TOR CP, pp. 11-15.

<sup>21</sup> Annual Energy Outlook 2011 with Projections to 2035. United States Energy Information Administration, 2011.

<sup>22</sup> Energy Information Administration (EIA). [http://tonto.eia.doe.gov/dnav/pet/pet\\_cons\\_psup\\_dc\\_nus\\_mbb1\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_cons_psup_dc_nus_mbb1_a.htm)  
[http://tonto.eia.doe.gov/dnav/ng/ng\\_cons\\_sum\\_dcu\\_nus\\_a.htm](http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm).

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