

DRAFT 2/6/23

**ULSTER COUNTY REUSE INNOVATION CENTER
INVENTORY OF DIVERSION/ REUSE PROGRAM POSSIBILITIES**

Introduction

Sustainable Hudson Valley's team conducted a literature review and several interviews in order to identify the widest possible range of program possibilities for materials diversion and reuse-based industries. We considered a subset of the materials in the initial waste characterization, focusing on those with the greatest likelihood of contributing to the County's goals of landfill diversion, climate benefits, and economic viability of a business ecosystem at the Reuse Innovation Center.

We also applied ReUse Consulting's many years of experience with partners and reuse programs in many locations to filter through the lens of experience what is most achievable and what will bring the most benefit in terms of waste diversion, as well as provide opportunities for local businesses. We have kept in mind that the goal of the proposed ReUse Innovation Center is not to duplicate, but to supplement and assist with current waste diversion programs and partner with existing organizations in this field.

Summary of diversion/ reuse opportunities - identify basic types.

Materials type	Repair/ resale of products and components	Recycling based manufacturing	"Craft" repurposing/ upcycling/reuse	Processing (compost, digestion, pyrolysis)
Plastics		<p>x melt and reform; already separating; sending off to recyclers. The % not being used, RIC could consult on educational efforts and business waste evaluations to help increase %. Others can create recycled containers, blended with new plastic, for ex.</p> <p>in shop they had used PVC pipe, connected with couplers, made cold frames, covered with plastic sheeting, rigid frame to put over plant starts. Bigger pipe - soccer goals for ex. Little sheds from wall panels, included vinyl siding. One experiment. We don't want to make Trex, but an example - Caveat: When you combine plywood and plastic, you can no longer separate for recycling.</p>	<p>x Ex, someone that made blocks for building.</p> <p>Also, Suprina Troche, puts plastic in wood chipper and creates mosaic art. Theoretically, we could create our own product out of recycled plastic - several steps down the road.</p> <p>Can sell siding, pipe, plexiglass as are. Wide variety of plastic materials resellable as is. storage bins. etc.</p>	

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		<p>Can melt plastic without oxy, make like giant legos. May create off-gassing, might be technical problems. Might be popular if could keep cost down. Could warp.</p>		
Paper		<p>x already happening every day; no aspirations for us to duplicate this function, but theoretically could produce a product of some kind. RIC could conduct Education and business waste eval to increase reuse. There are a lot of recycled paper content items; these are massive paper manufacturers that do this. Large scale paper mills. Source massive amounts and make non-recyclables also. This is a large scale company type effort, not a small-scale business. Creatives might make paper, have a class on it. Diversion so low that not a significant source.</p>	<p>x didn't see “creative reuse” store in UC. Teachers would re-use (not recycled). Paper could be used in this way.</p> <p>2000 lbs of paper saved for reuse as is while doing the closed school project. Knows people with a little shop for teachers who come and get stuff. Home schoolers, craft people. Not just paper but a lot of paper. Also have crafting stuff, yarn, fabrics, etc. All material donated. Send him for name, he will fill in.</p>	

Materials type	Repair/ resale of products and components	Recycling based manufacturing	"Craft" repurposing/ upcycling/reuse	Processing (compost, digestion, pyrolysis)
Metals	<p>x RIC goal - to have welding capacity on site. Repair and resell.</p> <p>Specific ex of biz? Reuse Center Bellingham has welding capabilities. Weld to repair. Ex, teacher's stools and desks had some damage, welding legs to strengthen.</p>	<p>x now metal recycled by West Kingston Recycling, shipped, melted down, made into new products. Send off to other places like copper mill for remanufacture. Don't make products, just supply. Very common. RIC efforts would involve business waste evaluations and other diversion programs. From tipping floor, 10s of 1000s a week could be saved. Doesn't get contaminated that easily.</p>	<p>x Ex remanufacturing, creating reused wood and metal tables or other furniture at RIC. Could make it its own business. In Portland, Metalwood Salvage. They salvage metal from various projects and make furniture. Also wood and combine.</p>	
Glass	<p>Windshield repairs with resin to seal crack. Keeps windshield in use. Windshields are non-recyclable.</p>	<p>X e.g. pozzolan for low C concrete; glass tiles from melted and reformed glass, many others. Pozzotive Westchester CO is marketing wider and wider</p> <p>Bedrock, a client, grind up glass, heat, melt and made tiles.</p>	<p>x Currently sell a lot of products made of glass. Windows, glass blocks, jars, glasses, etc. As is. Sometimes can combine with reclaimed wood, for ex frosted glass, for some nice products.</p> <p>RIC Bellingham, save windows as such, glass sheets for photos or painting protectors etc. Glassware resold. Glasses, vases, etc.</p>	

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		Artists take wine bottles and cut off tops and make drinking glasses. Maybe sell at art fairs.		
Food scraps/ yard waste				composting pyrolysis to biochar anaerobic digestion. Wood is a part of this process, generated by decon, wood business in RIC could feed scrap wood for composting process to composting business. If we were able to grind, we could sell directly to composting biz. Vs. having to pay to get rid of wood recycling. UC already doing composting.
Clean wood	x Now has repair station in RIC for wood, which is a common repair/resale scenario.	x prob w recycling wood, it's ground up and sent to lumber mill and burn it to dry new wood. Vs. composting example above. Trex. Building blocks from plastic and wood for outdoor use for ex. Caveat: how long would this take to break down? In his area, Lottenbach accepts wood, grinds it up and ships to lumber mills to burn for fuel. Alternative to fossil fuels, could have burned oil	x Biggest thing as industry is to gather and resell wood. Reclaimed wood furniture, remilling operations and make flooring, stair treads, etc. Many ex. Huge part of what we do and also huge part of landfill. Bellingham, biggest product is wood.	x see above

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		<p>or gas. Not greatest example. There are similar ex in UC. Taylor is mulching, adding colored dye to use in flower beds and things. Not best ex's, but similar to paper, just different levels. Paper takes more processing than wood.</p>		
Textiles	<p>x has group that fixes textiles; new clothing is very cheap though. Craft fair a couple weeks ago, person who does mending. Ex tear wedding dress, they fix. Get name of co or person. Small biz.</p>	<p>x there is a type of insulation made of denim. Probably not something RIC could do on site.</p> <p>Ithaca Reuse, big operation, dozens of workers, run a reuse store which sells a lot of clothing, books, household stuff. They get so many donations from anti-waste Ithacans. Good ones in store; stained or bad shape, put in large galer (sp?) boxes, send to a co. that buys to make rags. Machines to recycle are very expensive, so done on large scale, high exp. up front for mattresses as well as sanitary considerations.</p>	<p>x Upcycled clothing from scraps. Get company names. The Skirt Sisters, microbusiness, take used clothing and resew into skirts.</p>	

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		<p>Would need a lot of mattresses, not a 1K; more than UC generates acc to his research. You would have to collect them in an economically viable way. In garbage truck, so contaminated that no longer recyclable. Someone must also want output.</p>		
Furniture	x ex. refinishing before sale.	<p>couches - see Other, mattresses - theoretically?? might not be profitable. Doesn't know of real world examples.</p>	<p>x At RIC, they sell as is now. But could recover couch with new fabric. Reupholster. Custom Touch upholstery?</p>	
White goods/ appliances	<p>x have appliance repair person in Dave's county, send him a lot of washers/dryers and sells. Steve Mudd Appliance Repair. Small time. Is going to start selling in RIC showroom. Could have used appliance store.</p>	<p>x metal is recycled, we would not grind up etc. We could break for parts. We could collect metal in our recycling center and make sure it gets to recyclers. West Kingston probably recycles appliances. Compresses (crunches) to melt down.</p>	<p>x If it works, resell it as is. Big part of reuse industry. Common. Habitat.</p>	
Vehicles	x Bellingham has an auto repair place	<p>x specialists in vehicle recycling. They get paid by scrapyards. Kars for Kids.</p>	used vehicle sales.	ICE to EV conversion (though this has nothing to do w/tfr station or

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				<div> <p>diversion of waste stream for UC per se) It has to do with diverting a massive unrecognized stream of heavy, high embodied carbon material into a new use and that is spot on in the "innovation" part of what we are doing.</p> </div>
<div> <p>C & D debris* in addition to above categories, bricks, plastic, tyvek building paper, etc</p> </div>	<div> <p>x ex, clawfoot tubs; they refinish. Plastic pipes, cut off bad end for ex. and use. Bellingham. Taylor, sells all those things, everything you'd find at a Home Depot but mashed up and destroyed. Somewhat redundant. Chicago Brick specializes in used bricks. Process bricks at job site - cleaning mortar off and stacking on a pallet. Or you can do and they'll pay you.</p> </div>	<div> <p>x concrete, bricks, cardboard, sheet rock, all get recycled into new products. RIC role has been to sort so it can be recycled, rather than manufacturing. Ex, concrete recycling facility will receive it and use for roads. Transfer sta. already grinding up and reusing. There are specific C&D recycling facilities. Taylor in UC.</p> </div> <div> <p>Chicago Brick - runs brick through saw, cut in 4 thin layer to make brick facade, inch thick or .75. Glue to wall</p> </div>	<div> <p>x in addition to above glass, wood etc - sheet rock, pipes, unused rolls of building paper, etc are resold. Just some examples. Sometimes added to upcycled products. Build sheds out of reclaimed materials.</p> </div>	<div> <p>x The wood component.</p> </div>

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		so not reusable again. Cobblestones, pavers.		
<i>Scrap metal</i>		x	x	
Electronics	x fix computer with parts for ex. Find example. When he ran his np reuse store, had electronics program. UC collects, doesn't do with; where do they send?	x previously, disassembled parts and stored to use for repairs or sold parts to people building own computers at home. 75% of electronics were sent to a co. specializing in electronics recycling. Who in turn would sometimes send to Asia. Refurbish cell phones when trade in.	sold working used electronics as is.	
Other - mattresses, tires		mattresses break down and wood metal and textiles out, reclaim metal, recycle wood, recycle textiles into for ex absorbent pads used for oil spills & etc. (Used to make playgrounds from tires, but too much metal in them now.) Most ppl take tires to tire stores & send to recycler for you. Shoe soles?	company in Dave's county sold used tires for vehicles when in decent shape.	
Plants, trees			Resell plants, trees, landscaping recovered from properties. Bellingham has been successful.	

Examples of diversion programs/ projects by materials type

Project/Program/ materials	Cost to start [low mod high] L-M-H	General profitability \$-\$-\$-\$ [can this be done with reasonable profit margins]	Specialized facility needs (directly related to cost to start)	Specialized equipment needs	Are methods well established no - somewhat - yes	Other factors associated with success, risk, opportunity
<p>Plastics - in RIC shop they used PVC pipe, connected with couplers, made cold frames, covered with plastic sheeting, rigid frame to put over plant starts. Bigger pipe - soccer goals for ex. Little sheds from wall panels, included vinyl siding. One experiment. We don't want to make Trex, but it's an</p>	<p>Low</p>	<p>Low \$. made a few, couldn't live off it unless you could grow biz substantially and had demand, increasing cost. Did when slow using donated items.</p>	<p>No. Can do in the garage.</p>	<p>Basic tools</p>	<p>Yes, simple. A HS student could do cold frames, 20 in a day.</p>	

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<p>example - Caveat: When you combine plywood and plastic, you can no longer separate for recycling. Can melt plastic without oxy, make pieces like giant legos.</p>	Med	Low-Med	Maybe	Yes	No	<p>May create off-gassing, might be technical problems. Might be popular if could keep cost down. Could warp. Experimental.</p>
<p>“Used Materials Home Depot” - Sell used materials as i, for example, siding, pipe, plexiglass. Wide variety of plastic materials resellable as is. storage bins. etc.</p>	Med \$\$	<p>Med \$\$ done full time, not getting rich but doing ok.</p>	<p>20K sq ft or larger. it takes a lot of infrastructure to sell all sorts of things, because one thing would be low demand.</p>		Yes	<p>You need to find the supply and the demand, so harder than running a Home Depot.</p>

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<p>Cost to start [low mod high] L-M-H M because Like starting used Home Depot. General profitability \$-\$\$-\$\$\$ Med, \$\$. doing out of garage.</p>						
<p>Paper recycling - already happening every day; no aspirations for us to duplicate this function, but theoretically could produce a product of some kind. RIC could conduct Education and business waste eval</p>	<p>Paper Mill, Very High (millions)</p>	<p>High</p>	<p>Yes</p>	<p>very expensive specialized equipment</p>	<p>Yes</p>	<p>finding the demand</p>

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<p>to increase reuse. There are a lot of recycled paper content items; these are massive paper manufacturers that do this. Large scale paper mills. Source massive amounts and make non-recyclables also. This is a large scale company type effort, not a small-scale business.</p> <p>Another option: Creatives might make paper, have a class on it. Diversion so low that not a significant source.</p>						

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<p>Paper - reuse</p> <p>“creative reuse” store. Teachers, home schoolers, crafts people would re-use paper (not recycled). 2000 lbs of paper saved for reuse as is while doing the closed school project. Dave knows people with a little shop</p> <p>Business model includes paper but to be viable cannot only be paper. In this example, they also have crafting stuff, yarn, fabrics, etc. All material</p>	<p>Med to start up</p>	<p>Low to Medium; usu involves vols trying to help teachers [can this be done with reasonable profit margins]</p>	<p>3-4K sq ft</p>	<p>No</p>	<p>Yes</p>	<p>competition from dollar stores</p>

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donated. Business Name?						
Metals - RIC goal - to have welding capacity on site. Repair and resell. Bellingham has welding capabilities. Ex, teacher's stools and desks had some damage, welding legs to strengthen.	Med	\$\$ Med	Yes	Some specialized equipment	Yes	opportunity depends on existing demand. Willingness to fix things on site, ex farm equipment
Wood - remanufacturing, creating reused wood and metal tables or other furniture at RIC. Could make it its own business. In Portland,	Med	Med \$\$	Medium space	some, med. cost	Yes	

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<p>Metalwood Salvage. They salvage metal from various projects and make furniture. Also wood and combine. Also, in Brooklyn: https://www.redustudios.com/</p>						
<p>metal recycling - very common. At West Kingston Recycling it's shipped, melted down, sent off to other places like copper mills for remanufacture. *(Specifically, RIC efforts would more likely involve business waste evaluations and other diversion</p>	High	High \$\$\$	A lot of space, acres	A lot of specialized equipment	Yes	

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programs. From tipping floor, 10s of 1000s a week could be saved. Doesn't get contaminated that easily.)						
Glass - making tiles from glass (Bedrock is a company example.)	Med	Med, they charge a lot	Yes, need medium space	Yes, Crushers, forklifts, furnaces, rollers etc.	Yes; truly an art form, but glassmaking is not new.	
glass - Make pozzolan for low C concrete Talk with Pozzotive in Westchester Co						
Artisan upcycling: example, artists cut off tops of wine bottles and make drinking glasses. Small business, maybe art fairs.	Low	Low		right tools, not too much	Yes	

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<p>Glass - resale. RIC Bellingham, save windows as such, glass sheets for photos or painting protectors etc. Glassware resold. Glasses, vases, etc. Similar to building materials store. Currently sell a lot of products made of glass. Windows, glass blocks, jars, glasses, etc. As is. Sometimes can combine with reclaimed wood, for ex frosted glass, for some nice products.</p>	Med	Medium at best.	<p>Med size space, could be a thrift store with lots of other stuff or could be window glass, with cabinets etc. Not sold by itself</p>	Just shelves	Yes	
<p>Food scraps/ yard waste - not really a model for RIC and already being done</p>						

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at UCRRA. Theoretically however, RIC could feed scrap wood for composting process to composting business. If we were able to grind, we could sell directly to composting biz. Vs. having to pay to get rid of wood recycling.						
Clean wood - repair station at RIC, a very common repair/resale scenario	Med - because combined with other functions, not just wood repair, to be a viable business model.	Med \$\$	Yes	woodworking equipment, med. cost	Yes	
Wood recycling - environmentally problematic; it's	High	High \$\$\$	Yes	Yes	Yes	

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ground up and sent to lumber mill and burn it to dry new wood. (Ex: Lottenbach(sp?) near Dave's home and examples in UC. Alternatively, if combined with plastic (ex, Trex), how long would it take to break down?						
Taylor in Montgomery is mulching, adding colored dye to use in flower beds and things.						
Wood product resale - Biggest thing as industry is to gather and resell wood. Reclaimed	Med	Med \$\$	Space	Shelves	Yes	

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wood furniture, remilling operations and make flooring, stair treads, etc. Many ex. Huge part of what we do and also huge part of landfill. Bellingham, biggest product is wood.						
Textiles - repair Business name? group that fixes textiles; Mending at Craft fair recently, ex, tear wedding dress, they fix. Small business.	Low					new clothing is very cheap though.
there is a type of insulation made of denim, but probably not something RIC could do on site.						

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Would have to be large scale & require expensive equipment.						
textile recycling/ mattresses - ex, Ithaca Reuse (as part of an overall reuse store, not by itself). Dozens of workers.	High					Ithaca Reuse gets a lot of donations from Ithacans. Here??? Mattresses: sanitary considerations. When they receive textiles stained or in bad shape, put in large gaylord boxes, send to a co. that buys to make rags. Machines to recycle are very expensive, so done on large scale, high exp. up front for mattresses as well as sanitary considerations. Would need a lot

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						of mattresses, not a 1K; more than UC generates acc to his research. You would have to collect them in an economically viable way. When put in a garbage truck, they're so contaminated that no longer recyclable. Someone must also want output.
https://fb.watch/id7jSbRipi/						
Upcycled clothing - The Skirt Sisters, microbusiness. Take used clothing and resew into skirts.	Low	Low \$	No	sewing machine	Yes	would likely need to create demand

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Furniture - Refinish or	Refinishing, Med; Reupholstering, maybe Low	Refinishing, Med; Reupholstering, maybe Med	Yes	Yes. Exhaust booths, painting, sanding...	Yes	
Reupholster. Ex, Custom Touch Upholstery, Hyde Park, NY.	Low?	Low to Medium	No	some	Yes	
White goods/ appliances - repair/used appliance store Steve Mudd Appliance Repair. Small time. Does a lot of washers & dryers. Is going to start selling in RIC showroom. Could have a used appliance store.	Low	Low? Med?	Enough space depending on scale	tools, expertise	Yes	
Appliance metal recycling - metal is recycled, RIC would not grind up etc.						

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<p>We could break down for parts. We could collect metal in our recycling center and make sure it gets to recyclers. West Kingston probably recycles appliances. Compresses (crunches) to melt down.</p>						
<p>x If it works, resell it as is. Big part of reuse industry. Common. Ex., Habitat.</p>						
<p>Vehicles - auto repair - Bellingham</p>				<p>ICE to EV conversion (though this has nothing to do w/tfr station or diversion of waste stream for UC per se)</p>		

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				That is because traded in cars are not yet seen as an recyclable item - this is changing.		
Vehicle recycling (Kars for Kids) People are paid by scrapyard for what they deliver.						
Used vehicle sales - common business model	Med	Med \$\$	Need enough space	repair equipment	Yes	
ICE to EV conversion (though this has nothing to do w/tfr station or diversion of waste stream for UC per se)						
C & D debris* in addition to above categories, bricks, plastic, tyvek building paper, sheet rock, etc - Repair/resale				x The wood component.		

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<p>Miscellaneous category but same as the “used materials ‘Home Depot’” example, plus others: ex, clawfoot tubs; they refinish. Plastic pipes, cut off bad end for ex. and use. Bellingham. Taylor, sells all those things, everything you’d find at a Home Depot but mashed up and destroyed. Somewhat redundant. Chicago Brick specializes in used bricks. Process bricks at job site - cleaning mortar off and</p>						

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stacking on a pallet. Or you can do and they'll pay you.						
C&D Miscellaneous, recycling: concrete, bricks, cardboard, sheet rock, all get recycled into new products. RIC role has been to sort so it can be recycled, rather than manufacturing. Ex, concrete recycling facility will receive it and use for roads. Transfer sta. already grinding up and reusing. There are specific C&D recycling facilities. Taylor in Orange Co	Sheet rock example: High	High	need space, probably a couple dozen employees	Yes Specialized equipment needs maybe 200K, conveyor belt system, grinder, etc.	Yes, though not a ton of ppl doing	You need to collect it someplace. in BC, banned from landfill. Construction cos. must keep separate.

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<p>just over the border.</p> <p>Chicago Brick - runs brick through saw, cut in 4 thin layer to make brick facade, inch thick or .75. Glue to wall so not reusable again.</p> <p>Cobblestones, pavers. Process bricks at job site - cleaning mortar off and stacking on a pallet. Or you can do and they'll pay you. Many businesses would combine stuff.</p> <p>Some people ONLY take used sheet</p>						

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rock or scraps from new construction, grind up and form into new sheets. Sheet rock example:						
<i>Scrap metal - see large appliances</i>						
Electronics - repair- fix computers with parts, or cell phones. <i>*UC collects; where do they send?</i>	probably low, but specialized software needs unknown cost	Med	Not too much space needed	yes, software, hardware	Yes	
Electronics Recycling: previously, Dave's org disassembled parts and stored to use for repairs or						

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<p>sold parts to people building own computers at home. 75% of electronics were sent to a co. specializing in electronics recycling. Who in turn would sometimes send to Asia. Refurbish cell phones when trade in.</p>						
<p>Resale of working electronics - Established and has been done at RIC.</p>	Low	Med \$\$	not too much space	Low	Yes	Might get for free from people who want to get rid of it.
<p>Other - mattresses, tires - remanufacture</p>						

Project/Program/ materials	Cost to start [low mod high] L-M-H	General profitability \$-\$-\$-\$ [can this be done with reasonable profit margins]	Specialized facility needs (directly related to cost to start)	Specialized equipment needs	Are methods well established no - somewhat - yes	Other factors associated with success, risk, opportunity
<p>mattresses: theoretically, break down, get wood metal and textiles out, reclaim metal, recycle wood, recycle textiles into for ex absorbent pads used for oil spills & etc. (Used to make playgrounds from tires, but too much metal in them now.) Most ppl take tires to tire stores & send to recycler for you. Shoe soles?</p> <p>Used tires recycle example:</p>						

Project/Program/ materials	Cost to start [low mod high] L-M-H	General profitability \$-\$-\$-\$ [can this be done with reasonable profit margins]	Specialized facility needs (directly related to cost to start)	Specialized equipment needs	Are methods well established no - somewhat - yes	Other factors associated with success, risk, opportunity
Used tires, resale - can be resold when in decent shape.						have enough inventory, everyone who comes in will want something different

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